State of Oregon
Department of
Environmental
Quality

SOUTHERN WILLAMETTE VALLEY GROUNDWATER ASSESSMENT 2000-2001 NITRATE STUDY

Final Report

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1.0 INTRODUCTION

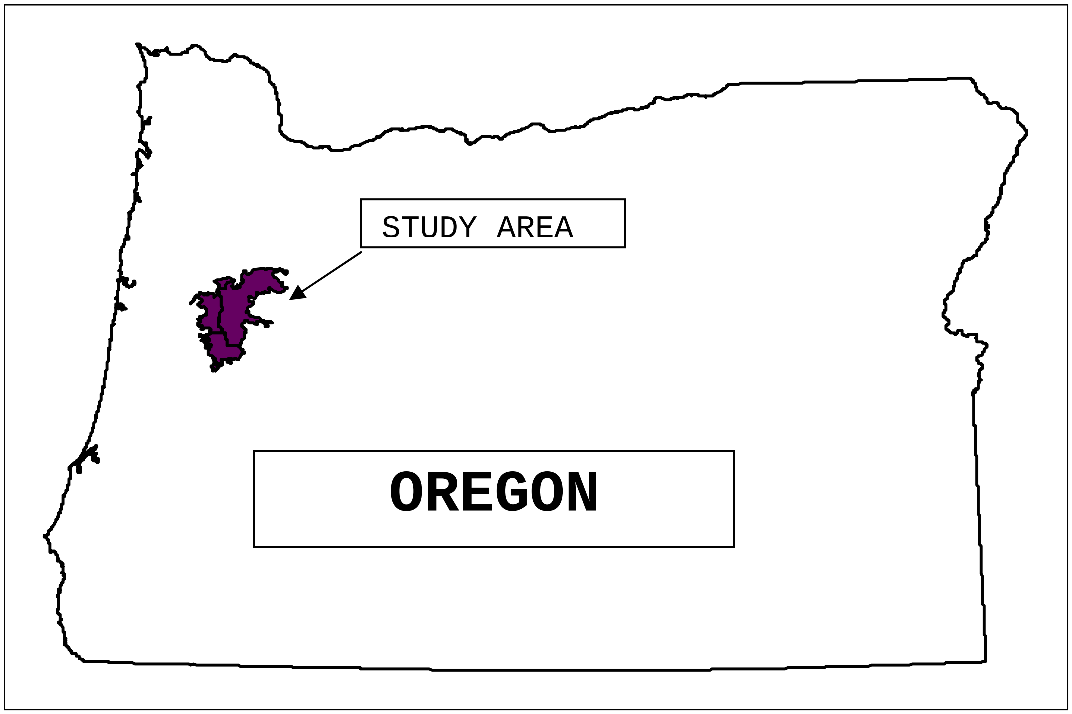
This report describes the work undertaken by the Department of Environmental Quality (DEQ) Groundwater Protection Program between Fall 2000 and Summer 2001 to study the current magnitude and extent of nitrate pollution of shallow groundwater in the Southern Willamette Valley. The Southern Willamette Valley is considered by DEQ to be a priority area for groundwater assessment and protection for three primary reasons: 1) severity and extent of nonpoint source groundwater contamination documented in past studies; 2) vulnerability of shallow groundwater to adverse impacts from population growth in the Willamette Valley; and 3) need for integration of groundwater quality protection strategies with other ongoing high-priority water quality improvement efforts in the Willamette Valley (i.e., Total Maximum Daily Loads [TMDLs]). DEQ will use the results of this evaluation to consider groundwater protection strategies, including the assessment of designating a Groundwater Management Area(s) or Area(s) of Groundwater Concern in the Valley, consistent with Sections 468B.175 and 468B.180 of the Groundwater Quality Protection Act.

The Groundwater Quality Protection Act is a critical component in Oregon's overall water quality protection and management strategy. The goal of DEQ's Groundwater Program is to ensure that Oregon's groundwater is protected as a resource for all present and future beneficial uses. The protection strategy begins with monitoring and assessment to identify groundwater quality problems. Where nonpoint sources of groundwater contamination are identified, groundwater management committees comprised of local stakeholders may be formed to develop groundwater management plans, in collaboration with state government agencies. Public education, research and demonstration projects are established to increase public awareness. These plans include development and implementation of best management practices to address groundwater contamination and protection.

DEQ has performed 45 regional groundwater studies in Oregon since the mid-1980s. Some evidence of 'non-point' groundwater contamination has been detected in 35 of the 45 areas studied. Non-point refers to the potential that the contamination is coming from an area, rather than from the end of a pipe, such as the discharge from a waste water treatment system. The most common contaminant found in these studies was nitrate, followed by pesticides, volatile organic compounds, and bacteria. Some of these areas, including the Southern Willamette Valley, have a high percentage of wells exceeding the drinking water standard for nitrates. In some cases pollutants occur in private water supply wells at concentrations exceeding safe exposure levels, thus posing threats to public health.

Groundwater from private and public wells is the principal source of drinking and irrigation water supply for a large number of residents in the Southern Willamette Valley. Portions of this area are already very populated, and this area is forecasted to be one of the fastest growing parts of the state. Demands for abundant, high quality

FIGURE 1: LOCATION OF THE STUDY AREA IN OREGON .



groundwater will rise with the increases in population. Left unchecked, nonpoint sources of groundwater contamination will increasingly compromise this water supply. When groundwater is contaminated from non-point sources at levels that exceed standards detailed in the Groundwater Quality Protection Act, DEQ is authorized to declare a "Groundwater Management Area." Once such a declaration is made, responsible agencies and the local communities will work together to develop an Action Plan with a focus on restoring groundwater quality. Through the development of an Action Plan, State government can play a key role in helping local governments, residents, and other stakeholders increase their awareness of groundwater quality concerns and mobilize them to take actions leading to groundwater protection and restoration of the water quality of this valuable resource.

2.0 PURPOSE AND SCOPE OF THE 2000-2001 STUDY

The purpose of this study was to confirm and supplement data collected in the past by DEQ and other agencies characterizing the occurrence of nitrate in shallow groundwater in the alluvial aquifers of the Southern Willamette Valley. Shallow groundwater (less than 75 feet below ground surface) in alluvium was targeted for sampling in this study because water-supply data (Hinkle, 1997) indicate that more than 80% of the groundwater used in the Willamette Valley is pumped from the alluvium. Shallow groundwater in the uppermost aquifer is assumed to be the groundwater resource most likely affected by anthropogenic activities.

DEQ's 2000-2001 study was limited to evaluating nitrate as a groundwater contaminant for three reasons: 1) nitrate sample collection and analysis is economical and could be completed in a timely fashion; 2) a considerable amount of nitrate data was already available from past studies, for use as a baseline for planning sampling targets; and 3) nitrate is a useful indicator of groundwater vulnerability, including the likelihood indicating a potential for of impacts from other contaminants like pesticides.

Nitrate in groundwater may originate from a number of point and non-point sources, including fertilizer, manure, septic systems, natural soil nitrogen, atmospheric deposition, land disposal of municipal waste, and fixation of atmospheric nitrogen. Nitrate concentrations exceeding 2-3 mg/L generally indicate anthropogenic contributions of nitrate (Madison and Brunett, 1985). In the Southern Willamette Valley where nitrate concentrations are commonly reported to be less than 1 mg/L, it is likely that "background" (non-anthropogenic) concentrations of nitrate approach the method detection limit of 0.05 ppm.

The health-based federal drinking water standard (MCL) for nitrate in drinking water is 10 mg/L. Consistent with the Safe Drinking Water Act, this regulatory standard applies exclusively to public drinking water systems and not to private water supplies. The epidemiological basis for the 10 mg/L drinking water standard is controversial, and recent studies have indicated there may be adverse human health effects at levels less than the 10 mg/L standard.

The results of this groundwater assessment may lead to an expanded investigation by DEQ for other contaminants (e.g., pesticides, volatile organic compounds, and/or arsenic) which are of interest both in terms of their potential impact on drinking water quality and degradation of surface water upon discharge of polluted groundwater to wetlands, lakes, streams, and rivers.

2.1 Objective

The primary objective of this study was to determine the magnitude and extent of nitrate contamination in the shallow alluvial aquifer from nonpoint sources in the Southern Willamette Valley. An important secondary objective was to perform outreach to local stakeholders (i.e., rural residents, farmers, and local government officials) about groundwater quality and protection from nonpoint sources in the Valley.

2.2 Project Organization and Responsibilities

This groundwater assessment was undertaken as a DEQ Water Quality Program initiative, in consultation with Oregon Health Division, Oregon Water Resources Division, Oregon State University Extension Service, Oregon Department of Agriculture, and the United States Geological Survey. DEQ staff responsible for undertaking this groundwater assessment are identified below in Table 1:

Table 1

2000-2001 Project Roles and Responsibilities

Role	Name and Location	Responsibilities	Contact Phone Number
Project Coordinator	Kerri Nelson, Eugene	Ensured coordination and consistency of project with other Water Quality Program and Western Region initiatives	541.686.7838 ext. 226
Project Advisor & Laboratory Coordinator	Greg Pettit, Eugene	Advised project team on: project scope; data collection methods, analysis, and interpretation; GW Protection Act interpretation. Coordinated project field work with Laboratory priorities and workload.	541.686.7838 ext. 253
Project Manager	Greg Aitken, Eugene	Developed, coordinated, and managed project implementation, including technical and public participation components	541.686.7838 ext. 252
Project Scientist	Jack Arendt, Salem	Coordinated collection and interpretation of project technical data	503.378.8240 ext. 240
Field Sampling Management	Rich Myzak, Portland	Implemented sampling plan and coordinated field operations with DEQ Laboratory Division	503.229.5983 ext.270
Field Sampling	Michael Tichenor, Portland	Collected field samples and performed public outreach	503.229.5983 ext.315
Laboratory Data Quality Assurance	Raeann Haynes, Portland	Coordinated Laboratory quality assurance and control activities, including management of laboratory analytical data (i.e., LASAR)	503.229.5983 ext.227
Sample Tracker	Bob McCoy	Tracked samples and data through the Laboratory	503.229.5983 ext.238
Communications & Outreach	Jennifer Boudin, Eugene	Coordinated media communications and assisted with public outreach	541.686.7838 ext. 235
Address/Mailing List Coordinator	Kathy Jacobsen, Eugene	Maintained project mailing lists, coordinated distribution of written communications to stakeholders	541.686.7838 ext. 0
Data Management – Laboratory	Won Kim, Portland	Maintained LASAR database for project analytical data	503.229.5360
Data Management – Western Region	Mary Camarata, Eugene	Developed and maintained databases for project data, coordinated with Laboratory data manager	541.686.7838 ext. 259
Data Management – Western Region	Mindy English Eugene	Data entry and maintenance of databases for project data, field sampling	541.686.7838 ext. 269

2.3 Location and Extent of Study Area

The area of this investigation encompasses the lowlands in the southern portion of the Willamette Valley, extending from Eugene to Albany in Lane, Linn, and Benton Counties (see Figure 2). Areas inside the urban growth boundaries of Eugene, Corvallis, Albany, and Lebanon are excluded because of this study's emphasis on groundwater quality issues affecting non-regulated rural water supplies. The boundary of the study area approximately coincides with the limits of shallow alluvium aquifer within the Southern Willamette Valley, known to include a shallow sensitive aquifer. It is bounded on the east by the Cascade Range, to the west by the Oregon Coast Range, to the north by the Salem Hills, and to the South by the city of Eugene's urban growth boundary. The study area encompasses approximately 780 square miles.

FIGURE 2

Southern Willamette Valley Study area

2.4 Land Uses

Land uses in the study area are predominantly agricultural (see Figure 3), including a diversity of crops (field crops, such as grains, hay, mint and hops; seed crops such as grass and vegetable seeds; and vegetable fruit, nut, and nursery crops) and pasture. Many of these crops are irrigated. Commercial livestock production occurs in the study area, including 33 confined animal feeding operations (CAFOs) permitted by the Oregon Department of Agriculture (Figure 4). Non-agricultural uses include rural residential, commercial, industrial, and natural habitat enhancement.

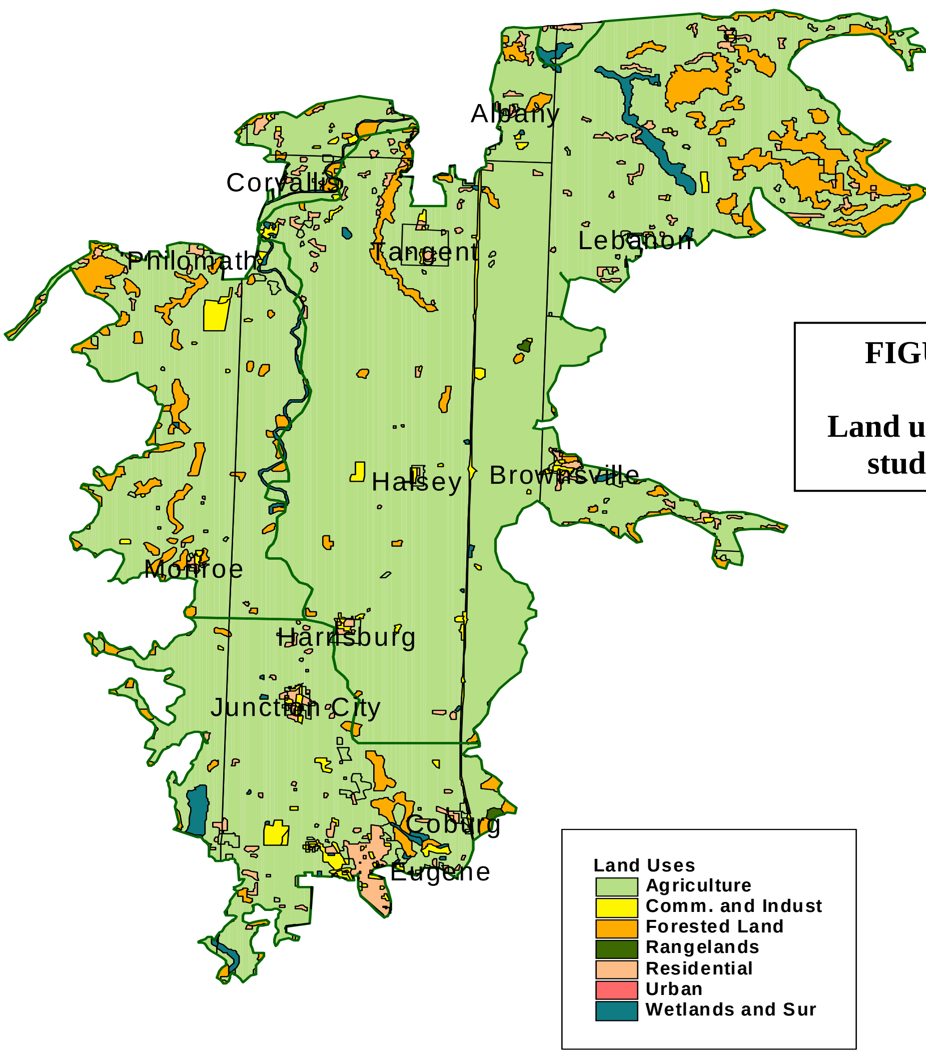


FIGURE 3

Land uses of the study area

2.5 Groundwater Resources

Based on information available in databases maintained by the Water Resources Division and Oregon Health Division (OHD), groundwater within the study area has multiple beneficial uses, including public and private water supply. Groundwater is also used extensively for irrigation. Other beneficial uses include recharge of surface water bodies that include rivers and wetlands.

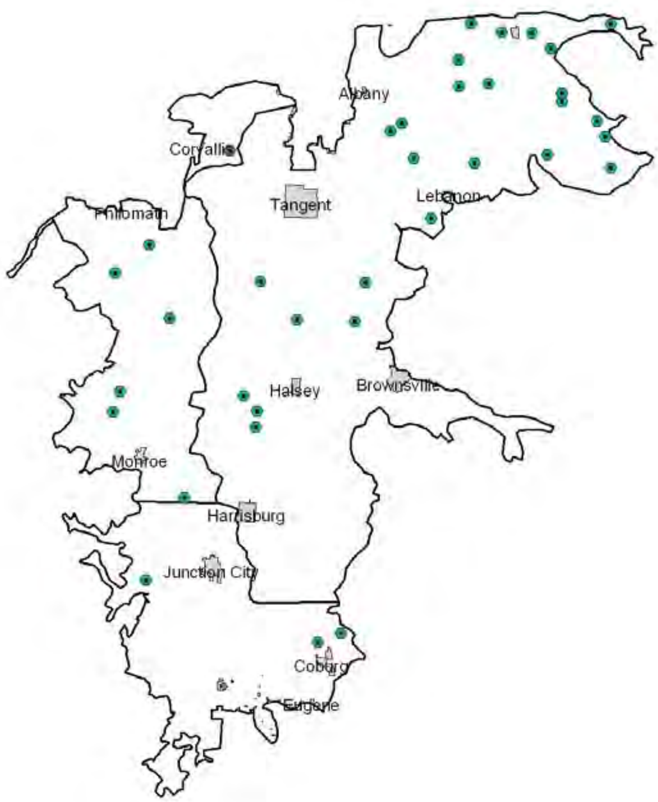


FIGURE 4

Locations of confined animal feeding operations

3.0 GEOLOGY AND HYDROGEOLOGY

The Willamette Valley is a broad, north-south trending alluvial plain in northwestern Oregon. The valley is flanked on the west by early Tertiary marine sedimentary and volcanic rocks of the Coast Range and on the east by Tertiary and Quaternary volcanic and volcaniclastic rocks of the Cascade Range. The Willamette Valley is an extensive lowland, typically 10 to 15 miles wide. The valley is sub-divided into four separate structural basins by local bedrock uplands. From north to south, the Portland Basin (Oregon and Washington), Tualatin Basin, central Willamette Valley, and southern Willamette Valley, each have decidedly different hydrologic properties. The valley lowlands are constricted midway between Portland and Eugene by the Salem-Eola Ridge, a northwest-southeast, cross-valley trending upland. The Southern Willamette Valley Groundwater Study Area, located south of the Salem-Eola Ridge, encompasses approximately 780 square miles.

The extent and thickness of major Quaternary age deposits control a majority of the regional groundwater systems within the Willamette River Basin.

3.1 Geology

Based on previous work conducted by state and federal agencies (Gamnett and Caldwell, 1998; Orzol et al, 2000), the Willamette Valley has been a topographic low for at least 15 million years. Subsequent uplift of the Coast Range and Cascade Range has further defined the basin along the north-south axis of a regional down-warp or trough. The sustained subsidence over time has resulted in the consistent filling of the lowlands from Cascade and Coast Range sources.

The lowlands and tributary valleys of the Willamette Valley are underlain by Quaternary-age, fluvial derived materials that were deposited during four major sedimentary episodes. These episodes can be subdivided into seven surficial geologic units. By their positions and internal stratigraphy, each of these units record major geologic and environmental events within the Willamette Valley. The character and distribution of these deposits also exert substantial control on current topography, soil characteristics, and groundwater properties.

As the major streams enter the valley lowlands from the surrounding mountains, large alluvial fans of coarse sand and gravel are deposited. These fans are thickest along the eastern margins and thin to broad braided deposits toward the west. Sediment particle sizes grade distally (westward) and with depth to finer-grained sediments. Consequently, within the lowlands, the upper 30 to150 feet of alluvial fill is made up of materials deposited by braided channel systems. The fill is primarily composed of sand and gravel deposited in sub-horizontal sheets, 6 to 30 feet thick. Across the valley, these deposits grade to fans greater than 300 feet thick where the Santiam and McKenzie rivers enter the lowlands. These two fans are partly responsible for the Willamette River's current position along the west side of the valley. The fan deposits can also be traced further upstream as much thinner valley trains of coarse gravel outwash flanking the major Cascade Range tributaries.

The two most recent periods of deposition culminated about 23,000 and 12,000 years ago, respectively. These two units represent long phases of fan deposition that occurred during the late Pleistocene. The young sedimentary units represent the latest phase of the braided stream-alluvial fan depositional system. Mapped exposures only represent the visible part of much thicker sand and gravel deposits. These pulses produced separate mapable units that likely represent episodes of elevated sediment production from the Cascade Range.

Between 15,000 and 12,000 years ago, filling of the Willamette lowlands by sediment from Cascade and Coast Range sources was repeatedly and cataclysmically interrupted by multiple floods from Glacial Lake Missoula. These floods left over 40 beds of sand, silt, and clay known locally as the Willamette Silt. The silts were derived primarily from the upper Columbia Basin. Total thickness in the southern Willamette Basin seldom exceeds 20 feet at lower altitudes near Albany. The silt quickly tapers to a feathered edge at altitudes of 300 to 360 feet above sea level on the margins and higher plains of the basin. South of Harrisburg, the silts are too thin to be mapped as a distinct unit.

About 12,000 years ago, there was a profound change in sediment and flow regimes of the Willamette River and its major tributaries. A transition from braided stream-alluvial fan deposition to modern incised meandering stream system began to occur. The Pleistocene braided river systems that had been forming significant outwash plains of sand and gravel evolved to incised and meandering systems that are developing today's Holocene floodplains. Today’s modern floodplains are typically 2 to 4 miles wide, are covered by cumulic soils with varying amounts of organic matter and ability to drain, and have been historically flooded several times. Underlying the Holocene floodplains, the interbedded sequences of channel facies that form belts of highly permeable sand and gravel are separated by over-bank facies of less permeable fine sand, silt, and clay.

3.2 Hydrogeology

One of the objectives of the Southern Willamette Valley Groundwater Study was to develop a better understanding of the factors that control the fate and transport of contaminants in shallow groundwater environments. Based on data collected during subsequent phases of the investigation, groundwater models of the Willamette Valley can be created to simulate future water quality conditions.

The Quaternary units within the Willamette Basin have unique hydrogeologic properties due to their (1) grain size characteristics, (2) degrees of weathering, compaction, and cementation, and (3) internal faces architecture. Although geologically, each lithologic unit can be distinctly different, hydrogeologic units are based on porosity and permeability and, therefore, can often overlap between lithologic boundaries. As such, there are five major hydrogeologic units that represent the dozen geologic units mapped in the Willamette Valley.

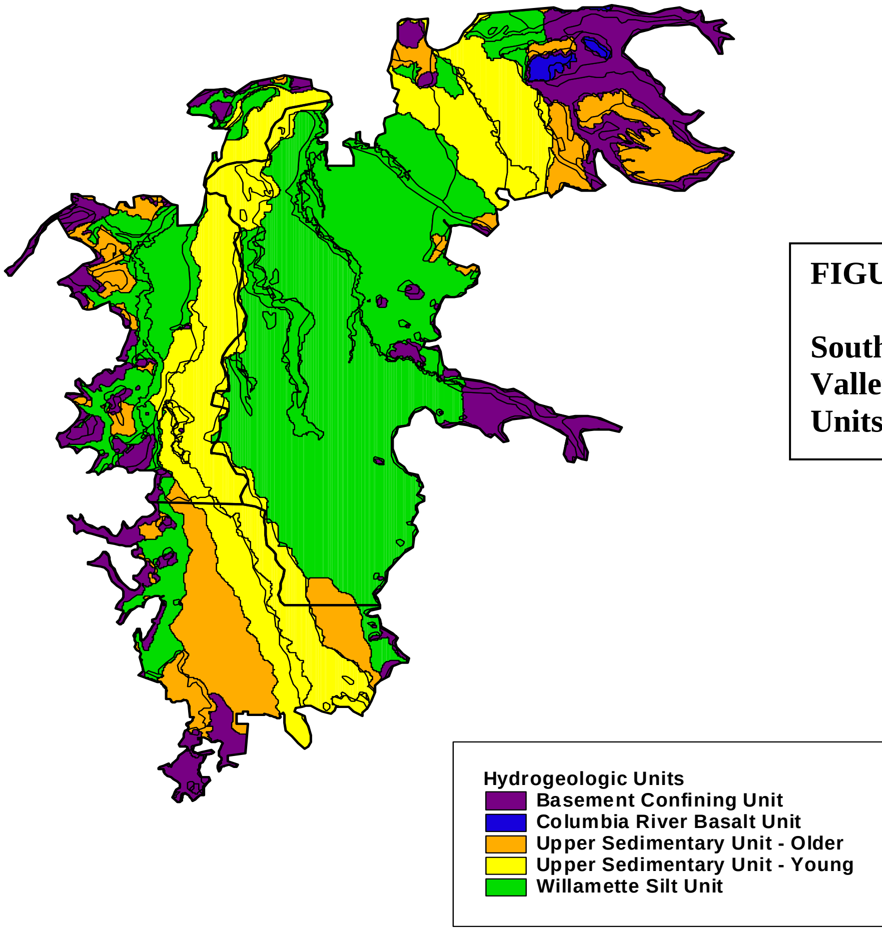


FIGURE 5

Southern Willamette Valley Hydrogeologic Units

Previous work in the Willamette Valley conducted by the US Geological Survey (USGS) and the Water Resources Department (WRD) has defined five regional hydrogeologic units. These regional units are (1) the Basement Confining unit, (2) the Columbia River Basalt unit, (3) the Willamette Confining unit [not shown as it underlies various units and does not surface in the study area], (4) the Willamette Aquifer [depicted as the Older and Younger Upper Sedimentary Unit], and (5) the Willamette Silt unit. In the southern part of the Southern Willamette Valley, the contact between the Basement and Willamette confining units is sometimes difficult to distinguish through well log assessment. As a result, some areas of the basin may not be as deep as initially interpreted. The Columbia River Basalt hydrogeologic unit outcrops as a small window located in the northeast corner of the study area; however, none of the study wells encountered these isolated basalt occurrences.

Based on their similar hydrogeologic properties, Holocene floodplain deposits of the Willamette

River and major tributaries (Figure 5, Younger Upper Sedimentary Units), late Pleistocene sands and gravels (Figure 5, Older Upper Sedimentary Units) that post-date the Missoula flood deposits, and late Tertiary fluvial sands and gravels that underlie terraces flanking the margins of lowlands and tributary valleys are group together as one hydrogeologic unit. This unit, referred to as the Willamette Aquifer, is more permeable and susceptible to contaminant impacts than other basin deposits. The Willamette Aquifer is generally much looser and less cemented than the older, Tertiary marine rocks and Cascade volcanic units in the basin. The Holocene sands and gravels of the modern floodplain are a major source of groundwater and generally have higher yields in the valley than other geologic units. The overall groundwater flow direction of the shallow alluvial aquifers is towards the Willamette River. Groundwater in the close proximity of the Willamette River will tend to flow in the direction of the river drainage.

In the study area, groundwater in the younger, upper part of the Willamette aquifer generally occurs under unconfined conditions. Regionally, groundwater flows to the major streams, indicating that base flow of these streams is sustained by groundwater discharge. The hydraulic gradient of the Willamette aquifer ranges between 2 and 60 feet per mile, depending on the location in the valley. Based on average values of the hydraulic gradient and other hydrogeologic characteristics of the Willamette aquifer, the velocity of water moving through the aquifer ranges between 3 and 30 feet per day which is typical for sand and gravel aquifers.

In areas where the water-table is near the ground surface, a considerable volume of groundwater in the Willamette Basin is removed through evapotranspiration from soil root zones. Based on cross-sectional groundwater flow models, about 15 or 16 inches of evapotranspiration per year is supported by the aquifer system.

An analysis of bank deposits and driller's well logs shows that the meandering winding and anastomosing rivers of the Holocene have left meandering ribbons of well-sorted gravels and sand. These highly permeable sediments are separated horizontally and vertically by fine-grained overbank deposits. Similar to a typical river section of today, the course-grained channel facies in the subsurface can characteristically be 30 to 100 feet wide and three to ten feet thick. Fine-grained overbank deposits of silt and clay typically underlie most of the floodplain. These deposits will often restrict the flow between individual ribbons of coarse-grained, channel facies deposits.

Generally, on a basin-wide scale, the younger Holocene sands and gravels are considered to be a homogenous unit. On a more local floodplain scale, facies variations between and within channel and overbank deposits will likely control groundwater flow patterns. Changes in channel facies can control processes such as solute transport and hyporheic flow, as well as provide avenues for interactions between surface water and groundwater. Locations where subsurface channel facies intersect active river channels are likely to be zones of substantial exchange between ground and surface water.

4.0 BACKGROUND INFORMATION

The overall approach used to collect, assemble, and analyze data for this report is described in this section. First, a description of the sources of historical data is given, followed by a description of the sampling design for 2000-2001 project data. In Section 4 and 5 of this report, approaches used to define the quality of both historical and 2000-2001 project data are discussed, as are the collection and analytical methods used for project data.

4.1 Historical Data

Assessment of historic nitrate data from previous groundwater investigations was the starting point for planning the sampling targets for this study. DEQ reviewed existing nitrate concentration data available from several sources, including various state and federal government programs that have monitored Valley groundwater quality in the past. This data review formed the basis for the project study design, by providing an indication of where nitrate pollution of groundwater has already been documented, and where data gaps exist.

4.1.1 Data Sources

The sources of nitrate concentration data reviewed by DEQ are included in Table 2, including information about their geographic focus, sampling extent, and a generalization about the level of data quality. Brief summaries of sample results from these studies are described in the sections that follow.

4.1.1.1 1985-1987 Oregon DEQ Studies

As part of a statewide assessment of shallow groundwater for contamination from agricultural chemicals (including nitrates), DEQ collaborated with local, state, and federal agencies in the mid 1980s in sampling groundwater from 45 shallow wells in Lane and Linn Counties (DEQ, 1988). The nitrate data from this study are known to have a high level of quality control including strict field sampling techniques by experience professionals and laboratory analysis using EPA-specified protocols and a rigorous Quality Assurance/Quality Control program.

Of the 16 wells tested in the Coburg Area, 9 wells had nitrate concentrations ranging between 3 and 7 mg/L. The remaining Coburg wells had nitrate levels lower than 3 mg/L. Of the 29 wells were sampled for nitrate in the North Albany area, samples from 8 wells had an exceedance of 5 mg/L. None of the samples exceeded the 10 mg/L MCL.

Table 2
Southern Willamette Valley Groundwater Assessments

Organization	Sampling Program	Geographic Focus	# of Sample Points in Southern Willamette	Sampling Period	Quality Control Level[1]
Oregon DEQ	Groundwater Assessments	Statewide	15	1985-1987	High
Oregon DEQ	Groundwater Assessments	Coburg, Junction City, Albany-Lebanon	61	1993-1994	High
Oregon DEQ	Voluntary Nitrate Testing	Statewide	34	1992-1993	Low
Oregon State University Agricultural Extension	Volunteer Nitrate Testing	Junction City and Coburg	271	1997	Low
Oregon Health Division	Real Estate Transaction Testing	Statewide	963	1989-1996[2]	Low
Oregon Health Division	Public Water Supply System Testing	Statewide	144	1979 through present[3]	Low/High
United States Geological Survey	NAQWA	Nationwide	30	1993	High

4.1.1.2 1993-1994 Oregon DEQ Studies

DEQ initiated the Statewide Groundwater Quality Monitoring Program in 1993 (DEQ, 1993b) to assess the impact of nonpoint sources on the quality of Oregon's groundwater resources. Based on known or suspected area-wide contamination and concerns about groundwater vulnerability, DEQ prioritized 32 areas within the state for assessment, including three areas (DEQ 1993c,

1 High quality Control attributed to adherence to strict protocols for field sampling and laboratory analysis by trained regulatory agency personnel; Low quality control designated when protocols for sampling and analysis are not documented, or when colorimetric analytical methods are used.

2 Electronic summaries of OHD's real estate transaction groundwater testing data are not available after 1996.

3 Data reviewed by DEQ do not include sampling events in the year 2000. "Low/High" rating due to the that sampling may not be done by trained personnel, but the analysis does follow EPA protocols.

1994a, and 1994 b) within the Southern Willamette Valley (Coburg, Junction City, and the Albany-Lebanon Plain). Between 1993 and 1994, 61 wells were sampled for nitrate as part of these three assessments. These data are known to have a high level of quality control, including strict well selection, field sampling, and laboratory analysis protocols.

The nitrate data obtained from DEQ's Coburg, Junction City, and Albany-Lebanon groundwater assessments are presented in Figure 6 and Table 3 (end of this Chapter).

- ***1994 Coburg Area Study***

In June 1994, DEQ collected samples from 20 domestic wells in the Coburg area (Figure 6), in which nitrate results ranged up to 15 mg/l. Nitrate concentrations exceeded 3 mg/L in 12 wells, and exceeded the 10 mg/L MCL in 4 wells. The higher concentrations of nitrate tended to occur in wells near the Coburg Bottom Loop Road, Pioneer Estates, and Lanes Turn Road areas.

