WALLA WALLA WATERSHED INITIAL ASSESSMENT

DRAFT

May 1995

With our multitudes of lakes, streams, and rivers, Washington State seems to have an abundance of water. However, the demand for water resources has steadily increased each year, while the water supply has stayed the same, or in some cases, declined. This increased demand for limited water resources has made approving new water uses complex and controversial.

The purpose of this assessment is to evaluate existing data on water to make decisions about pending water right applications and does not affect existing water rights.

To expedite decisions about pending water right applications, it is vital that we accurately assess the quality and quantity of surface and ground water. The Washington State Department of Ecology recognizes that water right decisions must be based on accurate scientific information. Ecology is working with consultants to conduct special studies called Initial Watershed Assessments throughout the state.

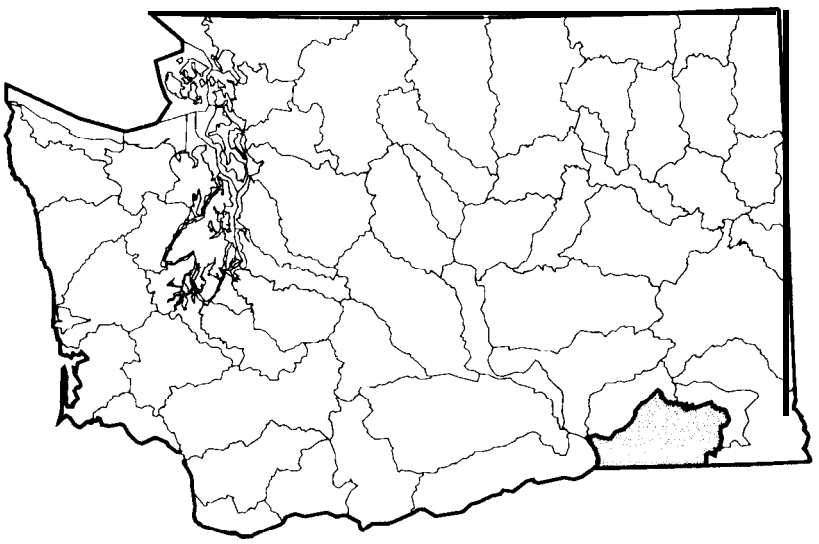
The assessments describe existing data on water rights, streamflow, precipitation, geology, hydrology, water quality, fisheries resources, and land use patterns. Some assessments provide straightforward results, allowing immediate water management decisions. In watersheds with little existing information, further studies will be necessary to acquire new data. In watersheds where major public policy conflicts exist, or where significant land use impacts are expected, water management decisions will be coordinated with local and regional planning processes.

This report summarizes information presented in the detailed Ecology Open-File Technical Report No. 95-11. It also presents some actions that could be taken in response to the results of this assessment.

Pacific Groundwater Group, Inc. and Associated Firms

Prepared in cooperation with the ***Washington Department of Ecology***

Walla Walla Watershed



What are the water allocation issues?

- Ecology needs to make decisions on 69 pending applications for water rights.
- Streamflows in the watershed are totally appropriated during the irrigation season. Summer flows in the Walla Walla River are extremely low and do not adequately protect instream uses.
- Fish stocks are depleted due to low flow conditions, habitat degradation, and the presence of dams on the Columbia River. Some species have entirely disappeared from the river system.
- Ground water and surface water are closely interconnected in the watershed. Pumping from the gravel aquifer will reduce flows in the Walla Walla River and associated tributaries.
- Pumping from the basalt aquifer system has resulted in significant ground water level declines.

WR-95-159

What is a watershed?

A watershed is an area of land where topographic features such as hills and valleys cause water to flow toward a single major river or other body of water. The Walla Walla watershed encompasses portions of Walla Walla and Columbia counties (Washington) and Umatilla County (Oregon). For the purpose of this assessment, discussion of "the watershed" refers to only that portion within Washington State.

Where does the water come from?

Ultimately, all of the streams, lakes, springs and other surface water and ground water in the watershed comes from rain or snowmelt. Some of this water evaporates or is used by plants, some flows into the streams and rivers, and the rest infiltrates into the soil to become ground water. Some segments of streams and rivers gain water from ground water that seeps into the channel. Other segments lose water that leaks through the streambed into the ground.

Precipitation averages 14.7 inches per year over the entire watershed and ranges from about 5 inches per year in the western part of the watershed to 45 inches per year in the Blue Mountains to the east. According to rainfall records at the Mill Creek Dam, summer is the driest season, with about 12 percent of the total precipitation falling between July and September.

What are the major surface water sources?

The Walla Walla River and its tributaries are the major surface water sources in the watershed. The main tributaries are the Touchet River and Mill Creek. Some of the flow in these rivers and streams is diverted into a complex system of irrigation ditches and canals. Surface water is also diverted directly from the Columbia River for irrigation in the western portion of the watershed.

