

STATE WATER PROGRAM



W.W.I.R.P.P. SERIES – No. 8

DESCHUTES RIVER BASIN INSTREAM RESOURCES PROTECTION PROGRAM INCLUDING PROPOSED ADMINISTRATIVE RULES

(WATER RESOURCE INVENTORY AREA 13)

**STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY**

JUNE 1980

DESCHUTES RIVER BASIN
INSTREAM RESOURCES PROTECTION PROGRAM

Including

PROPOSED. ADMINISTRATIVE RULES

(Water Resources Inventory Area 13)

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Water Resource Inventory Area 13

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SUMMARY

The Western Washington Instream Resources Protection Program develops instream resources protection measures under the authority of Chapter 90.54 RCW (Water Resources Act of 1971), Chapter 90.22 RCW (Minimum Water Flows and Levels), and Chapter 173-500 WAC (later Resources Management Program) for the 26 water resource inventory areas found in Western Washington. The Department of Ecology has formed a multidisciplinary interagency team to develop information for determining the measures necessary to protect the instream resources in the Deschutes River Basin (WRIA 13). This planning effort also involves private, public, county, tribal, and federal agency coordination. The results are the administrative rules designed to protect instream flow levels and minimize adverse impacts resulting from future water appropriations within the Deschutes River Basin.

Instream resources include fish, wildlife, recreation, navigation, water quality, scenic and aesthetic values, and other environmental factors which may be adversely affected by both natural and man-caused factors within the Deschutes Basin.

In accordance with administrative rules (Chapter 173-513 WAC), adopted on June 20, 1980, Deschutes River tributaries and the independent drainages of Woodland Creek, including Long Lake, Patterson Lake, Hicks Lake, Woodward Creek, and McLane Creek, will be closed to further out-of-stream consumptive appropriation. The Deschutes River main stem will be closed only from April 15 through October 31. Instream flows will be in effect for the Deschutes River at Control Station No. 12-0800-00 for November 1 through April 14.

NO EXISTING WATER RIGHTS WILL BE AFFECTED BY THE DESCHUTES RIVER BASIN INSTREAM RESOURCES PROTECTION PROGRAM.

The program and administrative rules will be reviewed at least once in every five years.

I. DESCHUTES RIVER BASIN INSTREAM RESOURCE PROTECTION PROGRAM OVERVIEW

The Deschutes River Basin Instream Resource Protection Program establishes specific instream flow levels and stream closures to protect the instream resources of fish, wildlife, water quality, navigation, recreation, scenic, and other environmental values. An overall Western Washington Instream Resources Protection Program proposal and Environmental Impact Statement has been circulated to the public and governmental agencies. (Copies are available from Department of Ecology (DOE), Olympia). The conceptual approach and technical procedures used to determine the instream flows are outlined in that document.

Instream Flows

State law provides that perennial streams and rivers shall be retained with base flows necessary to provide for preservation of wildlife, fish, navigation, scenic, aesthetic, and other environmental and navigational values (RCW 90.54.020(3)(a) 1971). The state may also establish minimum water flows or levels for streams, lakes, or other public waters for the purposes of protecting fish, game, birds or other wildlife resources, or recreational or aesthetic values (RCW 90.22.010). Each management reach selected for instream flow development is evaluated by the agencies interested in instream resources in the river basin under study. A stream having greater fish and wildlife, environmental, and aesthetic values generally requires higher levels of flow protection. Once instream flows are established, flow levels will be monitored and future water rights will be conditioned to instream flows. Closed streams will no longer be available for development of out-of-stream consumptive uses. The Instream Resources Protection Program Does Not Affect Any Existing Water Rights And Uses.

Public Participation

All interested individuals private groups, and public agencies are encouraged to comment on any aspect of the recommended measures for streams and lakes in the Deschutes River Basin. An ongoing series of coordination meetings has been accomplished with local, county, state, federal, and tribal agencies and interested private individuals and organizations. Advertisements have been placed in the local newspapers to provide notice to persons interested in participating in the program, and the proposed rules and time, dates, and places of public hearings have been published in the state register..

A public meeting and hearing was held at the Lacey City Hall on the evening of May 21, 1980. Oral and written comments have been received from numerous interested individuals and agencies. These comments and the department's responses are included in Appendix E of this document. The administrative rules (Chapter 173-513) were adopted at an adoption proceeding held June 20, 1980.

Statutory Authority

The Department of Ecology shall, when requested by the departments of Fisheries or Game, establish minimum flows or levels as required to protect instream values and any fish, game, or wildlife resources (Chapter 90.22 RCW, Minimum Water Flows and Levels).

