

Water In Oregon-Not A Drop To Waste

PART 1: REGULATING WATER IN OREGON



Waldo Lake, Oregon. Photo taken in September 2008.

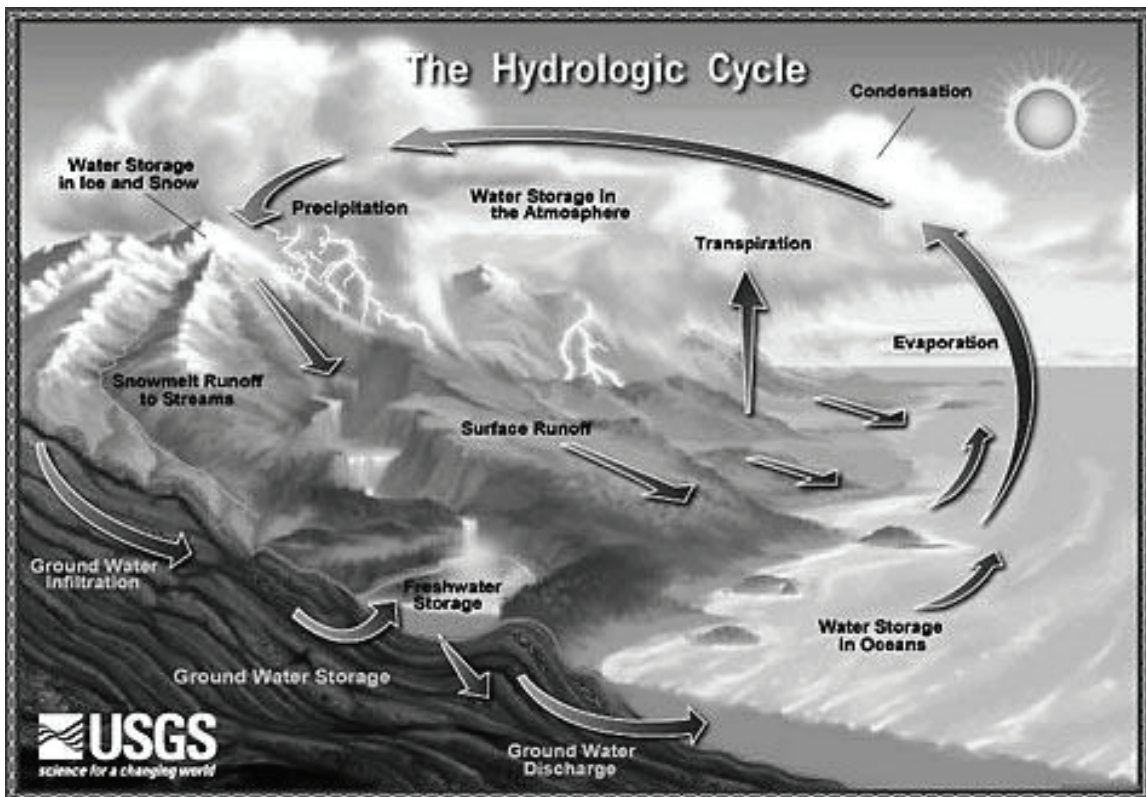


LEAGUE OF WOMEN VOTERS® OF OREGON EDUCATION FUND

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“When I was in graduate school 30 years ago, the question in our hydrology class was, ‘How much water can we take out of the stream?’ Now, it’s ‘How much water should we leave in the stream?’”

~ Dr. Robert Hirsch, former Associate Director for Water, USGS, 2007.

INTRODUCTION

The economy and growth of Oregon have always depended on its water resources. Indigenous tribes settled along the waterways and used them as a source of food and travel. Lewis and Clark followed the Columbia River to the coastline and mapped the Northwest. Later arrivals followed the Oregon Trail to its rich valleys, established communities along the rivers of the state, and relied on water resources to provide for transportation, to supply energy for mills, and to irrigate crops.

Much has changed since then, but Oregon law continues to base water rights on historical uses, and the current claims for water rights may actually exceed the available supply. The recent water shortages in the Klamath Basin have highlighted the legal and scientific challenges in managing scarce water resources. Today, Oregon has denser development and more competition for water resources. In addition, the historic use of waterways as a disposal site for pollutants has degraded many waterways, thus limiting potential uses as water sources. Even with added water regulations and increased scientific understanding of natural systems and their interrelationships, many of the state's water resources remain stressed and degraded. Federal and state funds for addressing water issues are limited and in some cases have been reduced.

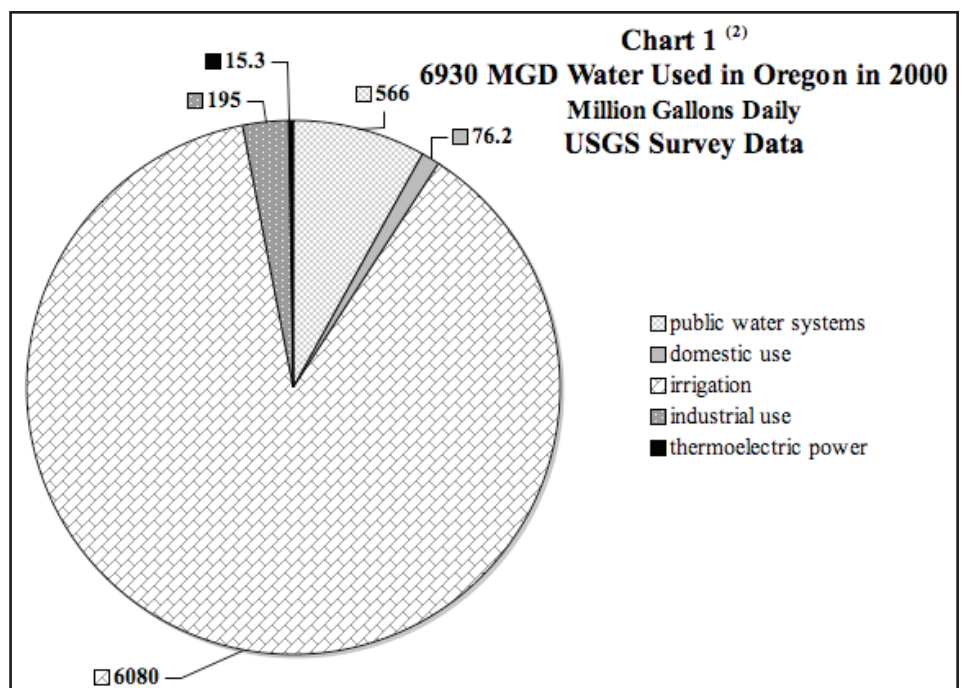
Because the League of Women Voters of Oregon positions on Water Policy and Planning (1985) and Water Quality (1969) do not reflect these transformations, Oregon League members proposed an update that combines water quality and quantity issues. This first report will address the current status of Oregon's water laws and regulations.

This document illustrates the complexity of water laws and the historic separation of water quality and quantity regulations. This report is not intended to supplant comprehensive information from state agencies. For more detailed information on specific topics please contact the appropriate resource. This report is also online at <http://www.lwvor.org/recentstudies.htm#Water>. In part two of the League's Water Study, specific concerns and gaps in water laws will be presented. By using the information compiled in this report, League members should be able to understand what has been accomplished, and then begin to comprehend water issues and needs of the 21st Century.

LOOKING AT OREGON'S WATERS

Any examination of Oregon's water supply must take into account the fluctuation of available water due to variability of rainfall and snow melt. These factors affect the amount of water available from all sources. Water for all uses, public and private, is obtained from surface sources such as rivers, streams and springs (86%) or from ground sources (14%).¹

Many users obtain their water through a variety of suppliers including but not limited to Bureau of Reclamation, the Army Corps of Engineers, municipali-



ties and public or private water districts. Other users obtain water through private/direct diversion outside of water supply or delivery. The State of Oregon does not own any significant water infrastructure.

In order to manage water issues, Oregon is divided into 18 river basins, not including the Columbia River which is treated as a separate unit. Within these basins there are multiple uses for water that vary by location and demand. For assistance in planning and evaluation, Oregon has identified beneficial uses for water rights as managed by the Water Resources Department (WRD), Oregon Revised Statutes (ORS) 536.300, and assigned beneficial water quality standards by watershed (Table 1, Page 18) managed by the Department of Environmental Quality (DEQ), Oregon Administrative Rules (OAR) 340-041. To some extent, these broad designations determine both the quality and priority of water uses.

ORS “536.300 Formulation of state water resources program; public hearing in affected river basin. (1) The Water Resources Commission shall proceed as rapidly as possible to study: Existing water resources of this state; means and methods of conserving and augmenting such water resources; existing and contemplated needs and uses of water for domestic, municipal, irrigation, power development, industrial, mining, recreation, wildlife, and fish life uses and for pollution abatement, all of which are declared to be beneficial uses, and all other related subjects, including drainage, reclamation, floodplains and reservoir sites.”

Who Owns The Water?

The people of Oregon own the water. As a bit of history, back in 533, Justinian stated: “By law of nature these things are common to mankind – the air, running water, the sea and consequently the shores of the sea.” This concept became part of the Magna Carta in 1215. In 1859, the U.S. Congress granted Oregon title to the beds and banks of navigable water bodies as a

part of the Oregon Admissions Act. By 1909, Oregon water law explicitly stated that, “all water within the state from all sources of water supply belongs to the public.” ORS 537.110.

The management of these waters is subject to the “Public Trust Doctrine” that requires the state to protect the public’s use of waterways for navigation, commerce and fisheries. In 1987, Oregon also recognized the in-stream use of water for “recreation” as a public use by ORS 537.332 (5)(a).

“Waters of this state” means any surface or ground waters located within or without this state and over which this state has sole or concurrent jurisdiction. ORS 537.007(12).

Ownership of waters in all waterways (regardless of the ownership of the beds or bank) lies with the state as the result of federal statutes providing for the disposal of public domain lands in the mid-to-late 19th century.³ A separate body of law governs the state ownership of bed and banks of a waterway.

Certain waters of the state are subject to “Tribal Reserved Water Rights.” These Tribal rights have been defined by a number of notable court cases (“Winters Doctrine” and the “Boldt Decision”) that are based on historic U.S. Government/Indian treaties and historic tribal uses. While the federal government holds Indian waters in trust for the tribes, the McCarran Amendment gave management of the tribal waters to the states. In 1997, Oregon adopted a “Government-to-Government Interest Statement” that commits Oregon to sharing this management responsibility with the nine Oregon tribes.⁴

TRIBAL RIGHTS RELATING TO WATER

Winters Doctrine *Winters v. United States*, 207 U.S. 564 1908

“In agreeing with the federal government to the creation of reservations, the tribes agreed to vast land cessions in return for guarantees that certain lands would be permanently reserved for Indian use and occupation.”⁵ Use was construed as sufficient water to fulfill the purposes of the reservation: in other words, a reserved water right. Though not quantified, these water rights date from the date of the reservation. ‘Winters rights’ or federal reserved water rights are creatures of federal law and are not subject to state law requirements such as ‘use it or lose it.’ In a line of cases following *Winters*, the U.S. Supreme Court held that federal reserved rights are not just Indian water rights but also attach to other federal lands that are dedicated to specific purposes, such as national forests, national parks, and wildlife refuges.

Boldt Decision *U.S. v. State of Washington*, 384 F. Supp. 312; 1974 While the U.S. Supreme Court held that irrigation water rights reserved in an Indian treaty could only be limited in amount to the “total reasonably required by the needs of the tribe,” this general principle and application was applied to fishing rights. The Boldt

decision concluded that the quantity of off-reservation harvest could be limited by conservation needs of the fish; and, the number of fish limited for non-treaty fishermen, as well as treaty fishermen in their “usual and accustomed grounds and stations” off-reservation. The decision divided the harvest with 50% going to the non-treaty fishermen and 50% to the treaty fishermen. The treaty Indians, however maintained exclusive rights to the fish on reservation.

