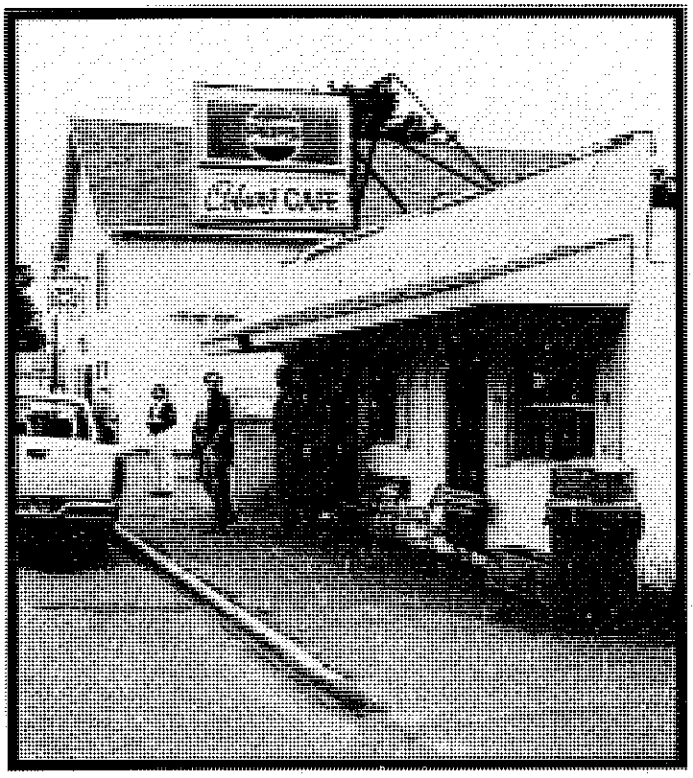
Coburg Drinking Water Protection Plan



Adopted by Coburg City Council
Resolution #97-7
June 17, 1997

June 1997

Prepared by Lane Council of Governments

Abstract

Groundwater is a critical natural resource that provides domestic, industrial, and agricultural water supplies. It is in every community's interest to develop a program that protects this valuable resource against contamination. In response to the federal Safe Drinking Water Act of 1986, the Oregon Department of Environmental Quality (DEQ) launched a new state voluntary wellhead protection program, which includes a certification process for local jurisdictions. Rather than a mandated *top down* approach, the program is built on the premise that local communities are best able to identify and address groundwater contamination concerns within the local area with the assistance of technical expertise from state or federal agencies. This document is the Coburg Drinking Water Protection Plan (Plan).

The DEQ and the Oregon Health Division (OHD) developed a guidance manual to assist local communities in preparing a wellhead protection program. Through a grant from the Environmental Protection Agency (EPA), Coburg was selected to conduct a pilot project of testing the use of the *Oregon State Wellhead Protection Program Guidance Manual* in developing a wellhead protection plan. The Plan was developed by bringing together diverse interest groups; identifying potential groundwater contamination risks within defined drinking water protection areas, and identifying management strategies that meet the needs of Coburg. Although every community is different, this plan provides a potential model for other communities to develop their own drinking water protection program.

Acknowledgments

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Table of Contents

Chapter One

Introduction

Document Organization

This document is organized into seven Chapters:

Chapter One, Introduction, provides the background and purpose of the Coburg Drinking Water Protection Plan (Plan). In addition, this chapter outlines the Plan's organization and describes the process used in its development.

Chapter Two, Public Participation, provides the background on how the Coburg Drinking Water Protection Committee (Committee) was selected and the interest groups represented. In addition, it contains an overview of how the community was involved and informed of the Plan's development.

Chapter Three, Delineation, provides a summary of the delineation process and results.

Chapter Four, Inventory, identifies potential contamination sources within the drinking water protection areas for existing and potential wells and describes the methodology used to gather potential contaminant information.

Chapter Five, Management of Potential Sources of Contamination, includes the goals and specific management strategies for agricultural, industrial/commercial, and residential land use activities.

Chapter Six, Contingency Plan, identifies primary threats leading to the disruption and/or contamination of Coburg's water system and details protocols to be used in the event of an emergency.

Chapter Seven, New Well Recommendation, provides a comparative analysis of three potential new well sites based on specific criteria related to groundwater protection. A recommendation for the selection of a new well is also included in this chapter.

Background

Groundwater is a critical natural resource that provides domestic, industrial, and agricultural water supplies. According to the Oregon Health Division (OHD), there are 3,450 public water systems in Oregon. About 88 percent of these systems depend on groundwater for at least some part of their drinking water. This includes 77 percent of Oregon's population (DEQ, 1996). It is in every community's interest to develop a program that protects this valuable resource against contamination.

The federal Safe Drinking Water Act of 1986, requires that every state have a wellhead protection program in place to guard against contamination of groundwater. The DEQ initially believed a mandatory wellhead protection program was needed to meet requirements of the Safe Drinking Water Act. The concept failed in the 1993 State Legislature and the DEQ has now developed a voluntary program.

Included in the new state voluntary wellhead protection program is a state certification process for local jurisdictions that develop plans. The DEQ and OHD Administrative rules provide the framework for developing a wellhead protection program leading to this certification. The DEQ and OHD have also developed a guidance manual to assist local communities in following these rules and preparing a wellhead protection program. Through a grant from the EPA, Coburg was selected to

conduct a pilot project of testing the use of the *Oregon State Wellhead Protection Program Guidance Manual* (Guidance Manual) in developing a wellhead protection plan.

This voluntary wellhead program is built on the belief that local communities are best suited to develop their own drinking water protection program based on the needs and land uses within the community. Coburg's interest in being proactive and its diversity of land uses make it an excellent location for this pilot project.

Purpose

The overriding purpose of this project is to apply the Guidance Manual in developing a wellhead protection plan for Coburg. Communities throughout the state and other parts of the country are viewing Coburg as a potential model from which they can develop their own wellhead protection plans. There are six primary goals of this project:

1. Delineate the drinking water protection areas for Coburg's existing and potential future well sites.

2. Conduct drinking water protection area inventories, and identify potential sources of groundwater contamination within the delineated area and risks associated with those potential sources.

3. Develop a wellhead protection management plan that has management strategies for the drinking water protection area of the existing wells.

4. Evaluate and analyze three potential new well sites and recommend the selection of a new well site from a groundwater contamination risk perspective.

5. Develop a contingency plan for possible interruption and/or contamination of the water supply system.

6. Provide feedback to the state and federal partners in the study (DEQ, Oregon Department of Agriculture (ODA), OHD, and EPA) on the effectiveness of the Guidance Manual.

Chapter Two

Public Participation

Coburg Demographics

Coburg is a small, rural, picturesque community, located approximately seven miles north of the Eugene-Springfield metropolitan area. The City is surrounded by agricultural lands and open space. The following demographic information comes from the *Coburg, Oregon Community Assessment* prepared for the City of Coburg in 1995 (E.D. Hovee, 1995).

In 1994, Coburg's population was 760. Residential population has remained fairly steady in the last 20 years. Coburg continues to serve as a bedroom community for the Eugene-Springfield metropolitan area—only 24 percent of working residents work in Coburg. Furthermore, many of the workers in Coburg are recruited from the larger Lane County and the Eugene-Springfield metropolitan area. There are approximately 1,100 employees at the industrial park in a community with a population of only 760. However, only 3 percent of the industrial/highway employees live in the Coburg area. The long-standing pattern of commuting workers has placed additional pressure on the community for housing development, resulting in three major subdivision plans in the past few years.

Retail trade and the service industry dominate employment opportunities for Coburg residents. Coburg has established itself as a premier antique community with 12 antique shops. It is home to an annual Antique Fair that attracts over 360 antique dealers from throughout the western United States, and as many as 30,000 visitors in one day.

Unemployment in Coburg is low with only 3 percent recorded in 1990. However, in 1989, the median income of households in Coburg was just over $21,000—well below the state-wide median of $27,250. Poverty rates for Coburg doubled from 1980 to 1990 and, in 1990, were well above comparable county or state-wide averages.

Coburg has good access to markets due to its close proximity to Interstate 5 and the Eugene airport. In recent years, several businesses have taken advantage of Coburg's location. The City has experienced much growth in its industrial park on the east side of town, including development of Monaco and Marathon recreational vehicle companies, and several truck and machinery/equipment companies. There are currently over 20 companies located at the industrial park. This escalating growth has placed increased demands on both the public water supply and the need for a community sewerage system. One of Coburg's biggest challenges is to address the probable need for a sewage treatment system. The City is proceeding with engineering plans for development of a sewage treatment plant to serve the industrial park. Eventual extension of a sewer system to residential and commercial areas will become more likely if required by Lane County to address elevated nitrate concentrations in groundwater, or to serve residential/commercial development.

To address the consequences of growth, in addition to the Plan, Coburg is in the midst of working on a long-term strategic action plan, a 20-year transportation system plan, and a buildable lands inventory. The strategic action plan will lay out the steps necessary to address critical community issues as prioritized by the Coburg community. A committee has been formed to develop the plan with its work due to be completed in June.

The community of Coburg was aware of groundwater quality concerns before the initiation of the wellhead study, as is indicated in two recent studies. In the Community Priorities Survey conducted in 1994-95, 60 percent of the respondents

listed water quality as one of the top three most important issues facing Coburg. The Coburg Community Assessment, completed by Rural Development Initiatives, Inc. (RDI) in 1995, identified the need for wellhead protection to maintain a safe and adequate water supply. Even so, it was necessary to put considerable effort into recruiting community members for involvement in the study and to conduct outreach.

Forming the Drinking Water Protection Committee

The formation of the Coburg Drinking Water Protection Committee (Committee) began in late 1995. After intensive recruiting for the citizen committee through a newsletter, flyers posted in customary places throughout Coburg, and an article in the Tri-County News, the city received three applications for the committee. To increase the pool of applicants, there was a targeted outreach effort. With the assistance of the Lane County Extension Service, a one-page information sheet/ application was mailed to all local homeowners who have been active in the volunteer Extension Service nitrate testing program. The Public Works Director also conducted individual recruitment by telephone.

Representation of Interests

The voluntary program is built on the premise that with a lot of people doing their part they will make a difference in protecting the groundwater resource. All interest groups, including government, agriculture, industry, and residential can work together and help ensure a safe drinking water supply. To institute an atmosphere of communication, cooperation, and collaboration, the inclusion of all interest groups is critical to the success of this project.

Most of the drinking water protection area for Coburg's existing wells is outside of Coburg's city limits and urban growth boundary (UGB) (see Map 1). Responsible management authorities for this area include the City of Coburg and Lane County. The Committee includes representatives from the City of Coburg and Lane County government bodies including the:

- Coburg City Council,
- Coburg Planning Commission,
- Coburg Public Works Department, and
- Lane County Planning Commission.

Since Coburg's groundwater source area has both urban and rural qualities, it contains a range of land use activities with diverse interest groups. The Committee membership composition drew from the full spectrum of interest groups within the community. Members included (other than those related to responsible management authorities):

- Commercial/Industrial: Three representatives,
- Agriculture: Two representatives,
- Residential: Two representatives, and
- Government: Five representatives.

Committee membership also includes a representative of Lane County, Oregon State University Extension Service. In addition, this locally driven process has been supported by technical assistance from the Oregon Health Division (OHD), Department of Agriculture (ODA), and DEQ. The Committee member list is included in Appendix B.

Community Information

Community involvement and support is vital to the success of the management plan, and, ultimately, for the protection of groundwater quality. The Committee held eight committee meetings over the course of a year. These meetings were open to the public. Announcement of the meetings was submitted to the local newspaper and also advertised on the reader board at City Hall. In addition, meeting packets (agenda and minutes) were regularly sent to anyone who requested to be put on an interested parties mailing list.

At its first meeting, the committee began discussing the need to keep the community informed and invited their participation in the process. They developed a Citizen Involvement Plan that involved a number of activities, each geared toward raising awareness of groundwater issues among community members.

- Coburg Newsletter (ongoing): Coburg publishes its own newsletter every other month. Articles about groundwater were frequently included (Appendix A).

- Senior Nutrition Site (July): The IOOF Hall is the local site of the Senior Nutrition Lunch. Project leaders for the wellhead study described the study to the seniors at one of their luncheons.

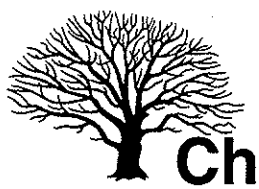
- Coburg Golden Years (July): Coburg Golden Years is an annual celebration of music and country life. The Committee used this opportunity to display the recently completed wellhead delineation and to talk with community members about the study. The large and colorful maps were quite an attraction and drew many interested people to the booth to find out what it was all about.

- Town Hall Meeting (July): Representatives from the Committee spoke about the wellhead study at a Town Meeting that focused on several critical planning projects. Several people voiced their interest in the study and asked to be put on the mailing list for information on the wellhead study.

- Assembly Program at Coburg Elementary (September): Representatives of the Committee, OHD, and Lane County Extension Service conducted an assembly program for all of the classes at Coburg Elementary (K-5). The program included a lecture on groundwater basics and four hands-on booths that the students cycled through in small groups. This is likely to be an annual event at the school.

Among the Plan's management recommendations are several that call for outreach and education. These recommendations include outreach to the agricultural and business communities, recognition programs for those who actively participate in groundwater protection, and regular articles in the Coburg newsletter describing what residents can do around the home to reduce the risk of contributing to groundwater contamination.

At the same time that the committee was being formed, work was underway to clearly define the area of the aquifer where Coburg gets its drinking water. This process is discussed and presented in the following chapter.