The Western Washington Instream Resource Protection Program is authorized under Chapter 90.22, Chapter 90.54 RCW (Water Resources Act of 1971), and Chapter 173-500 WAC (Water Resources Management Program). The Water Resources Act states, ". . . perennial rivers and streams of the state shall be retained with base flows . . ." (RCW 90.54.020).

Methodology

Hydrologic base flows are prepared under a statistically based methodology by the Department of Ecology. The departments of Fisheries and Game use fishery habitat based methods for determining recommended levels of protection for instream resources. These recommendations and supporting information, together with available hydrologic information, are used to develop instream resource protection measures proposed for adoption in the Washington Administrative Code.

Planning Assumptions: The first assumption made in the development of the Deschutes River Basin Instream Resources Protection Program is that adequate data is available at the present time with which to develop an instream resources protection program. A second assumption is that no supplemental environmental impact statement (EIS) is required because the overall EIS for the Western Washington Instream Resource Protection Program adequately addresses anticipated environmental impacts.

Determination of Instream Flows

The Deschutes River Basin Instream Resources Protection Program identifies the need to close the Deschutes River to future out-of-stream consumptive appropriation from April 15 until October 31 in order to protect instream resources. The recommended program is based on analysis of basin hydrology and surveys of fish production capabilities in various parts of the Deschutes River Basin. The reason for not proposing closure of the Deschutes River year round is to retain the option of development of environmentally sound storage projects in future years that could make use of winter flows for a variety of potential uses including hydroelectric power generation, municipal and industrial water supply, release of stored water for support of fish, wildlife, and water quality enhancement during low flow periods.

Stream Ratings

Instream resources are only partially quantifiable; some aspects of environmental quality are subjective measurements. To differentiate among different stream systems, a rating system was devised to reach a consensus on the relative significance of various streams. This rating system is a part of an overall multidisciplinary planning system designed to provide expertise in the areas of fish, wildlife, recreation, hydrology, and water quality.

Inherent in the rating process is a comparative definition of levels of instream resource protection. In short, the higher the values for instream resources, the higher the level of provided instream flow protection. A conversion curve has been developed to convert stream ratings to base flow occurrences. This data is used to prepare a hydrologic base flow curve which together with habitat based flow requirements is used to determine the proposed instream flows.

A stream rating committee was formed of state agencies and tribal representatives concerned with stream-related activities. Each participant was asked to rate a particular stream or reach, from a low value of one to a high value of four. Each stream was rated for the following six categories:

Wildlife. Values for birds, wild animals, and game fish.

Fish. Use values for propagation; rearing; and migration of fish, resident game fish, and values of stream for fishing.

Scenic and Aesthetic. Audible and visual values of natural beauty.

Navigation. Values for all forms of boating.

Other Environmental Values. Physical and human factors.

Water Quality Standards. Set by Washington State Department of Ecology.

II. ENVIRONMENTAL SETTING OF THE DESCHUTES RIVER BASIN

Location - The Deschutes River Basin is located at the southern terminus of the Puget Sound Basin in Thurston and Lewis counties, Washington. It is defined as Water Resources Inventory Area No. 13 (WRIA 13) by DOE.

Beginning at its point of origin within the Bald Hills, the Deschutes River flows 60 miles through low mountains and hills to Capitol Lake in Olympia, thence to Budd Inlet on Puget Sound. Woodland Creek, Woodward Creek, and McLane Creek form independent smaller basins that empty into fjord-like inlets within south Puget Sound. WRIA 13 comprises about 304 square miles of forest, farm, and urban areas that is considered by many to be one of the most desirable living areas in the Pacific Northwest. (1)*

Geology and Geography

The upper Deschutes River Basin lies on the north flank of a northwest trending branch of the Cascade Mountains which extends from the main crest of the Cascades northwest to Tenino. The rocks have been arched about a northwest-southeast axis, and erosion has exposed lower tertiary volcanic rocks of the Northcraft Formation, and the overlying sedimentary rocks of the Skookumchuck Formation.

Relics of ancient surfaces with deeply weathered bedrock and well developed soils can be found in several places in southwest Washington, including part of the study area. These surfaces may date from early Pleistocene to Pliocene times (from one to several million years). The presence of the deep weathering suggests that pauses in uplift, and therefore pauses in erosion, occurred in the past and allowed deep in-place weathering and soil formation. (13)

During the Pleistocene epoch the northern and northeastern edges of the upper Deschutes River Basin were glaciated. Also two small cirque glaciers occupied the very head of the Deschutes River valley. Glaciation in the basin was of two types: (1) mountain valley glaciers, and (2) continental ice sheet. In addition to the minor effects of the small cirque glaciers, Mount Rainier valley glaciers and their associated meltwaters had a profound effect on the northeast portion of the basin, which is adjacent to the Nisqually River Basin. Glacier ice spilling into the Deschutes Basin from the Nisqually valley (site of Alder Lake) deposited till and meltwater sediments as well as rounding off ridges of bedrock. (13)

* (1) refers to reference #1 located in the references section of this program document.

