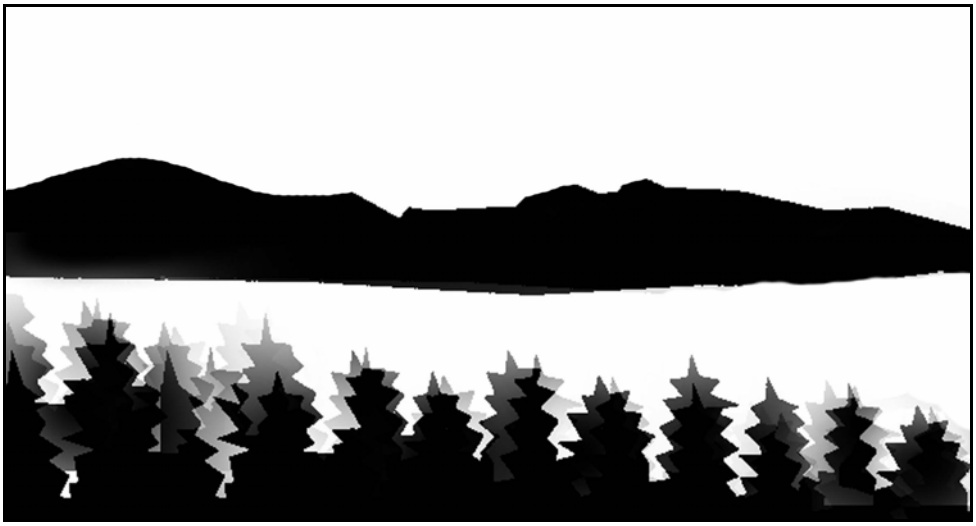
Dunes City Drinking Water Source Assessment and Potential Planning Strategies



Prepared by
Lane Council of Governments

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and Potential Planning Strategies
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Executive Summary

An inventory of potential contamination sources was performed within Dunes City's drinking water protection area. The primary intent of this inventory was to identify and locate significant potential sources of contaminants of concern. The inventory was conducted by reviewing applicable state and federal regulatory databases and land use maps, interviewing persons knowledgeable of the area, and conducting a windshield survey by driving through the drinking water protection area to field locate and verify as many of the potential contaminant source activities as possible. The primary contaminants of concern for surface water intakes are sediments/turbidity, microbiological, and nutrients. It is important to remember that the sites and areas identified are only potential sources of contamination to the drinking water, and water quality impacts are not likely to occur when contaminants are used and managed properly.

Siltcoos Lake, Woahink Lake, and managed forestlands dominate the delineated drinking water protection area for Dunes City. The information for Dunes City is derived from the combination of South Coast Water district and Alderwood Water District source water assessments. A total of 42 potential contamination sources were identified within Dunes City's drinking water protection area. Of those, 27 are located in sensitive areas. The potential contaminant sources identified in the protection area include clear cuts, road density, grazing animals, pastures, lake recreation, four RV Parks, a Boys Scout Camp, areas of high-density housing, marinas, a rural fire station, three transportation corridors, and areas of future housing development.

The potential contaminant sources identified in the protection area that relate to agricultural/forest management include clear-cut forests, two nurseries, and grazing animals. Potential contaminant sources related to commercial land use include a park maintenance facility, trucking company, wrecking yard, gas station, ATV repair shop, and septic tank maintenance company. Residential/municipal land uses include areas of high-density housing, a substation, two motels, two RV Parks, lake recreation, an ATV Park, and a State park. One transportation corridor, Highway 101, was also included in this inventory. The potential contaminant sources within the drinking water protection area all pose a relatively higher to moderate risk to the drinking water supply with the exceptions of one motel, the future expansion of the State park, Woahink Creek, pastures, a fishing resort, and the fire station, all which present a lower risk. In addition, Woahink Creek and high turbidity levels in Siltcoos Lake are also listed as potential low-risk contaminant sources. This document provides a quick look at the existing potential sources of contamination that could, if improperly managed, impact the water quality in the Dunes City drinking water protection area.

The susceptibility analysis combines the results of the locations of the potential contaminant sources with the locations of the sensitive areas. Overlaying the locations of the moderate- to high-risk sources within the sensitive areas provides an indication of the areas that are highly susceptible to contamination. For Dunes City, the results of the susceptibility analysis include the distribution of 23 identified high- to moderate-risk sources within the areas of highly permeable soils, high-erosional soils, high-runoff potential soils, and within the 1,000-foot setback from the streams. The susceptibility analysis provides the community and the public water system with information on where the greatest risk occurs and where to focus resources for protection.

Background and Community Profile

Dunes City is a small town located in western Lane County on the central coast of Oregon, about six miles south of Florence. The city covers approximately 2.5 square miles, which includes 820 acres of Woahink Lake near the center of the city and approximately 23,000 linear feet of Siltcoos Lake Shoreline along North Beach Bay, Kiechle Arm, and Booth Island. The drinking water supply of Dunes City's 810 households consists of the combination of public and private systems utilizing Woahink Lake and Siltcoos Lake intakes along with groundwater supplied wells.

Source water assessment reports prepared by the Department of Environmental Quality (DEQ) for the Alderwood Water Development Company and the South Coast Water District are the primary sources of information for this report. Since many of Dunes City residents receive a portion of their water from Woahink Lake through their own private systems, the Alderwood Development Company source water assessment can also be used to assess risks to the private systems drawing from the same water source. Many Dunes City residents also receive water from Siltcoos Lake. The source water assessment report for the South Coast Water District provides the inventory and the information for Siltcoos Lake intakes.

The source water assessments in Oregon include delineating the source area supplying the water system, identifying areas "sensitive" to contamination, and conducting an inventory of potential contamination sources in the area. Using the results of the inventory and sensitive areas, the susceptibility of the water system is determined. Sources of information reviewed during the assessments include U.S. Geological Survey (USGS) documents/websites, DEQ reports, Environmental Protection Agency (EPA)/DEQ databases, and other readily accessible reports. The procedures for conducting the source water assessments were developed by a statewide advisory committee (*Source Water Assessment Plan,* 1999).

Many watersheds in Oregon provide water used for public or "domestic" drinking water supplies, irrigation, industry, hydro power, fish hatcheries, and of course, natural in-stream fish rearing. Watersheds vary considerably in terms of overall health and susceptibility to contamination. Changes in surface water quality parameters can be caused by a variety of factors in any watershed. Developing a plan and providing educational materials to protect the water quality in a drinking water watershed can reduce future expenditures for treating the drinking water supply or finding a new supply.