Flow in the watershed's rivers and streams has three sources: ground water discharge to streams, overland runoff during wetter periods, and irrigation return flows during the irrigation season. Streamflows during the dry summer months are sustained by ground water discharge and irrigation return flows. Streamflows during other periods are closely linked to rainfall and therefore vary widely.

What are the major ground water, sources?

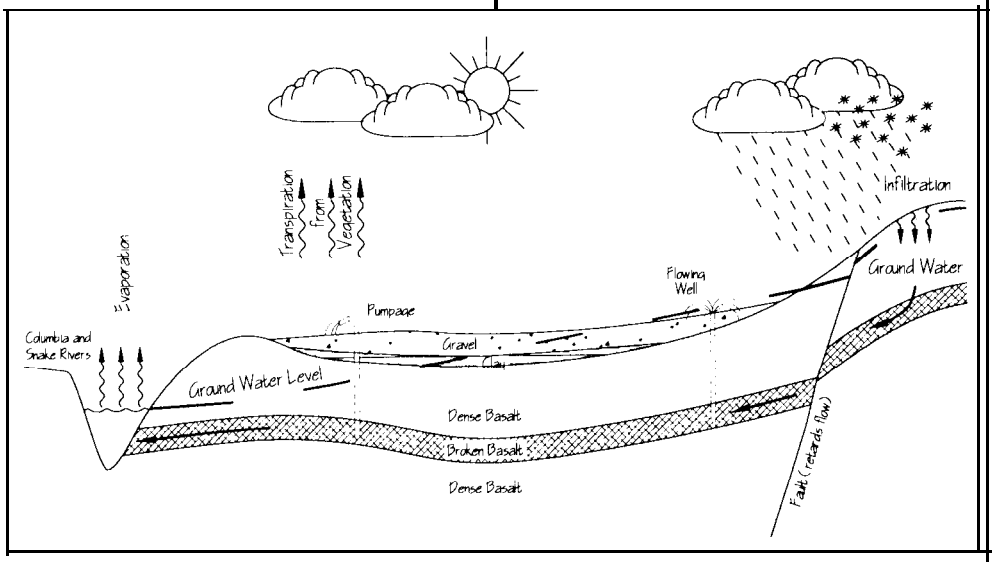
Two major ground water sources, known as aquifers, exist in the watershed. The "gravel aquifer" consists of sands and gravels deposited by the Walla Walla River and neighboring streams in the central part of the watershed. Beneath this aquifer is a layer of clay which restricts further downward ground water movement.

A deeper system of aquifers is found in an extensive sequence of layered lava flows known as the Columbia River Basalts. The aquifers occur as thin water bearing layers separated by relatively thick layers which do not contain usable amounts of ground water. The porous water bearing layers comprise about ten percent of the total basalt thickness. Flow between these aquifers tends to be restricted by the non-water bearing portions of the basalts.

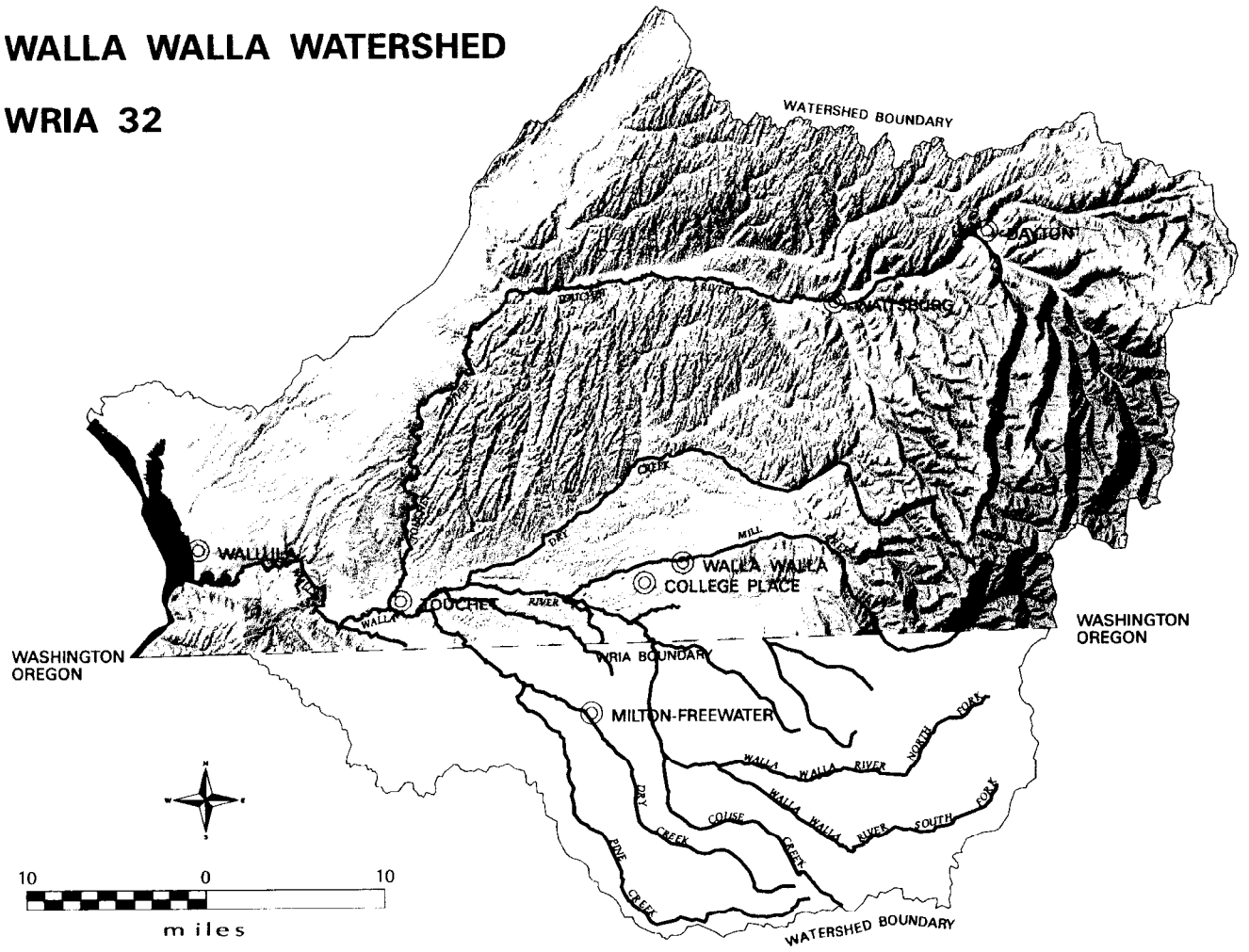
How are surface and ground water connected?