Except in the upper reaches, the gradient of the Deschutes River is rather gentle. In its first 5.5 miles, the river descends approximately 1200 feet. In the next 5 miles to Deschutes Falls, the river descends only 400 feet. For the next 6.5 miles, the descent is reduced to 140 feet and the final drop of 480 feet to sea level occurs in the remaining 30 miles to Puget Sound. (1)

Tumwater Falls, a series of waterfalls and pools, is located at the rivers present confluence with Capitol Lake within the city of Tumwater. This area is a very popular tourist attraction and is also the location of a Department of Fisheries fish ladder and salmon spawning facilities. In early pioneer times, these falls provided the water power for Washington's first grist mill. These falls are an important part of Washington State's cultural and historical heritage.

Climate

The climate of the Deschutes River Basin is characteristic of the Puget Sound area with mild, wet winters and warm, dry summers.

During the winter months of October through April, more than 85 percent of the average annual rainfall occurs, and is usually accompanied by an extensive cloud cover. During this period, there is relatively little temperature variation and daytime temperatures in the 40s and low 50s usually drop into the 30s at night. Rainfall averages around 45 inches per year.

In the spring, Pacific weather disturbances generally shift to the north, resulting in clear skies and a much reduced rainfall. At this time of the year, coastal areas experience some fog, but it usually disappears by early afternoon. During the summer months, daytime temperatures in the 70s and 80s fall into the 40s and 50s at night. Rainfall becomes very light with an average of one inch falling each month. Occasionally, no measurable rainfall will occur during periods of up to 30 days. In May and June, approximately half of the days are sunny, while in July, August, and September, more than two-thirds of the days enjoy sunny weather. (13)

Population

Population has increased rapidly in the Deschutes River Basin during the last 20 years. Portions of the basin are experiencing some of the most dramatic increases in population in the State of Washington. According to Thurston County Regional Planning, the growth rate is 5 percent per year. Thurston planners estimate the basin's present population at 79,000. The Lacey and West Olympia areas are projected for even greater development in the next 20 years. Population for the entire basin may reach 160,000 by the year 2000. Other estimates put the basin population between 130,000 and 200,000 by 2005 A.D. Factors contributing to this rapid growth include a rapidly expanding service industry, in migration of out-of-state people, and a gradual increase in state and federal government employees who work in Olympia and Ft. Lewis. The impact of the construction of the twin nuclear power plants at Satsop is also being felt in the basin.

Land Use

Forestry and farming are the main uses of land in the Deschutes Basin, although use of land for urban and suburban development is increasing rapidly. Total farm production is about \$5 million annually. (2)

Adequate developable land exists in the basin to accommodate projected urban land needs up to the year 2020. This will be mainly at the expense of existing agricultural, forest, and wildlife lands and habitat. Approximately 16,000 acres are currently in agricultural cropland production. In the area of irrigated agriculture, forage crops of alfalfa and hay continue to be the primary crops. This is expected to decrease to around 5,000 acres by the year 2020. (2) Comprehensive multipurpose watershed management plans have been designed for the basin by county planners that include floodwater damage prevention, watershed rehabilitation, drainage improvement, and irrigation development. (2) However, these plans have not reached the implementation stage. Nor has the Thurston County comprehensive land use plan been put into affect.

The drainage basin has an area of approximately 304 square miles. Approximately 90 percent of this area, i.e., 273 square miles, is located in Thurston County, while the remaining 10 percent, i.e., 31 square miles, is located in the Bald Hills of Lewis County. Ten percent of the basin is covered by marine waters or lakes; less than 18 percent is urbanized; the remaining area is utilized for timber, agriculture, and other uses. (1)

III. WATER RESOURCES

Surface Water

The Deschutes River has a length of about 60 miles and flows northwestward from the Bald Hills to its mouth at Budd Inlet on Puget Sound. Average annual runoff in the upper reaches of the Deschutes River may reach .80 inches per year. The lowlands yield between 20-30 inches of runoff. High river flows usually occur in December, January, or February as a result of winter storms. Minimum flows are normally experienced in July, August, September, and October. Summer base flows during extended dry periods hover around 100 cubic feet per second (cfs) in the lower river with heavy dependence on ground water for sustenance. (2) Major tributaries of the Deschutes include Percival Creek, Spurgeon Creek, Fall Creek, Mitchell Creek, Johnson Creek, Thurston Creek, and the Little Deschutes River. The Deschutes River had a mean annual flow of 388 cfs over a 30-year period from 1931 to 1960. This amounts to an average annual volume of 281,000 acre-feet.