Purpose

The purpose of this assessment is to identify potential risks to the drinking water supply that can assist the ways Dunes City protects the area which supplies drinking water from surface water sources. One of the best ways to ensure safe drinking water and minimize future treatment costs is to develop a local plan designed to protect against potential contamination. Not only will this measure add a margin of safety, it will raise awareness in the local community to the risks of drinking water contamination, and provide information about how to help protect the system. This assessment is incorporated into the recommended management strategies and outreach material for Dunes City residents

Natural Environment

Dunes City is located west of the Oregon Coast range approximately two miles from the Oregon coastline and approximately six miles south of Florence at 40 feet above mean sea level. The Siltcoos Sub-Basin (HUC # 17100207), where Woahink Lake and Siltcoos Lake are located, is the catchment basin for 129 square miles (USGS) between the discharge points located at the ocean and the

headwaters in the Coastal Range. The Sub-Basin includes Cleawax, Woahink, Siltcoos, and Tahkenitch lakes as well as Maple, Fiddle, Lane, Siltcoos, Fivemile, Leitel, and Tahkenitch creeks.

The climate in the Siltcoos Sub-Basin area is characterized by moderate annual temperature and precipitation variations. Information on climate in Dunes City area is based on the National Oceanic and Atmospheric Administration's (NOAA) Honeyman State Park climate station located at the north end of Woahink Lake at an elevation of 110 feet above mean sea level (Western Regional Climate Center). The average annual temperature is 52 degrees for the period of 1971 to 2000. Winters are cool and wet, with temperatures usually staying above freezing. The Honeyman State Park station gets an average of one inch of total snowfall per year but none of it accumulates to measurable depths. The summers are dry and moderately warm with temperature highs of approximately 65 to 70 degrees. Average annual precipitation is about 71.5 inches, with 70 percent of that occurring between November and March.

Delineation of Dunes City's Drinking Water Protection Area

The delineation of the source area or the drinking water protection area is a fundamental aspect of the assessment of the system. For surface water sources the drinking water protection area delineation process begins by identifying the *watershed.* The watershed area is also called the *catchment basin* of a receiving water body. The outer boundary of this watershed is the drainage divide formed by the surrounding ridges and hills. The surface water delineation includes the entire watershed area upstream of water system intakes. This watershed area provides *source* water to surface water intakes. The two main sources of surface drinking water for Dunes City residents include Woahink and Siltcoos lakes and both are the focus of this assessment.

Woahink Lake is contained within the Alderwood watershed. The geographic area providing water to Woahink Lake, the drinking water protection area, includes the lake itself and approximately 1.18 miles of streams. The protection area encompasses a total area of 6.7 square miles. The geographic area providing water to Siltcoos Lake, the drinking water protection area, extends upstream approximately 85 miles in an easterly direction and encompasses a total area of 61.8 square miles. Included in this area are a number of tributaries to the main stem, including Maple Creek, Fiddle Creek, Lane Creek, Woahink Creek, and numerous smaller tributaries.

A map of the drinking water protection area provides the community with the knowledge of the geographic area providing their drinking water. This is the area where contamination poses the greatest threat to the drinking water supply. Information about the drinking water protection area allows the community to develop management strategies that will have the most impact on protecting the source of the drinking water. (Refer to Map 1.)

The study area for evaluating the extent of the drinking water protection area for Woahink and Siltcoos Lakes includes USGS topographic maps for the Goodwin Park, North Fork, Florence, Goose Pasture, Fivemile Creek, and Tahkenitch Creek quadrangles (all dated 1984) at the 1:24,000 scale. As part of conducting the source water assessment, the DEQ collected information from the water system operator, researched written reports, and established a geographic information systems (GIS) base map of the delineated watershed.

Identification of the Sensitive Areas in the Watershed

As part of the source water assessment, the DEQ identified the natural *sensitive areas* within the watershed. Sensitive areas are those within the drinking water protection area that are vulnerable to contamination because of natural features of the land. The objective in determining the sensitive areas for surface water sources is to produce reliable information to the community that is useful in developing and prioritizing protection strategies. The list of the sensitive areas to be identified within drinking water watersheds were defined by the DEQ advisory committee as the procedures were developed (*Source Water Assessment Plan,*1999). The sensitive areas within a drinking water watershed includes both setbacks (land adjacent to stream) and other natural factors that increase the risk of contamination of the surface water. The result is an identification of a subset of the entire watershed. The sensitive areas are those where potential contamination sources or land use activities, if present, have a greater potential to impact the water supply.

In establishing sensitive areas in a watershed, there are several limiting factors to take into account. In using GIS to delineate the sensitive areas within the watershed, the DEQ located existing GIS layers and other natural resource agency data sets. Not all areas of the state have been mapped for the natural resource parameters of interest or at the level of detail ideal for this type of analysis. The availability of data at appropriate scales is also a potential limitation. The sensitive area mapping may be limited simply by the lack of readily available data, and conducting additional research is not possible within the timeframe allowed to do this assessment. DEQ staff has sought to obtain the best available information for each water system as the source water assessment was performed.

There are four individual characteristics that determine the sensitivity of areas within the drinking water watersheds in the *Source Water Assessment Plan* (1999) procedures for Oregon water systems. A brief description of the sensitive area characteristics and the sources of the GIS data are included below.

Sensitive Area Setbacks

The first sensitive area is a setback using a consistent 1,000-foot (about 300 meters) distance from the water body. The 1,000-foot sensitive area setbacks are intended to identify those areas where there are higher risks of contamination by spills or other releases, simply due to their proximity to the water body. The sensitive area setbacks are identified as a minimum of 1,000 feet from centerline of the intake stream and all perennial tributaries within the delineated drinking water watershed. The distance of 1,000 feet was based on EPA national guidance for the distance to conduct the potential contamination source inventories adjacent to streams.

High Soil Erosion Potential

The soil erosion potential is determined by combining the effects of slope and the soil erodibility factor (K-factor). Slopes within a watershed are evaluated using the 1:24,000 Soil Survey Geographic Database (SSURGO) data sets from the *Natural Resources Conservation Service*. The slope for a map unit is a weighted average of the average slope. The soil erodibility factor is also available in the SSURGO database and quantifies the susceptibility of soil particles to detachment and movement by water including the effects of rainfall, runoff, and infiltration. The K-factor used is a weighted average of only the value for the surface layer of the map unit. In the watershed, only soils with *high* erodibility ratings were mapped as sensitive areas. Soils that classify as *high* include soil with slopes greater than 30 percent and K-factors greater than 0.25. This rating system is based on the *Revised Universal Soil Loss Equation* from the U.S. Department of Agriculture's (USDA) Agricultural Research Service as defined in the *Washington's Standard Methodology for Conducting Watershed Analysis* (Washington Forest Practices Board, 1993).