McCarran Amendment 43 U.S.C. §666 1988

Because federal reserved rights are often very senior in priority and potentially large in volume, yet are not lost by non-use, these rights create a good deal of uncertainty for state water managers. The McCarran Amendment, originally adopted in 1952, helps states deal with this uncertainty. The law allows states to adjudicate and, to some extent, to administer federal water rights, including Indian reserved rights and other federal reserved rights. Thus, when a state conducts a general stream adjudication of surface waters or a basin adjudication of groundwater, the state can join the federal government as a party in order to determine the existence, priority, extent, and quantity of the federal rights, thereby integrating these rights with state-issued prior appropriative rights.⁶

REGULATING WATER QUANTITY

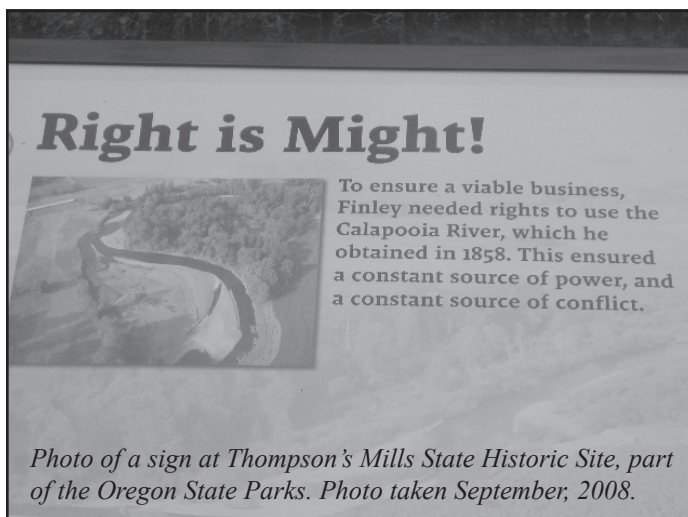
Prior Appropriation Doctrine

A permit from the Oregon Water Resources Department (WRD) is required to use the waters of the state. Since 1909 the allocation of waters of the state has been governed by the “Prior Appropriation Doctrine” which “ensures that the first water user to obtain water rights has first access to water in times of shortage. If a ‘downstream’ landowner has the earlier priority date, the ‘upstream’ landowner may have to let the water pass unused to meet the needs of the senior,

downstream water right holder.”⁷ In other words, first in time, first in right.

Water rights are attached to the land, as long as the water is used. Once established, a right cannot be forfeited without proof that the water has not been used for at least five consecutive years. In the event of a conflict between users with water rights or permits, the priority date determines who may use the water. If rights have the same date of priority, domestic and livestock uses have preference over other uses. In addition, should the governor declare an emergency drought, priority is given to domestic and livestock uses.⁸

Water is not available from most surface water sources in Oregon for new water rights, and most of the surface water during the low flow period is fully appropriated. In late summer months many users are cut off when there are insufficient water levels for out-of-stream use. In 1987, the law allowed the Departments of Fish and Wildlife, Environmental Quality, and Parks and Recreation to acquire water rights for the protection of fish, to minimize water pollution, and for various public recreational water uses. These in-stream water rights are, with some exceptions, subject to senior water rights. The state regulates water



use from all sources through a variety of measures.^{9, 10}

REGULATING SURFACE WATERS

Stream Withdrawal (Out-of-stream Water Rights)

The Water Resources Commission and Department serve the public by practicing and promoting responsible water management.¹¹

Permits

Early water rights were established through the prior appropriation doctrine; however, today permits are required to use surface water because in Oregon all water is publicly owned. Withdrawing water from streams, lakes or rivers must be for beneficial uses. Such uses may include commercial or non-commercial irrigation, drinking water, water storage, and manufacturing applications. These uses must not waste water.¹²

Some surface water uses exempt from permit requirements are:

1. Natural spring use, unless said water flows off the property at any time of the year.
2. Stock watering, without diversion, directly from the water source.
3. Salmon and Trout Enhancement Program (STEP) for egg incubation.
4. Fire control emergencies and fire fighting training.
5. Forest management such as slash burning, although the user must notify the Department of Fish and Wildlife (ODFW) and WRD and follow their rules or restrictions of the WRD.
6. Certain land management practices if water use is not the primary intended activity.
7. Rain water collection and use from an artificial impervious surface (e.g. building roof or parking lot).¹³

Application Process

The water right process involves three steps: application, permit, and final certificate of an out-of-stream

water right. The certificate may remain valid forever so long as the water right is regularly exercised according to the terms and conditions specified in the certificate. After a water right certificate has been issued, certain aspects of the water right may be changed by filing a “transfer” application. The application requires proposed use and source of water, legal descriptions for property, maps to include roads and rights of way crossed, names and addresses of any other affected property owners, and information from the local land use planning entity. Supplemental forms are used for irrigation (Form I) or municipal uses (Form M). Notice is sent to state agencies, county planning offices, and individuals or organizations. Public comment may occur without charge at this point. Notification of those living near the application site is not required.¹⁴

Public Notices, comments and appeals processes differ among agencies. Specifics regarding the process followed may be obtained from relevant agencies. In some cases fees may be required.

Other Considerations

To change or modify an existing permit requires a permit amendment application, similar to a transfer application. The application shows the proposed change of a point of diversion (place where water is removed from a source), point of appropriation (the original source from where a permittee is allowed to take water), place of use, or any combination of these. The proposed change must not injure other water rights.¹⁵ After a water project is finished, the permit holder has one year to submit proof of water use to the WRD. Except for certain small ponds, the final survey is conducted by a certified water rights examiner using the map and the beneficial use statement. The survey is the basis for the issuance of the Water Rights Certificate. Water certificates continue as long as water is used without waste as allowed by the certificate.¹⁶

Oregon law also allows for diversion and use of water for short-term or fixed periods. ORS 537.143.



Rows of metal tubes carry irrigation water from ditch to a field of onions.

A “limited license” allows the use of water if water is available (such as in winter wet periods) that will not injure other water rights. A limited license can be made available as soon as three weeks after filing with the WRD. Irrigation is usually not allowed unless the source is stored water or the need is a one time occurrence for a newly established crop.¹⁷ ORS 537.143(6).

Water Transfers and Diversions

Because out-of-stream water use is restricted to what is listed in the water right, a change in place of use, point of diversion, or type of use requires a permanent transfer. Generally, these transfers do not increase the amount of water or the priority date of the existing water right, but any portion of the water right involved in a change of use or place that is not included in the change can be lost. For example, if a water user wants to change from irrigation to domestic use, or a municipality changes the point of diversion to a new water intake, the water right holder must apply for a transfer. The application steps include a description of current use, the change proposed and proof of use, land ownership (or consent of owner), a map prepared by a water right examiner and compliance with local land use plans. WRD reviews the application to make sure other water rights are not affected, public comment is allowed,

and WRD may apply conditions or deny the application if other water rights are injured. Only after the transfer is approved can the water user can make the proposed change. Temporary transfers can be made in place of use, such as those needed for rotation of crops, but not for changes in type of use. The application procedure is similar to permanent transfers.¹⁸

Cancellation of a water right may occur after five years of continuous non-use but is not automatic. Upon receipt of sworn affidavits asserting non-use, an administrative proceeding is initiated. Cancellation can occur even if the current property owner did not own the property when the use was discontinued. Once cancelled, water may not be used unless a new water right subject to current laws and rules is obtained.¹⁹

Water conservation is inherent in the water right; however, saved water from efficient practices cannot be put to uses beyond those specified in a water right. A water user may submit a conserved water application to the WRD asking for authorization to use a portion of the saved water for a new use or for an in-stream use such as improving stream flows or fish habitat.²⁰

Some agricultural and municipal water users are required to prepare water management and conservation plans. The WRD gives workshops and technical assistance on such management practices.

All legally established water rights are on record in the Salem office of the WRD. These records are also maintained in the local watermasters’ offices. Vast online resources are found at <http://www.wrd.state.or.us>. Records identify a water right but do not specify whether the water use is continuous or is subject to cancellation. Any department research request has a fee.²¹

The state has 20 watermaster districts that enforce water laws and permit uses. Most of the watermasters’ work involves responding to complaints about water use and determining when junior water permit holders must be cut off during times of water shortages (usually late summer). These locally-based state

watermasters measure and monitor streamflows for management and planning needs within budgetary constraints.²²

Watermasters, under the direction of WRD regional managers, enforce water laws and measure the waters of the state.²³

Developing a water right often involves permits and requirements from other agencies as well. City and county planning offices are the best resources when construction occurs in waterways, riparian areas, and wetlands.²⁴

In-Stream Water Rights

History – Protecting In-Stream Uses

Oregon was one of the first states in the West to protect in-stream water from appropriation by prohibiting the use of streams feeding into Columbia River Gorge waterfalls. In 1955, the Legislature went further by authorizing the Water Resource Board to adopt minimum perennial stream flows deemed necessary to support aquatic life, minimize pollution and to provide for recreation. Only the Oregon Fish and Wildlife Department (ODFW) and the Department of Environmental Quality (DEQ) were authorized to request these minimum flows. ORS 537.336. This legislation had limited effect because the minimum flows were junior to existing water rights.

The Legislature in 1987 passed the landmark In-Stream Water Right act declaring that in-stream uses, as well as out-of-stream uses, were to be considered “beneficial.” ORS 537.346. All existing minimum stream flows were converted to in-stream water rights. Like the 1955 minimum stream flow law, the 1987 law had a limited effect on protecting in-stream uses. Much of Oregon’s water was already appropriated and these new water rights were junior to the older existing rights. Also “minimum” stream flows were not always adequate to protect the designated in-stream uses.²⁵ By 2007, more than 500 minimum

perennial stream flows had been converted to in-stream water rights and more than 900 state agency in-stream water rights had been issued.

The 1987 law authorized a method for flow restoration: the transfer of existing out-of-stream water rights by sale, lease, or donation. ORS 537.348. By 2007, almost 50 in-stream transfers had been completed. The Oregon Water Trust, Deschutes River Conservancy and the Klamath Basin Rangeland Trust have been active partners in the in-stream leasing program.²⁶

In the early 1990s, the Oregon Water Resource Commission (WRC) adopted standards for in-stream flows for Oregon’s free-flowing scenic waterways as a different route for in-stream protection. The Scenic Waterways act required, with some exceptions, that flows must be sufficient to meet the purposes of the act. Fish, wildlife, and recreation are designated “beneficial” uses for Scenic Waterways. ORS 390.805-.925. Before issuing a permit to withdraw water from a scenic waterway, the State must demonstrate that water is available to protect those beneficial uses, referred to as “Diack” flows. The Legislature has since modified the act by allowing permitting for human consumption, livestock, and groundwater uses under certain circumstances.²⁷ ORS 390.835(5)-(12).

Application Process

WRD processing of applications for in-stream water rights is much the same as for out-of-stream rights. The department can approve, reduce or reject a request and is the final authority in determining water flows necessary to protect public uses.²⁸ ORS 537.343.

There are several differences in processing in-stream and out-of-stream rights. Water availability standards are different for the two. A water right certificate, not a permit, is issued for in-stream use. The certificate is held in the name of the State as the official trustee for the people of Oregon rather than in the name of the applicant. There is no fee for processing as this is considered a “public” use of the water. ORS 537.341.

In-stream water rights are unique and allow few exceptions to the prior appropriation doctrine. Those exceptions are for multipurpose storage of water, municipal use, and emergency water shortages. ORS 357.354. Hydroelectric use would also trump an earlier in-stream water right. ORS 537.352 (storage), ORS 537.360 (hydroelectric).

Transfer and Leasing

According to the 1987 In-Stream Water Rights Act, water rights can be purchased, leased, or sold for conversion to in-stream use. ORS 537.348. WRC is required to approve a water right transfer that allows a change in type of use, point of appropriation or place of use. A transfer request must be approved if it meets the basic requirements and if it does not result in an enlargement of the original right. Water rights transfer retains the original source and priority date. Existing water rights can be leased for temporary conversion to an in-stream use or may be sold for permanent conversion. A greater need for water and the limited supply has created a market for conserved water and an incentive to conserve.²⁹ In 1997, the Legislature clarified that users can purposely use less water (i.e., conserve) without eroding the amount of their right providing they are ready, willing and able to divert and use the full amount and that unused water may be leased or sold.

Short-term leases are the primary vehicle in Oregon for creation of in-stream rights. These leases cannot exceed five years, creating a trial period for landowners who are reluctant to transfer their in-stream rights permanently. Short-term leases are also useful for landowners who are not using their water right and are thus at risk of forfeiting their right because of non-use.³⁰

Springs

By legal definition, natural springs are surface water, not groundwater. Use by a landowner may be exempt from permitting, if the spring arises on a property, but does not form a channel that flows off the property. Many residents in Oregon use springs, and often dig



The Owyhee or Malheur Siphon carries irrigation water to benchland off the valley floor.

cisterns where the springs are seasonal. Residents are advised to check with the local watermaster as to whether they have an exempt use or need a water right.³¹

Wetlands

Wetlands are considered “waters of the state” and are defined by soils, vegetation, and hydrology. Bogs, fresh and salt water marshes, vernal pools, playas, fens, and swamps are all regulated as wetlands.

The Department of State Lands (DSL) estimates Oregon had 1.4 million acres of wetlands in 1995. In 1859, the date of statehood, Oregon had about 2.4 million acres. Losses are attributed to industrial, residential and commercial development as well as to historic ditching or draining of lands for agriculture. Use of wetlands for agriculture is not regulated if the use has been continuous since 1989.

