PUYALLUP-WHITE 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. It does not affect existing 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, stream flows, 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. 95-08. It also presents some actions that could be taken in response to the results of this assessment.

Science Applications International Corporation
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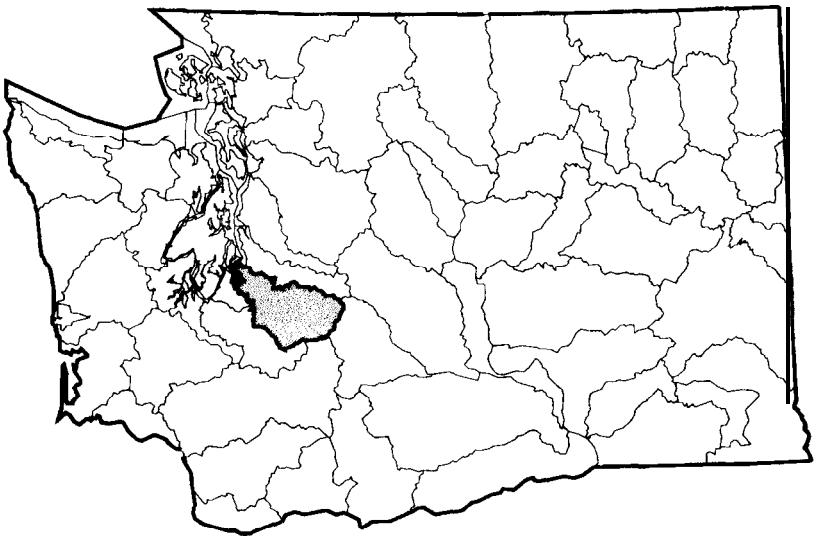
In partnership with the:
Washington Department of Ecology

Poyallup-White Watershed Location Map



What are the water allocation issues?

- Ecology needs to make decisions on 44 pending water right applications.
- Streamflow data indicate a decrease in low flows during the past 20 years despite above average precipitation and closure of some streams to new water rights.
- Stream flows are lowest and water quality is degraded when some Pacific salmon species migrate upstream to spawn.
- Population growth is steadily increasing the demand for water. Increased water use will likely further degrade water quality and fish habitat.

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.

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.

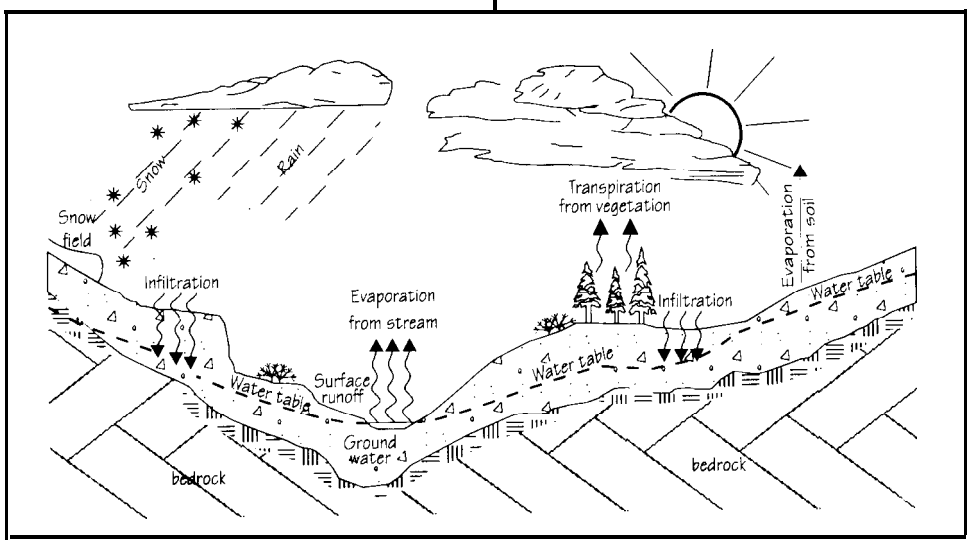
Average annual precipitation in the Puyallup-White watershed ranges from about 39.4 inches at Tacoma to over 80 inches in the Cascade Mountains. Data from the Seattle and McMillin weather stations show that precipitation has been higher than average from the mid-1950s through the present.