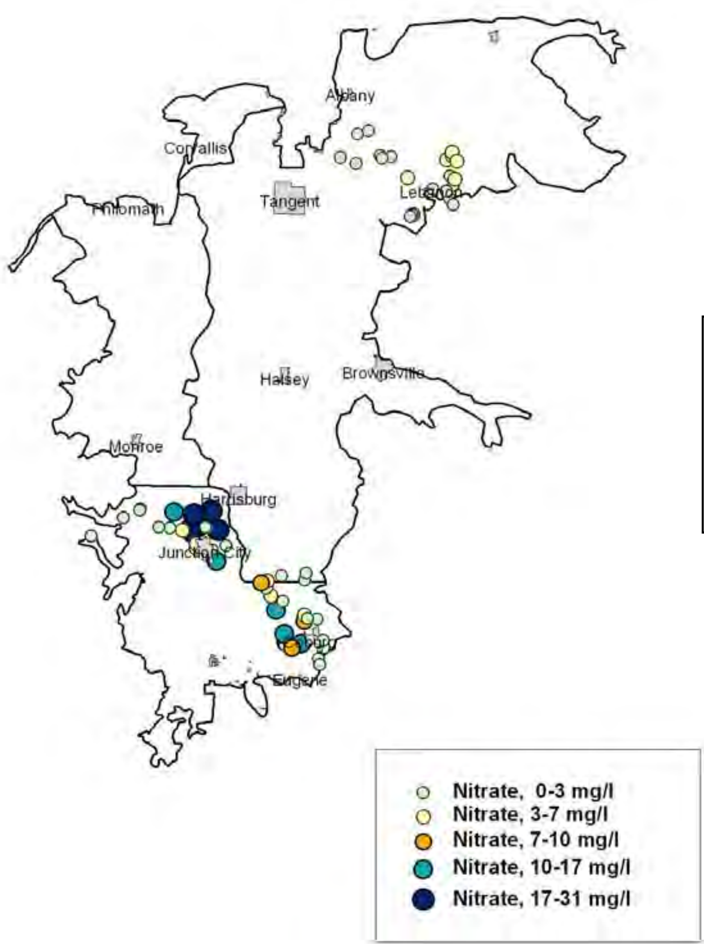


FIGURE 6

Nitrate results
DEQ groundwater
1993-94 investigations

- ***1994 Coburg Area Study***

In June 1994, DEQ collected samples from 20 domestic wells in the Coburg area (Figure 6), in which nitrate results ranged up to 15 mg/l. Nitrate concentrations exceeded 3 mg/L in 12 wells, and exceeded the 10 mg/L MCL in 4 wells. The higher concentrations of nitrate tended to occur in wells near the Coburg Bottom Loop Road, Pioneer Estates, and Lanes Turn Road areas.

- ***1993 Junction City Area Study***

In April 1993, DEQ collected samples from 21 domestic wells in the Junction City area (Figure 6), in which nitrate results ranged up to 31 mg/L. Nitrate concentrations exceeded 3 mg/L in 11 wells, and exceeded the 10 mg/L MCL in 8 wells, primarily in an area north of Junction City.

- ***1993 Albany-Lebanon Plain Study***

In August 1993, DEQ collected samples from 21 domestic wells in Albany-Lebanon Plain area (Figure 6), in which nitrate ranged up to 6.5 mg/L. Nitrate concentrations exceeded 3 mg/L in seven of the 21 wells, primarily in the South Santiam River floodplain near Tennessee and Tennessee School Roads. The 10 mg/L MCL was not exceeded in any of the 21 wells.

4.1.1.3 Oregon State University Extension Volunteer Testing

Staff of the Lane County office of the Oregon State University (OSU) Extension Service surveyed approximately 500 domestic well owners in northern Lane County (including Junction City and Coburg areas) during 1995-1997 to increase awareness about groundwaterquality protection and to accumulate nitrate screening data as a measure of groundwater quality. The nitrate screening data were collected using a Hach kit for colorimetric analysis of well water samples. DEQ considers these samples to have a lower level of quality control when compared to samples collected by experience professionals and laboratory analysis conducted using EPA-specified protocols and a rigorous laboratory Quality Assurance/Quality Control program. These data are nonetheless valuable in showing the approximate distribution of elevated nitrate concentrations.

OSU Extension data available to DEQ include nitrate results from 469 domestic wells scattered in rural areas between Harrisburg and Eugene (Figure 7). Nitrate concentrations generally ranged up to 34 mg/L, and one sample had nitrate at 233 mg/L. There were exceedances of the 10 mg/L MCL in 167 wells. Nitrate concentrations ranged between 3 and 10 mg/L in 191 wells.

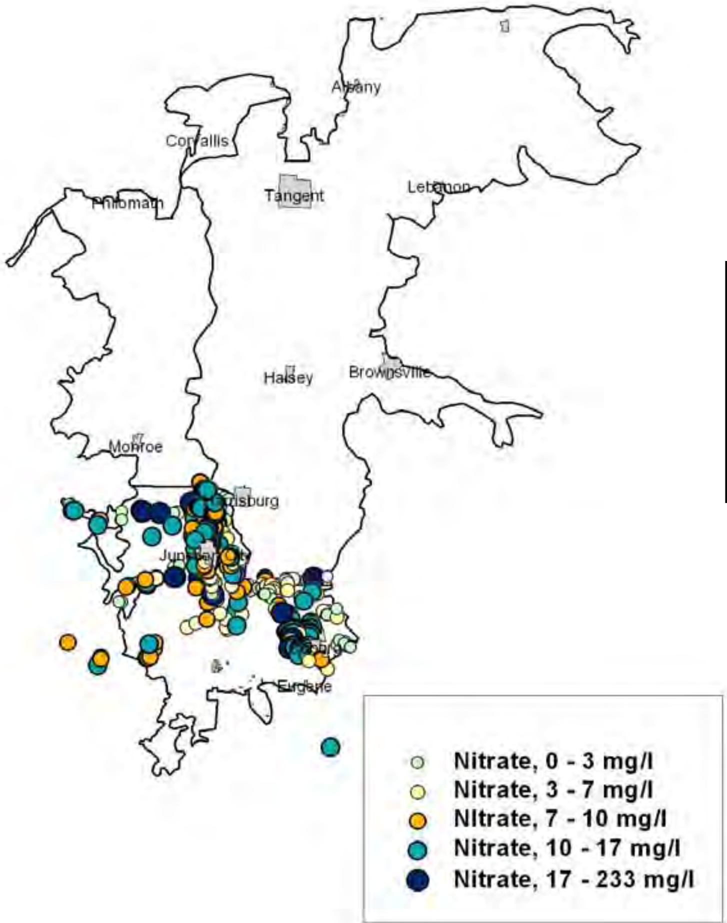


FIGURE 7
1995-97 OSU Extension Volunteer Testing – in Junction City & Coburg areas

Wells with elevated nitrate tended to be located near Coburg and Junction City, and within the younger alluvium near the Willamette River between these two cities. Another significant number of wells with high nitrate levels occurred west of Harrisburg, including the floodplain of Ferguson Creek.

4.1.1.4 Oregon Health Division Real Estate Transaction Testing

Since 1989, Oregon Revised Statutes 448.271 has required sellers of residential property with domestic wells to sample for nitrate and bacteria. Nitrate testing data are routinely submitted to the Oregon Health Division (OHD) by property sellers, but data submitted more recently than 1996 are not organized or easily available due to staff resource limitations at Oregon Health Division. Laboratory sample results from 964 wells sampled between 1989 and 1996 in the

Counties of Linn, Lane and Benton have been reported to OHD as a result of this program. DEQ considers these data have a low level of quality control, in the absence of strict field sampling or laboratory analysis protocols. Once again, these data are still valuable in showing the approximate distribution of elevated nitrate concentrations.

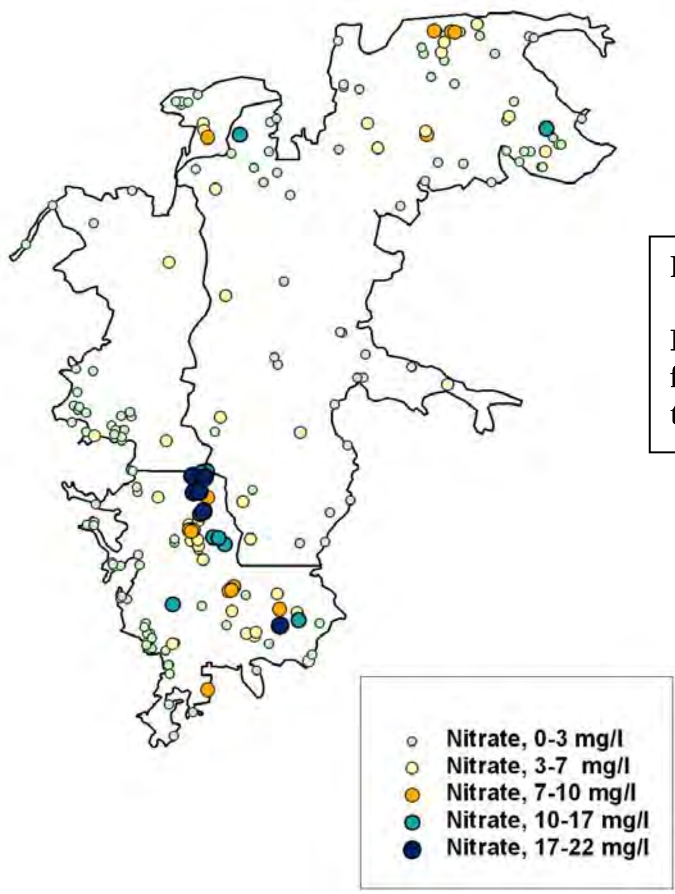


FIGURE 8

Nitrate results from real estate transactions

Only a portion of the 964 domestic wells in these three Counties were actually in the Southern Willamette Valley study area. Of this group, 564 wells had addresses that were recognized by the ArcView mapping program. The nitrate results from those recognizable addresses sampled in the project study area between 1989 and 1996 are presented in Figure 8 and described below:

- Nitrate exceeded the 10 mg/L MCL in 34 wells. The majority of these wells occurred in the Junction City area (19), north Eugene –Coburg area (4), and the Albany – Lebanon Plain (7).

- Nitrate ranged between 3 and 10 mg/L in 175 domestic wells. Many of these wells occurred in the Albany-Lebanon Plain area (47), Corvallis (23), north Eugene-Coburg (27), Harrisburg (7), Junction City (39), and Scio (14).

4. 1.1.5 Oregon Health Division Public Drinking Water Supply Data

Consistent with the Safe Drinking Water Act, OHD requires testing of public drinking water supplies including restaurants, hotels, mobile home parks, and any drinking water supply regularly accessible to the public. DEQ staff reviewed OHD records and found at least 112 permitted public water supply systems dependent on a groundwater source within the study area. These systems are required to monitor water quality on a routine basis, including laboratory analysis for nitrate. Data are considered to have a mixed level of quality control, when compared to samples collected by experience professionals and laboratory analysis conducted using EPA-specified protocols and a rigorous laboratory Quality Assurance/Quality Control program. Samples may have been collected by untrained individuals (such as the homeowner) but the analyses are required to be completed by a laboratory certified for drinking water samples.

Figure 9 shows the approximate locations of public water supply systems found in the project study area, including an indication of one or more incidences of elevated nitrate concentrations detected at any time during historic routine monitoring. Nitrate levels of 3-10 mg/L were reported at least once in 27 systems, predominantly east of Corvallis, Tangent, Albany-Lebanon Plain area, Scio, Halsey, Harrisburg, and Junction City areas. Exceedances of the 10 mg/L MCL were reported at least once in 8 systems within the project study area, near Junction City, Harrisburg, Coburg, Brownsville, Corvallis and Tangent.

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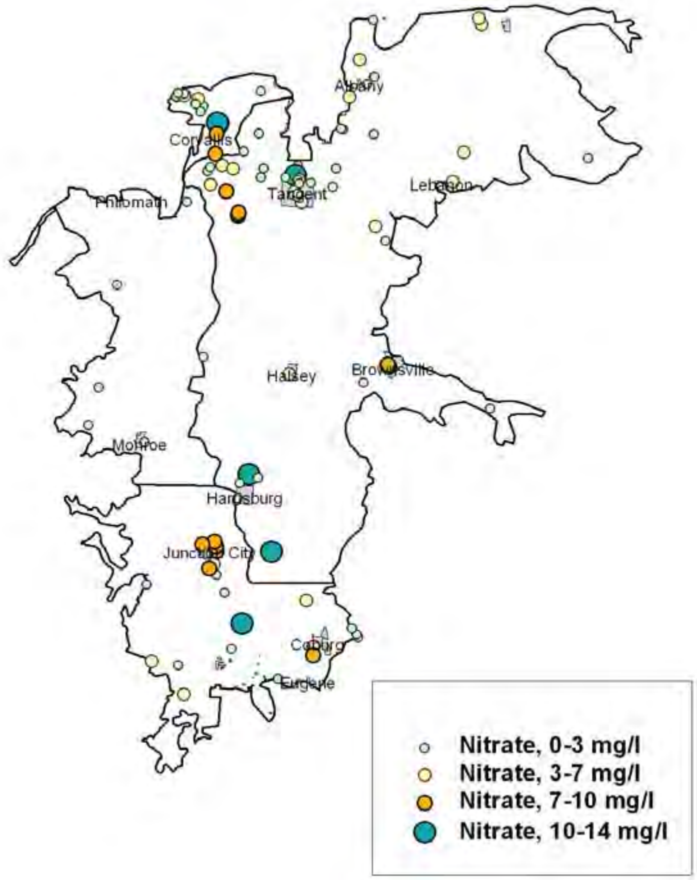


FIGURE 9

Historical highest nitrate value for individual public water supplies

Nitrate data available to DEQ for these public water supply systems are not reliable indicators of general shallow groundwater quality for the following reasons:

- water samples are collected at the "entry point" to the water supply system, which often includes water pumped from more than one well;
- any exceedances of the nitrate MCL will generally trigger immediate corrective action, including abandonment of the source or reduction of contaminant levels by dilution of water from other sources;
- once a system violation is corrected, documentation of violation details (e.g., specific nitrate MCL exceedances) may not be consistently available;
- public water supply wells (particularly newer ones) tend to be relatively deep and extend below

the shallow vulnerable aquifers.

Because of the above information, DEQ believes that the available public water supply system monitoring data is likely to be biased towards underreporting of elevated nitrate levels actually be present in shallow groundwater. This nitrate information is presented for informational purposes, but not intended to be used for comparison with the shallow domestic well data.

4.1.1.6 United States Geological Survey Willamette Valley Groundwater Assessment

The USGS studied groundwater quality in the Willamette Valley (Hinkle, 1997), including laboratory analyses of nitrate in samples collected in 1993 from 30 water supply wells distributed broadly across the project study area. These data are known to have a high level of quality control, including strict well selection, field sampling, and laboratory analysis protocols.

Figure 10 includes locations and nitrate concentration ranges for these 30 wells. Nitrate concentrations ranging from 3-10 mg/L occurred in 6 wells, and exceedances of the nitrate MCL (10 mg/L) occurred in 4 wells. The limited number of wells sampled in this study and their wide spatial distribution across the study area makes it difficult to determine any general patterns in nitrate distribution. However, these data are consistent with the data from other studies showing elevated nitrate concentrations near Junction City, Harrisburg, and Coburg.

4.1.1.7 Oregon DEQ Voluntary Nitrate Testing

DEQ sponsored a voluntary nitrate testing program between 1992 and 1993, enabling the screening of groundwater from 34 domestic wells in the Coburg area for nitrate. Testing results from this program are considered to have a low level of quality control in the absence of strict field sampling or analysis protocols. Samples were collected by well owners and analyzed for nitrate by DEQ staff using a Hach field kit for colorimetric analysis. The results of this testing indicated that a majority of the 34 wells had nitrate concentration exceeding 3 mg/L, and six wells exceeded the 10 mg/L MCL.

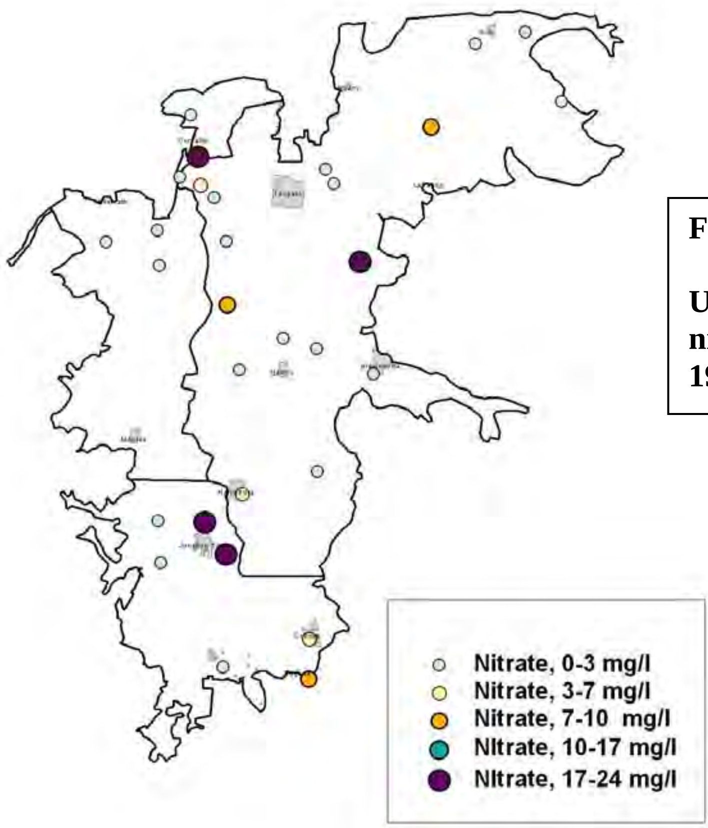


FIGURE 10

USGS NAQWA study of nitrate in groundwater 1991 & 1993

4.1.2 Historic Data Summary & Data Gaps

Nitrate data from the previous cited studies and data sources indicate regional concentration trends, despite their variable quality and their biased spatial distribution within the project study area. Elevated nitrate concentrations (greater than 3 mg/L) tended to occur in the following general areas: Albany-Lebanon Plain (especially north of Lebanon); rural area between Albany and Corvallis; and areas near Harrisburg, Junction City, and Coburg. In addition, public water supply system data suggest that elevated nitrate concentrations occur in groundwater near Tangent, Halsey, and Scio.

Despite the useful data available from these seven studies, they were not sufficient in quality and/or quantity for regional interpretations of nitrate distribution in groundwater within most of the project study area. The portions of the study area with little or no historic data include areas near Alvadore (east of Fern Ridge Reservoir), Monroe, Halsey, Brownsville, Corvallis-Albany, Tangent, Millersburg, and Scio.

Table 3
Nitrate Results
1993-1994 DEQ Studies

Sample Date	Laser Number	General Location	Nitrate, mg/L
06/27/1994	16643	Pauite, Coburg	7.1
06/27/1994	16644	Coburg Rd. Coburg	8.9
06/27/1994	16641	Coburg Rd. N. Coburg	4.2
06/27/1994	16642	Indian Dr. Coburg	2.3
06/27/1994	16646	Coburg Rd. Coburg	2.6
06/28/1994	16647	Coburg Rd. Coburg	13.0
06/28/1994	16648	Coburg Rd. Coburg	3.3
06/28/1994	16649	Lanes Turn Rd. Coburg	5.9
06/29/1994	16655	Cross Rd.Ln. Coburg	3.4
06/29/1994	16656	Coburg Bottom Loop Coburg	11.0
06/28/1994	16650	Cross Rd. Ln. Coburg	8.4
06/28/1994	16651	Powerline Rd. Coburg	1.8
06/28/1994	16652	Herman Rd. Coburg	0.6
06/28/1994	16653	Coburg Rd.N. Coburg	0.7
06/29/1994	16658	Coburg Bottom Loop Coburg	15.0
06/29/1994	16659	Knox Rd. Coburg	2.0
06/29/1994	16660	Coburg Bottom Loop Coburg	13.0
04/20/1993	16534	Oaklea Dr. Junction City	17.0
04/20/1993	16535	Hw. 99W Junction City	31.0
04/20/1993	16538	Love Lake Rd. Junction City	21.0
04/20/1993	16539	Lingo Ln, JC.	19.0
04/21/1993	16540	Oaklea Dr. Junction City	19.0
04/20/1993	16537	Hwy. 99W Junction City	18.0
04/21/1993	16541	6Th Ave. Junction City	5.1
04/19/1993	16545	Ferguson Rd. Junction City	12.0
04/20/1993	16543	Love Lake Rd. Junction City	0.0
04/21/1993	16544	Spruce Junction City	3.5
04/20/1993	16546	Teritorial Rd. Junction City	0.0
04/19/1993	16547	Washburne Ln. Junction City	2.2
04/21/1993	16551	Cox Butte Rd. Junction City	3.7
04/21/1993	16553	Strome Ln. Junction City	14.0
08/09/1993	16582	Kgal Dr. Lebanon	0.9
08/10/1993	16583	W. Oak Dr. Lebanon	3.8
08/09/1993	16577	Tennessee School Rd. Lebanon	5.1
08/09/1993	16578	Tennessee Rd. Lebanon	6.5
08/10/1993	16584	W. Oak Dr. Lebanon	0.7
08/10/1993	16588	Spicer Dr. Lebanon	0.5
08/10/1993	16590	Muller Dr. S.E. Albany	0.0
08/10/1993	16591	Stutzman Dr. S.E. Albany	1.1
08/09/1993	16579	Tennessee Rd. Lebanon	6.4
08/09/1993	16580	Tennessee Rd. Lebanon	4.5
08/10/1993	16585	36232 W. Oak Dr. Lebanon	0.3

08/10/1993	16587	Langmack Rd. Lebanon	3.9
Sample Date	**Laser Number**	**General Location**	**Nitrate, mg/L**
08/10/1993	16592	Red Bridge Rd. S.E. Albany	0.8
08/11/1993	16594	Penny Ln. Lebanon	0.2
08/11/1993	16597	Fry Rd. S.E. Albany	1.2
04/19/1993	16536	Link Ridge Dr. Junction City	ND
04/19/1993	16536	Link Ridge Dr. Junction City	ND
04/19/1993	16542	Alder Junction City	ND
04/19/1993	16548	Cox Butte Rd. Junction City	ND
04/19/1993	16549	Ferguson Rd. Junction City	ND
04/19/1993	16550	Territorial Rd. Junction City	ND
08/10/1993	16589	Spicer Dr. S.E. Albany	ND
08/11/1993	16596	Midway Dr. S.E. Albany	ND
08/11/1993	16593	Wheeler Lp. Lebanon	ND
06/27/1994	16645	Powerline Rd. Coburg	1.7
06/29/1994	16657	Smith Ln. Coburg	10.0
06/28/1994	16654	Coburg Rd. Coburg	1.2
08/09/1993	16581	Tennessee Rd. Lebanon	3.3
08/10/1993	16586	Gore Dr. Lebanon	0.7
04/21/1993	16552	Prairie Rd. Junction City	ND
08/11/1993	16595	Honah Lea Dr. Lebanon	ND

5.0 PROJECT DESIGN AND METHODS

5.1 Sampling Design for Project Data

Design of a sampling plan for DEQ's 2000-2001 groundwater assessment included two main criteria for selecting sampling targets. Firstly, DEQ sampled groundwater from private water supply wells broadly distributed across the Valley to fill gaps in the spatial distribution of the historical data. Secondly, DEQ focused collection of groundwater samples in three areas within the Valley previously sampled by DEQ in the mid-1990s (Coburg, Junction City, and Lebanon-Albany plain areas). Within these three areas, 61 wells that were previously sampled were re-sampled. Additional wells with no previous sampling history were also sampled in these areas, to further define the nature and extent of nitrate contamination apparent from the historical data.

5.2 Project Sample Collection Methods

Groundwater samples were collected from hose-bibs or taps plumbed directly to water supply wells, consistent with the DEQ Laboratory Field Sampling Reference Guide (DEQ, 1993a). Sample documentation and chain-of-custody procedures outlined in the Master Plan and Reference Guide were followed. Samples were shipped to the DEQ Laboratory by field staff within 5 days of collection.

The following breakdown characterizes the current use of the 476 project wells sampled for evaluation of spatial distribution of nitrate:

- 437 wells used for private domestic water supply
- 29 wells used for public water supply systems
- 10 wells used for irrigation or livestock

To expedite sample collection and project completion, field staff limited sampling to wells that were actively being used by their owners and readily accessible to DEQ field staff. The winter season in which sampling took place precluded access to many shallow irrigation wells that are not typically operational outside the dry irrigation season.

Because the wells targeted for sampling were typically being pumped by their owners as an active water supply, samples were collected from the wells after a purge time of about 1 minute. Longer purge times, characteristic of most other DEQ groundwater studies, were deemed unnecessary for actively used wells in this project because these wells experienced a degree of regular purging from their frequent use.

5.3 Project Analytical Methods

Samples were analyzed for Laboratory analyses included Nitrate/Nitrite – Nitrogen (NO_3+NO_2-N), consistent with U.S. EPA Methods 353.2. Nitrate analyses were done at the DEQ Laboratory in Portland using the lead-cadmium reduction method. The analytical minimum reporting level

(MRL) was 0.05 mg/l for these analyses.

5.4 Quality Control and Quality Assurance

The data generated by this sampling event met the data quality objectives set for this project. This was determined by analyzing duplicate, field blank, and transfer blank samples for 10% of the samples collected.

5.5 Comparisons with Water-Quality Criteria and Nitrate Health Risks

The USEPA drinking current drinking water maximum contaminant level (MCL) for nitrate (as nitrogen) of 10 mg/L nitrate was used as a benchmark to conduct data comparison. The MCL is the maximum concentration of a contaminant allowed in public water systems as regulated by the federal Safe Drinking Water Act. The MCL is not enforceable for private water supply systems. Water with a nitrate (as nitrogen) concentration below the MCL of 10 mg/L is not necessarily free of health risks.

Infants and developing fetuses are especially vulnerable to health problems from drinking water with nitrate levels above 10 ppm. Nitrate can interfere with the ability of the blood to carry oxygen to vital tissues of the body in infants of six months old or younger. The result is called methemoglobinemia, or "blue baby syndrome". Infants may also receive greater exposure than others in the same household because of their smaller body weight and the higher proportion of water in their diets. Concentrations less that 10 ppm nitrate may have adverse, but non-lethal, health effects on infants due to nitrates converting to nitrites in the blood, and limiting the ability to efficiently transfer O2.

Many adults are also susceptible to nitrate effects. Some older children and adults are genetically susceptible to methemoglobinemia, and a large number of adults are exposed to chemicals in their workplaces, or in medications that put them at increased risk for harm from nitrate.

Little is known about the long-term effects of drinking water with elevated nitrate levels. Some ongoing research (Weyer et al, 2001) indicates that nitrate at levels as low as 3.0 mg/l in drinking water may have other negative health effects, including increased risk of certain cancers and spontaneous miscarriages. To date, scientific research results are not conclusive about these possible effects.

5.6 Reporting of Data to Well Owners

In May 2001, nitrate data, sampling date(s), and geographic coordinates were sent to each owner of wells sampled by DEQ as part of this study. A fact sheet describing nitrate health risks and a customer service questionnaire were also included with the laboratory results. A sample of this mailer is included in Attachment B. Of the 518 mailers, eight were returned. as undeliverable due to an incorrect address.

6.0 DATA MANAGEMENT

For data validation and user accessibility, project data was entered into two separate database management systems.

6.1 LASAR

DEQ Laboratory staff entered all project analytical data into the Laboratory Analytical Storage and Retrieval (LASAR) system, which is designed to hold all analytical data generated by the Laboratory. Metadata for sampling stations (wells) and equipment are associated with each data point, including a single point latitude/longitude geographic coordinate. LASAR data is available agency-wide and can also be accessed publicly through DEQ's internet web site. The LASAR web site link is: http://www.deq.state.or.us/wq/lasar/LasarHome.htm.

6.2 Project ACCESS™ database

DEQ Western Region staff entered both analytical and non-analytical data into an ACCESS™ database, hosted on DEQ's Eugene local area network in Attachment D of this report.

6.3 Geographic Information System

ArcView™ (v. 3.2) software was used as a geographic information system (GIS) tool for evaluating historic and current project groundwater data as a function of land use, hydrogeology, demographics, permitted point sources, and surface water quality. ArcView was also used to display and map this information.

7.0 WELL DATA

7.1 Methods of Identifying Well locations

All wells discussed in this report have been assigned a unique identifier designated as the LASAR Station Number by DEQ. LASAR numbers previously assigned to the wells sampled by DEQ in the mid-1990s were maintained, and new LASAR numbers were assigned to wells sampled for the first time by DEQ in this study. Each LASAR number is linked electronically to information about well ownership, use, street address, and geographic coordinates.

DEQ also used a handheld GPS unit for obtaining latitude and longitude coordinates at each sample locality.

7.2 Well Selection

Water supply wells in the Valley were selected for sampling and nitrate analysis if they intercepted the uppermost subsurface water-bearing zone, because of the high vulnerability of shallow groundwater to impacts from non-point sources. Generally, these shallow wells were less than 75 feet deep, and in many cases were less than 50 feet deep.

Water supply wells were also targeted for sampling if they met one or more of the following criteria:

<u>Criterion No. 1: Wells previously sampled by DEQ</u>

Of the 61 wells that were previously sampled by DEQ during 1993 and 1994 in portions of Coburg, Junction City, and the Albany-North Lebanon area (see Table 43), DEQ was successful in accessing 12 of these wells and collected samples in December 2000. The 1993-1994 set of wells was originally selected by DEQ based on land use patterns (e.g., agriculture, high density rural residential), proximity to potential nitrate contaminant sources (e.g., large onsite septic systems, CAFOs) and indications of nitrate contamination from existing data (including OHD's real estate transaction testing). Field staff attempted to access these wells by calling well owners listed in previous DEQ reports, and visits to the current occupant of the property with a known well location.

<u>Criterion No. 2: Shallow wells in areas with documented nitrate contamination</u>

DEQ field staff sought additional shallow water supply wells (less than 75 feet deep) to sample in each of the three areas previously sampled in the mid-1990s (Coburg, Junction City, and the Albany-Lebanon Plain). Numerous "cold call" inquiries were made by field staff to identify accessible shallow wells and seek permission to sample from property owners. Typically, these are wells that have no documented sampling history.

<u>Criterion No. 3: Shallow wells in areas of the Valley with no documentation about nitrate contamination</u>

Little is known about nitrate levels in shallow groundwater within large areas of the Willamette

Valley, outside of the Coburg, Junction City, and Albany-North Lebanon areas. DEQ field staff made numerous “cold call” inquiries about accessing shallow wells owned by rural residents near the following communities in the Southern Willamette Valley: Alvadore, Cheshire, Lancaster, Bear Creek, Harrisburg, Brownsville, Halsey, Shedd, Tangent, Oakville, Granger, Riverside, Orleans, Pirtle, Scio, Grand Prairie, and Crabtree. These are wells that have no documented sampling history other than a possible analysis for nitrate and bacteria as part of a property transfer.

Criterion No. 4: Public requests for shallow well sampling

In a number of cases, DEQ staff received unsolicited requests by rural residents for well sampling. As a public service, these requests were honored if the well was determined to be shallow (less than 75 feet deep) and located within the study area.

7.3 Documentation of Well Depth

DEQ staff sought documentation about geology and well construction details (i.e., WRD water well reports and interviews with well drillers) for all wells sampled in this study to facilitate the interpretation of sample results. However, a significant number of the available shallow irrigation and domestic farm wells were drilled or dug without conventional documentation (i.e., WRD Water Well Report). Of the 476 wells sampled in this assessment, Water Well Reports were successfully retrieved for only a small fraction less than half of these wells. Additional labor-intensive record searching is likely to yield additional Water Well Reports. However, DEQ staff predict it is not likely that significant documentation will not be found or that many well reports will be confidently matched to with a large number of the wells sampled in this assessment because shallow wells in the Valley tend to be drilled more than 20 years ago. Many of, and most of these wells drilled before the 1980’s were not documented with WRD well water reports.

Due to the screening nature of this assessment and the large number of wells sampled in the Valley, DEQ staff chose to rely largely on anecdotal information provided by the well owner regarding well depth.

Wells without corresponding documentation of installation were selected for sampling at the discretion of the project staff when in the event that conventionally documented wells were not available in an area targeted for sampling. In those cases, project staff took extra measures to interview the well owner (and well constructor when known) about construction details, sound the well depth when possible, and inspect the wellhead for seal defects.

7.4 Protocol for Contacting and Communicating with Well Owners

Once a particular well had been tentatively identified as meeting the selection criteria or by field reconnaissance, prospective well owners were identified, informed about the project, and asked for permission to sample their wells. DEQ staff used these opportunities to inform, educate, and solicit input from well owners, consistent with the public participation requirements of the Groundwater

Quality Protection Act and the project objective of increasing public awareness and collaboration in protecting groundwater resources.

DEQ field sampling staff used the following general protocol for communicating with prospective well owners:

- To the extent possible, telephone contact was made before making personal contact with well owners. Telephone numbers were obtained for specific street addresses through reverse telephone directories available on the internet, or data available electronically from county tax assessors. The telephone contact included a personal introduction, brief information about project objectives, and a request for an opportunity to inspect the wellhead and sample the well. Project staff conveyed the benefits gained by well owners who allow their wells to be sampled.

- Personal field contacts with well owners followed-up on the telephone conversation, and additional information was provided about the project objectives, groundwater quality protection, and the purpose for DEQ's interest in sampling private wells. Field staff also sought information, comments, and advice from well owners. Such feedback was recorded as part of the field documentation.

- Written materials were offered to well owners during these contacts, including the following documentation: 1) DEQ staff business card; 2) a DEQ Introductory Letter; and 3) OHD's Nitrate Fact Sheet. If the well owner was not at home, this package of information was inserted into a plastic pocket wands left in an accessible location, inserted into a plastic pocket. Project staff was prepared to graciously accept refusal from well owners to access their private well. Such refusals were documented so that in these cases the owners will not be contacted again for future project sampling efforts.

8.0 FIELD SAMPLING LOGISTICS AND LABORATORY ANALYSES

Technical staff from both the DEQ Laboratory and DEQ's Western Region performed the field sampling. The DEQ Laboratory performed all laboratory analyses.

Field sampling and laboratory analyses were conducted according to the standard procedures outlined in Section 5.0 and 6.0 of the September 1993 Statewide Groundwater Monitoring Program Master Plan (Plan). This Plan is presented in Appendix C, including sampling procedures, sample documentation and custody, sample transport, health and safety, laboratory data QC/QA, equipment calibration and maintenance, data reduction/validation/maintenance, performance audits, data assessment, corrective action, and confirmatory sampling requirements.