Oregon, like the federal government, is committed to a goal of “no-net-loss” of wetlands. Both also require mitigation if wetland loss is deemed unavoidable.

able. Mitigation can be on-site, off-site, compensated through purchase of credit in an authorized mitigation bank, or a “payment-in-lieu” of mitigation.

Since 1989, DSL has had permit authority for filling and/or removing material from wetlands under Oregon’s Removal-Fill Program. ORS 196.795-990. Many projects impacting wetlands also require a permit by the U.S. Army Corps of Engineers (Corps) under Section 404 of the federal Clean Water Act (CWA). Before issuing a permit, DSL requires sign-off by the appropriate local government which determines that the permit request is consistent with the local comprehensive plan and land use regulations. Coastal Zone Certification is also required if the project is within the Oregon coastal zone. The Department of Land Conservation and Development (DLCD) is responsible for determining consistency with the Oregon Coastal Zone Management Program.³²⁻³⁶

All individual applications for wetland permits have a public response period, and a public hearing may be requested. Permits may be appealed.

Storage of Water, Including Dams

Surface water is fully appropriated during the summer in Oregon. However, with the predictions of climate change, state, county, city, and local water districts are reviewing water storage options. Types of water storage include above and below ground.

Above Ground Storage

Dams

The main sponsor of the dam building era of 1900-1960 was the federal government. Dams were authorized for agriculture, flood control, energy, and transport of product. Historically, the primary purposes for dams in Oregon were irrigation and flood control. The two federal agencies that continue to oversee dams are the Bureau of Reclamation and the Corps.

The Corps can issue contracts to use stored water for municipal and industrial water supply and water quality.³⁷ Corps projects are almost entirely west of the Cascades. In the Willamette basin, 13 dams store 2.3 million acre feet (750 billion gallons). The Bureau stores about 2.5 million acre feet (815 billion gallons) in Oregon. In addition, all but one of 24 storage dams in Oregon (McKay Dam on the Umatilla Project) are run by private or public water-user organizations.³⁸

A water right is not required for dams constructed by the Corps, but a water right is required for use of stored water managed by the Bureau of Reclamation. Unlike dams in southwestern U.S., big dams in Oregon and in the Northwest capture only some of the runoff during the wet seasons.

Evidence indicates that dams can be disastrous for fish. The impact of tributary dams may be even more harmful. Chinook are extinct above the Hells Canyon Dam complex on the Snake River, above Pelton and Round Butte Dams on the Deschutes River and above upper basin dams in the Willamette, Umpqua, Rogue, Umatilla, and Walla Walla Rivers. The Upper Deschutes Dam complex cuts fish off from three major river systems. Two dams were identified for removal: Marmot Dam (removed in 2007) on the Sandy River and the Savage Rapids Dam (removal in progress) on the Rogue River.³⁹ Other projects are in process.

Reservoirs

There are almost 15,000 reservoirs recorded in Oregon’s water rights records. Purposes of the various federal reservoirs in Oregon were specified when Congress authorized them. There are a few big non-federal reservoirs in Oregon, usually used for hydroelectric purposes.

By 1950, project purposes were locked in, and today use of water for another purpose is very difficult. Some releases have been accomplished by side-stepping the original purpose, i.e., for navigation, but this is rare. Updating a storage project’s authorization requires an Act of Congress.⁴⁰ Reservoirs in the Columbia River basin retain only approximately 30% of the area’s runoff.⁴¹

Below Ground Storage

Oregon is exploring supplementing groundwater availability using Aquifer Storage and Recovery (ASR): withdrawing surface water during high flows and storing in an aquifer. Both municipalities and the agricultural sector are exploring this concept. The WRD has looked for sites with hydrogeologic suitability, principally in Columbia River basalt. Basalt aquifers are usually deep formations, preventing “mining” by other wells, and they generally do not show serious water quality problems in recovery. If the water source is municipally treated prior to storage, water quality is generally not a problem. Currently ten sites have been studied in basalt aquifers and two in other aquifer types. The current sites are operating under a limited license for withdrawal, with a five-year test period.⁴²

The ASR process requires well injection to store water with filtration and disinfection infrastructure prior to injection to prevent contamination of existing groundwater. Drinking water standards must be met. ORS 537.534. However, in some areas water quality issues limit the process. For example, agricultural users, because they do not have water treatment plants on-site for sanitizing injected water, face more water quality issues. Nitrates from fertilizer and vegetation are the primary agricultural pollutant. Original groundwater can also contain heavy metals, salts, and nitrates above drinking water standards. In these cases, the cost of treatment could exceed the benefit of the recovered portion of the water.

Other public concerns have largely been related to noticeable effects on other users in the area. When water is injected into aquifers, the water level rises in nearby wells and new springs may be created. The use of stored water may impact fish or affect water supply to other users. ORS 537.531 to .534 and OAR 690-350-0100 to 690-350-0300.⁴³

REGULATING GROUNDWATER

Groundwater was not covered by state law until 1955 when the Oregon Legislature passed the Ground Wa-

ter Act.⁴⁴ Groundwater in Oregon is generally regulated by ORS 537.505 to .795 and 537.992.

Some uses of groundwater in Oregon are exempt from water right permitting requirements. These uses include:

- Stock watering,
- Lawn or noncommercial garden irrigation not exceeding ½ acre in total area,
- Single or group domestic purposes not exceeding 15,000 gallons per day,
- Industrial or commercial purposes up to 5,000 gallons per day,
- Down-hole heat exchange uses not exceeding 15,000 gallons per day, and
- Watering school grounds of ten acres or less of schools located within a critical ground water area. ORS 537.545.⁴⁵

Single or group domestic purposes include drinking water from wells that serve a daily population of less than 10 and have less than 4 connections.

A network of groundwater level monitoring wells is maintained by WRD to monitor water levels in wells. However, not all of Oregon’s groundwater aquifers are monitored.⁴⁶

Wells

Regulation of well construction is the primary means of safeguarding Oregon’s groundwater from contamination, waste, and loss of artesian pressure. According to the DEQ, 70% of Oregonians, including over **90 % of rural residents**, rely on groundwater as their primary or secondary drinking water source.⁴⁷ There are an estimated 200,000 to 350,000 individual home domestic wells that supply drinking water to Oregonians.⁴⁸

The WRD, aided by their Ground Water Advisory Committee, regulates well construction. Regulation is achieved through notification and required reporting, plus established well construction standards and well

logs. Since 1955, the WRD has maintained a record of well logs, but any on-going monitoring of water quality from wells with three or less hookups is not required and is at the owners' expense.

Wells are generally constructed by a state-licensed well contractor, but WRD does allow individuals to dig their own wells. ORS 537.753. Although some Oregon counties have adopted rules about the siting or placement of wells, the State of Oregon has not. A well can be placed at the convenience of the homeowner, with some minor exceptions. When finished, every well must be tested for flow and drawdown. About a quarter to a third of new wells are state-inspected. Recent legislation requires that wells be retested with any sale or exchange of property.⁴⁹ ORS 448.271. Also, the Health Division can require other tests for contaminants in an area of questionable groundwater quality.⁵⁰

If a well is abandoned, the WRD has a procedure to protect groundwater from contamination. OAR 690 Div. 220. The number of wells abandoned over time and unfilled is unknown.

In the 1990s, the state began a well identification program. Since 1996, all wells drilled, altered, or deepened must have an identification number and are required to be included on all property deed transfers. Any lands with wells without numbers will need to acquire numbers in order to sell the property. ORS 537.789.

While many of Oregon's wells are used for domestic water supply, the WRD has three other categories: monitoring wells, geotechnical holes, and residual other "holes." These wells or holes are governed essentially the

same way as water wells and require licensed contractors, start cards, well logs, and regulated construction standards.⁵¹

Other Groundwater Regulations

Earlier laws appeared to assume an unending supply of water. In the 1950s, with the realization by the public, the Legislature, and various agencies that withdrawal of groundwater may affect surrounding water sources, and that groundwater sources may be hydraulically linked to surface water sources, regulation of 'critical ground water area' and 'limited ground water area' was developed. By designating areas as critical or restricted (limited), well construction and water extractions could be regulated. Counties may also have groundwater requirements.

Critical Ground Water Areas have been established "... when pumping of ground water exceeds the long-term natural replenishment of the underground water reservoir ... the Water Resources Commission must declare ... a critical ground water area and restrict water use. The law is designed to prevent excessive declines in ground water levels." In such

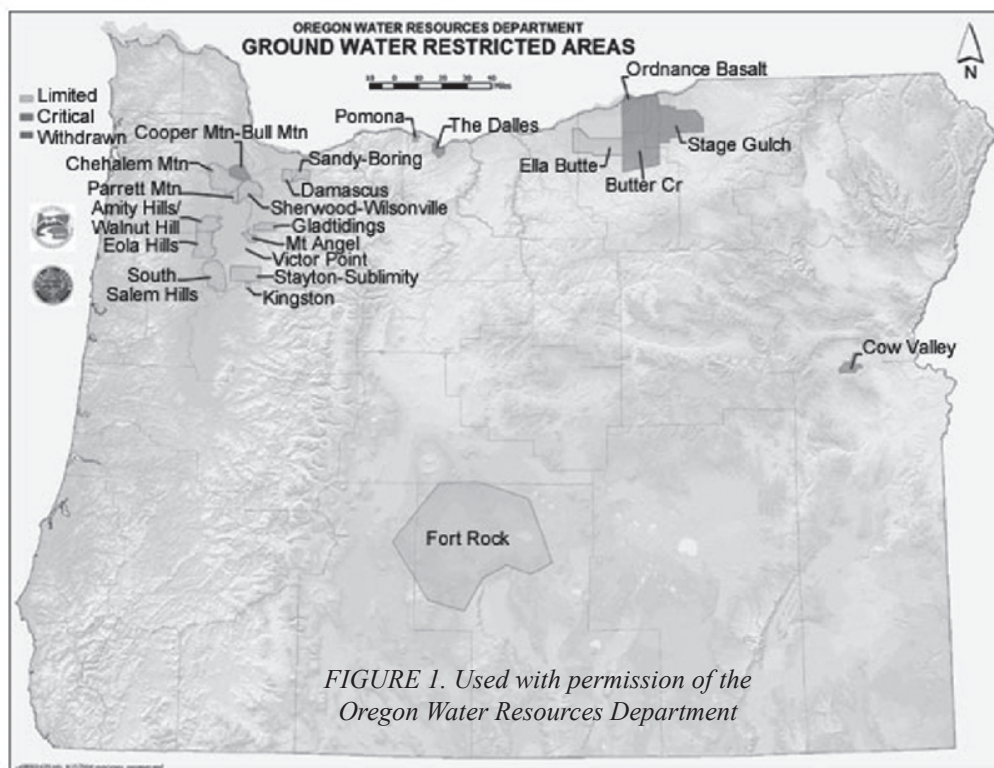


FIGURE 1. Used with permission of the Oregon Water Resources Department

areas, “certain users of water may have preference over other users, regardless of established water right priority dates. Critical ground water areas also can be declared if there is interference between wells and senior surface water users or deterioration of ground water quality.” ORS 537.730.

Ground Water Limited Areas are designated when the WRC takes preventive action before declines in well levels occur. In areas where groundwater aquifers are isolated in volcanic rock or basalt, “heavy pumping from the basalt ... have caused declines; new water rights are restricted to a few designated uses.”⁵²

The map on page 12 shows both limited and critical ground water areas currently designated in Oregon.⁵³ These areas differ from the Ground Water Management Areas designated by the DEQ for water quality purposes. County, city, and local administrations may have additional regulations. The current limited and critical areas tend to be centered in the populated regions. As data become available other areas may be identified and designated.

MEASURING AVAILABLE WATER

Historically, use of water under a state water right did not require measurement and reporting of water use to the state. For about the past 20 years, however, the state has increased efforts to acquire information about water use. In 2000, the WRC initiated a strategy for improving water measurement statewide. The strategy prioritizes diversions having the greatest impact on stream flows in areas with the greatest needs for fish. The WRD has developed a statewide inventory of significant diversions within high priority watersheds (have high potential for fish and stream flow restoration as established by ODFW and WRD) and will be working to increase measurement at these diversions.⁵⁴ Since 1995, new water rights permits for both surface and groundwater rights have included a requirement for measuring and reporting use. ORS 537.099 requires that federal and state agencies, cities, counties, schools, irrigation districts, and other special districts report water use on an annual basis. This condition of use is based on reporting the quan-

tity diverted as specified in the water right. As of 2003, about 8% of surface water and groundwater rights are required to be measured, either by statute for public entities or permits for individual right holders which constitutes about 46% of the water diverted statewide.