High Permeability Soils
Soils identified in the USGS geologic map of Oregon GIS layer (1:500,000 scale) as Recent Alluvial Deposits (Qal) are mapped as sensitive areas due to the high potential for groundwater recharge adjacent to the stream. Alluvial deposits are typically very high permeability soils. These areas may be very vulnerable to rapid infiltration of contaminants to groundwater and subsequent discharge to a stream or lake/reservoir.

High Runoff Potential
The potential for high runoff rates was evaluated using the 1:24,000 SSURGO data sets from the Natural Resources Conservation Service. Class D soils, which are defined as soils with very slow infiltration rates, were mapped as sensitive areas within the boundaries of the drinking water protection area. Map units are assigned to hydrologic groups based on their majority component. A Class D soil is typified as clayey, has a high water table, or has an impervious layer that occurs at a shallow depth. Soils with these characteristics would have the potential for rapid runoff and subsequent transport of sediments and possible contaminants to the surface water body supplying the water system.

Additional Sensitive Areas
There may be other natural characteristics within a watershed that can be mapped as sensitive. Modifying the list of sensitive areas in this assessment can be done by the community by identifying resources and procedures that are appropriate for the area. For example, the local community may choose to add *transient snow zones* for high elevations, zones of high rainfall, and landslide/debris-flow hazards to the sensitive areas within their watershed.

Transient snow zones are typically defined as areas above 1,500 feet in the Oregon Coast Range. In some watersheds these areas may be subject to rapid snowmelt or rain-on-snow events, which increase the likelihood of transport of sediments to the surface water bodies in the watershed. Areas of high rainfall or irrigation rates may increase the likelihood of transport of sediments and possible contaminants to the surface water body. These areas can be identified using average annual precipitation data from Oregon Climate Service (years 1961 through 1990) and irrigation/water rights data from Oregon Water Resources Department's water rights database. Mapping the high-risk landslide and debris-flow areas can also be useful for evaluating sediment risks from natural hazards within a drinking water watershed. The Department of Forestry has recently completed GIS-based landslide and debris flow maps for western Oregon. (Refer to www.odf.state.or.us/gis/debris.html.)

Results
The sensitive areas within Dunes City's drinking water protection area are shown on Map 1. These include the setback from Siltcoos Lake, Woahink Lake and all perennial tributaries, areas of high soil erosion potential, and areas of high runoff potential. Areas with high soil permeability were not identified in the GIS layers. Good data coverage was available for each of the sensitive areas.

Drinking Water Protection Area Inventory
The primary intent of an inventory is to identify and locate significant potential sources of any of the contaminants of concern within the drinking water protection area. Significant potential sources of contamination can be defined as any facility or activity that stores, uses, or produces contaminants of concern and has a sufficient likelihood of releasing such contaminants to the environment at levels that could contribute significantly to the concentration of these contaminants in the source waters of the water supply. An inventory is a very valuable tool in that it provides:

- Information on the locations of potential contaminant sources, especially those that present the greatest risks to the water supply;
- An effective means of educating the local public about potential problems;
- Valuable awareness to those that own or operate facilities and conduct land use activities in the drinking water protection area; and
- A reliable basis for developing a local protection plan to reduce the risks to the water supply.

Inventories are focused primarily on the potential sources of contaminants regulated under the federal Safe Drinking Water Act. This includes contaminants with a maximum contaminant level (MCL), contaminants regulated under the Surface Water Treatment Rule, and the microorganism Cryptosporidium. The inventory was designed to identify several categories of potential sources of contaminants including micro-organisms (e.g., viruses, Giardia lamblia, Cryptosporidium, and fecal bacteria); inorganic compounds (e.g., nitrates and metals); organic compounds (e.g., solvents, petroleum compounds and pesticides) and turbidity/sediments. Contaminants can reach a water body (e.g., groundwater, rivers, lakes, etc.) from activities occurring on the land surface or below it. Contaminant releases to water bodies can also occur on an area-wide basis or from a single point source.

When identifying potential risks to a water supply, it is necessary to make *worst-case* assumptions. This is important because it is the **potential** risk that we are attempting to determine through this procedure and it is simply not possible within time constraints to conduct individual reviews or inspections at any of the facilities or land uses. The worst-case assumption that is made when considering potential risks to water bodies is that the facility or activity is not employing good management practices or pollution prevention. Under today's regulatory standards and environmental awareness, the majority of the identified activities and land uses employ *best management practices* (BMPs) in handling contaminants or preventing water quality degradation from their operations. It is important to note that while the inventory assessment will list all **potential** risks, many of these do not present actual risks to the water system. Environmental contamination is not likely to occur when contaminants are handled and used properly, or when BMPs are employed. The day-to-day operating practices and environmental (i.e., contamination) awareness varies considerably from one facility or land use activity to another. In-depth analysis or research was not completed to assess each specific source's compliance status with local, state and/or federal programs or laws. Further, the inventory process did not include an attempt to identify unique contamination risks at individual sites such as facilities (permitted or not) that do not safely store potentially hazardous materials.

Assumptions are also made about what potential contamination sources are included in the various types of land uses. For example, it is assumed that rural residences associated with farming operations have specific potential contamination sources such as fuel storage, chemical storage and mixing areas, and machinery repair shops.

Past, current, and possible future potential sources of contaminants were identified through a variety of methods and resources. In completing the inventory, the DEQ used readily available information including review of DEQ, EPA, and other agencies' databases of currently listed sites; interviews with the public water system operator; and field observation as discussed below.