The following sections represent amendments to portions of the September 1993 Statewide Groundwater Monitoring Program Master Plan, consistent with the specific needs of this project.

8.1 Data Management, Analysis, & Reporting

DEQ Laboratory staff entered and managed all laboratory analytical data in LASAR, while non-analytical data were entered and managed by DEQ Water Quality Program staff in an ACCESS™ database. GIS tools (ArcView™) were used to evaluate the groundwater data as a function of land use, hydrogeology, demographics, permitted point sources, and surface water quality. DEQ also used hand held GPS units in order to collect adequate information to view well locations in ArcView.

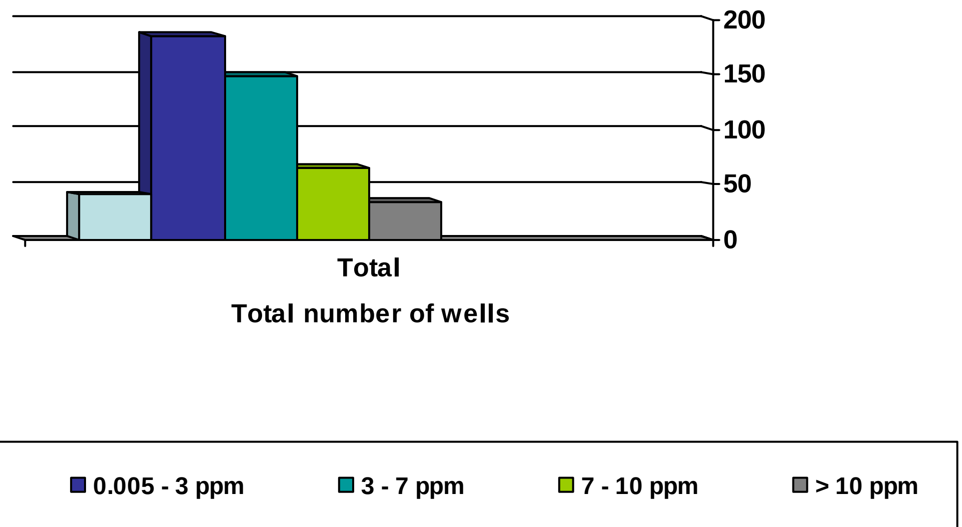
A separate database with both analytical and non-analytical data was created in the DEQ Eugene office, and is housed on the Eugene shared directory.

9.0 DISTRIBUTION OF NITRATE

The distribution of nitrate in groundwater in the Southern Willamette Valley can be discussed in terms of spatial variability. Consideration of temporal variability (evaluation of differences in nitrate concentrations over time) is difficult due to the limited number of wells that have available nitrate data for a period of time. Approximately 100 wells were in the subset of wells that both for this project and DEQ's previous assessment work done in the mid-1990s, but all of the 2000-2001 samples were collected within a 5 month period of time.

The nitrate-N levels measured in the 476 wells sampled for this project range from non-detectable (method reporting limit of 0.05 mg/l) to 231.0 mg/L. The results are summarized presented in Table 4 and shown in Figure 12. A histogram of these data is shown in Fig. 11.

Figure 11
Histogram of 2000-2001 Nitrate Results



To facilitate data interpretation, the number of wells sampled is compared with 5 groupings of Nitrate-N levels, as follows:

TABLE 4

Concentration Range (mg/l)	**Characterization**	**Number of Wells**	**% of total wells sampled**
Non-detectable	Absent	41	8.61
0.5 – 3	Low	186	39.08
3 – 7	Moderate	149	31.30
7 – 10	High	65	13.66
Above 10	very high	35	7.35

The 476 samples were not randomly distributed throughout the Valley. Because some of the project data were collected to investigate previously identified nitrate problems (e.g.,

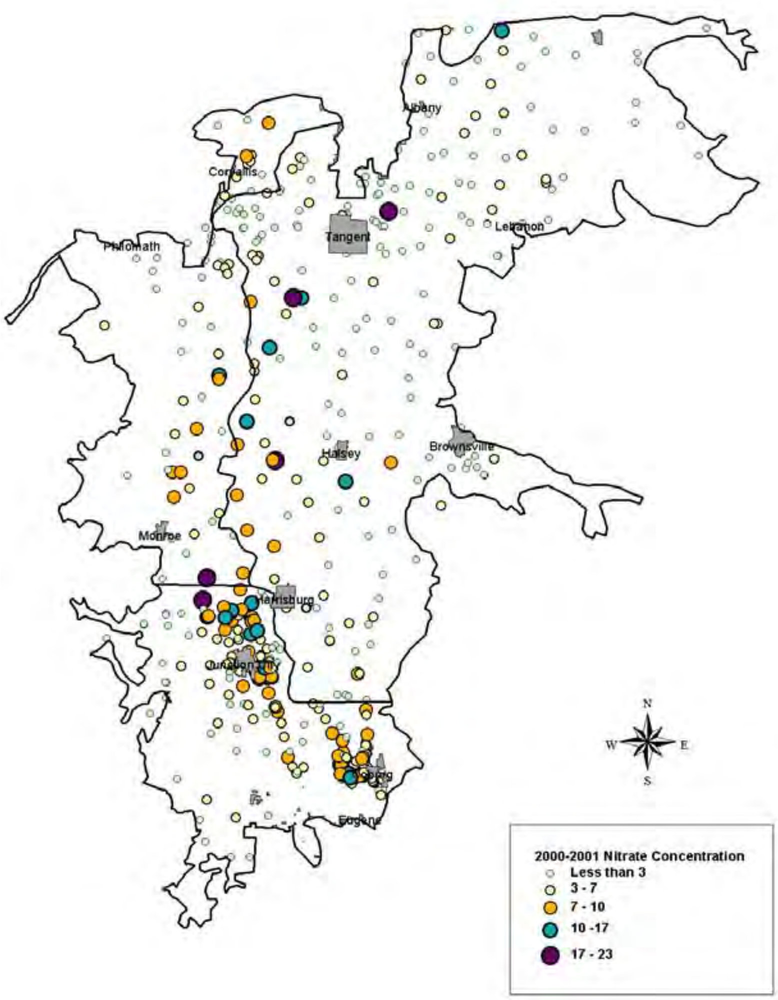


FIGURE 12

Highest nitrate value from wells sampled during 2000-2001 study

Coburg Bottom Loop Road area), the cumulative data set may contain a bias towards high nitrate concentrations. The data do, however, indicate the existence of extensive bodies of high nitrate groundwater in the Valley.

Depth data were available for only some of the 476 sites. The 476 samples were not randomly distributed throughout the Valley. Because some of the project data were collected to investigate previously identified nitrate problems (e.g., Coburg Bottom Loop Road area), the collective data sets may contain a bias towards high nitrate concentrations. The data do, however, indicate the existence of extensive areas of groundwater with high nitrate concentrations in the Valley.

Examining the group of samples that were above 7 mg/L and contrasting the sample locations with the hydrogeologic units, it is clear that the higher values of nitrate are present in mainly one feature. All but 5 of the wells with greater than 10 mg/L of nitrate are present in the Younger Upper Sedimentary Unit (reworked floodplain deposits of the Willamette River and major tributaries). There are 6 wells with nitrate values between 7-10 mg/L that are significantly outside of the Younger Upper Sedimentary Unit, and 6 other 7-10 mg/L wells that are not mapped in this Unit, but are adjacent to it. This relationship is presented in Figure 13 below, with the Younger Upper Sedimentary Unit represented in black.

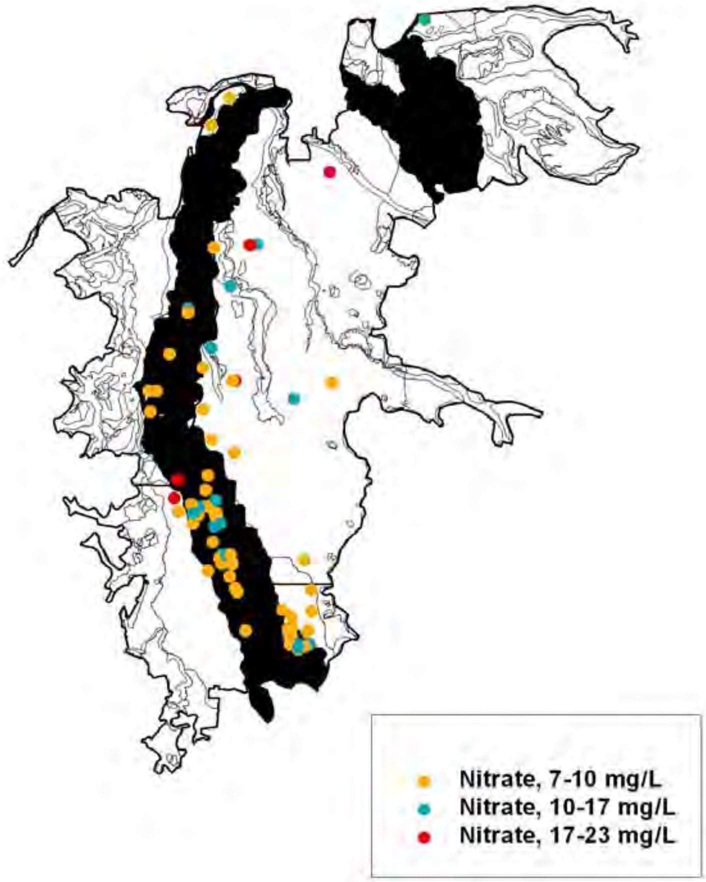


FIGURE 13

Higher nitrate values relative to the Upper Sedimentary Unit (Younger)

10.0 CONCLUSIONS

Based upon the information gathered during this investigation, combined with data available from other sources and previous studies, there is sufficient evidence to indicate adverse impacts to the groundwater from anthropogenic activities. More than 20% of the 476 wells sampled during this study contained nitrate at concentrations greater than 7 mg/L.

Approximately 89% of the wells sampled with values greater than 7 mg/L appear to be located in or relatively adjacent to the sand and gravel deposits associated with the Willamette River and its tributaries. This hydrogeologic Unit contains very permeable material and there is relatively little overlying silt or clay to buffer the impacts from land uses.

The Groundwater Quality Protection Act has established 7 mg/L as the criteria that must be exceeded before the DEQ can designate an area as a Groundwater Management Area. This study provides the documentation needed that nitrate has exceeded the limit needed to consider a declaration of a Groundwater Management Area. Important questions that could be answered by the Groundwater Advisory Committee would include:

1. What are the sources of nitrate to the groundwater;
2. How are nitrate values changing over time; and,
3. Are the best management practices currently employed adequate to protect the groundwater resource?

DEQ should evaluate the information provided in this report, and should network with other agencies, local governments and the residents of this area. Any future steps taken must reflect the best interests of public health, safety and the environment.

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Attachment A
Nitrate Results
Oregon Health Divison
Real Estate Transfer Data
1989-1996

Nitrate Range 0-3 mg/L =	BLACKK
Nitrate Range 3-10 mg/L =	BLUE
Nitrate Range >10 mg/L =	RED

PROPERTY SELLER	ADDRESS	CITY	NITRATE (mg/L)	Year Collected	Well Depth (feet)
MIKE/DEANNA MUELLER	34527 RIVERSIDE DR	ALBANY	0	1995	UNKN
BOB/PAT BARTHOLOMEW	34071 OAKVILLE RD	ALBANY	0	1995	UNKN
FRANK WRIGHTMAN EST.	737 SW 10TH	ALBANY	0	1992	
C/W BENAGE	35461 OAKVILLE RD	ALBANY	0	1996	
VOLZ FAMILY INVEST.	29889 HWY 34	ALBANY	0	1997	
LINN BENTON BANK	31470 EASY AVE	ALBANY	0	1997	
LINN BENTON BANK	31470 EASY AVE	ALBANY	0	1997	
ANDERSON	36037 SW BRYANT DR	ALBANY	0	1994	68
UNRAU	34097 TEDDY AVENUE N.E.	ALBANY	1	1989	
PASCONE	4866 PALESTINE ROAD	ALBANY	1	1990	
KILGORE	34272 TEDDY AVENUE N.E.	ALBANY	1	1990	
RUST	39036 N.E. SCRAVEL HILL ROAD	ALBANY	1	1990	
WALLINS	1760 N.W. THORNTON LAKE PLACE	ALBANY	1	1990	
BEDTKER	35158 KNOX BUTTE ROAD	ALBANY	1	1990	
AVERILL	210 N.E. MARILYN	ALBANY	1	1990	
RITCHIE	3877 THREE LAKES ROAD S.E.	ALBANY	1	1991	
GRANUM	390 JUNIPER LANE	ALBANY	1	1991	
DVA	34358 HWY 20 S.E.	ALBANY	1	1992	
TORAKE	3610 N.E. EARL AVENUE	ALBANY	1	1990	
LUCILE HANSEN	1007 HOUSTON ST NE	ALBANY	1	1995	UNKN
G WESTBROOK	2710 PARK TERRACE	ALBANY	1	1996	
NICE	33844 SUNNYVIEW DRIVE N.E.	ALBANY	1	1990	
MC DONALD	34585 RIVERSIDE DRIVE S.W.	ALBANY	1	1989	
OCHSE	1710 INDEPENDENCE HWY	ALBANY	1	1991	
BENDER	39635 SANTIAM BLUFF	ALBANY	1	1990	
RICHARDSON	33470 DEVER-CONNER DRIVE	ALBANY	1	1991	
FREDERICK	34489 RIVERSIDE DRIVE S.W.	ALBANY	1	1990	
DAWSON	33082 S.E. PEORIA ROAD	ALBANY	1	1991	40
KARL ARNOLD	36066 SANTIAM HWY SE	ALBANY	2	1995	UNK
LURLENE HOLLOWAY	34629 FRY RD SE	ALBANY	2	1995	70
HENRY	2520 HILL STREET S.E.	ALBANY	2	1991	
FERGUSON	633 NEBERGALL LOOP	ALBANY	2	1990	32
SMITH	888 LAWNRIDGE N.W.	ALBANY	2	1989	
MCNAUGHTON	350 MARILYN STREET	ALBANY	3	1990	
MORAN	7744 N.W. MINT	ALBANY	3	1992	
BOHNING	1505 HARDEN LANE N.W.	ALBANY	3	1990	
BARKER	2411 MILLERSBURG DRIVE N.E.	ALBANY	3	1992	37
CUMMINNGS	3519 SE DAVID	ALBANY	4	1992	
KING	35106 MULLER DRIVE S.E.	ALBANY	4	1990	
WINN	34610 RED BRIDGE RD	ALBANY	4	1991	
DVA	3273 ALEXANDER LANE	ALBANY	5	1989	
MARTIN	2035 JACKSON STREET S.E.	ALBANY	5	1991	
DVA	2175 N.E. BARKER COURT	ALBANY	5	1990	
HENRY ALBRIGHT	4710 KNOX BUTTE RD	ALBANY	5	1993	35

PHIL WORTHINGTON	3439 BERNARD NE	ALBANY	6	1993	
DAN/MARY BETH RODDY	34254 KAMPH DR NE	ALBANY	7	1994	62
WIRTH	36732 OLD BRIDGE ROAD	ALBANY	7	1991	
D.K. BRANDON	430 DOUGLAS ST SE	ALBANY	7	1993	50
LAHODNY	39240 MORNINGSTAR ROAD	ALBANY	8	1991	30
GENE PULIS	35231 TENNESSEE RD	ALBANY	9	1995	UNK
RAY MOE	31618 SW BRYNAT WAY	ALBANY	9	1994	
SCHOEN	33809 HWY 99E	ALBANY	11	1990	
HOPKINS ESTATE	2002 WAUERLY SE	ALBANY	12	1996	
SNYDER	35186 RIVERSIDE DRIVE	ALBANY	16	1990	
LANGMADE	38786 MORINING STAR ROAD	ALBANY	22	1990	
ALFRED C. BEGIN II	16490 ALSEA HWY	ALSEA	0	1995	UNKN
RALPH BURR ESTATE	26421 FUDGE RD	ALSEA	0	1994	
STEEPROW	18568 HAINES ROAD	ALSEA	1	1991	
WILBUR W MALTBY	17246 ALSEA HWY	ALSEA	1	1994	
CARPENTER	17345 ALSEA HWY	ALSEA	1	1992	
ELWOOD RICKMAN	27499 6TH ST	ALVADORE	0	1995	100
MARK/KIM McBEE	90804 ALVADORE RD	ALVADORE	0	1995	50
OGLES	27210 LOUDEN LANE	ALVADORE	1	1991	40
DEBORAH J KNIGHT	90911 STARLITE LN	ALVADORE	2	1996	
STAN/DORIS ZUMWALT	36783 MOUNTAIN HOME	BROWNSVILLE	0	1995	UNK
PINZ, BILL, BENITA	34678 LAKE CREEK DR	BROWNSVILLE	0	1996	
JOHN RINALDI	27088 WALNUT LN	BROWNSVILLE	0	1993	
CANNING	27536 PEARL STREET	BROWNSVILLE	1	1989	
GANN	35135 NORTHERNWOOD DRIVE	BROWNSVILLE	1	1990	
WOOD	35001 NORTHERN WOOD RD.	BROWNSVILLE	1	1992	150
WOOD	35001 NORTHERNWOOD RD	BROWNSVILLE	1	1992	150
HOSTETLER	34070 POWELLS HILLS LOOP	BROWNSVILLE	1	1992	
HEALY	27101 WALNUT LANE	BROWNSVILLE	2	1990	
MOULTRIE	34554 LAKE CREEK DRIVE	BROWNSVILLE	3	1991	
DOONEY	37605 SUNSET LANE	BROWNSVILLE	3	1991	
FARNSWORTH	37545 SUNSET LANE	BROWNSVILLE	5	1990	
KEVIN ZERBY	35033 NORTHERNWOOD DR	BROWNSVILLE	8	1993	110
BOB FALK	27062 6TH ST	CHESHIRE	0	1995	UNKN
GEORGE/LINDA ESSIN	26247 HWY 36	CHESHIRE	0	1996	UNKN
M/M STEPHENSON	93128 PARK ST	CHESHIRE	0	1996	100
BILL WILLIAMS	22986 HWY 36	CHESHIRE	0	1996	60
DAVID MASON	26418 VALLEY VIEW	CHESHIRE	0	1996	120
BRADLEY	24045 HWY 36	CHESHIRE	0	1997	175
ROBERT KISH	22798 HWY 36	CHESHIRE	0	1997	130
SISK	92114 GOLDSON ROAD	CHESHIRE	0	1989	
PRUTETT	92124 GOLDSON ROAD	CHESHIRE	0	1991	
EMERSON	22895 HWY 36	CHESHIRE	1	1990	
KARSTENS	25651 HWY 36	CHESHIRE	1	1990	
GUY AMES	25919 HIGHWAY 36	CHESHIRE	1	1994	85
BIBOUX	23360 HALL ROAD	CHESHIRE	1	1990	60
RAMEY	93128 PARK	CHESHIRE	1	1991	115
MAY	25123 HALL ROAD	CHESHIRE	1	1991	
USDA HUD	23292 BIRDHAVEN LANE	CHESHIRE	1	1992	
WITTY	23882 HALL RD.	CHESHIRE	1	1992	115
GOLDIE CRICHTON	22685 HWY 685	CHESHIRE	1	1992	
RON VAN LANDINGHAM	26409 VALLEY VIEW	CHESHIRE	2	1996	146
NEDELMAN	26950 6th ST	CHESIRE	1	1993	0275
OBERG	26526 HALL ROAD	CHESIRE	6	1991	
PAT GISBORNE	25373 HWY 36	CHESSHIRE	0	1996	200
UNKNOWN	91476 STALLINGS LN	COBURG	0	1994	
KISTLER	91488 STALLINGS	COBURG	5	1991	
JOHNSON	91662 COBURG ROAD	COBURG	7	1992	65
B/G LIGHTHART	2965 SW 53RD (SHOP WELL)	CORVALLIS	0	1997	58

LARRY RADER	6820 NW GRANDVIEW DR	CORVALLIS	0	1995	UKN
PHIL/SHARON WILLIAMS	7275 SW DEERHAVEN	CORVALLIS	0	1996	UNKN
M/M BIRKEN	29657 CRONN DRIVE	CORVALLIS	0	1995	UNKN
NOBLE	1915 SW 53RD	CORVALLIS	0	1995	UNKN
MARTHA TRUNINGER	5253 SECHER LN	CORVALLIS	0	1995	UNKN
MARTHA TRUNINGER	5265 SW SECHER LN	CORVALLIS	0	1995	UNKN
RODERICK L JOHNSON	1240 NW KAINUE DR	CORVALLIS	0	1995	70
CARRIE BOLSTER	2020 1/2 SW 45TH ST	CORVALLIS	0	1995	165
KELLY JUNG	1149 NW ALDER CRK DR	CORVALLIS	0	1996	200
LORI/PAT O'CONNELL	7545 McDONALD CIRCLE	CORVALLIS	0	1996	UNKN
DON GRAVE	37119 SOAP CRK RD	CORVALLIS	0	1996	60
ALFRED/NANCY KYLE	37296 SOAP CRK RD	CORVALLIS	0	1996	65
MICHEAL/KATHY BRANDI	3700 SW BROOKLANE	CORVALLIS	0	1996	UNK
MICHAEL/NANCY PLATZ	2655 NW ROYAL OAKS DR	CORVALLIS	0	1996	160
BILL FRANCIS	1070 NW OVERLOOK	CORVALLIS	0	1996	UNK
JAMES/CHATRINE SMITH	8037 NW MITCHELL DR	CORVALLIS	0	1996	UNK
MARIE RICHTER	1025 SW 53RD ST	CORVALLIS	0	1996	
OR MAUL	2535 SW 53RD ST	CORVALLIS	0	1997	
GARY OAKLEY	8275 NW STARVIEW DR	CORVALLIS	0	1997	140
A/E GOOS	5245 SW BLUEBERRY	CORVALLIS	0	1997	
J/T SORGEN	5775 SW WEST HILLS RD	CORVALLIS	0	1996	
B/G LIGHTHART	2965 SW 53RD	CORVALLIS	0	1997	348
PATRICIA JURTIN	27069 FOREST SPRING LN	CORVALLIS	0	1997	
PATTERSON	KAINAI DR	CORVALLIS	0	1992	200
RELOCATION RESOURCES	6205 N.W. FAIR OAKS DRIVE	CORVALLIS	0	1990	
MOORE	1220 N.W. RIDGEWOOD PLACE	CORVALLIS	0	1990	
GARY HALVORSON	7035 SW DEERHAVEN	CORVALLIS	0	1994	
CATHY STORY	4855 SE GAGNON	CORVALLIS	0	1994	
HAHN	4720 S.W. NASH	CORVALLIS	1	1990	
YOUNG	7300 N.W. ACORN RIDGE	CORVALLIS	1	1990	
LAMB	GRANDVIEW DRIVE	CORVALLIS	1	1990	
KILSGAARD	5215 S.W. BLUEBERRY DRIVE	CORVALLIS	1	1989	
LIEN	39055 TRILLIUM LANE	CORVALLIS	1	1990	
DUDEY	37741 GOVIER PLACE	CORVALLIS	1	1990	
CARPENTER	960 N.W. HIGHLAND TERRACE	CORVALLIS	1	1990	94
BURLESON	29339 S.E. CARROLL DRIVE	CORVALLIS	1	1990	40
MACPHERSON	5420 SHASTA AVENUE	CORVALLIS	1	1990	110
SHEFFOLD	7140 N.W. OAK DRIVE	CORVALLIS	1	1990	
BRALY	717 N.W. LEWISBURG	CORVALLIS	1	1990	80
BAKER	6360 S.W. WEST HILLS ROAD	CORVALLIS	1	1990	160
MAINE	39000 TRILLIUM LANE	CORVALLIS	1	1990	255
FERRELL	375 N.W. ARMSTRONG	CORVALLIS	1	1991	70
GARRARD	7210 N.W. COUNCIL TREE LN #1	CORVALLIS	1	1991	150
GARRARD	7210 N.W. COUNCIL TREE LN #2	CORVALLIS	1	1991	380
CURTIS	2835 SW WESTERN BLVD	CORVALLIS	1	1991	
CURTIS	2835 S.W. WESTERN BLVD	CORVALLIS	1	1991	
AMERICAN HEART ASSN	525 LEWISBURG AVENUE	CORVALLIS	1	1991	
SCHEFFLER	9153 N.W. TANYA PLACE	CORVALLIS	1	1992	305
WILLIAMS	4855 SW GAGNON	CORVALLIS	1	1992	46
R & V GORDON	29710 SE SHADY OAK DRIVE	CORVALLIS	1	1993	
CARSON	955 NW MEADOW VIEW DRIVE	CORVALLIS	1	1993	0062
SEIDLER	2450 S.W. 53RD ST.	CORVALLIS	1	1992	
ORCO INC	5160 ELLIOTT CIRCLE	CORVALLIS	1	1989	
WHITTLE	3840 N.W. HIGHLAND DRIVE	CORVALLIS	1	1990	
SCHRIVER	235 N.E. GRANGER	CORVALLIS	1	1989	
WILLAMETTE S & L	6610 N.W. MT VIEW DRIVE	CORVALLIS	1	1989	
CURTIS GARNER	910 SE RICHLAND AVE	CORVALLIS	1	1994	
JOHN/KAY ENBOM	3190 NW DEER RUN	CORVALLIS	1	1995	UNK
WEEDMAN	501 N.E. THOUSAND OAK DRIVE	CORVALLIS	1	1990	

WARREN	7710 N.W. MCDONALD CIRCLE	CORVALLIS	1	1991	167
MURPHY	2540 WINDSOR PLACE	CORVALLIS	1	1991	275
JOHNSON	7640 HOODVIEW DRIVE	CORVALLIS	1	1991	240
MC DANIEL	8460 N.W. MICHELL	CORVALLIS	1	1991	300
BOAL	5249 S.W. SECHER LANE	CORVALLIS	1	1991	265
BOAL	5265 S.W. SECHER LANE	CORVALLIS	1	1991	265
PRESTON	7305 N.W. MOUNTAIN VIEW	CORVALLIS	1	1991	90
HZHB RANCH	GRANDVIEW DRIVE	CORVALLIS	1	1991	153
SIMMONS	39046 TRILLIUM LANE	CORVALLIS	1	1992	298
CIRELLO	7120 N.W. MADRONA WAY	CORVALLIS	1	1991	
MAGRUDER	4880 S.W. RESEVOIT	CORVALLIS	1	1992	
W & J THOMPSON	7145 SW SHAMROCK LANE	CORVALLIS	1	1993	0125
JAMES	5065 SE 3RD ST	CORVALLIS	1	1994	
POWELL	MOUNTAIN LAUREL CIRCLE N.W.	CORVALLIS	1	1990	95
WESTERN RELOCATION	8275 N.W. CHAPPARRAL DRIVE	CORVALLIS	1	1991	350
JOHNSON	1016 NW ALDER CREEK	CORVALLIS	1	1902	
FLORIO	2865 ROYAL OAKS	CORVALLIS	1	1991	
CORNELL	29418 HIGHWAY 34	CORVALLIS	1	1991	80
DVA	38966 PRENA ROAD	CORVALLIS	1	1989	
PARADIS	7035 N.W. CHURCHILL WAY	CORVALLIS	1	1990	95
CLAIN/PAM ANDERSON	6353 NW MOUTAIN VIEW DR	CORVALLIS	1	1994	UKN
RONALD R BAYLESS	605 NW MT LAUREL CLE	CORVALLIS	2	1995	50
BARTON/VANDEHAY	1480 SW ALLEN STREET	CORVALLIS	2	1996	
LIMEHOUSE	7810 N.W. OXBOW	CORVALLIS	2	1989	
SCOTT	5815 N.W. VINYARD DRIVE	CORVALLIS	2	1989	
DVA	2540 ASBAHR	CORVALLIS	2	1989	
HEIDRICH	1260 S.E. ALEXANDER	CORVALLIS	2	1991	48
LUEHRING	6380 N.E. PETTIBONE DRIVE	CORVALLIS	2	1989	
A/L STEFFEN	375 NW ARMSTRONG WAY	CORVALLIS	2	1996	100
BECKER	27704 HWY 99W	CORVALLIS	2	1990	
ENGDALL	4525 S.W. PHILOMATH	CORVALLIS	2	1990	
STOTT	4710 S.E. 3RD	CORVALLIS	2	1989	
SLEEPER	4525 S.E. 3RD	CORVALLIS	3	1989	
SMITH	4130 N.E. FAIRACRES STREET	CORVALLIS	3	1991	67
MITZIE YOUNG	PARCEL #2 RHODA WAY	CORVALLIS	3	1996	
BERTALOTTO	33993 NE VELLE	CORVALLIS	3	1992	35
BROWN	5245 S.W. HILLVIEW	CORVALLIS	3	1991	
MOORE	1925 N.E. SEAVY AVENUE	CORVALLIS	3	1990	30
LAPATRA	2365 N.E. MERLOY AVENUE	CORVALLIS	4	1990	
HEGGEN	8553 N.W. OAK CREEK DRIVE	CORVALLIS	4	1990	76
DAGGS	1401 GRANGER ROAD	CORVALLIS	4	1990	103
TAYLOR	4140 N.E. FAIR ACRES	CORVALLIS	4	1990	55
HENSHAW	2130 - 2140 N.E. MERLOY	CORVALLIS	5	1991	
EVA COTNER	28750 HWY 34	CORVALLIS	5	1995	UNKN
SPECTRUM PROPERTIES	24402 MAXFIELD CREEK ROAD	CORVALLIS	5	1991	
SMITH	2120 N.E. STEELE	CORVALLIS	5	1990	
FRED MEYER	33250 PRIMROSE RD SE	CORVALLIS	6	1994	
COOK	4050 N.E. MORNING DRIVE	CORVALLIS	6	1990	60
WILT	30600 SMITH LOOP RD	CORVALLIS	7	1995	45
JEFFRESS	4051 N.E. FAIR ACRES	CORVALLIS	7	1991	
BRICKEY	3325 WHITE OAK ROAD	CORVALLIS	8	1990	
FORBES	4805 NE HIGHWAY 20	CORVALLIS	8	1992	
RICH	28830 HWY 34	CORVALLIS	9	1990	
HILL	3095 N.E. GARDEN ROAD	CORVALLIS	9	1990	
BAIER	5111 NE HWY 20	CORVALLIS	9	1993	
DVA	27941 EUREKA ROAD	CORVALLIS	12	1990	
LEMA L. SPICER	89666 SHEFFLER RD	ELMIRA	0	1995	UNKN
FRANKS	24994 W. DEMMING ROAD	ELMIRA	0	1992	
JOE MILLS	90117 DEMMING RD	ELMIRA	0	1995	50

TED PALMER	90004 KNIGHT RD	ELMIRA	0	1995	280
HARRIET WATSON	89996 TERRITORIAL RD	ELMIRA	0	1996	UNK
MARY SHEPHERD	24645 W DEMMING RD	ELMIRA	0	1996	UNK
DARRELL/ALYCE SMITH	89596 DEMMING RD	ELMIRA	0	1996	UNK
ELDA V LOWMAN	24881 HORN RD	ELMIRA	0	1996	56
LOUISE ANDERSON	88687 EVERS RD	ELMIRA	0	1996	85
CHAR./DAISY PHILLIPS	90259 DAISY LANE	ELMIRA	0	1995	72
BRYSON/WEST	23482 SUTTLE ROAD	ELMIRA	0	1995	80
MC CALL	89340 KNIGHT RD	ELMIRA	1	1989	
SMITH	88939 LOIS LANE	ELMIRA	1	1990	
DVA	22916 GREEK CREEK ROAD	ELMIRA	1	1989	
KISER	24691 W. DEMMING ROAD	ELMIRA	1	1990	
HONZA	25375 LAMB ROAD	ELMIRA	1	1990	
DANA MUELLER	25374 PERKINS RD	ELMIRA	1	1995	UKN
DALE YOUNKIN	88733 TERRITORIAL RD.	ELMIRA	1	1995	UNK
CROWELL	88844 EVERS ROAD	ELMIRA	1	1990	
KACZMARCZYK	88871 EVERS ROAD	ELMIRA	1	1990	
CHILDS	89383 DEMMING ROAD	ELMIRA	1	1990	
GARNER	90361 BAKER ROAD	ELMIRA	1	1990	
DUNNING	24650 DEMMING RIDGE ROAD	ELMIRA	1	1990	
BRUNNER	23168 WALTER ROAD	ELMIRA	1	1990	
PARKER	89335 KNIGHT ROAD	ELMIRA	1	1990	85
HEISLER	90266 SHEFFLER ROAD	ELMIRA	1	1991	
THOMPSON	24439 WARTHEN ROAD	ELMIRA	1	1990	
MEADE	24717 OAK LANE	ELMIRA	1	1991	50
WIGHAM	88764 TERRITORIAL ROAD	ELMIRA	1	1991	
FITZGERALD	25364 LAMB ROAD	ELMIRA	1	1991	60
WHITEHOUSE	25231 ARNOLD LANE	ELMIRA	1	1991	80
GADDY	24605 PULONE ROAD	ELMIRA	1	1991	
BAILEY	89359 KNIGHT ROAD	ELMIRA	1	1991	275
THOMAS	23515 W. SHEFFLER ROAD	ELMIRA	1	1991	
DARROCK	89071 SHEFFLER ROAD	ELMIRA	1	1991	45
SMITH	24084 WARTHEN ROAD	ELMIRA	1	1991	59
POWER	90035 POWER LANE	ELMIRA	1	1992	
LOIS MARQUARDT	25363 ARNOLD LANE	ELMIRA	1	1993	
CRUMP	23021 GREEN CR RD	ELMIRA	1	1994	
MARGUARDT	88776 EVENS ROAD	ELMIRA	1	1991	
CLAIRBORNE	89819 W. DEMMING ROAD	ELMIRA	1	1989	
BRESSLER	89372 FERN DRIVE	ELMIRA	2	1991	
ROBETSON	89098 KNIGHT ROAD	ELMIRA	2	1993	
CHYLEEN HARRIS	25404 NOYER LANE	ELMIRA	4	1995	UNKN
THALLON/ETZWILER	84668 MCBETH RD	EUEGNE	0	1995	70
ROSEMARY MAJOR	29031 GIMPEL HILL RD	EUGENE	0	1996	156
ALICE J SMITH	33724 VAN DUYN RD	EUGENE	0	1997	130
CHARLES/JILL CCHARPF	85336 FORSEST HILL LN	EUGENE	0	1995	UKN
MICHAEL GESTENBURGER	82790 MARLOW RD	EUGENE	0	1995	UKN
GARY VOORHIRES	84897 LAUGHLIN RD	EUGENE	0	1995	70
JEROME/JUDITH PARTCH	28441 BRIGGS HILL ROAD	EUGENE	0	1995	UKN
RODGER D SMITH	88649 FIR VIEW ST	EUGENE	0	1995	115
ALLEN MADSEN	28585 CROW RD	EUGENE	0	1995	UNK
M/M ABRAHAM	85296 RIDGETOP DR	EUGENE	0	1995	350
M/M KITTLESON	WEST OF 29323 GIMPI HILL	EUGENE	0	1995	115
JERRY/SUSAN PIERCE	30400 SEELY LN	EUGENE	0	1995	300
BRIAN ROHTER	86016 PLAYWAY	EUGENE	0	1995	54
EULA PEARSON	26724 PICKENS RD	EUGENE	0	1995	104
GERALD SHAWL	80520 OLD LARANE RD	EUGENE	0	1995	103
DON MITCHELL	86878 BAILEY HILL RD	EUGENE	0	1995	UNKN
ROSCOE DIVINE	86426 SANFORD RD PROPERTY	EUGENE	0	1995	240
kATHRINE SHANER	85006 LORANE HWY	EUGENE	0	1996	UNKN