What are the major surface water sources?

The largest surface water source is the Puyallup River. Major tributaries to the Puyallup River include the Carbon and White rivers and South Prairie Creek. On the White River, the U.S. Army Corps of Engineers controls the flow of water through Mud Mountain Dam to prevent flooding and maintain minimum flows. Puget Sound Power and Light diverts water at two locations for electrical generation. One diversion is on the White River for the White River Canal, and the other is on the Puyallup at Electron.

What are the major ground water sources?

In the upper part of the watershed, much of the geology is the volcanic rocks of Mount Rainier and the Cascade Mountains. These rocks do not form productive aquifers, so ground water is not the main source of water in that area. At lower elevations, the glacial deposits of the Puget Sound area form more productive aquifers. The major aquifers are found in the Puyallup Valley and its tributary valleys that are filled with porous sand, silt, and gravel deposits.



The hydrologic cycle in the Puyallup-White Watershed (modified from Walters and Nassar).

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, the ground water flows from the aquifer to the surface water, 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.

Along the lower reaches of the Puyallup and White rivers, ground water pumping can significantly lower both ground water levels and water flows in the river. Before issuing future ground water rights, Ecology must consider potential effects on other water users.

How is water used?

The major surface water uses in the Puyallup-White watershed are irrigation, and municipal and domestic supplies. Surface waters are also used for protection of water quality, fish populations, recreation and navigation.

The major ground water uses in the watershed are public water supply and single wells.

How does land use affect water?

Land use practices have profound effects on the amount and quality of water moving through the watershed. Logging operations can strip soils of vegetation, increasing the amount of runoff. Increased soil erosion from this runoff can cloud the water with sediment. In agricultural areas, chemicals and livestock wastes can drain into streams and percolate into ground water. Irrigation can withdraw significant volumes of water.

PUYALLUP - WHITE WATERSHED

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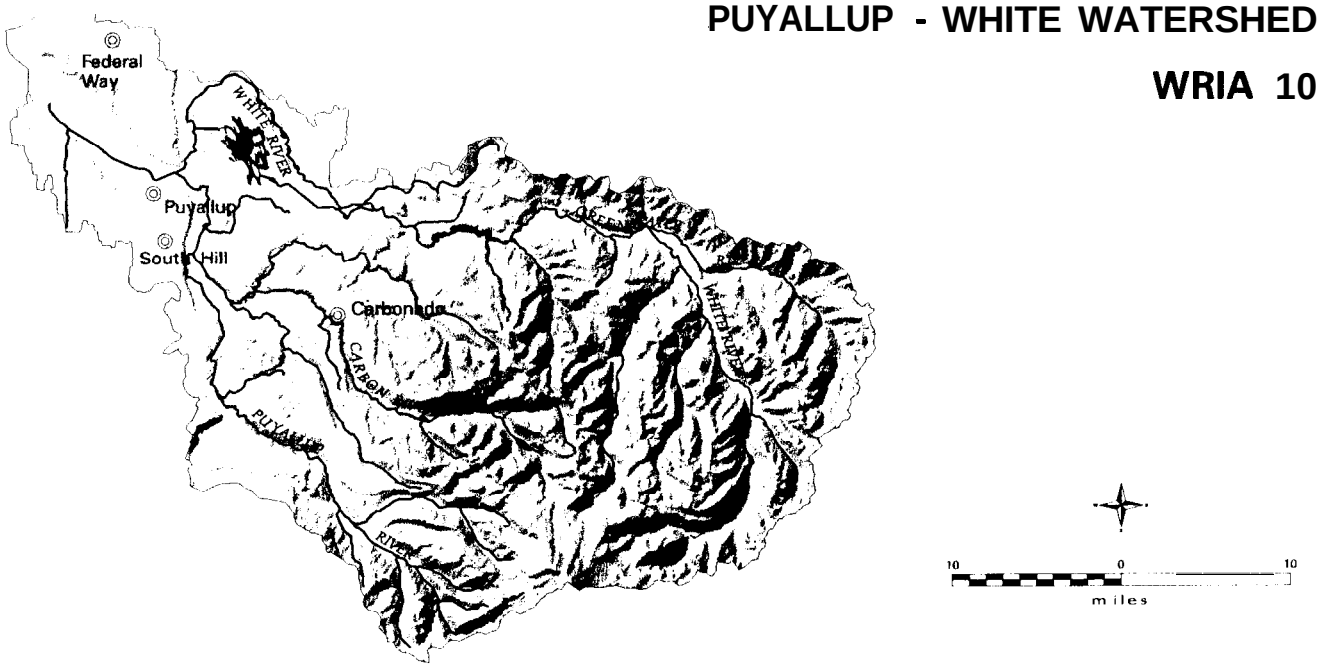