The process for completing the inventory for the drinking water protection areas for Woahink and Siltcoos lakes included several steps, which are summarized as follows*:*

1. Collected relevant information as of October 14, 1999, from applicable state and federal regulatory databases including the following lists:
   - DEQ Environmental Cleanup Site Information System (ECSI), which includes the U.S. EPA National Priorities List (NPL) and the U.S. EPA Comprehensive Environmental Response, Compensation and Liability Information System (CERCLA) list;
   - DEQ leaking underground storage tank (LUST) list;
   - DEQ registered underground storage tank (UST) list;
   - DEQ Active Solid Waste Disposal Permits list;
   - DEQ dry cleaners list;
   - DEQ Site Information System (SIS), which includes Water Pollution Control Facility (WPCF) and National Pollutant Discharge Elimination System (NPDES) permitted facilities;
   - State Fire Marshall Hazardous Material Handlers (HAZMAT) site list (information on materials in a gas-form was not used since gaseous compounds rarely pose a threat to surface water or groundwater); and
   - DEQ Hazardous Waste Management Information System (HWIMSY) list, which includes U.S. EPA Resource Conservation Recovery Act (RCRA) generators or notifiers, and U.S. EPA RCRA Treatment, Storage, and Disposal Facility (TSDF) Permits.

   Because of the way various state and federal databases are set up, the specific location of listed sites is not always given or accurate within the database. The DEQ verified the presence and approximate location of potential contaminant sources and land uses within the drinking water protection area by consulting with local community members and/or by driving through the area (windshield survey) as discussed below in subsequent inventory steps.

2. Interviewed public water system officials, or someone they designated as knowledgeable of the area to identify potential sources that are not listed elsewhere in databases or on maps and to assist in locating potential sources listed in the state and federal databases.

3. Conducted a windshield survey by driving through the drinking water protection area to field locate and verify as many as possible of the potential contaminant source activities. The field staff looked for potential contaminant sources within four general categories of land use: residential/municipal, commercial/industrial, agricultural/forest, and other land uses.

4. Assigned high-, medium-, or low-risk ratings to each potential contaminant source based on the *Oregon Source Water Assessment Plan* (1999). Relative risk ratings are considered an effective way for the water supply officials and community to prioritize management efforts for the drinking water protection area.

Inventory Results

The results of the inventory were analyzed in terms of current, past, and future land uses; their proximity to the lake; and their associated potential risk. In general, land uses that are closest to the lake and those with the highest risk rating pose the greatest threat to a drinking water supply. The inventory results are shown in detail on Attachment 1 and with geographic reference on Map 1.

The delineated drinking water protection area is primarily dominated by Siltcoos Lake, and Woahink Lake. There are a total of 42 potential contaminant sources associated with the drinking water supply of Woahink and Siltcoos lakes: 19 for Siltcoos Lake and 23 for Woahink Lake.

The potential contaminant sources by land use identified in the watershed include the following:

Recreation:

Siltcoos – Lake recreation, boating/fishing/etc.

Woahink – Lake recreation, Sand Dunes Frontier Park

Forest Management /Agricultural:

Siltcoos – Non-irrigated crops (e.g., Christmas trees, grains, grass, pasture), grazing animals, clearcut harvest, road density

Woahink – Irrigated crops (e.g., orchards, vineyards, nurseries), non-irrigated crops (e.g., Christmas trees, grains, grass, pasture), grazing animals, clearcut harvest

Commercial/Industrial:

Siltcoos – Gas stations

Woahink – Gas stations, repair shops, fleet/trucking/bus terminals, junk/salvage yards, ATV recreation, ATV repair shop, park maintenance facility, septic maintenance company

Residential/Municipal:

Siltcoos – Camp Baker Boys Scout Camp with associated large-capacity septic system, Darlings RV Park and ADA Station Resort with associated gas stations and septic systems, Westlake Resort with associated septic system, Nightengales Fishing Resort, marinas, high-density housing on septic/wells, Siuslaw Valley Fire Rescue Station, railroad, transmission lines, and future housing developments

Woahink – High-density housing with associated high-density septic systems/wells, Honeyman State Park, future development plans for Honeyman State Park, Big Spruce Mobile Home Park, Ocean Breeze Motel, Woahink Suites, Lakeshore RV Park, Woahink Lake RV Resort, and a substation

In addition the high turbidity levels associated with Siltcoos Lake and Woahink Creek were also identified as potential contaminant sources during the inventory. Highway 101 was also identified as a potential source of contamination located just outside of the drinking water protection area. This potential source is included in the inventory because it poses a high degree of potential contamination risk.

Most of the potential contaminant sources within the drinking water protection area pose a relatively higher to moderate risk to the drinking water supply with the exception of pastures, a fishing resort, Ocean Breeze Motel, the future development site at Honeyman State Park, and the fire station, which present lower risks.

This inventory of potential contaminant sources within the drinking water protection area provides a look at the potential sources that could, if improperly managed, impact the water quality in the watershed. Even very small quantities of certain contaminants can significantly impact water bodies. It is important to remember the sites and areas identified in this section are only **potential** sources of contamination to the drinking water.

Susceptibility Analysis

Susceptibility can be defined as the potential for contamination in the drinking water protection area to reach the intake on the surface water body being used for drinking water purposes. Whether or not a particular drinking water source becomes contaminated depends on three major factors:

1) The occurrence of a facility or land use that releases contamination;
2) The location of the release; and
3) The hydrologic and/or soil characteristics in the watershed that allow the transport of the contaminants to the surface water body.

In conducting a susceptibility analysis the first step is identifying the part of the watershed that is most sensitive to contamination. This was accomplished after the delineation phase of the assessment.

The second step consists of identifying and locating the potential contaminant sources in the drinking water protection area. Based on the type of facility and the nature of the chemicals they use, these sources represent a lower, moderate, or higher relative risk to the surface water body. This step was accomplished in the inventory phase of the assessment.

The third step in the susceptibility analysis is to overlay the results of the inventory with the map of the sensitive areas. The results of the inventory are analyzed in terms of current, past, and future land uses; their time-of-travel relationship or proximity to the intake site; and their associated risk rating. In general, land uses that are closest to the intake and those with the highest risk rating pose the greatest threat to a drinking water supply. The presence and locations of the potential contamination sources within the sensitive areas will determine where the water system has the highest susceptibility to contamination. The susceptibility analysis cannot predict when or if contamination will actually occur, but it does recognize conditions that are highly favorable for contamination to occur. If a contaminant release to soils or water should occur in a sensitive area, it is very likely that contamination of the surface water body would occur if remedial actions are not undertaken.

Results

The results of the potential contamination source inventory are combined with the locations of the sensitive areas to determine the most susceptible areas within Woahink Lake and Siltcoos Lake drinking water watersheds. Overlaying the locations of the moderate- to high-risk sources with the sensitive areas provides an indication of the areas that are highly susceptible to contamination. The susceptibility analysis results are shown on Map 1. The total numbers of sources both within and outside of the sensitive areas are summarized in Table 1. Where the moderate to higher risk sources fall within the sensitive areas are those areas most vulnerable to contamination. In the watershed, it includes the distribution of the identified sources (i.e., stormwater-outfalls, random dumpsites, managed forestlands, transmission line and transportation corridors, and an area with grazing animals) within the 1,000-foot setback from the streams. The susceptibility analysis provides information on where the greatest risk occurs and where to focus resources for protection.