MIKE JARQOE	87304 HALDERSON RD	EUGENE	0	1991	
GREEN	HALDDERSON STREET	EUGENE	0	1993	430
HOLLON GUNTER	85178 LORANE WAY	EUGENE	0		
CHARLES AGOL	85240 McBETH RD	EUGENE	0	1995	UNK
ERNEST ROBIRDS	86195 & 86201 EL CAMINO	EUGENE	0	1996	90
SNOW MOUNTAIN RESOUR	86476 BAILEY HILL LP	EUGENE	0	1996	160
HOWARD WIDOFF	15 SPENCER HOLLOW RD	EUGENE	0	1995	456
ANGELA STOCKER	84443 MURDOCK RD	EUGENE	0	1996	UNK
PHILIP M BRANDT	27939 ROYAL AVE	EUGENE	0	1996	70
THOMAS MOZER	87451 GREENHILL RD	EUGENE	0	1996	389
CASS JACKSON	84286 LORANE HWY	EUGENE	0	1997	
MARIE HAYES	28291 GIMPL HILL RD	EUGENE	0	1996	
J/T CRAWFORD	29915 FOX HOLLOW	EUGENE	0	1996	
EMMA FOX	86522 BAILEY HILL LOOP	EUGENE	0	1996	170
AARON AUBUCHON	30119 FOXHOLLOW RD	EUGENE	0	1996	90
CHARLES SHARPF	85336 FIRREST HILL LN	EUGENE	0	1996	
FRANK KRUIT	27228 BRIGGS HILL RD	EUGENE	0	1996	100
JIM SCHWERING	28131 SPENCER CRK RD	EUGENE	0	1996	120
FRANK KRUIT	27228 BRIGGS HILL RD	EUGENE	0	1996	
NAGANGAST	27965 BRIGGS HILLS RD	EUGENE	0	1997	
STATTON	32644 DILLARD ROAD	EUGENE	0	1989	
WALKER & BUSH INVEST	33007 DILLARD RD	EUGENE	0	1995	UKN
GREGG	87326 GREENHILL ROAD	EUGENE	0	1989	
MORNINGSUN	30900 BLANTON ROAD	EUGENE	0	1989	
MC GEE	84608 LAUGHLIN ROAD	EUGENE	0	1991	
ROBINSON	89779 MONTEITH LN.	EUGENE	0	1992	60
GAWLOWSKI	86541 LORANE HWY.	EUGENE	0	1992	100
ROBINSON	89779 MONTEITH LN	EUGENE	0	1992	60
HUITT	3970 1/2 MCDOUGAL	EUGENE	0	1990	
ROSS	27961 JUDY	EUGENE	1	1989	
GALLAGHER	1900 E. REACON DRIVE	EUGENE	1	1989	
GILLESPIE	25309 FLECK ROAD	EUGENE	1	1990	
COCHRAN	30366 FOX HOLLOW	EUGENE	1	1990	
OTTO	85164 S. WILLAMETTE	EUGENE	1	1990	
GLOVEN	29633 FOX HOLLOW	EUGENE	1	1989	
KOSTER	28485 BRIGGS HILL ROAD	EUGENE	1	1989	
VROOMAN	4271 W. 18TH	EUGENE	1	1989	
GEORGE VAN VLEET	87171 KELLMORE	EUGENE	1	1995	276
M/M MICHALSEN	33451 VAN DUYN RD	EUGENE	1	1995	UNKN
WESTBROOKS	87140 DUKHOBAR ROAD	EUGENE	1	1990	
BOURGERI	91793 HORSE CREEK ROAD	EUGENE	1	1990	
FATTZ	84977 PEACEFUL VALLEY ROAD	EUGENE	1	1990	
TODD	28578 CROW ROAD	EUGENE	1	1990	
KIERAN	36541 REDWOOD HYW	EUGENE	1	1992	38
JAMES BENNETT	FOXRIDGE LN	EUGENE	1	1994	161
ANDREAS	29572 GIMPLE HILL RD	EUGENE	1	1994	260
LORNA K GILMORE	81142 TERRITORIAL	EUGENE	1	1994	240
DENNIS WILLIAMS	85462 PINE GROVE RD	EUGENE	1	1993	?
GERALD THENELL	180 CHAPMAN DR	EUGENE	1	1994	?
LARRY STOWELL	31981 GERMAN ST	EUGENE	1	1994	?
SUDUT	81522 TERRITORIAL RD	EUGENE	1	1993	
T'HOAFT	82307 TERRITORIAL RD	EUGENE	1	1993	
ZAK SCHWARTZ ET AL	33728 SEAVEY LOOP	EUGENE	1	1993	
OSU FOUNDATION	56582 NORTH BANK RD	EUGENE	1	1993	
JOHN ANDREAS	29572 GIMPL HILL RD	EUGENE	1	1994	260
EDDIE&SANDY DAVIS	90216 COBURG RD	EUGENE	1	1995	UKN
ROBERT/TERRY NEHL	34520 MATHEWS RD	EUGENE	1	1995	UKN
ANDREAS	29572 GIMPL HILL RD	EUGENE	1	1994	260
HARTWIG	25388 EL DALE DRIVE	EUGENE	1	1990	

MILLER	34769 MATHEWS ROAD	EUGENE	1	1989	
HILL	30729 FOX HOLLOW	EUGENE	1	1990	
COPE	84286 LORANE HWY	EUGENE	1	1990	
JESSEE	26949 PICKENS ROAD	EUGENE	1	1990	
LUDWIG	27053 PICKENS ROAD	EUGENE	1	1990	
JESSEE-LUDWIG	26945 PICKENS ROAD	EUGENE	1	1990	
GRUENER	91010 SUNDERMAN	EUGENE	1	1990	
SORENSON	34833 HWY 58	EUGENE	1	1990	
BECKER	34866 MATHEWS ROAD	EUGENE	1	1990	
HINMAN	86460 LORANE HWY	EUGENE	1	1990	
BOTTEM	86663 CENTRAL ROAD	EUGENE	1	1990	
CONTRACT SALES INC	38391 & 38883 DEXTER ROAD	EUGENE	1	1990	
PADDOCK	84966 PEACEFUL VALLEY ROAD	EUGENE	1	1990	160
PREMER	26227 FAWVER ROAD	EUGENE	1	1990	
BUCHOLTZ	SHORE LANE, LOT 1700	EUGENE	1	1990	103
ROBINS	85476 S. WILLAMETTE STREET	EUGENE	1	1990	
HENNINGSGAARD	85114 S. WILLAMETTE	EUGENE	1	1990	
MURRY	86730 CENTRAL ROAD	EUGENE	1	1990	60
FOX	87165 KELLMORE	EUGENE	1	1991	420
HILL	33024 BLOOMBERRY ROAD	EUGENE	1	1991	
DWYER	34376 MATHEWS ROAD	EUGENE	1	1991	120
KINNEY	85333 PEACEFUL VALLEY ROAD	EUGENE	1	1991	241
LUIS	27500 W. 10TH	EUGENE	1	1991	
DVA	28104 CROW ROAD	EUGENE	1	1990	28
RICHARDSON	1690 RIVER LOOP #1	EUGENE	1	1991	
TUPPER	85260 S. WILLAMETTE	EUGENE	1	1991	
DVA	84760 S. HIDEAWAY HILLS	EUGENE	1	1991	
MCKENDRICK	87893 GREENHILL ROAD	EUGENE	1	1991	
EGBERT	27645 ERICKSON ROAD	EUGENE	1	1991	119
WARREN	28393 ROYAL AVENUE	EUGENE	1	1991	
WILLIAMS	84983 LARSON ROAD	EUGENE	1	1991	
HELD	84640 LORANE HWY	EUGENE	1	1991	
ARILLA	87140 DUKHOBAR	EUGENE	1	1991	
MASTYN	29251 HAM ROAD	EUGENE	1	1991	
MEREDITH	85500 MCBETH ROAD	EUGENE	1	1991	
TROJANEK	27812 CLEAR LAKE ROAD	EUGENE	1	1991	50
JAROS	S. WILLAMETTE STREET	EUGENE	1	1991	191
ZUELKE	86838 BAILEY HILL ROAD	EUGENE	1	1991	
MC CUEN	34337 HWY 58	EUGENE	1	1991	
SPENCE	27321 CLEAR LAKE ROAD	EUGENE	1	1991	
KUPEL	85488 APPLETREE COURT	EUGENE	1	1992	
FORTIER	85967 S. MODESTO	EUGENE	1	1991	
KLEINER	32158 DILLARD ROAD	EUGENE	1	1992	
WHIT	86899 CENTRAL ROAD	EUGENE	1	1992	
JACQUE	87304 HALDERSON ROAD	EUGENE	1	1991	
MURPHY	28393 RAINBOW VALLEY RD.	EUGENE	1	1991	
RAU	85262 PEACEFUL VALLEY RD.	EUGENE	1	1992	160
ESCOBOSA	25847 CROW RD.	EUGENE	1	1992	
NELSON	27470 CLEAR LAKE RD.	EUGENE	1	1992	229
GOREE	3301 APPLETREE DRIVE	EUGENE	1	1993	168
GUNTER	8517 LORANE HWY	EUGENE	1	1993	
NEVEN JENSEN	85115 DOANE RD	EUGENE	1	1993	
BROWN/PENUNIRI	29249 WILLOW CREEK RD	EUGENE	1	1992	110
SHELLY ROSS	87904 OAK HILL DR	EUGENE	1	1992	65
JESSE EAGAN	27285 CLEAR LAKE RD.	EUGENE	1	1993	0085
M. & M. WHEELER	87496 DUKHOBAR	EUGENE	1	1993	
TOY	86565 N MODESTO	EUGENE	1	1993	
RIDDLE	82811 MARLOW ROAD	EUGENE	1	1992	
BAUMANN	29915 FOX HOLLOW	EUGENE	1	1993	0155

NELSON	27470 CLEAR LAKE RD	EUGENE	1	1992	229
GAWLOWSKI	86541 LORANE HWY	EUGENE	1	1992	100
SMITH	27965 BRIGGS HILL RD.	EUGENE	1	1994	
KRESS	28066 SPENCER CR RD	EUGENE	1	1994	
ZAMORANS	27676 CROW ROAD	EUGENE	1	1989	
BATY	83218 TERRITORIAL ROAD	EUGENE	1	1990	
MOULER	86410 PINE GROVE ROAD	EUGENE	1	1990	
ROOZEN	86207 BAILEY HILL ROAD	EUGENE	1	1991	
PIKE	32846 DILLARD ROAD	EUGENE	1	1991	
DI LIBERTO	85150 APPLEWOOD DR	EUGENE	1	1993	0500
GOULD/McKAMEY JR.	29969 FOX HOLLOW RD	EUGENE	1	1995	400
BONTEKOE	27211 HUEY LANE	EUGENE	1	1990	
DENNEY	85036 LARSON ROAD	EUGENE	1	1991	
HEIN	27875 GREEN OAKS DRIVE	EUGENE	1	1990	
JACAVE	87304 HALDERSON RD	EUGENE	1	1992	
ODEGARD	89580 FIR BUTTE ROAD	EUGENE	1	1991	
GLADYS ABARR ESTATE	3560 SISTERS VIEW	EUGENE	1	1996	
EMERY	27313 BRIGGS HILL ROAD	EUGENE	2	1990	
KAUFFMAN	27855 GREEN OAK DRIVE	EUGENE	2	1991	81
PETERSEN ESTATE	85058 ;ARSON RD	EUGENE	2	1996	UNKN
ANN PERSON	30920 LANES TURN	EUGENE	2	1996	
SETTLE	34488 HIGHWAY 58	EUGENE	2	1995	UNK
M/M RALPH ALSETH	90334 LAKEVIEW DR	EUGENE	2	1995	UNKN
RALPH/RUTH AALSETH	90334 LAKEVIEW DR	EUGENE	2	1995	UNKN
LIDA WHIPPS ESTATE	90214 LEDA WAY	EUGENE	2	1994	
C/L NICHOLSON	27929 GREEN OAKS DR	EUGENE	2	1996	
CROCKER	27364 BRIGGS HILL ROAD	EUGENE	2	1989	
M/M ADAIR	27977 GREEN OAKS	EUGENE	2	1995	UNK
ORUM	2811 BUCKSKIN	EUGENE	2	1991	52
WHITT	28045 WILDERNESS LANE	EUGENE	2	1992	
WHITT	28045 WILDROSE LN	EUGENE	2	1992	
LUCILE MOYER FRAST	90897 PRAIRIE RD	EUGENE	2	1996	UNKN
WENNERSTROM	89710 FIR BUTTE ROAD	EUGENE	3	1989	
JOHNSON	85037 LARSON RD.	EUGENE	3	1992	
JOHNSON	85037 LARSON RD	EUGENE	3	1992	
INDA	83032 TERRITORIAL HWY	EUGENE	3	1989	
BETH ISKRA	4700 RIVER RD	EUGENE	3	1996	
TERESA SIBOLD	28899 HILLAIRE DR	EUGENE	3	1995	40
TALBOTT	28151 EDGEWATER	EUGENE	4	1993	0085
ROBERTS	555 RIVER LOOP	EUGENE	4	1990	
PONS	90828 COBURG ROAD	EUGENE	4	1992	
ALLEN	31981 COBURG BOTTOM LOOP	EUGENE	4	1993	0100
DELCURTO	90744 PRAIRIE ROAD	EUGENE	4	1993	
CLAUSEN	90748 PRARIE ROAD	EUGENE	4	1990	30
KIMBERLY STURTEVANT	4075 SCENIC DR	EUGENE	5	1997	25
HOOKER	28230 CLEAR CREEK ROAD	EUGENE	5	1991	47
FIPPS	5165 ROYAL AVENUE	EUGENE	6	1990	
BOB/JUDY COOPER	83087 SIMPSON RD	EUGENE	6	1996	270
SMALL	MEADOWVIEW LANE	EUGENE	6	1991	
GEORGE MISNER	29404 CLEAR LAKE RD	EUGENE	6	1995	UNKN
MATSINGER	31981 COBURG BOTTOM LOOP	EUGENE	6	1992	
WILLIAMS	4323 RIVER RD	EUGENE	6	1992	
GREGORY	195 HILLVIEW #1	EUGENE	7	1990	
HENSON	755 NOTTINGHAM	EUGENE	7	1990	
HUBBARD	93699 PRAIRIE ROAD	EUGENE	8	1989	
BLACHLY	5190 ROYAL AVENUE	EUGENE	9	1991	
L/L/S COLTHAR	31710 GREEN ISLAND RD	EUGENE	9	1996	UNK
KLETZOK	31987 COBURG BOTTOM LOOP	EUGENE	10	1990	
KIRKPATRICK	31439 COBURG BOTTOM LOOP	EUGENE	12	1990	

LEON SMITH	90908 KNOX RD	EUGENE	19	1995	UKN
CLAIRBORNE	89765 GREENHILL ROAD	EUGENE	19	1990	
STEVEN HILDEBRAND	25867 CENTER SCHOOL RD.	HALSEY	1	1995	UNK
ZIEGER	31556 AMERICAN DRIVE	HALSEY	1	1990	
GREIG	29469 ABRAHAM DR.	HALSEY	4	1992	
KEN/BEVERLY KOHN	33200 MT TOM RD	HARRISBURG	0	1995	UNKN
RUSS/JUDY COSTELLO	33947 MT TOM DR	HARRISBURG	0	1995	244
BOWERS	34014 PRICEBORO DR.	HARRISBURG	0	1993	0125
GORDON JONES	22335 GAP RD	HARRISBURG	0	1996	UNK
S/P JAQUA	29544 CARTNEY DR	HARRISBURG	0	1996	
DVA	34033 MT TOM DRIVE	HARRISBURG	1	1989	
BARBARA MAURER	22415 GAP RD	HARRISBURG	1	1994	50
GILTNER	33805 WILDWOOD ESTATES LOOP	HARRISBURG	1	1990	
GRUBER	32802 MT. TOM ROAD	HARRISBURG	1	1990	53
GODDARD	20915 FILBERT ROAD	HARRISBURG	1	1991	44
GANN	23789 GAP ROAD	HARRISBURG	1	1991	
SLACK	30890 PRICEBOW	HARRISBURG	2	1990	
NOT GIVEN	34310 TUB RUN DR	HARRISBURG	2	1997	55
BOWERS	22955 N. COBURG ROAD	HARRISBURG	2	1989	
VITUS	30878 PRICEBORO DR.	HARRISBURG	2	1992	
VITUS	30878 PRICEBORO DR	HARRISBURG	2	1992	
WILLIS	25085 PEORIA ROAD	HARRISBURG	5	1991	35
WILLIAMS	20966 N. COBURG ROAD	HARRISBURG	5	1991	
DICK STRODA	22304 COBURG RD	HARRISBURG	6	1996	41
G WAGGENER	25258 ROWLAND RD	HARRISBURG	6	1996	60
BROCK	30599 DIAMOND HILL DRIVE	HARRISBURG	6	1990	
SACRED HEART HOSPITA	20830 CURTIS RD	HARRISBURG	6	1994	
BARENTS	24040 HWY 99E	HARRISBURG	7	1992	
BEKKER	93853 RIVER ROAD	JUNCTION CITY	14	1990	
WINKLER/CHOWYN	26181 CLEARINGSIDE DR	JUNCTION CITY	0	1995	90
JUDSON PORTER	1 ACRE LAKE HILLS DR	JUNCTION CITY	0	1995	130
FRANCIS/JERRI BENNET	95148 TURNBOW LANE	JUNCTION CITY	0	1995	UKN
ELDON/CAROL. ZEHNER	90648 ALVADORE RD	JUNCTION CITY	0	1995	UNK
JEFF/LAURA CARROLL	26521 FRANKLIN RD	JUNCTION CITY	0	1995	265
RUTH BREAZEALE	23473 HWY 36	JUNCTION CITY	0	1995	UNKN
VIAVAL OGLES	27210 LOUDEN LANE	JUNCTION CITY	0	1996	59
LOWAN	24588 LAKE HILL DR	JUNCTION CITY	0	1996	UNKN
GAYLE WALKER	94899 LINN RIDGE DR.	JUNCTION CITY	0	1993	0090
JONES	91148 STARLITE LANE	JUNCTION CITY	0	1992	65
HUNT	95086 TURNBOW LN	JUNCTION CITY	0	1993	125
MARTHA MATHIS	26446 VALLEY VIEW	JUNCTION CITY	0	1996	165
M/M DOORNIK	94764 TURNBOW LANE	JUNCTION CITY	0	1996	70
RICH REMONT	25640 LAWRENCE RD	JUNCTION CITY	0	1996	105
HINRICHS	24916 PARADISE DR	JUNCTION CITY	0	1996	425
BILL/PENNY JAMES	91955 TERRITORIAL HWY	JUNCTION CITY	0	1996	UNKN
CAROL HUGHES	25286 BUTLER RD	JUNCTION CITY	0	1996	UNKN
KEVIN GENT	93205 GIANT OAKS DR	JUNCTION CITY	0	1996	
M/M BROWN	24750 LAWRENCE RD	JUNCTION CITY	0	1996	
JOHN/KAREN MORREAU	93924 PITNEY LANE	JUNCTION CITY	0	1996	
O'BRYANT	24831 PARADISE	JUNCTION CITY	0	1990	
ALEXANDER	23869 HIGH PASS ROAD	JUNCTION CITY	0	1991	240
OGLES	27266 LOUDEN LANE	JUNCTION CITY	0	1993	
KAWASAKI	90430 LARSLAN LANE	JUNCTION CITY	1	1990	
AUSTIN	94607 TURNBOW LANE	JUNCTION CITY	1	1990	
COLLINS	90664 TERRITORIAL	JUNCTION CITY	1	1989	
WILKIE	26110 HALL ROAD	JUNCTION CITY	1	1989	
DEURMYER	24915 HIGH PASS ROAD	JUNCTION CITY	1	1989	
GARY F SMITH	26441 FRANKLIN RD	JUNCTION CITY	1	1994	
BARBARA RILEY	23845 HWY 36	JUNCTION CITY	1	1994	

STEVEN MERRILL	94313 TEMPLETON RD.	JUNCTION CITY	1	1995	UNK
POTLAND LIVESTOCK	26317 HALL ROAD	JUNCTION CITY	1	1990	
NOMEQUITY	26366 CORY ROAD	JUNCTION CITY	1	1990	
BARNHART	26521 FRANKLIN ROAD	JUNCTION CITY	1	1990	
KADRMAS	25037 PARADISE ROAD	JUNCTION CITY	1	1990	
CHRISTIE	95545 TERRITORIAL ROAD	JUNCTION CITY	1	1990	90
WING	93130 GIANT OAK DRIVE	JUNCTION CITY	1	1990	50
SMITH	91310 TERRITORIAL ROAD	JUNCTION CITY	1	1990	93
RILEY	26291 FERGUSON ROAD	JUNCTION CITY	1	1990	210
LEDNICKY	25166 FERGUSON ROAD	JUNCTION CITY	1	1991	
LEE	25129 LAVELL ROAD	JUNCTION CITY	1	1991	40
ROSS	91077 STARLITE LANE	JUNCTION CITY	1	1991	
JENKINS	24080 HIGH PASS ROAD	JUNCTION CITY	1	1991	100
JOHNSON	90746 DALE WOOD DRIVE	JUNCTION CITY	1	1991	
SEELEY	26291 FERGUSON ROAD	JUNCTION CITY	1	1991	
ANDERSON	90681 DALEWOOD	JUNCTION CITY	1	1992	
KESTER	27036 8TH STREET	JUNCTION CITY	1	1991	80
CANNING	25051 LAVELL ROAD	JUNCTION CITY	1	1992	140
VICANS	24718 PARADISE RD.	JUNCTION CITY	1	1992	
SNIDOW	SPRINGBROOK LN. #7	JUNCTION CITY	1	1992	145
NARUM	24664 BUTLER RD.	JUNCTION CITY	1	1992	100
JAMES RAMSEYER	24526 LAKE HILLS DRIVE	JUNCTION CITY	1	1992	
SLOCUM	26181 CLEARING SIDE DR	JUNCTION CITY	1	1992	170
STAMBAUGH	25974 BUTLER RD	JUNCTION CITY	1	1992	
J & A DICKEY	24670 BUTLER ROAD	JUNCTION CITY	1	1993	
SMITH	90765 DALEWOOD	JUNCTION CITY	1	1993	
ROCK LANGELIERS	25119 PARADISE	JUNCTION CITY	1	1993	0044
BALE	600 ALDER STREET	JUNCTION CITY	1	1993	
NARUM	24664 BUTLER RD	JUNCTION CITY	1	1992	100
LANGELIERS	25119 PARADISE	JUNCTION CITY	1	1993	0044
BOWMAN	24234 HWY 99 W	JUNCTION CITY	1	1990	
GERTRELL	93710 TERRITORIAL ROAD	JUNCTION CITY	1	1990	
JOHN EVANS	91415 TERRITORIAL RD	JUNCTION CITY	1	1996	
CRISP	28244 FERGUSON ROAD	JUNCTION CITY	1	1990	25
SKINNER	25031 LAVELL RD.	JUNCTION CITY	2	1992	200
GLYN REDFORD	29125 MEADOWVIEW ROAD	JUNCTION CITY	2	1992	
FARM CREDIT BANK	91731 PRAIRIE ROAD	JUNCTION CITY	2	1990	
OGLES	27304 LONDON LANE	JUNCTION CITY	2	1993	0077
B/M ANDREWS	30636 LONE PINE DR	JUNCTION CITY	2	1996	40
NELSON	93616 DORSEY LANE	JUNCTION CITY	3	1990	
PITCHER	93618 PRAIRIE ROAD	JUNCTION CITY	3	1991	100
LOWELL/DEEDEE BARTON	90490 ALVADORE RD	JUNCTION CITY	3	1996	145
COOLEY	93767 DORSEY LANE	JUNCTION CITY	3	1989	
MP CATTLE CO	25362 HIGH PASS ROAD	JUNCTION CITY	3	1993	3
BOWMAN	23879 WHY 99W	JUNCTION CITY	3	1992	
ROY WESLER	27575 HWY 36	JUNCTION CITY	4	1995	
FITZPATRICK	28319 W. MEADOWVIEW ROAD	JUNCTION CITY	4	1990	
GLYN REDFORD	91704 HWY 99	JUNCTION CITY	4	1992	
FOLTZ	30046 MONTMORENCE DR.	JUNCTION CITY	4	1993	0049
PARKER	93885 PITNEY LN.	JUNCTION CITY	4	1992	
GABER	24010 SCHULTZ ROAD	JUNCTION CITY	5	1991	
VERN KAISER	93940 PRAIRIE RD	JUNCTION CITY	5	1994	
TIPTON	93291 PRAIRIE ROAD	JUNCTION CITY	5	1990	
STUCKAATH	1790 IVY STREET	JUNCTION CITY	5	1990	
BALL	94393 OAKLEA DRIVE	JUNCTION CITY	5	1991	40
BODENNER	94609 WILLAMETTE DRIVE	JUNCTION CITY	5	1990	
NORMA CANNON	94363 OAKLEA DR	JUNCTION CITY	5	1996	
MURPHY	1644 W. 10TH AVENUE	JUNCTION CITY	6	1990	
DOUG LANE	1020 SPRUCE ST	JUNCTION CITY	6	1995	UNKN

RAY PEDERSON	30185 LASSEN LANE	JUNCTION CITY	7	1995	UNKN
TATE REAL ESTATE	27964 FERGUSON ROAD	JUNCTION CITY	7	1989	
DAN ARNESON	91954 HWY 99 S	JUNCTION CITY	7	1994	100
SMITH	29055 DAVID LN.	JUNCTION CITY	7	1992	32
SMITH	29055 DAVID LN	JUNCTION CITY	7	1992	32
ENEL GOLDAN	93928 PRAIRIE RD	JUNCTION CITY	7	1993	29
ANDERSON	93914 PRAIRIE ROAD	JUNCTION CITY	7	1990	
SKAYHAN	94612 TOFTDAHL LANE	JUNCTION CITY	7	1990	
KULONGASKI	30325 MAPLE DRIVE	JUNCTION CITY	7	1991	
GEORGE HATTO	905 VINE ST	JUNCTION CITY	8	1995	UNKN
SHORT	820 SPRUCE ST.	JUNCTION CITY	8	1992	
KULORGOSKI	30303 MAPLE DRIVE	JUNCTION CITY	8	1991	
PIERCE	31296 LASSEN LANE	JUNCTION CITY	8	1989	
WHITFORD	1825 W. 10TH	JUNCTION CITY	8	1990	
MONROE	30050 HEATHER OAK	JUNCTION CITY	8	1990	
TENNENT	29361 DANE LANE	JUNCTION CITY	8	1990	
LANGSTON	30135 HEATHER OAK	JUNCTION CITY	9	1990	25
HUTCHENS	748 VINE STREET	JUNCTION CITY	9	1991	
BRODBECK	1701 W. 10TH	JUNCTION CITY	9	1992	21
ESTATE OF DNNIS	29368 LINGO LANE	JUNCTION CITY	10	1996	
BOWEN	95299 OAKLEA DRIVE	JUNCTION CITY	11	1992	
A MOORE	94185 RIVER RD	JUNCTION CITY	11	1996	
E DALE MCCONNELL	28241 MEADOWVIEW RD	JUNCTION CITY	12	1994	35
ROBERT N BECK	29141 LINK LN	JUNCTION CITY	12	1994	
PALMER	94091 RIVER ROAD	JUNCTION CITY	12	1991	
EUNICE PLUMMA	94863 DODSON CT	JUNCTION CITY	14	1994	100
ARLENE/LEE ZUMWALT	28937 LINGO LANE	JUNCTION CITY	15	1995	UNKN
MATTINGLY	29390 TALBOT LANE	JUNCTION CITY	16	1992	
LEE/ARLENE ZUMWALT	28897 LINGO LN	JUNCTION CITY	17	1995	UNKN
EARL CHAPPELL	96310 NORATON RD	JUNCTION CITY	17	1993	
ZUMWALT	95602 HOWARD LANE	JUNCTION CITY	18	1990	
D/F CARLSON	28712 LINGO LANE	JUNCTION CITY	19	1996	
DVA	94955 HWY 99E	JUNCTION CITY	20	1992	25
LEE/ARLENE ZUMWALT	28883 LINGO LANE	JUNCTION CITY	20	1995	UNKN
LEROY TERRIEN	94910 LINK RIDGE DR	JUNCTION CITY	21	1994	35
WILLIE	28780 JAGER LANE	JUNCTION CITY	21	1992	
BLACKBURN	96065 NORATON ROAD	JUNCTION CITY	22	1992	
RODRICK/SUSAN BROWN	34203 FORD MILL RD	LEBANON	0	1995	UNK
ROD/SUSAN BROWN	34219 FORD MILL RD	LEBANON	0	1995	UNKN
CLYDE ERLER	34835 EDE RD	LEBANON	0	1995	UNKN
SANDERSON	1/2 MILE NE OF 39303 GRIGGS	LEBANON	0	1996	UNKN
GLENDA MELSON	30570 SODAVILLE MT HOME DR	LEBANON	0	1992	
WHITE	510 MINNESOTA ST	LEBANON	0	1992	86
BEAVER	455 OREGON ST	LEBANON	0	1992	
MOSS	875 W ASH ST	LEBANON	0	1992	52
YATES	29724 BATTLE CREEK RD	LEBANON	0	1993	500
W/J POPE	38102 RIVER DR	LEBANON	0	1996	25
ANN WHITEHILL	41250 MCDOWELL CRK	LEBANON	0	1996	165
WALTER POPE	38102 RIVER RD	LEBANON	0	1996	25
B/B GREEN	37645 SODAVILL CUT-OFF DR	LEBANON	0	1997	2
ANFRONY CASTRO	34212 KOWITZ RD	LEBANON	0	1997	
DSS CLAYTON	39522 GRIGGS DR	LEBANON	0	1995	UKN
KEN/KATHLEEN BUCK	32704 BENTON RD	LEBANON	0	1995	UKN
KEITH/JAN FLESHMAN	29186 SANTIAM TERRACE	LEBANON	0	1995	UNKN
EVELYN ROBINSON	33910 BREWSTER RD	LEBANON	0	1995	UNKN
ART JOHNSON	40087 BAPIST CHURCH	LEBANON	0	1996	175
KYHL	40396 HWY 228	LEBANON	0	1989	
HORST/NOFZINGER	777 BINSHADLER	LEBANON	0	1992	
GARY S FRIBERG	37079 ROCKHILL ROAD	LEBANON	0	1993	

