TUCANNON RIVER WATERSHED INITIAL ASSESSMENT

DRAFT

February 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, appears to have declined. This increased demand for limited water resources has resulted in the water rights allocation process becoming very complex and controversial.

In order to expedite decisions about pending water rights, it is vital that we accurately assess the quality and quantity of surface and ground water resources within Washington. The Washington Department of Ecology (Ecology) recognizes that water right decisions must be based upon accurate scientific data. Ecology has hired consultants to assist with special studies called Initial Watershed Assessments throughout the state; Ecology and the consultants will jointly compile and evaluate existing data in selected watersheds known as Water Resource Inventory Areas (WRIAs).

The assessments will describe existing water rights, stream flow, precipitation, geology, hydrology, water quality, fisheries resources and land use characteristics. Some assessments will 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, the water management decision making process will require coordination with local and regional planning processes.

This summary document outlines information presented in a detailed technical report, called an Open File report.

Summary Document *Prepared* by:

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Prepared in cooperation with the
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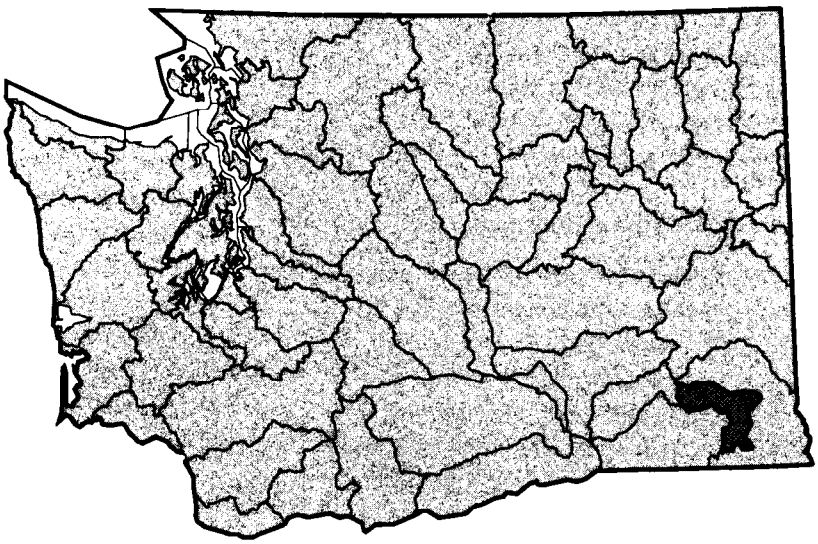

What are the water allocation issues?

- The total quantity of water rights claims and state-issued water rights exceeds the yearly mean daily flow in the lower river.
- For much of the year, Tucannon River flows do not meet instream flows recommended by the Washington Department of Fish and Wildlife.
- Chinook salmon and steelhead have been characterized as at risk and/or at depressed levels of production in studies done by the American Fisheries Society and the Washington Department of Fish and Wildlife.
- Currently, there are six water right applications on file with Ecology, three requesting surface water allocations, and three requesting ground water allocations for irrigation.
- Ground water has been found to be in continuity with surface water. Additional pumping of ground water will likely reduce flow in the Tucannon River.

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What is a watershed?

A watershed is all of the area that drains into a particular river, stream, or body of water. The watershed for each body of water, such as the Tucannon River, includes hills, lowlands, developed and undeveloped areas. Precipitation falling within the Tucannon River Watershed that is not taken up by vegetation either soaks into the ground to become ground water or runs off the land and eventually ends up in the Tucannon River. Watershed boundaries are defined by the highest points separating two watersheds, such as hills or mountains.

Where does the water come from?

Precipitation is the source of recharge for both ground and surface water in the Tucannon Watershed. The amount and type of annual precipitation varies considerably from the upper watershed to the lower watershed. Precipitation, which mostly occurs between September and May, ranges from more than 40 inches a year in the higher elevations to about 10 to 15 inches a year in lower elevations. During the winter, approximately 30 percent of the precipitation falls as snow. While snow stays on the ground nearly the entire winter in the higher elevations, snow falling at elevations less than 1,500 feet typically melts within a few weeks.