In the lower reaches of the watershed, municipal and industrial consumers use large quantities of water and contribute pollutants. The expansion of impervious surfaces (roads, parking lots, buildings) increases the amount and rate that surface runoff flows into streams. This increased runoff means less water enters the ground to recharge the aquifer. High runoff rates may, in fact, produce increased flooding. Storm water runoff can also carry pollutants from developed areas to lakes and streams.

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 preserving large quantities of clean water to reduce the effect of existing pollutants and to maintain proper water temperatures for fish and other aquatic life. Removing streamside vegetation tends to raise water temperature to a level that may be harmful to fish and other aquatic animals, insects and plants.

The major water quality problems in the watershed appear in the White River, its tributaries and the lower Puyallup River. Those problems include fecal coliform bacteria and high water temperatures. Other problems, which are critical to fish populations, include dissolved oxygen, ammonia and residual chlorine. Dissolved copper, lead, zinc, mercury and nutrients have also been reported.

Are our fish resources stable?

Fish species in the Puyallup-White watershed include chinook, coho and chum salmon as well as steelhead trout. Fish habitats of the White River and lower Puyallup have been severely impaired by human activities, particularly dams. Adverse conditions affecting fish include poor water quality, high water temperatures, physical barriers (dams), destruction of spawning habitat and low streamflows.

There have been a number of recent studies on the health of fish stocks in Washington State. Data from two of the more prominent studies were used to evaluate fishery issues in the Puyallup-White watershed. These studies are the American Fisheries Society ("AFS") and the Salmon and Steelhead Stock Inventory ("SASSI").

The status of chinook populations on the Puyallup and White rivers are classified as "critical" meaning production levels are so low that permanent damage to the stock is