Chapter Three

Delineation of the Drinking Water Protection Area

Introduction

The delineation process identifies where the well overlies the aquifer that supplies groundwater to the well. The delineated area also identifies the area with the greatest contamination risk and where management strategies will have the most impact on protecting the water supplied by the well. This becomes the drinking water protection area. The delineated area is divided into time of travel (TOT) zones to indicate the amount of time it takes water to move from that zone to the pumping well.

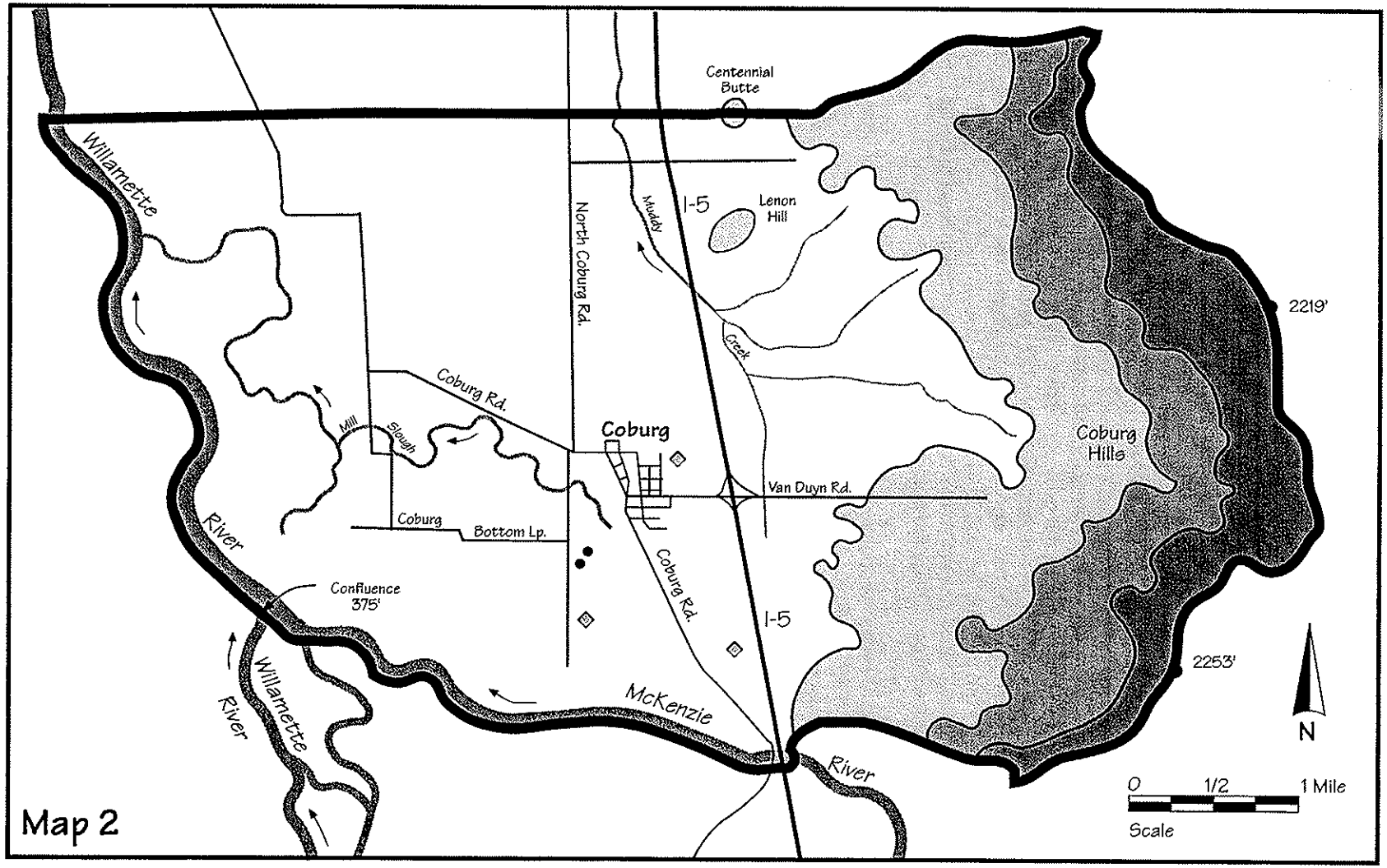
An analysis of how long it takes a substance to move from the land surface to the aquifer is also important in determining the contamination potential of different segments of the drinking water protection area. This is accomplished through a susceptibility analysis. A susceptibility analysis considers factors related to water movement, such as soil permeability and the probability that a given contaminant will move from the land surface to the aquifer. It is important to identify the well-head area infiltration risk within the drinking water protection area to better understand the area's contamination potential.

Technical guidelines for completing the delineation and susceptibility analysis are contained in the Guidance Manual. Although the Guidance Manual provides requirements and direction on how to conduct the delineation, each community is unique in how these guidelines are applied. Coburg's delineation works for Coburg alone because it is based on information and conditions within the local area.

Lane Council of Governments (LCOG) contracted with Cascade Earth Sciences Ltd. (CES), a consulting firm, to perform the delineation modeling and a susceptibility analysis, and to prepare the delineation report. CES delineated the drinking water protection areas for Coburg's existing wells and three potential new well sites in the Coburg area. These drinking water protection areas are displayed on Map 1. The scope of work for Coburg's drinking water protection delineation included 1) collection and evaluation of data, 2) development of a hydrogeologic conceptual mode, 3) selection of delineation method for designated well locations, and 4) a susceptibility analysis. These four elements are summarized below.

Collection and Evaluation of Data

The study area for Coburg's delineation is mainly bounded by natural features with the Willamette and McKenzie rivers forming the western and southern boundaries, respectively, and the Coburg Hills forming the eastern edge. This study area is displayed on Map 2. A review of existing sources provided information regarding geography, geology, hydrogeology, and groundwater. Sources of information included maps, well reports, discussions with Lane County Extension Office and area farmers, reports on file at the Oregon Water Resources Department, and consultant reports.



Coburg Drinking Water Protection Project Study Area Map

Map Produced by LCOG May 1997

Legend

- Study Area Boundary
- Major River or Creek
- City Wellheads
- Proposed New Well Sites
- Elevation 500'-999'
- Elevation 1,000'-1,499'
- Elevation 1,500'+

Development of a Hydrogeologic Conceptual Model

Creation of a conceptual hydrogeologic model is necessary to transform the actual flow system into a mathematical model that represents the physical processes operating within the subsurface. A conceptual model synthesizes available information from well logs, water level measurements from wells and rivers, aquifer testing, surface mapping, and previous hydrogeological investigations into a realistic prediction of flow system behavior.

According to the CES analysis, Coburg draws its water from two different zones of the unconfined aquifer underlying the Coburg study area. One zone is shallow and the other one deep. Well #1 draws water from the deeper zone and is susceptible to contamination, although there is a greater depth of soil and rock materials that can filter contaminants. Well #2 gets its water from both the shallow and the deep water bearing zones and is highly susceptible to potential contamination.

The delineated area displayed on Map 1 was accomplished assuming average characteristics of the shallow and deeper water bearing zones. A single set of drinking water protection areas was delineated for the two Coburg wells because the wells are located within 400 feet of each other and are rarely pumped at the same time. If they were treated individually, the delineation would look quite different. If well #2 is delineated based on characteristics of the shallow zone, the area is much narrower and longer that the *average* delineation in Map 1. In fact, the five-year time-of-travel (TOT) for the shallow well would extend nearly out to Interstate 5. Management strategies should address the fact that well #2 is more susceptible and draws its water from further away than indicated in Map 1.

Delineation Method

The two-dimensional analytical flow model, QuickFlow, was used to delineate the drinking water protection area for each of the wells. This model was selected because it is well documented, easy to use, and includes all of the elements required to simulate the effects of wells, boundary conditions, and uniform recharge. Factors considered by the model included: pumping rate, the ability of the aquifer to transmit water, aquifer thickness, porosity, normal flow direction, range in direction, and the effects of other pumping wells. The protection areas were delineated with limited site specific data; however, the data reviewed provided an adequate basis to develop a reasonable conceptual model and select model input. Following Oregon guidance, the drinking water protection areas were identified for a distance that would be traveled by groundwater in ten years. This TOT is used to provide the City with adequate response time should a contamination event occur.

Susceptibility Analysis

Susceptibility analysis is an estimation of the probability of a contaminant being transported from the soil surface to groundwater. It can be useful in evaluating the relative vulnerability within a drinking water protection area. The analysis considers a variety of properties such as soil permeability and depth to groundwater. Like other aspects of the delineation process, the susceptibility analysis was conducted using existing information. The quality and intensity of data are much greater for

the soil surface area than for sub-surface areas. Soil data provided by Soil Conservation Service mapping are spatially continuous within the drinking water protection areas whereas sub-surface soils were determined from well logs. The Guidance Manual requirement of three well logs per drinking water protection area was usually not possible to achieve in the Coburg susceptibility analysis.

Infiltration potential scores were calculated for each of the drinking water protection areas to quantitatively represent the susceptibility within each of these areas. Table 1 summarizes the scores for each well within each time of travel area. The drinking water protection areas for the Coburg wells have a moderately high infiltration potential (score: 7 to 8) and associated groundwater vulnerability. The susceptibility rating for the existing well is highest within the six-month TOT. Proposed wells A and C have moderate ratings, and proposed well site B has a high infiltration risk.

The delineation provided the Committee with a defined area in which to focus management strategies to protect groundwater. To further the analysis of potential risks to groundwater contamination, the next step was to conduct a land use inventory within the delineated drinking water protection areas. This process and results are presented in the following chapter.

Table 1
Susceptibility Analysis Results
Coburg Drinking Water Protection Areas

Time of Travel	Infiltration Potential Scores (Winter Conditions)			
	Coburg City Wells	Proposed Well A	Proposed Well B	Proposed Well C
Six Months	8	5	8 (Newberg Soil) 10 (Camas Soil)	6
Five Years	7	5	8 (Newberg Soil) 10 (Camas Soil)	7
Ten Years	7	5	8 (Newberg Soil) 10 (Camas Soil)	7
20 Years	7	5	8 (Newberg Soil) 10 (Camas Soil)	7

Low = 1-3, Medium = 4-7, High = 8-10
Source: Cascade Earth Sciences, Coburg Wellhead Protection Delineation, 1996

Chapter Four

Wellhead Protection Areas Inventory

Introduction

The inventory for Coburg includes the drinking water protection area for the existing two wells and the three proposed wells shown on Map 1. The purpose of the inventory is to identify potential groundwater contamination sources by examining land uses. Past, existing, and future land uses have been plotted and assigned risk ratings within the delineated drinking water protection areas in the Coburg area. These risk ratings were assigned from the Guidance Manual. In developing risk ratings for differing types of land use for the Guidance Manual, the DEQ used Oregon-specific data, as well as EPA guidance to develop a list of types of potential sources in each risk category. Criteria for placement in the specific categories was limited to historic release data and potential contaminant characteristics. The potential risk ratings assume that the facility or activity does not employ good management practices or pollution prevention because it is the potential risk that is being identified.

Methodology

Past, current, and potential future land uses were identified through a variety of methods. The inventory process did not include a visual inspection of sites for individual contamination sources, having determined that this approach would be too invasive to be acceptable within the local community. It was also determined that the inventory goal could be accomplished by other means such as local knowledge about potential contamination sources and management practices. A detailed inspection is also beyond the scope of this project. Instead, assumptions were made about particular types of land uses and risks associated with those land uses. These assumptions are discussed further in the results portion of this chapter. The process for completing the inventory is summarized as follows:

- Developed a 1":380' base map showing the delineated areas, time of travel zones, tax lots, roads, and addresses
- Reviewed aerial photographs (dated 1956, 1964, 1994). Note: The aerials worked well combined with local resident interviews. They were useful as a memory jogger rather than being able to identify specific historic or existing land uses directly from the photos.
- Interviewed long-time local residents about past land uses
- Divided drinking water protection areas into general types of land use (commercial/industrial, agricultural, and residential)
- Worked with sub-committee to plot more specific types of existing land uses for each tax lot in the delineated drinking water protection areas
- Assigned high-, medium-, or low-risk ratings to each land use according to the Guidance Manual
- Prepared inventory form for each TOT for each groundwater protection area
- Reviewed Comprehensive Plan Diagram to identify potential future types of land use
- Reviewed and allowed adjustments for risk ratings (no adjustments made)
- Plotted information from state agency data bases. Data plotted include:
  - Leaking underground storage tank (LUST) sites - DEQ, 1987-1996
  - Registered underground storage tank sites - DEQ, as of 2/96
  - Above-ground fuel storage tank sites - State Fire Marshall, as of 4/96
  - Hazardous materials use sites - State Fire Marshall, as of 4/96
  - Hazardous materials spill sites - State Fire Marshall, 1986-1996
  - Environmental clean-up sites - DEQ, as of 4/96
  - Water discharge permit sites - DEQ, as of 4/96

Results

As has been noted, the inventory process did not include an attempt to identify specific potential contamination problems at specific sites such as facilities that do not safely storing potentially hazardous materials. However, some assumptions were made about particular types of land use. 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. It should also be noted that although the inventory depicts existing agricultural uses (crops grown), these are likely to undergo continual change due to normal crop rotation practices. What is irrigated (medium-risk) farm land now may be non-irrigated (low-risk) farm land next year, or vice versa.

Map 1 displays the results of the inventory for the existing and potential well sites. The results of the inventory were analyzed in terms of current, past, and future land uses; their TOT relationship to the well site; and their associated risk rating. In general, land uses that are closest to the well and those with the highest risk rating pose the greatest threat to a safe drinking water supply. Inventory results are summarized below.