Table 1
High, Moderate, and Low Risk Contamination Sources
Within the Drinking Water Protection Area
Woahink and Siltcoos Lakes

Risk Potential	Within Sensitive Areas	Outside of Sensitive areas	Total Within Drinking Water Protection Area
Woahink Lake			
Higher Risk Potential Contamination Sources	2	6	8
Moderate Risk Potential Contamination Sources	7	6	13
Lower Risk Potential Contamination Sources	1	1	2
Woahink Lake Total Contamination Sources	**10**	**13**	**23**
Siltcoos Lake			
Higher Risk Potential Contamination Sources	6	1	7
Moderate Risk Potential Contamination Sources	8	0	8
Lower Risk Potential Contamination Sources	3	1	4
Siltcoos Lake Total Contamination Sources	**17**	**2**	**19**
Total Potential Contaminant sources	**27**	**15**	**42**

Source: Department of Environmental Quality Source Water Assessment Report, Alderwood Water Development Company, Oregon PWS #4100304, 2002 and Department of Environmental Quality Source Water Assessment Report, South Coast Water District, Oregon PWS4100302, 2002.

Summary

This assessment provides a basis for focusing limited resources within Dunes City to protect the drinking water source for many residents. The delineation provides the community with information regarding the location of the land area that directly supplies surface water intakes, i.e., the drinking water protection area. The sensitive areas are those where potential contamination sources or land use activities, if present, have the greater potential to impact the water supply. When the sensitive area

information is combined with the potential contaminant source inventory, the highly vulnerable areas are identified (the susceptibility analysis). These should become high priority areas to be addressed first with educational information, technical assistance, and focused outreach to landowners to encourage voluntary cooperation in protecting the water quality in this watershed.

This assessment provides a basis for informed decision-making regarding community planning. The delineation, inventory and susceptibility analysis provides the community with a significant amount of information regarding where their drinking water comes from and an identification of some of the potential risks to the quality of that source. Educating citizens about the susceptibility and risks to the drinking water source enables more public involvement in any future decisions about the water source.

The results of this assessment and the recommendations based on the results are summarized below.

♦ Within the Woahink and Siltcoos Lake drinking water protection areas, there are large areas identified as sensitive to contamination. Areas that are adjacent to the streams/river, areas that have high soil erosion potential and high runoff potential should all receive special considerations for protection. These are some of the areas where the risk is greatest for existing **and future** potential sources of contamination impacting the water quality in the watershed. It is recommended that other natural conditions be considered and possibly added to the assessment results before proceeding with voluntary development of a drinking water protection plan.

♦ The susceptibility of the drinking water source depends on both the natural conditions in the watershed as well as the land uses and facilities operating in the watershed. The purpose of the susceptibility exercise is to identify those factors that may pose more of a risk than others within the community's drinking water protection area. It provides information with respect to facilities or land uses in the sensitive areas within the drinking water protection area that should be given greater priority in developing protection strategies. A review of the inventory and the sensitive areas indicates that the Woahink and Siltcoos Lakes have at least 36 high and moderate-risk potential sources of contaminants with 12 of those sources being within the sensitive areas in the watershed.

♦ Due to the streamlined procedures for conducting the source water assessments, the results could potentially create a misperception that the "human activities" within the watersheds are higher risks than natural conditions or disturbances such as landslides and storm events. For example, it would be erroneous for communities to conclude that their source water was not at risk from natural conditions that produce sediments if there were no potential contamination sources identified within their watershed. It is recommended that the community take steps to ensure the natural conditions (both those identified in this assessment and any other additional areas identified by the community) within the watershed are considered when developing strategies for protection.

♦ Contaminants could already be in the surface water. It is highly recommended that the City conduct routine tests for contamination in the raw water so that such data can be used to determine existing risks in the watershed. Collecting and analyzing this raw water data by DEQ or OHD has not been done and is beyond the scope of this assessment.

♦ This assessment provides a basis for dealing with future water quality work in the watershed. The delineation, inventory, and susceptibility analysis has been designed to serve as a strong foundation for further in-depth watershed assessments or water quality improvement efforts, such as Oregon's Total Maximum Daily Load (TMDL) plans.

♦ The primary intent of this source water assessment is to provide the background information for Dunes City to use in developing a local Drinking Water Protection Plan. Dunes City could assemble a team to assist in the development and implementation of a Drinking Water Protection Plan. Clean safe drinking water is fundamental to the viability of any community. Protecting the drinking water source is a wise and relatively inexpensive investment in the community's future. The next section will discuss this voluntary process.

Building a Strategic Plan to Reduce Risks

A wide range of potential contaminant sources is present in the assessment area including irrigated and non-irrigated crops, recreation, commercial use, and private septic systems. With this diverse array of potential inputs, the possibilities of counteracting approaches can be taken from numerous sources in practice and theory. The majority of public remedies include an educational program and incentives. The benefit from these programs is not only to encourage protection of the drinking water supply but also to insure future involvement by local residents when associated health risks are identified.

The process for completing a Drinking Water Protection Plan is voluntary and would include the following steps:

1. Assemble a local Drinking Water Protection Team
2. Enhance the assessment clarifying the actual risks of identified facilities and activities
3. Develop a plan to protect the supply (reduce the risks of contamination)
4. Develop a contingency plan to address the potential loss of the system

One of the goals of developing a Drinking Water Protection Plan based on the inventory results is to address those land use activities that do pose high or moderate risks to your water supply. Dunes City should target these facilities with greater levels of education and technical assistance to minimize the risk of contamination.

Technical assistance may be available to Dunes City through additional grant funding from the Department of Land Conservation and Development if Dunes City chooses to continue with developing a drinking water protection plan. Using the results of the assessment (and enhanced inventory), the local community can form a "Drinking Water Protection Team" of community members and develop a plan to reduce the risks of contamination from those sources.

Oregon's drinking water protection approach relies upon the concept of "community-based protection", as are many other water quality programs. Community-based protection simply refers to the concept of allowing local control and decision-making to implement the water quality protection effort. Community-based protection is successful only with significant local citizen and stakeholder involvement.