McLane, Woodward, and Woodland creeks form three independent subbasins and contribute about 60 linear miles of stream length. All are intermittent during summer low flow periods in their upper extremities. (3)

Budd, Eld, and Henderson inlets are significant saltwater areas within the Deschutes Basin. The Deschutes River discharges in the Budd Inlet, McLane Creek into Eld Inlet and Woodland and Woodward creeks to Henderson Inlet. The three inlets also receive freshwater inflow from numerous small springs and creeks along their flanks.

Approximately 55 lakes, plus numerous smaller marshes and beaver ponds, exist within the basin. All of the larger lakes are heavily used for recreational purposes. The shorelines of Long, Patterson, Chambers, Hicks, Offutt, and Lawrence lakes are all being heavily developed for summer homes. Little undeveloped lakeside land remains available around the major lakes. Heavy urban development around these lake shores may cause water quality problems from septic tank drainage. (16)

Other lakes of high recreational and aesthetic values within the Deschutes Basin include McIntosh, Offutt, Hicks, Chambers, Capitol, Black, Ward, and Lawrence lakes. Long, Patterson, Lawrence, Chambers, and Hicks lakes are recommended for closure to future out-of-lake consumptive use. These three lakes are interconnected and form the headwaters of Woodland Creek. Hicks Lake has a surface area of 167 surface acres, a maximum depth of 35 feet, and a volume of 2,703 acre-feet. Patterson Lake has a surface area of 257 surface acres with a maximum depth of 20 feet. Long Lake has a surface area of 310 surface acres and a maximum depth of 20 feet. Long Lake has two small islands within its perimeter and is heavily developed on all sides. Long Lake drains directly into Woodland Creek. All three lakes are reaching an advanced eutrophic stage, experiencing heavy aquatic vegetation and occasional water quality problems. Lawn irrigation and septic tank drainages are contributing factors in this problem. (16) In order to protect the summer water levels and water quality and to insure that the recreational values of these lakes is protected a closure to further out-of-lake consumptive use has been

recommended. In addition to the high aesthetic qualities provided by Long, Patterson, and Hicks lakes to the lakeside residents, an important sports fishery is available to the sportsmen of the state. Patterson Lake is well known for its good large-mouth bass fishing. Long and Hicks lakes are usually planted with rainbow trout prior to the opening of trout season each spring. Water skiing, swimming, and sun bathing are also popular recreation activities on these lakes.

Flooding

Flooding within the Deschutes River Basin can occur at any time between December and March and is caused by excessive precipitation. Heavy snow melt is usually not a factor and the lack of high mountain snowpack prevents a spring snow melt flood problem. The 100-year floodplain is slowly being developed by both urban and agricultural development; however, future local land use plans may prohibit further intensive, flood prone development in these areas. Flooding within the Woodland, Woodward, and McLane creeks drainages is seldom a serious problem for local residences and farms. Heavy, rapid storm water runoff is a primary cause of drainage and water pollution problems in the vicinity of Tumwater and Olympia. (2)

Maximum instantaneous discharge reported for the Deschutes River near Olympia was about 6,650 cfs in 1964. Woodland Creek had a maximum instantaneous discharge of 204 cfs in 1951. (1) Local flooding is considered to be a serious problem by the U.S. Fish & Wildlife Service in areas of salmon spawning habitat. Spawning gravels are removed by high velocity flows and bank failures cause siltation and erosion. (11)

Low Flows

Mean monthly discharges for the Deschutes River are very similar to other primarily rain fed streams of the southern Puget Sound lowlands. Minimum flows, derived primarily from ground water discharge are common during August and September. Summer base flows average about 100 cfs at in the lower Deschutes River, while Woodland Creek has a base summer flow of approximately 12 cfs.

Impoundments

Capitol Lake forms the single largest, man-made impoundment in the Deschutes River Basin with a surface area of about 306 acres and a volume of 2,600 acre-feet. (1) This lake is subject to severe siltation. Much of the sediment is carried downstream by floods within the Deschutes River. It is estimated that up to 30,000 tons are deposited in this lake each year. Dredging efforts to restore the lake were started in 1979. Capitol Lake is used for swimming, recreation, and fish rearing and is an important local recreational asset. Public swimming is occasionally curtailed due to water pollution problems. This lake is also considered to be an important wintering area for the golden eye duck.