In areas where both surface water and ground water are used, the connections between the two sources become important. In some instances, ground water flows from the aquifer to the surface water body, while in others the reverse occurs. Ground water provides the total flow in the rivers and creeks when there is no rain or snowmelt to contribute to the flow.

In the Walla Walla watershed, the gravel aquifer is directly connected to local rivers and streams. The gravel aquifer is recharged in places, particularly at higher elevations, by downward seepage through overlying streambeds. In other places, the gravel aquifer discharges to the Walla Walla River and other streams. The deeper basalt aquifer system is naturally isolated from the Walla Walla River and its tributaries, but is connected on a more regional scale to the Columbia and Snake rivers.



The hydrologic cycle in the Walla Walla watershed



Map of the Walla Walla watershed. Note that this study is limited to the portion within Washington State.

Where ground water and surface water are directly connected, pumping of additional ground water will reduce river flows. In the Walla Walla watershed, pumping of the gravel aquifer will reduce streamflows in the Walla Walla River and other local streams. Pumping from the basalt aquifer system has resulted in significant ground water level declines, and has likely reduced ground water discharge to the Columbia and Snake rivers.

How is water used?

According to State records, water allocated in the Walla Walla watershed is almost evenly divided between surface water and ground water sources. Surface water is almost entirely (99 percent) used for irrigation. Ground water is predominantly (62 percent) used for irrigation, with lesser quantities used for municipal **(13** percent) and domestic (12 percent) purposes. Pie charts showing surface water and ground water allocations by use are shown on Page 5.

How does land use affect water?

Land use affects water availability by modifying patterns of recharge and runoff and by intercepting water along its flow path. Some land uses, such as municipal and irrigated agriculture, consume large amounts of water. Other land uses, such as range land, require less water.

Seventy-five percent of the Walla Walla watershed is used for cropland, much of it irrigated. Municipal, industrial and domestic water use is concentrated around Walla Walla, College Place, Dayton and Waitsburg, which occupy four percent of the watershed. The remaining twenty-one percent of the watershed is range and forest land.

Water availability is affected by surface water and ground water withdrawals. Irrigation requires substantial surface water and ground water withdrawals during the growing season; while municipal, industrial and domestic uses require year-round supplies (which are generally obtained from ground water). Patterns of recharge and runoff in the watershed have been modified by irrigation practices, agricultural grading, and paving of municipal surfaces.

Land use practices can adversely affect water quality. Agricultural practices may cause leaching of fertilizers and pesticides into ground

water, removal of streamside vegetation, and soil erosion. Municipal and domestic development also tends to increase pollution from "non-point" sources, such as lawns, septic tanks, and roads.

What are the water quality issues?

Water quality is closely tied to water quantity. Water supplies must be of high quality for drinking water use and to support fish and wildlife. At the same time, water quality may depend on maintaining large quantities of clean water to reduce the adverse effects of pollutants and increased surface water temperatures. Removing streamside vegetation tends to raise water temperature to a level that may be harmful to fish and other aquatic animals and plants.