Any successful protection program will need to be flexible enough to allow Dunes City to adopt the "tools" or elements that are most appropriate. Allowing this local control in making the changes necessary for improving water quality will accomplish two key elements of restoration and protection. Community-based protection can draw on the knowledge and successful adaptive practices of the local

area. Landowners generally know best how to achieve water resource restoration and protection as long as a thorough explanation of the problem is provided, the objectives are defined, and some technical assistance is provided. Secondly, knowing they have more local control, citizens will also be more likely to participate in the program and more willing to assist with the educational and outreach efforts that will make the plan successful.

In communities already developing and implementing Drinking Water Protection Plans, the process has served to bring many diverse interests together on a common goal and strengthened the local rural and urban relationships through communication and increased understanding. We must continue to do a better job in our outreach efforts to point out that we are all part of the existing water quality problems. The risks and sources of water quality problems are not only from industries, farmers, and managed forests, but every individual living, commuting and working in the area.

Following is a list of potential management strategies that have been used by other cities to address risks to their drinking water sources. It can serve as a starting place or menu of strategies that Dunes City may want to pick and choose from if developing a Drinking Water Protection Plan seems to be the right choice.

Initiate a public awareness campaign

- Allocate funds for an educational program that deals with all aspects of drinking water.
- Set up workshops to educate the local residents about main forms of pollutants posing risks to the drinking water supply.
- Initiate an education program in local classrooms.
- Mobilize a citizen group to work with public officials and staff.
- Distribute an information packet that describes the top contaminants and concerns for the area.
- Involve citizen volunteer groups in the monitoring and sampling of the water supply.
- Implement public presentations using models and PowerPoint presentations at local school or public functions, notifying residents of their location relative to high-risk areas.
- Prepare an alternative list to common household chemicals that are more environmentally friendly.
- Distribute a learn-by-example methodology, using BMPs of large corporations to tutor smaller businesses in the community.
- Install signs in recreation areas and high-traffic areas.
- Prepare informational materials targeting commercial businesses, recreation providers, and the agricultural community about risks and risk reduction associated with chemical and fuel storage.
- Inform residents and businesses of their location within the drinking water protection area and the importance of their assistance in protecting groundwater for their own and the community's drinking water supply.

Establish a Self-Maintenance Program

- Issue water-sampling kits for local residents to assist in testing of private intakes with supervision of trained staff, thereby reducing the necessary personnel power and increasing citizen involvement and awareness.
- Solicit the water filtration industry for a cooperative incentive program offering filtration units to residents in problem areas at a reduced cost or with a low interest finance option.

- Distribute the Oregon State University (OSU) Extension Service Home-A-Syst pamphlet that describes the assessment system and inform property owners of how to order the Home-A-Syst assessment packet.

Upgrade the spill response and hazardous waste collection programs

- Evaluate the hazardous waste collection program and consider implementing a stronger local program.
- Increase the availability of waste pick-up and drop-off for proper disposal.
- Initiate inspections of commercial areas with assessments and recommendations.
- Promote a hazardous waste drive, in accordance with an education program to inform and motivate residents to properly dispose of and store chemicals and any products that pose a potential risk.
- Inventory and become familiar with hazardous materials used and transported within the drinking water protection area.
- Initiate a public response team for spills and clean-up.

Develop a septic maintenance and upgrade program

- Determine standards of septic systems and inspection intervals.
- Use Lane County guidelines and ordinances as a baseline and consider strengthening installation and inspection requirements.
- Limit septic system installments per set land parcel area.
- Require periodic testing and inspection of septic systems.
- Inform residents of proper and improper procedures of septic system maintenance and operations.

Promote Alternative Agricultural and Residential Techniques

- Encourage use of irrigation techniques that reduce sediment contamination, sediment load, and suspension times.
- Promote reduction of residential pesticide and fertilizer applications.
- Reduce nitrogen-based fertilizers and pesticide content levels in the drinking water supply by promoting organic practices, conservation tillage, and integrated pest management techniques.
- Work with the Lane County Extension Service to make voluntary site visits to help property owners determine potential risks.
- Distribute the OSU Extension Service Home-A-Syst pamphlet that describes the assessment system and inform property owners of how to order the Home-A-Syst assessment packet.
- Distribute the Oregon Department of Agriculture *Water Quality Guide* to rural residents.

Designate public lands as protection areas

- Implement BMPs on public lands and recreation areas to protect the drinking water supply.
- Promote BMPs on public lands that can serve as models for private land owners.
- Address stormwater runoff issues along Highway 101 by working with the Oregon Department of Transportation to install treatment facilities.

Increase scope of outreach program

- Inform residents within the watershed but outside of the city limits about the drinking water protection program.
- Stop it at the source; reduce contamination and sediment load in tributaries within the watershed through a comprehensive outreach campaign.

Conclusion

The majority of the drinking water for Dunes City is taken from the surface water sources of Woahink and Siltcoos lakes. Drinking water protection in Dunes City involves identifying potential contaminant sources in highly susceptible areas and developing protection strategies that reduce the risks to surface water sources. Dunes City's drinking water assessment includes an inventory of potential contaminant sources with an in-depth look at the areas associated with those risks. These problems can be addressed through recommendations ranging from community-based involvement including maintenance and testing to educational programs. The recommendations are based upon the sources of greatest potential risk.

Success of the recommended management strategies requires community involvement. Community-based protection can draw on the knowledge and successful adaptive practices of the local area. Stakeholders are generally potential advocates of achieving water resource restoration and protection. Initially the potential problems must be addressed in reasonable terms with clear objectives. The provision of technical assistance is necessary without substantial cost to the involved parties. As citizens are able to exert more local control, they also will be more likely to participate in programs assisting with the educational and outreach efforts. We recommend that the protection plan be developed so as to minimize any burdens on individual property owners, but maximize the equity in responsibility for reducing the risks of future contamination. A concentrated effort in outreach efforts is suggested to point out that we are all part of the existing water quality problems. The risks and sources of water quality problems are not only from industries, farmers, and managed forests, but every individual living, commuting, and working in the area.