Existing Wells (Well sites 1 and 2, see Map 1)

Within the delineated drinking water protection area for the existing wells, the majority of land use is agricultural with some industrial use at the wings of the ten-year TOT. This drinking water protection area also includes 20-25 rural residences. Some of these residences are associated with large farming operations, but most are small hobby farms or strictly for single-family residential use. The inventory for the existing wells for the six-month TOT, within the 5- and 10-year TOT zones, and within the 20-year TOT includes:

Six-Month Time of Travel

- 100 percent irrigated agricultural land (medium risk)
- Mint distillery: 1 (high risk)
- Two residences associated with farming operations (medium risk)
  - Pesticide/fertilizer storage, mixing, and application
  - Machinery repair facilities
  - Fuel storage

Five- to Ten-Year Time of Travel

- 80-85 percent irrigated farm land (medium risk)
- About 18 rural residences with four residences associated with farming operations (medium-high risk)
- Includes eight businesses, including a sand and gravel mining operation. (Two high risk, five medium risk, and one low risk)
- Other potential contamination sources:

- Mint distilleries (medium risk): 2
- Hazardous materials storage sites (high risk): 1
- Above ground fuel storage tanks (non-agriculture) (medium risk): 2
- Known underground fuel storage tanks (high risk): 1
- Aggregate extraction may extend into this area in the future (high risk)

20-Year Time of Travel

- About 80-85 percent agricultural land use with about half irrigated and half non-irrigated (low-medium risk)
- Includes six industrial businesses, including a portion of a sand and mining gravel operation (Two high risk, three medium risk, and one low risk). It should be noted that Plan designations for a portion of this area include extending the sand and gravel operations.
- Proposed sewage treatment plant site (high risk)
- Proposed golf course (medium risk)
- Other potential contamination sources:
  - Cemetery (medium risk)
  - Prior dairy farm (medium risk)
  - Freeway (medium risk)
  - Hazardous materials storage sites (high risk): 1

Proposed Well Site A (see Map 1)

Six- Month Time of Travel

- About 1/3 industrial with one business: RV manufacturing (medium risk)
- About 1/3 proposed new housing sub-division (medium risk)
- About 1/3 irrigated agriculture (medium risk)
- Reports of containing an old dump site with potentially toxic materials (high risk)

Five- and Ten-Year Time of Travel

- Includes 16 industrial/commercial businesses (eight high risk, eight medium risk)
- About 40 high-density homes (medium risk associated with septic system density > 2/acre)
- Even mix of irrigated and non-irrigated farm land, although irrigated portion is within the five-year TOT and non-irrigated is located primarily in the ten-year TOT (low-medium risk)
- Other potential contaminant sources:
  - Leaking underground storage tank (LUST) sites (high risk): 3
  - Hazardous materials storage sites (high risk): 3
  - Hazardous spills sites (high risk): 3
  - Freeway interchange area (high risk)
  - Hotel sewage lagoon (high risk)

20-Year Time of Travel

- About 90 percent non-irrigated agriculture land (low risk)
- Industrial use includes two medium-risk businesses
- Other potential contaminant sources:
  - Leaking underground storage tank (LUST) sites (high risk): 1
  - Hazardous materials storage sites (high risk): 1

Proposed Well B

Six-Month Time of Travel

- About 2/3 non-irrigated and 1/3 irrigated agriculture use (low-medium risk)
- Rural residences: Two, both associated with farming operations and associated contamination sources (medium-high risk)

Five- and Ten-Year Time of Travel

- One high-risk industry, which is a sand and gravel mining operation comprising about 35 percent of five-year TOT
- Mostly non-irrigated agricultural land with some irrigated (low-medium risk)
- Proposed sub-division along southeast edge (high risk)
- Potential contamination from McKenzie River if river contamination occurs from up-stream sources (medium risk)
- Sand and gravel mining is likely to be further extended into this area.

20-Year Time of Travel

- Irrigated farm land (medium risk)
- Potential contamination from McKenzie River if contamination occurs up-stream (medium risk)
- Sand and gravel mining likely to occur in the future

Proposed Well Site C

Six-Month Time of Travel

- Mostly irrigated agriculture land use (medium risk)
- Freeway and Coburg Road (medium risk)

Five- and Ten-Year Time of Travel

- Mostly non-irrigated farm land with a small portion of irrigated agriculture land (low-medium risk)
- One high-risk business (machine shop)
- Rural residences: Five, not associated with farming operations (medium risk)

- Proposed golf course (medium risk)
- Portion of the proposed wastewater treatment plant (high risk)
- Freeway and Coburg Road (medium risk)
- Other potential contaminant sources:
  - Hazardous materials spills (high risk): 2
  - Contaminated runoff from land use in the Coburg Hills (medium risk)
  - Contamination up-stream in the McKenzie River (medium risk)

20-Year Time of Travel

- Extends into the Coburg Hills and beyond the study area boundary

The completion of the inventory provided the Committee with the basis to develop management strategies that would address potential risks to groundwater contamination that were identified in the inventory process. The management of potential sources of contaminants is presented in the following chapter.

Management of Potential Sources of Contamination

Introduction

This chapter is divided into the three primary land use categories in Coburg's drinking water protection area: agriculture, industrial/commercial, and residential. Within each category, potential sources of contamination are first identified and then are addressed by formulating goals and related management strategies. Goals are broad vision statements describing desired conditions or activities in the future. They provide direction for the development of management strategies. The management strategies for each goal add more specificity in describing a course of action. Each goal and related cluster of management strategies includes a background discussion that provides the rationale for the goals and management strategies identified for each land use category.

The implementation of management strategies is key to the ultimate success of the Plan. Upon the adoption of the Plan, the City Council will appoint a standing Drinking Water Protection Committee (Ongoing Committee). This committee will include, but is not limited to, representatives from the industrial, agricultural, and residential sectors. It is recommended that an additional member from the Coburg Chamber of Commerce is also appointed. This Ongoing Committee will meet at least twice a year to oversee implementation of the Plan and continue to shape and redirect implementation efforts as necessary. Implementation strategies are indicated by ▲ in this plan.

Recommended Ongoing Committee members include:

- Mike Warner, Marathon Coach or Jim Anderson, Truck and Travel (Commercial/Industrial)
- David Downing (Agriculture)
- Mary Beth Schmid (Resident and NRCS)
- Stan Nelson (Chamber of Commerce)
- Ross Penhallegon (OSU Extension Service)
- Jack Harris (Coburg Public Works)

Agriculture

Farmers in Coburg have worked with the land, irrigation water, fertilization, and pesticide applications for years. Guarding the health of the land and water is important for the continued success of the farming operation because quality land and water are what the farming community depends on for its business success. Most farmers are conscientiously striving to do the best they can to protect themselves and others from problems. Through both mandated and voluntary efforts, growers are already applying many best management practices that protect both the health of the land, and the health of the community. The agriculture chapter of this management plan motivates agricultural land users to expand voluntary efforts to provide further protection for Coburg's drinking water supply.

By taking a proactive voluntary approach, agricultural growers avoid causing drinking water safety problems that might result in potentially reactive regulatory measures. Three goals comprise the backbone of the management strategies geared towards agricultural-related land use. An education-, recognition-, and incentives-based management plan encourages rather than demands cooperation, communication, and collaboration among the farming community.

Following is an overview of the inventory as it relates to agricultural uses, and the three goals and related management strategies.

Agriculture Inventory Summary

Agricultural land use comprises about 80-85 percent of the drinking water protection area (within the ten-year TOT). The majority of agricultural activity is conducted by five large operation growers and about five to seven small farm operators within the drinking water protection area. Mint or vegetables farms comprise the majority of crops grown within the area. These crops require irrigation, which puts most of the area within the medium potential contamination risk category, according to the Guidance Manual. Irrigation increases the susceptibility of the aquifer by providing more water that can potentially leash chemicals from the soil.

Agriculture Goals and Management Strategies:

Goal 1: Educate the agriculture community about the need for groundwater protection and encourage participation of all agricultural operators in the drinking water protection area.

Related Management Strategies

1. Identify groundwater quality management objectives for farmers in the area. (What do we want them to do to help protect the resource?) (Completed)

2. Develop and administer a survey for individual farm sites to assess current irrigation, fertilization, pesticide management, and farm management practices. (Completed)

   ▲ This survey, or a similar survey, will be redone approximately every two years to reinforce the information on groundwater protection and the need to continue it. The Ongoing Committee may be able to gather information on the effectiveness of the educational campaign by reviewing responses to the surveys over time.

3. Identify information outlets and possible information formats.

   - Prepare a summary matrix of resources available for technical and/or financial assistance and distribute it to farmers in the drinking water protection area. (Matrix Completed by Lane Extension, Appendix B)
   - Provide information at growers meetings. (Ongoing work with Lane Extension)
   - Write and distribute newsletter articles about groundwater protection practices. (Primarily Extension Service articles)
   - Provide a summary of survey results to drinking water protection area farmers to inform them of what other farmers are doing to help protect groundwater. (Being completed)

4. Consult with state agencies (DEQ, ODA) about the best available technology for farming operations, such as mint distilleries, and share information with local farmers.

Background Discussion:

The primary purpose of this goal is in having informed and participatory farmers within the groundwater protection area. Just by knowing that their farm is within the drinking water protection area, growers have a greater sense of ownership and responsibility for the continuation of their own and the community's safe drinking water supply. A first step in attaining this goal is to determine the objectives: what is it we want growers to do for agricultural related groundwater protection? The next step is to assess how well farmers within the drinking water protection area are already protecting drinking water and identify any gaps between what is desired and what is already being achieved.

Three things are recommended to protect the drinking water resource and in answer to the question what do we want growers to do?

1. Minimize irrigation leaching,
2. Minimize nitrogen leaching, and
3. Minimize pesticide water leaching.

Leaching refers to the movement of a substance (fertilizer, pesticides, etc.) down through the soil beyond the root zone, and potentially into the aquifer that is the source of drinking water. Water, either through rain or irrigation, is the primary force driving the movement of these substances through the soil. The extent of leaching varies with different substances, but in general is controlled by many factors. Some of these factors are the amount and timing of substance application, and the amount and timing of water applied after application. In addition, other best management practices, such as the use of cover crops or integrated pest management techniques also can reduce leaching.

Working with the land is the farmer's livelihood. In most cases, best management practices that protect drinking water are being applied because they help prevent problems to others and make good business sense. Farming is like any other business in that it is essentially based on consumer demand and profit margins. Consumers are increasingly demanding environmentally friendly farming practices. The use of practices that minimize leaching is preferred by growers because they reduce the amount of chemicals used, thus reducing costs and increasing profit margins. Currently, a program associated with the Oregon State University Extension Service has been conducting research on area farms to measure the amount of leaching of fertilizers and pesticides from irrigated crops. Using lysimeters, called passive capillary samplers (PCAPS), researchers can tell how much of a substance is leached after different farming practices. Results from these measurements are helping farmers adjust product applications to reduce leaching, resulting in the maximum use of products applied and protecting the groundwater. Expansion of this program onto other farm sites within the drinking water protection area and a greater sharing of results will strengthen the level of protection, especially regarding nitrate leaching.

The agriculture sub-committee administered a survey (Appendix C) to six of the main growers in the drinking water protection area. The survey was intended to assess how well current irrigation, pesticide, and fertilization management practices are helping to protect drinking water. With the help of the survey, farmers are

better educated about their location within the drinking water protection area and what practices can be applied, the sub-committee is better informed about any gaps between desired and actual practices on which to base other management strategies, and the general community can be better educated about what the agricultural community is currently doing to protect the groundwater resource.

Developing objectives and administering the survey are starting points for the agricultural portion of the management plan. Other management strategies are built from this framework. For example, results of the survey are being shared with other growers in the groundwater protection area. In this way, farmers in the area become better educated about what other growers are doing and begin trying methods that work for others. Other educational efforts will include newsletter articles, and a summary matrix of technical and financial resources available to farmers in the drinking water protection area.

Goal 2: Develop a recognition program demonstrating that the agriculture community is active in groundwater protection and encouraging further protection measures.

Related Management Strategies:

1. Develop criteria for becoming a Groundwater Guardian farmer (Completed).

   - Willing to have a passive capillary (PCAP) sampling station on property and/or willingness to apply information generated from PCAPs that measures fertilization and/or irrigation of similar crops
   - One-on-one consultation with an extension agent
   - Demonstrated willingness to cooperate, which was measured by the number of positive responses to survey questions
   - Maximizing use of Best Management Practices (BMPS) identified in the drinking water protection area agricultural survey
   - In compliance with all existing regulations

   ▲ The Ongoing Committee will enlist the assistance of a volunteer coordinator to promote the program and coach/confirm participants.

2. Provide signs or some less public form of recognition for Groundwater Guardian farmers.

   ▲ David Downing will check in with growers to identify an appropriate form of recognition.

Background Discussion:

Farmers should be recognized for the important contributions they make in protecting Coburg's drinking water. Recognition programs acknowledge and reward growers for voluntarily applying practices that are in the best interest of the community. This develops a greater sense of understanding and cooperation with local area farmers and the rest of the general community. Public recognition also generates community awareness that everybody is working together and doing their part to protect groundwater.

An agriculture recognition program needs to take into account the sensitivity farmers might feel to having increased public attention. In recent years, the agriculture community has come under increased scrutiny by the public. The shift in public perception has resulted in the agricultural community being increasingly regulated and has also placed negative attention on farmers. Many farmers no longer want any additional attention, whether it be positive or negative. A potential concern is that even positive attention can lead to something negative. For this reason, the type of recognition received is up to individual farmers. Some may want a Groundwater Guardian sign displayed at their farm site, whereas others may prefer another form of acknowledgment such as a personalized plaque.