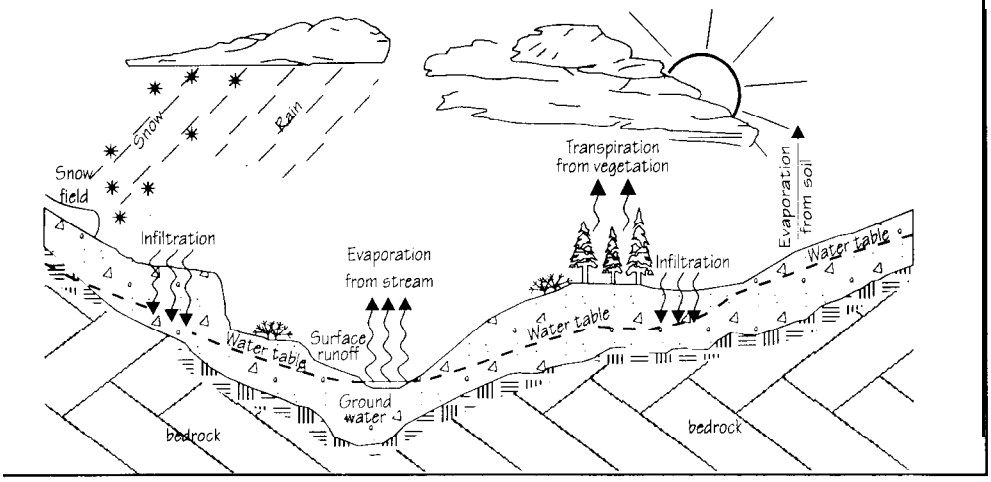
Along with precipitation, melt water from snow pack in the higher elevations supplies stream flow in the spring and early summer. Some of this runoff infiltrates downward through the soil to become ground water. During the late summer and through the winter this same ground water discharges to the Tucannon River and its tributaries, serving as an ongoing source of water when precipitation and snowmelt sources contribute the least.

What are the major surface water features?

In addition to the Tucannon River, which is the major water body in the watershed, there are dozens of smaller tributary creeks and streams scattered throughout the watershed (see map, right). Many of these creeks flow only during periods of snowmelt or heavy precipitation; the two major year-round tributaries are Pataha Creek and Cummings Creek.

What are the major ground water sources?

In the Tucannon River Watershed, infiltrating rainfall and snow melt are the primary sources of ground water. The watershed consists of sedimentary deposits underlain by lava flows within the Columbia River Basalt group. Both of these formations can contain substantial ground water resources.



A general representation of the hydrologic (water) cycle (modified from Walter and Nassar).

How are surface and ground water connected?

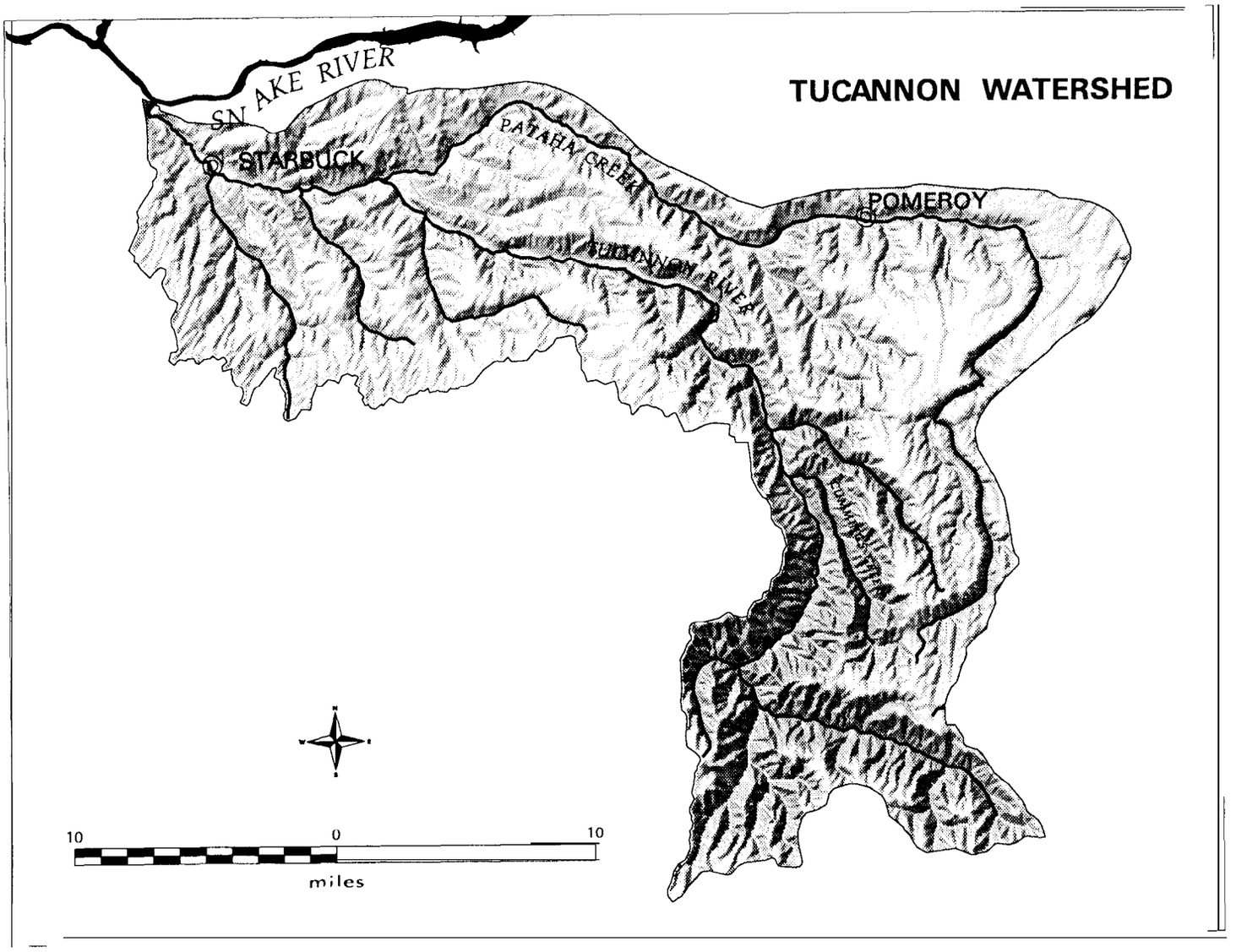
In the Tucannon Watershed, precipitatio and ground water are the only sources water to the river. Studies have determined that ground water contribute significantly to flows in the Tucannon River, supplying virtually all of the base flow. Many well-developed wetlands an spring areas along the main branch of th river are also fed by ground water.