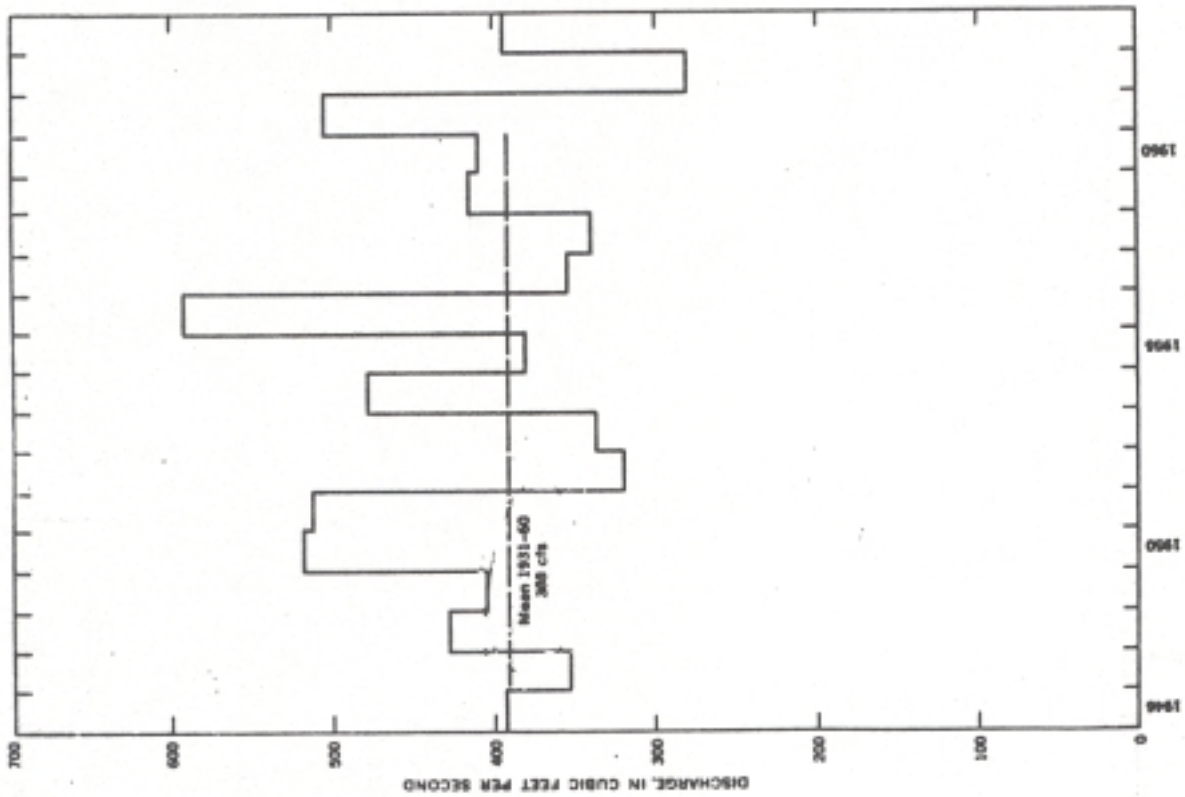


FIGURE 1 -Annual discharges, Deschutes River near Olympia.

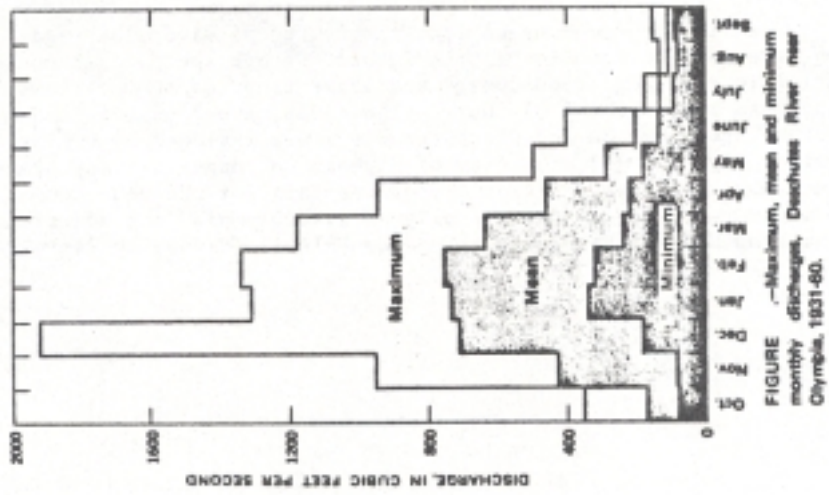


FIGURE 2 -Maximum, mean and minimum monthly discharges, Deschutes River near Olympia, 1931-60.