Like most recognition programs, criteria have been established that farmers must meet to qualify for being recognized as being groundwater friendly. Most of these criteria are not specific practices as much as general actions that demonstrate a commitment and openness to applying practices that protect groundwater. Recent surveys in the Lane County area indicate that recognition efforts have more credibility if the certification process is not completed entirely by the agricultural community. Rather, a community outreach, involving agriculture and non-agriculture representatives would be better accepted by the public.

Goal 3: Develop an incentives program that promotes groundwater stewardship in the drinking water protection area.

Related Management Strategies:

1. Identify additional measures that might be applied that could receive funding from state or federal grants. (Identified)

   - Apply for Groundwater Research and Development grant funding to install additional PCAPs in the drinking water protection area to help farmers gauge appropriate fertilizer and/or pesticide applications.
   - Provide backflow devices on ground water pumps.
   - Secure an Environmental Quality Incentives Program grant to provide technical and financial assistance, and education to protect and improve groundwater quality.

   ▲ Currently, Committee members representing Lane County Extension and the Natural Resource Conservation Service (NRCS) are writing a grant to support these efforts. In the future, the Ongoing Committee will coordinate grant-writing efforts.

2. Identify and implement financial incentives that encourage conservation and protection practices.

   - Develop a summary matrix of incentives available through local, state, and federal agencies and distribute to farmers in the drinking water protection area. (To be completed by the NRCS)
   - Encourage the City of Coburg to work with the property owner where the wells are sited and pay for any agreed upon best management practices that provide added protection to the well.

   ▲ This will be an activity that is overseen by the Ongoing Committee.

Background Discussion:

Stewardship of Coburg's groundwater resource is promoted through voluntary protective actions taken by property owners. Some protective measures are confronted by barriers, such as project cost, lack of technical knowledge, permit fees, and potential loss of full financial value of the property. Incentives encourage rather than demand landowners to initiate conservation and best management practices on their property. Effective incentive programs can provide assistance to property owners with project coordination, technical expertise, funding, and financial gain.

The purpose of this goal is to provide and inform landowners of financial incentives to protect groundwater. An array of incentive programs are currently available through local, state, and federal programs. Potential incentives might include: technical assistance, cost-sharing, conservation easement purchases, and tax reductions. Management strategies related to this goal primarily link property owners with existing programs. Providing growers with a summary matrix of available programs allows farmers to select incentives that best match their farming operation.

Being located in a delineated drinking water protection area in some cases allows for additional government funding to be allocated to protection efforts. Installing PCAPs has been identified as being an important measure that could help farmers in the area reduce chemical leaching primarily associated with fertilization. Coburg will link more extensively with the existing Oregon State University research program that has already helped reduce the amount of nitrate leaching through a variety of BMPs. Securing funding for additional monitoring stations is a priority in achieving this goal. The need for backflow devices on surface water pumps has also been identified as a measure that could potentially lower risks to groundwater contamination. Grant or cost-sharing possibilities are being explored to secure funding for both lysimeters (PCAPs) and backflow devices.

The Environmental Quality Incentives Program (EQIP) was recently established under the 1996 Farm Bill. The program is designed to provide technical, financial, and educational assistance to farmers to address significant natural resource concerns and objectives in priority areas. With the delineation of the Coburg drinking water protection areas, Coburg has defined a priority area of concern for potential EQIP funding to be directed to places with critical environmental needs.

Commercial/Industrial

Three goals will lead to greater assurance of groundwater protection for businesses in the drinking water protection area. For each goal, more specific management strategies, actions, and tasks that are directed at achieving the goal have been identified. The goals and management strategies are incentives-based rather than mandatory. They focus on education, technical assistance, recognition, and potential cost-sharing with public agencies. Incentives motivate rather than demand business owners to initiate best management practices on their property. Following is a summary of the industrial/commercial inventory and the subcommittee's recommended goals and management strategies for the Coburg drinking water protection area.

Commercial/Industrial Inventory Summary:

The existing drinking water protection area contains eight businesses primarily located in the Robert's Court Industrial Park near the northeast corner of the ten-year TOT. A sand and gravel mining operation comprises a significant portion of the southwest corner of the ten-year TOT and extends into the 20-year TOT. Groundwater risk assessments of these business enterprises have been determined using the ratings in the Guidance Manual. Within the drinking water protection area there are two businesses considered to be potential high risk, five a medium risk, and one as a low risk to potential groundwater contamination.

Commercial/Industrial Goals and Management Strategies

Goal 1: Inform businesses about the need for groundwater protection and facilitate changes that reduce the risks of groundwater contamination.

Related Management Strategies

1. Sponsor an open house type of event and invite DEQ to talk with business people about pollution prevention practices and available assistance.

   - Invite a DEQ pollution prevention program representative to talk with business managers and owners within the entire industrial park area.
   - Send letters to businesses in the entire Coburg area about the need for groundwater protection, their relationship to the existing city wells, and resources available to identity pollution prevention techniques for individual business types. The letter should stress that this is not a mandatory program. Included in the resources available list should be:
     - An announcement of the open house, and
     - A list of people on the industrial/commercial sub-committee and other large business owners that can help smaller businesses develop groundwater protection plans.
   - Provide fact sheets at the open house, tailored, if possible, to local businesses listing BMPs that can be applied to reduce the risk of groundwater contamination.
   - Provide basic groundwater information stressing the relationship between groundwater quality and land use activities.
   - Announce the availability of other workshops that will be held to deal with general awareness, hazardous waste, and stormwater.
   - Share with businesses the results of the Business-Consumer survey conducted in Coburg, Junction City, and Springfield in 1996.

   ▲ This activity is tentatively scheduled for fall 1997. The Committee will recruit and work together with a volunteer coordinator to develop the workshop(s).

2. Establish a mentoring program with large industries helping the smaller, less regulated businesses in the community. This action is a follow-up to the open house session.

   - Assist small businesses in developing a spill response plan.
   - Share spill response resources with small businesses.
   - Sponsor joint employee training workshops to raise awareness of groundwater and potential land use impacts. Workshops should include topics of general awareness, hazardous waste, and stormwater runoff.

3. Provide sand and gravel mining businesses with educational information and link with technical assistance.

   ▲ LCOG has compiled best management practices recommended for the sand and gravel mining industry and will distribute the information to local sand and gravel mining operators.

   ▲ During the annual inspection and permitting process, Oregon Department of Geology and Mining Industries (DOGAMI) will suggest best management practices to reduce the risks of groundwater contamination.

   ▲ Notify DOGAMI that there is a sand and gravel mining operation within the Coburg drinking water protection area. (Completed)

Background Discussion

Many commercial/industrial activities that pose risks to groundwater are regulated through laws such as the Toxic Substances Control Act (TSCA) and the Resource Conservation and Recovery Act (RCRA). However, even facilities that are required to have permits for building, material, storage, or waste discharge cannot be assumed to pose no risks to groundwater. The majority of other regulations applicable to commercial and industrial facilities rely on responses to contamination events, rather than on preventing problems. Coburg's commercial/industrial management strategies focus on pollution prevention.

Smaller businesses tend to be less regulated compared to larger businesses because they use and or generate less hazardous materials. However, even though they use and generate less, some of these businesses still present a moderate risk to a clean drinking water supply. Although many protection measures already exist, larger businesses can take an active role in mentoring the smaller, less-regulated businesses. Establishing partnerships can also play a key role in addressing non-point pollution. With the support of local businesses, local government, and state or federal funding assistance, area-wide solutions are possible.

As identified in the inventory process, a sand and gravel mining operation is also located within the drinking water protection area. The primary risk associated with sand and gravel mining operations is the immediate exposure of the water table due to mineral extraction. The industry is regulated by DOGAMI and an annual permit and inspection are required. Groundwater protection is one focus of the permitting and inspection process. The DOGAMI will continue to work with the industry within Coburg's drinking water protection area and provide suggestions of BMPs to reduce the risk associated with mining activities.

The purpose of this goal is to reduce the risks of groundwater contamination by businesses in the drinking water protection area by educating and assisting those businesses in developing groundwater protection strategies that supplement the regulatory structure. An emphasis of this goal and related action items is in developing partnerships with and between larger industrial complexes, smaller businesses, and state agencies. Another focus of this goal is to provide education and technical assistance to business owners by providing how-to information and in linking the property owner with technical assistance available on the local, state, or federal level. Education and technical assistance can help the business owner explore alternatives that might not otherwise be considered. Currently, the Coburg Public Works Director inspects industries within industrial park areas. This inspection offers a continuing opportunity to disseminate drinking water protection information and helps to ensure that industries within the drinking water protection area are in compliance with regulations.

A groundwater open house/symposium event will be scheduled for Coburg businesses and will be the educational catalyst for many of the other management strategies. Business owners and managers can learn about technical assistance available through the DEQ Pollution Prevention Program as well as local resources available to help them address local needs. The DEQ Pollution Prevention, Waste Reduction Program offers businesses free technical assistance regarding BMPs for handling chemicals that could be harmful to groundwater. On-site technical assistance is designed to provide businesses with alternative regulations, while at the same time protecting groundwater.

Goal 2: Establish community-wide recognition that businesses are actively engaged in groundwater protection.

Related Management Strategies:

1. Provide information to the community about what practices are already in place by industrial/commercial businesses.

   - Write newsletter articles.
   - Use public postings.

   ▲ Activity of the Ongoing Committee and other volunteers.

2. Establish a business recognition program for businesses that are applying good groundwater pollution prevention practices.

   - Inform businesses about the link between pollution prevention and consumer preferences to support green businesses.
   - Link with Oregon State Green Permit Program for qualifying to become a Groundwater Guardian business.
   - Publicly recognize businesses that are helping other businesses protect the groundwater resource.
   - Provide a plaque, sign, or door sticker showing that the business is groundwater friendly.

   ▲ The Ongoing Committee has recruited and will begin working with a volunteer coordinator to implement this program. Graduate students from the University of Oregon that were involved with the business incentives survey may also be interested in assisting with this effort.

Background Discussion:

Most businesses, through both mandated and voluntary efforts are already applying BMPs that protect drinking water. The purpose of this goal is to publicly recognize these businesses for their contributions and identify additional activities that could be accomplished above and beyond just those that are currently regulated. Community residences and consumers should know that the business community is taking an active role in reducing risks to drinking water.

Recognition programs can serve as an incentive by providing favorable publicity to those involved. As with most recognition programs, standards must be established and met for a business to qualify. The certification process must be controlled at the community level, outside of businesses themselves. Technical assistance will be offered as a component of the recognition program so that the businesses can comply with the standards that are set. Recognition programs tend to have a snowball effect in the sense that as awards are given or signs displayed, others want the same recognition. For this reason, recognition programs also tend to have an educational benefit as others learn about the types of practices that are beneficial to drinking water protection.

Results from the Business Incentives Survey sponsored by the OHD indicate that recognition programs influence consumer habits. Most consumers responding to the survey indicated that they would pay more for goods and services if they were provided by a business certified as protective of groundwater. For the certification to be credible to these same consumers, however, the certification would have to be completed by individuals other than the business itself.

The business recognition program in Coburg links with programs already established or being established on the state level. Business owners will be informed of opportunities to apply for the Governor's Award for Toxic Use Reduction, an annual award given to businesses with significant reductions in their use of toxic material. Currently, the DEQ is developing a Green Permit business recognition program that businesses in Coburg will be encouraged to be involved with.

Goal 3: Investigate the feasibility of managing stormwater runoff on an area-wide basis in the Robert's Court industrial complex.

Related Management Strategies:

1. Examine the possibility of using created wetlands for stormwater treatment, including funding options.

2. Explore options such as constructing grassy swales or detention ponds to treat stormwater runoff.

3. Work with an intern to develop a stormwater plan for at least the industrial corridor.

4. Provide informational sessions and fact sheets on how to treat stormwater runoff. (See Goal 2)

5. Require stormwater treatment as part of the site plan review and approval process for new businesses in the industrial areas.

▲ The Public Works Supervisor has already begun this process and will continue to work on development of a stormwater management program.

Background Discussion:

In developed areas, land has been covered by streets, parking lots, and buildings (impervious surfaces) that prevent rain from being infiltrated into the ground. As the runoff flows over these surfaces, it can pick up pollutants—chemicals, oil, grease, fertilizers, and herbicides—that have collected on the surface. Stormwater leaving these impervious surfaces can then discharge onto the ground or enter surface waters where pollutants can eventually percolate down to groundwater.

Like most industrial areas, the Robert's Court Industrial Park contains significant impervious surface area. Stormwater runoff in this area is currently addressed by collecting the water running off of the impervious surface and directing it into a drywell. A drywell is a sub-surface drainage area that allows direct recharge to the sub-surface below the soil. Contaminants carried in the stormwater discharge could eventually infiltrate into the aquifer with this type of system. Potential contamination risk of stormwater leaving the Robert's Court area could be reduced by helping to ensure that water leaving impervious surface areas and entering the ground or surface water does not contain pollutants that could contaminate ground and/or surface water.