FOMEST GUTSHALL	38082 GOLDEN VALLEY	LEBANON	0	1995	UNK
MIKE NELSON	32694 HAYDEN DRIVE	LEBANON	0	1996	
RAYMOND LATHAM	40799 LACOMB DR	LEBANON	0	1994	100
EDITH CRUISE	37245 ROEHILL DR	LEBANON	0	1994	?
LOWELL WHITFIELD	35414 E LACOMB DR	LEBANON	0	1994	80
RONALD CURREY	30745 CARNELIAN CT.	LEBANON	1	1995	UNK
ROD/SUSAN BROWN	34219 FORD MILL RD.	LEBANON	1	1995	60
VANDERLIP	39095 MT HOME DRIVE	LEBANON	1	1989	
TAYLOR	32399 S. VIEW ROAD	LEBANON	1	1990	
PULVER	40529 BAPTIST CHURCH DRIVE	LEBANON	1	1989	
HUFLEY	30780 TYE VALLEY ROAD	LEBANON	1	1990	
HAMILTON CR SCH DIST	35113 BREWSTER ROAD	LEBANON	1	1990	
QUINN	32021 MOSS DRIVE	LEBANON	1	1990	
KEENEY	41760 CUTOFF DRIVE	LEBANON	1	1990	
JENSEN	29010 BERLIN ROAD	LEBANON	1	1990	
BUNCH	30450 BUTTE CREEK ROAD	LEBANON	1	1990	
JENSEN	30115 BERLIN ROAD	LEBANON	1	1990	
MAROL	39625 BAPTIST CHURCH DRIVE	LEBANON	1	1990	
BAHRS	36449 HWY 34	LEBANON	1	1990	
LITTLE	33999 BOND ROAD	LEBANON	1	1990	
BARNES	340 N. SANTIAM HWY	LEBANON	1	1990	
COEN	3967 BAPTIST CHURCH ROAD	LEBANON	1	1990	
OVERLOCK	30484 TY VALLEY ROAD	LEBANON	1	1990	
FUNK	38625 GOLDEN VALLEY DRIVE	LEBANON	1	1991	78
ROBERTSON	30521 RANCHO ROAD	LEBANON	1	1991	152
KING	37898 MIDDLE RODGE ROAD	LEBANON	1	1991	
WILKISON	33923 MT. PLEASANT DRIVE	LEBANON	1	1990	144
SNOOK	37155 DEADWOOD	LEBANON	1	1991	
STATE OF OREGON	40683 PEAPLES DRIVE	LEBANON	1	1991	326
STUTZMAN	30483 FAIRVIEW ROAD	LEBANON	1	1992	
KAUFFMAN	30807 TY VALLEY ROAD	LEBANON	1	1992	108
SHIELDS	40355 BAPTIST CHURCH DR.	LEBANON	1	1992	92
BAGGETT	32403 HIDDEN VALLEY RD.	LEBANON	1	1992	85
STATE OF OR VETS AFF	875 W. ASH ST.	LEBANON	1	1992	52
MASON	935 CASCADE DRIVE	LEBANON	1	1992	
J/L FITZSIMMONS	39180 RIVER DR	LEBANON	1	1996	52
JEFF REEDER	29329 SANTIAM TERRACE	LEBANON	1	1996	
PACIFIC FIRST BANK	36656 EDGEMONT DRIVE	LEBANON	1	1990	
BRINK	34112 OLSON LANE	LEBANON	1	1990	
WESTERN UNITED LIFE	30165 HORSESHOE LOO RD	LEBANON	1	1996	
WILLAMETTE S & L	AGATE DRIVE	LEBANON	1	1990	
DVA	40959 LACOMB DRIVE	LEBANON	1	1989	
SWANSON	34990 EDE ROAD	LEBANON	1	1990	155
BURDELL	30474 SANTIAM RIVER ROAD	LEBANON	1	1990	
BABB	2780 BIRCH	LEBANON	1	1991	
ALT	36924 GORE DRIVE	LEBANON	1	1991	
LORI CHANCELLOR	35305 EDE RD	LEBANON	1	1994	
PACIFIC POWER & LGHT	33691 TOTEM POLE ROAD	LEBANON	1	1990	
ROBERT GEOGHEAGAN	33976 MT PLEASANT	LEBANON	1	1994	120
WRIGHT	29559 SANTIAM TERRACE	LEBANON	1	1992	
ROBERT REWOLDT	38318 HARRINTON DR	LEBANON	1	1995	UKN
B & S NG	2826 MOLLY PLACE	LEBANON	1	1992	
OCCUPANT	33414 BILLINGER SEALE RD	LEBANON	1	1992	165
SCHUMAKER	41060 BAPTIST CHURCH ROAD	LEBANON	1	1990	
WEBER	1653 12TH STREET	LEBANON	1	1991	140
SAVAGE	1983 OLD SANTIAM HWY	LEBANON	1	1990	
PORTER	36940 ROCK HILL DRIVE	LEBANON	1	1991	
SISSNERS	2240 MCKINNEY LANE	LEBANON	1	1992	
SIZEMORE	2240 MCKINNEY LN	LEBANON	1	1992	

RUNYAK	39821 MCDOWELL CREEK	LEBANON	1	1991	87
BALL	950 CASCADE DRIVE	LEBANON	1	1992	
DVA	36764 HWY 34	LEBANON	2	1991	57
POWELL	30749 S.W. LARSON ROAD	LEBANON	2	1991	200
BAILEY	466 AIRPORT ROAD	LEBANON	2	1990	20
WEDMAIN	775 LEBANITE DRIVE	LEBANON	2	1991	
TEMPLE	38970 RIVER RD.	LEBANON	2	1992	
BALL	38970 RIVER RD.	LEBANON	2	1992	
BALL	38970 RIVER RD	LEBANON	2	1992	
OLSON	230 CROWFOOT ROAD	LEBANON	2	1992	
MUSANTE	30321 TOWNSEND ROAD	LEBANON	2	1992	
MC DOUGALD	610 CENTRAL AVE	LEBANON	2	1993	
ALLEN	171 TAYLOR STREET	LEBANON	2	1991	40
HURST	30594 WEIRICH ROAD	LEBANON	3	1990	70
PEARSON	1250 9TH STREET	LEBANON	3	1990	
ROYAL PEDERSON	5450 SANTIAM HWY	LEBANON	3	1995	UNKN
RIDINOUR	2590 6TH STREET	LEBANON	3	1990	
BISHOP	305 OLIVE	LEBANON	3	1992	77
DANIELS	34075 FORD MILL ROAD	LEBANON	3	1989	
ED SAVOY	2440 PORTER	LEBANON	3	1996	
WOLFE	29019 SANTIAM TERRACE RD	LEBANON	3	1994	
PACKARD	30183 TOWNSEND ROAD	LEBANON	3	1991	
HEYNE	30276 FAIRVIEW	LEBANON	3	1991	
JAE MCPHERSON	535 CASCADE DR	LEBANON	3	1993	
METROPOLITAN MORT.CO	2540 PRIMROSE AVENUE	LEBANON	4	1991	
JACKOLA	1225 CASCADE DRIVE	LEBANON	4	1992	50
DVA	2090 MT. VIEW LANE	LEBANON	4	1989	
DAVISON	40344 LIND HAVEN LOOP	LEBANON	4	1990	180
BROSTROM	40940 BAPTIST CHURCH ROAD	LEBANON	4	1990	
ROWELL	23745 ROWELL LANE	LEBANON	4	1991	
DVA	40375 MCDOWELL CREEK ROAD	LEBANON	4	1990	
JACKSON	32042 HIDDEN VALLEY ROAD	LEBANON	4	1990	
DVA	39596 GRIGGS DRIVE	LEBANON	5	1989	
LAWHON	30529 BERLIN ROAD	LEBANON	5	1991	70
HILDEBRANDT	35293 TENNESSE RD.	LEBANON	6	1992	29
CLANTON	37390 TENNESSEE SCHOOL ROAD	LEBANON	6	1990	
KIRK	31300 S. MAIN	LEBANON	6	1990	180
BEAVER	455 OREGON ST.	LEBANON	6	1992	
DALE	38252 RIVER DRIVE	LEBANON	7	1991	
MICHAEL-LEONARD INC	33916 SANTIAM HWY N	LEBANON	8	1996	50
PRIMISING	660 W. ASH	LEBANON	8	1991	
PACIFIC POWER & LIGH	39933 MT. HOPE ROAD	LEBANON	8	1989	
DVA	2662 PRIMROSE STREET	LEBANON	14	1989	
HAUPT	35356 EDE ROAD	LEBANON	15	1990	
UNKNOWN	1220 CASCADE DR	LEBANON	15	1993	
MAX/DENISE WALL	SHADY OAKS DR	MONROE	0	1996	275
HOLOELL	26496 ALPINE RD	MONROE	0	1995	UKN
ROBERT C. HUMPHREY	25982 GREEN PEAK RD	MONROE	0	1995	UKN
DR BARTH	26358 SHADY OAK DR	MONROE	0	1995	300
BENSON	26712 NEVVETT BLVD	MONROE	0	1993	300
MAX/DENISE HALL	26680 PATTERSON DR	MONROE	0	1996	85
M/D WALL	SHADY OAKS ESTATES LOT 2	MONROE	0	1996	110
M/W WALL	SHADY OAKS DR LOT 7	MONROE	0	1996	190
MAX/DENISE WALL	SHADY OAKS DRIVE LOT 8	MONROE	0	1996	275
MAX/DENISE WALL	SHADY OAKS DR LOT 9	MONROE	0	1996	210
MAX/DENISE WALL	SHADY OAKS LOT 10	MONROE	0	1996	170
MAX/DENISE WALL	SHADY OAKS DR LOT 12	MONROE	0	1996	260
MAX DENISE WALL	SHADY OAKS DR LOT 5	MONROE	0	1996	170
R RODGERS	27602 REESE CREEK RD	MONROE	0	1996	

DAVE/THERESA HALL	1349 COMMERCIAL	MONROE	0	1996	
DAVE/THERESA HALL	1349 COMMERCIAL	MONROE	0	1996	
WILLIAMS	24851 ORCHARD TRACT RD	MONROE	0	1997	250
MAX/DENISE WALL	SHADY OAKS DR LOT 15	MONROE	0	1996	290
MAX/DENISE WALL	SHADY OAKS DRIVE LOT 13	MONROE	0	1996	
MAX/DENISE WALL	SHADY OAKS DRIVE LOT 11	MONROE	0	1996	
DOROTHY MONTERERDE	24843 KYLE RD	MONROE	0	1997	90
MAX/DENISE WALL	SHADY OAKS DRIVE	MONROE	0	1997	370
M/C ANDERSON	25849 CHERRY CREEK RD	MONROE	0	1996	
PETER KAY TRUST	26274 CHERRY CREEK RD	MONROE	0	1996	
JEFF JENKS	FOSTER RD	MONROE	0	1996	240
M/M JERRY STEPHENS	2616 FOSTER RD	MONROE	0	1996	260
WASSON	24365 WILLIAMS ROAD	MONROE	1	1989	
ULRICH	25828 FOSTER ROAD	MONROE	1	1989	
DVA	24684 JUDY LANE	MONROE	1	1990	
CARDA	25039 DYKSTRA ROAD	MONROE	1	1993	71
CLOER	26756 PATTERSON DR	MONROE	1	1994	
WILLIAM MERCHANT	95818 TERRITORIAL RD	MONROE	1	1993	110
KNIGHT	26286 SHADY OAK DR.	MONROE	1	1992	400
GENGALEY	24694 LARSON RD.	MONROE	1	1992	85
JUDITH S. KNOX	27124 REESE CREEK ROAD	MONROE	1	1995	UNK
MOSS	26625 PATTERSON DRIVE	MONROE	1	1990	
FREED	26632 ALPINE CUTOFF ROAD	MONROE	1	1990	
LARKIN	26114 FOSTER ROAD	MONROE	1	1990	
VANSANT	25111 WEBSTER	MONROE	1	1990	100
HOLSTER	24449 BELLFOUNTAIN ROAD	MONROE	1	1990	
PARSONS	25659 FOSTER ROAD	MONROE	1	1990	360
BAYNE	24855 BELLFOUNTAIN ROAD	MONROE	1	1991	100
STAHL	26593 SHADY OAK DRIVE	MONROE	1	1991	230
GLEN	25650 SPRING HILL DRIVE	MONROE	1	1991	215
KREITMAN	26316 CHERRY CREEK ROAD	MONROE	1	1991	80
BARNTS	25079 CHERRY CREEK ROAD	MONROE	1	1991	70
GONZALEZ	24459 TERRITORIAL ROAD	MONROE	1	1991	285
EDWARDS	24521 TERRITORIAL ROAD	MONROE	1	1991	405
JULIUS HEIDENREICH	1349 COMMERCIAL ST	MONROE	1	1992	190
HUMPHRY	25158 ORCHARD TRACT ROAD	MONROE	1	1993	
WATTS & O'NEILL	23960 ALPINE ROAD	MONROE	1	1993	
EDWARDS	24459 TERRITORIAL	MONROE	1	1993	
MALO	26929 BELLFOUNTAIN RD	MONROE	1	1993	
SMITH	26059 CATON LANE	MONROE	1	1994	
BOYDEN	TRACT 7 HANSHEW ORCHARDS	MONROE	1	1994	
ASSOC RELOC CO	24512 TERRITORIAL ROAD	MONROE	1	1991	140
BLACK	25264 KYLE ROAD	MONROE	1	1992	
EICHLER	25125 CHERRY CREEK ROAD	MONROE	1	1989	
SEARS	26118 ALPINE ROAD	MONROE	2	1990	
TADDEU	27548 OCCIDENTAL LN.	MONROE	4	1992	
ARNOLD WEBER	24796 HWY 99W	MONROE	4	1995	UKN
PERCY	25543 COON ROAD	MONROE	6	1993	
GAMMAGE	23471 WOD CREEK RD	PHILOMATH	0	1992	55
Frank Van Werkhooven	35658 JOHNSTONE DR	PHILOMATH	0	1996	UNKN
RICH/CAROL ECKHART	2681 ROSECREST DR	PHILOMATH	0	1996	90
JENNIE SIFNEOS	24566 ELDERBERRY LN	PHILOMATH	0	1996	UNK
TURNER FAMILY TRUST	37471 KING VALLEY HWY	PHILOMATH	0	1996	125
CYNTHIA PATTERSON	32888 FIR CREEK LN	PHILOMATH	0	1996	
CAROL DAVIS HAWKINS	37991 ALEXANDER RD	PHILOMATH	0	1997	
VERN/EVA HARRIS	31619 FERN RD	PHILOMATH	0	1997	45
VERN/EVA HARRIS	31619 FERN RD (WELL #2)	PHILOMATH	0	1997	365
JACK MORGAN	30899 BOTKIN RD	PHILOMATH	0	1997	262
McCRACKEN	24245 ERVIN RD	PHILOMATH	0	1996	

LORETTA G FOLTZ	MARILYN DR	PHILOMATH	0	1996	
LARRY W BLAIR	24348 GELLATLY WY	PHILOMATH	0	1996	
FOX	35588 GENTRY STREET	PHILOMATH	0	1990	
BARBARA BROWN	33176 ADA DR	PHILOMATH	0	1994	?
SARA/MICHAEL BELL	34055 MARYS RIVER ESTATES RD.	PHILOMATH	1	1995	UNK
BEACHLEY	35787 SUMMERS LANE	PHILOMATH	1	1990	
MAHANA	38560 KINGS VALLEY HWY	PHILOMATH	1	1990	
WITTE	33197 ADA DRIVE	PHILOMATH	1	1990	
ROBBINS	23093 ALSEA HWY	PHILOMATH	1	1990	
WARNER	24162 GELLATLY WAY	PHILOMATH	1	1990	
HILDEBRAND	37276 KINGS VALLEY HWY	PHILOMATH	1	1990	94
STEVENSON	32864 FERN ROAD	PHILOMATH	1	1990	
BARTZAT	NW CORNER OF MCBEE & WEST HILL	PHILOMATH	1	1990	125
BURCK	38845 KINGS VALLEY HWY	PHILOMATH	1	1991	60
TERFLOTH	34031 CASCARA LANE	PHILOMATH	1	1991	210
JENCO	39241 LUCKIAMUTE RD.	PHILOMATH	1	1992	
ROY L OLSON	23892 HWY 20	PHILOMATH	1	1995	37
LORIN C. WEYMOUTH	24663 ERVIN ROAD	PHILOMATH	1	1993	0063
PETERSON	23106 DECKER ROAD	PHILOMATH	1	1992	110
MCKEE	23441 HWY. 20	PHILOMATH	1	1992	450
DILSON	23750 PRICE CREEK RD.	PHILOMATH	1	1992	
GOETZINGER	39208 LUCKIAMUTE ROAD	PHILOMATH	1	1993	0055
BETHERS	24266 ALSEA HWY	PHILOMATH	1	1991	
RANDY BURGESS	1283 N 9TH	PHILOMATH	2	1996	UNK
MARK HUMMEL	LOT 112 SUMMERS LN	PHILOMATH	3	1996	UNK
VERNA KNAPP	35659 SUMMERS LN	PHILOMATH	3	1996	UNK
MONDAZZE	33441 NOON RD.	PHILOMATH	3	1992	
BURCHARD	2020 PRIMROSE LOOP	PHILOMATH	4	1990	
CLARK	36831 ALEXANDER ROAD	PHILOMATH	6	1989	
JOHN D LUNDBERG	40100 RAINBOW DR	SCIO	0	1994	UKN
NOEL SCHOMBER	37964 KELLY RD	SCIO	0	1995	UNKN
OCCUPANT	36403 FREEMAN RD	SCIO	0	1992	
LIEN	39944 STAYTON-SCIO RD	SCIO	0	1992	125
WERNER	40540 COLE SCHOOL RD	SCIO	0	1992	
ARDATH M SCHWAB TRUS	37844 FARRIS RD	SCIO	0	1996	278
RELO ALTON	38279 HUNGRY HILL RD	SCIO	0	1996	UNK
ELMER/BETTY BRUST	42454 FISH HATCHERY DR	SCIO	0	1996	UNK
RUBY JENKINS	39212 STAYTON-SCIO RD	SCIO	0	1996	
VANLIEW	49647 RUBY LOOP N	SCIO	0	1995	280
HOUSEHOLD FINANCE	40767 ROGERS MT. LOOP RD	SCIO	1	1990	
FREY	40155 SANDMER DRIVE	SCIO	1	1990	
KREGER	40617 RODGERS MOUNTAIN LOOP	SCIO	1	1990	
DARLAND	40218 COLE VIEW DRIVE	SCIO	1	1990	
BARTCHY	40729 RODGERS MOUNTAIN LOOP	SCIO	1	1991	185
STOCKHOFF	36847 BROWN DRIVE	SCIO	1	1991	42
WALKER	38282 HUNGARY HILL DR.	SCIO	1	1992	75
WERNER	40540 CALE SCHOOL RD.	SCIO	1	1992	
GARY VOSLER	39281 MYERS PLACE	SCIO	1	1991	320
LITTLE	40218 COLE VIEW DRIVE	SCIO	1	1993	
KAHR	38370 SHELBURN DRIVE	SCIO	1	1991	
STATE FARM INSURANCE	38773 S.W. 6TH ST.	SCIO	1	1992	
STATE FARM INSUR. CO	38773 SW 6TH ST	SCIO	1	1992	
JULSRUD	39933 FISH HATCHERY DRIVE	SCIO	1	1990	
BRUCE R CLOUD	29827 FARRIS RD	SCIO	1	1994	
ELKINS	37964 KELLY ROAD	SCIO	1	1991	
NEUHAUS	38250 HYW 226	SCIO	1	1989	
PALDERSTON	93417 THOMAS CREEK DRIVE	SCIO	2	1991	
SCIVALLY	38063 KELLY ROAD	SCIO	3	1990	
CHASE	38824 WEST SCIO ROAD	SCIO	3	1991	

WENZEL	38591 GOAR RD.	SCIO	3	1992	42
STAATS	37447 ROBINSON DR	SCIO	3	1991	
KALINA	40641 N. RUBY LOOP	SCIO	3	1992	60
HADLER	38026 GILKEY ROAD	SCIO	4	1991	31
WOOD	38716 GARDEN DR.	SCIO	4	1992	48
R & M LANGWELL	37978 ROBINSON DRIVE	SCIO	6	1993	0060
ELLIS	38430 GOAR ROAD	SCIO	6	1990	
NORMAN FISHER	38638 JEFFERSON-SCIO DR	SCIO	7	1994	
ZOLKOSKE	42111 MT. PLEASANT DRIVE	SCIO	7	1989	
BUTLER	37800 ROBINSON DRIVE	SCIO	8	1991	72
LAGLER	37890 ROBINSON DRIVE	SCIO	8	1991	47
NOVAK	37378 ROBINSON DRIVE	SCIO	9	1989	
DVA	38286 S. RUBY LOOP	SCIO	16	1989	
JANSEN	34020 POWELL HILLS LOOP	SHEDD	0	1994	
BALL	33855 SUNSET VIEW LANE	SHEDD	2	1992	170
LISA/JUDITH WALLIN	PLAINVIEW RD	SHEDD	3	1995	UKN
BRAND	31970 BOSTON MILL DR	SHEDD	3	1994	
ALUCILLE/WM DOBRININ	29802 MAIN ST, PEORIA	SHEDD	12	1995	UKN
ALUCILLE/WM DOBRININ	29802 MAIN ST, PEORIA	SHEDD	12	1995	UKN
LAKIN	32235 TANGENT DRIVE	TANGENT	1	1990	
CAMERON	34033 LOONEY LANE	TANGENT	1	1991	
YU	31405 ALLEN LANE	TANGENT	1	1990	
M/M BARTHOLOMEW	33200 HINCK RD	TANGENT	1	1995	60
DAVE/ROSE STALEY	33840 HWY 99E	TANGENT	1	1996	60
HOWARD	34675 HWY 99E	TANGENT	2	1990	
FARWELL	31434 SEVEN MILE LANE	TANGENT	4	1991	
GEORGE CLARK	87782 ERDMAN WAY	VENETA	0	1994	62
BEN/PEGGY ROGERS	25781 JEANS RD	VENETA	0	1995	100
BARBARA FOSTER	88438 TIMBERLINE DR	VENETA	0	1994	UNK
CARL/CALLI TIPPINS	24337 VAUGHN RD	VENETA	0	1995	120
BARBARA SCRUMP	88061 HUSTON RD	VENETA	0	1995	100
ELEANOR BUCHOLTZ	88226 LAKESIDE DR	VENETA	0	1995	UNKN
FLEAGER	23352 SUTTLE ROAD	VENETA	0	1992	
THEWELL	25628 PERKINS	VENETA	0	1992	135
CASE	25226 STRAWBERRY LN	VENETA	0	1993	120
POLANSKY	25821 HWY 126	VENETA	0	1993	80
JON/SUSAN MORSE	25911 FLECK RD	VENETA	0	1996	UNK
ERIC ROOST	24451 VAUGHN RD	VENETA	0	1996	180
JONES/NOONE	25603 MILO ROAD	VENETA	0	1996	
G/J GULDAGER	26108 MARENA DR	VENETA	0	1996	
JAMIE DIEHL	25420 PERKINS	VENETA	0	1996	
M/M SELLS	86100 CNETRAL RD	VENETA	0	1996	
FRANK GALUSHA	26222 PERKINS RD	VENETA	0	1996	
RHONDA TAYLOR	88101 S THOMAS LN	VENETA	0	1996	UNKN
ROBERT BERRY	8655 TERRITORIAL RD	VENETA	0	1996	UNKN
JOEL/JUNE CHAURAN	87538 BIGGS RD	VENETA	0	1995	85
J/J TUCKER	25560 WHATON LANE	VENETA	0	1997	45
SUSSMAN	26052 OWENS FLECK ROAD	VENETA	0	1991	181
STACKHOUSE	26333 PERKINS ROAD	VENETA	0	1989	
WRIGHT	87017 MUIRLAND DRIVE	VENETA	0	1991	250
CARLILE	27301 JEANS ROAD	VENETA	0	1990	
RICHEY	25853 PERKINS ROAD	VENETA	1	1990	
FRANCIS	24717 WOLF CREEK ROAD	VENETA	1	1990	
PETZOLD	25812 FLECK ROAD	VENETA	1	1990	
BARBARA FOSTER	88438 TIMBERLINE DR	VENETA	1	1994	
PERRY	25446 E. HUMTER ROAD	VENETA	1	1992	78
KATHRINE MORRIS	25435 E BOLTON RD	VENETA	1	1995	185
BARBARA FOSTER	88438 TIMBERLINE DR	VENETA	1	1994	UNK
MICHAEL ALVIN	97670 TERRITORIAL RD.	VENETA	1	1995	UNK

MICHAEL KEARNEY	25843 TANYA LANE	VENETA	1	1995	85
SCHLEEF	26241 FLECK ROAD	VENETA	1	1990	
TAYLOR	25946 JEANS ROAD	VENETA	1	1990	
FISHER	24389 BOLTON HILL	VENETA	1	1990	
GILDAY	88469 RIDICULOUS LANE	VENETA	1	1990	
BARBER	23561 VAUGHN ROAD	VENETA	1	1990	
SOUZA	25513 JEANS ROAD	VENETA	1	1991	
MC CABE	25340 VAUGHN ROAD	VENETA	1	1990	
SULLIVAN	88785 ELLMAKER ROAD	VENETA	1	1991	85
HOAG	25420 PERKINS ROAD	VENETA	1	1991	
ABREN	87161 CENTRAL ROAD	VENETA	1	1991	230
AK	25429 WOLF CREEK ROAD	VENETA	1	1991	
FISHER	25950 PERKINS ROAD	VENETA	1	1991	60
CRANE	25789 TIDBALL LANE	VENETA	1	1991	
THOMPSON	88664 ELLMAKER ROAD	VENETA	1	1992	
SMITH	24380 SUTTLE ROAD	VENETA	1	1992	
DOOR	86527 TERRITORIAL	VENETA	1	1991	180
NORBERG	89065 BLUE VIEW	VENETA	1	1992	
BENNETT	25548 JEANS ROAD	VENETA	1	1992	
MITH	24580 SUTTLE ROAD	VENETA	1	1992	
BULLER	25821 HWY 126	VENETA	1	1992	
SMITH	23965 SUTTLE ROAD	VENETA	1	1992	
AYDELOTT	23386 WOLF CREEK	VENETA	1	1992	45
MC DOUGAL	86544 TERRITORIAL ROAD	VENETA	1	1992	180
HIRSCH	88806 FAULHABER	VENETA	1	1992	
STRONG	88332 HUSTON RD.	VENETA	1	1992	70
JOHNSON	87528 CINNEBAR	VENETA	1	1993	80
KANEBLATH	87708 HUSTON ROAD	VENETA	1	1993	0080
EICHBLATT	FLECK RD	VENETA	1	1992	0185
HAXBY	26077 ENGLAND LOOP	VENETA	1	1994	
THOMPSON	87288 TERRITORIAL ROAD	VENETA	1	1990	
BRINTON	29821 JEANS ROAD	VENETA	1	1991	
WASHBURN	88260 LAKE SIDE DRIVE	VENETA	1	1991	40
ANDERSON	25993 VISTA DRIVE	VENETA	2	1991	90
JOHNSON	86256 SMIGLEY LANE	VENETA	2	1990	

Attachment B

Please tell us what you think about our groundwater study, and feel free to give us advice about how to make this work more meaningful and useful to you. Thanks for your help!

	Yes	No
1. Is the information we've given you clear and understandable?	[]	[]
2. Is the information about your well water useful?	[]	[]

3. How can we do a better job providing you with all the information needed to protect your groundwater resources:
____
____

4. Any other questions, advice, or comments you would like us know about:
____
____

	Yes	No
5. Do you want us to contact you for follow-up:	[]	[]

If yes, please write your name & phone number here: ________________________________

Best time to call: ________________________
I

Your Name:________________________ Address:____________________________________

Phone #:______________________________

ATTACHMENT C

Statewide Groundwater Monitoring Program
MASTER PLAN

Version 1.0

Prepared by:

David Cole
Laboratory Services Division

and

Andree Pollock
Groundwater Section
Water Quality Division

Groundwater Section
Water Quality Division
Oregon Department of Environmental Quality
811 SW Sixth Avenue
Portland, Oregon 97204-1390
September, 1993

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FIGURE PAGE

1.0 INTRODUCTION

In October of 1989, the State of Oregon passed the Groundwater Protection Act (Act). The goal of this Act is to "...prevent contamination of Oregon's groundwater resource while striving to conserve and restore this resource and to maintain the high quality of Oregon's groundwater resource for present and future uses." (State of Oregon, 1989).

Pursuant to Section 29 of the Act, the Department of Environmental Quality (DEQ), the Oregon Water Resources Department (WRD), and Oregon State University (OSU) are required to cooperate in an "...ongoing statewide monitoring and assessment program of the quality of the groundwater resource of this state." (State of Oregon, 1989). The Act further requires that a program be set up that identifies:

1. Areas of the State that are especially vulnerable to groundwater contamination;

2. Long term trends in groundwater quality;

3. The ambient quality of the groundwater resource of Oregon; and,

4. Any emerging groundwater quality problems.

This document focuses on the evaluation of groundwater quality in areas that may have been impacted by nonpoint source contamination or that may be vulnerable to groundwater contamination. As part of this program, work plans will be developed for different areas across the State which have been identified as priorities for assessment.

The work plans will describe the hydrogeologic features and land uses of each area and contain all of the information necessary to locate and sample the wells.

Once an area specific work plan is prepared, the DEQ Laboratory will sample the wells and the DEQ and Oregon Department of Agriculture (ODA) laboratories will analyze the groundwater samples following DEQ's quality assurance and quality control procedures. Once the samples are analyzed and the results distributed, a report on the study will be prepared.

2.0 PROJECT ORGANIZATION AND RESPONSIBILITIES

The Statewide Groundwater Monitoring Program is an interagency project with participants from the DEQ, the ODA, the Oregon Health Division (OHD), WRD, and OSU. Table 1 lists the participating agencies and their roles. A list of key individuals involved with each project is included with the site specific work plans.

3.0 AREA IDENTIFICATION AND PRIORITIZATION

Before groundwater sampling work plans could be prepared and before sampling could be conducted, the areas that were at risk needed to be identified. The area identification and prioritization process is outlined below.

3.1 AREA SELECTION CRITERIA

Areas in Oregon with known or suspected contamination or that may be susceptible to contamination were identified utilizing a

TABLE 1
List of Participating Agencies

AGENCY NAME	AGENCY PHONE NO.	DESCRIPTION OF ROLE IN PROJECT
Department of Environmental Quality Water Quality Division, Groundwater Section	229-5279	Responsible for project management including developing sampling plans and preparing reports.
Department of Environmental Quality Laboratory Division Groundwater Monitoring Section	229-5983	Responsible for conducting the groundwater sampling and performing inorganic chemical analyses.
Department of Human Resources Health Division Drinking Water Section	731-4010	Responsible for providing health risk assessments and for notifying well owners of sample results and health risks.
Oregon Department of Agriculture	378-3797	Responsible for performing pesticide

Laboratory Division		analyses and reporting the test results to the DEQ an OHD.
Oregon Water Resources Department	378-3741	Provides access to water well reports, water right records, and technical support.
Oregon State University Agricultural Extension Agents	Call Local Office	Provide updates on pesticide use and agricultural practices.
Oregon State University Agricultural Chemistry Department	737-1789	Responsible for assisting the Oregon Department of Agriculture Laboratory with pesticide analyses, data interpretation, and quality control and quality assurance.

number of resources. DEQ and OHD personnel involved with statewide groundwater monitoring in the past were instrumental in identifying areas that needed further assessment. Table 2 is a list of prioritized areas which need further assessment. This list was generated in January, 1993. The criteria used in selecting study areas are outlined below. Figure 1 shows the location of the study areas.

[FIGURE 1 is not available]

Areas may be added or subtracted from the list, and priorities modified, as additional information is available. The DEQ is currently working on a groundwater vulnerability mapping project that be used in the future to prioritize and list areas of the state for groundwater sampling.

3.1.1 Areas Identified by the Oregon Health Division

The OHD (Leland, 1992) (see Appendix A) identified four areas which the OHD felt qualified as "Areas of Concern" based upon data from property transfer private well testing. The DEQ has subdivided these four areas into the Prineville, Redmond, Madras, Klamath Falls-Merrill, Medford, Junction City, Albany-Lebanon, Woodburn, and Canby areas for detailed groundwater assessment to confirm the OHD findings.

3.1.2 Areas Identified During Past Assessments

A number of areas within the state have been assessed in the past. This sampling was conducted as part of past DEQ studies, or as part of the DEQ's Volunteer Nitrate Testing Program (DEQ, 1992b).

"Oregon's 1992 Water Quality Status Assessment Report" (305b report) (DEQ, 1992a) summarizes past sampling events conducted by the DEQ. If Table 4.3-3 of the 305B report indicated that additional data was needed for a given area, the area was included on the priority list. A copy of Table 4.3-3 and a list of the areas tested by the Volunteer Nitrate Testing Program are include in Appendix B.

Areas identified by the 305b report include Clatsop Plains, Harbor Beach, Jackson County, Mission Bottom, Mid-Multnomah County, Farmington/Hillsboro, Dever-Connor, Lake Labish, Sauvie Island, Jefferson, Coburg, Milwaukie, La Pine, Lower Umatilla

Basin, Milton-Freewater, City of Imbler, Ontario, Klamath Falls, and Santa Clara-River Road.

Mid-Multnomah County, Milwaukie, Lower Umatilla Basin, and Northern Malheur County (Ontario) are part of ongoing DEQ investigations and are not include on the priority list of areas needing further assessment.