As precipitation falls upon the watershe some of it evaporates, some is taken up by trees and plants, and some percolate or infiltrates into the soil, where it is carried into the ground water system. The figure below illustrates the general principles of the hydrologic, or water, cycle.

In the Tucannon Watershed, the valley sediments are very limited in depth and areal extent. The primary source of bas flow is from the artesian basalt aquifers that outcrop as springs. These basalt aquifers were exposed as the river cut across the basalt contacts that form the regional aquifer system. An additional source of recharge to these basalt aquifers may be from outside of the surface water drainage basin. The basalts gently dip to the northwest at a gradient much less than the Tucannon River gradient and most of the springs discharge at a higher elevation than the mean annual high water. Ground wate pumping from points of withdrawal far removed from the river can have an effe on the base flow by reducing the artesia head and thereby reducing ground wate discharge to the river.

How does land use affect water use and movement?

Land uses dictate how water is used within a watershed, as well as seasonal availability of water and water quality. In the Tucannon Watershed, most of the major changes in land use occurred ov fifty years ago, as the area was settled and forests were turned into pastures a croplands.



Land use changes in the watershed over the years have caused changes in the river's flow regime, bed conditions, water quality, and habitat values. In particular, there has been a significant reduction in the amount of streamside (also called riparian) vegetation. Studies done by the Soil Conservation Service estimated that between 1937 and 1978, streamside or riparian woodland vegetation in the watershed decreased by between 33 and 55 percent. Much of this vegetation loss was caused by severe flooding which occurred in the river in the 1960s and 1970s; however, a great deal of streamside vegetation was also lost to agriculture. Settlers at the turn of the century converted forest lands to crop lands and pastures, which in turn increased the amount of runoff flowing into the river.

What are the important **water quality issues in theTucannon River Watershed?**

Ecology has identified the Tucannon River and two of its tributaries (Pataha Creek and Cummings Creek) as water bodies which fail to meet state water quality standards. The mainstem of the river has exceeded water quality standards for fecal coliform bacteria and temperature. Pataha Creek has exceeded water quality standards for fecal coliform bacteria and ammonia, and Cummings Creek has exceeded standards for water temperature. High water temperatures in the Tucannon River and its tributaries have been experienced due to significant losses in riparian vegetation that have occurred over the past five decades. Riparian vegetation provides shading for the river, promoting cooler water temperatures. High levels of both fecal coliform bacteria and ammonia are frequently found in rivers and streams draining livestock range areas such as the Tucannon watershed.

Efforts are currently underway to improve water quality through measures such as construction of sediment catchbasins and replanting of riparian vegetation.

Are our fish resources stable?