Stormwater runoff can be managed in the Robert's Court Industrial area on both an individual business and an area-wide basis. Businesses can reduce their individual stormwater impact by applying BMPs that reduce pollutants at the source to prevent pollution of stormwater runoff discharged from the site. Practices can also be used to divert runoff away from areas of exposure to pollutants, such as raw materials, intermediate products, or finished products. On an area-wide basis, BMPs could be used to direct polluted runoff to natural or other types of treatment. Encouraging businesses to apply source reduction practices as much as practicable is a priority because these practices reduce the amount of pollution generated at the site and prevent contaminants from being exposed to stormwater in the first place. Treating contaminated stormwater to remove pollutants before the runoff leaves the individual site or industrial area is the next option, although this may transfer the pollution problem from one place or medium to another since treatment will not be completely effective. Source reduction methods are also desirable because they are often less expensive than treatment methods.

Residential

People need to know that their groundwater is a valuable and vulnerable resource. They also need to know what they can do, or *not* do, to help protect this resource. Many people are unaware that some common activities, such as housecleaning or gardening, may involve toxic chemicals that could have serious impacts on groundwater quality if overused or improperly disposed. Very small amounts of certain contaminants can corrupt an entire community's groundwater supply, as can the cumulative effect of numerous less odious sources.

To help prevent groundwater contamination, community members need to be more aware of about how their actions can affect groundwater. Education can lead to understanding, and understanding can lead to behavioral changes that help reduce the risk of groundwater contamination.

Following is an overview of residential land use within the drinking water protection area, and management strategies that address issues related to residential land use.

Residential Inventory Summary

Within the 10-year drinking water protection area there are approximately 20 rural homesteads. Within the entire study area, which extends to the boundaries of the Rural Fire Protection District, there are an estimated 600-800 residences.

Residential Goals and Related Management Strategies

The single goal for the residential community, which aims at raising awareness of groundwater sensitivity, will be targeted to *all* residences within the study area, regardless of their proximity to the drinking water protection area.

Goal 1: Increase awareness of groundwater vulnerability and residence-based sources of contamination among community members. Also provide information on non-toxic alternatives and safe use and storage of toxic materials.

Related Management Strategy

1. Develop a series of groundwater-related articles that can be inserted into the Coburg Newsletter on an ongoing basis. (In progress, expected to be completed by March 1997)

   ▲ Prepared articles will be given to Coburg's newsletter coordinator. The Committee may work with the newsletter coordinator to develop additional articles.

2. Provide assistance to the Coburg Elementary School to assist with presenting lessons on groundwater basics to the school children. (Continuing assistance from OHD, DEQ, and Lane County Extension Service)

   ▲ Continuing assistance from OHD, DEQ, and Lane County Extension Service.

3. Erect signs to inform people that they are in a groundwater sensitive area. (As a participant in the Groundwater Guardian program, Coburg has received Groundwater Guardian Community signs that will be erected at entrance ways to the city and/or at the entrance to the drinking water protection area.

4. Pursue other means of educating the community about groundwater protection. Potential activities include:

   - Placing educational displays at various businesses in and around Coburg (e.g., growers co-op, grocery stores, bank).
   - Working with scout troops to pass out educational materials on groundwater protection to all residences.

5. Promote hazardous waste round-up events.

   ▲ Activity of the Ongoing Committee and other volunteers.

Background Discussion:

Threats to groundwater from residential land users primarily relate to the use, storage, and disposal of hazardous materials. The density of septic systems also has a strong influence on nitrate levels with housing greater than two units per acre considered to be of moderate to high risk because of the potential for elevated nitrate levels. Hazardous substances associated with residential use can come from: household hazardous wastes, mechanical repair and maintenance products, land and garden care products, swimming pool maintenance chemicals, and stormwater runoff carrying petroleum products. To reduce risks associated with high-density housing, as of 1982, Coburg requires new housing development to have a minimum lot size of 10,000 square feet.

The purpose of this goal is to empower Coburg community members with knowledge so they can personally take actions to protect their groundwater resource. Outreach efforts will educate the community on (1) the vulnerability of Coburg's groundwater, (2) how each citizen's actions can affect groundwater quality, (3) why it is important to reduce the cumulative effects of groundwater impacts, and (4) what could be the consequences of groundwater contamination. In this context, the educational materials will help instruct community members on the actions they can take to reduce the risk of groundwater contamination.

Chapter Six

Contingency Planning

The goals and management strategies presented in the previous chapter focus on proactive efforts that will protect the drinking water supply. In a sense, the purpose of developing management strategies is to reduce the likelihood of ever having to use the contingency portion of this Plan. However, in the event that a contamination problem should ever occur, Coburg needs to be prepared to deal with this emergency situation. The purpose of this Contingency Plan is to design a response to the contamination or disruption of Coburg's current water supply. This plan focuses on:

- The identification of the primary potential threats to the water supply and
- Developing procedures to be followed should the threats materialize.

Coburg's Contingency Plan addresses ten elements required by the Oregon Wellhead Protection Program, including:

1. Potential threats to the drinking water supply,
2. Protocols for incidents response,
3. Prioritization of water usage,
4. Key personnel and development of a notification roster,
5. Short-term and long-term replacement of water supplies,
6. Short-term and long-term conservation measures,
7. Plan testing, review, and update,
8. Personnel training,
9. Provisions for public education, and
10. Logistical and financial resources.

1. Potential Threats to the Drinking Water System

Primary threats to Coburg's drinking water system are related to an interruption of water delivery or contamination of the groundwater supply. Six types of events have been identified that could cause an interruption in delivery and/or contamination of the water supply, including:

A. Mechanical problems: power outage, broken main, pump failure;
B. Flooding;
C. Detection of a contaminant at the wellhead;
D. Chemical spill in the following zones of the drinking water protection area;
   a. Six-month time of travel (TOT) - Agriculture chemicals (boiler chemicals for mint distilleries and general agriculture related uses) and transportation of fuels and agriculture chemicals.
   b. Five-year TOT - Agriculture chemicals (boiler chemicals for mint distilleries and general agriculture related uses), transportation of fuels and agriculture chemicals, and rural residence uses of hazardous materials.
   c. Ten- to 20-year TOT - Potential threats from 11 industrial businesses, Interstate 5 transportation of hazardous materials and agriculture chemicals.
E. Sabotage; and
F. Spill in the McKenzie River

The most likely threats to the drinking water system are mechanical failure, detection of a contaminant at the wellhead, and a chemical release within the groundwater protection area. Procedures to deal with these threats are outlined in element #2 below.

2. Protocols for Incident Response

This element details the appropriate response for the most likely potential threats listed above (A-D).

A/B - Mechanical and flooding related interruptions:

- Rely on reservoir capacity (five days in winter, 1-1.5 days in summer)
- Apply conservation measures (see element 6)

C - Detection of a contaminant at the wellhead:

Response to the detection of a contaminant at the wellhead depends on whether the substance reaches or exceeds the maximum contaminant level (MCL) measured during the monitoring process. If the contaminant is recorded as being at elevated levels, yet is still below the MCL for that substance, then quarterly monitoring should occur to track any changes in the contamination level of the well. The OHD must be notified. If the MCL does not meet allowable standards the following procedures should be followed:

- Shut down the contaminated well or wells,
- Implement curtailment or conservation plan,
- Identify local irrigation wells that may have to be shut down to reduce contaminant flow,
- Send news release to local media, and
- Notify residents and businesses about conservation measures needed to be taken.

D - Chemical spill within the drinking water protection area:

Six-month to two-year TOT

- Recommend to the City Council the reconstruction of well #2 (shallow source well) so it draws only from the lower water bearing zone of the aquifer, reducing contamination risk.
- If well #2 has not been reconstructed, shut down well #2 immediately.
- If well #2 has been reconstructed, discontinue use of the well that is closest to the release.
- Inventory and rank chemicals used in the drinking water protection area and prepare related responses.
- Contact Lane County Emergency Response Coordinator if spill occurs.
- Follow communication procedures contained in element 4 of this plan.
- Inform emergency responders that spill is within the drinking water protection area.
- Upon notification of spill, shut down well #2 (shallow source well).
- Determine if chemical type and/or quantity dictates shutting down well #1 (deeper water bearing zone).
- Implement curtailment or conservation plan.
- Follow procedures for approaching area to minimize risk to personnel.
- Have absorbent and containment material on hand.
- Contact the Oregon Fire Marshal and CHEMTREC to determine what chemicals have been spilled and their characteristics.
- Identify local irrigation wells that may have to be shut down.
- Send news release to local media.
- Notify residents and businesses about conservation measures needed to be taken.
- Leave clean-up to responsible party.

Two-year to 20-year TOT

- Recommend to the City Council the reconstruction of well #2 (shallow source well) so it draws only from the confined aquifer, reducing contamination risk.
- Inventory and rank chemicals used in the drinking water protection area and prepare related responses.
- Contact Lane County Emergency Response Coordinator if spill occurs.
- Follow communication procedures contained in element 4 of this plan.
- Inform emergency responders that spill is within the drinking water protection area.
- Notify residents and businesses about conservation measures needed to be taken.
- Follow procedures for approaching area to minimize risk to personnel.
- Contact the Oregon Fire Marshal and CHEMTREC to determine what chemicals have been spilled and their characteristics.
- Leave clean-up to responsible party.

3. Prioritization of Water Usage

This element prioritizes community needs in case the water supply is interrupted and/or a replacement supply is necessary. A one million gallon above ground holding tank in Coburg contains about a 3.5 day supply of drinking water in the winter and about a 1.5 day supply in the summer. In the event of an emergency where one or both wells are shut down, prioritization of water usage is already established by Coburg City ordinance. Prioritization of water use from highest to lowest is as follows:

1. Fire department,
2. Residents,
3. Industrial/commercial,
4. School,
5. RV parks,
6. Agriculture use of city wells, and
7. City park irrigation.

4. Key Personnel (Notification Roster)

In the event of an emergency situation threatening the water supply, key people must be notified and response procedures coordinated between city, county, and state personnel. These personnel and their roles are listed below:

Lane County Sheriffs Office,
Emergency Response Coordinator (Ike Jensen, 682-4160).
The county Emergency Response Coordinator should be the first person notified and is the person that under normal procedures assumes command of the situation. This person informs the County Public Health Department and the Oregon Emergency Response System, who in turn notify other appropriate state agencies. The public water system coordinator should have a previously established arrangement with the county coordinator to ensure that the City is notified when a spill emergency occurs within the groundwater protection area. It is also the responsibility of the county coordinator to inform all emergency responders that the spill is within a drinking water protection area.

Coburg Public Water System Coordinator
(Public Works Director, Jack Harris, 485-4358).
This person coordinates necessary actions on a local level, making any decisions regarding the operation of the water system, providing technical assistance as appropriate regarding response procedures, and working with the county to prepare a press release to Coburg residents. Other local officials will also be notified by the local coordinator or someone else designated by the local coordinator. Other local officials to be notified include:

- Coburg City Mayor,
- Coburg Fire District Fire Chief,
- Coburg Police, and
- General public news release media contacts.

5. Short-Term and Long-Term Replacement of Water Supply

In the event of an emergency, the minimum water needs of the community must be met, and this supply must meet applicable health standards. Short-term options are those where the alternative supply is needed for a few hours or days. Long-term options are considered for a permanent alternative supply.

Short-term drinking water - Bottled water and/or conservation

Intermediate term - Import water from neighboring sources (national guard tankers) and implement conservation practices

Long-term - New well or treatment

6. Conservation Practices

Conservation of water use will lessen demands on Coburg's public water system in the event of an emergency situation. This element identifies short- and long-term conservation practices that could be implemented as a function of user needs identified in element #3, Prioritization of Water Usage.

Coburg City Parks: Parks will not be irrigated if a water usage reduction is necessary.

Agricultural Uses: Limitations placed on agricultural users may include the use of Coburg's wells or the use of irrigation or other wells that may influence the contamination of Coburg's wells. Currently, the owner of the property on which the existing wells are situated has the right to use the City well water for agricultural purposes, including the use of this water for mint distillery processes. The owner should be notified that if the water system is interrupted or contaminated, this water supply may be limited. Other agricultural wells in the general vicinity of the Coburg wells may also influence the flow of contamination by drawing water more quickly toward the City wells. These irrigation wells should be identified prior to an emergency and farmers notified in the event of an emergency that their use is restricted.

Schools: Schools can reduce water use primarily by eliminating grounds irrigation. In a temporary emergency, tankers for drinking water and other essential functions should be stationed at the school facility to keep it in operation.

Industry/Commercial: Many businesses already have a contingency plan in place that identifies water conservation practices in the event of a water shortage. Businesses should be informed that in the event of an emergency their water intake may be curtailed and that it is in their best interest to develop a conservation plan if they do not already have one. Businesses should also be encouraged to develop their own or a jointly shared water storage facility for water use in an emergency situation.

Resident: Common conservation measures for residential use include limiting practices such as, lawn irrigation and car washing, laundry use, and installing conservation devices such as low-flow shower heads. The Oregon Water Resources Department (OWRD) publishes a variety of informational pamphlets letting residential users know how to reduce water. With the assistance of OWRD, Coburg should identify procedures to limit water usage among residential users and educate residents prior to an emergency.

Fire Department: In the event of a fire during a water supply emergency, the fire department has top priority in water usage. The Coburg Fire District must be notified when a conservation program is going into effect and should identify alternative sources of water or fire response services to ensure fire protection.

7. Plan Testing, Review, and Update

This contingency plan's efficacy will be evaluated, reviewed, and updated using an annual review and mock exercises. The public water system coordinator will review any personnel or situational changes and make adjustments to the plan on at least an annual basis. The most effective way to test the plan's ability to design an appropriate and adequate response is through performance of a mock exercise. A simulated emergency will allow emergency responders to make adjustments to the plan as needed. Mock exercises will also serve as an educational tool for local citizens, reminding the community of the importance of protecting groundwater and the conservation measures that would be put into place in the event of an emergency situation.