TABLE 2

Areas of Potential, Suspected, or Known Nonpoint Source Groundwater Contamination

Ranking	Area	County	SIPA[1] Score	IR[2] Score	SA[3] Score	LU[4] Score	Population/Multiplier	total score
1	Woodburn	Marion	50	25	25	15	13,600/1.3	150
2	Junction City	Lane	50	25	25	20	7,400/1.2	144
3	Prineville	Crook	50	25	25	15	5,600/1.2	138
4	Canby	Clackamas	50	25	25	10	9,400/1.2	132
5	Albany-Lebanon	Linn	25	25	25	15	44,900/1.4	126
6	Medford	Jackson	20	25	25	15	49,100/1.4	119
7	Upper Grande Ronde Valley	Union	25	25	25	15	17,100/1.3	117
8	Redmond	Deschutes	50	25	0	20	7,900/1.2	114
9	Washington/Yamhill Co.	Washington/ Yamhill	20	25	25	10	39,500/1.4	112
10	Clatsop Plains	Clatsop	50	0	25	10	19,200/1.3	111
11	Hood River-Parkdale	Hood River	30	25	25	20	4,800/1.1	110
12	Burns-Hines	Harney	30	25	25	15	4,300/1.1	105
13	Milton-Freewater	Umatilla	20	25	25	15	5,600/1.2	102

Ranking	Area	County	SIPA[1] Score	IR[2] Score	SA[3] Score	LU[4] Score	Population/Multiplier	total score
14	Lake Labish-Mission Bottom	Marion	45	25	25	5	100/1.0	100
15	Klamath Falls-Merrill	Klamath	20	25	25	5	17,800/1.3	98
16	John Day-Canyon City	Grant	25	25	25	10	2,500/1.1	94
17	The Dalles	Wasco	30	25	0	15	11,200/1.3	91
18	Harbor Beach	Curry	20	25	25	10	4,700/1.1	88
19	Sauvie Island	Multnomah/ Columbia	20	25	25	10	4,100/1.1	88
20	Jefferson	Marion	20	25	25	5	1,900/1.1	83
21	Tillamook	Tillamook	0	25	25	25	4,200/1.1	83
22	La Pine	Deschutes	50	0	25	5	200/1.0	80
23	Grants Pass	Josephine	20	0	25	15	17,800/1.3	78
24	Madras	Jefferson	30	25	0225	15	3,600/1.1	77
25	Dever-Conner	Linn	20	25	25	5	200/1.0	75
26	Haines	Baker	20	25	25	5	400/1.0	75
27	Coburg	Lane	15	25	25	10	800/1.0	75
28	Lakeview	Lake	0	25	25	15	2,600/1.1	72

Ranking	Area	County	SIPA[1] Score	IR[2] Score	SA[3] Score	LU[4] Score	Population/Multiplier	total score
29	Paisley	Lake	10	25	25	10	300/1.0	70
30	Enterprise	Wallowa	0	25	25	10	2,100/1.1	66
31	Myrtle Point	Coos	0	0	25	10	2,700/1.1	39
32	Coquille	Coos	0	0	25	10	4,100/1.1	39

Notes:

1. SIPA = State Identified Priority Area
2. IR = Irrigation
3. SA = Shallow Aquifer
4. LU = Land Use

The Jackson County area has been narrowed down to the Medford Area.

Mission Bottom and Lake Labish are adjacent to each other and have been combined into one area.

Farmington/Hillsboro has been included in a broader Washington/ Yamhill County area. This was done to emphasize the need to sample wells in different areas of Washington and Yamhill Counties.

The City of Imbler has been included in a larger Upper Grande Ronde River Valley area.

Santa Clara-River Road was not included on the list at this time because sewer installation has not been completed. Once the homes in the area are hooked up to the sewer, the area will be re-sampled.

3.1.3 Other Area Selection Criteria

Additional areas were identified based upon the percent of land under irrigation (WRD, 1992), the detection of arsenic in the groundwater (Leland, 1992), and the presence of shallow sensitive aquifers (Sweet, 1980). Figure 2 is a reproduction of Sweet-Edwards' "Ground Water Aquifers" map.

Areas identified by this criteria are Hood River-Parkdale, Burns-Hines, John Day-Canyon City, The Dalles, Tillamook, Grants Pass, Lakeview, Paisley, Enterprise, Myrtle Point, and Coquille.

[FIGURE 2 is not available]

3.2 AREA PRIORITIZATION

The areas listed on Table 2 were prioritized according to the criteria listed below. The priorities of the areas on this list are subject to change as additional information becomes available.

3.2.1 State Identified Problem Areas

The DEQ and other state agencies have identified areas of the state with known or suspected nonpoint source contamination. The scoring criteria for this category are listed below. No more than 50 points were assigned to any area. If more than one criteria was met, only the highest score was assigned.

Scoring Criteria

Fifty (50) points were assigned if an area has a known or suspected groundwater problem based upon one or more of the following: OHD testing of public water supply systems, the OHD data base on property transfer well testing, and DEQ Volunteer Nitrate Testing.

Thirty (30) points were assigned if the OHD (Leland, 1992) indicated that arsenic was detected in the groundwater in the area. Although arsenic naturally occurs in some areas, it can also be an indicator of arsenic-based pesticide contamination.

Twenty (20) points were assigned if an area was sampled during past DEQ and OHD groundwater sampling events and contamination has been identified. Additional sampling needs to be conducted to confirm the presence of contamination and/or to determine the extent of the problem.

Zero (0) points were assigned if there has not been any State conducted groundwater sampling.

3.2.2 Percent of Irrigated Land/Precipitation

The percent of land under irrigation and precipitation reflects the intensity of agriculture and the potential for leaching of pesticides and other contamination into the groundwater. The scoring criteria for this category are listed below.

Scoring Criteria

Twenty-five (25) points were assigned if 80 to 100 % of the area is irrigated or if 60 to 80 % of the area is irrigated and the area receives 80 or more inches of precipitation annually. Zero (0) points were assigned if the above criteria was not met.

3.2.3 Sensitive Aquifers

Areas with shallow unconfined aquifers are more susceptible to contamination. The scoring criteria for these sensitive aquifers is listed below.

Scoring Criteria

Twenty-five (25) points were assigned if the area has a shallow groundwater aquifer as identified by Sweet-Edwards and Associates (Sweet, 1980).

Zero (0) points were assigned if the area does not have a shallow groundwater aquifer.

3.2.4 Land Uses

The presence of land uses of concern in an area reflects potential groundwater pollution as a result of these land uses. The land use score is the sum of the scoring criteria listed below.

Scoring Criteria

Five (5) points were assigned if agriculture was practiced in the area.

Five (5) points were assigned if food processing is one of the industries in the area.

Five (5) points were assigned if wood products (logging, saw and planing mills, plywood, boxes, mobile homes, paper, furniture, and fixtures) are one of the industries in the area.

Five (5) points were assigned if manufacturing (textile and apparel, printing and publishing, chemical, petroleum, plastics, leather, stone, clay, glass, concrete, metals, machinery and transportation equipment, electrical and control instruments) is conducted in the area.

Five (5) points were assigned if more than 25 confined animal feeding operations (CAFOs) were present in the area.

3.2.5 Population Scoring

The total scores for each area were multiplied by a population factor. The estimated populations of the areas are listed on Table 2 along with the population factors for each area.

This criteria emphasizes both the potential impacts from septic systems and the population at risk from utilizing the groundwater in an area. The multipliers and corresponding population ranges are listed below.

MULTIPLIER	POPULATION
1	<1,000
1.1	1,000 to 4,999
1.2	5,000 to 9,999
1.3	10,000 to 19,999
1.4	>20,000

3.2.6 Adjustments To Scores

In order to factor in information not included in the above scoring, the scores for some areas were adjusted. Listed below are the areas for which the scoring has been changed and the reasons for the change. These adjustments were made in the state identified problem area scoring.

Albany-Lebanon This area was assigned 25 points. This was done because the Albany-Lebanon aquifer covers a greater area than other areas with similar scores.

Upper Grande Ronde Valley Originally this area was split into two areas, Grande Ronde and Imbler. Although Imbler has been sampled in the past, the Upper Grande Ronde Valley area was assigned 25 points to emphasize the fact that most of the valley has not been sampled.

Clatsop Plains Although this area has been sampled in the past, it was assigned 50 rather than 20 points to emphasize the need to re-sample in order to determine if adoption of a groundwater management plan in 1982 has had a beneficial effect on the groundwater. In addition, the area has not been sampled since 1984.

Lake Labish-Mission Bottom This area was assigned 45 points because groundwater sampling conducted prior to 1986 indicated that nitrate may be present in the groundwater in the Lake Labish area and because nitrate and EDB contamination have been confirmed in the Mission Bottom area.

Klamath Falls-Merrill Although the OHD has identified this area as an area of concern, the DEQ has sampled the groundwater on several occasions and as recently as 1990. Since data on the groundwater quality in the area is available, the area was given a score of 20 instead of 50 points.

John Day-Canyon City The OHD indicates that arsenic may be present in the groundwater in this area. Normally 30 points would be assigned for this criteria. However, since the arsenic may be naturally occurring, the John Day-Canyon City area was assigned 25 points.

La Pine This area has been sampled 6 times in the past. However, no sampling has occurred since 1982. This area was assigned 50 points to emphasize the need to conduct follow-up sampling. The sampling will be used to determine if there have been any beneficial effects from the sewer installation in the La Pine core area and to determine if there have been any impacts to groundwater quality in areas outside the core area due to population growth.

Paisley The OHD has indicated that arsenic is present in the groundwater in this area. However, the arsenic may be naturally occurring, therefore the area was assigned 10 instead of 30 points.

4.0 AREA SPECIFIC WORK PLANS

Work plans will be developed for each area on the priority list. The plans serve to document well location, summarize area information, and to outline groundwater sampling requirements.

4.1 PROJECT DESCRIPTIONS

Appendix C contains a sample outline for the work plans. The work plans must describe the objectives and scope of the project. Although this document outlines many of the criteria for preparing work plans, individual work plans may include additional requirements. These requirements may be based upon new knowledge or may be necessary in order to coordinate efforts with other DEQ divisions or sections or with other state agencies.

4.2 WELL SELECTION

While the criteria for selecting wells may vary from area to area, the following is a summary of the usual process for selecting wells.

Prior to selecting wells, the area to be sampled must be defined. This may include: determining the limits of shallow sensitive aquifers (from maps or water well reports);

determining the limits of apparent contamination based upon OHD property transfer data and/or DEQ voluntary testing data; identifying areas of high irrigation (or moderate irrigation and high rainfall); or evaluating any other data that may be available for a specific area.

The local sanitarian, the water master, the Soil Conservation Service, the local agricultural extension agent, and the DEQ regional office are all possible sources for information that may be useful in locating wells or areas with potential problems.

Once the area is defined, well selection begins by reviewing water well reports at WRD. The number of water well reports selected for further evaluation can vary depending on specific needs, however selecting 3 to 5 wells per square mile usually provides enough water well reports so that the number and distribution of wells field-verified meet the criteria outlined herein.

Although specific criteria can change depending on the characteristics of each area, water well reports are typically selected based upon the following criteria.

1.   If possible, water well reports for wells which tap shallow, unconfined aquifers should be selected. Ideally, wells with depths less than 100 feet below ground surface should be chosen. This is necessary because shallow aquifers have the greatest chance of being impacted by nonpoint source contamination (Follett, 1989).

2.   Water well reports with street addresses should be selected whenever possible since this can reduce the amount of field time required to locate the wells.

3.   Some of the water well reports should be picked near potential nonpoint sources and near areas identified as having high nitrate concentrations by OHD's property transaction data base or DEQ's voluntary nitrate testing. This may include selecting wells which were sampled previously. The data from testing conducted following this program will be used to confirm the prior data. In addition, it is important to have wells situated in areas where there may not be any data available to better evaluate area wide groundwater quality.

4.   Since the sampling data will be used to help determine if an area wide problem exists as well as confirming existing

sample results, the well locations should be selected so that a fairly even distribution of the wells is achieved across the area. If a section of the study area has been identified as one needing additional sampling, and a water well report is not available for that area from WRD, a well will have to be located by visiting the area and making door to door contacts. The well owner should be asked for a copy of the water well report, if available, or any other known information concerning the well.

4.2.1 Field Verification of Well Locations

Once well logs are selected, specific wells need to be identified for sampling. This requires re-reviewing the water well reports to ensure that they meet the above criteria and indicating the preferred well locations on a map. The actual wells selected for the study will vary from this preliminary map due to difficulties in locating the selected wells and difficulties in obtaining permission to sample wells during field visits. Any adjustments to wells selected should be made using the above well selection criteria.

Once the preferred well locations are identified, well owners must be identified, contacted, and permission to sample the wells obtained. The names on the water well reports may not be the current well owners names.

Local telephone books are a useful resource in identifying well owners. Often water well reports list only an owners name and no address. Addresses can often be verified by comparing addresses in the telephone book to the location of the well. The telephone books are also useful since the well owners can be contacted for permission and directions prior to field verification of the well and sampling point locations. For most areas, the best times for calling are between 12 and 1 p.m. and 5 and 9 p.m.

In metropolitan areas, an additional aid for locating well owners is the Cole Reverse Directory. This directory lists street and route/box addresses and the current residents name and telephone number.

In areas where mailing addresses have changed from the old route/box addresses to street addresses, it may be possible to locate some of the older wells by contacting the county planner, or the local post office. The county planners and post offices may have a list of the old addresses correlated to the new addresses or old maps.

Where the current well owner's name and telephone number are not available, permission to sample the well has to be obtained by a visit to the well address.

Once the well owner is contacted and permission to sample the well obtained, the locations of the wells need to be field verified. The purpose of this visit is two-fold. During the visit, the location of the property, the well, and the sampling point can be determined and described in a manner to facilitate location of the well by the sampling crew.

The visit also provides an opportunity to gather additional information about the area around the well. This information is used to complete the "Well and Site Identification Record". A copy of this form is in Appendix D.

Information that should be noted in the field includes: locations of septic systems, pastures, corrals, agricultural fields, industries, and any other information that may be useful in evaluating the sample results. Photographs are also useful in aiding future location of the wells and sampling points.

If it appears that the well construction/maintenance is poor or local sources might overwhelm area-wide sources in effects on the well water, these factors should be noted and the well rejected as a sampling point.

The field visits are a good time to distribute informational brochures regarding nonpoint source pollution, health effects, and DEQ's program and to answer any questions the well owner might have regarding the purpose for the sampling.

Approximately 20 wells (or in multiples of twenty wells if more than a week of sampling is needed to adequately characterize an area) should be selected. This is the optimum number of wells that can be efficiently located, and sampled, in a week due to scheduling and staff limitations.

4.2.2 Well Selection Limitations

Some shallow irrigation and domestic farm wells were drilled, or dug, prior to records being kept. Un-logged wells are not typically located and selected while preparing sampling plans for several reasons. Improper well seals, and other problems which can't be identified without a water well report, can limit the use of the data from un-logged wells.

In addition, locating unlogged wells requires additional staff time to identify the wells, to obtain permission to sample the wells and to interview the owner regarding well construction.

However, if a properly installed well can't be located within a specific part of the study area, un-logged wells may be selected to provide data for the sub-area.

4.3 ANALYTE SELECTION

Two separate sets of analyses will be conducted on the groundwater samples. The first set analyses tests for analytes which are tested for in all areas. These analytes are listed on Table 3.

The second set of analyses are for pesticides. Pesticide analyte selection is based upon pesticide use. This information is obtained from "Oregon State Pesticide Use Estimates for 1987" (Rinehold and Witt, 1989) and through contact with the local OSU agricultural extension agent or OSU in Corvallis.

Any pesticide with a use greater than 1000 pounds per year, in the county where the area is located, is considered for analysis. Pesticides that fit this criteria are selected if they are on the list of pesticides selected for analysis during the National Pesticide Survey (NPS), were detected during the NPS (EPA, 1990), or are on the California list of pesticide groundwater contaminants (Johnson, 1989). These lists are in Appendix E.

4.3.1 Limitations to Pesticide Selection

Groundwater samples are not tested for all of the pesticides used in a specific area. Only those pesticides with high use and a high potential for reaching groundwater are tested.

In addition, the ODA Laboratory resources are limited. Adequate staff and/or equipment are not available to test for every pesticide separately. Therefore, careful decisions must be made with the assistance of the ODA Laboratory and OSU chemistry staff regarding which multiple analyte screens and detection limits are appropriate for pesticides used in a particular sampling area.

Single analyte analyses might be desired to evaluate the presence of a widely used pesticide in an area where multiple analyte screens are used to detect less common pesticides. OSU can also provide QA/QC for multiple analyte analyses in the form of single analyte analyses on limited number of samples for some pesticides.

The purpose of the pesticide sampling is to identify areas where current or past agricultural practices and pesticide use may have impacted the groundwater. If groundwater contamination from pesticides is encountered in a given area, additional pesticides should be included in future sampling events.

TABLE 3
Standard Analyte List

Field Parameters

Alkalinity as $CaCO_3$	Conductivity
Temperature	pH

Indicator Parameters

Ammonia (NH_3 as N)	Chemical Oxygen Demand (COD)
Chloride (Cl^-)	Total Kjeldahl Nitrogen (TKN)
Nitrate/Nitrite-Nitrogen (NO_3/NO_2 as N)	
Total Organic Carbon (TOC)	
Total Phosphate (PO_4)	Sulfate (SO_4)

Metals

Aluminum (Al)	Arsenic (As)
Boron (B), dissolved only	Calcium (Ca)
Copper (Cu)	Iron (Fe)
Magnesium (Mg)	Manganese (Mn)
Mercury (Hg)	Potassium (K)
Silicon as SiO_2 , dissolved only	Sodium (Na)
Zinc (Zn)	

Volatile Organic Compounds (VOCs)

Acrolein (2-Popenal)	Benzene
Bromodichloromethane	Bromoform
Bromomethane	Carbon Tetrachloride
Chlorobenzene	Chloroethane
2-Chloroethyl Vinyl Ether	Chloroform
Chloromethane	Cis-1,3-Dichloropropene
Dibromochloromethane	1,2-Dibromoethane (EDB)
1,2-Dichlorobenzene	1,3-Dichlorobenzene
1,4-Dichlorobenzene	1,1-Dichloroethane
1,2-Dichloroethane	1,1-Dichloroethylene
1,2-Dichloropropane	1,2-Dimethylbenzene
1,3-Dimethylbenzene	1,4-Dimethylbenzene
Ethylbenzene	Methylene Chloride
1,1,2,2-Tetrachloroethane	1,1,2,2-Tetrachloroethylene
Toluene	trans-1,3-Dichloropropane
trans-Dichloroethylene	1,1,1-Trichloroethane

Trichloroethylene

Vinyl Chloride

5.0 FIELD SAMPLING/SAMPLING LOGISTICS

The DEQ Laboratory Water Quality Monitoring Section will conduct the field sampling. The ODA Laboratory will be notified of the sampling schedule prior to the DEQ Laboratory conducting the sampling so they can plan to receive the samples. In addition, the DEQ Laboratory will notify the well owners of the sampling schedule. The notification should be in writing several weeks before the scheduled event. In addition, as indicated in the work plans, some individual well owners will need to be contacted by telephone to arrange the sampling visit.

The sampling will be conducted according to standard procedures as outlined below.

5.1 SAMPLING PROCEDURES

Samples will be collected from a tap, hose bib, or gate valve as close to the well as possible. Samples will be collected before pressure tanks, other holding vessels, and treatment systems whenever possible. To assure that a representative water sample is obtained at least one well casing volume of water should be purged from the well prior to sampling. For domestic and irrigation wells that are in current use, the well shall be pumped until a stable water temperature is achieved or for five minutes, whichever is sooner. Wells that have not been in recent use will be purged until stable water temperatures are achieved.

The samples will be collected in accordance with the procedures established in the "DEQ Laboratory Field Sampling Reference Guide" (DEQ, 1993b). Table 4 lists the sample containers and sample preservation necessary for the samples.

In addition to well sampling, the sampling crew will use a global positioning system (GPS) to identify the latitude and longitude of each well. The DEQ Laboratory uses a Magellan NAV 5000 GPS with an accuracy of +/- 15 meters in two dimensions.

5.2 SAMPLE DOCUMENTATION AND CUSTODY

Routine chain of custody procedures shall be observed. The Field Data Sheets will:

1. Indicate the date and time each well is sampled.

2. Identify each sample site by well owner name,

3. Identify each container by number,

4. Indicate each well's assigned STORET data base number,

TABLE 4
Sample Containers and Preservation*

LABORATORY	CONTAINER	PRESERVATION	HOLDING TIME	ANALYSIS
DEQ	(1) 250 ml DP Poly	Ice Chest (≤ 4°C)	28 days	Ions
DEQ	(4) 40 ml glass vials	Ice Chest (≤ 4°C)	14 days	Volatile Organic Compounds (VOCs)
DEQ	(1) 250 ml DM Poly (1) 250 ml TM Poly	HNO_3 (pH ≤2), Ice Chest HNO_3 (pH ≤2), Ice Chest	14 days to 6 months	Metals, Dissolved Metals (Field Filtration)
DEQ	(1) 500 ml R Poly	H_2SO_4 (pH ≤2), Ice Chest	28 days	Nutrients, Organic Compounds
DEQ	(1) 500 ml TH Poly	HNO_3 (pH ≤2), Ice Chest	14 days	Mercury
DEQ	(1) 1000 ml P Poly	Ice Chest		Physical
OSU	(1) variable**	variable**	variable**	variable**
ODA	(1) 2000 ml Glass	Ice Chest	14 to 28 days	Pesticides

* Per Sample.
** The OSU laboratory will be used in a support role to perform analyses as needed, such as to confirm constituent values above background levels, to perform QA/QC testing, and to test samples when the other laboratories are backlogged.

5. Indicate what analyses are to be performed, and

6. Indicate which laboratories are to perform the different analyses.

5.3 SAMPLE TRANSPORT

Each day, the sampling crew will ship the pesticide samples to the Oregon Department of Agriculture Laboratory in Salem and the rest of the samples to the DEQ Laboratory in Portland via a designated carrier.

The work plans should include a section that identifies the transporter of the samples (typically Greyhound) and should include the address and telephone number of the transporter.

5.4 HEALTH AND SAFETY

All personnel who participate in this project will conform to the Occupational Safety and Health Administration (OSHA) regulations that govern personal protection in the work place. The sampling stations in this project are domestic water wells. Samples obtained from these sources are not considered hazardous. However, unknown constituents or concentrations may be present in the media to be collected.

It is the responsibility of the participating personnel to initiate and follow all necessary safety measures related to the project in accordance with the "Mode of Operations Manual For The Water Quality Monitoring Section" (DEQ, 1986) and to be aware of the potential hazards that are associated with the collection, handling, analysis, and disposal of the samples.

Field conditions which may require additional precautions include the following:

1. Severe temperature extremes;

2. Unavailable potable water;

3. Exposure to dogs, insects, reptiles, and rodents;

4. Hazards that are associated with extended travel in very primitive and remote terrain during severe weather conditions;

5. Lifting and carrying of heavy equipment including coolers of samples and ice; and

6. Possible exposure to hazardous materials.

6.0 LABORATORY ANALYSES

Once the DEQ Laboratory receives the samples, and the DEQ Sample Tracker has accepted them and assigned case numbers, the monitoring personnel will forward the case numbers on to the ODA (and OSU lab personnel if they are participating in a particular sampling event) to be referred to when reporting the data.

6.1 ANALYTICAL METHODS

All analyses will be performed using Environmental Protection Agency (EPA) or other approved methods. Table 5 lists constituents, test methods, and minimum reporting values to be utilized for this project.

7.0 DATA QUALITY CONTROL/QUALITY ASSURANCE

Table 4 lists the data quality objectives for this project. Data analyses for constituents with drinking water standards will be used for health risk assessments.

TABLE 5
Laboratory Analyses

PARAMETER	REFERENCE	ANALYTICAL TECHNIQUE	MIN. REPORT VALUE (mg/l)
Chemical Oxygen Demand (COD)	R2-410.4	Dichro. Spectro.	5.0
Total Organic Carbon (TOC)	R2-415.2	UV/Sulfate Oxidation	1.0
Volatile Organic Compounds (VOC)	EPA 8260	Purge & Trap, GC/MS	0.0005
Calcium (Ca)	R2-200.7	Inductively Coupled Plasma (ICP)	0.1
Manganese (Mn)	R2-200.7	ICP	0.02
Sodium (Na)	R2-200.7	ICP	0.5
Potassium (K)	R2-200.7	ICP	0.5
Chloride (Cl^-)	R2-325.1	Auto Ferricyanide	0.5
Sulfate (SO_4)	R2-375.2	Auto Methyl Thymol	0.5
Arsenic (As)	R2-206.3	Gaseous Hydride	0.005
Mercury (Hg)	R2-245.1	Cold Vapor	0.0005
Iron (Fe)	R2-200.7	ICP	0.04

Magnesium (Mg)	R2-200.7	ICP	0.5
Silicon as SiO_2, dissolved only	R2-200.7	ICP	0.3
Boron (B), dissolved only	R2-200.7	ICP	0.03
Aluminum (Al)	R2-200.7	ICP	0.1
Copper (Cu)	R2-200.7	ICP	0.02
Zinc (Zn)	R2-200.7	ICP	0.02
Total Kjeldahl Nitrogen (TKN)	R2-351.1	Block Digestion	0.2
Ammonia (NH_3 - N)	R2-350.1	Auto Phenate	0.02
Nitrate/Nitrite-Nitrogen (NO_3+NO_2-N)	R2-353.2	Auto Cd Reduction	0.02
Total Phosphate (PO_4)	R1-424F	Ascorbic Acid Reduction	0.01
Pesticide Screens	NPS	Methods 1, 2, 3, 4, & 5	0.0002 to 0.002
Alkalinity	R2-310.1	Titration	1.0
Conductivity	R2-150.1	Wheatstone Bridge	1 µ_/cm
pH	R2-150.1	Electrode	0 - 14 SU

Referenced methodologies are detailed in the following publications:

R1 - Standard Methods for the Examination of Water and Wastewater, 16th Edition, APHA, AGWA, WPCF, 1985.

R2 - Methods for Chemical Analysis of Water and Wastes, EPA/4-79-020 (revised, 1983).

EPA - SW-846 Test Methods for Evaluating Solid and Hazardous Wastes, 3rd Edition, 1986. Conforms with EPA Drinking Water Method 524.2.

NPS - National Pesticide Survey Methodology, EPA Technical Support Division, Office of Drinking Water.

The DEQ Laboratory's Quality Assurance Section will prepare a quality assurance plan for each site. The quality assurance plan will outline the number of spike, duplicate, blank, and split samples that are necessary for the sampling event based upon the total number of samples to be collected.

7.1 EQUIPMENT CALIBRATION AND MAINTENANCE

The established DEQ Laboratory procedures will be followed, along with the manufacturers' recommendations for calibrating, maintaining, and operating equipment.

7.2 DATA REDUCTION, VALIDATION, AND REPORTING

Each participating laboratory will review the data that they generate to evaluate and report whether the data meets the quality assurance (QA) objectives. The reports, along with the data, will be sent to the DEQ project manager and the laboratory groundwater monitoring coordinator. Monitoring personnel will transfer the data from the Laboratory Information Management System (LIMS) to the STORET system for data storage and manipulation. Latitude and longitude coordinates, which STORET requires, will be determined during sampling (see 5.1 SAMPLING PROCEDURES).

If data objectives are not met, the laboratory QA personnel will schedule a meeting to determine why the objectives were not met and to recommend subsequent action.

7.3 QUALITY CONTROL PROCEDURES

Routine quality control (QC) procedures will be employed as listed in the DEQ Laboratory Quality Assurance Manual (DEQ, 1993). Acceptable limits for the laboratory quality assurance objectives are listed in Table 5. In addition to the QA manual requirements, the following QC procedures will be performed:

1. Duplicate samples will be analyzed to measure the analytical precision on a minimum of 10% of the samples that are collected.
2. A transport and a transfer blank will be analyzed to detect interferences introduced during sampling or transport.
3. Reagent blanks will be analyzed to detect interferences during analysis, and to verify method detection limits.

TABLE 6
Quality Assurance Objectives

CONSTITUENT	CONCENTRATION RANGE	PRECISION RANGE	RPD	100% + ACCURACY
Conductivity	≥ 25 µ_/cm^3	-	± 5%	± 5%
pH	0 - 14 SU	± 0.2 SU	-	± 0.1 SU
Alkalinity	≥ 10 mg/l	-	± 5%	Not Applicable
Total Kjeldahl Nitrogen	0.2 - 1.0 mg/l ≥ 1.0 mg/l	± 0.2 mg/l -	- ± 20%	- ± 20%
Ammonia NH_3 - N	0.02 - 0.2 mg/l ≥ 0.2 mg/l	± 0.05 mg/l -	- ± 20%	- ± 20%
Nitrate/Nitrite-Nitrogen NO_3 + NO_2 - N	0.02 - 0.2 mg/l ≥ 0.2 mg/l	± 0.05 mg/l -	- ± 10%	- ± 15%
Total Phosphate	0.01 - 0.1 mg/l ≥ 0.1 mg/l	± 0.05 mg/l -	- ± 20%	- ± 20%
Chemical Oxygen Demand (COD)	5.0 - 10.0 mg/l ≥ 10.0 mg/l	± 0.5 mg/l -	- ± 20%	- ± 20%
Total Organic Carbon (TOC)	1.0 - 5.0 mg/l ≥ 5.0 mg/l	± 0.5 mg/l -	- ± 20%	- ± 20%
Volatile Organic Compounds (VOC)	0.0005 - 0.010 mg/l ≥ 0.01 mg/l	± 0.001 mg/l -	- ± 15%	- ± 15%
Manganese (Mn)	0.02 - 0.10 mg/l ≥ 0.10 mg/l	± 0.01 mg/l -	- ± 15%	- ± 15%
Calcium (Ca), Sodium (Na), Potassium (K), Magnesium (Mg), Silica (SiO_2)	0.5 - 10.0 mg/l ≥ 10.0 mg/l	± 1.0 mg/l -	- ± 15%	- ± 15%
Aluminum (Al)	0.1 - 5.0 mg/l ≥ 5.0 mg/l	± 1.0 mg/l -	- ± 15%	- ± 15%
Sulphate (SO_4), Chloride (Cl^-)	0.5 - 5.0 mg/l ≥ 5.0 mg/l	± 1.0 mg/l -	- ± 15%	- ± 15%
Iron (Fe), Copper (Cu), Zinc (Zn), Boron (B)	0.05 - 0.5 mg/l	± 0.05 mg/l	- ± 15%	- ± 15%

	≥ 0.5 mg/l	-		
Mercury (Hg)	0.0005 - 0.005 mg/l > 0.005 mg/l	± 0.0003 mg/l	- ± 15%	- ± 15%
Arsenic (As)	0.005 - 0.1 mg/l ≥ 0.1 mg/l	± 0.001 mg/l -	- ± 15%	- ± 15%

7.4 PERFORMANCE AND SYSTEM AUDITS

The DEQ Laboratory participates in the EPA Water Pollution Performance Evaluation Studies and is a certified drinking water laboratory. The DEQ will perform inorganic and volatile organic compound (VOC) analyses.

The ODA coordinates the Pesticide Analytical Response Center and is authorized under the Federal Insecticide, Fungicide, Rodenticide Act (FIFRA) program to perform pesticide analyses.

The OSU laboratory is recognized to perform analyses for the registration of pesticides under the U.S. Department of Agriculture (USDA) minor crop program.

7.5 DATA ASSESSMENT

Each laboratory is responsible for maintaining the quality of the data generated. The DEQ and ODA laboratories will evaluate their generated data for accuracy and precision, prior to reporting the results to the DEQ project manager. Table 5 lists the general acceptance criteria for accuracy and precision. The numerical difference between duplicate analyses, divided by the mean, determines the precision. Complete procedures for assessing accuracy and precision are detailed in the DEQ "Quality Assurance Manual" (DEQ, 1993a).

7.6 VALIDATION ANALYSES

For analytical results which are at or near the drinking water standard for the constituent being assessed, additional analyses may be requested. The project manager and the laboratory QA officer will perform a complete review of the data and analytical methodology available to determine the applicable methodology to be used in the confirmatory analysis.

7.7 DATA DISTRIBUTION

All participating laboratories (DEQ, ODA, and OSU) shall send their data reports to the DEQ Laboratory sample tracker. When the sample tracker has assembled all of the data, he will forward copies to the DEQ project manager, the DEQ laboratory groundwater monitoring coordinator, and to OHD.

The DEQ Laboratory groundwater monitoring coordinator will be responsible for assuring that all of the data is entered into the STORET water quality data base, and verified within 60 days after the sample tracker releases the data.

The DEQ Laboratory will forward a copy of the data, along with well owner information, to the OHD. The OHD will be responsible for assuring that each individual well owner receives a letter describing the results from their well.

The project manager will maintain a mailing list of persons interested in receiving data from the project and will ensure that reports are sent to each individual when they are finalized.

7.8 CORRECTIVE ACTION

Corrective action will be initiated at the first indication of non-conformance with the project QA objectives. Prior to initiating corrective action, the personnel initiating the corrective action will flag the data in question, and inform the laboratory QA officer, the groundwater monitoring coordinator, and the project manager. If warranted, a meeting will be held to determine the causative factors, and to recommend subsequent action.

7.9 QUALITY ASSURANCE REPORTS

Annually, each laboratory will generate a report that summarizes the integrity of the analytical data generated, as well as any significant aspects of the program which has affected, or may affect, the quality of the data that this project has generated.

8.0 CONFIRMATORY SAMPLING

If a problem is indicated by the groundwater sampling, the area will be revisited and confirmatory samples collected. Water samples will be collected only from wells which had detections of pesticides or volatile organic compounds, or which had nitrate concentrations greater than 5 mg/L.

9.0 REPORTS

A final report will be prepared by the DEQ's Water Quality Division, Groundwater Section that summarized the initial and confirmatory groundwater sampling. If an extended period of time lapses between the initial sampling and confirmatory sampling, a preliminary final report will be prepared using only the data from the initial sampling.

The report will describe the area; why the area was chosen; how the wells and pesticide analytes were chosen; groundwater use; agriculture; the geology and hydrogeology; the results of the study, comparisons of the data to OHD Property Transfer and Volunteer Nitrate Testing Data; and recommendations for further work.

Copies of the historic sampling data should be included in the appendices of the report if the data is not readily available elsewhere.

The reports will include a table of the data, copies of the analyses, the water well reports and the well identification records, and maps of the area. Appendix F is a sample outline for the final reports.

10.0 STUDY AREA BINDERS

A binder must be prepared for each study area. The binders are used to store all of the information pertinent to the study and should include the following:

The study area work plan;
A preliminary and/or final report;
Field reports;
Laboratory Analyses;
A computer disk with all pertinent documents;
Film negatives;
Copies of historic sampling reports/data;
Maps; and
Any other information pertinent to the study area that is

not readily available elsewhere.