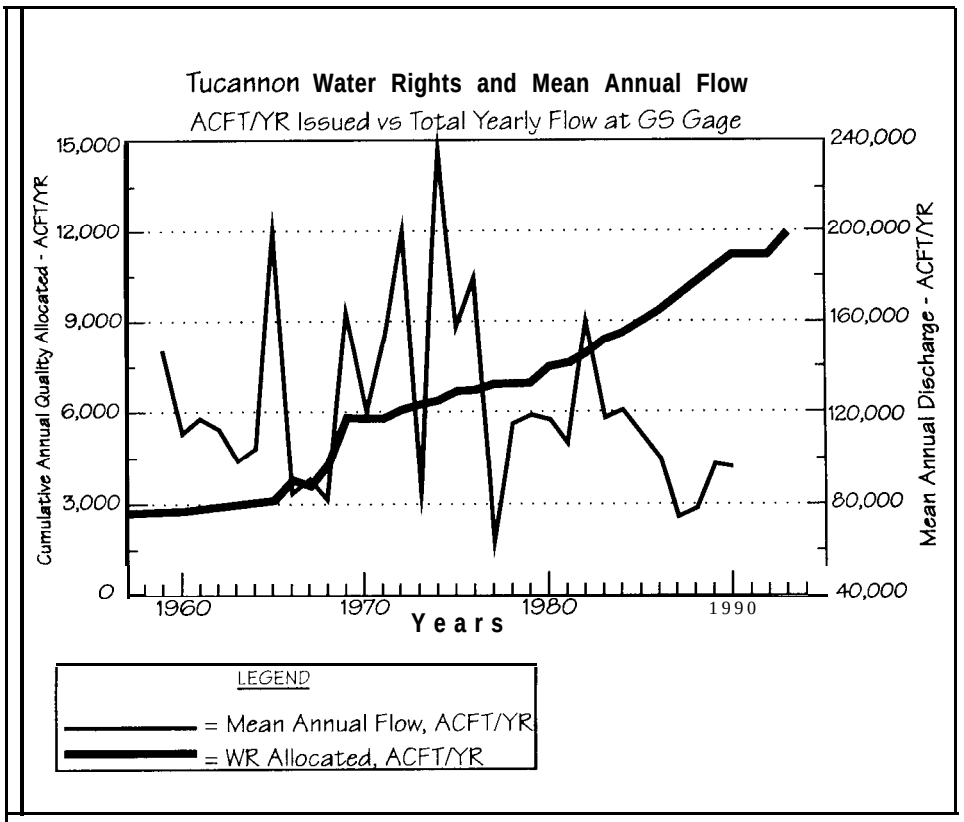
The Tucannon River is a valuable salmon and steelhead spawning stream; as a result, many state and federal agencies are currently evaluating the health of the wild salmon and steelhead resources within the watershed. The Washington State Department of Fisheries and Wildlife operates a trout,

salmon, and steelhead hatchery on the Tucannon River near Rainbow Lake.

Two recent studies evaluated the status of chinook salmon and steelhead stocks in the Tucannon River. One study was conducted by the Endangered Species Committee of the American Fisheries Society (AFS), and one was conducted by the Washington State Department of Fisheries and Wildlife, with assistance from 23 Indian Tribes and organizations (referred to as the Salmon and Steelhead Stock Inventory, or SASSI). Chinook salmon and steelhead were rated as "High Risk" and "Special Concern" respectively, in the AFS study, and "Depressed" in the SASSI study. The AFS rating of "High Risk" indicates a population at high risk of extinction; a population of fish in this category is likely to meet the threshold for listing as endangered under the Endangered Species Act. The AFS rating of "Special Concern" indicates fish populations that could be threatened by relatively minor disturbances or are at risk for other reasons. The SASSI rating of "Depressed" indicates a stock of fish whose production is below expected levels but above the level where permanent damage to the stock is likely. While both studies indicate concern about the fisheries resources in the Tucannon River, the AFS study indicates a higher level of concern.

Stream Flows in the Tucannon River

Existing monthly flow data from the Tucannon River near Starbuck from 1915 to 1990 indicate the mean annual flow of the Tucannon River has been declining for the past 31 years. The graph above shows the yearly average daily discharge for the water years 1959 - 1990, compared with allocated water rights. The calculated yearly flow for the year 1990 was 148 cubic feet per second (cfs), which was a drop of 37 cfs from the year 1960. This reduction in river flows cannot be attributed to decreased precipitation in the watershed, because rainfall records at Pomeroy and Dayton indicate that annual precipitation has increased slightly over the past 30 years.