The WRD and area watermasters use the following categories for scrutiny of compliance with the metering requirements for approximately 2,200 significant diversions in high priority watersheds:

- 1) Water rights with measuring as a condition of use.
- 2) Surface water diversions that are greater than five cubic feet per second, or greater than 10% of the lowest monthly 50% exceedance flow as defined in the WRD’s water availability model and greater than 0.25 cubic feet per second. Exceedance flow is consumptive use as a percentage of natural stream flow in a priority watershed. Fifty percent exceedance is use greater than 50% of the lowest monthly stream flow.⁵⁵

Watermasters may require metering of any older water right to satisfy a public concern or for the purpose of complying with newer regulations. ORS 540.310.

The WRC’s original goal was to complete the inventory and assessment on the high priority stream flow restoration watersheds identified by ODFW by April, 2005. In 2008, of the 2,200 significant diversions, approximately 29% have been brought into compliance with the metering regulations and another 17% are on the approved plan to become compliant.⁵⁶ A high portion of water users are out of compliance. Watermasters are working on public outreach and education, but there is no funding to offset users’ investments in metering devices that, based on size and sophistication, can cost up to tens of thousands of dollars.⁵⁷

REGULATING WATER USE FOR HYDROELECTRIC POWER

The Pacific Northwest is blessed with major rivers. Hydroelectric generators on the Columbia River provide much of Oregon’s electricity. Oregon’s first hydroelectric facility was installed at Willamette Falls in 1889. The Umpqua, Klamath, and McKenzie Rivers

are also major contributors to Oregon's hydroelectric generation. Although hydroelectricity has environmental impacts, it has historically been a cheap and reliable source of power, relatively more benign than other sources of power and also considered a renewable energy resource.

The types of hydroelectric projects include impoundments, run-of-the-river, and pumped storage. An impoundment includes a dam creating a reservoir for water storage thus enabling control of the river flow to produce power when most needed. These projects are generally owned by private utilities such as Pacific Corporation and Portland General Electric and local/public utilities such as the Eugene Water and Electric Board. There are a few privately owned run-of-the-river projects that divert some water from the stream to run through power turbines, after which the water rejoins the stream. Pumped storage is another type of hydroelectric power generation. Low-cost off-peak electric power is used to pump water from a lower elevation reservoir to a higher elevation. During periods of high electrical demand, the stored water is released through turbines. Oregon has no pumped storage at this time, but a project is proposed for the Klamath Falls area.

Who's in Charge

Federal

In 1980, Congress passed the Pacific Northwest Electric Power Planning and Conservation Act, 16 USCA Sec. 839 et seq., establishing a multi-state Northwest Power and Conservation Council. Under the act, the Council and Bonneville Power Administration,⁵⁸ a federal agency, must protect, mitigate, and enhance fish and wildlife while assuring an adequate power supply. 16USCA Sec. 839 (b)(e)(2). Thus began the struggle between fish and hydroelectric power, which was made even more intense when Northwest salmon species were listed as endangered. The Northwest Power and Conservation Council designated certain areas (stream segments) that, in Oregon alone, protect over 9,000 stream miles from hydroelectric production.⁵⁹

Most non-federal hydroelectric projects are licensed for a 50-year period by the Federal Energy Regulatory Commission (FERC).⁶⁰ Many existing hydroelectric facilities in Oregon and the Northwest are due for relicensing.

State

The WRD is the lead agency in hydroelectric projects. An agency consolidated review is required for larger projects as a result of a law passed in 1997, which recognized the state's role in FERC's process for relicensing projects. The Hydroelectric Application Review Team, composed of representatives from the WRD, DEQ, ODFW, and the Oregon Energy Facility Siting Council, participates throughout FERC's entire lengthy process to assure that Oregon's statutory policies and environmental concerns are addressed. The state agencies must review the need for power, the protection of anadromous salmon and steelhead, potential loss of wild game fish, and recreational opportunities.

WRD considers water rights for hydroelectric generation as either perpetual for municipal corporations that apply for permits (unless conditioned) or for non-municipal corporations that apply for time-limited licenses. A public hearing is mandatory for larger projects (over 100 theoretical horsepower), but not for smaller projects unless the Water Resources Commission (WRC) believes it is in the public interest.⁶¹

REGULATING WATER MOVEMENT OR SALE OUT OF STATE

One of the current issues of concern is the movement of water from one basin to another, which could potentially reduce the available water for those closest to the water source. The issue is addressed in ORS 537.810(1) which states:

“No waters of the state arising within a basin shall be diverted, impounded or in any manner appropriated for diversion or use outside the boundaries of that basin except on the express consent of the Legislative Assembly.”

However, this does not apply to the Klamath Basin or to Goose Lake nor to municipalities that have historically transferred water for their use. ORS 537.810(3)(4). (A separate statute covers Walla Walla, Washington, which diverts water from Mill Creek, a tributary of the Walla Walla River. ORS 537.835.) The Legislature may grant an exception to this general prohibition against diversion for “the protection of the natural resources of the basin and for the public health and welfare of current and future inhabitants of the basin of origin.” ORS 537.810(1). These protections also apply to “waters forming a common boundary between states.” ORS 537.820.

REGULATING WATER QUALITY

During the early years in Oregon, water was seen as an infinite resource that would always remain clean and usable. As population grew, the waters deteriorated due both to industrial discharges, chiefly from pulp and paper mills, and to domestic wastewater discharge. Early in the twentieth century, the population became alarmed that water quality was decreasing. Much of the concern focused on the Willamette River, which served as a center for population and industry.

In 1938, Oregon voters initiated and passed the Water Purification and Prevention of Pollution Bill that created the Oregon State Sanitary Authority (OSSA) under the jurisdiction of the Oregon State Board of Health to enforce regulations. The newly established OSSA began to enact wastewater treatment requirements for both cities and industries. These actions included an initial requirement for primary treatment of wastewater (settling of waste and treatment of discharge with disinfectant). Smaller communities came into compliance during the 1940s. In 1952, Portland opened the Columbia Boulevard Wastewater Treatment Plant providing primary waste treatment.⁶² In 1958, OSSA began to require secondary treatment of sewage wastes (anaerobic bacterial digestion of waste). In the 1960s, OSSA adopted rules to require permits of dischargers both for domestic wastewater and industrial discharges, limiting quantities and types of discharge. In 1967, Governor Tom McCall

pledged stricter pollution laws statewide and a cleaner Willamette River. By 1968, all single identifiable sources of water pollution discharge were regulated statewide.

By the 1960s, water pollution awareness had increased across the United States. The Water Quality Act of 1965, now entirely superseded by the Clean Water Act, was the first major federal step in controlling water pollution and required states to submit water quality standards and plans for meeting them to the federal government for review and approval. The OSSA was responsible for developing Oregon’s plans.⁶³

National concern reached a peak when Ohio’s Cuyahoga River burned. In 1972, the U.S. passed the revised Federal Water Pollution Control Act, 33 USC 1251 et seq., commonly known as the Clean Water Act (CWA) that became the incentive for a nationwide challenge to improve water quality. This broad act called for identifying pollution problems and developing measures to reduce and eliminate the problems. Through this act, the U.S. Environmental Protection Agency (U.S. EPA) took on the responsibility to regulate activities that threaten the quality of the nation’s water resources. Oregon assumed the responsibility for waters within state boundaries.

Congress adopted a comprehensive water policy for the nation in the federal CWA and set as a national goal the elimination of pollutant discharges to the navigable waters of the U.S. by 1985. An interim goal was set to ensure that all navigable waters would be fishable and swimmable by 1983.⁶⁴

To reach these goals, Congress established a regulatory framework:

- No one has the right to pollute the navigable waters of the United States. Dischargers are required to obtain permits.
- Permits shall set limits on the concentration of the pollutants being discharged. A violation of the limits carries a penalty of fines or imprisonment.
- The best available technology shall be used to control the discharge of pollutants.⁶⁵

Over the last 36 years, the federal and state governments working together have moved forward to address pollution problems. The first measures addressed pollution at the end of pipes discharging to surface waters (point source pollution). Since the late 1980s the regulation has begun tackling the more complex problem of pollution from water such as stormwater running across surfaces, picking up pollutants and eventually depositing these pollutants in surface waters (nonpoint source pollution).

The CWA allows the U.S. EPA to delegate much of the regulation to the states. Oregon has encompassed the federal requirements in state legislation and in some cases exceeded federal standards. Regulations both identify the quality of water needed for specific purposes and direct what kind and how much pollution may be discharged. The initial step in the program required gathering data and on-going monitoring of water bodies.

MONITORING WATER QUALITY

Oregon has recognized that in order to determine the quality of water, a monitoring program must be implemented. The on-going measurement of water quality provides base values to identify problems and improvements in water bodies and determine if the water body meets the standards for the identified uses such as fish survival, navigation, drinking and swimming (Table 1 on page 18). Oregon has a number of monitoring programs. Monitoring is tracked, primarily through the DEQ.

Some of the water quality monitoring programs the DEQ directs, supervises or tracks across the state include: Coastal Environmental Monitoring and Assessment Program, Groundwater Monitoring, Long-term Large River Monitoring, Regional Probabilistic Stream Assessment, Oregon Beach Monitoring Program, Total Maximum Daily Load (TMDL), Volunteer Monitoring, Willamette Basin Mercury Study, and Toxics Monitoring Project in Willamette Watershed. Individual permits require additional monitoring. The Department of Public Health requires public water sources to test drinking water both at the source and prior to service. Wastewater utilities are required to monitor water quality at discharge points.⁶⁶

One of the challenges that Oregon faces in water quality testing is providing funding to maintain its monitoring program. Individual chemical and biological test expenses range from just a few dollars to several hundred for a single test. Some tests must be performed in a certified laboratory. Under the Safe Drinking Water Act, labs running samples for public water supply systems must be certified. Sample collection, preservation, and lab analysis must be performed through standard field approved methods and quality assurance protocols. Other tests can be performed by trained volunteers in the field. In all cases accuracy and reproducibility are essential. Supervision by trained qualified personnel is required. From year to year, the amount of testing may vary depending on monitoring cycles, funding and staffing.

As science advances, tests become more accurate allowing for identification of ever smaller amounts of pollutant. Because testing parameters and methods have changed and improved over the years, historic data is sometimes not comparable and decisions must be made based on available knowledge.

The DEQ addresses these problems through an on-going program of physical, chemical, and biological water quality monitoring. The program is divided

into three activities: 1) collecting valid and relevant data through sampling and assessment, 2) managing data from all sources to ensure availability of accurate and complete data, and 3) analyzing and interpreting water quality data for reports which identify conditions and threats to water quality, evaluate trends, and model proposed actions.⁶⁷

In the 1970s the DEQ developed the Oregon Water Quality Index (OWQI). With this easily understood tool, the DEQ is now able to track improvements or problems with water quality in specific water bodies over time. This tool provides for the analysis of a defined set of variables and produces a score that describes the general water quality. Variables analyzed include temperature, dissolved oxygen (percent saturation and concentration), biochemical oxygen demand, pH, total solids, ammonia and nitrogens from nitrate, total phosphorus, and indicator bacteria (*E. coli* since 2002). Scores range from 10 (worst case) to 100 (ideal water quality). Sites for testing are selected throughout the state to provide geographic coverage and include the major rivers and water bodies. In 2007, there were 144 monitoring sites in the network. The DEQ notes that the number of sites may vary periodically due to both logistics and budgetary constraints.⁶⁸

Recognizing that the volume and flow of water are important components of water quality, the WRD works with the ODFW on ensuring appropriate stream flow for fisheries and recreation. The WRD Strategic Measurement Plan approved by the WRC in 2000-2001 outlines requirements for monitoring flows, volumes, and usage of water resources at the source. Although the program is still developing initial information, it will eventually provide a valuable resource for stream flow information.⁶⁹

The ODFW Plan for Salmon and Watersheds,⁷⁰ established in 1997, is used throughout the state to maintain water quality in important salmon streams. Much of the water monitoring performed within the state supports the goals of this plan. However, the ODFW recognized that the plan did not address the needs of other species and introduced the Oregon Conser-

vation Strategy in 2006. This strategy focuses on habitat, since healthy fish and wildlife need healthy habitats. The plan contains components for monitoring and consolidating data from other departments, universities, watershed councils, soil and conservation districts, and the federal government. It may provide a stronger monitoring network for Oregon and reduce overlap between agencies.

Federal funding for monitoring has been provided through the CWA, the Total Maximum Daily Load (TMDL) requirements of the CWA, and the Federal Beach Act. In Oregon, under the Beach Monitoring Program funded by the federal government, the DEQ monitors water quality for Oregon's ocean beaches. Coastal county health departments issue swimming advisories as appropriate. In general, the DEQ has worked to consolidate information and prevent duplication. The ultimate goal is to obtain the maximum information for a strong database that can be used to evaluate water quality in Oregon.