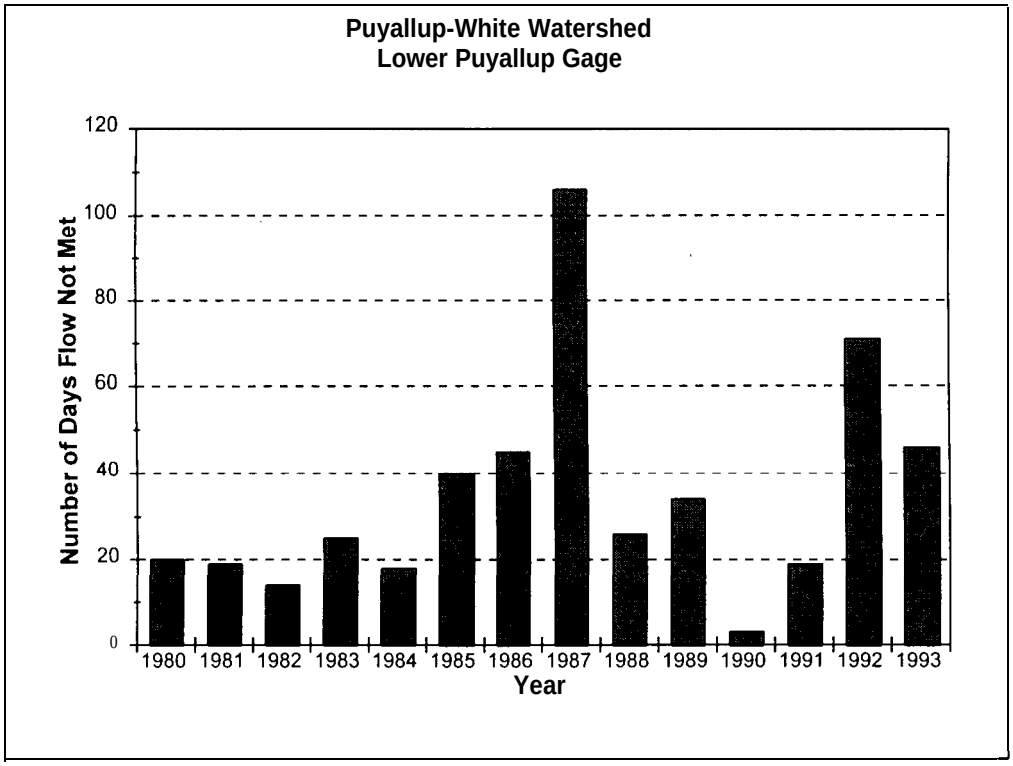
likely. In some cases, there is insufficient information to determine the status of the chinook populations. Coho on the Puyallup are considered to be "depressed," meaning fish production is below expected levels but above the level where permanent damage to the stock is likely. Spring chinook on the White River are at "moderate" risk. This means that the number of fish returning to spawn has declined to about one adult per spawner. Native stocks of spring chinook are extinct in the Puyallup River.

How have streamflows changed?

The U.S. Geological Survey operates five stream gaging stations on the Puyallup-White system to measure streamflow. One of these gages is located near Alderton (upper Puyallup gage) and another is located at the confluence of the White and Puyallup rivers (lower Puyallup gage).

Ecology set instream flows for the Puyallup-White watershed in 1980. The instream flow established from mid-September until November at the lower Puyallup gage is 1,000 cfs and is 500 cfs at the upper Puyallup gage. The instream flows apply only to water rights issued after they were established. Water rights issued before flows were set are not affected.

Instream flows were not met at the lower Puyallup gage an average of 35 days per year between 1980 and 1993 (see graph at right). At the upper Puyallup gage, instream flow requirements were met between 1980 and 1987, but were not met an average of 37 days from 1987 to 1992. For both gages, the number of days that instream flows were not met appears to have increased since 1980.



Number of days instream flows were not met

One measure of minimum stream flow is the seven-day low flow. This represents the lowest recorded flows that occur each year over a period of seven consecutive days. The graph on the top of page 5 shows the seven-day low flows each year since 1916 at the lower Puyallup gage and the instream flow. The heavy black line shows the average of the preceding 10 years. The ten-year average indicates that low flows have continued to decline despite the establishment of instream flows in 1980.