Yearly average daily discharge for the Tucannon River for water years 1959 to 1990

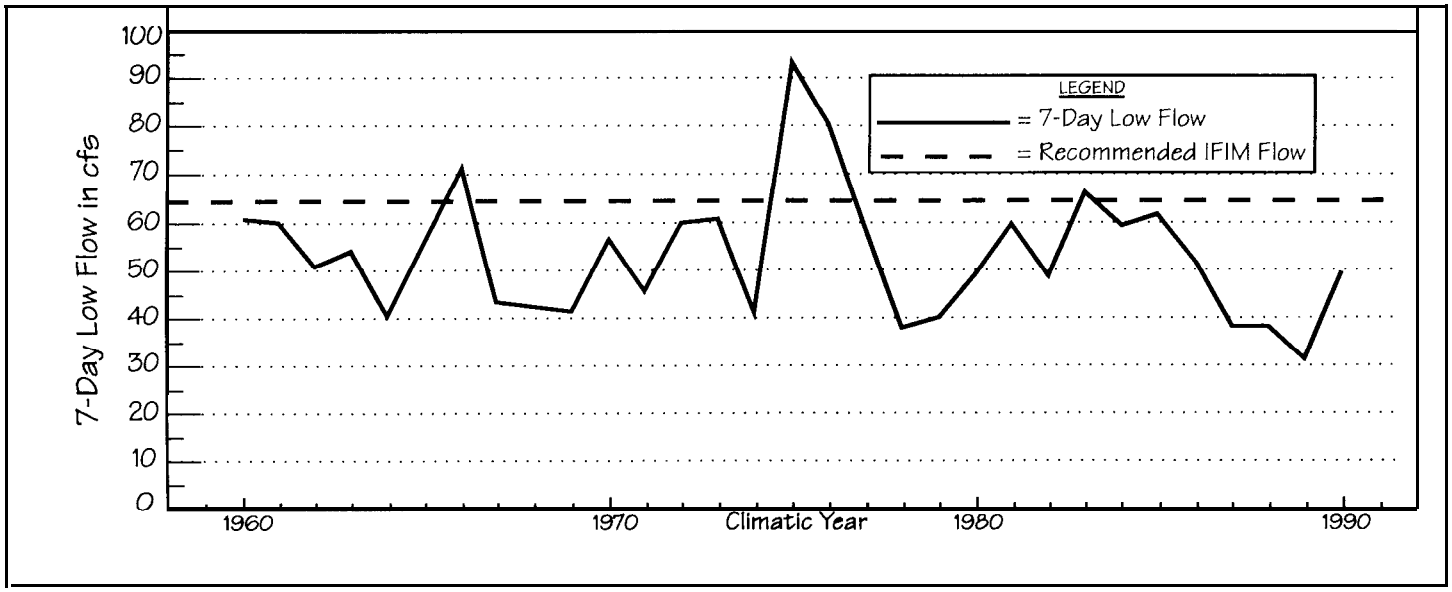
The Instream Flow Incremental Method (IFIM) is used to evaluate how fish habitat varies over a range of stream flows. Ecology and the Washington State Department of Fish and Wildlife used this method to determine recommended flows needed to protect fish habitat in the Tucannon River. It appears that flows in the Tucannon River are decreasing to levels below recommended flows for protecting fish habitat. Except for several exceptionally wet years in the 1970s, the lowest mean flows over seven consecutive days (7-day low flows) have fallen below the IFIM recommendation almost every year. Comparing flow data with recommended flows indicates that river flows fall below the recommended IFIM flow of 65 cfs more than 50 percent of the time during late July, August, and into early September. This comparison is shown at the top of page 5. The number of days when the IFIM flow is not met has increased from approximately 30 days in 1960 to more than 60 days in 1990, as shown at the bottom of page 5.

What are water rights and water claims?

A water right is a legal authorization to use a certain amount of public water for specific beneficial purposes. Washington State law requires certain users of public water to receive approval from the state before actually using the water. This approval is granted in the form of a water right permit or water right certificate, and is issued for use of both surface and ground water. It is not necessary to apply for a water right if the proposed use is for 5,000 gallons or less of ground water each day for watering stock, watering a lawn or garden less than one-half acre in size, or a single or group domestic or industrial well.

When evaluating a water right permit, the following requirements must be met:

1. The water use will be beneficial;
2. There will be no impairment of existing rights;
3. There is water available for appropriation; and



Except for several exceptionally wet years in the 1970s, the lowest mean flows over seven consecutive days have fallen below the IFIM recommendation.

4. The requested water right will not be detrimental to the public's interest.

A water right claim is different from a state-issued water right. Claims represent old rights filed under the Water Right Claim Registration Act, which pre-date state water law. Claims are not confirmed water rights.