In 2007, the DEQ received funding from the Legislature to begin a Toxic Monitoring Program in Oregon watersheds. The program will develop a monitoring and assessment plan focusing on toxic pollutants that pose the greatest threat to human health and the environment. The DEQ will collect samples from multiple water sources, analyze and interpret data, determine potential local pollutant sources, and assess the level of threat to human health and the environment from identified pollutants. When problems are identified the DEQ will work with sources and stakeholders to eliminate the pollutant. The initial sampling and analysis plan targets the Willamette River.⁷¹

Identifying Impaired Waters

Section 305(b) of the federal Clean Water Act (CWA), 33 USC 1315 requires states to report on the extent to which all navigable waters meet water quality standards.

All surface waters including rivers, lakes, ponds, reservoirs, wetlands, estuaries and coastal waters are considered "navigable waters" under the CWA.

The DEQ is primarily responsible for managing water quality in Oregon. Water quality standards are set to fully protect beneficial uses. They can be either narrative or numeric criteria. All state water quality standards contain a section that describes how water currently meeting standards will be protected. This is called the antidegradation policy.⁷² The DEQ establishes beneficial uses for each navigable water in Oregon (Table 1 below) and decides what to test.

Table 1: Designated Beneficial Uses.

Water quality standards are established by DEQ to protect beneficial uses of the State's waters. Beneficial uses are assigned by basin in the Oregon Administrative Rules for water quality, OAR 340-041-0101 through 0350, which include:

domestic water supply	livestock watering
fishing	aesthetic quality
industrial water supply	fish and aquatic life
boating	hydropower
irrigation	wildlife and hunting
water contact recreation	
commercial navigation and transportation	

Section 303(d), 33 USC 1313, of the federal CWA requires each state to determine which estuaries, streams and lakes *do not* meet the clean water standards. These water bodies are placed on Oregon's "303(d)" or "impaired waters" list. The current list contains about 1400 water bodies. Standards most often violated are for temperature, bacteria, and dissolved oxygen. Other standards include, but are not limited to, sedimentation, habitat modification, toxics, pH, chlorophyll A, and biological criteria (such as benthic invertebrate and fish health). Specific pollutants are also listed along with the names of the water bodies. Oregon's Impaired Waters list is available online at http://iaspub.epa.gov/waters/state_rept.control?p_state=OR. Definitions are located in OAR 340-42-0030 and statutes are located in ORS Chap. 468B (water quality).^{73, 74}

Total Maximum Daily Loads (TMDLs)

Once impaired waters have been placed on the 303(d) list, the federal CWA mandates that states take action to upgrade the quality of the listed water to achieve identified beneficial uses. The CWA requires each state to evaluate the impaired waters and establish a defined numerical Total Maximum Daily Load (TMDL) for each impaired water. A TMDL is the maximum amount of pollutant that a water body can assimilate without violating state water quality standards for identified beneficial uses. It is DEQ's role to list and develop a completion date for TMDLs for those waterbodies that do not meet water quality standards.⁷⁵

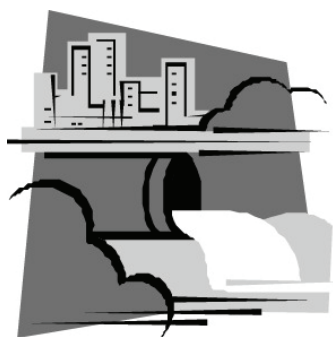
The DEQ conducts a study of the impaired water to determine the TMDL load. The DEQ calculates a specific pollution load limit TMDL for each type of pollutant entering a body of water for the entire basin or subbasin. Once the TMDL is determined, each known source, both point sources (such as pipes) and nonpoint sources (such as runoff from irrigation or stormwater) is given a portion of the TMDL. Point sources include but are not limited to discharges from industry and municipal sewage treatment facilities. Nonpoint sources include but are not limited to runoff from farms, forests, urban areas, and natural sources such as decaying organic matter or nutrients in the soil. The total TMDL includes the sum of the discharges from all known sources plus a safety margin. Seasonal variation, uncertainty, and growth that allows for future discharges to a stream or river without exceeding water quality standards are taken into consideration.⁷⁶

Ultimately each source of pollution is limited to an assigned amount of discharge that will not impair the water. In order to establish the TMDL in Oregon, DEQ has developed an approach to look at the quality of an entire river and watershed rather than whether or not a specific discharge meets existing permit requirements. Streams are addressed in either sub-basin groups or entire basins, as in the Willamette. It is thought that using a broader approach will not only speed up the process but also facilitate recognition of

basin interrelationships. Based on the results of the watershed evaluation, specific discharges may have to meet more restrictive requirements.

Not all identified impaired waterways have completed TMDL studies. As of 2006, DEQ had established TMDLs and allocations for at least some streams in all of Oregon's major river basins, except the mid-coast, John Day, Malheur, Owyhee, Willamette Rivers, and Goose and Summer Lake basins. TMDL completion for the entire state is scheduled for 2010.⁷⁷

DEQ estimated that 75% (68 subbasins) of the 91 subbasins in Oregon are primarily affected by forestry and/or agricultural nonpoint source activity. Of these 68 subbasins, half are wholly federally owned and/or managed lands. The other half are either privately owned lands or mixed federal, state, and private ownership. The remaining 23 subbasins are affected by both point and nonpoint sources, including municipal sewage treatment plants, industrial discharges, urban stormwater runoff, construction activities, agriculture, and forestry.⁷⁸⁻⁷⁹



ADDRESSING POLLUTION SOURCES

Point Source Pollution

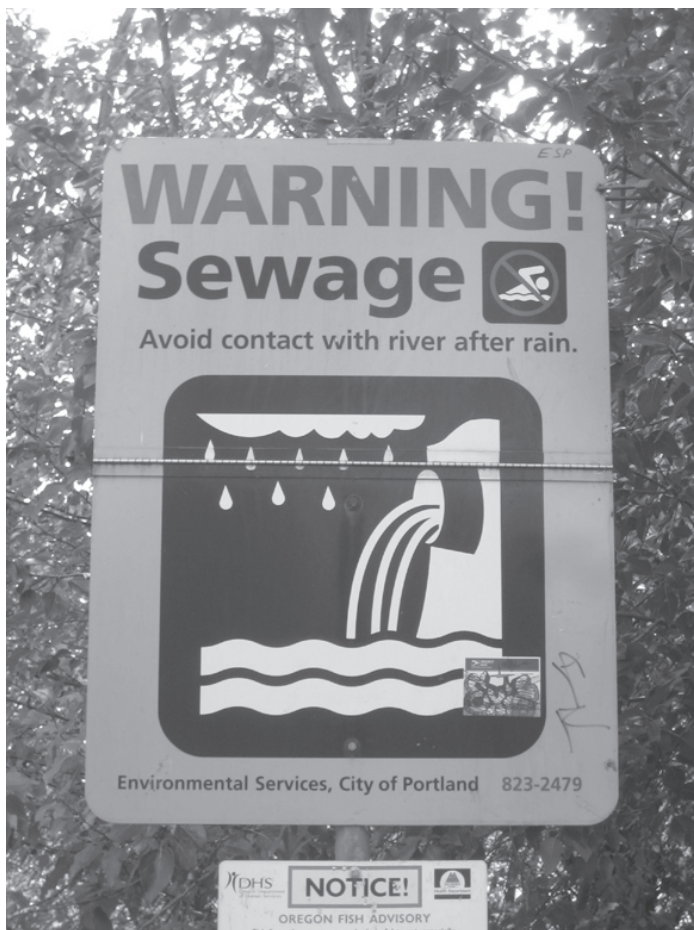
Historically both domestic and industrial wastes were routinely discharged through pipes into Oregon streams and rivers without treatment or standards. Since 1938, Oregon has been addressing the problem. In 1972, the State took on delegated responsibility under the federal Clean Water Act (CWA) for the National Pollutant Discharge Elimination System (NPDES) permit program. The federal program was in fact modeled on Oregon's own state water pollution control facilities permit program.⁸⁰ Point source pollution refers to direct discharges (end of pipe or ditch) of pollutants that could affect water quality to a receiving stream, mainly from publicly owned

wastewater treatment plants or industrial facilities discharges. The CWA recognized that discharges could include pipes discharging directly into bodies of water or discharging to the ground that ultimately seeps into surface waters. Today, *all point source discharges must be permitted through the DEQ*. Public notice of both new and renewed permits is posted on the DEQ website at <http://www.deq.state.or.us/news/publicnotices/pn.asp>. In most cases there is a 14 day notice period for state Water Pollution Control Facilities (WPCF) permits and a 30 day notice for NPDES permits.

In considering point source pollution discharges, the DEQ looks at the pattern of water flow that distributes a pollutant. This is termed the toxic mixing zone or regulatory mixing zone, a cubic dimension of water that has a higher concentration of pollution because the discharge source is at the start of dispersion (plume). The DEQ specifically describes the size of the area at the end of the discharge pipe into a receiving stream of water where the effluent with its established permit limits mixes with the receiving stream. The permittee is required to meet in-stream water quality standards at the downstream boundary of the mixing zone. This zone is further divided to identify the much smaller area (usually around 10% or less of the regulatory mixing zone) where initial mixing occurs. Measurements do not occur in this zone, but further downstream, after the pollutant has more evenly distributed into the waterway. These mixing zones are viewed as a pollution point with concentrations that may affect levels further downstream,^{81, 82} and usually are not identified by signs or warnings for the public. Maps are available at <http://www.deq.state.or.us/wq/wqpermit/mixingzones.htm>.

Point Source Permit Program

To evaluate water quality, the DEQ has established both narrative and numeric water quality standards. Narrative standards specify that surface waters of the state must be free from the following pollutants that result from human activity: suspended solids, floating debris, color, odor, toxic substances and nutrients that create nuisance growths of weeds and algae. Nu-



merical water quality standards have been set for an extended list of various pollutants and can be found in OAR 340-041.

The DEQ uses these standards to establish enforceable effluent limits in permits and to regulate the discharge of treated wastewater. Two types of permits, National Pollutant Discharge Elimination System (NPDES) and Water Pollution Control Facility Permits (WPCF) are issued. Both types of permits prescribe limitations on discharge treated wastewater and set reporting requirements.⁸³

National Pollutant Discharge Elimination System
NPDES permits are issued pursuant to the CWA and ORS Chap. 468B for discharges directly to “waters of the United States” which include surface waters such as streams, rivers, lakes, oceans, and wetlands. “Major” permits typically cover large sewage treatment plants with discharge flows of more than one million gallons per day or large industrial producers with a high potential for large quantity discharges of toxic

pollutants. Facilities that do not meet the definition of major are placed in the “minor” permit category.

The NPDES permit specifies the maximum allowable level of total suspended solids, biochemical oxygen demand, nutrients and bacteria that can be discharged to a stream as well as the minimum level of dissolved oxygen that must be present in the discharge. The regulation also established for various industrial sectors such as steel, pulp and paper, electronics, etc., specific technology based effluent limits for the typical pollutants discharge from that sector. Where waterbodies are water quality limited and TMDLs have been established, the permit contains the established waste load allocation for any TMDL parameter. The department also requires each major permit facility to provide data describing the pollutants in its discharge. The department performs a Reasonable Potential Analysis on this data to determine if the level of these pollutants will violate water quality standards. If there is a potential for the discharge to violate standards, facility-specific water quality based effluent limits are established and placed in the facility’s permit to prevent it from violating water quality standards.⁸⁴ NPDES permits must be renewed every five years. Criteria for permitting may change as water quality concerns change throughout Oregon. Notice of permit applications are posted on the DEQ website. Hearings may be scheduled if requested by ten or more members of the public.⁸⁵

Water Pollution Control Facilities Permits

State WPCF permits are issued pursuant to ORS Chap. 468B and OAR 340-045 specifically for disposal systems such as land irrigation and lagoons that do not discharge directly to surface waters. (Note: Permits for residential septic tanks and drain fields are part of DEQ’s onsite septic system program and are discussed later.)

NPDES and WPCF permits are either individual site specific or general permits. General permits are developed when DEQ can adequately control comparable discharges from sites with similar activities with a standard set of requirements.

Wastewater Treatment Facilities Requirements

All public wastewater systems must first obtain a Permit to Install (PTI) before a treatment plant can be constructed. The PTI is issued after the plans for construction, operation, and management are examined to ensure that the receiving stream will be protected.