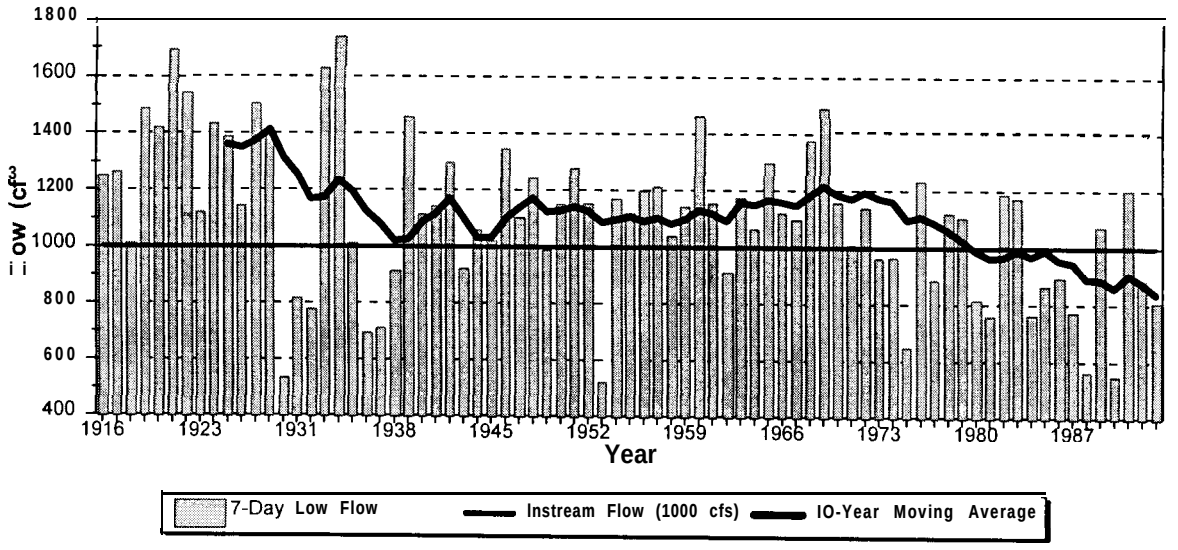
The regulation also closed all tributaries to the White River, Hylebos and Wapato Creeks, and many tributaries to the Puyallup River to further surface water appropriations. Data from three of the gages in the watershed show that the low flows dropped in the past 20 years. This same time period had above average precipitation. The decline can be attributed to increased demand for surface and ground water and to paving of land surfaces. Paving land surfaces reduces the recharge to the aquifers which, in turn, reduces the ground water contribution to streams in summer.

What are water rights?

A 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. Ground water users 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.

Comparison of 7-Day Low Flows to Established Instream Flow - Lower Puyallup Gage



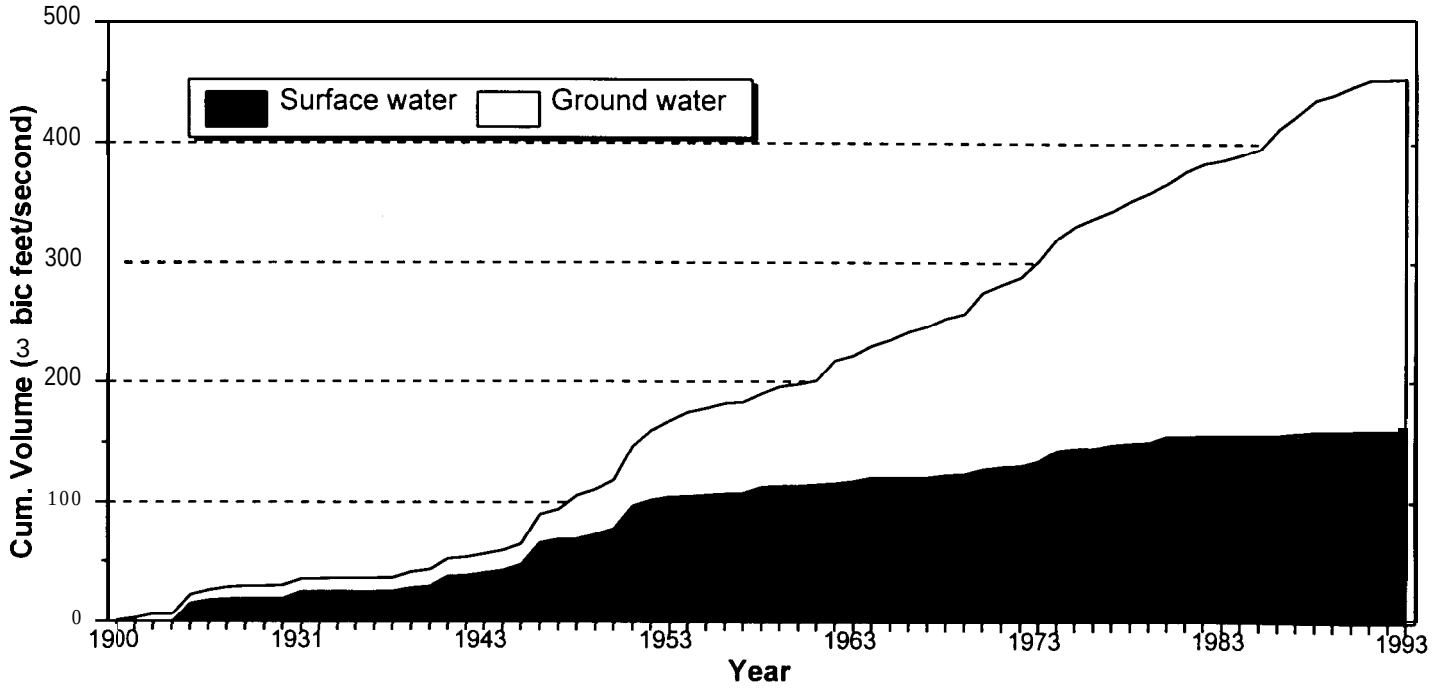
What are water-right claims?