In order to meet future water needs from the Deschutes River, storage may become necessary at sometime in the future. A storage project could be beneficial in reducing flood damage and augmenting low summer flows for the instream resources. (16) During 1968-1969, a proposal to construct the Shellrock Dam on the Deschutes River was reviewed by DOE at the request of Olympia. (6) The City of Olympia no longer has any plans to construct Shellrock Dam. Recent city plans call for the development of ground water resources in the vicinity of East Olympia, and additional withdrawals from McCallister Creek in nearby WRIA 11 (Nisqually Basin).

Ground Water

Ground water is an important source of water in the Deschutes River Basin. With much of the lowland areas being overlaid with deposits of porous glacial outwash material, these areas are capable of storing much of the precipitation that occurs during the year.

In the southern Puget Sound area, approximately 85 percent of the annual precipitation occurs during the seven months from October through April. The remaining 15 percent occurs from May through September. Serious water shortages could occur if it were not for the excellent ground water storage capabilities of the aquifers in the area. (1)

A study published in 1966, "Geology and Ground Water Resources of Thurston County," indicates availability of ground water of excellent quality and adequate yields for domestic and other uses generally throughout the basin. (3)

In most areas where ground water is utilized, the water is available at relatively shallow depths at yields from 10 to 50 gallons per minute (gpm) with many areas yielding 50 to 250 gpm. A sample survey of data obtained from existing wells in the basin indicates that in over 80 percent of the wells the water level was within 50 feet of the surface of the land.

The quality of water obtained from ground water sources in the basin is generally good. The dissolved solid content is usually less than 150 parts per million (ppm) and is acceptable for practically all purposes. (1)

In Table 1, ground water inflow from precipitation and outflow from pumpage are compared for the Deschutes River Basin and Thurston County to determine if the ground water resources are adequate to meet all pumpage demands. Ground water inflow for the Deschutes River Basin is estimated from precipitation, actual evapotranspiration, and runoff based on tables and maps prepared by the Weather Bureau, Soil Conservation Service, and USGS. Subsurface inflow, stream seepage, and upward flow from deeper aquifers are not considered. From Table 1, the surplus water available for recharge (36") is precipitation (P) minus actual evapotranspiration at available water capacity of 2 inches (Ea(2)). The runoff in the Deschutes River Basin, according to the USGS runoff map, averages about 25 inches. Total recharge from precipitation is 36 inches minus 25 inches or 11 inches annually.