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Attachment 1
Inventory Results – Potential Contamination Sources
Woahink Lake 1-23, /Siltcoos 23-42
City of Dunes City

Reference Number	Potential Contaminant Source Type	Potential Impacts	Regulation Database Listing	Proximity to Sensitive Areas	Relative Risk
1	Transportation – Freeways/State Highways/Other Heavy use roads	Vehicle use increases the risk for leaks or spills of fuel and other hazardous materials. Road building, maintenance and use can increase erosion/slope failure causing turbidity. Over application or improper handling of pesticides/fertilizers may impact water.	None	Within sensitive area	Higher
2	Parks	Over-application or improper handling of pesticides/fertilizers may impact drinking water. Excessive irrigation may cause transport of contaminants through runoff. Heavy use along edge of waterbody may contribute to erosion, causing turbidity.	SIS list with an individual WPCF permit for an on-site system	Within sensitive area	Moderate
3	Other-Park Maintenance Facility	Spills, leaks, or improper handling of chemicals and other materials during transportation, use, storage, and disposal may impact the drinking water supply.	LUST list with unknown status SFM-Diesel fuel stored in aboveground tank SFM-Unleaded gasoline stored in aboveground tank UST-list-PWS needs to verify tank permit status	Within sensitive area	Moderate
4	Other-Scuba Training Facility	The impacts of this potential contaminant source could be addressed during an enhanced inventory.	none	Within sensitive area	Lower

Reference Number	Potential Contaminant Source Type	Potential Impacts	Regulation Database Listing	Proximity to Sensitive Areas	Relative Risk
5	Wells/Abandoned Wells	Improperly installed or maintained wells and abandoned wells may provide a direct conduit for contamination to groundwater and drinking water source.	none	Within sensitive area	Moderate
6	Junk/Scrap/ Salvage Yards	Spills, leaks, or improper handling of automotive chemicals, batteries, and other waste materials during storage and disposal may impact the drinking water supply.	SIS list with a GEN12Z NPDES for stormwater from industrial activities	Outside sensitive areas	Higher
7	UST – Status Unknown Fleet/Trucking/Bus Terminals	Spills, leaks, or improper handling of stored materials. Spills, leaks, or improper handling of fuels, grease, solvents, and other materials from vehicle service, fueling, and parking areas may impact the drinking water supply.	UST list –PWS needs to verify tank permit status LUST list with unknown status SFM-Diesel stored in aboveground tank SFM- Motor Oil stored in aboveground tank SFM- Used motor oil stored in aboveground tank SIS list with a GEN12Z NPDES for stormwater from industrial activities	Outside sensitive areas	Moderate Moderate
8	UST- Upgraded/ Registered – Active	Spills or improper handling during tank filling or product distribution.	SFM- Gasoline stored in Underground tanks SFM- Propane stored in	Outside sensitive areas	Lower

Reference Number	Potential Contaminant Source Type	Potential Impacts	Regulation Database Listing	Proximity to Sensitive Areas	Relative Risk
	Automobiles – gas stations	Spills, leaks or improper handling of fuels and other materials during transportation, transfer, and storage may impact the drinking water supply.	aboveground tank UST – list with a status of 3 UST(s) upgraded and 0 not upgraded to DEQ 1998 technical standards. LUST list with unknown status		Moderate
9	Crops – irrigated (Inc. orchards, vineyards, nurseries, greenhouses)	Over-application or improper handling of pesticides/fertilizers. Excessive irrigation may transport contaminants or sediments to groundwater/surface water through runoff. Drip-irrigated crops are considered to be a low risk.	SFM – Fertilizers stored in bags	Outside sensitive areas	Higher
10	Other – ATV Repair Shop	Spills, leaks, or improper handling of chemicals and other materials during transportation, use, storage, and disposal.	none	Outside sensitive areas	Moderate
11	Housing – High Density (>1 House/0.5 acres)	Improper use, storage, and disposal of household chemicals. Stormwater run-off or infiltration may carry contaminants to drinking water supply.	None	Outside sensitive areas	Moderate
12	Other – septic maintenance company	Spills, leaks, or improper handling of chemicals and other materials during transportation, use, storage, and disposal may impact the drinking water supply.	SIS list with an individual WPCF permit	Outside sensitive areas	Moderate
13	Crops – Irrigated (inc. orchards, vineyards, nurseries, greenhouses)	Over-application or improper handling of pesticides/fertilizers may impact drinking water. Excessive irrigation may transport contaminants or sediments to ground/surface water supply.	none	Outside sensitive areas	Higher

Reference Number	Potential Contaminant Source Type	Potential Impacts	Regulation Database Listing	Proximity to Sensitive Areas	Relative Risk
14	UST – Decommissioned/Inactive Automobiles – repair shops Junk/scrap/ Salvage yards	Historic spills or leaks may impact the drinking water supply. Spills, leaks, or improper handling of automotive fluids, solvents, and repair materials during transportation, use, storage, and disposal may impact the drinking water supply. Spills, leaks, or improper handling of automotive chemicals, batteries, and other waste materials during storage and disposal may impact the drinking water supply.	LUST list with unknown status UST list – PWS needs to verify tank permit status	Outside sensitive areas	Lower Moderate Higher
15	Other – Motel	The impacts to this potential contaminant source will be addressed during the enhanced inventory.	none	Outside sensitive area	Lower
16	Other – Motel	The impacts to this potential contaminant source will be addressed during the enhanced inventory.	SIS list with a individual NPDES permit	Within sensitive area	Moderate
17					
18	Other – ATV Recreation Area UST – Status Unknown	Spills, leaks, or improper handling of chemicals and other materials during transportation, use, storage, and disposal may impact the drinking water supply. Spills, leaks, or improper handling of stored materials may impact the drinking water supply.	UST list – PWS needs to verify tank permit status	Outside sensitive areas	Moderate Moderate

Reference Number	Potential Contaminant Source Type	Potential Impacts	Regulation Database Listing	Proximity to Sensitive Areas	Relative Risk
19	Large capacity septic systems (serves > 20 people) – class V UICs Campgrounds/RV Parks	If not properly sited, designed, installed, and maintained, septic systems can impact drinking water Leaks or spills of automotive fluids or improperly managed septic systems and wastewater disposal may impact drinking water supply. Heavy usage along edge of waterbody may contribute to erosion, causing turbidity.	UIC list with 1 Active UIC's classified as septic systems (drainfield disposal method) SIS list with an individual WPCF permit for an on-site system.	Outside sensitive area	Moderate Moderate
20	Utility Stations – Maintenance Transformer Stations	Spills, leaks, or improper handling of chemicals and other materials including PCBs during transportation, use, storage, and disposal may impact the drinking water supply.	none	Outside sensitive areas	Higher
21	Grazing Animals(>5 large animals or equivalent/acre) Crops – Non-irrigated (Inc. Christmas trees, grains, grass seed, pasture)	Improper storage and management of animal wastes may impact drinking water supply. Concentrated livestock may contribute to erosion and sedimentation of surface water bodies.	none	Outside sensitive areas	Higher Lower
22	Managed Forest Land – Clearcut Harvest (<35 yrs.)	Cutting and yarding of trees may contribute to increased erosion, resulting in turbidity and chemical changes in drinking water supply. Over-application or Improper handling of pesticides or fertilizers may impact drinking water source.	none	Within sensitive area	Higher

