Region 2050 Alternative Growth Scenarios Evaluation:
Water Supply and Facilities
Approach, Assumptions, and Issues
Draft November 22, 2004

This summary evaluates the extent to which each scenario meets the Regional Goal and Objectives related to public facilities and services. Specifically, this evaluation assesses the relative impacts of the three scenarios on the capacity and cost to provide water supply and water facilities.

Findings and Issues

The quality of life in the region is directly related to the quality and availability of water for drinking, irrigation, and industry. This evaluation provides a discussion and analysis of issues facing the region with regard to water supply, use, and quality.

Residents and businesses throughout the region rely on clean and available water from both ground and surface water sources. Residents of Coburg, Junction City, Springfield, Oakridge, and Veneta and all rural residents depend on ground water as their sole source of drinking water. Eugene, Cottage Grove, Lowell, and Westfir rely on surface water for their respective drinking water sources. Creswell uses surface water from the Willamette River, in addition to ground water. Coburg, Eugene, Junction City, Springfield, and Veneta have prepared drinking water protection plans.

An unconfined aquifer underlies most of the region supplying relatively clean and plentiful ground water. Ground water quality within the region is currently within acceptable limits for most existing uses with only disinfection required to meet drinking water quality standards. However, there are localized problems with low well productivity, water hardness, contamination, and lack of sanitation. Some wells produce high levels of nitrate or concentrations of arsenic that are unsafe for human consumption. The northern portion of the region, including the Coburg and Junction City areas, has been designated a Ground water Management Area due to high concentrations of nitrate. Ground Water Management Areas are regulated by the Oregon Department of Environmental Quality (DEQ).

Toxic, arsenic-rich ground water is apparently associated with the volcanic ash portion of the Fisher Formation. Wells yielding arsenic-rich ground water have been noted in the Spencer Creek area; north and west of Creswell; and near Cottage Grove. Arsenic is also found west of Westfir, northeast of Marcola, along Highway 58 to Lowell, and near Culp Creek. Future regulations relative to permissible arsenic levels in drinking water could also have an impact on the cost and future capability of some municipal water systems.

The McKenzie River supplies some of the cleanest drinking water in the Pacific Northwest, but elevated temperatures potentially affect fish and other aquatic life. The Willamette River continues to be a source for municipal drinking water by a number of cities as it makes its way to Portland, although water quality in the Willamette River is

threatened. The Coast Fork, Middle Fork and Main Stem of the Willamette are considered "water quality limited" for temperature and mercury. The Coast Fork, Main Stem, and Long Tom are also "water quality limited" for bacteria. The DEQ is currently finalizing Total Maximum Daily Load (TMDL) allocations for mercury, bacteria, and temperature for the Willamette Basin. DEQ and federal agencies are continuing efforts to address point and non-point sources of pollution in the Willamette Basin.

Although the region's location in the maritime northwest means abundant rainfall, the demand for water could result in a deficiency of the resource over the next 50 years. With growth of the population, irrigated agriculture, and industry, demand for consumptive use of water has and will continue to increase. At the same time, increasing use of the resource by recreation and the need to maintain or enhance fish habitat argues for less consumption. The increased human activity in the region heightens the risk that the resource will be polluted and may require additional levels of treatment to meet drinking water requirements with associated increased costs.

At the same time, available water supplies are expected to decline due to climate changes. As discussed in the "Scientific Consensus Statement on the Likely Impacts of Climate Change on the Pacific Northwest,"[1] between 1950 and 2000, snowpack across the Pacific Northwest declined; scientists are very certain that the Pacific Northwest is warming and that since 1975 the warming is probably best explained by human-caused changes in greenhouse gases.

Scientists have intermediate certainty that average temperatures in the Pacific Northwest will continue to increase in response to global climate change and they predict that spring snowpack will continue to decline in many areas, resulting in further losses of natural water storage in the mountains. Mid-elevation areas will, in general, experience impacts sooner than high-elevation areas. In many river basins (especially those characterized by a mix of winter precipitation and those dominated by snowmelt), winter streamflow will increase, summer streamflow will decease, and peak flows will occur earlier in the year. Impacts to water resources may include decreased summer water availability, decreased low flows in late summer, increased flood risks in winter, reduced summer hydropower capacity, higher water temperatures, and increased pollutant concentrations in late summer.