The Walla Walla River and some other streams in the watershed occasionally experience problems with water quality. Problems include: high temperatures, pH (acidity), fecal coliform and heptachlor on the Walla Walla River; high temperatures, pH and fecal coliform on the Touchet River; high temperatures on the North Fork Touchet River; and phosphorus, nitrogen, high temperature, and fecal coliform on Mill Creek.

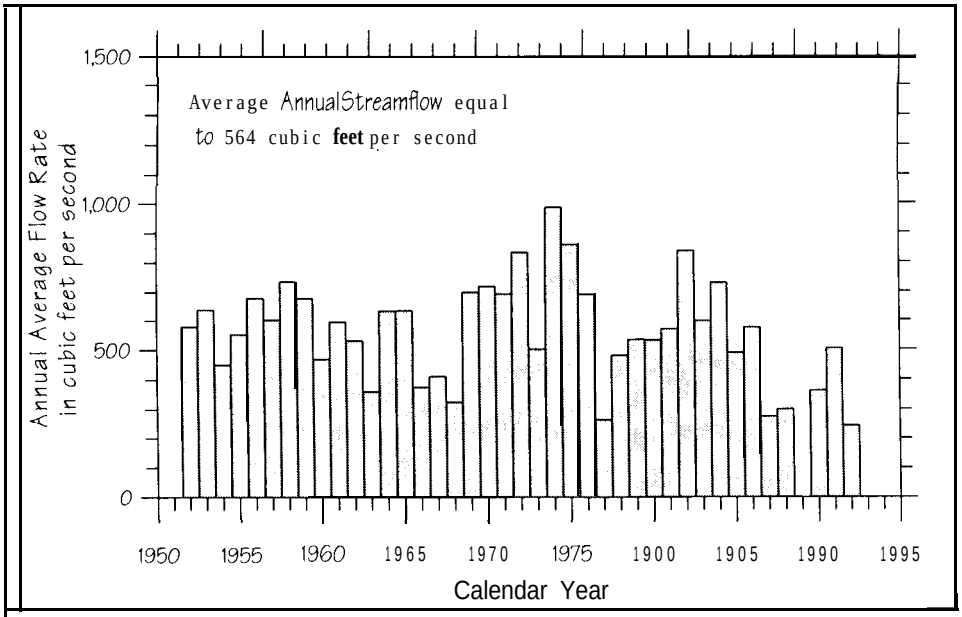
Recent studies (EES and Pacific Groundwater Group, 1995) have identified nitrate and coliform bacteria contamination of the gravel aquifer near Walla Walla. This contamination appears to be associated with agriculture and/or septic drainage.

Are fish resources stable?

Much of the information on fisheries issues in the Walla Walla watershed is found in the "SASSI" (Salmon and Steelhead Stock Inventory) study, prepared by the Washington Departments of Fisheries and Wildlife, with assistance from 23 Indian tribes and tribal organizations.

According to the SASSI report, the Walla Walla watershed currently supports two stocks of summer steelhead. These stocks are listed as "depressed," meaning fish production is below expected levels based on available habitat and natural survival rates, but above the level where permanent damage to the stock is likely. Causes for this condition are low flows, habitat degradation, and the presence of dams downstream on the Columbia River.

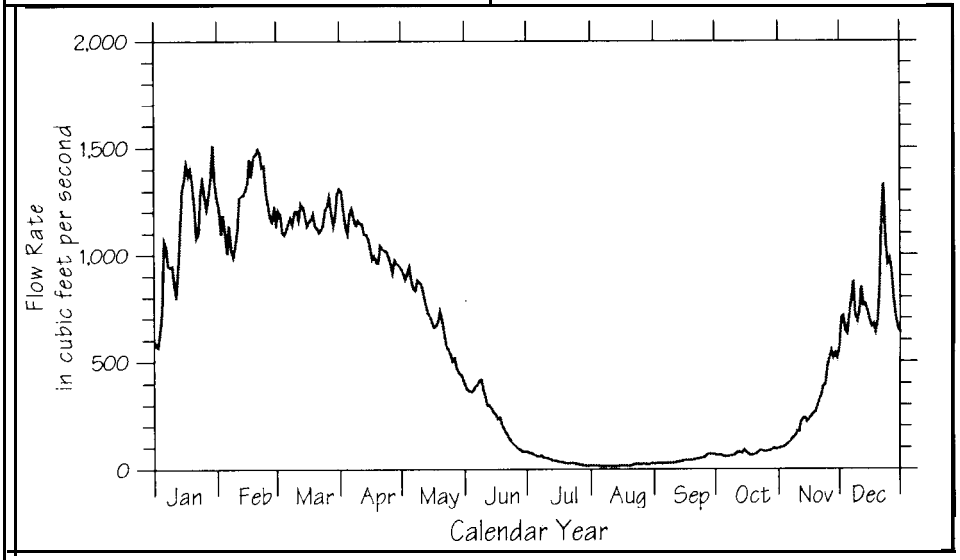
Chinook, chum, coho and sockeye salmon are reported to have once inhabited the watershed, but are no longer present. The watershed also supports a number of other fish species whose survival is of concern, including Dolly Varden/bull trout, pygmy whitefish and sea-run cutthroat trout (Washington Department of Fish and Wildlife, 1994).