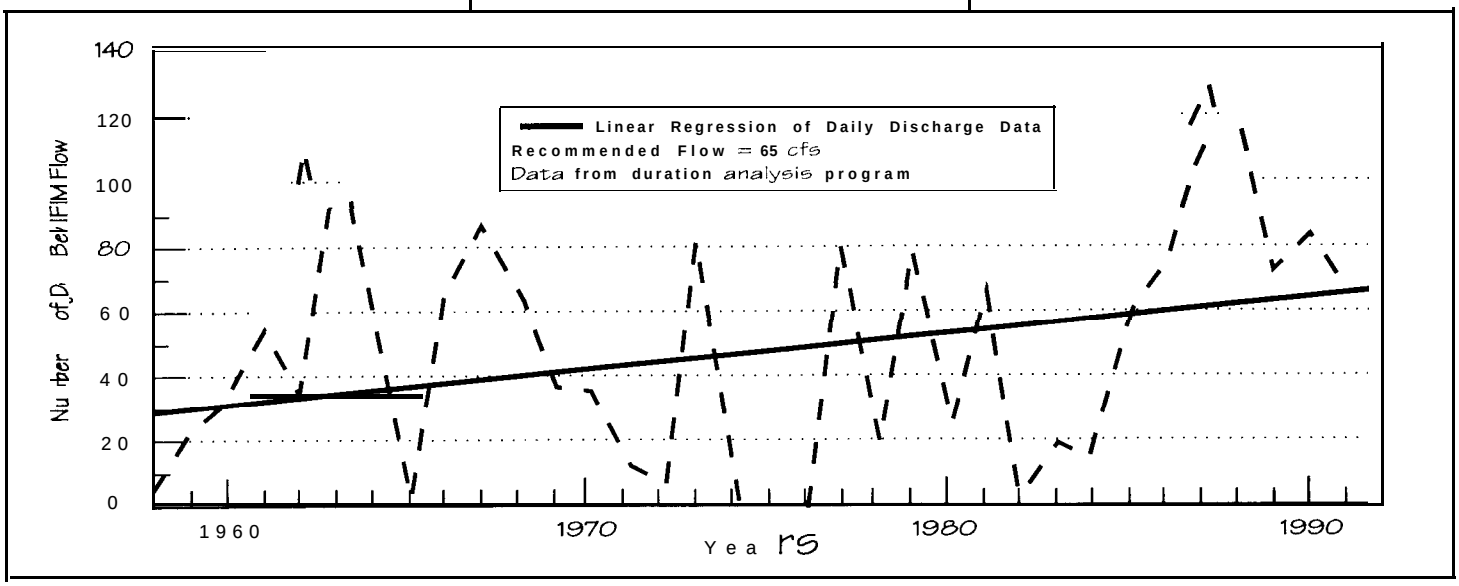
Why are water rights important?

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.

What are the conflicts or issues in the watershed?

A review of state-issued water rights and claims indicates that a total of 228 cfs has been allocated "on paper" for surface and ground water in the watershed. The combined total of water rights claims and state-issued water rights is 193 cfs for surface water diversions alone, which is more than the yearly mean daily flow (166 cfs) in the lower river. Currently, there are six water right applications on file with Ecology, requesting a total of 0.3 cfs from a tributary creek for irrigation, and 1,800 gpm of ground water, also for irrigation.

Although Ecology has not measured the actual use of water within the watershed, it can be seen that competing uses could occur between providing recommended instream flows for fisheries and allocating water according to state-issued water rights. As allocated surface and ground water rights have increased, mean annual flows in the Tucannon River have decreased. Irrigation is the single biggest off-stream use of water in the watershed; as irrigated agriculture has



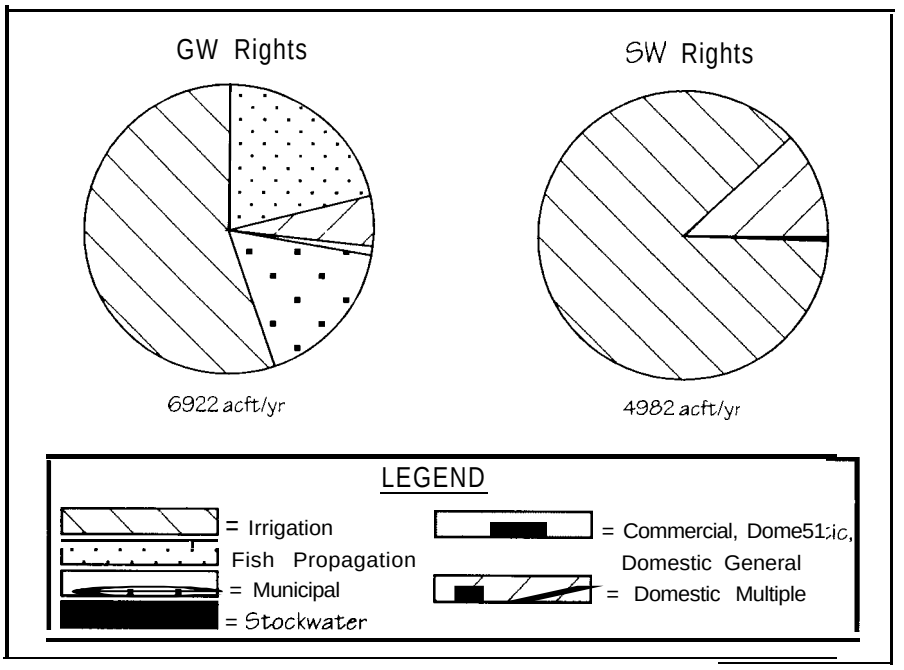
Comparison of flow data with recommended flows showing number of days the Tucannon River flow is below recommended IFIM flow.