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. A total of 2,057 water right claims have been filed, for a total flow equivalent of about 61 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, we can protect senior water rights and benefit the overall public good.

Water-Right Permits & Certificates

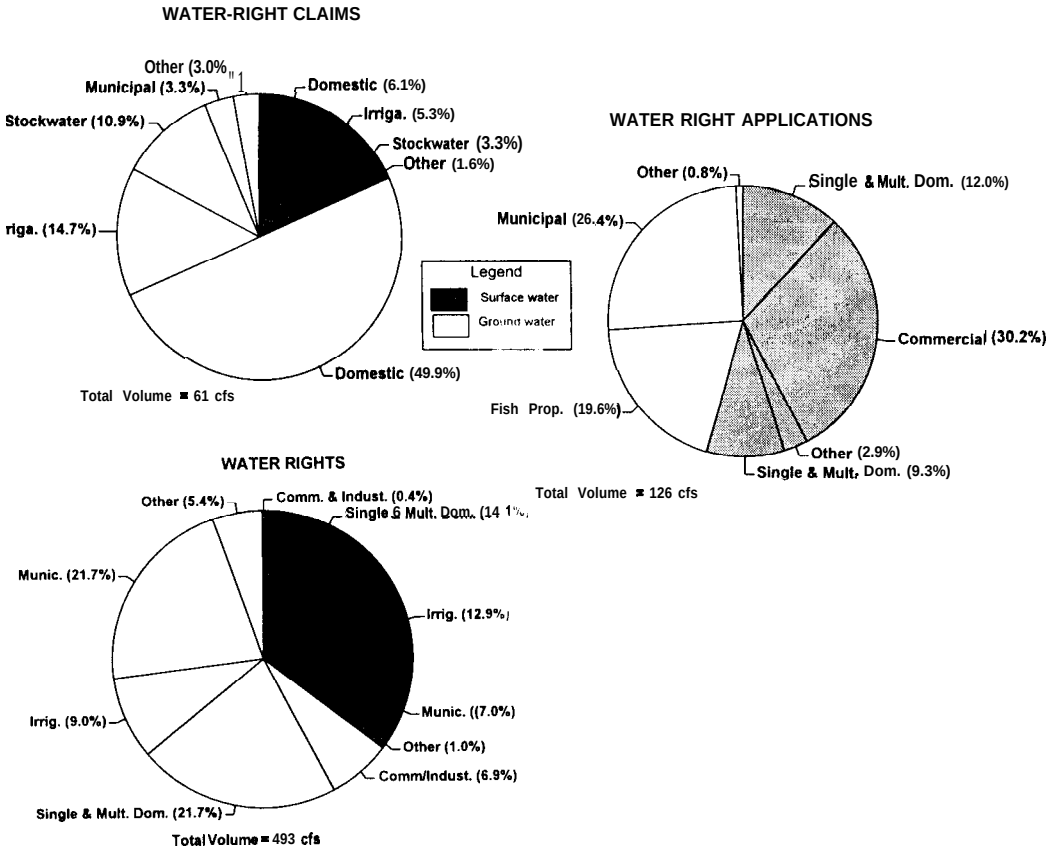


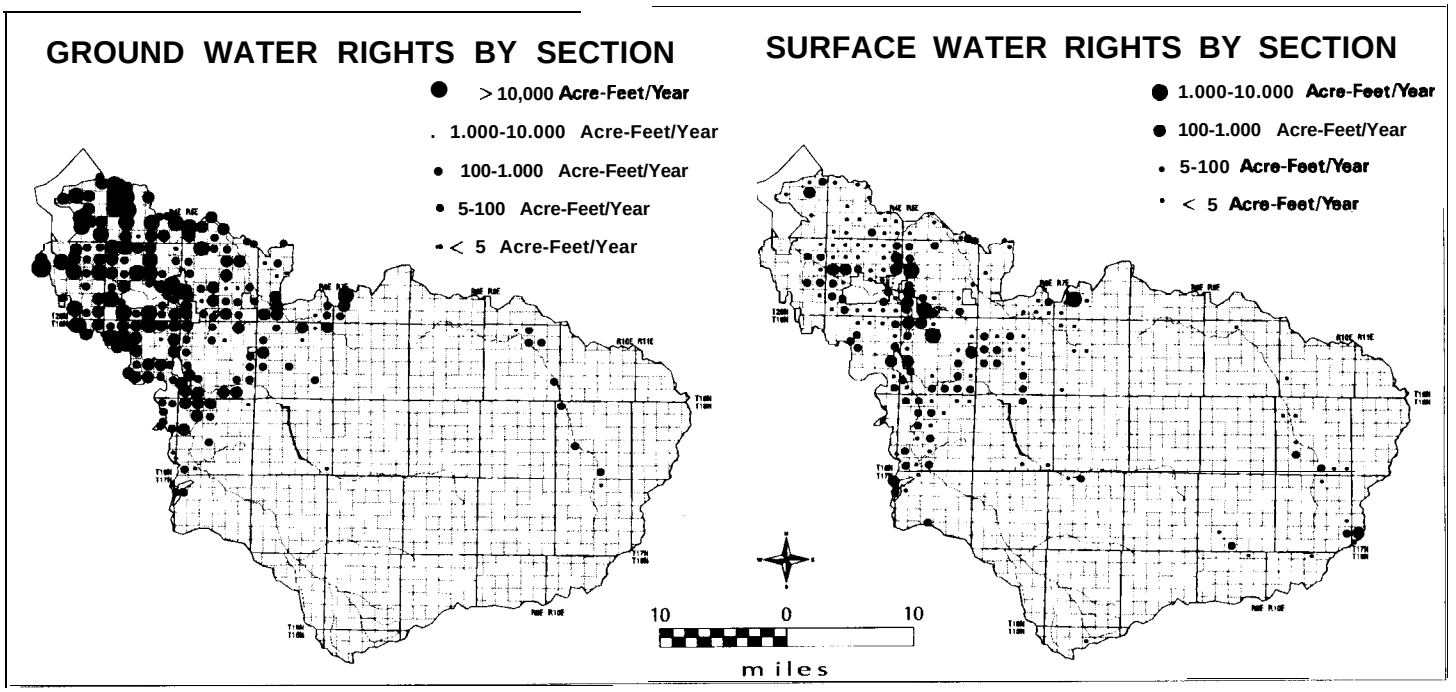
How is water currently allocated and what new uses are proposed?

The amount of water already allocated in the watershed has increased fourfold since 1950. The allocations of ground and surface water increased from 94 to 453 cfs between 1947 and 1994 (the period of most rapid growth).

Currently, applications for 34 ground water rights and ten surface water rights are pending with Ecology for water rights throughout the watershed. The applications request a total of 126 cfs (69 cfs for ground water and 57 cfs for surface water) for municipal and domestic supplies, commercial use and fish rearing. Before issuing future water rights, Ecology must consider potential effects on other water users.