Reference Number	Potential Contaminant Source Type	Potential Impacts	Regulation Database Listing	Proximity to Sensitive Areas	Relative Risk
23	Other – Marinas and boat recreation on lake	The impacts of this potential contaminant source will be addressed during the enhanced inventory.	none	Within sensitive area	Moderate
24	River recreation – Heavy use	Inadequate disposal of human wastes may contribute bacteria and nutrients to the drinking water supply. Heavy use – according to boat traffic, streambank erosion causing turbidity. Fuel spills and emissions may also contribute to contamination.	none	Within sensitive area	Moderate
25	Large Capacity Septic Other – Boys Scout Camp	If not properly sited, designed, installed, and maintained, septic systems can impact drinking water. (serves >20 Scout camp field) The impacts of this potential contaminant source can be addressed during the enhanced inventory.	SIS list with a GEN02 NPDES permit for filter	Within sensitive area	Moderate Lower
26	Automobiles – Gas RV Park/ Campgrounds	Spills, leaks, and improper handling of supplies or other materials during transportation, or transfer. Supply leaks or spills of automotive fluids or improperly managed septic systems and wastewater may impact the drinking water supply. Cumulative effects of multiple systems may impact the drinking water supply.	none	Within sensitive area	Moderate Moderate
27	Other – Marina	The impacts of this potential contaminant source should be addressed during the enhanced inventory.	none	Within sensitive area	Moderate

Reference Number	Potential Contaminant Source Type	Potential Impacts	Regulation Database Listing	Proximity to Sensitive Areas	Relative Risk
28	5 – Campgrounds/ RV resort	Leaks or spills of automotive fluids or improper disposal may impact drinking water supply. Heavy usage along waterbody may contribute to erosion, causing turbidity.	none	Within sensitive area	Moderate
	Managed Septic Systems and Wastewater	If not properly sited, designed, installed, and maintained. Density >1 Cumulative effects of multiple systems in an area may impact drinking water supply.		Within sensitive area	High
29	Automobiles – Gas Stations	Spills, leaks, or improper handling of fuels and other materials during transportation, transfer and storage may impact the drinking water.	SIS list with a individual WPCF permit for an on-site system	Within sensitive area	Moderate
	RV Park	Leaks of spills of automotive fluids or improper disposal may impact drinking water. Heavy usage along the edge of the waterbody causing erosion may cause turbidity.			

Reference Number	Potential Contaminant Source Type	Potential Impacts	Regulation Database Listing	Proximity to Sensitive Areas	Relative Risk
30	Managed Septic Systems and Wastewater Housing – High Density Wells/Abandoned	If not properly sited, designed, installed, and maintained. Density >1 Cumulative effects of multiple systems in an area may impact drinking water supply Improper use, storage, and disposal of household chemicals may impact the drinking water supply. Stormwater runoff may carry chemicals to drinking water supply. Improperly installed or maintained wells and abandoned wells may provide a conduit for contamination to groundwater and drinking water source.	None	Within sensitive area	Moderate
31	Other – Recreational Fishing Resort	Will be addressed in enhanced inventory.	None	Within sensitive area	Lower
32	Fire/Rescue	Spills, leaks, and improper handling of chemicals and other materials during storage, use, transportation and disposal may impact the drinking water supply.	None	Outside sensitive area	
33	Transportation – Railroad	Rail transportation elevates the risk of leaks/spills of fuel and other hazardous materials. Installation/Maintenance of tracks may increase erosion and slope failure causing turbidity. Over application/improper handling of pesticides may impact the water supply.	None	Within sensitive area	Higher

Reference Number	Potential Contaminant Source Type	Potential Impacts	Regulation Database Listing	Proximity to Sensitive Areas	Relative Risk
34	Transmission Lines	Construction and corridor maintenance may contribute to increased erosion and turbidity to drinking water supply. Over-application of pesticides/fertilizers may impact the drinking water supply.	none	Within sensitive area	Higher
35	Transportation – Highway Other	Vehicle use increases the risk for leaks or spills of fuel and other hazardous materials. Road building maintenance and use can increase erosion/slope failure causing turbidity. Over application/misuse of pesticides/fertilizers may impact the DWPA and or water supply.	None	Just outside sensitive area	Higher
36	Managed Forest Land – Clearcut Harvest(<35 yrs.	Cutting and yarding of trees may contribute to increased erosion, resulting in turbidity and chemical changes in drinking water supply. Over-application or Improper handling of pesticides or fertilizers may impact drinking water source.	None	Within sensitive area	Higher
37	Managed Forest Land – Road Density	Road building, maintenance, and usage may contribute to erosion and possible slope failure causing turbidity in drinking water supply. Vehicle use increases the risk of leaks or spills of petroleum	None	Within sensitive area	Higher
38	Grazing animals	Improper storage and management of animal waste may impact drinking water supply. Concentrated livestock may contribute to erosion And sedimentation of surface water bodies.	None	Within sensitive area	Higher
39	Crops – irrigated/non-irrigated	Over-application or improper handling of pesticides/fertilizers may impact drinking water. Some agricultural practices may result in excess sediments discharging to surface waters. Non-irrigated crops are generally considered low risk.	None	Within sensitive area	Lower

Reference Number	Potential Contaminant Source Type	Potential Impacts	Regulation Database Listing	Proximity to Sensitive Areas	Relative Risk
40	Other – Future Housing Developments	The impacts of this potential contaminant source will be addressed during the enhanced inventory.	None	Within sensitive area	Lower
41	Other – Woahink Creek	The impacts of this potential contaminant source will be addressed during the enhanced inventory.	None	Within sensitive area	Lower
42	Other – High Turbidity Siltcoos Lake	The impacts of this potential contaminant source will be addressed during the enhanced inventory. Siltation and Algae blooms are causing problems with filtration.	None	Within sensitive area	Higher

Source: Source Water Assessment Report, Alderwood Water Development Company, Oregon PWS #4100304 and Source Water Assessment Report, South Coast Water District, Oregon PWS 4100302