The link between long-range land use planning and the ability of the water resources to serve future needs is critical, due to competing demands on water and on the agencies that manage it and to the almost certain climatic affects on the resource over the next 50 years. The authority for managing water use resides at the state and federal level. The region's local governments and utilities have no direct influence over management

[1] On June 15, 2004, a subcommittee of participants in the scientific meeting "Impacts of Climate Change on the Pacific Northwest" convened at Oregon State University and drafted the "Scientific Consensus Statement on the Likely Impacts of Climate Change on the Pacific Northwest." The objective of the statement is to assist Governor Kulongoski's Advisory Group on Global Warming (GAGGW) by describing the state of scientific knowledge and uncertainty regarding climate change impacts in the Pacific Northwest. The GAGGW is charged with recommending strategies for reduction of greenhouse gas emission for the State of Oregon. [For more information. visit the site: http://www.energy.state.or.us/climate/Warming/Report/Appendix_D(Draft).htm.]

of the resource itself, but land-use decisions at the local level do affect the issues of water supply and quality.

Particularly relating to ground water, gaps in state authority can result in unsustainable use of the resource (over appropriation); and local land-use decisions can aggravate the situation if the issue is not addressed. The issue of exempt ground water use highlights the difficulty in managing the resource at a regional level. New rural development relies on individual exempt ground water wells as the water supply. Although statewide planning goals indicate a need for local government to consider water availability as part of the approval process, there is lack of ground water expertise and ground water data for this region. If the Department of Water Resources does not formally restrict ground water development, ground water is assumed to be available. The state does not limit new domestic well construction until a documented decline of the resources occurs. With the realization that the surface water in the region is fully appropriated, there is an anticipated increase in use of ground water. This is particularly an issue for most of the small cities in the Satellite Communities Growth Scenario and the rural area in the Rural Growth Scenario.

As discussed in the attached paper "Identifying Future Water Needs and Resources," by Michael Mattick, Oregon Water Resources Department, except for the McKenzie River, water is not available in the region from surface water sources for new municipal uses. Reauthorization of the Willamette Basin Project Reservoirs (federal projects) may make storage releases a viable source in the future. New ground water sources are possible, though problematic, due to yield or hydraulic connection issues. Intensive rural development with intensive well construction will result in water distribution problems. Transferring existing water rights is an option in most situations, but a transfer process requires a review for injury and these reviews can be difficult to get approved.

Through the Region 2050 process, the local governments in the region have the opportunity to recognize the need for and coordinate water management planning at the regional level. This evaluation is intended to assess the relative impacts on water system capacity and cost of the three alternative growth scenarios; not to determine how water will best be provided in the Preferred Growth Scenario. It is anticipated that a more in-depth analysis will be recommended in the Regional Growth Management Strategy to determine the most efficient and sustainable way to provide water services in the region under the Preferred Growth Scenario.

Methodology

This assessment will reflect the results of a quantitative and qualitative evaluation conducted by the Water Evaluation Team, comprised of staff from EWEB, Springifeld Utility Board, LCOG, water and fire districts, city and county public works, Oregon Water Resources Department, and the Oregon Health Division.

The evaluation will measure the capacity to serve based on water availability and status of water rights; cost based on cost to expand individual systems to serve increased housing, employment, and land area in the scenarios. The approach includes administering the attached survey sent to all providers in the region (preliminary results

are now being analyzed). The survey will be used to derive estimates of the cost for providing water services for each of the three alternative growth scenarios. The data will be broken down by overall systems costs and average cost per customer. Service providers also were asked to estimate the customer level at which they would be required to make major capital investments.