Allocated Uses of Water





What are the conflicts?

Maintaining the flows of the Puyallup and White rivers is important to support fish populations on a year-round basis, protect existing water rights and reduce damage by pollutants already found within the watershed. At the same time as surface water flows have declined, ground water withdrawals have increased and the two are interconnected. Additional ground water pumping may cause stream flows to 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 its 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 to learn more about water rights issues in the Puyallup-White watershed, the following studies and technical reports are available:

AFS. 1991. "Pacific Salmon at the Crossroads: Stocks at Risk from California, Oregon, Idaho, and Washington." Fisheries. American Fisheries Society.

Ebbert, J.C., G.C. Bortleson, L.A. Fuste, and E.A. Prych. 1987. Water Quality in the Lower Puyallup River Valley and Adjacent Lands, Pierce County, Washington. U.S. Geological Survey Water - Resources Investigation Report 86-4154.

Ecology. 1995. Draft Initial Watershed Assessment Water Resources Inventory Area 10 Puyallup-White Watershed. OFTR 95-08.

Ecology. 1980. Puyallup River Basin Instream Resource Protection Program including Proposed Administrative Rules, Series No. 6. Washington State Department of Ecology. Olympia, Washington. March 1980.

LPWMCL. 1992. Lower Puyallup Watershed Phase 1 Report. 132 pp. Lower Puyallup Watershed Management Committee.

Pelletier, G.J. 1993. Puyallup River Total Maximum Daily Load for Biochemical Oxygen Demand, Ammonia, and Residual Chlorine. Washington State Department of Ecology, Olympia, Washington.

PRBWQMP. 1974. Puyallup River Basin Water Quality Management Plan, Water Resource Inventory Area No. 10, Consolidated Basin Planning Area. No. 13-I I-5. Consoer, Townsend and Associates, Tacoma, Washington.

WDF & WDW. 1993. 1992 Washington State Salmon and Steelhead Stock Inventory (SASSI). Washington Departments of Fish and Wildlife.

For more information...

Contact Gale Blomstrom at (360) 407-0271 (voice) (360) 407-6306 (TDD), or write to the Department of Ecology, P.O. Box 47775, Olympia, Washington 98504-7775

What do we know about the Puyallup-White watershed?

This assessment found that streamflows have continued to decline after the streams in the watershed were closed to further water rights. Land use changes associated with population growth and ground water pumping may be adversely affecting senior water rights. Ground water maintains the water levels in streams and lakes when there is little precipitation. Water quality and aquatic habitat also depend on adequate stream flow. Because of these findings, the Puyallup-White watershed is classified as a "high risk" watershed by Ecology.

What actions can be taken?

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

Encourage conservation. changes and transfers of water riuhts. water reuse and pipeline interconnections to make efficient use of existinu water riuhts.

Pro: -May meet new water use demand without an adverse impact on streamflow and senior water rights.

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

Increase storaae of water durina Reriods of hiah stream flow for use durina Reriods of low stream flow.

Pro: -Allow for additional water rights to be issued without an adverse impact on water resources during critical flow periods.

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

Denv applications for new water rights where source is tributary to closed surface water.

Pro: -Applicants would get decisions now; surface waters and existing rights would be protected.

Con: -Applicants would not get the decisions they want.

Approve applications for new water riuhts where acceptable mitiuation is proposed or where source is not tributatv to closed surface water and impairment of existinu riuhts would not occur.

Pro: -Some applicants would get approvals; surface waters and existing rights would be protected.

Con: -No criteria exist for "acceptable mitigation;" applicants would have to determine that the source is "non-tributary;" could be expensive and time consuming.

Expand local water *management efforts to a regional planning committee which could resolve conflicts about water with the grea test particip a tion bv residents.*

Pro: - Consolidation and cooperation between water interest would allow more flexible solutions and cost-effective approaches to water issues, Activities could include increases to storm water retention areas, improvement of aquatic habitat and water quality, interconnection of water supplies, and additional collections 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.