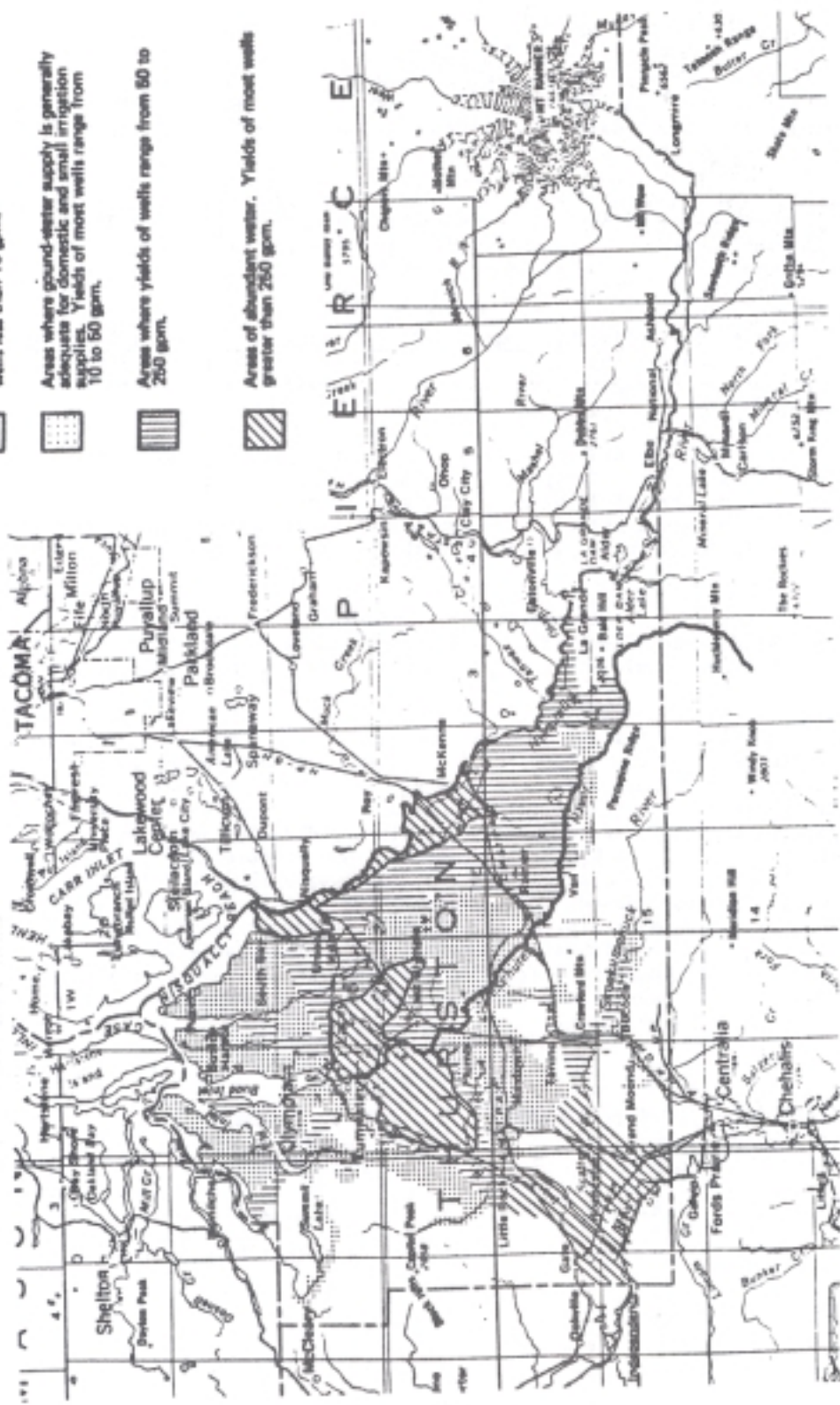
TABLE 1

(Data for Olympia airport)

	J	F	M	A	M	J	J	A	S	O	N	D	Totals
P	7.93	5.97	4.81	3.14	1.88	1.57	0.7	1.17	2.12	5.28	7.98	8.19	50.74
Ea(2)	0.3	0.6	1.1	1.8	2.6	2.1	1.0	0.7	1.8	1.7	1.0	0.5	15.2
Sur- plus	7.63	5.37	3.71	1.34	-0.72	-0.53	-0.3	0.47	0.32	3.58	6.98	7.69	35.54

LEGEND

-  Areas of doubtful ground-water supply. Very few well records available. Yields of most wells less than 10 gpm.
-  Areas where ground-water supply is generally adequate for domestic and small irrigation supplies. Yields of most wells range from 10 to 50 gpm.
-  Areas where yields of wells range from 50 to 250 gpm.
-  Areas of abundant water. Yields of most wells greater than 250 gpm.



Availability Of Ground Water

Figure 2

Figure 2 is a map of the Deschutes Basin and surrounding area indicating the generalized availability of ground water.

Ground Water Utilization and Development

Ground water pumped from wells in the lowlands is used mostly for irrigation in the area southeast of Olympia. Several large-yielding artesian wells supply water to industrial uses at Tumwater. Industry engineers believe that these wells do not fluctuate with nearby Deschutes River levels during low or high flow periods. These wells are deeper than 100 feet. An important well field is located within the grounds of the Tumwater Golf Course and adjacent to the Deschutes River.

Relationship of Ground Water to Instream Protection Measures

As stated in the Water Resources Act of 1971, "Full recognition shall be given in the administration of water allocation and use programs to the natural interrelationships of surface and ground waters." RCW 90.54.020(8) It is the intent of this program to insure that surface waters are protected from significant impact with respect to the use of adjacent or nearby ground water resources that are known to be in continuity with protected surface waters. Significant effects and continuity will be defined in DOE's water management procedures which establish criteria for determining whether significant hydraulic continuity exists between a protected surface water course and proposed wells. Proposed wells found to be in significant hydraulic continuity with such surface sources would be treated in the same manner as a direct diversion from the surface source. This determination will be made on a case-by-case basis.