Expert Panel
A preliminary draft assessment will be prepared based on a literature search and survey results. The Draft Assessment will be reviewed by a panel of federal, state and local water experts to address the broader issue of water availability in the region in the future and to provide specific feedback on the draft evaluation. The approach includes convening a meeting, "Region 2050 Growth Scenarios: Water Supply Evaluation." Invited participants include staff from EWEB, Springfield Utility Board, water and fire districts, Oregon Water Resources Department [Barry Norris (Administrator), Bill Fugi, Doug Woodcock (hydrology), and Michael Mattick], Cascades West COG (Scott Wilson), DLCD (Doug White), Army Corps of Engineers (Mat Ray), Oregon Health Division (ACE), and local government public works staff and engineering consultants for small cities.

Assumptions

Assumptions for Water Systems: Municipal, Water District and Private Water Companies

- The State requirements for securing surface water and ground water rights remain the same.
- The existing technology and legal requirements for municipal water systems remains about the same.
- Current levels of consumption remain about the same, although some reduction is expected due to new conservation measures.
- The laws relating to serving only within defined service boundaries, (whether water districts or city limits), remain the same.
- All costs are shown in 2004 dollars.

Assumptions for Domestic Water Systems Not Served by Municipal, Water District or Private Water Companies

- Existing health standards may become more stringent and will still be applied to domestic wells.
- The existing technology will improve, both for collecting water on a site and for filtering contaminants.

- Current levels of consumption remain about the same, although some reduction is expected due to new conservation measures.

Criteria

The evaluation is based on the following Regional Goals and Objectives.

Goal

Develop a regional approach to facilitate the efficient provision of infrastructure and community services in the Southern Willamette Valley in conformance with the desires of each utility and district.

Objectives

1. Work collaboratively to ensure the availability of a full range of infrastructure and services to meet the needs of all residents in the region.

2. Identify innovative strategies and partnerships to finance existing and future facility expansions and improvements.

3. Develop a regional strategy to place less demand on infrastructure through enhanced conservation policies and practices.

Water Supply and Facilities Assessment

(report on assessment results)

In the matrix below, each scenario is rated high, medium, or low on each criterion. For example, if a scenario strongly meets a criterion, it will receive a rating of "high" for that criterion; if it does not meet a criterion, the scenario will receive a rating of "low" for that criterion. This first threshold analysis is supplemented, where applicable, by a qualitative and/or geographic-specific analysis.

	Growth Scenario			
	Com-pact Urban	**Satellite Com-munities**	**Rural Growth**	**Comments**
Cost: Efficient provision of water services in the Southern Willamette Valley.				
Capacity: Availability of clean reliable water for drinking, irrigation, and industry throughout the region.				
Identify innovative strategies and partnerships to finance existing and future facility expansions and improvements. (Actions, not criteria for evaluation)				
Develop a regional strategy to place less demand on infrastructure through enhanced conservation policies and practices. (Actions, not criteria for evaluation)				

High = H Medium = M Low = L

Identifying Future Water Needs and Resources

By Michael Mattick, Oregon Water Resources Department
January 26, 2004

Summary

Except for the McKenzie River, water is not available from surface water sources for new municipal uses. Reauthorization of the Willamette Basin Project Reservoirs may make storage releases a viable source in the future. New ground water sources are possible though problematic due to yield or hydraulic connection issues. Intensive rural development with intensive well construction will result in water distribution problems. Transferring existing water rights is an option in most situations.

Oregon Water Law

Need for a Water Right, permits and certificates

Oregon Revised Statutes (ORS) 537.110 and 537.130, declares that: all water within the state from all sources of water supply belongs to the public; with various exceptions, any person intending to acquire the right to the beneficial use of any or the surface water of the state shall, before beginning construction, or performing any work, or appropriation, make an application to the Water Resource Department for a permit. ORS 537.535 contains similar provisions related to ground water.

Water use permits can only be issued for a five year period. Within that time, the permit holder is to develop the use system and make the permitted use. One more year is allowed for the permittee to hire a Certified Water Right Examiner (a special class of engineer or surveyor) who writes a report about the water use and any permit conditions and maps the system and use. This information is used to develop and issue a Water Right Certificate. The Certificate defines the right for all time and is the end of the water right application process.