In Oregon, wastewater treatment plants are self monitoring. Facilities permitted by the DEQ are required to conduct laboratory analyses on wastewater discharges to determine if permit limitations are being met. The results are typically submitted monthly to the DEQ in a Discharge Monitoring Report (DMR). Manual tracking of a DMR is slow, but DEQ recently established a DMR data entry system for major facilities so that monthly data is now entered as the DMRs are submitted to DEQ. Permit writers now have direct electronic access to the major facility DMR data to review and determine if a facility is in compliance with its permit. In the future, if funding becomes available, the DEQ will add “minor” facilities to this DMR data base. The DEQ is also pursuing the potential for entering DMR data through an “E-DMR” data submittal format, but this will take several years.⁸⁶

The DEQ inspects major facilities once every two years and minor facilities once every five years. Because of staff limitations, the DEQ relies on complaints to discover most violations.

The wastewater treatment facilities are public entities. However, in some instances public facilities may contract with companies such as CHM2 Hill Engineering to run treatment plants.⁸⁷

Updating the DEQ Wastewater Permitting Program

The wastewater regulation program is complex. The number of recognized pollutants has significantly increased. The renewal of a permit requires multiple studies and extensive evaluation of the treatment process. Large volumes of data and information must be evaluated. In 2005, Senate Bill 45 was introduced by Governor Kulongoski on behalf of the DEQ as

part of the funding and program improvements package recommended by the Blue Ribbon Committee on Wastewater Permitting. Based on recommendations, the DEQ set specific goals for improvements:

- Reducing the major NPDES individual permit backlog to 10% by the end of 2007.
- Improving accountability by developing and tracking permit issuance plans and establishing individual performance expectations.
- Improving emphasis on key water quality concerns and a more holistic solution by issuing permits using a watershed approach.
- Reviewing compliance data in a timely manner and improving compliance inspections.
- Yearly reports track progress on the goals.

In addition to enacting Senate Bill 45, the Legislature approved increasing wastewater permit fee revenue by 11% and appropriated \$420,000 in additional General Funds for the wastewater permitting program for 2005-2007. In the 2007 report, the DEQ requested additional money to address program and staffing costs.⁸⁸

Septic Systems

A septic system consists of a tank and a drain field used for homes or other facilities that are not connected to a municipal sewer system. It treats sewage to prevent ground and surface water pollution. The septic tank removes “setttable and floatable solids.” The subsequent clarified septic tank outflow drains through the filters in the drain field.

Generally, when the amount of scum and sludge (the gunk at the bottom) is more than 35% of the septic tank’s volume, it is time to pump the tank. The factors determining this are roughly the size of the tank and house, plus the water usage. In newer construction, a 1,000 gallon septic tank serves up to four bedrooms. If a family of four resides there, the tank should be emptied approximately every three years, but that same tank can be pumped about every six years, if two persons share that identical house.⁸⁹ If the tank is not pumped properly, new wastewater will not have sufficient time for its solids to settle, and the drain

field will clog and cause sewage to overflow to the surface.

The DEQ regulates septic systems. OAR 340-071-0110 establishes the rules for the construction, alteration, repair, operation, and maintenance of onsite wastewater treatment systems. In addition to permission from the DEQ on siting a new septic system,



other local land use ordinances or limitations on digging may apply. Native American Tribes may also have identified some ground as ancient burial sites or former campsites,

and tribal permission to dig may be required before installing either a septic tank or a drain field.

Oregon septic workers are required to have licenses. Under OAR 340-071-0650, installer and maintenance provider license re-certification is required every three years after receiving the initial certification.

Industrial Discharges

The DEQ is responsible for monitoring and enforcement of regulations for industrial pollution. Oregon actually began regulation of industrial discharge prior to the 1972 CWA. Beginning in 1958 the secondary treatment of wastes was required for industrial plants along the Willamette River and its tributaries. In 1968, Oregon State Sanitary Authority (OSSA) rules required industries and municipalities to obtain permits before wastes could be discharged into Oregon waters.^{90,91} Today all industrial facilities that discharge process wastewater are required to obtain a permit.⁹²

The state-administered program for industrial point source discharges includes several component permits. Point source permits are required for discharges of wastewater such as sewage or processing water, wash water, and even for wastewater that may be rel-

atively clean, such as non-contact cooling water. The point source of the discharge may include a variety of disposal systems including land irrigation, seepage ponds, onsite sewage systems, and dry wells, or may discharge to surface water directly through a pipe or ditch, or indirectly through a storm sewer system.

Depending on the nature and method of discharge, industries may receive NPDES or WPCF permits from the DEQ similar to permits issued to waste treatment facilities. Alternatively for minor discharges the DEQ may decide to include the industry under a General Permit as part of an umbrella permit process.

Industrial wastewater discharge permits require monthly reports that are sent to the DEQ. Permits must be renewed every five years. Industrial dischargers do their own monitoring. The monitoring tracks the amount of pollutant, such as specific chemicals, bacteria, sediments, toxins, dissolved oxygen, excessive nutrients, and nitrates found in the water.

As part of the permitting process, federal and state regulations have set standards for acceptable levels of discharge based initially on “best practical technology” with a goal of setting standards based on “best available technology.” However, because of the diversity of industries, early standards often were based on “best available judgment.” As more information and technology becomes available, the standards are being adjusted. Because of the number and diversity of industries, the review process may not be current.⁹³

With a goal of minimizing direct discharges to waters of the state, the DEQ encourages industry to consider discharging to publicly owned wastewater treatment facilities. Wastewater treatment facilities are responsible for reviewing the nature of discharges from industrial plants and for determining requirements for quality prior to accepting discharges. Before accepting industrial discharges the wastewater treatment plant must determine that discharges will not impact its NPDES or WPCF requirements. Local facilities can charge fees and require extensive monitoring. Often the discharges must be pretreated prior to entering the sewer in order to meet the standards of the waste-

water treatment facility.

Since control of the pollutants may necessitate treatment prior to discharge to the Publicly Owned Treatment Works (POTW), the U.S. EPA recognized the need for a uniform standard for “pretreatment” of industrial waste. In 1981, the U.S. EPA authorized the DEQ to regulate pretreatment programs in Oregon.

Objectives of the pretreatment program are:

1. Protect POTWs from pollutants that may cause interference with sewage treatment plant operations.
2. Prevent introducing pollutants into a POTW that could cause pass through of untreated pollutants to receiving waters.
3. Manage pollutant discharges into a POTW to improve opportunities for reuse of POTW wastewater and residuals (sewage sludge).
4. Prevent introducing pollutants into a POTW that could cause health or safety concerns for workers, or that could pose potential danger to the public or to the environment.

Depending on the nature of the discharge the pretreatment program will vary. “Limits may often be met by the non-domestic source through pollution prevention techniques (product substitution, recycle and reuse of materials, more efficient production practices, improved environmental management systems, etc.), pretreatment of wastewater, or implementation of best management practices.”⁹⁴

In Oregon, local governments (including sewage collection and treatment agencies as defined in ORS Chap. 451, cities and counties) manage approved pretreatment programs. Oregon has about 25 approved programs that oversee more than 300 industrial users. The programs are managed through a variety of approaches including permitting, regulatory efforts, and voluntary programs between local waste treatment entities and industry.⁹⁵

The U.S. EPA has composed industry sector notebooks as guides for water pollutant controls and environmental information. These notebooks provide a holistic approach for reducing pollution, including regulations and compliance information and are

available for specific industry sectors.⁹⁶

Different industries need differing pollution reduction approaches. In June, 2007, Governor Kulongoski signed a clean water bill which required a statewide assessment of toxic pollution and pollution prevention planning by some high volume polluters. The bill provided funding to DEQ “to conduct a statewide assessment of the most dangerous pollution – chemicals that persist for a long time in the environment or that accumulate in people’s bodies – entering Oregon waterways. The Department would prioritize pollutants, identify sources, and identify available pollution prevention and reduction strategies.”⁹⁷ It will help develop solutions for facility specific pollution treatment.⁹⁸

Nonpoint Source Pollution

Oregon prides itself on its “green” concerns and thus has taken a leadership role in encouraging many practices that address nonpoint source pollution as part of the statewide planning process established in 1973. In the early 1990s, the federal government directed the activities of the CWA toward a new target, stormwater runoff, referred to as Nonpoint Source (NPS) pollution. This is water that runs over the surface of fields, roofs, driveways, roads and other impervious surfaces, dissolving or suspending and carrying these materials to water bodies. Activities, such as clearcutting forest, clearing land, storing raw materials without covering, increasing impervious surface, and intensive animal farming, can all impact water. Individual activities, such as washing cars on the street, storing landscaping dirt in the street, and dumping oil down storm sewers, also contribute to the problem. Pollution from these sources includes sediment, metals, animal waste (and accompanying bacteria), chemicals, fertilizers, oil and grease, as well as increases in water temperatures. In addition, the velocity of runoff increases when the surfaces are smooth and water is directed quickly to water bodies. This higher velocity in turn results in erosion, prevents infiltration and changes the natural flows of streams and rivers.

With recognition of runoff as a major pollution problem, the activities of individuals as well as communities, industries, treatment plants, construction sites, forestry, and agriculture all bear responsibility.

Agricultural Control of Runoff

In a speech made to the National Cattlemen's Association Board of Directors in March 1993, the U.S. EPA Deputy Director David Davis stated that EPA data show NPS pollution is the largest remaining water quality problem in the U.S. He further said that data from the states attribute 41% of the total NPS pollution to agriculture.⁹⁹

In 1993, Oregon's Agricultural Water Quality Management Act, ORS 568.900-.933, was passed. Following enactment the Oregon Department of Agriculture's (ODA) Agricultural Water Quality Program was developed. The act was amended in 1995 and "reinforces ODA's responsibility for and jurisdiction over agricultural practices and water pollution associated with farming practices on agricultural and rural lands." ORS 561.

The ODA worked in partnership with 45 local Soil and Water Conservation Districts to identify 39 watershed-based Agricultural Water Quality Management Areas across the state. A Local Advisory Committee consisting of farmers, ranchers and community leaders was established in each area to identify area water quality problems and opportunities to address these problems and to establish the Agricultural Water Quality Management Area Plans. All 39 plans have been approved by the Board of Agriculture. These plans provide the direction for



resolution of agricultural water quality issues. A list of the plans and updates is available at http://oregon.gov/ODA/NRD/docs/pdf/plans/pln_rl_hstry.pdf.

The ODA works with producers through education and assistance to ensure voluntary individual compliance. The ODA is charged with the investigation of agricultural conditions that would cause pollution of public waterways. A complaint form is available online. Complaints are investigated by ODA and a second effort is made to work with the producer through voluntary compliance. If the producer does not comply, enforcement action including civil penalties may occur.¹⁰⁰

Animal Waste Runoff

Animal waste can be a valuable resource that, when managed properly, reduces the need for commercial fertilizer. However, these wastes can affect water quality. Data indicate that approximately one-third of the agricultural NPS pollution is caused by animal waste runoff from feedlots, holding areas and pastures.¹⁰¹ Waste from animal concentrations and/or manure storage areas that are not protected can wash into streams reducing oxygen in water and endangering aquatic life. Likewise, when this waste is allowed to seep into groundwater, water quality is jeopardized. Nitrates entering well water from sources such as animal waste and fertilizer can be particularly dangerous to infants due to its capacity to cause oxygen depletion in the blood.

If proper practices are followed pollution can be reduced. These protective practices are very often referred to as Best Management Practices (BMPs) and include facilities or structures, management practices, or vegetative cover.

To address the issue of animal waste, the ODA operates the Confined Animal Feeding Operations (CAFO) Program. The program was started in the early 1980s to prevent CAFO wastes from contaminating groundwater and surface water. The general definition of a CAFO is "the concentrated confined feeding or holding of animals in buildings, pens, or

lots where the surface is prepared to support animals in wet weather, or where there are wastewater treatment facilities (e.g., manure lagoons). OAR 340-051-0010 (2), 40CFR sec 122.23.” According to the ODA, waste may include, but is not limited to, manure, silage pit drainage, wash down waters, contaminated runoff, milk wastewater, and bulk tank wastewater. See also OAR 603 Div. 74 CAFO Operation Program.

Permitting and enforcement of the CAFO program are regulated by the ODA. The ODA initially issued Water Pollution Control Facilities permits for animal waste. More recently, under U.S. EPA guidance, the ODA has begun issuing National Pollutant Discharge Elimination Program permits to CAFOs that fit the federal definition of a concentrated animal feeding operation. All permitted CAFOs must prepare an animal waste management plan. The plan provides a detailed description of facilities and operations with respect to containment, treatment, storage, and disposal of waste and wastewater, and addresses how the facility will comply with permit conditions.¹⁰²

Forestry Operations Runoff

The Board of Forestry’s mission is “to lead Oregon in implementing policies and programs that promote environmentally, economically, and socially sustainable management of Oregon’s 28 million acres of public and private forests.”¹⁰³

Forestry regulations with regard to water can be found in ORS Chap. 197 and ORS 197.180. Regulations are linked to state land use planning, the Oregon Plan for Salmon and Watersheds, and requirements for impaired waters and Total Maximum Daily Loads (TMDLs).