Section one of the binder is reserved for the work plans, preliminary and final reports. The last document prepared should be the first in the binder.

The computer disk should contain work plans, preliminary and final reports, and any other pertinent documents. This allows for easy incorporation of portions of the work plans into preliminary and final reports, etc.

The binders have clear plastic windows for labels. The binder labels are prepared using Harvard Graphics.

REFERENCES

DEQ, 1986. "Mode of Operations Manual For the Water Quality Monitoring Section." Laboratories and Applied Research Division, Oregon Department of Environmental Quality.

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DEQ, 1993a. "Quality Assurance Manual." Laboratories and Applied Research Division, Oregon Department of Environmental Quality.

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EPA, 1990. National Survey of Pesticides in Drinking water Wells-Phase I Report. USEPA Office of Water, Office of Pesticides & Toxic Substances, EPA 570/9-90-015.

Follett, ed., 1989. Nitrogen Management And Groundwater Protection. Elsevier Science Publishers, Amsterdam, The Netherlands.

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Leland, David, 1992. Letter to Rick Kepler, Department of Environmental Quality's Groundwater Section, August 10, 1992.

WRD, 1992. "Percentage of Irrigated Land In Oregon" map. Oregon Water Resources Department, October 5, 1992.

Rinehold, J.W. and Witt, J.M., 1989. Oregon Pesticide Use Estimates for 1987. Oregon State University, April 1, 1989.

State of Oregon, 1989. Groundwater Protection Act of 1989. House Bill 3515, Sections 17 Through 66. (Oregon Revised Statutes 468B.150 through 468B.185)

Sweet, H. Randy et al., 1980. "Ground Water Aquifers" map from "Surface Impoundment Assessment for the State of Oregon." Sweet-Edwards and Associates, May, 1980.

APPENDIX C
Sample Table of Contents for Work Plans

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APPENDIX F
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References

ATTACHMENT D

2000-2001 Nitrate data from the Southern Willamette Valley Study

LASAR Number	St Name	St Type	City	Zip	Date	Temp (C)	Cond (um/hos)	pH (su)	NO3 (mg/l)	LAB QUAL
16534	Oklen	Dr	Junction City	97448	12/6/2000	12.80	295	6.8	6.58	
16536	Link Ridge	Rd	Junction City	97448	12/6/2000	12.40	569	8	0.005	U
16536	Link Ridge	Rd	Junction City	97448	12/6/2000	12.50	567	8	0.005	U
16537	Hwy 99		Junction City	97448	12/6/2000	11.40	272	6.6	9.38	
16538	Love Lake	Rd	Junction City	97448	12/6/2000	11.60	296	6.7	6.55	
16539	Lingo	Ln	Junction City	97448	12/6/2000	12.00	155	7.3	0.939	
16541	6th	Ave	Junction City	97448	12/6/2000	14.30	293	7	5.38	
16543	Love Lake	Rd	Junction City	97448	12/6/2000	12.40	228	8	0.005	U
16545	Ferguson	Rd	Junction City	97448	2/28/2001	12.80	659	6.8	13.1	
16545	Ferguson	Rd	Junction City	97448	2/28/2001	12.70	651	6.8	13	
16545	Ferguson	Rd	Junction City	97448	12/6/2000	13.50	628	7.1	13.6	
16545	Ferguson	Rd	Junction City	97448	12/6/2000	13.60	629	7	13.7	
16546	Territorial	Rd	Junction City	97448	12/7/2000	11.70	285	7.3	0.023	
16548	Cox Butte	Rd	Junction City	97448	12/6/2000	13.70	548	7.8	0.005	U
16550	Territorial	Rd	Junction City	97448	12/6/2000	14.20	1028	7.5	0.005	U
16551	Cox Butte	Rd	Junction City	97448	12/6/2000	10.50	275	6.9	6.21	
16552	High Pass	Rd	Junction City	97448	12/7/2000	12.50	179	6.8	0.005	U
16552	High Pass	Rd	Junction City	97448	12/7/2000	12.40	179	6.8	0.005	U
16553	Strome	Ln	Junction City	97448	2/28/2001	12.40	368	7.1	11.1	
16553	Strome	Ln	Junction City	97448	12/6/2000	12.30	292	6.8	13.3	
16578	Tennessee	Rd	Lebanon	97355	12/5/2000	11.60	165	6.7	4.97	

LASAR Number	St Name	St Type	City	Zip	Date	Temp (C)	Cond (um/hos)	pH (su)	NO3 (mg/l)	LAB QUAL
16579	Tennessee	Rd	Lebanon	97355	12/5/2000	12.20	153	6.7	4.18	
16580	Tennessee	Rd	Lebanon	97355	12/5/2000	11.40	221	7.4	0.0076	
16583	Oak	Dr	Tangent	97389	12/13/2000	11.70	119	7.9	0.857	
16584	Oak	Dr	Tangent	97389	12/13/2000	12.60	119	7.8	0.855	
16586	Gore	Dr	Lebanon	97355	12/5/2000	12.70	193	7.7	1.45	
16586	Gore	Dr	Lebanon	97355	12/5/2000	12.60	193	7.7	1.46	
16587	Lansmack	Rd	Lebanon	97355	12/5/2000	13.20	192	7.7	3.82	
16588	Spicer	Dr	Lebanon	97355	12/4/2000	12.20	152	7.9	0.779	
16589	Spicer	Dr	Albany	97321	12/4/2000	12.30	219	8.3	0.005	U
16590	Muller	Dr	Albany	97321	12/6/2000	12.90	133	8.2	0.005	U
16591	Stutzman	Dr	Albany	97321	12/4/2000	11.50	210	7.9	0.28	
16591	Stutzman	Dr	Albany	97321	12/4/2000	11.40	208	7.9	0.389	
16594	Penny	Ln	Lebanon	97355	12/5/2000	13.10	154	8.6	0.005	U
16595	Hanah Lea	Dr	Lebanon	97355	12/6/2000	12.30	135	8.3	0.005	U
16596	Midway	Dr	Albany	97321	12/6/2000	12.30	251	7.8	0.005	U
16597	Fry	Rd	Albany	97321	12/5/2000	11.60	374	7.3	1.65	
16641	Coburg	Rd	Coburg	97408	12/12/2000	12.60	289	6.8	4.21	
16642	Indian	Dr	Eugene	97408	12/12/2000	8.90	184	7.1	0.593	
16643	Pauite		Eugene	97408	12/12/2000	12.70	182	7	4.76	
16644	Coburg	Rd	Coburg	97408	12/12/2000	12.60	198	7.1	5.55	
16645	Powerline	Rd	Coburg	97408	12/13/2000	10.20	218	7.6	2.01	
16646	Coburg	Rd	Coburg	97408	12/12/2000	12.50	164	7.2	4.09	
16647	Coburg	Rd	Coburg	97408	12/12/2000	12.20	307	7.2	9.28	
16648	Coburg	Rd	Coburg	97408	12/13/2000	13.20	333	7.1	4.53	
16649	Lanes Turn	Rd	Eugene	97408	12/12/2000	12.20	236	7	4.47	
16650	Cross Roads	Ln	Eugene	97408	12/12/2000	12.50	230	6.7	4.57	
16651	Powerline	Rd	Eugene	97408	12/12/2000	12.70	224	7.4	2.25	
16651	Powerline	Rd	Eugene	97408	12/12/2000	12.70	224	7.5	2.25	
16652	Herman	Rd	Eugene	97408	12/12/2000	9.40	314	7.4	0.481	

LASAR Number	St Name	St Type	City	Zip	Date	Temp (C)	Cond (um/hos)	pH (su)	NO3 (mg/l)	LAB QUAL
16654	Coburg	Rd	Coburg	97408	12/12/2000	12.30	175	6.8	3.11	
16654	Coburg	Rd	Coburg	97408	12/12/2000	12.30	176	6.8	3.11	
16655	Cross Roads	Ln	Eugene	97408	12/12/2000	13.50	236	7.3	2.89	
16656	Coburg Bottom Loop	Rd	Coburg	97408	12/12/2000	12.30	327	6.8	11.4	
16656	Coburg Bottom Loop	Rd	Coburg	97408	4/17/2001	12.90	349	6.8	11.9	
16658	Coburg Bottom Loop	Rd	Coburg	97408	3/29/2001	12.90	256	6.6	9.78	
16658	Coburg Bottom Loop	Rd	Coburg	97408	12/12/2000	12.50	292	6.6	12.3	
16659	Knox	Rd	Coburg	97408	12/12/2000	11.50	135	6.8	1.72	
16660	Coburg Bottom Loop	Rd	Coburg	97408	2/16/2001	11.80	376	7.16	12.2	
16660	Coburg Bottom Loop	Rd	Coburg	97408	4/11/2001	12.40	354	6.8	12.2	
16660	Coburg Bottom Loop	Rd	Coburg	97408	12/12/2000	11.40	354	7	13.6	
24587	Oak Plain	Dr	Shedd	97377	12/7/2000	8.10	422	6.79	0.005	U
24588	Weber	Rd	Brownsville	97327	12/7/2000	7.80	1100	6.92	0.005	U
24589	Bond Butte	Rd	Harrisburg	97446	12/7/2000	7.70	1351	6.81	1.13	
24590	Malpass	Rd	Harrisburg	97446	12/7/2000	7.50	800	6.91	1.65	
24591	Powerline	Rd	Halsey	97348	12/7/2000				4.53	
24592	Powerline	Rd	Harrisburg	97446	5/2/2001	13.10	189	6.8	6.59	
24592	Powerline	Rd	Harrisburg	97446	12/7/2000				7.33	
24593	Linn West	Dr	Shedd	97377	12/7/2000				0.433	
24594	Wyatt	Dr	Harrisburg	97446	12/8/2000	12.70	369.4	6.81	4.14	
24595	Priceboro	Rd	Harrisburg	97446	12/8/2000	8.60	359.5	7.1	2.18	

LASAR Number	St Name	St Type	City	Zip	Date	Temp (C)	Cond (um/hos)	pH (su)	NO3 (mg/l)	LAB QUAL
24596	Coburg	Rd	Harrisburg	97446	12/8/2000				0.771	
24602	Oupor		Scio	97374	12/13/2000	10.80	187	9.2	0.005	U
24603	Gilkey	Rd	Scio	97374	12/13/2000	13.00	136	7.4	3.04	
24604	Tennessee	Rd	Albany	97321	12/14/2000	11.60	212	6.6	7.08	
24604	Tennessee	Rd	Albany	97321	4/19/2001	12.30	227	6.9	5.91	
24605	Seven Mile	Ln	Tangent	97389	12/14/2000	12.90	262	7.6	0.0278	
24606	Hwy 34		Albany	97321	12/14/2000	22.20	223	7.6	3.57	
24650	Hwy 99		Tangent	97389	12/13/2000	7.90	358	7.06	3.29	
24651	Colorado Lake	Dr	Corvallis	97333	12/13/2000	6.90	409.4	7.03	2.04	
24652	Riverside	Dr	Albany	97321	12/13/2000	11.00	442.4	6.99	4.95	
24653	Peoria	Rd	Corvallis	97333	12/14/2000	13.00	264.6	6.63	2.55	
24654	Stahlbush Island	Rd	Corvallis	97333	12/14/2000	13.00	417.7	6.66	2.07	
24684	Pettibone	Dr	Corvallis	97330	1/4/2001	13.90	436	7.3	0.005	U
24685	Granger	Ave	Corvallis	97330	4/17/2001	13.20	204	7	9.02	
24685	Granger	Ave	Corvallis	97330	1/4/2001	13.00	25	6.7	9.74	
24686	Seavy	Ave	Corvallis	97330	1/4/2001	12.30	323	7.4	0.005	U
24687	Hwy 20		Corvallis	97330	1/5/2001	13.30	305	7.3	3.7	
24688	Hwy 20		Corvallis	97330	1/5/2001	13.00	328	6.7	4.4	
24689	Strawberry	Ln	Corvallis	97330	1/5/2001	12.80	153	6.6	2.25	
24693	Priceboro	Dr	Harrisburg	97446	1/4/2001	14.10	445	7.3	4.39	
24694	Coburg	Rd	Harrisburg	97446	1/4/2001	11.80	240	7.6	5.07	
24694	Coburg	Rd	Harrisburg	97446	1/4/2001	11.90	240	7.5	5.07	
24695	Old Hwy 34		Albany		1/8/2001	12.60	380	7.5	3.28	
24696	Blackberry	Ln	Tangent	97389	1/8/2001	11.90	382	7.5	0.127	
24697	Hwy 34		Albany	97321	1/9/2001	13.00	595	7.6	0.0248	
24698	Oakville	Rd	Albany	97321	1/9/2001	13.20	526	7.6	2.72	
24699	Oakville	Rd	Albany	97321	1/9/2001	13.50	393	7.7	0.005	U
24700	McFarland	Rd	Tangent	97389	1/9/2001	13.40	270	7.4	3.08	
24701	Old Oak	Dr	Tangent	97389	1/9/2001	13.50	435	7.4	0.0558	

LASAR Number	St Name	St Type	City	Zip	Date	Temp (C)	Cond (um/hos)	pH (su)	NO3 (mg/l)	LAB QUAL
24701	Old Oak	Dr	Tangent	97389	1/9/2001	13.50	434	7.4	0.0569	
24702	Tangent Loop Rd @ Hwy 34		Albany		1/9/2001	12.60	276	7.6	0.168	
24703	Hwy 34		Albany	97321	1/9/2001	13.50	277	7.9	0.005	U
24705	Fox	Dr	Albany	97321	1/8/2001	12.50	537	7.4	0.147	
24706	Berry	Dr	Albany	97321	1/8/2001	13.80	368	6.9	1.69	
24707	Clover Ridge	Rd	Albany	97321	1/8/2001	13.30	228	7	5.43	
24708	Scravel Hill	Rd	Albany	97321	1/8/2001	12.20	43	5.6	1.08	
24709	Weddle		Jefferson	97352	1/8/2001	12.00	149	6.4	4.98	
24710	Scravel Hill	Rd	Albany	97321	1/8/2001	13.60	243	8.3	0.941	
24711	Kamph	Dr	Albany	97321	1/9/2001	11.40	292	7.2	0.847	
24712	Cyrus	Rd	Albany	97321	1/9/2001	11.90	234	6.8	4.48	
24713	Folsom		Albany	97321	1/9/2001	11.10	246	6.8	4.75	
24714	Knox Butte	Rd	Albany	97321	1/9/2001	11.00	327	7.3	6.22	
24715	Knox Butte	Rd	Albany	97321	1/9/2001	14.50	293	7.2	1.8	
24716	Gerig	Dr	Albany	97321	1/9/2001	9.20	165	7.3	1.82	
24717	Gerig	Dr	Albany	97321	1/9/2001	13.50	184	7.3	3.43	
24718	Spicer School	Rd	Lebanon	97355	1/9/2001	10.80	151	8.3	0.175	
24719	Samtiam	Hwy	Lebanon	97355	1/9/2001	13.00	234	7.1	6.2	
24720	Hwy 20		Albany	97321	1/10/2001	5.60	333	7.3	1.99	
24721	Three Lakes	Rd	Albany	97321	1/10/2001	13.90	339	7.9	0.005	U
24722	Three Lakes	Rd	Albany	97321	1/10/2001	11.10	371	7.2	2.11	
24723	Seven Mile	Ln	Albany	97321	1/10/2001	12.80	308	7.4	2.97	
24724	Red Bridge	Rd	Albany	97321	1/10/2001	11.80	248	7.8	0.005	U
24725	Gove	Dr	Lebanon	97355	1/10/2001	1.30	159	7.6	0.0278	
24726	Hwy 20		Albany	97321	1/10/2001	13.00	207	7.5	0.893	
24727	Jefferson-Scio	Dr	Jefferson	97352	1/11/2001	9.70	102	6.6	2.53	
24728	Jefferson Scio	Rd	Jefferson	97352	2/26/2001	12.90	326	7.4	13.3	
24728	Jefferson Scio	Rd	Jefferson	97352	2/26/2001	12.70	326	7.4	13.2	
24728	Jefferson Scio	Rd	Jefferson	97352	1/11/2001	12.50	330	7.2	14.1	
24729	Kelly	Rd	Jefferson	97352	1/11/2001	11.80	290	7.5	6.02	
24730	Helms	Dr	Jefferson	97352	1/11/2001	7.40	275	6.7	3.21	

LASAR Number	St Name	St Type	City	Zip	Date	Temp (C)	Cond (um/hos)	pH (su)	NO3 (mg/l)	LAB QUAL
24731	Kelly	Rd	Scio	97374	1/11/2001	13.00	441	8.2	0.005	U
24732	Gilkey	Rd	Scio	97374	1/11/2001	7.30	275	7.6	0.005	U
24733	Goar	Rd	Scio	97374	1/11/2001	12.70	180	6.6	2.89	
24734	Robinson	Dr	Scio	97374	1/11/2001	12.70	161	7.7	2.23	
24736	Church	Dr	Shedd	97377	1/11/2001	12.20	452	6.93	4.47	
24737	Peoria	Rd	Shedd	97377	1/11/2001	12.50	352	7.1	0.005	U
24737	Peoria	Rd	Shedd	97377	1/11/2001	12.70	363	7.13	0.005	U
24738	Pine Grove	Rd	Halsey	97348	1/12/2001	10.90	592	6.88	14.1	
24738	Pine Grove	Rd	Halsey	97348	4/18/2001	11.80	441	6.6	14.2	
24738	Pine Grove	Rd	Halsey	97348	4/18/2001	11.80	441	6.6	14.7	
24739	Peoria	Rd	Halsey	97348	1/12/2001	12.60	443	6.88	6.57	
24740	Nye	Rd	Brownsville	97327	1/24/2001	12.80	142	7.35	0.005	U
24741	Nye	Rd	Brownsville	97327	1/24/2001	11.30	211	7.57	0.0061	
24742	Nye	Rd	Brownsville	97327	1/24/2001	12.00	229.2	7.21	0.677	
24744	Lake Creek	Dr	Brownsville	97327	1/24/2001	12.40	252	7.64	0.0055	
24745	Blackley	Ave	Brownsville	97327	1/24/2001	12.30	230	7.25	0.005	U
24746	Walker	Ln	Brownsville	97327	1/24/2001	9.00	182	7.24	0.011	
24747	Walker	Ln	Brownsville	97327	1/24/2001	7.20	236	7.3	0.005	U
24748	Hwy 228		Brownsville	97327	1/24/2001	12.80	264	6.81	2.75	
24749	Hwy 228		Halsey	97348	1/19/2001	12.30	444	7.55	0.0443	
24750	Corner of Peoria Rd & Lake Creek Rd				1/18/2001	5.40	576	7.09	6.01	
24751	Peoria	Rd	Harrisburg	97446	1/18/2001	15.20	475	7.19	5.04	
24752	Coburg	Rd	Harrisburg	97446	1/18/2001	7.80	4457	7.3	0.045	
24753	Priceboro	Rd	Harrisburg	97446	1/18/2001	6.80	278.4	7.14	0.253	
24754	Crook	Dr	Halsey	97348	1/18/2001	11.20	616	7.09	19.3	
24754	Crook	Dr	Halsey	97348	4/12/2001	12.90	499	7.2	18.4	
24755	Crook	Dr	Halsey	97348	1/18/2001	1.60	391	7.01	9.67	
24755	Crook	Dr	Halsey	97348	4/12/2001	12.80	387	7.3	9.69	
24756	Irish Bend	Rd	Halsey	97348	4/12/2001	13.00	419	7.2	7.52	

LASAR Number	St Name	St Type	City	Zip	Date	Temp (C)	Cond (um/hos)	pH (su)	NO3 (mg/l)	LAB QUAL
24756	Irish Bend	Rd	Halsey	97348	1/18/2001	8.40	444	7.03	7.73	
24757	Coburg	Rd	Eugene	97408	1/25/2001	9.60	304	6.76	6.07	
24758	Coburg	Rd	Eugene	97408	1/25/2001	12.00	210	6.98	6.23	
24759	Stallings	Ln	Eugene	97408	1/25/2001	11.10	163	7.39	0.848	
24760	Stallings	Ln	Eugene	97408	1/25/2001	10.00	334	7.12	6.61	
24761	Tangent Loop		Tangent	97389	1/22/2001	13.10	269	7.6	1.33	
24762	Wirth	Rd	Tangent	97389	1/22/2001	11.40	291	7.1	3.6	
24763	Tangent Loop		Tangent	97389	1/22/2001	13.10	295	7.7	0.369	
24764	Hwy 99		Tangent	97389	1/22/2001	12.10	332	7.3	3.45	
24764	Hwy 99		Tangent	97389	1/22/2001	12.10	331	7.3	3.63	
24765	Lake Creek	Dr	Tangent	97389	1/22/2001	13.20	315	7.8	0.005	U
24766	Peoria	Rd	Albany	97321	1/22/2001	11.20	262	6.9	5.43	
24767	Peoria	Rd	Albany	97321	1/22/2001	11.80	195	6.6	3.02	
24768	Peoria	Rd	Corvallis	97333	1/23/2001	14.40	264	6.8	1.29	
24769	Primrose	Rd	Corvallis	97333	1/23/2001	12.90	509	7.4	0.776	
24770	Peoria	Rd	Corvallis	97333	1/23/2001	9.00	399	6.8	2.7	
24771	Peoria	Rd	Corvallis	97333	1/23/2001	11.70	674	6.6	2.81	
24772	Peoria	Rd	Corvallis	97333	1/23/2001	13.50	593	6.8	0.0447	
24772	Peoria	Rd	Corvallis	97333	1/23/2001	12.80	618	7	0.0379	
24773	Lamb	Dr	Albany	97321	1/23/2001	10.90	231	6.8	3.5	
24774	Peoria	Rd	Albany	97321	1/23/2001	12.90	210	6.8	5.3	
24775	Arthur	Dr	Albany	97321	1/23/2001	13.10	277	7.3	0.0484	
24776	Riverside	Dr	Albany	97321	1/23/2001	12.60	528	7.7	0.005	U
24777	Hwy 34		Corvallis	97333	1/23/2001	12.10	258	6.6	3.13	
24778	Titeca	Ln	Lebanon	97355	12/5/2000	12.40	64	6.6	0.0234	
24779	Prairie	Rd	Junction City	97448	4/18/2001	14.20	283	6.9	8.21	
24779	Prairie	Rd	Junction City	97448	12/6/2000	13.00	287	7.1	8.88	
24780	Coburg	Rd	Coburg	97408	1/29/2001	9.00	165	7.12	3.33	
24781	Coburg	Rd	Eugene	97408	1/29/2001	13.90	147	6.83	1.86	
24781	Coburg	Rd	Eugene	97408	1/29/2001	13.90	147	6.83	1.87	
24782	Coburg	Rd	Eugene	97408	1/29/2001	12.30	300	6.77	3.77	
24783	Coburg	Rd	Coburg	97408	1/29/2001	12.40	438	6.82	6.17	
24784	Stallings	Ln	Eugene	97408	1/29/2001	12.50	340	7	6.83	
24785	Coburg	Rd	Coburg	97408	1/29/2001	11.50	366	7.21	4.79	
24786	Hurlhurt		Corvallis	97333	1/30/2001	13.00	313	6.7	9.8	
24786	Hurlhurt		Corvallis	97333	4/19/2001	13.50	316	6.7	10.5	
24787	Greenberry	Rd	Corvallis	97333	1/30/2001	12.10	627	7.5	0.468	
24788	Lewellen	Rd	Corvallis	97333	1/30/2001	16.90	467	7.7	0.466	
24789	Morning Star	Rd	Albany	97321	1/31/2001	5.90	192	6.5	3.26	
24790	Third	St	Lebanon	97355	1/31/2001	11.10	259	6.7	3.45	
24791	Engle	Rd	Albany	97321	1/31/2001	9.20	264	7.4	4.62	

LASAR Number	St Name	St Type	City	Zip	Date	Temp (C)	Cond (um/hos)	pH (su)	NO3 (mg/l)	LAB QUAL
24792	Hwy 34		Albany	97321	1/31/2001	14.60	216	7.4	1.2	
24793	Kizer Island		Corvallis	97333	1/31/2001	7.80	548	7.8	0.005	U
24794	Kiger Island	Dr	Corvallis	97333	1/31/2001	12.50	346	6.7	3.74	
24795	Gore	Dr	Albany	97321	1/31/2001	10.30	162	8.4	0.005	U
24795	Gore	Dr	Albany	97321	1/31/2001	10.20	162	8.5	0.005	U
24796	River	Rd	Junction City	97448	2/5/2001	13.00	300	6.8	11.4	
24796	River	Rd	Junction City	97448	4/19/2001	12.70	303	6.8	11.7	
24797	River	Rd	Junction City	97448	2/5/2001	11.30	227	6.7	5.9	
24797	River	Rd	Junction City	97448	2/5/2001	11.80	227	6.7	5.91	
24798	Oaklea	Dr	Junction City	97448	4/12/2001	12.30	302	6.6	8.56	
24798	Oaklea	Dr	Junction City	97448	2/5/2001	12.50	294	6.7	8.34	
24799	Love Lake	Rd	Junction City	97448	2/6/2001	12.90	229	6.6	6.7	
24800	Sommerville	Lp	Harrisburg	97446	2/6/2001	12.60	251	7.6	0.0764	
24801	Sommerville	Lp	Harrisburg	97446	2/6/2001	12.80	332	7.3	5.77	
24802	Bush Garden	Dr	Harrisburg	97446	2/6/2001	13.00	278	7.4	9.05	
24803	Pitney	Ln	Junction City	97448	2/6/2001	12.00	329	7.4	0.421	
24804	Pitney	Ln	Junction City	97448	2/6/2001	11.90	244	7.3	0.0057	
24805	Hulbert Lake	Rd	Junction City	97448	2/6/2001	10.50	422	7.4	17.8	
24805	Hulbert Lake	Rd	Junction City	97448	4/11/2001	13.10	441	7.3	17.9	
24806	Greenhill	Rd	Junction City	97448	2/7/2001	12.70	215	7.8	2.24	
24806	Greenhill	Rd	Junction City	97448	2/7/2001	12.80	214	7.7	2.25	
24807	Greenhill	Rd	Junction City	97448	2/7/2001	11.70	190	8	1.57	
24808	Prairie	Rd	Junction City	97448	2/7/2001	13.00	283	7.2	3.32	
24809	Hwy 99		Junction City	97448	2/7/2001	12.50	340	7.1	3.62	
24810	Toftdahl	Ln	Junction City	97448	2/7/2001	10.90	245	6.9	4.72	

LASAR Number	St Name	St Type	City	Zip	Date	Temp (C)	Cond (um/hos)	pH (su)	NO3 (mg/l)	LAB QUAL
24811	Howard	Ln	Junction City	97448	4/18/2001	12.30	313	7.1	9.73	
24811	Howard	Ln	Junction City	97448	2/7/2001	12.00	313	6.9	9.66	
24812	Ferguson	Rd	Junction City	97448	2/7/2001	12.20	160	7	0.356	
24813	Ferguson	Rd	Junction City	97448	2/7/2001	12.00	450	7.5	0.006	
24814	River	Rd	Junction City	97448	3/1/2001	12.90	297	6.6	8.56	
24814	River	Rd	Junction City	97448	4/12/2001	12.40	298	6.7	7.99	
24815	Horseshoe	Ln	Albany	97321	2/22/2001	11.90	211	7.1	4.52	
24816	Lindsay	Dr	Shedd	97377	2/8/2001	12.00	322	7	9.31	
24817	Lindsay	Dr	Shedd	97377	2/8/2001	11.50	410	6.7	14	
24818	Rowland	Rd	Harrisburg	97446	2/8/2001	11.40	576	7.5	4.41	
24819	Harris	Dr	Harrisburg	97446	2/8/2001	13.40	532	7.5	0.478	
24820	Rowland	Dr	Harrisburg	97446	2/8/2001	8.80	616	7.6	1.13	
24821	Twin Buttes		Harrisburg	97446	2/8/2001	13.00	1024	7.5	5.78	
24822	4th		Halsey	97348	2/8/2001	7.10	619	7.1	1.79	
24824	Creek Bend	Rd	Halsey	97348	2/8/2001	10.80	353	7.3	6.82	
24825	Potter	Rd	Halsey	97348	2/8/2001	8.70	244	7.4	3.22	
24825	Potter	Rd	Halsey	97348	2/8/2001	9.00	245	7.4	3.25	
24826	Abraham	Dr	Shedd	97377	2/7/2001	12.40	309	7.6	5.21	
24827	Cak View	Dr	Brownsville	97327	2/7/2001	9.80	429	7.9	0.0372	
24828	Sovern	Ln	Junction City	97448	2/7/2001	12.90	287	7.1	2.27	
24829	8th	St	Alvadore	97409	2/7/2001	10.90	98	7.3	2.02	
24830	Buckskin	Dr	Eugene	97402	2/7/2001	12.00	131	7.6	5.77	
24831	Van Duyn		Eugene	97408	2/7/2001	12.50	216	7	6.57	
24832	Bush Garden	Dr	Harrisburg	97446	5/2/2001	14.20	326	7.3	7.03	
24832	Bush Garden	Dr	Harrisburg	97446	2/7/2001	13.30	317	7.1	7.01	
24833	Priceboro	Dr	Harrisburg	97446	2/7/2001	10.10	258	7.5	1.16	
24833	Priceboro	Dr	Harrisburg	97446	2/7/2001	9.80	258	7.5	1.16	
24834	Airport		Corvallis	97333	2/5/2001	11.50	772	7.3	0.0122	
24835	53rd		Corvallis	97333	2/5/2001	12.40	446	7.6	0.0197	

LASAR Number	St Name	St Type	City	Zip	Date	Temp (C)	Cond (um/hos)	pH (su)	NO3 (mg/l)	LAB QUAL
24836	Bellfountain	Rd	Philomath	97333	2/5/2001	10.10	306	7.8	0.0074	
24837	SW 53rd		Corvallis	97333	2/5/2001	12.00	628	8.2	0.0063	
24838	Brooklane	Pl	Corvallis	97333	2/5/2001	9.70	356	7.4	0.0866	
24839	Alexander		Corvallis	97333	2/5/2001	11.90	370	6.9	1.62	
24840	Three Mile	Rd	Corvallis	97333	2/5/2001	12.30	419	7.2	1.24	
24840	Three Mile	Rd	Corvallis	97333	2/5/2001	12.40	417	7.3	1.25	
24841	Greenberry	Rd	Corvallis	97333	2/6/2001	9.10	444	7.4	0.0099	
24842	Guerber	Ln	Corvallis	97333	2/6/2001	12.70	360	7.9	4.99	
24843	Eureka	Rd	Corvallis	97333	2/6/2001	11.60	274	6.6	9.07	
24843	Eureka	Rd	Corvallis	97333	4/17/2001	11.80	274	6.8	8.61	
24844	McFarland	Rd	Monroe	97456	2/6/2001	8.00	1760	7.4	0.0129	
24845	Stow Pit	Rd	Monroe	97456	5/1/2001	12.60	279	6.8	6.11	
24845	Stow Pit	Rd	Monroe	97456	2/6/2001	12.60	269	7	6.17	
24846	Fawver	Ln	Monroe	97456	2/6/2001	12.30	238	6.8	7.53	
24847	Lindsay	Dr	Shedd	97377	2/8/2001	7.20	489	6.8	19.2	
24847	Lindsay	Dr	Shedd	97377	1/8/2001	11.10	495	6.75	20.7	
24848	Royal	Ave	Eugene	97402	2/9/2001	11.70	353	7.06	2.82	
24849	Royal	Ave	Eugene	97402	2/9/2001	11.40	1496	6.85	0.152	
24850	Bridges	Lane	Eugene	97402	2/9/2001	11.00	144	7.5	1.83	
24851	Clear Lake Rd		Eugene	97402	2/9/2001	11.00	415	7.09	1.44	
24851	Clear Lake Rd		Eugene	97402	2/9/2001				1.44	
24852	Greenhill	Rd	Eugene	97402	2/9/2001	11.90	244	7.1	3.95	
24853	Fir Butte		Eugene	97402	2/9/2001	10.80	104	7.52	2.23	
24854	Ridge	Dr	Tangent	97389	2/13/2001	13.00	380	7.8	2.59	
24855	Plainview	Dr	Shedd	97377	2/13/2001	8.30	350	7.6	5.08	
24856	Plainview	Dr	Shedd	97377	2/13/2001	10.90	420	7.5	3.74	
24857	Wirth	Rd	Tangent	97389	2/13/2001	11.00	414	7.3	6.9	
24858	Driver	Rd	Tangent	97389	2/13/2001	11.60	345	7.4	2.94	
24859	Bell Plain	Dr	Shedd	97377	2/13/2001	12.50	492	7.9	0.0259	
24860	Green Valley	Rd	Shedd	97377	2/13/2001	12.70	527	7.5	3.42	
24861	Green Valley	Rd	Shedd	97377	2/13/2001	12.70	365	7.8	3.81	
24862	Peoria	Rd	Shedd	97377	2/13/2001	11.80	260	7.4	7.87	
24862	Peoria	Rd	Shedd	97377	2/13/2001	11.70	261	7.5	7.86	
24862	Peoria	Rd	Shedd	97377	4/12/2001	12.50	262	7.1	7.5	
24862	Peoria	Rd	Shedd	97377	4/12/2001	12.80	262	7.1	7.55	
24863	Peoria	Rd	Halsey	97348	2/13/2001	11.70	392	7.8	5.9	
24864	Green Valley	Rd	Shedd	97377	2/15/2001	12.10	391	7.8	3.21	