If the use has not been developed to the full intended extent within the five year period, an extension of time may be requested. When evaluating the request, the Department considers weather or not the permittee has shown due diligence in development of the water right, and weather the right is likely to be necessary considering other rights the applicant may hold . The Department may grant an extension for whatever period is reasonable to fully develop the right. For a municipality, this may be 20 years or more. However, these long term extensions typically are conditioned to require periodic reporting of ongoing need for and development of the right.

New Water Rights

The filing of a water use permit application establishes the tentative priority date for the water right if a permit is issued. The priority date is important because, during times of shortage, the oldest rights get to use water the longest, new rights are regulated off in favor of older rights, regardless of what the use is. This is known as the Prior Appropriation Doctrine.

The Department can only accept applications for uses which are Classified in the Basin Program. A Basin Program is a set of administrative rules adopted by the Water Resources Commission, identifying which new uses of water will be allowed from the various sources in a particular river basin. The Willamette Basin Program is contained in Oregon Administrative Rule (OAR) Chapter 690, Division 502, and can be viewed at http://www.wrd.state.or.us/files/Publications/Notices/new_oars/Div_502-Willamette_Basin.pdf

Surface Water

The McKenzie River is the only stream in the Southern Willamette Valley classified for new municipal use on a year round basis. All other surface waters of the Willamette Basin from Albany continuing upstream are restrictively classified to prohibit new municipal use permits between July 1 and August 31 of each year. The farther up the basin one travels, the more restrictive the municipal restriction becomes. Essentially, except for the McKenzie, the natural flow of surface water is closed to new municipal permits during the summer months.

Stored Water

If an entity has the ability to store "excess" water during the winter and spring, the Department would very likely issue a permit allowing the storage and another allowing the use of that stored water.

The Army Corps of Engineers stores significant quantities of water in the various Willamette Basin storage projects (Cottage Grove, Dorena Lake, Lookout Point, and Fern Ridge Reservoirs). However, due to the authorizing federal legislation and the language used on the reservoir certificates, that water is currently unavailable for purchase by municipalities. A joint state federal effort to look at reauthorizing the projects was tabled. That effort may be resurfacing. For entities with the ability to reach a diversion point below these projects, storage releases may be an option in the future.

Ground water

The Resource

Very generally speaking, there are two types of aquifers in the Southern Willamette Valley, alluvial and bedrock.

The alluvial aquifer is made up of boulders, gravel, sand, various layers of clay and silts, which have washed down from the Coast Range, Cascade Mountains and foot hills. As this material moved down gradient, it filled in valleys, creating valley floors. Generally speaking, the ground water found in these areas is considered unconfined, meaning the water is at atmospheric pressure, or put another way, when water is encountered at some depth, it does not rise up in the hole but stays at that depth. The resource is often abundant. However, wells constructed in these areas may be significantly connected to nearby surface water streams.

The bedrock aquifers flank the valley floors. Generally speaking, the geology to the East and South of the Willamette Valley is strongly influenced by volcanic activity from the Cascade Range. The rock may be basalt from lava flows or it may be compressed

ash deposits or a mixture of volcanic materials. The bedrock on the West of the valley is composed of ancient marine sediments that have been up lifted over time. This is ancient seabed, sandstone and siltstone, mudstone. Generally speaking, in bedrock of both origins, volcanic and marine, water does not readily move *through* the rock. Rather it moves through fractures or cracks and seams in the rock formation. This is why wells in close proximity may have very different yields. One well may encounter large extensive fractures while another may encounter none. Often, the water found in these wells rises to a higher level than where it was first encountered.

The level at which water stabilizes is called the Static Water Level. When the water rises to shallower depth than where it was encountered, the aquifer is generally considered to be confined, meaning an impermeable material overlies the aquifer holding it under pressure. When the well pierces the material, the water rises in the hole. Wells in these formations are less likely to be strongly hydraulically connected to surface water but they usually yield less water than those in alluvium deposits. Also, wells in volcanic material have some potential to yield water with unsafe arsenic levels. The department recommends all wells drilled in volcanic formations, used for domestic consumption, be tested annually for arsenic. Arsenic can be removed through reverse osmosis and other means.