8. Personnel Training

To be effective, contingency plans must rely on properly trained people operating within a well-organized and effective system with up-to-date information. County and state emergency responders have been professionally trained to deal with hazardous materials (HAZMAT) responses. Local personnel should also be trained in initial HAZMAT response because they could be the first to arrive on site.

9. Public Education

Educational materials build and maintain support for the Plan and can encourage assistance and understanding when contingency plans are put into effect. Management strategies for Coburg's Plan have a strong educational component that satisfies part of this element of the contingency plan. However, there are other educational components directly related to this contingency plan that must be implemented to make the plan an effective emergency response tool. Before an emergency occurs, local residents and business owners must be knowledgeable about appropriate conservation measures that they will be expected to apply. Informational packets need to be prepared and distributed in advance of a water supply interruption or contamination.

10. Logistical and Financial Resources

The City of Coburg should participate in an emergency response situation only to the extent of providing assistance and information regarding the water system and the particular needs of the community. The City should not attempt any clean up efforts on its own, although containment may be appropriate. The responsible party is legally obligated to report and clean up chemical releases. Appropriate clean up measures will be dependent on the type and quantity of chemical released.

Contingency elements provide mechanisms for a well-planned response in the event of a contamination situation. Coburg's future growth will also increase demands for an additional water supply. An analysis of potential new well sites from a groundwater risk perspective provides a basis for selecting a new well location that minimizes future contamination risks. An analysis and recommendation of a new well site is contained in the following chapter.

Chapter Seven

New Well Site Comparative Analysis and Recommendation

Coburg's growing population and industrial development places increasing demands on the existing water supply. Although the current capacity is sufficient, Coburg will soon need an additional well to meet the demands of growth. In addition, because both of Coburg's wells are in the same area, the City's entire water supply cold be threatened or eliminated by a single event. Evaluating potential sites according to groundwater contamination risks allows the City to select a site that has a lower risk potential and develop proactive approaches by guiding existing and future land use activities to protect the area. This chapter provides an evaluation and analysis of the potential new well sites for Coburg.

Three potential new well sites were identified and investigated for Coburg's new water supply by an earlier study conducted by CES. These three sites are shown on Map 1 and labeled A, B, and C. The Committee analyzed the three options from a groundwater risk perspective, although the Committee recognizes that a variety of elements, such as distribution, productivity, and cost may also be considered for the ultimate selection of Coburg's next drinking water source. Selecting a preferred site from a safe drinking water perspective involves an analysis of various land use components such as property ownership and contamination risks associated with various land use activities. For a safe drinking water supply, the most desirable new well site is that of proposed well C, located just south of Coburg. The reasoning for this recommendation is described in this chapter.

Selection Criteria

The three proposed well sites were analyzed using several criteria associated with land use. These criteria were determined by the New Well Sub-Committee to be the most important factors influencing the choice of the most appropriate new well from a drinking water protection perspective. Criteria used in evaluating the proposed new well site included:

City ownership of wellhead property: City ownership (or possibility of purchase) of the property on which the well is located is considered a top priority for a new well. Having control over the immediate vicinity of the wellhead helps ensure protection of this most critical area. Lack of ownership and control of the land on which the existing wells are sited has significantly increased the vulnerability of the current water supply.

Number of property owners: Protecting and managing a drinking water protection area generally becomes more complex with increasing numbers of property owners within the area. There is a greater chance that some of those property owners will not be supportive of a wellhead protection program that will increase the risk of contamination.

Cooperation of property owners: Cooperative landowners within the drinking water protection area help ensure that the area will be protected to the best ability of those property owners. Property owners who are opposed to a siting of the new well are less likely to voluntarily take extra precautions in protecting the area.

Risks associated with current land uses: Land uses vary in the type and degree of potential risk to groundwater. The higher the overall risk associated with differing land uses within the drinking water protection area, the less desirable that site is for selection of a new well location.

Risks associated with expected future land uses: Expected future land uses can influence the vulnerability of the drinking water protection area if future land

uses are expected to pose a higher risk than existing land uses. General future land uses can be estimated by Plan Designations for the area and more specific development proposals are often known by local residents.

Infiltration risk: Soil and sub-soil characteristics influence the permeability of the land surface, which in turn influences the ability of a contaminant to enter the aquifer. According to the CES susceptibility analysis, infiltration risk in all three proposed well sites is high, although risk severity is still distinguishable between the three proposed wells.

Comparative Analysis

Following is a comparative analysis of each proposed well site related to the potential of future groundwater contamination. For detailed information about land uses within each groundwater protection area, see the Inventory chapter of this Management Plan (Chapter Four).

Well Site A

Proposed Well A is situated in northeast Coburg just west of Industrial Way. The infiltration risk for this site is lower than the other two proposed sites, although it is still considered to be moderately high. The well would be on currently owned city property next to the existing drinking water storage tanks. Land use within the immediate vicinity (six-month TOT), will be comprised of a fairly equal mix of agriculture, industrial, and residential representing a medium to high risk throughout this critical area. There have also been reports of a historical dump site just southwest of the proposed wellhead and within the six-month TOT. Although these reports of hazardous materials dumping have not been confirmed, if this site were to be considered in the future, further investigation of potential contamination risks would need to be conducted.

Compared to the other two proposed well sites, the drinking water protection area for site A has the most complex and diverse land ownership and use. About 80-90 property owners would need to be actively engaged in any management plan for this area, including about 20 businesses. Cooperation levels among property owners is unknown, but would probably be mixed with some being highly supportive of a wellhead protection plan and others potentially resistant to active measures that would reduce contamination risks. This diversity of ownership increases the odds that just one irresponsible land owner can lead to the contamination of the community's water supply.

The drinking water protection area for Site A contains several land use activities that represent a medium or high risk to groundwater contamination. Septic systems and general household hazardous materials use pose a high risk due to the density of residential housing in the Miller Street area. About 75 percent (15) of all the businesses in the area are considered to be a medium or high risk. Current agricultural use within the five-year TOT is also predominantly a medium risk although most agricultural use beyond the five-year TOT is non-irrigated and therefore considered a lower risk.

Four major roadways pose transportation-related potential problems for this drinking water protection area. The most significant risk is Interstate-5, in particular at the interchange with Van Duyn Road. As industrial development continues to grow within the interchange vicinity, congestion and related accidents will continue

to be a problem. Because of the trucking-related industry in the area, the interchange experiences a great deal of truck traffic and three hazardous materials spills have already been reported in this area since 1988.

Projected land use will bring even more complexity, diversity, and risk into the drinking water protection area for site A. Most of the drinking water protection area within the urban growth boundary (UGB) west of Interstate 5 is designated for industrial development. This expanded industrial development is likely to replace the existing agricultural use in the five-year TOT and will probably represent a higher risk than the current land use.

Well site A is desirable because of its proximity to the service area and the City of Coburg has the most direct control over this area because most of it is within the city limits. However, existing and expected future land uses pose significant risks to this drinking water protection area making site A the least desirable location from a wellhead protection perspective. The complexity and diversity of land use and land ownership within this groundwater protection area would also demand a complex and diverse management plan if this site is eventually selected.

Well Site B

Well site B is located southwest of Coburg outside of the Coburg UGB. Currently, all of the six-month TOT is in agriculture land use, with about 65-70 percent being non-irrigated (low risk) and about 30-35 percent being irrigated (medium risk). Two rural residences associated with farming operations are also located within the immediate vicinity of the wellhead.

Compared to the other two proposed well sites, the drinking water protection area for site B has the least complex and diverse land ownership and use. The area beyond the six-month TOT (5- to 20-year TOT) is either in agricultural or sand and gravel mining use involving three land owners. Initial inquiries indicate that the City of Coburg would have difficulty purchasing or securing easement agreements for property on which to site a new well, which is considered to be the most important factor in selecting a new well. In addition to a low potential for city ownership, at least one property owner within the groundwater protection area is opposed to the siting of a new well at this location, limiting the political acceptability of this option. A representative of Wildish Sand and Gravel Company, a company that owns land within the drinking water protection area has submitted a letter stressing concern over potential conflicts with wellhead protection and the extraction of aggregate resources.

Future land use is expected to remain a mix of agriculture and aggregate mining. However, the majority of the area is expected to shift from agriculture to sand and gravel mining use as most of this drinking water protection area has been designated an aggregate resource area. Sand and gravel mining operations are considered a high risk to potential groundwater contamination primarily because of the immediate exposure of the water table created by surface material extraction. Both existing and expected future mining operations in this area pose a significant potential threat to the development of a safe drinking water supply. This potential threat can be minimized through active management strategies and BMPs applied by the mining business; however, the business owner must be willing to apply extra precautionary methods to help ensure drinking water protection.

If proposed wellhead site B had City of Coburg ownership and cooperative drinking water protection area landowners, its location would be desirable because there

are only a few land uses and property owners to work with. However, city ownership potential and landowner support of a well sited in this area is minimal, significantly reducing the desirability of this site. If proposed well B is considered further, city ownership of wellhead property and cooperative agreements with drinking water protection area landowners must be secured. Management strategies reducing potential risks associated with aggregate mining and agriculture-related uses would need to be actively applied.

Well Site C

Well site C is proposed to be located just south of the Coburg UGB. Although this drinking water protection area has some groundwater contamination risks associated with it, it is the preferred site. Current and future property ownership and land use activities offer the best assurance of wellhead protection relative to the other proposed sites.

Within the immediate vicinity of the wellhead (six-month TOT), site C is primarily irrigated agricultural land (medium risk). About 1,000 feet of Interstate 5 also runs through the six-month TOT posing the greatest risk to the well within this critical zone. Prospects for the City of Coburg to purchase property for siting the well are high. Landowners within the vicinity of the proposed well have indicated a willingness to sell property for this purpose. Agricultural users within the six-month TOT area have also indicate a cooperative attitude and willingness to support a wellhead protection management program for this area.

Existing land use within the five- to 20-year TOT is mixed, but primarily is comprised of non-irrigated agricultural land (low risk). The area also includes four rural residences and a machine shop that is considered to be a relatively high risk. A portion of a cemetery is also located in the upper northeast section of the drinking water protection area.

Interstate 5 is probably the most significant potential contamination risk for this drinking water protection area. Nearly a mile of freeway runs through the groundwater protection area in the five-year and six-month TOT zones. Because of the freeway's proximity to the well, an accidental spill (especially within the six-month TOT) could cause an immediate and possibly irreversible curtailment of use of this well. Most of this section of the freeway is flat and straight, and runs through the open valley with minimal visual obstructions making it a relatively safe section of freeway. The chance of a spill accident occurring on most of this section is small. The bridge over the McKenzie River, in the ten-year TOT has the highest potential for accident occurrence. Since 1986 there have been three reported hazardous material spills on this bridge.

Known potential future land uses within the drinking water protection area of site C may influence the area's vulnerability to groundwater contamination. One potential site for Coburg's future wastewater treatment plant is located just north of the proposed wellhead posing a medium risk to the well. However, selection of the site for wastewater treatment has not been finalized and it is likely that another area will be chosen. A golf course will also be situated west of the proposed site on the west side of Interstate 5. Golf courses generally are considered a medium risk because of the use of grounds maintenance chemicals and a high amount of irrigation. However, substantial improvements have been made in the industry in recent years and more is known about how to reduce potential contamination threats to groundwater resources.

Proposed well site C is recommended as the preferred new well location because it poses the fewest risks to potential groundwater contamination from existing and future land use activities. Landowners within the drinking water protection area have also indicated a willingness to be supportive of wellhead protection strategies for this area. In addition, the City of Coburg has the opportunity to be proactive and develop protective measures for this groundwater protection area before the water system is constructed.

If this site is selected as the new well site, a wellhead protection management plan should be developed and implemented that is specific to the needs of this drinking water protection area. Several components of the plan will be critical in helping to ensure adequate protection of this area. Since Interstate 5 poses the greatest potential threat to the system, a high-quality spill response plan should be developed before this system goes on line. Coburg should also work with the Oregon Department of Transportation to explore the possibility of installing spill containment structures along the freeway, at least within the six-month TOT area, and possibly along the bridge at the McKenzie River. Wellhead protection management of the area should include education and technical assistance to farmers encouraging BMPs that protect groundwater. As the golf course site is constructed, developers should be linked with education and technical assistance resources that can help design facilities and landscapes that minimize risks to contamination. Installing monitoring wells down-gradient along the perimeter of the golf course would also help ensure that golf course protection practices are effective or adjustments can be made if detection of contaminants occurs.

Alternatives to the Proposed Well Locations

Coburg may want to consider other locations or adjustments to the location of the proposed new well sites. For example, the location of well C could be moved slightly to the west to increase the wellhead distance to the freeway. Any changes to the proposed sites should include a newly defined delineated area and a complete inventory of the drinking water protection area. As was done with the current three proposed sites, an evaluation and analysis of potential threats to the water supply should be conducted using the criteria suggested in this section.

Conclusions

Table 2 summarizes the rankings of each site for the six criteria depicting a generalized summary of the many components considered for each well. As displayed, proposed well C ranks first for four out of the six criteria. Although proposed well A has a lower infiltration risk, land use activities within this drinking water protection area increase the risk of contamination from a variety of contaminant sources. Proposed well A also ranks better in regards to City ownership of property because the City of Coburg already owns the property where the well is proposed to be sited. However, initial inquiries suggest that the City of Coburg will be able to purchase property in the drinking water protection area of proposed site C if it selects that site.

Based on the criteria developed by the Committee, proposed well C is the most desirable site from a groundwater safety perspective. This site has the lowest risks associated with existing and future land use. Land use risks that have been inventoried in this drinking water protection area can be minimized and are man-

ageable with appropriate wellhead protection management strategies. In addition, this site has cooperative land owners who are likely to be supportive of a wellhead protection management plan.