become more prevalent, flows in the river have decreased. Continued reduction of flows in the river could seriously affect fish populations. The conflict between providing instream flows for fisheries and irrigation supplies for agriculture will likely increase if fisheries populations continue to decline.

What are the current major water uses in the watershed?

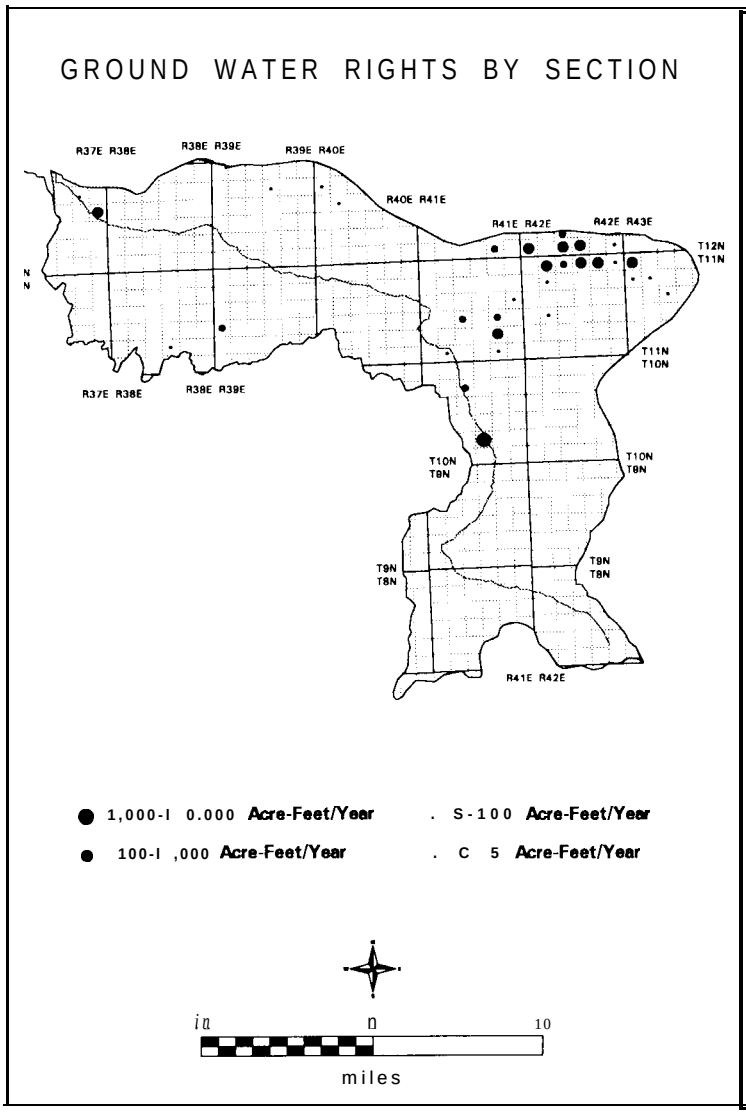
At this time, there are 67 surface water rights and 54 ground water rights in the Tucannon Watershed issued by Ecology. In addition, there are 765 water rights claims on file with Ecology.

Irrigation is the predominant water use for both surface and ground water in the watershed, as shown in the figure at the right. The locations of rights by section are shown in the figures below.