LASAR Number	St Name	St Type	City	Zip	Date	Temp (C)	Cond (um/hos)	pH (su)	NO3 (mg/l)	LAB QUAL
24865	Hwy 99		Shedd	97377	2/15/2001	10.00	620	7.3	4.33	
24866	Bottom Mill	Dr	Shedd	97377	2/15/2001	13.20	715	7.7	0.0155	
24867	Seven Mile	Rd	Shedd	97377	2/15/2001	12.60	414	7.9	0.234	
24868	Powerline	Rd	Halsey	97348	2/15/2001	10.90	532	7.3	3.78	
24869	Powerline	Rd	Halsey	97348	2/15/2001	12.70	800	7.5	0.0709	
24870	Lake Creek	Dr	Halsey	97348	2/15/2001	13.90	410	7.1	3.7	
24871	Peoria	Rd	Harrisburg	97446	5/2/2001	13.80	416	7.2	8.95	
24871	Peoria	Rd	Harrisburg	97446	2/15/2001	12.80	409	7.5	8.83	
24872	Cartney	Dr	Harrisburg	97446	2/15/2001	12.40	463	7.4	9.91	
24873	Cartney	Dr	Harrisburg	97446	2/15/2001	10.80	242	7.5	5.65	
24873	Cartney	Dr	Harrisburg	97446	2/15/2001	10.80	242	7.5	5.65	
24874	Van Duyn	Rd	Eugene	97408	2/12/2001	11.80	733	7.24	0.0106	
24875	Coburg	Rd	Coburg	97408	2/12/2001	12.20	308	7.01	5.41	
24876	Coburg	Rd	Coburg	97408	2/12/2001	9.80	522	7.22	0.0792	
24877	Coburg	Rd	Coburg	97408	2/12/2001	11.50	232	6.98	3.08	
24878	Coburg	Rd	Coburg	97408	2/12/2001	12.50	262	7.17	4.32	
24879	Coburg	Rd	Coburg	97408	2/12/2001	11.50	325	7.01	5.92	
24880	Coburg	Rd	Coburg	97408	2/12/2001	7.20	232	7.01	5.06	
24881	Coburg	Rd	Coburg	97408	2/12/2001	11.10	377	7.1	5.92	
24882	Coburg	Rd	Coburg	97408	2/12/2001	10.40	332	6.97	6.92	
24883	Coburg Bottom Loop	Rd	Coburg	97408	2/12/2001	11.20	214	7.3	4.7	
24884	Coburg Bottom Loop	Rd	Coburg	97408	5/2/2001	12.40	260	6.8	11.8	
24884	Coburg Bottom Loop	Rd	Coburg	97408	5/2/2001	12.20	260	6.9	11.7	
24884	Coburg Bottom Loop	Rd	Coburg	97408	2/12/2001	8.10	306	7.13	14.3	
24885	Electric	Rd	Corvallis	97333	2/15/2001	13.40	228	6.9	1.68	
24886	Electric	Rd	Corvallis	97333	2/15/2001	12.50	237	6.8	2.25	
24887	Wolcott	St	Corvallis	97333	2/15/2001	14.50	237	6.7	2.95	
24887	Wolcott	St	Corvallis	97333	2/15/2001	14.20	237	6.7	2.95	
24888	Hwy 34		Corvallis	97333	2/15/2001	11.20	247	6.8	1.14	
24889	Electric	Rd	Corvallis	97333	2/15/2001	12.70	254	6.7	4.5	

LASAR Number	St Name	St Type	City	Zip	Date	Temp (C)	Cond (um/hos)	pH (su)	NO3 (mg/l)	LAB QUAL
24890	Terra Circle		Corvallis	97333	2/15/2001	13.80	320	6.6	2.46	
24891	Colorado Lake	Dr	Corvallis	97333	2/15/2001	13.00	220	6.6	1.63	
24892	White Oak		Corvallis	97333	2/15/2001	11.70	140	7	2.14	
24893	Riverside	Dr	Albany	97321	2/15/2001	11.00	260	6.7	7.43	
24893	Riverside	Dr	Albany	97321	4/17/2001	10.10	380	6.8	7.45	
24894	Riverside	Dr	Albany	97321	2/15/2001	12.40	373	7.3	0.0115	
24895	Owl	Pl	Corvallis	97333	2/15/2001	12.70	236	6.8	0.99	
24896	SE Bridgeway		Corvallis	97333	2/15/2001	13.00	463	7.3	0.256	
24897	Park		Corvallis	97333	2/16/2001	11.30	373	7.6	0.021	
24898	Kiger Island	Dr	Corvallis	97333	2/16/2001	12.50	306	6.7	5.85	
24898	Kiger Island	Dr	Corvallis	97333	2/16/2001	12.50	309	6.7	5.84	
24899	Kiger Island	Dr	Corvallis	97333	2/16/2001	12.40	257	6.7	7.11	
24900	Kiger Island	Dr	Corvallis	97333	2/16/2001	12.60	207	6.7	4.49	
24901	Coburg	Rd	Coburg	97408	4/11/2001	13.10	266	7.1	6.92	
24901	Coburg	Rd	Coburg	97408	2/16/2001	12.50	296	6.91	7.1	
24902	Coburg Bottom Loop	Rd	Coburg	97408	2/12/2001	12.80	316	7.01	8.65	
24902	Coburg Bottom Loop	Rd	Coburg	97408	4/11/2001	11.70	271	6.7	8.47	
24903	Coburg Bottom Loop	Rd	Coburg	97408	2/16/2001	12.70	299	7.2	7.5	
24903	Coburg Bottom Loop	Rd	Coburg	97408	4/11/2001	12.90	276	6.9	7.11	
24904	Coburg Bottom Loop	Rd	Coburg	97408	2/16/2001	11.10	148	7.35	1.33	
24905	Coburg Bottom Loop	Rd	Coburg	97408	2/16/2001	11.50	365	6.79	8.47	
24905	Coburg Bottom Loop	Rd	Coburg	97408	2/16/2001	13.20	58	7.2	8.47	
24905	Coburg Bottom Loop	Rd	Coburg	97408	2/16/2001	12.00	369	6.72	1.21	

LASAR Number	St Name	St Type	City	Zip	Date	Temp (C)	Cond (um/hos)	pH (su)	NO3 (mg/l)	LAB QUAL
24905	Coburg Bottom Loop	Rd	Coburg	97408	4/11/2001	11.50	274	6.7	7.88	
24906	Coburg Bottom Loop	Rd	Coburg	97408	4/11/2001	12.10	289	6.9	9.22	
24906	Coburg Bottom Loop	Rd	Coburg	97408	2/16/2001	11.80	290	7.01	9.31	
24907	Coburg Bottom Loop	Rd	Coburg	97408	2/16/2001	11.20	388	7.12	12.1	
24907	Coburg Bottom Loop	Rd	Coburg	97408	4/11/2001	12.10	315	6.8	10.6	
24908	Coburg Bottom Loop	Rd	Coburg	97408	2/16/2001	10.90	489	6.97	9.97	
24908	Coburg Bottom Loop	Rd	Coburg	97408	4/11/2001	12.10	302	6.9	9.82	
24909	Coburg Bottom Loop	Rd	Coburg	97408	2/16/2001	12.70	291	6.8	9.55	
24910	Willamette	St	Coburg	97408	2/20/2001	12.40	382	7.4	6.06	
24911	Smith	Ln	Coburg	97408	2/20/2001	11.40	390	6.87	7.83	
24911	Smith	Ln	Coburg	97408	4/11/2001	11.40	214	7	7.51	
24912	Coburg	Rd	Coburg	97408	2/20/2001	10.10	400	7.13	6.34	
24913	Coburg	Rd	Coburg	97408	2/20/2001	11.30	387	7.41	7.47	
24913	Coburg	Rd	Coburg	97408	4/11/2001	12.90	321	7.1	7.54	
24914	Green Island	Rd	Eugene	97408	2/20/2001	11.90	367	7.35	8.29	
24914	Green Island	Rd	Eugene	97408	4/11/2001	12.60	299	6.9	8.23	
24914	Green Island	Rd	Eugene	97408	4/11/2001	12.60	299	6.9	8.22	
24915	Coburg	Rd	Coburg	97408	2/20/2001	11.70	240	7.19	2.9	
24916	River	Rd	Junction City	97448	5/1/2001	12.30	315	6.7	11.6	
24916	River	Rd	Junction City	97448	3/2/2001	10.00	355	7.07	11.4	
24917	Wickwire	Lane	Junction City	97448	3/2/2001	10.30	146	7.15	11.1	
24917	Wickwire	Lane	Junction City	97448	4/12/2001	12.10	310	6.7	11.2	
24918	Midway	Dr	Albany	97321	12/4/2000	13.20	385	7.2	3.76	

LASAR Number	St Name	St Type	City	Zip	Date	Temp (C)	Cond (um/hos)	pH (su)	NO3 (mg/l)	LAB QUAL
24919	Knox	Rd	Coburg	97408	12/12/2000	10.80	118	7.3	1.97	
24923	Lingo	Lane	Junction City	97448	3/2/2001	11.40	206	7.44	3.88	
24924	Prairie	Rd	Junction City	97448	2/1/2001	11.10	307	6.5	4.02	
24924	Prairie	Rd	Junction City	97448	2/1/2001	11.20	307	6.5	4.03	
24925	Dorsey	Ln	Junction City	97448	2/1/2001	12.60	305	7.4	4.27	
24926	Dane	Ln	Junction City	97448	2/1/2001	8.30	276	7.2	6.32	
24927	Dane	Ln	Junction City	97448	2/1/2001	12.40	270	7.2	5.41	
24928	Old River	Rd	Monroe	97456	2/1/2001	12.70	266	7.1	7.07	
24928	Old River	Rd	Monroe	97456	4/19/2001	13.10	272	7.1	7.38	
24929	Hwy 36		Junction City	97448	1/30/2001	13.50	437	7	0.005	U
24930	Pitney	Ln	Junction City	97448	1/30/2001	12.50	360	6.9	6.41	
24950	Courtney Creek	Dr	Brownsville	97327	1/24/2001	11.80	165	7.16	5.38	
24951	Coburg Bottom Loop	Rd	Coburg	97408	1/26/2001	10.90	423	6.82	12.4	
24952	Noraton	Co	Junction City	97448	5/1/2001	11.90	291	6.6	11.4	
24952	Noraton	Rd	Junction City	97448		10.50	291	6.6	12.4	
24952	Noraton	Co	Junction City	97448	5/1/2001	11.90	291	6.6	11.2	
24953	McMullen	Ln	Junction City	97448	2/13/2001	10.40	141	6.7	2.73	
24954	Territorial	Rd	Junction City	97448	2/14/2001	10.00	511	7.3	0.005	U
24955	Prairie	Rd	Junction City	97448	2/14/2001	12.70	219	7.2	4.17	
24955	Prairie	Rd	Junction City	97448	2/14/2001	12.70	219	7.3	4.18	
24956	McMullin	Ln	Harrisburg	97446	2/14/2001	12.50	104	6.9	1.57	
24957	Hwy 99		Junction City	97448	5/1/2001	12.70	616	7	22.1	
24957	Hwy 99		Junction City	97448	2/14/2001	9.80	612	7	23.1	
24991	Columbus	St	Albany	97321	2/21/2001	12.70	284	7.6	2.99	

LASAR Number	St Name	St Type	City	Zip	Date	Temp (C)	Cond (um/hos)	pH (su)	NO3 (mg/l)	LAB QUAL
24992	Columbus	St	Albany	97321	2/21/2001	13.10	254	7.7	0.005	U
24993	Horn	Ln	Albany	97321	2/21/2001	12.20	254	7.6	0.959	
24994	SE Lochner		Albany	97321	2/21/2001	13.20	297	7.5	0.0057	
24994	SE Lochner		Albany	97321	2/21/2001	13.20	296	7.5	0.0054	
24995	Seven Mile	Ln	Albany	97321	2/21/2001	12.70	267	7.8	3.19	
24996	Ellingson	Rd	Albany	97321	2/21/2001	9.00	302	7.4	0.661	
24997	Ellingson	Rd	Albany	97321	2/21/2001	13.10	286	7.4	1.17	
24998	Hwy 99		Tangent	97389	2/21/2001	13.90	297	7.5	0.539	
24999	McFarland		Tangent	97389	2/21/2001	12.60	376	7.4	5.56	
25000	Oakville	Rd	Albany	97321	2/22/2001	9.50	245	6.9	5.51	
25001	Walnut	Dr	Albany	97321	2/22/2001	13.00	343	7.6	0.0073	
25001	Walnut	Dr	Albany	97321	2/22/2001	13.10	348	7.6	0.0067	
25002	Riverside	Dr	Albany	97321	2/22/2001	13.70	525	7.3	0.458	
25003	Riverside	Dr	Albany	97321	2/22/2001	13.60	486	7.5	0.163	
25004	River	Rd	Junction City	97448	3/2/2001	11.20	345	7.04	9.4	
25004	River	Rd	Junction City	97448	4/18/2001	12.60	291	6.8	9.14	
25005	Lingo	Lane	Junction City	97448	3/2/2001	12.10	204	7.67	0.926	
25006	Lingo	Lane	Junction City	97448	4/18/2001	12.70	321	6.7	9.62	
25006	Lingo	Lane	Junction City	97448	3/2/2001	10.90	326	7.24	9.26	
25007	Tangent	Dr	Albany	97321	1/4/2001	14.70	912	7.02	1.06	
25008	Columbus	St	Albany	97321	1/4/2001	14.50	58	6.78	21	
25008	Columbus	St	Albany	97321	2/22/2001	12.70	485	7.13	20.5	
25009	Driver	Rd	Shedd	97377	1/4/2001				0.668	
25010	Wirth	Rd	Shedd	97377	1/4/2001	12.40	648	7.35	0.005	U
25011	Bond	Ln	Halsey	97348	1/5/2001	12.70	962	7.15	0.005	U
25012	Hwy 99		Halsey	97348	1/5/2001	12.80	1233	6.96	0.0653	
25013	Peckinpaugh	Ln	Shedd	97377	1/5/2001	12.90	1236	7	2.85	
25014	Fayetteville	Rd	Shedd	97377	2/8/2001	12.80	323	6.5	11.7	
25014	Fayetteville	Rd	Shedd	97377	1/5/2001	13.60	449	6.69	16.6	
25014	Fayetteville	Rd	Shedd	97377	4/12/2001	12.60	301	6.3	13.9	
25015	Hwy 99		Shedd	97377	1/8/2001	11.40	431	6.94	2.68	
25016	Country	Rd	Tangent	97389	1/8/2001	7.90	509	7.18	0.005	U

LASAR Number	St Name	St Type	City	Zip	Date	Temp (C)	Cond (um/hos)	pH (su)	NO3 (mg/l)	LAB QUAL
25018	Powerline	Rd	Harrisburg	97446	1/8/2001	10.90	387	7.4	3.42	
25019	Powerline	Rd	Harrisburg	97446	1/8/2001	11.20	477	7.4	7.14	
25020	Lassen	Ln	Junction City	97448	4/18/2001	12.80	294	7.1	7.99	
25020	Lassen	Ln	Junction City	97448	1/9/2001	12.70	280	6.7	8.55	
25021	River	Rd	Junction City	97448	1/10/2001	11.40	257	6.6	6.19	
25022	Luckey	Ln	Junction City	97448	1/9/2001	13.40	236	6.8	3.84	
25023	River	Rd	Junction City	97448	1/9/2001	12.50	252	6.8	5.96	
25023	River	Rd	Junction City	97448	1/9/2001	12.30	252	6.8	5.95	
25024	River	Rd	Junction City	97448	5/1/2001	12.90	304	6.8	7.83	
25024	River	Rd	Junction City	97448	1/9/2001	12.80	278	6.7	7.86	
25025	River	Rd	Junction City	97448	1/9/2001	11.60	162	7.7	0.961	
25026	Territorial	Rd	Junction City	97448	1/10/2001	12.40	861	6.9	0.871	
25026	Territorial	Rd	Junction City	97448	1/10/2001	12.20	860	7	0.868	
25027	High Pass	Rd	Junction City	97448	1/10/2001	13.90	203	7.1	0.448	
25028	Pitney	Ln	Junction City	97448	1/10/2001	13.00	316	7.1	2.78	
25029	Purkerson	Rd	Junction City	97448	1/10/2001	11.70	331	8	0.005	U
25030	Milliron	Rd	Junction City	97448	1/10/2001	13.20	244	7.9	5.9	
25036	Territorial	Rd	Junction City	97448	1/11/2001	11.00	1557	6.9	0.005	U
25037	Wickwire	Ln	Junction City	97448	1/11/2001	11.40	289	6.7	10.9	
25037	Wickwire	Ln	Junction City	97448	2/28/2001	11.90	313	7.54	10.8	
25037	Wickwire	Ln	Junction City	97448	4/12/2001	11.80	305	6.7	9.71	
25038	Hubbard	Rd	Monroe	97456	1/17/2001		298	6.8	7.83	
25038	Hubbard	Rd	Monroe	97456	4/17/2001	12.90	328	6.6	9.94	
25039	Bundy	Rd	Corvallis	97333	1/17/2001		264	7.2	4.12	
25040	Irish Bend	Rd	Monroe	97456	1/17/2001		122	6.9	0.959	

LASAR Number	St Name	St Type	City	Zip	Date	Temp (C)	Cond (um/hos)	pH (su)	NO3 (mg/l)	LAB QUAL
25041	McFarland	Rd	Monroe	97456	1/17/2001		227	8.7	0.0166	
25042	Horning	Ln	Corvallis	97333	1/18/2001	11.40	131	6.8	2.14	
25043	Bruce	Rd	Corvallis	97333	1/18/2001	12.50	320	7.2	4.39	
25044	Hwy 99		Corvallis	97333	1/18/2001	11.50	325	7.3	3.8	
25045	Lakeside	Dr	Corvallis	97333	1/18/2001	10.40	241	7.6	0.0251	
25046	Hulbert	Rd	Corvallis	97333	1/18/2001	11.80	294	6.9	8.38	
25046	Hulbert	Rd	Corvallis	97333	4/19/2001	15.10	290	6.8	8.12	
25047	Smith Loop	Rd	Corvallis	97333	1/18/2001	12.50	246	6.7	4.13	
25048	Smith Loop	Rd	Corvallis	97333	1/18/2001	10.30	269	6.9	1.51	
25049	Payne	Rd	Corvallis	97333	1/18/2001	11.10	418	7.2	3.51	
25050	Coburg	Rd	Coburg	97408	1/30/2001	11.80	261	6.96	6.12	
25050	Coburg	Rd	Coburg	97408	1/30/2001	11.80	261	6.96	6.11	
25052	Lake Creek		Halsey	97348	2/21/2001	18.80	4670	7.7	0.0248	
25053	Seefield	Dr	Halsey	97348	2/21/2001	11.10	592	7.2	8.05	
25053	Seefield	Dr	Halsey	97348	4/17/2001	12.70	605	6.9	8.15	
25054	Belts	Dr	Harrisburg	97446	2/21/2001	13.60	3340	8.6	0.0131	
25055	Belts	Dr	Harrisburg	97446	2/21/2001	11.10	895	7.7	0.0572	
25056	Hwy 99		Halsey	97348	2/21/2001	13.30	397	7.5	0.0156	
25057	Lake Creek	Dr	Halsey	97348	2/21/2001	13.10	644	7.3	11.7	
25058	Nixon	Dr	Harrisburg	97446	2/21/2001	12.90	406	7	8.92	
25058	Nixon	Dr	Harrisburg	97446	5/2/2001	13.10	442	6.6	8.99	
25059	Nice Wood	Dr	Halsey	97348	2/21/2001	13.20	384	7.3	4.49	
25060	Saddle Butte	Rd	Shedd	97377	2/22/2001	12.50	332	7.5	0.0057	
25061	Seven Mile	Ln	Shedd	97377	2/22/2001	12.50	402	7.8	0.0073	
25062	Manning	Rd	Brownsville	97327	2/22/2001	13.20	370	7.6	0.005	U
25063	Brownsville	Rd	Brownsville	97327	2/22/2001	7.70	384	8.4	0.0644	
25064	Lacomb		Lebanon	97355	2/22/2001	12.20	302	8.3	0.0087	
25065	Richardson Gap	Rd	Scio	97374	2/22/2001	13.00	552		2.42	
25066	Pearl		Coburg	97408	2/22/2001	13.40	269	7.6	0.44	
25067	Pearl		Coburg	97408	2/22/2001	12.40	268	7.69	0.411	
25068	Coburg	Rd	Coburg	97408	2/22/2001	13.10	318	6.84	5.72	
25069	Stallings	Ln	Eugene	97408	2/22/2001	12.80	358	7.55	2.41	

LASAR Number	St Name	St Type	City	Zip	Date	Temp (C)	Cond (um/hos)	pH (su)	NO3 (mg/l)	LAB QUAL
25070	River	Rd	Eugene	97448	2/27/2001	14.40	731	7.02	4.19	
25070	River	Rd	Eugene	97448	2/27/2001	14.40	753	6.99	4.19	
25071	Stallings	Ln	Eugene	97408	2/22/2001	12.40	289	7.52	7.97	
25071	Stallings	Ln	Eugene	97408	5/2/2001	13.10	241	7.5	8.3	
25072	River	Rd	Eugene	97448	2/27/2001	12.70	368	7.62	2.8	
25073	Lone Pine	Dr	Junction City	97448	2/27/2001	12.20	248	7.3	1.82	
25074	Tamarack	St	Junction City	97448	2/27/2001	13.00	468	6.86	4.78	
25075	Stallings	Ln	Eugene	97408	2/22/2001	13.10	429	6.9	9.76	
25075	Stallings	Ln	Eugene	97408	2/22/2001	13.20	428	6.87	9.85	
25076	Coburg Bottom Loop	Rd	Coburg	97408	2/22/2001	11.20	309	6.91	13.9	
25076	Coburg Bottom Loop	Rd	Coburg	97408	4/11/2001	11.60	289	7.3	12.6	
25077	Coburg Bottom Loop	Rd	Coburg	97408	2/22/2001	12.50	276	6.95	10.6	
25077	Coburg Bottom Loop	Rd	Coburg	97408	4/11/2001	12.40	275	6.7	10.6	
25078	Hwy 126		Lyons HWY		2/26/2001	11.00	214	8.1	0.0271	
25079	Richardson Gap	Rd	Scio	97392	2/26/2001	8.40	177	7.8	0.0171	
25080	Fish Hatchery	Dr	Scio	97374	2/26/2001	10.40	225	7.8	0.233	
25081	Richardson Gap	Rd	Scio	97379	2/26/2001	9.90	272	8.9	0.005	U
25082	Richardson Gap	Rd	Scio	97379	2/26/2001	11.30	704	9.4	0.005	U
25083	Reiling	Ln	Monroe	97456	2/28/2001	9.40	313	7.8	0.0343	
25084	Ingrahm Is	Rd	Monroe	97456	2/28/2001	12.00	93	7.1	0.618	
25085	Fergusson	Rd	Junction City	97448	2/28/2001	12.10	287	7	6.51	
25086	Fergusson	Rd	Junction City	97448	2/28/2001	12.50	208	7.4	0.176	
25087	Hulbert Lk	Rd	Junction City	97448	2/28/2001	13.50	303	7.4	2.4	
25088	High Pass	Rd	Junction City	97448	2/28/2001	13.20	380	6.7	6.36	
25089	High Pass	Rd	Junction City	97448	2/28/2001	10.30	258	7.3	3.62	
25090	A Territorial	Rd	Monroe	97456	2/27/2001	11.80	244	8.1	0.005	U

LASAR Number	St Name	St Type	City	Zip	Date	Temp (C)	Cond (um/hos)	pH (su)	NO3 (mg/l)	LAB QUAL
25091	Adams	Ln	Junction City	97448	2/27/2001	11.60	250	6.9	8.63	
25091	Adams	Ln	Junction City	97448	5/1/2001	11.90	261	6.9	8.85	
25092	Hwy 99		Junction City	97448	2/27/2001	12.90	174	7.4	1.02	
25093	Ingrahm	Rd	Junction City	97448	2/27/2001	13.20	204	6.9	5.02	
25094	Hubbard	Rd	Monroe	97456	2/27/2001	11.40	315	6.7	9.69	
25094	Hubbard	Rd	Monroe	97456	4/17/2001	12.40	312	6.8	9.65	
25095	Gwillim	Ln	Monroe	97456	2/27/2001	9.80	358	7.3	0.876	
25096	Ingrahm Is.	Rd	Monroe	97456	2/27/2001	13.10	302	7.3	3.38	
25097	Bavers	Dr	Harrisburg	97446	3/1/2001	7.20	234	7.7	1.68	
25098	Powerline	Rd	Harrisburg	97446	3/1/2001	13.20	352	7.6	2.63	
25099	Priceboro		Harrisburg	97446	3/1/2001	13.20	387	7.7	5.65	
25100	Willamette	Dr	Junction City	97448	3/1/2001	10.80	139	7.3	2.23	
25101	Lewisburg	Ave	Lewisburg	97330	3/1/2001	12.90	485.5	7.34	0.0067	
25103	Groshong	Rd	Albany	97321	3/1/2001	8.80	749	7.08	11	
25106	Chick	Lane	Junction City	97448	2/28/2001	13.20	431	6.77	6.98	
25107	Oaklea	Rd	Junction City	97448	2/28/2001	13.20	348	7.17	5.21	
25108	Strome	Lane	Junction City	97448	2/28/2001	12.10	325	6.98	11	
25108	Strome	Lane	Junction City	97448	4/18/2001	12.60	278	6.8	10.4	
25109	Strome	Lane	Junction City	97448	2/28/2001	11.50	294	7.04	6.82	
25110	River	Rd	Junction City	97448	3/1/2001	13.00	348	7.33	8.93	
25110	River	Rd	Junction City	97448	4/18/2001	12.50	288	6.8	8.88	
25111	Willamette	Dr	Junction City	97448	3/1/2001	11.50	132	7.2	1.62	
25112	Love Lake	Rd	Junction City	97448	3/1/2001	11.20	198	7.46	5.17	
25113	Love Lake	Rd	Junction City	97448	3/1/2001	11.90	154	7.22	5.65	
25113	Love Lake	Rd	Junction City	97448	3/1/2001	11.80	153	7.21	5.86	

LASAR Number	St Name	St Type	City	Zip	Date	Temp (C)	Cond (um/hos)	pH (su)	NO3 (mg/l)	LAB QUAL
25114	River	Rd	Junction City	97448	4/19/2001	13.10	283	6.8	7.1	
25114	River	Rd	Junction City	97448	3/1/2001	11.50	326	7.02	7.31	
25115	Maple	Dr	Junction City	97448	3/1/2001	8.50	186	6.79	0.923	
25116	Elm & 10th St	St	Junction City	97448	3/1/2001	12.40	286	7.05	7.72	
25116	Elm & 10th St	St	Junction City	97448	3/1/2001	12.30	286	7.01	7.7	
25117	River	Rd	Junction City	97448	3/1/2001	10.70	307	7.29	9.97	
25118	Viking	St	Junction City	97448	4/18/2001	11.70	309	6.7	10.7	
25118	Viking	St	Junction City	97448	3/1/2001	9.60	318	7.07	10.7	
25119	River	Rd	Junction City	97448	4/18/2001	11.80	298	6.7	8.94	
25119	River	Rd	Junction City	97448	3/1/2001	7.20	359	7.27	8.88	
25120	River	Rd	Junction City	97448	3/1/2001	11.80	137	7.24	1.75	
25121	Hentze	Lane	Junction City	97448	3/1/2001	11.60	113	7.44	1.7	
25122	Willamette	Dr	Junction City	97448	3/1/2001	13.60	168	7.17	1.8	
25134	Lingo	Lane	Junction City	97448	3/15/2001	12.00	289	6.8	7.84	
25135	Howard	Lane	Junction City	97448	3/15/2001	11.70	290	6.8	9.39	
25135	Howard	Lane	Junction City	97448	5/1/2001	12.70	297	6.8	9.42	
25136	Lingo	Lane	Junction City	97448	3/15/2001	14.50	309	6.9	4.59	
25136	Lingo		Junction City	97448	3/15/2001	14.30	309	6.9	4.59	
25137	Lingo	Lane	Junction City	97448	3/15/2001	12.40	297	7.2	11	
25137	Lingo	Lane	Junction City	97448	5/1/2001	12.80	308	7.2	11.2	
25138	Hwy 99		Junction City	97448	3/15/2001	12.10	376	7.7	0.0052	
25139	Toftdahl	Lane	Junction City	97448	3/15/2001	12.80	310	6.8	6.8	
25140	Hwy 99		Junction City	97448	3/15/2001	12.40	243	7.3	8.17	

LASAR Number	St Name	St Type	City	Zip	Date	Temp (C)	Cond (um/hos)	pH (su)	NO3 (mg/l)	LAB QUAL
25140	Hwy 99		Junction City	97448	5/1/2001	12.60	250	7	8.37	
25141	Washburn	Lane	Junction City	97448	3/15/2001	10.80	305	7.3	5.15	
25142	Ferguson	Rd	Junction City	97448	3/16/2001	13.00	359	7.5	8.8	
25142	Ferguson	Rd	Junction City	97448	5/1/2001	12.80	362	7.1	8.99	
25143	Ferguson	Rd	Junction City	97448	3/16/2001	12.90	363	7.5	0.0245	
25144	Feguson	Rd	Junction City	97448	3/16/2001	11.70	333	6.6	16.1	
25144	Feguson	Rd	Junction City	97448	5/1/2001	12.20	344	6.6	15.9	
25145	Hwy 99		Junction City	97448	3/16/2001	12.40	319	6.7	10.7	
25145	Hwy 99		Junction City	97448	3/16/2001	12.40	320	6.7	10.7	
25146	Hwy 99		Junction City	97448	3/16/2001	12.80	200	7.4	1.21	
25147	Hwy 99		Junction City	97448	3/16/2001	12.20	305	6.7	8.44	
25148	Ayers	Lane	Junction City	97448	5/1/2001	12.50	310	6.7	7.55	
25148	Ayers	Lane	Junction City	97448	3/16/2001	11.80	299	6.7	8	
25149	Ayres	Lane	Junction City	97448	3/16/2001	11.10	328	6.7	11.3	
25194	Coburg	Rd	Coburg	97408	5/2/2001	13.70	353	7.1	7.82	
25194	Coburg	Rd	Coburg	97408	4/18/2001	14.40	348	7.1	7.72	
25210	Coburg Bottom Loop	Rd	Coburg	97408	5/2/2001	12.60	224	7	8.29	
25210	Coburg Bottom Loop	Rd	Coburg	97408	3/27/2001	12.10	231	6.9	8.41	
25211	Coburg Bottom Loop	Rd	Coburg	97408	5/2/2001	12.60	256	7.5	9.07	
25211	Coburg Bottom Loop	Rd	Coburg	97408	3/27/2001	12.30	267	7.5	9.38	
25212	Coburg Bottom Loop	Rd	Coburg	97408	5/2/2001	12.00	224	7	5.88	
25938	Smith Lane	Ln	Coburg	97408	3/27/2001	11.10	140	6.6	3.67	

25939	Coburg Bottom Loop	Rd	Coburg	97408	3/27/2001	11.30	337	7	16.6	
25940	Coburg Bottom Loop	Rd	Coburg	97408	3/27/2001	10.60	269	8	8.58	
25941	Powerline	Rd	Coburg	97408	3/27/2001	12.50	334	7	2.65	
25942	Herman	Rd	Coburg	97408	3/27/2001	11.70	159	7.5	0.891	
25943	Herman	Rd	Coburg	97408	3/27/2001	13.10	178	7.7	1.46	
25944	Coburg	Rd	Coburg	97408	3/27/2001	12.90	312	7.3	8.65	
25944	Coburg	Rd	Coburg	97408	3/27/2001	13.00	312	7.4	8.65	
25945	Coburg	Rd	Coburg	97408	3/27/2001	12.30	277	7.4	0.722	
25946	Coburg	Rd	Coburg	97408	5/2/2001	12.50	272	7.1	6.87	
25946	Coburg	Rd	Coburg	97408	3/28/2001	12.30	268	7.2	7.4	
25947	Coburg	Rd	Coburg	97408	3/28/2001	13.00	314	7.2	9.15	
25947	Coburg	Rd	Coburg	97408	5/2/2001	12.80	325	7	8.84	
25948	Powerline	Rd	Harrisburg	97446	3/28/2001	13.40	327	7.9	4.68	
25949	Powerline	Rd	Harrisburg	97446	3/28/2001	14.00	318	7.6	4.39	
25954	Highway 99S		Junction City	97448	3/28/2001	14.60	226	7.3	2.86	
25955	Highway 99 S		Junction City	97408	3/28/2001	14.00	141	7.6	0.442	
25956	Prairie	Rd	Junction City	97448	3/28/2001	13.80	207	7.2	4	
25957	River	Rd	Junction City	97448	5/1/2001	12.30	277	6.7	7.25	
25957	River	Rd	Junction City	97448	3/28/2001	12.20	270	6.8	7.69	
25958	Pitnay	Lane	Junction City	97448	3/28/2001	12.70	298	7.2	2.22	
25958	Pitnay	Lane	Junction City	97448	3/28/2001	12.70	297	7.3	2.22	
25959	Smith	Ln	Coburg	97408	3/29/2001	12.40	301	6.7	14.5	
25960	Coburg Bottom Loop	Road	Coburg	97408	3/29/2001	12.70	239	7.7	6.33	
25961	NE Morning	St	Corvallis	97330	3/29/2001	13.90	312	7.1	3.91	
25961	NE Morning	St	Corvallis	97330	3/29/2001	14.10	309	7.1	3.91	
25962	NE Pin Oak	St	Corvallis	97330	3/29/2001	12.70	301	7.1	5.91	
25963	NE Hwy 20		Corvallis	97330	3/29/2001	12.30	254	7.2	9.19	