Table 2

Comparative Evaluation Ranking for Proposed Well Sites

Evaluation Criteria	Proposed Well		
	A	B	C
City Ownership of Property	1	3	2
Number of Property Owners	3	2	1
Property Owner Cooperation	2	3	1
Current Land Use Risks	3	2	1
Future Land Use Risks	2	3	1
Infiltration Risk	1	3	2

Key: 1 = most desirable; 3 = least desirable

References

Brahmani, B., 1993. *Final Report of the Volunteer Well Water Nitrate Testing Program.*

Cascade Earth Sciences, Ltd., 1996. *Coburg Wellhead Protection Area Delineation Report, Lane County, Oregon.*

E.D. Hovee and Company for Rural Development Initiatives, Incorporated, 1995. *Coburg, Oregon Community Assessment.*

Environmental Law Education Center, 1996. *Proceedings from: Protecting Local Groundwater Resources in Oregon.* May 1996 conference, World Forestry Center, Portland Oregon.

Golder Associates in association with Adolfson Associates, 1995. *Wellhead Protection Area Delineation Report for Springfield Utility Board and Rainbow Water District.*

Idaho Water Resources Research Institute, 1993. *How to Conduct an Inventory in Your Wellhead Protection Area: A Training Manual for Use With Volunteers.*

Licas, I. J., H. Skovroned, and M. Drabkin, 1991. *Industrial Pollution Prevention Opportunities for the 1990s.* EPA/600/8-91/052.

Montgomery Watson and McKeever/Morris, 1994. *Non-Point Source Pollution Control Guidebook.* Prepared for Oregon Department of Environmental Quality and Oregon Department of Land Conservation and Development.

National Institutes for Water Resources, 1993. *Water Science Reporter.* Volume 1, Number 1.

National Rural Water Association, 1992. *Wellhead Protection Program Case Studies.*

National Water Well Association. *Handbook for the Identification, Location, and Investigation of Pollution Sources Affecting Ground Water - A Basic Guide for Government Personnel, Industrial Officials, and Ground-Water Consultants.*

Olympia, City of, 1996. *Draft Summary Well Source Protection Plan: A Wellhead Protection Plan for the City of Olympia's East Olympia and Allison Springs Area Wells.*

Oregon Department of Environmental Quality, 1992. *Small Businesses and Hazardous Waste: What You Should Know.*

Oregon Department of Agriculture, 1993. *Water Quality Protection Guide: Recommended Pollution Control Practices for Rural Homeowners and Small Farm Operators.*

Oregon Department of Environmental Quality, 1993. *Small Quantity Hazardous Waste Generator Handbook.*

Oregon Department of Environmental Quality, 1993. *Hazardous Waste Determination Handbook.*

Oregon Department of Environmental Quality, 1993. *Wellhead Protection: Getting Your Program Started.* Wellhead Protection Seminar.

Oregon Department of Environmental Quality, Water Quality Division, Groundwater Section, 1993. *Groundwater Protection Grant Projects in Oregon and Potential Funding Sources.*

Oregon Department of Environmental Quality, 1994. *Used Oil Management Rules, OAR 340, Division 111 and Federal 40 CFR 279, Part 279 (As of March 22, 1994).*

Oregon Department of Environmental Quality. *Groundwater. Pollute or Preserve? It's Your Water. It's Your Choice.* Brochure, undated.

Oregon Department of Environmental Quality, METRO, and Washington State Department of Ecology. *The Hazardous Home Handbook: A Guide to Hazardous Household Products and Effective Alternatives.* Undated.

Oregon Department of Human Resources, Health Division, 1995. *Drinking Water Program, Groundwater.*

Oregon State University Extension Service, 1993. *Home-A-Syst, Homestead Assessment System: A Program to Help you Protect the Groundwater That Supplies Your Drinking Water.*

Stewart, Sheree and D. Nelson, 1996. *Oregon Wellhead Protection Program Guidance Manual.* Oregon Department of Environmental Quality and Oregon Health Division publishers.

United States Environmental Protection Agency, Office of Groundwater Protection, 1988. *Developing A State Wellhead Protection Program: A User's Guide to Assist State Agencies Under the Safe Drinking Water Act.* Washington D.C. EPA document 440/6-88-003.

United States Environmental Protection Agency, Office of Groundwater Protection, 1991. *Managing Groundwater Contamination Sources in Wellhead Protection Areas: A Priority Setting Approach.* EPA document 570/9-91-023.

Appendices

Appendix A

Coburg News

WHAT IS GROUNDWATER?

By Jack Harris, Public Works Supervisor

Groundwater occurs as part of the oldest "recycling" program - the hydrologic cycle. Water moves between the earth and atmosphere in an endless loop of evaporation and precipitation. As water falls to earth as rain and snow, some of it flows into lakes, streams, and oceans. But most of this water seeps into the ground, fills up the pores and cracks in soil and rock, and is called groundwater.

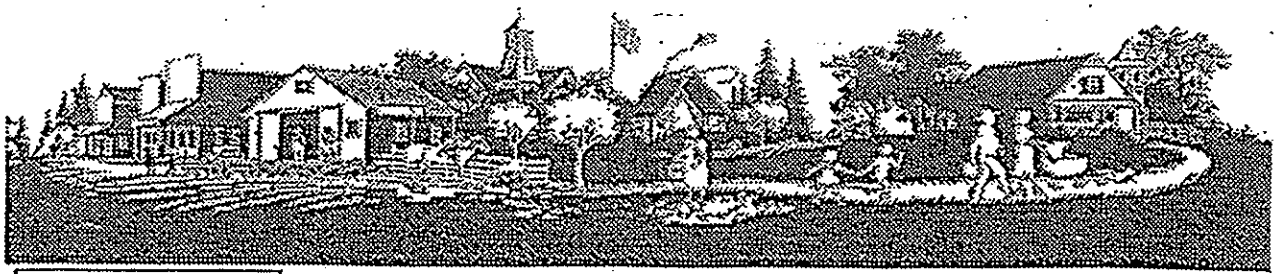
Aquifers are layers of rock or sediments that hold large quantities of usable groundwater. Wells pump water from aquifers to meet the growing needs of communities, homeowners, businesses, schools, farms and utilities for safe and abundant supplies of water.

Contaminants threaten groundwater quality. Sources of contaminants include household chemicals, septic systems, landfills, industrial wastes, and agricultural pesticides and fertilizers. Because contaminants come from many sources, we must work together to protect Oregon's priceless groundwater resources.

Why Protect Groundwater?

* Groundwater is the world's major source of fresh water.
* Over 75% of Oregonians are at least partially dependent on groundwater.
* In many rural homes and schools, groundwater is the only source of drinking water.
* Once polluted, groundwater may be difficult, costly, or impossible to clean up.
* Some groundwater contaminants are hazardous to human and animal health.
* Protecting groundwater now means clean groundwater for the future.

CITIZENS AND COMMUNITIES WORKING TOGETHER FOR GROUNDWATER PROTECTION -- Protecting groundwater is like putting together a giant jigsaw puzzle. Citizens and communities must work together to find the pieces that fit their local needs and concerns. The result is a picture of how their community can be a part of the groundwater protection solution.



Coburg News

JUNE 1996

DO YOU KNOW WHERE YOUR DRINKING WATER COMES FROM?

By Karen Tamow - LCOG

Whether you live in the incorporated City of Coburg and have city water piped to your house, or live on the outskirts of the city and have your own private well, the source of your drinking water is the same -- it comes from underground!

You don't have to dig very deep below the ground's surface (5 - 25 feet) to find the level where water fills the spaces between the soil and rocks. This saturated zone is called an aquifer.

Coburg residents get their water from wells that tap into this aquifer. Because there is no solid (impermeable) layer between the ground's surface and the aquifer, Coburg's source of drinking water is vulnerable to pollutants that seep into the ground. A wide variety of activities, taking place at the home, farm, business, factory or anywhere in-between, can give rise to potential groundwater pollutants.

To help preserve the quality of Coburg's drinking water, the city is working on developing a plan to protect this resource. This plan is being developed by the Drinking Water Protection Committee, which is composed of a diverse group of city residents, farmers, and commercial, Industrial and business representatives. The committee is following guidelines established under Oregon's voluntary Well head Protection Program. This program emphasizes a preventative, educational approach to protecting groundwater resources.

The drinking water protection plan will be presented to the City Council in the fall. If you would like to find out more about the Drinking Water Protection Committee you can contact Jack Harris, Public Works Director, at 485-4358, or David Downing, Committee Chair, at 686-0478.

SPRING CLEANING IN THE FALL??

Take advantage of two local hazardous waste roundups to clear out more than just dust and cobwebs - and help keep Coburg's drinking water safe and clean at the same time!!!!

Household hazardous wastes can result in groundwater contamination if they are not safely stored and disposed. Chemicals, paints, solvents, and other toxic materials can work their way into the groundwater if they spill on the ground or are poured down drains in homes that have septic systems. These actions could result in the contamination of our community's underground source of drinking water.

In general, it is best to prevent waste by buying only as much as you need, and to use less-toxic or non-toxic products when possible. Leftover products can be shared with friends and neighbors to avoid having to store them. Lane County will accept some hazardous household wastes year round - such as batteries, latex paints, oil and tires (call Lane County Waste Management at 687-4120 for disposal information). As for everything else, take advantage of free hazardous waste roundups to make sure they are safely disposed.

Two FREE hazardous waste roundups are coming soon to a location near you!

Saturday, October 5

Place	Harrisburg High School
Time	10-2
Contact	Mike Huycke @ 541-928-2554x205

Friday and Saturday, November 1 & 2

Place	Glenwood Dump
Time	Fri. 1-5, Sat. 8-4
Contact	Jeff Bishop @ 687-3828

For Household Hazardous Waste Roundups

DO:

- Bring paint and related materials, solvents, cleaners, acids, lawn and garden chemicals, and just about any other hazardous products.
- Make sure products are securely packaged in original and/or clearly marked containers.
- Bring 25 gallons of waste or less.
- Bring containers up to five-gallon size.

DON'T:

- Mix wastes.
- Bring explosives or radioactive materials.
- Bring commercial waste. This event is for household waste only.

What To Bring:

Aerosol Cans	Furniture Stripper	Lighter Fluid	Pool Chemicals	Transmission Fluid
Antifreezes	Gasoline	Motor Oil	Rose Dust	Turpentine
Brake Fluid	Herbicides	Oil Filters	Rust Remover	Weed Killers
Degreasers	Household Batteries	Oven Cleaners	Slug Bait	Wood Preservative
Drain Cleaners	Kerosene Gas	Paints	Solvents	
Engine Cleaners	Lab Sets	Paint Thinner	Spot Remover	
Fluorescent Tubes and Ballasts	Lacquer	Pesticides	Thermometers	

Appendix B

Coburg Wellhead Project
Drinking Water Protection Committee Members

Rural Resident

Reed Vollstedt
33970 Van Duyn Rd.
Coburg, OR 97408
344-7759 (h)

Urban Resident

Mary Beth Schmid
USDA Natural Resource Conservation Service
55D Oakway Center
Eugene, OR 97401
465-6436 (w)

Industrial Park LID

Vern Egge
Egge Sand & Gravel Co.
90520 Coburg Rd.
Eugene, OR 97401
485-1515 (w)

Mike Warner
Marathon Coach
91333 Coburg Industrial Way
Coburg, OR 97408
343-9991 (w)

Lane County OSU Extension

Ross Penhallegon
Mike Wells
950 W. 13th Ave.
Eugene, OR 97401
687-4243 (w)

Farmers

David Downing, Chair of CAC
PO Box 8159
Coburg, OR 97408
686-0478 (w)

Business Owner/C. of C. Member

Jim Anderson, Jr.
Truck & Travel
32910 E. Pearl St.
Coburg, OR 97408
485-2137 (w)

Coburg Planning Commission

Stan Nelson
PO Box 8348
Coburg, OR 97408
344-2400 (w)

Coburg Public Works Department

Jack Harris, Director
PO Box 8316
Coburg, OR 97408
485-4358 (w)
FAX 485-0655

Lane Co. Planning Commission

Clay Myers
PO Box 8190
Coburg, OR 97408
710-1745 (w)

Appendix C

Dear Property Owner:

As you may know, Coburg is taking a proactive approach in protecting our drinking water supply by developing a local wellhead protection plan. A wellhead protection plan is developed by identifying the area where the water supply originates and protecting that area through our own selected methods. Your farm is within this drinking water supply area.

Our local wellhead protection team is working to develop this plan with involvement from as many local citizens and property owners as possible. We think that "by everyone doing something" we can make a difference in making sure that our drinking water is safe. Through educational efforts, residences within the Coburg area will be: reducing their home and lawn chemical use; maintaining their septic systems on a more regular basis; and learning how they can become more responsible "groundwater friendly" home owners. Industrial and commercial businesses in the Coburg area are: holding workshops to learn about safer practices; setting up a mentoring program where bigger businesses offer technical assistance to smaller companies; and offering a recognition program to businesses that are "groundwater friendly."

Like many of the businesses in Coburg, the agricultural community is already heavily regulated and doing many things that protect groundwater. As part of the wellhead protection plan, we want to document the types of things we are already doing and possibly identify areas where we could voluntarily improve. The enclosed survey will help us show the many practices that are already in place.

Your participation is filling out the survey or any future activity is completely voluntary.

We think that through collaboration, communication, and cooperation with all members of the Coburg community, we can continue to develop a safe drinking water program that is beneficial to all of us.