Strategy D of the five strategies in the Forestry Plan specifically addresses water quality:

“Protect, maintain, and enhance the soil and water resources of Oregon’s forests.

D.1. The board will support and contribute to continuing statewide efforts under the Oregon Plan for Salmon and Watersheds to protect and enhance Oregon’s native fish populations and water quality, while sustaining a healthy economy.

D.2. The board will continue to use the Forest Practices Act as the primary means to protect soil productivity and water quality and also promote ongoing voluntary resource restoration and enhancement efforts by forest landowners through the Oregon Plan.”

Urban, Industrial and Construction Runoff

State Nonpoint Source Permitting Programs For Stormwater

Under the National Pollutant Discharge Elimination System (NPDES) permit system the Federal government set up a two phase permitting process to address stormwater pollution. The DEQ has been delegated the responsibility for issuing and enforcing state permits. In Phase I, larger Municipal Separate Storm Sewer Systems (MS4) communities with populations over 100,000, industries in specific standard industrial categories (SIC) such as chemical industries, and construction sites disturbing over five acres were required to obtain permits. In Phase II smaller MS4s (communities under 100,000 that meet federal urban population definitions) and construction sites disturbing over one acre were required to obtain permits.¹⁰⁴ In most cases there is a 14 to 30 day notice period. Public notice of both new and renewed permits is posted on the DEQ website at <http://www.deq.state.or.us/news/publicnotices/pn.asp>.

Municipal Separate Storm Sewer System (MS4) Permits

The MS4 permits require communities to develop stormwater pollution prevention programs. In Oregon these programs are referred to as Stormwater Management Plans (SWMP). Pollution reductions in both Phase I and Phase II are intended to reduce pollution to the “maximum extent practical.”

Under Phase I, the large to medium size Oregon urban areas were required to submit permit applications. These applications were required for the cities of Portland, Gresham, Salem, and Eugene, Clackamas County, and Clean Water Services (Washington County). The Phase I communities were required to prepare a detailed permit application with information on their existing stormwater systems, sampling of discharges, and other specific information. These permits required self-monitoring. All permits required the development of a SWMP that included BMPs to reduce pollution to the “maximum extent practical” and to prevent additional discharges unless otherwise permitted. The communities are required to submit a yearly report on their progress in completing plan tasks.¹⁰⁵ Specific plans are available at <http://www.deq.state.or.us/WQ/stormwater/municipal1.htm>.

In Phase II, the federal government specified six components that MS4 permits for smaller urban populations area must address in a SWMP: public education, public involvement, unlawful discharge detection and elimination (including mapping of the system), construction site permitting, post construction stormwater maintenance requirements, and community good housekeeping (development of in-house BMPs). However, the Phase II federal permits did not require monitoring.¹⁰⁶ The State has the authority to develop the approach to meeting the requirements of the permit. A complete list of communities requiring permits is available at <http://www.deq.state.or.us/WQ/stormwater/municipal2.htm>.

Construction Permits

The NPDES 1200-C stormwater general permit ad-

ministered by the DEQ requires permits for construction which include clearing, grading, and excavation operations that disturb one acre or more of land. Applicants are required to submit an application form, a Land Use Compatibility Statement, and an Erosion and Sediment Control Plan. The permits for projects disturbing more than five acres are subject to public review. Effective October 1, 2006, construction sites that discharge stormwater directly to or into a storm sewer system that discharges to a water body listed as “impaired” for turbidity (water clarity) or sedimentation on the State’s 303(d) list, or to a water body covered under state TMDL pollution limits, must include stormwater sampling and BMPs to treat or control these discharges.¹⁰⁷

Industrial Permits

The industrial activities that are subject to permitting requirements are determined by SIC codes listed in the federal regulations 40CFR 122.26(b)(14) and (15). These activities include many types of manufacturing, transportation, mining, and steam electric power industries, as well as scrap yards, landfills, certain sewage treatment plants, and hazardous waste management facilities. Applicants are required to submit an application form, Stormwater Pollution Control Plan (SWPCP), SWPCP checklist, Land Use Compatibility Statement, and fees. Exemptions are available to industries that demonstrate no runoff exposures.¹⁰⁸ These industrial activities are covered by individual as well as general permits. The permits require monitoring and reporting to the DEQ.

Pesticide Runoff

Pesticides have been identified in waterways and may be a significant problem for habitat and use of water. To better track and understand this concern, the Oregon Legislature passed the Pesticide Use Reporting System in 1999. Sec. 3 Chap. 1059 Oregon Laws 1999, ORS 634.042. The law requires web-based yearly reporting of all pesticide applications (including herbicides, fungicides, insecticides): 1) conducted by a government entity such as spraying rights-of-way, insect control for public health, or testing for

research, 2) conducted by business including industry, agriculture and forestry, and 3) conducted in locations used by the public. The reporting is compiled on a watershed basis.¹⁰⁹ The report requires providing the name and identification number of the pesticide, the date applied, the quantity, location, and purpose of the application.¹¹⁰ The Pesticide Use Reporting System is due to sunset on December 31, 2009. OAR 603-057-0405 to 0418.

The DEQ is implementing a Pesticide Stewardship Program in five targeted areas around the state. Water quality is being assessed. Where pesticides are discovered the DEQ is working with local agricultural agencies and interests to develop and implement management practices to reduce pesticide levels in the waters of the state.¹¹¹

Protecting Habitat and Fisheries from Runoff Pollution

Fish and wildlife resources need both adequate and high quality water (that is, water quantity as well as water quality). Historically, fish and wildlife have suffered from a lack of free flowing, clean water. Many species have been listed as “threatened” or “endangered” under the federal Endangered Species Act. 16 USCA 1531-1534 (1973). The dramatic decline of salmon and steelhead is well known but other lesser known species, such as the Klamath Basin short-nose sucker, have also been listed. “Entire age classes of young suckers are routinely lost due to poor water quality conditions,” according to the U.S. Fish and Wildlife Service.¹¹²

Oregon has developed several programs of its own in response to declining species. Beginning in 1996 with Governor Kitzhaber’s Coastal Salmon Restoration Initiative and the subsequent Oregon Plan for Salmon and Watersheds in 1997, the state has expanded species restoration.

“The plan, in short, has achieved dramatic and significant results for salmon, watersheds, agency effectiveness, and voluntary conservation actions of the private sector.”¹¹³

The plan, based on voluntary actions taken by private landowners as well as interagency coordination of both dollars and activities, is funded by the Oregon Watershed Enhancement Board (OWEB), federal funds and salmon license plate dollars. The OWEB funding resulted from a citizen’s constitutional initiative in 1998 that allocated 15% of the net revenue of the Oregon lottery to parks and natural resources. These lottery funds are distributed 50% for “financing the protection, repair, operation, and creation of state parks, ocean shore and public beach access areas, historic sites and recreation areas”; and 50% for “financing the restoration and protection of native salmonid populations, watersheds, fish and wildlife habitats and water quality in Oregon.”¹¹⁴ See Oregon Constitution, Article XV, Section 4(b).

The DEQ provides both loans and grants for programs that address nonpoint source (NPS) pollution using funding provided under Section 319 of the federal CWA. In 2009, about \$1.6 million in grant funding is available, and the DEQ is seeking applications from government agencies, tribal nations and nonprofit organizations to address nonpoint sources of pollution affecting coastal, river, lake, drinking and groundwater resources of the state.¹¹⁵

From species protection to watershed management is a big step, but as Rick Bastasch in *The Oregon Water Handbook* notes, “What happens in a watershed can have a great impact on the timing and quality of the water it releases.”¹¹⁶ This impact, in turn, affects many economic activities in the watershed. Along with Oregon Watershed Enhancement Board, 45 Soil and Water Conservation Districts (ORS Chap. 568), and about 90 Watershed Councils “convene diverse interests in a non-regulatory forum to articulate a common vision for ecological and economic sustainability and livability in watersheds.”¹¹⁷ ORS 541.351(15).

Addressing Runoff to Coastal Tributaries

Oregon's Coastal Nonpoint Pollution Control Program

The Oregon Department of Land Conservation and Development (DLCD) administers the Oregon's Coastal Non Point Pollution Control Program (CNPCP) which was developed in compliance with requirements of Section 6217 of the Coastal Zone Management Act Reauthorization Amendments of 1990 (CZMRA).

CZMRA is administered at the federal level by the U.S. Environmental Protection Agency (EPA) and the National Oceanic and Atmospheric Administration (NOAA). The federal requirements are designed to restore and protect coastal waters from nonpoint source pollution and require coastal states to implement a set of management measures based on guidance published by EPA. The guidance contains measures for the following areas: agricultural activities, forestry activities, urban areas, marinas, hydro-modification activities, and protecting wetlands. In Oregon, the geographical boundaries for the CNPCP are the same as the Coastal Program boundary except in the Rogue and Umpqua basins where the CNPCP boundary includes these basins in their entirety.¹¹⁸

The regulatory activities supporting the program include state rules developed under other departments such as the DEQ. The CNPCP provides a strong program of technical assistance that includes the activities of the Oregon Sea Grant, an important federal educational component of nonpoint source (NPS) management.

Groundwater Pollution

Overall, little is known about the quality of groundwater in Oregon. As of a 2003 report, the DEQ had assessed the groundwater quality of less than 7% of the state. The WRD has assessed only approximately 15% of the groundwater supplies for the state.¹¹⁹ Groundwater regulation is part of the Oregon Groundwater Quality Protection Act of 1989. ORS 468B.150-190. The act sets a goal for the state to "prevent contamination of the groundwater resource, to conserve and restore the resource, and to maintain the high quality of Oregon's groundwater

resources for present and future uses." The DEQ has primary responsibility for implementing groundwater protection.

Monitoring data from ambient groundwater studies and monitoring of public water supplies show that 35 to 45 areas have some impairment or reason for concern. The most commonly detected contaminant is nitrate followed by pesticides, volatile organic

compounds, and bacteria. Data from over 14,000 private wells across the state show wells with nitrate levels above the federal drinking water standard to be as high as 18% in some counties, while other counties show none. A Ground Water Management Area can be declared if area wide contamination, due in part to nonpoint sources, is found to exceed one half of a drinking water standard or 70% of the nitrate drinking water standard. DEQ declared two groundwater management areas in the 1990s (Malheur County in Eastern Oregon for nitrates and the pesticide Dac-thal, and the Lower Umatilla Basin in North Central Oregon for nitrate contamination) and more recently added the Southern Willamette Valley. For these areas action plans are in process and monitoring is underway.¹²⁰ Another area of concern is the La Pine area of central Oregon where potential problems have been



Wallowa River. Photo taken in July, 2006.

identified from contamination due to high density on-site sewage disposal. A demonstration project is underway in this region to look at alternative innovative on-site systems. Deschutes County has recently passed additional regulations.¹²¹

Drinking water quality regulations

The Oregon Drinking Water Program (ODWP) is administered by the Department of Human Services (DHS), Public Health Division (PHD). Their responsibility is to assure Oregonians safe drinking water. The program accomplishes this by administering and enforcing drinking water quality standards for public water systems in Oregon. The ODWP “focuses resources in the areas of highest public health benefit, and promotes voluntary compliance with state and federal drinking water standards. The program also emphasizes prevention of contamination through source water protection, provides technical assistance to water systems, and water system operator training.”¹²² The regulations can be found in OAR 333-061-0032, Public Water Systems, effective 2-15-2008.¹²³ Relevant rules and regulations are in ORS 448 (Oregon Drinking Water Quality Act) and OAR Chap. 333. These standards come from drinking water standards established by U.S. EPA under the federal Safe Drinking Water Act. ODWP adopts standards no less stringent than the federal standards, directly administers and enforces them in Oregon under an agreement with the U.S. EPA called “Primacy,” and operates under U.S. EPA oversight. ODWP in turn works closely with local health departments throughout Oregon to oversee public drinking water systems.

The PHD regulates public water systems where piped water is provided to the public for human consumption. In Oregon, public water systems with greater than three hook-ups, or serving more than 10 people at least 60 days per year, are regulated. Water not distributed through pipes is regulated if there are 15 or more service connections or if it serves 25 people in a day, 60 days per year. Public systems can be small shared systems, transient non-community water

systems such as campgrounds, wayside restaurants and parks and non-transient, non-community water systems, such as schools, worksites and hospitals. According to the PHD, approximately 90% of Oregon’s citizens get their drinking water from public water systems. ORS 225.020 gives cities the right to own/operate water supply facilities. The 50 largest public water systems supply drinking water for 70% of the population of the state.¹²⁴

In terms of sources of drinking water by population, 50% of Oregon’s citizens rely solely on groundwater (mostly small systems). Approximately 30% rely solely on surface water. These are mostly large systems. Another 20% rely on surface water and groundwater.