Annual flow in the Walla Walla River at USGS gaging station near Touchet.

How have streamflows changed?

Annual streamflow in the watershed varies widely from one year to the next in a pattern similar to annual



Mean daily flow in the Walla Walla River near Touchet. Most of the river's flow occurs in winter and spring, when demand is lowest and fisheries habitat is least critical.

precipitation. This high variability is demonstrated by the streamflow record from the Walla Walla River near Touchet (see graph, top left). This stream gage is located near the mouth of the Walla Walla River and therefore includes the contribution of all the river's major tributaries.

Seasonal variability of streamflow follows a more predictable pattern. The graph of mean daily flows at the Walla Walla River near Touchet (bottom left) shows that summer low flow conditions occur between June and October. These reduced flows are caused both by decreased precipitation and storm runoff and by seasonal stream diversions and ground water pumping for irrigation. Historically, all of the Walla Walla River flow upstream of the Oregon border has been diverted during the irrigation season. Return flows from irrigation and ground water discharge through the streambed provide summer flows in the Walla Walla River downstream of the border.

To protect senior water rights, Ecology imposed seasonal closures on all streams within the watershed in 1977. These closures were imposed because these streams are considered totally allocated during the irrigation season and water is not available for protection of instream uses. Setting of instream flows was deferred in this process pending the development of possible storage projects.

Analysis of streamflow data at four gages within the watershed (Touchet River, Walla Walla River, and two on Mill Creek) shows below average annual streamflows beginning in the mid 1980s. The streamflow data, which begins in the 1940s and 1950s, do not strongly suggest long-term declining trends. The effects of climatic variation were not assessed, but may play a significant role in understanding streamflow trends. Summer low streamflows, in general, appeared to be stable. The period of record, however, is not sufficiently long to determine how streamflows have changed relative to pre-3evelopment conditions.

What are water rights?

4 water right is a legal authorization to use a certain amount of public water for specific beneficial purposes.

State law requires every user of streams, lakes, springs and other surface waters to obtain a water right permit before using these waters. People who use ground water also need a water right permit unless they use 5,000 gallons or less each day for one or more of the following purposes: watering stock, watering a lawn or garden less than one-half acre in size, or for a single or group domestic or industrial water supply.

What are water right claims?

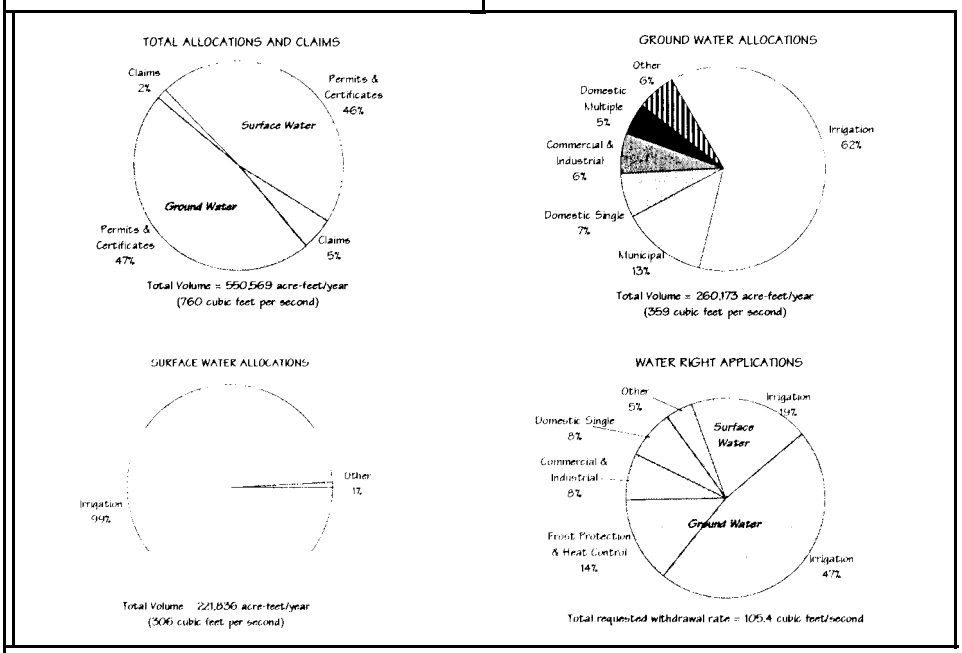
A water right claim is just that, a claim for a right to use water. A water right claim on file with Ecology may or may not represent a valid water right. The validity of a claim can only be established through a superior court determination of water rights. Surface water claims were adjudicated in 1920. Since the adjudication, 2,560 claims have been filed within the watershed for a flow equivalent to about 13 cfs. In addition, a total of 678 ground water claims have been filed for a flow equivalent to about 38 cfs.