If you have any questions about wellhead protection, please feel free to call David Downing at 686-0478 or Ross Penhalllegon at 984-7313 . Thank you for your participation in this important community effort. It is critical to the protection of our drinking water supply.

Sincerely,

David Downing

Ross Penhallegon

Mary Beth Schmid

Clay Myers

The Coburg Wellhead Protection committee has been given the responsibility to begin looking at how to protect the groundwater and wellhead area of Coburg wells. A group of public, private, and citizen volunteers have come together to suggest and evaluate recommendations to protect the valuable groundwater resource.

The agricultural sub committee has taken responsibility to look at farm land and help growers tell the story of what has been done to protect the groundwater. This process will:

Help farmers to minimize pesticide leaching.
Help farmers to minimize nitrogen leaching.
Help farmers to minimize irrigation leaching.

By lowering potential risk of different leachates, the whole community is the benefactor.

Goals

1) Encourage farmers to be proactive.

2) To evaluate/discuss the farm management plans they have implemented in the last five years with five major farmers.

3) To encourage Best Management Practices (BMPs), such as timers on irrigation pumps or split nitrogen applications.

4) Recognize those farmers who have implemented a set of standards with a "Groundwater Friendly" sign.

Information Gathering Process

1) Determine what positive changes have been made in the last five years.

2) Determine what voluntary regulations have been implemented in the last five years.

Growers To Be Involved

1) Les and Jim Green
2) Lynn Williamson
3) Richard Funke
4) David/Randy Downing
5) Pete and Judy Gutowski

Questionnaire

Farmers have been working with the land, soil, irrigation water, fertilization, and pesticides for many years. Most farmers have conscientiously strive to do the best they can to protect themselves and the groundwater. In an effort to show the urban residents what the farmers are doing, the following questionnaire was developed to tell that story:

A. USE OF COVER CROPS **Which cover crops have you used in the last five years?**

List general ACRES of each:

_____ clover _____ hay/alfalfa _____ fava beans

_____ grass seed _____ buckwheat _____ winter wheat

_____ winter grains _____ wild chick weed _____ Other

List total crop acreage: _____

(In the next sections, mark the answer which best describes your farm operation.)

B. IRRIGATION PRACTICES

1. Farmers try to implement water saving devises and conserve water and reduce leachate. As a farmer, I:

_____ use timers on the irrigation pumps.

_____ number of pumps (list number).

_____ number of timers (list number).

_____ do not use irrigation pump timers.

_____ check soil moisture to determine the water holding capacity before and after irrigating.

_____ run irrigation sets LESS than 6 or 12 hours.

_____ use evapo-transpiration information.

In the next section, mark the answer which best describes your farm operation, continued.)

_____ use tensiometers.

_____ use a shovel to check soil moisture.

C. FERTILIZATION PRACTICES

2. Farmers try to implement fertilization techniques that place nitrogen near the roots and reduce leachate. As a farmer, I:

_____ use stem nitrate testing to determine nitrogen needs for mint.

_____ soil tests are done once a year.

_____ done pre-plant _____ done post harvest

_____ a soil consultant is used.

_____ leaf analysis is used on crops.

_____ NO3-N (nitrate-nitrogen) is calculated in the irrigation water usage.

_____ use minimal OSU fertilizer recommendations

_____ use moderate OSU fertilizer recommendations

_____ use high OSU fertilizer recommendations

_____ use split fertilizer applications in the spring.

_____ use timers when applying liquid N

_____ nitrogen application stops 30 minutes before end of irrigation cycle.

_____ use minimal nitrogen in the fall, less than 50# per acre on fall crops.

_____ less than 30#/acre

_____ on-farm experimentation is being implemented to lower nitrogen usage.

I am experimenting with _____

_____.

D. PESTICIDE AND PETROLEUM MANAGEMENT

3. Farmers try to implement proper pesticide and petroleum management techniques. As a farmer, I:

_____ use minimal rates of pesticides

_____ use moderate rates of pesticides

_____ use high rates of pesticides

_____ Insect and disease scouting is used to determine pressures

_____ use calendar spraying

_____ use pheromone traps

_____ implement Integrated Pest Management (IPM) techniques

_____ have applied biological controls

_____ avoid the use of organo phosphates

_____ have the spray equipment checked 1 x per year.

_____ 2 x a year

_____ 3 x a year

_____ calibrate the sprayer 1 x per year

_____ 2 x per year

_____ 3 x per year.

_____ use emulsifiable concentrates (EC's)

_____ use dry flowables (DF)

_____ use wettable powders (WP)

_____ use spreader/stickers

_____ store pesticides in approved, locked storage facilities

_____ store petroleum products safely

_____ MSDS sheets are available to all employees

_____ use pesticide signage when needed

_____ train my employees or have them trained at least once a year

Thank you for taking the time to help us better understand what farmers are doing to protect the local groundwater.

Appendix D

Summary Matrix of Financial or Technical Resources Available for Agricultural Land Users

Agency	Financial Assistance	Kind of Information
Oregon Department of Environmental Quality	Grants Special funds	Hazardous Waste Wellhead Protection
Farm Service Agency	Cost share	Best Management Practices Fertilizers Cover Crops
Farm Advisors		Best Management Practices Pesticides Fertilizers Irrigation Equipment Farm Practices
Groundwater Management Areas	Grants Special funds	Best Management Practices Wellhead Protection Hazardous Waste
Lane County Extension Service		Best Management Practices Pesticides Fertilizers Irrigation Equipment Farm Practices Wellhead Protection Hazardous Waste
Lane County Waste Management		Hazardous Waste Best Management Practices
Natural Resource Conservation Service	Cost share Grants Special funds	Best Management Practices Pesticides Cover Crops Equipment Farm Practices
Oregon Department of Agriculture	Grants Special funds	Best Management Practices Pesticides Fertilizers Irrigation Equipment Farm Practices Wellhead Protection Hazardous Waste

Source: Lane County Extension Service, 1996

Appendix E

Dear Coburg Business Partner:

As you may already know, Coburg has taken a proactive approach to protecting our drinking water supply by developing a local drinking water protection plan. A wellhead protection plan is developed by identifying the area where the water supply originates and protecting that area. As your industrial/commercial representatives on the Coburg Drinking Water Protection Committee, we are developing the plan that protects groundwater in ways that work best for local businesses.

Many types of land uses have the potential to impact our drinking water. Farmers, schools, and rural and city residences are all pulling together with the sense that "by everyone doing something" we can all make a difference in making sure our drinking water is safe. We recognize that the business community is regulated and is already doing many things that protect drinking water. That is why our plan includes a business recognition program for "groundwater friendly" businesses. We are also working on ways to let business owners know how to protect our groundwater in low-cost or no-cost ways, to reduce business liabilities and provide assurance of safe drinking water in the future.

To begin, we would like to invite you to an "open house" with our guest speaker Bart Collingsworth from the Department of Environmental Quality (DEQ). Bart works with the Pollution Prevention Program and has helped many businesses around the state learn how to prevent pollution and save money in the process.

Your participation in the open house or future activities is certainly not mandatory. We believe though, that cooperation, collaboration, and communication makes good business sense by reducing liabilities and being active community members.

Enclosed is a list of resources available for you to become a more groundwater active and responsible business member of the community. Thank you in advance for your participation. If you have any questions feel free to call any of the following members of the Coburg Drinking Water Protection Committee.

Sincerely,

Jim Anderson, Truck and Travel

Mike Warner, Marathon Coach

Jack Harris, Coburg Public Works

Local Resources and Events:

(Title) Open House - Bart Collingsworth will talk about some of the cost-free, non-regulatory technical resources available through the DEQ. Many pollution prevention practices can protect the environment and save money. Fact sheets and other informational material on groundwater protection will also be available.

Time:
Location:

Local Advisory Team - Even small amounts of hazardous materials can pollute groundwater. As owners and managers of larger businesses that often deal with larger quantities of potentially hazardous materials, we can help you: develop a spill response plan, suggest management practices that will prevent groundwater contamination, and direct you to other technical resources that relate to your particular business. Contact any or all members of this group:

Mike Warner, Marathon Coach - 343-9911
Jim Anderson, Truck and Travel - 485-2137
NAME Monoco Coach - NUMBER

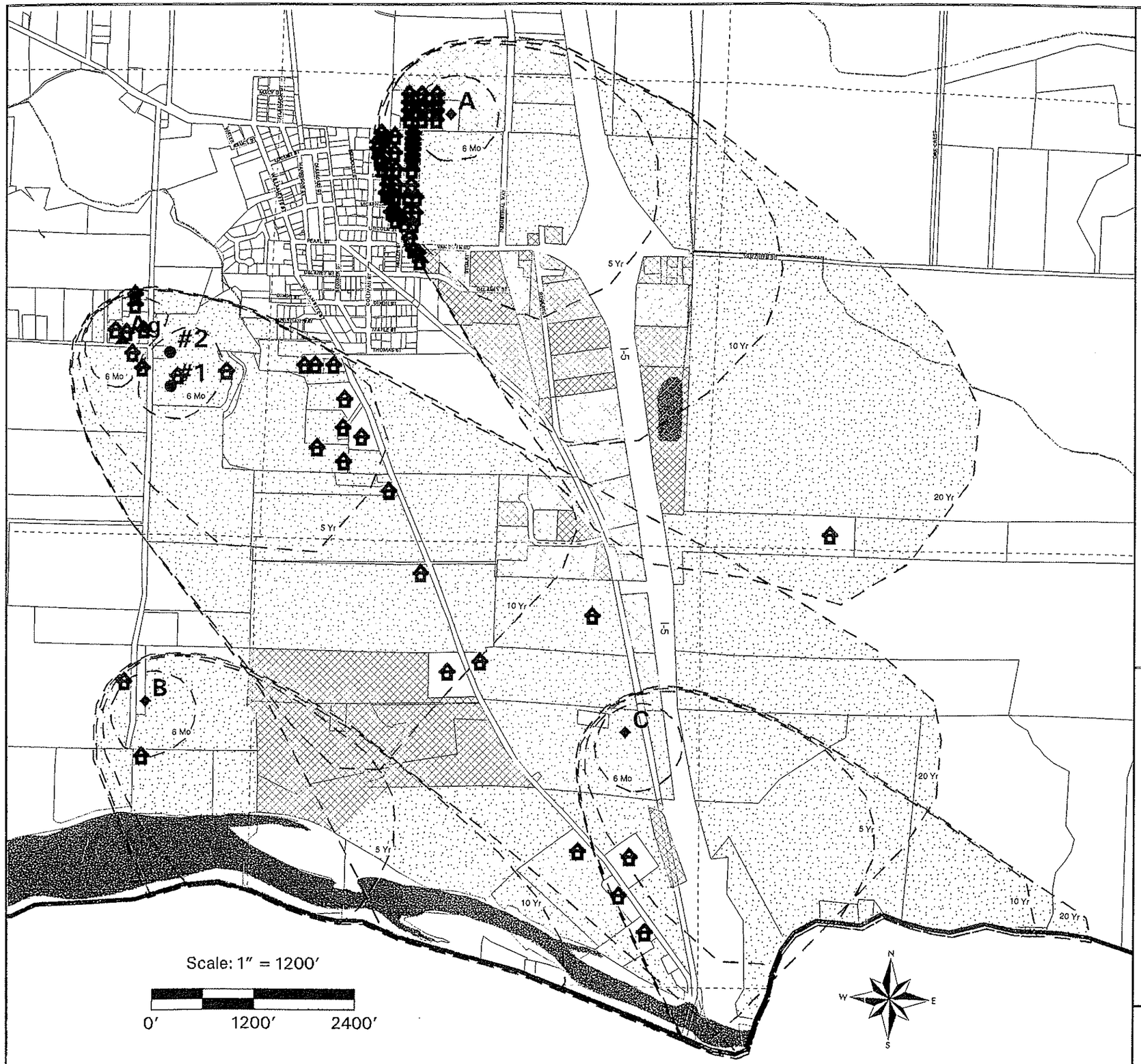
Other Technical Assistance Resources:

Organization	Services Offered	Contact Person
OSU Extension Service	Manufacturing efficiency audits (water, energy, raw materials, for SIC codes 20-39)	Greg Wheeler (541) 737-2515
USDOE Pollution Prevention Information Resource Center	Free on-site pollution prevention technical assistance For small businesses, personnel exchanges, laboratory assistance	Gary Spanner (509) 372-4296
Oregon Environmental Technology Association	Network of environmental service providers	David Welsh (503) 227-6361
Oregon Economic Development Dept.	Manufacturing extension program technical assistance	Peter Schmid (503) 986-0192
Oregon Dept. of Energy	Energy efficiency audits	Mark Kendall (503) 378-8444
Oregon DEQ: Hazardous Waste Program	Hazardous waste technical and compliance assistance	DEQ staff (800) 452-4011
Oregon DEQ: Toxics Use Reduction Program	Technical assistance (pollution prevention and planning)	DEQ staff (800) 452-4011

Map

Map 1

Results of Wellhead Protection Inventory



Generalized Landuse and Risk Ratings from work of Inventory Subcommittee.

- Agriculture, Low Risk
- Agriculture, Moderate Risk
- Commercial/Industrial, Low Risk
- Commercial/Industrial, Moderate Risk
- Commercial/Industrial, High Risk
- Residences

Wellhead Protection Areas from data provided by Cascade Earth Sciences.

- Existing City of Coburg #1 & #2
- Existing Agricultural Well
- Proposed Future Well Locations
- Time-of-Travel Delineations (6 Mo, 5 Yr, 10 Yr, 20 Yr)
- Section Lines

Map produced by LCOG, 3/97.