The state tries to manage ground water in conjunction with surface water. If the use of a well will substantially influence water availability in a stream, the proposed use is evaluated under the same standards applied to a proposed use from that stream. Every new application to use ground water is evaluated to consider the effect it may have on surface water sources. A shallow well tapping unconfined water is considered to have potential for substantial interference with every stream within a quarter mile of the well.

Domestic Wells

State law exempts certain uses of ground water from the water use permitting requirements (ORS 537.545). These uses include: livestock watering; irrigation of up to one half acre of non-commercial lawn or garden; industrial and commercial use of up to 5,000 gallons per day; and domestic use of up to 15,000 gallons per day. 15,000 gallons is a large amount for a domestic system. The statute is intended to exempt individuals and “small” community systems from the need for a permit from the state. The exemption could allow 30 homes to each use 500 gallons per day or 150 homes to each use 100 gallons per day. The exception applies to an individual well or group of wells plumbed into one system. The half acre lawn and garden exception likewise applies to the system, so 10 homes, each with ¼ acre lawn, would require an irrigation permit for the 2.5 acres of irrigation.

Though these uses are exempt from permitting requirements, they are not exempt from regulation if the ground water resource declines and there is not enough for all who desire to use it. If wells are found to interferer with each other and a complainant has fully penetrated the aquifer, the Department determines priority dates from whatever information is available and regulates water use based on those dates.

Intensive development of rural properties, relying on ground water for domestic water supplies will result in increased interference complaints and distribution activity. Some

areas do yield low quantities of ground water where homeowners haul water to storage tanks during the driest summer months.

Transfer of Water Rights

A water right identifies a particular point of diversion or appropriation, character of use, place of use, an allowable rate of diversion and for irrigation rights, often a maximum quantity that may be diverted during a year or season. The character, point of diversion, and place of use may be changed through a Transfer process. The transfer application must demonstrate that the right has been used within the last five years and that the same source will be utilized. The department evaluates the application to ensure it will not injure any other existing right, regardless of priority dates. Generally speaking, water rights may be moved downstream to the same or other uses more readily than upstream.

Additional Information

The WRD Web Page address is www.wrd.state.or.us and has additional information and resources. The Link: http://www.wrd.state.or.us/publication/aquabook02/index.shtml is another good overview of Oregon Water Law.

Well Logs

Well logs on file can be viewed using the *Grid-Web* selection under *Access Well Logs*. After selecting Grid-Web, select “Questions about Grid-Web” at the bottom of the screen and then read “Basic Information” and “How do I search for a Well Logs?”

Water Right Locations

In the center of the Web page is a link Create Water Right Maps. Selecting Interactive Mapping will allow you to generate water right maps of particular areas using the Township, Range and Section information. Water right locations are bright green and points of diversion are purple triangle. This data are approximate.

REGION 2050
Sustaining Quality of Life in the Southern Willamette Valley

Water Supply Questionnaire

Dear Water Utility Staff:
Please complete the following questionnaire and return your response via e-mail to cheinkel@lane.cog.or.us or hard copy to Carol Heinkel, LCOG, 99 East Broadway, Suite 400, Eugene, Oregon 97401 ***by August 10, 2004.***

1. What is the current service area population of your water system?

2. What is the projected service area population (current capacity in terms of population)?

3. Please estimate the cost of providing water services to the additional population (including all customer classes) for each of the growth scenarios (see attached tables). Assume the mix of customer base and current average consumption levels remain the same as in the year 2000 over the next 50 years.) Please include overall systems costs as well as an average cost per customer.*

4. Assuming that the average per customer consumption in all customer classes remains the same as in 2000 and that costs are spread evenly among all customers (new and existing), at what customer level (service area population) will you be required to make a major capital investment such as new well or new filtration facilities? Please include these costs into the estimates in question #3.

5. Will serving population growth in any of the scenarios require applying for additional surface water rights? Will it require applying for ground water rights?

6. What issues do you anticipate in providing water services under each of the growth scenarios?

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*Average cost per customer is not a rate. It is a fraction that will be used as a common measure to compare the scenarios.