Why are water rights important?

The basis for water rights is "first in time, first in right." This means people with older, or senior, rights get to use the water first when there is not enough for everyone. The water rights program ensures that Washington's water resources are appropriately allocated and managed. By effectively managing allocation of new water rights, Ecology can protect senior water rights and benefit the overall public good.

How is water currently allocated and what new uses are proposed?

By volume, water allocations in the watershed are almost evenly divided between ground water and surface water. The 1,316 ground water rights



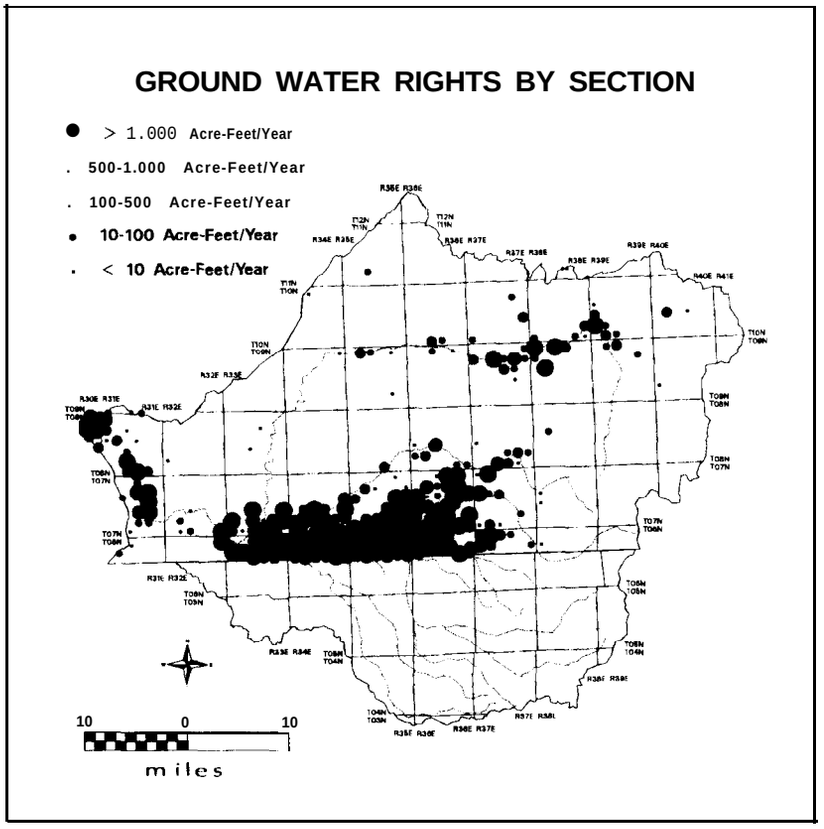
Distributions of water rights in the Walla Walla watershed by use and by :ategory (permits/certificates, claims, and applications).

issued by Ecology are equivalent to a flow of 359 cfs, and the 1,735 surface water rights are equivalent to a flow of 349 cfs.

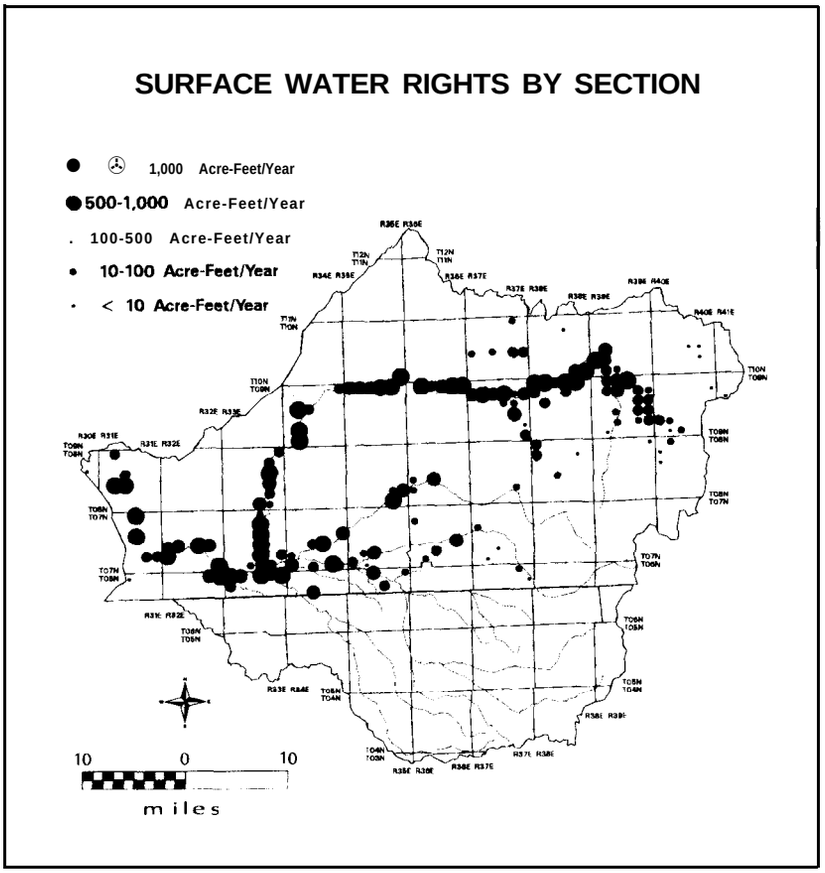
Ecology currently has applications for 62 ground water rights and 7 surface water rights. Applications are filed for specific pumping rates or diversion flows, however allowable annual withdrawal volumes may be less. Ground water applications are requesting about 86 cfs for irrigation and (to lesser extents) frost protection/heat control and several other uses. Surface water applications are requesting approximately 20 cfs, almost entirely for irrigation,