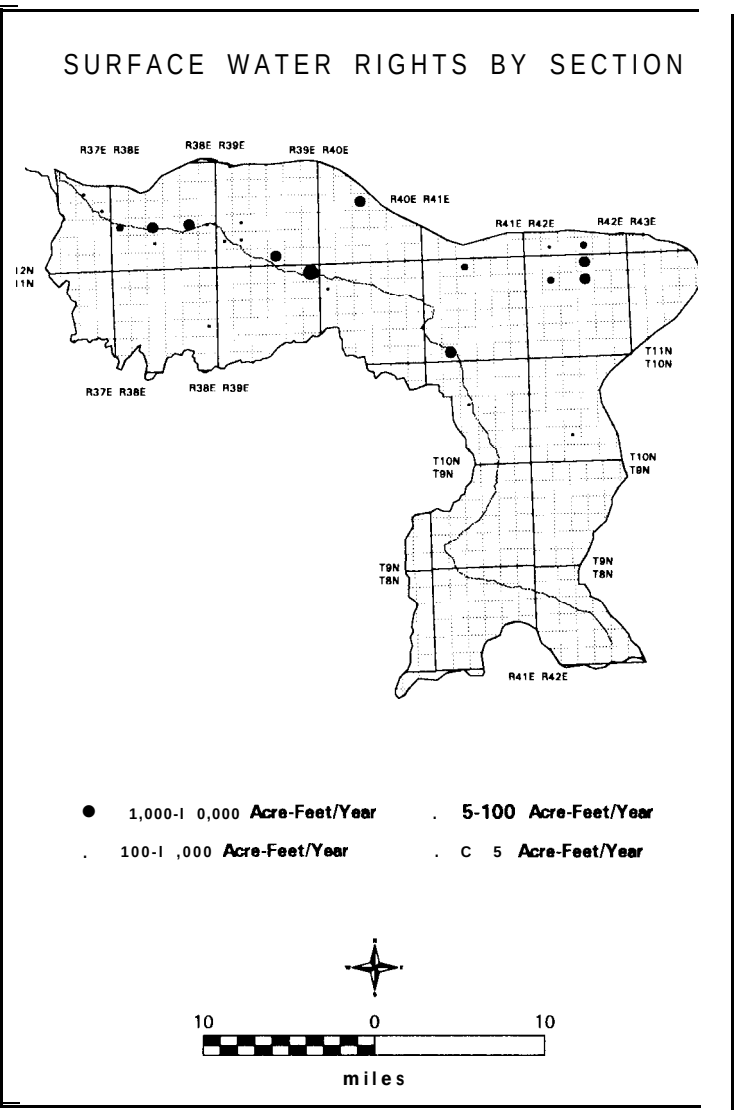


Irrigation is the predominant water use in the Tucannon River Watershed.

Existing ground water rights in the Tucannon Watershed by section.



Existing surface water rights in the Tucannon Watershed by section.



What decisions can be made?

In order to protect senior water rights and build upon current public and private efforts in the watershed, Ecology must make decisions on the future allocation of water. Ecology considers the Tucannon River Watershed to be a high risk as defined in the proposed Hydraulic Continuity Policy. This risk classification leads to a range of decision options, as discussed below.

Initiate regional planning process: hold applications pending until regional planning is complete.

Pro: -Provides process for widespread involvement and cooperative decision-making.

Con: -Resource and time-intensive; will delay decisions on existing applications.

Hold pending ground water and surface wafer applications *until instream flows have been established by rule.*

Pro: -Ensures public participation prior to decisions, as recommended instream flows will be set by regulation.

Con: -No decisions on existing applications will be made until the rule has been established.
-Depending upon enforcement capabilities, unauthorized use may increase.

Consider applications for conjunctive use or applications which propose mitigation of impacts.

Pro: -Would allow some new development and protect senior water rights and maintains recommended stream flows.

Con: -Lack of public involvement in process.
-May significantly limit new development requiring additional water use.

Deny all pending applications based on exisfinq data and recommended stream flows.

Pro: -Highest level of protection to senior right-holders and instream flows.

Con: -Will significantly limit new development requiring additional water use.

Encourage conservation and efficient use of exisfins rights.

Pro: -Does not further diminish resources in watershed.
-May allow new development.

Con: -Water savings from conservation may be minimal or less substantial than projected.

Develop off-stream wafer storage in the watershed.

Pro: -May allow some additional development.

Con: -Engineering and construction costs are very high.
-Potential water quality and habitat impacts could result.

Where do we go from here?

Ecology will hold a public workshop to discuss the available information and decision options for the Tucannon River Watershed. Ecology will then choose a course of action leading to water rights decisions.

What additional information is **available on the Tucannon River Watershed?**

If you would like to learn more about water rights issues in the Tucannon River Watershed, the following studies and technical reports are available:

"Initial **Watershed Assessment, Tucannon River Watershed",** 1995. **Washington Department of Ecology.**

"Pacific Salmon *at the Crossroads: Stocks at* Risk *from* California, *Oregon,* Idaho, and Washington", March-April, 1991. Fisheries.

"1992 Washington *State* Salmon and Sfeelhead Stock Inventory", March 1993. Washington Department of Fish and Wildlife.

For more information ...

Contact Bruce Howard at (509) 456-2926 or write Department of Ecology, Water Resources Section, 4601 North Monroe, Suite 202, Spokane, Washington 99205-1295.

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

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