As of 2008, there were 3,600 water systems in Oregon. The majority of Oregonians receive water through a few large water systems. There are many small systems that each provide water to only a few hundred people and are scattered throughout Oregon. About 91% of public water systems provide water to 500 or fewer people, and over half of the community water systems serve fewer than 200 people.¹²⁵

Public drinking water systems must meet specified design criteria and perform monitoring. Public systems must have a certified water operator in place. The state provides a training and certification program. Systems are required to prepare a public information report each year as well as providing the state with required reports and monitoring information.

Oregon has established a safe drinking water benchmark to measure progress of both the drinking water program and public water suppliers as they implement safe drinking water standards. The benchmark measures the percentage of the population served by community water systems that supply water meeting all health-based standards continuously during the year and the percentage of the community water systems that supply water meeting all health-based standards during the year. Approximately 1300 programs, including all larger systems across the state,

are involved in benchmarking. According to the 2007 benchmark report, 96% of individuals served by public water systems were served water that met the health-based standards, and 86% of the *community water systems* met the standard.^{126, 127}

Following the 1996 Amendments to the Federal Safe Drinking Water Act, new resources were made available for Oregon DHS to provide drinking water protection and assistance to public water systems and communities. In partnership with the Oregon Economic and Community Development Department over 80 Oregon communities have received almost \$150 million in revolving fund loans since 1997 to construct safe drinking water projects. In partnership with DEQ, "Source Water Assessments" have been completed for all public water systems serving 15 or more connections, or at least 25 people year-round. As a result the DEQ and DHS groundwater and surface water source areas which supply public water systems have been delineated. Each area has been inventoried to determine potential sources of contamination and the most susceptible areas at risk for contamination.

According to the DEQ,

As a result of the assessments, communities already have both a detailed map of where their water comes from and a list of the potential contaminant sources (natural and man-made) that may affect the water quality.... The individual communities can use the assessment results to voluntarily develop a plan to protect the source area. The assessment report provides information to the community that enables them to focus limited resources on the higher-risk areas within the watershed or recharge zones for wells.¹²⁸

CURRENT ACTIVITIES

Land Use Planning and Water

The Department of Land Conservation and Development (DLCD) oversees the statewide program for land use planning. The program, in effect since 1973,

includes both state statutes and administrative rules. State law requires each city and county to address 19 statewide goals in a comprehensive plan for local land use and to implement a development code to put the plan into effect. Land use decisions must meet state goals.

Laws stress the need for coordination in order to keep plans and programs consistent at all levels throughout the state. OAR 660.015. County and municipal Comprehensive Plans are submitted to and reviewed by the State for compliance with the goals. The planning process requires citizen review and involvement (Goal 1). The plans are expected to consider other planning documents including but not limited to the Oregon Plan for Salmon and Watersheds, the Oregon Conservation Strategy, Oregon Wildlife Diversity Plan, the Comprehensive Conservation Management Plan for the Lower Columbia River, and the Oregon Estuary Plan.

Statewide goals related directly to state waters include:

Goal 5: To protect natural resources and conserve scenic and historic areas and open spaces

Goal 6: To maintain and improve the quality of the air, water and land resources of the state

Goal 2 requires local governments to establish a land use planning process and policy framework as a basis for all decisions and actions related to land use and to assure an adequate factual base for such decisions and actions. Goal 11 relates to planning and developing a timely, orderly, and efficient arrangement of public facilities and services, including those for water, sewer/septic, and stormwater, to serve as a framework for urban and rural development. However, the biggest barrier to linking land use decisions to water quantity and quality is lack of scientific data on Oregon's water resources, especially in rural areas. Local governments, when reviewing land use applications, must rely on data from the applicant except in a few places in Oregon where government or impartial scientific data exists. In cases where there is opposition, decision-makers must deal with dueling experts

when considering water issues. An additional barrier is the jurisdictional disconnect between local governments and state agencies.¹²⁹

The statewide land use planning program also has goals related to coastal issues. These are:

- Goal 16: Estuarine Resources,
- Goal 17: Coastal Shorelines,
- Goal 18: Beaches and Dunes,
- Goal 19: Ocean Resources¹³⁰

Planning agencies must consider state and federal regulations, including issues surrounding TMDLs and impaired waters. In conjunction with other state departments, DLCDC has prepared a Water Quality Model Code and Guidebook available at http://www.oregon.gov/LCD/OCMP/WQ_modelcode.shtml. The state's water permit guide is available at http://www.oregonstatelands.us/DSL/PERMITS/docs/WRPPIT_guide_2008_lms.doc.

In 2005, the Legislature passed Senate Bill 82 that established the Oregon Task Force on Land Use Planning known as "The Big Look." The task force is charged with studying and making recommendations to the 2009 Legislature on:

1. Oregon's land use planning program in meeting the current and future needs of Oregonians in all parts of the state;
2. Respective roles and responsibilities of state and local governments in land use planning; and
3. Land use issues specific to areas inside and outside urban growth boundaries and the interface between areas inside and outside urban growth boundaries.

Among the issues brought to the task force has been how to better connect the issues of water quality and quantity with land use decisions.¹³¹

Infrastructure Needs

According to a 2008 report prepared for the Legislature, an estimated 2,700 public water systems in

Oregon are subject to regulation under the federal Safe Drinking Water Act. An estimated 208 publicly owned wastewater collection/treatment systems serve the majority of Oregon's urban centers.¹³²

The estimated combined total cost to repair or replace antiquated systems or construct improvements sufficient to come into or maintain compliance with state and federal regulations for water or wastewater infrastructure improvement needs exceeds \$4.48 billion. Of that number, state economists estimate that there is a \$1.23 billion gap between what communities have in local revenues to finance themselves and the total cost of improvements. For many of Oregon's small- to medium-sized communities, the impact on economic competitiveness of the community will be enormous.

Climate Change

Across the country, states and regions are adopting policies to address climate change. Since 1920 temperatures have been rising in the Pacific Northwest. The average annual precipitation has changed, land is being submerged on the central and northern Oregon coast, and the snowpack level has declined. Between 1950 and 1995 snowpack in the Cascades decreased by about 50% and peaked earlier in the year. Changes in the hydrological system may result in coastal and river flooding, continued snowpack declines, and lower summer river flows.¹³³

By the 2040s the average annual temperature is expected to increase by 4.1° F. This trend is expected to continue. The Northwest will have drier summers and wetter winters with more rain and less snow. This will include great risks for floods in winter and decreased late-spring and summer streamflows. Storm severity may increase in Oregon, melt snow packs faster, cause more flooding, decrease summer streamflows and yield less water for fish, irrigation, drinking water, recreation, and pollution abatement.¹³⁴

A law signed by Governor Kulongoski in 2007 aimed to reduce greenhouse gas emissions with three goals: by 2010 to begin reducing gases, by 2020 to achieve

greenhouse gas levels 10% less than 1990 levels, and by 2050 to achieve greenhouse gas levels 75% below 1990 levels. This bill also established a Global Warming Commission of 25 members, which is responsible for meeting the greenhouse gas reduction targets, to examine cap and trade systems, to develop an educational strategy and to track impacts on Oregon.¹³⁵

Oregon belongs to the Western Climate Initiative (WCI), a regional collaboration launched in February 2007 by the governors of Arizona, California, New Mexico, Oregon, Washington and two Canadian provinces to develop strategies to address climate change. The recommendations from the WCI are expected in 2009.

Water Supply and Conservation

In 2007, the Legislature funded the Oregon Water Supply and Conservation Initiative to assess existing and long-term water supply needs, inventory potential storage sites, analyze conservation opportunities, calculate basin yield estimates, and provide grant funding for community and regional water planning.

In 2008, the Water Conservation, Reuse and Storage Grant Program, established by Senate Bill 1069, was designed to fund the qualifying costs of planning studies that evaluate the feasibility of developing water conservation, reuse or storage projects. Funding of \$1.6 million is available for grants, with a maximum award of up to \$500,000 for each feasibility study.

As a result of these efforts, new legislation is expected in 2009 to build on the information gathered from the work being done at the local level through these grants.¹³⁶

A SNAPSHOT IN TIME

This document outlines the current status of laws and regulations in Oregon controlling the use and protection of our waters. It does not intend to provide in-depth information of individual regulations, but rather a guideline for deeper study of individual issues. Regional, city and county regulations have not been discussed in this document. Since laws and regulations are constantly changing, users are encouraged to verify information for specific projects.

In developing this report, the study committee has learned that many regulations overlap, agencies approaches differ, and goals may sometimes conflict. For example beneficial uses for water removed from waterways may conflict with protection of the quality of a stream. The committee has observed that the most significant user of water is agriculture for irrigation and conflicts relating to protecting fish under the Endangered Species Act are occurring. The study committee has also learned that many decisions are dependent on the scientific knowledge of our waters. The demands on agencies are significant and enforcing regulations is challenging.

After reviewing this document readers should have a better understanding of water regulation. Based on this understanding, readers may be better able to protect our scarce water resources and to participate in more efficient consumption of Oregon water. Part two of the report will provide an in-depth discussion of current water issues and concerns.



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ACRONYMS

ACRONYM	TITLE	SOME ACTIVITIES
BMP	Best Management Practice	Generally good housekeeping practices including both designed structures and employee procedures intended to reduce pollution.
CAFO	Confined Animal Feeding Operations Program	Programs regulated by the ODA to manage waste from Animal feeding operations.
Corps/COE	Army Corps of Engineers	Responsible for investigating, developing and maintaining the nation's water and related environmental resources, dams, and wetlands.
CWA	Federal Clean Water Act	Federal law, rules and regulations for water quality first enacted in 1972.
DEQ	Oregon Department of Environmental Quality	General surface and ground water quality, NPDES and WPCF permitting, water quality monitoring, civil penalties for violations, septic systems.
DHS	Oregon Department of Human Services	Responsible for public health issues.
DLCD	Department of Land Conservation and Development	Oversees water supply planning, land planning, coastal zone management.
DSL	Department of State Lands	Wetland administration, hydroelectric licensing, navigable waters
EPA	Environmental Protection Agency	Is a federal agency (some states have EPAs, but Oregon does not). Leads the nation's environmental science, research, education and assessment efforts. The mission of the Environmental Protection Agency is to protect human health and the environment.
FERC	Federal Energy Regulatory Commission	Regulates all interstate energy including hydroelectric energy
MS4	Municipal Separate Storm Sewer System	Municipalities required to hold NPDES permits for stormwater discharges
NPDES	National Pollution Discharge Elimination System	Federal permitting for discharges to U.S. waters
NPS	Nonpoint Source Pollution	Pollution discharge by runoff over surfaces to water of U.S.
OAR	Oregon Administrative Rules	ORS 183.310(9) defines "rule" as "any agency directive, standard, regulation or statement of general applicability that implements, interprets or prescribes law or policy, or describes the procedure or practice requirements of any agency." The Oregon Administrative Rules are published by the Oregon Secretary of State.
ODA	Oregon Department of Agriculture	Confined animal feed operations and agricultural management plans.
ODF	Oregon Department of Forestry	Implementation of the Oregon Forest Practices Act, which provides for timber harvest using techniques that are consistent with conservation and environmental protection.
ODFW	Oregon Department of Fish and Wildlife	Oregon Plan for Salmon and Watersheds.
ORS	Oregon Revised Statutes	The Legislative Counsel Committee, pursuant to ORS 171.275, publishes Oregon Revised Statutes and distributes the up-to-date statute text, index, comparative section tables and annotations.
PHD	Public Health Division of the DHS	Manages the drinking water program.
POTW	Publically Owner Treatment Works	Treats wastewater and regulates what can go down the sewer
PS	Point Source Pollution	Pollution discharged directly to a water of U.S. (from pipes or constructed drainage flows.
SWMP	Stormwater Management Plan	A plan including BMPs to reduce pollution in stormwater discharges
TMDL	Total Maximum Daily Load	Defined amount of pollutant that can enter a water and still maintain beneficial use for water.
WPCF	Water Pollution Control Facility Permits	Permits issued for wastewater discharges that do not directly enter waters
WRD	Oregon Water Resources Department	Regulates surface and ground water permits, water right transfers and cancellations, well construction, water use monitoring and enforcement, stream water flow, ground water levels, droughts and water emergencies, civil penalties for violations.
WRC	Oregon Water Resources Commission	A seven-member citizen body established by statute to set water policy for the state and oversee activities of the Water Resources Department in accordance with state law.