The distributions of water rights and applications by use and category are shown on the previous page. The geographic distribution of water rights is shown below and to the right.

The amount of water allocated probably exceeds the amount actually used. This assessment indicates that ground water use in the Walla Walla watershed is not well quantified, but is estimated to be about 20 percent to 35 percent of allocations. Similarly, surface water use is estimated to be about 25 percent of allocations.



Ground water rights in the Walla Walla watershed



Surface water rights in the Walla Walla watershed.

Allocations represent the volumes legally available for use if all water rights are exercised. If the amount of water used approaches the amount allocated, further streamflow reductions are likely to occur.

What are the conflicts?

Water use conflicts occur when the available water supply is insufficient to fulfill existing water rights and claims while maintaining reasonable streamflows. Future conflicts could occur if current water rights are fully used or if permits are granted which interfere with senior water rights.

Streams in the watershed are currently considered to be totally appropriated during the irrigation season, with additional streamflow unavailable for protection of other instream values. Average annual flow in the Walla Walla River near Touchet is 564 cfs. Water rights in the watershed amount to 349 cfs for surface water and 359 cfs for ground water. Many of these appropriations are capable of affecting streamflow in the Walla Walla River because they directly divert surface water or withdraw ground water from the gravel aquifer. If existing water

rights are more fully utilized, stream-flow reductions and possible conflicts between water right holders may result.

In addition to appropriations, water right claims exist for about 51 cfs and current applications are requesting as much as 106 cfs. Some of these withdrawals could affect streamflow in the Walla Walla River, while others, such as those from the Columbia River and the basalt aquifer system, would not. Although surplus streamflow appears to be available during the winter months, many of the claims and applications are for irrigation withdrawals which occur during the summer months when streamflows are already very low.

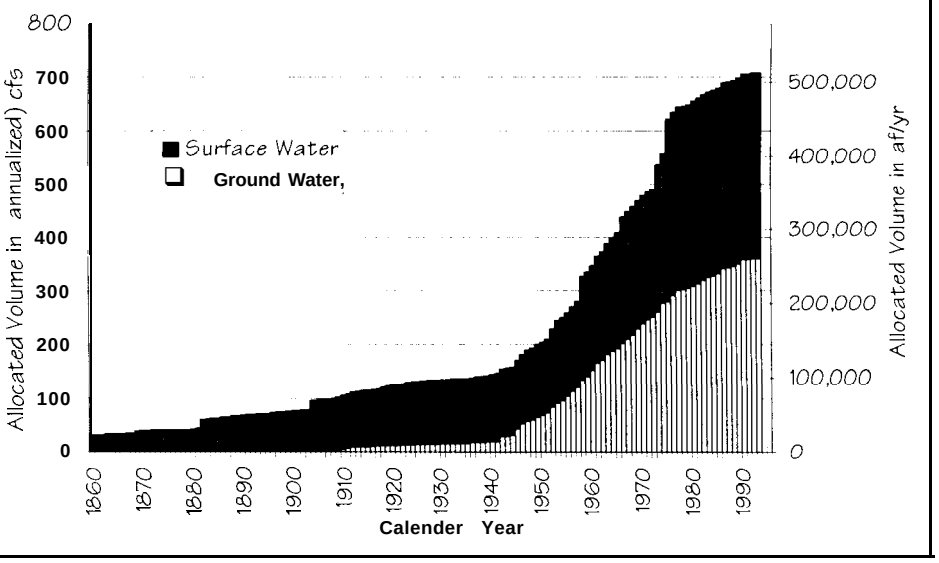
Additional ground water withdrawals from the basalt aquifer system will cause associated water level declines. Senior water right holders may be impaired in areas of significant decline.

Where do we go from here?

While Ecology is mandated by law to protect instream water use and existing water rights, Ecology also is responsible for making decisions on applications for new water rights. The public's opinion is important to Ecology in making program decisions related to water use. Ecology invites public input on what steps should be taken next. We will also work with people who have applied for new water rights in the area to discuss options for processing their applications.

What additional information is available?

If you would like more about water rights issues in the Walla Walla watershed, the following studies and technical reports are available:



Water rights versus time in the Walla Walla watershed.

Confederated Tribes of the Umatilla Indian Reservation, Oregon Department of Fish and Wildlife, Washington Departments of Fisheries and Wildlife. 1990. Walla Walla River Subbasin Salmon and Steelhead Production Plan. Confederated Tribes of the Umatilla Indian Reservation, Pendelton, OR.

EES (Economic and Environmental Services) and Pacific Groundwater Group. 1995. Draft Pre-Ground Water Management Area Study. Prepared for the Walla Walla Urban Area Water User Coordinating Committee.

Ecology. 1977. Basin Program Series No. 6, Water Resources Management Program, Walla Walla River Basin (Water Resources Inventory Area Number 32). Prepared by the Policy Development Section of the Water Resouces Management Division.

Ecology, 1988. Water Resources Program for the Walla Walla River Basin, WRIA 32. Chapter 173-532 WAC.

Ecology. 1995. Initial Watershed Assessment, Walla Walla River Watershed. OFTR 95-I 1. Washington Department of Ecology

WDF & WDW. 1993. 1992 Washington State Salmon and Steelhead Stock Inventory. Washington Departments of Fisheries and Wildlife

WDFW. 1994. Walla Walla WRIA: Map products produced from the Washington Department of Fish and Wildlife WARIS database. Prepared by Marshall and Associates.

For more information ...

Contact Bruce Howard, (509) 456-5057 (voice), (509) 458-2055 (TDD), or write the Department of Ecology, Water Resources Section, 4601 N. Monroe, Suite 202, Spokane, WA 99205-I 295.

Ecology does not discriminate in its services. If you have special communications needs, contact Lisa Newman at (360) 407-6604 (voice) or (360) 407-6006 (TDD).

What do we know about the Walla Walla watershed?

This assessment found that ground water and surface water are closely interconnected and pumping from the gravel aquifer will reduce flows to the Walla Walla River and associated tributaries. Pumping from the basalt aquifer system has caused significant water level declines, Precipitation and streamflow are lowest during the irrigation season when demand for water is greatest. Maintaining water quality and aquatic habitat also depend on adequate streamflow. Because of these findings, the Walla Walla watershed is classified as "high risk" by Ecology. Ecology must consider potential impairments to existing water rights and instream resources when making decisions on pending water right applications.

What actions can be taken?

Based on the risk, Ecology could take a number of actions. Usually, a combination of actions is needed to effectively manage water resources. The list below describes some actions that could be taken to address the water issues raised in this report. This list is not comprehensive. Ecology wants to hear your opinions on the actions listed below, and any other ideas you have.

Encouraae water conservation. changes and transfers of water riahts. water reuse. and pipeline interconnections to make efficient use of water.

Pro: May meet new water use demand without adversely affecting streamflow and senior water rights.

Con: May only be applicable to municipalities or other large water users.

Increase storaae of water durina high streamflow periods for use durina low streamflow periods. Surface water storaae or aauifer recharae Droiects could be used to enhance low flows durina the summer demand season.

Pro: Allow for additional water rights to be issued without adversely affecting water resources during periods of low flow.

Con: Potentially expensive, may be difficult to find suitable site, may require cooperation of others.

Approve around water withdrawals from the basalt aquifer svstem which do not cause unacceptable water level declines, until the withdrawal limit established bv rule (WAC 173-532-070) is reached.

Pro: Could allow issuance of new water rights without impairment of senior water rights.

Con: Currently available water rights data are insufficient to determine if the regulatory withdrawal limit has been reached.

Denv applications for new water riahts from the gravel aquifer and surface waters durina Deriods of regulatory closure.

Pro: Applicants would get a decision, new water rights would not further degrade or diminish water resources, and senior rights would be protected.

Con: No new year-round withdrawals would be approved.

Encouraae reaional watershed planning to resolve conflicts about water with the greatest participation by residents of the watershed.

Pro: Cooperation between water interests would allow more flexible solutions and cost-effective approaches to water issues. Activities could include increases to storage and/or storm water retention areas, improvement of aquatic habitat and water quality, interconnection of water suppliers, and additional collection of hydrogeologic and water use data. A regional perspective could be used to meet new water uses.

Con: Would require time, money, and political consensus to create and carry out the plan. Availability of funding is uncertain.