IV. WATER QUALITY

Surface Water Quality

The quality of the surface waters of the Deschutes Basin is relatively good in the sparsely populated upper watershed areas and generally deteriorates in the more heavily settled regions. Existing conditions within the basin are as follows:

Water quality standards within the basin are Class A for south Puget Sound and the Deschutes River, Class B for Budd Inlet, and Class AA for lake feeder streams, (1)

High sediment transport occurs within the Deschutes River when the river's discharge exceeds 5,000 cfs. (2)

Although the quality of water within Budd Inlet is not good, the Deschutes River freshwater flows play an important part in flushing out pollutants. Raw sewage combined with storm flows presents a serious water quality problem within Budd Inlet. (1)(4)

Woodland Creek has experienced industrial pollution problems in recent years from point source pollution activities in the vicinity of Lacey.

Water Quality Assessment

Analysis of accumulated ambient water quality data indicates the waters of Deschutes River and tributaries to be generally of high quality. Apparent violations of state water quality standards are most often related, either directly or indirectly, to natural causes.

Total coliform bacterial densities were seen to be commonly in excess of the state Class A maximum acceptable median value standard. Acceptable levels were recorded only during the winter and early spring months when flows were high and water temperatures low. During the remainder of the year, coliform densities often exceed the standard. Although there were correspondingly high levels of ammonia during this period, which tends to confirm the organic loadings and suggests fecal pollution, the evidence is not conclusive; coliform of plant origin can cause high ammonia readings. (21)

Water temperatures and dissolved oxygen content were of a consistently high quality throughout the year. Mean temperatures are near 10°C with summer highs near 18°C and winter lows around 3°C. Dissolved oxygen concentrations are typically near 10.0 mg/l with slight decreases in late summer [Figures 1(c) and 1(b)]. Turbidity levels of near 5 JTU's occur throughout the river with higher short-lived levels occurring along with the peak streamflows [Figure 1(h)]. Siltation of Capitol Lake indicates the river turbidity and sediment loads are significant, pH is well within the standard range, with a mean value near 7.3 standard units. (21)

Some potentially significant nonpoint sources of water pollution are logging and related activities; fertilizer contaminated storm runoff from golf courses; and other areas using fertilizers, farming, irrigation, gravel excavations, and rock quarrying.

Ground Water Quality

Water in most aquifers is generally low in dissolved solids content (less than 150 ppm) and is acceptable for practically all uses. High iron content is present in the Lacey fire station well, according to the Lacey City Engineer. (9) High sulfate content is present in a well in the Mima Mounds area.

More highly mineralized ground water is common near Puget Sound, where some freshwater aquifers contain traces of sea water. Hardness of water in the basin is generally less than 60 parts per million. Silica is usually in the 20 to 40 parts per million range. (2)

The areas of poorer quality water are mainly along Puget Sound; however, significant encroachment of sea water has not as yet been observed. Locally, in the western and southern parts of the lowlands, where quaternary deposits are thin, many wells completed in these deposits produce highly mineralized water derived from underlying bedrock. (1)

Wells of greatest yield in the basin pump water mostly from aquifers whose origin is older than glacial till, but substantial yields are also obtained from aquifers in rather thick and coarse recessional outwash in the irrigated area southeast of Olympia. Few wells are more than 200 feet deep, and the water-bearing zones from which they produce are commonly less than 30 feet thick. South of East Olympia, large well yields are obtained from aquifers in deposits older than till and from recessional outwash aquifers. In much of the southern part of the basin and in an area southwest of Olympia, aquifers in quaternary deposits are usually too thin to support large well yields; but elsewhere, yields of several hundred gallons per minute can be obtained from adequately developed wells.

Geologists and engineers believe that there are adequate ground water resources to support the region's growth at least to the year 2020. (8)(9)(10)(14)

The City of Olympia and Lacey plan to develop future wells in the vicinity of the Capitol City Golf Course and East Olympia. Tumwater may drill additional wells near the Tumwater Golf Course according to the City Engineer, John Cunningham.

V. INSTREAM RESOURCE USE

Fisheries

The Deschutes River main stem, Percival Creek, and Capitol Lake are the most important anadromous fish habitat resources in the basin. Instream use for anadromous fisheries has come about as the result of fish ladders at the Capitol Lake dam, major fish passage facilities at the mouth of the Deschutes River, fish ladders in Percival Creek, and fish rearing facilities in Percival Cove. Prior to the construction of fish ladders at Tumwater Falls in the 1940s, anadromous fish were blocked from migrating upstream by height of the falls. In conjunction with the passage of facilities, the Department of Fisheries has developed facilities for capture and artificial spawning of adult chinook and coho salmon migrating upstream. These eggs are used in highly successful hatchery programs. During 1978 an extensive habitat enhancement project was completed on Swift Creek, an important chum salmon spawning stream. As a result of these efforts, chinook, chum, coho salmon, and steelhead provide highly significant contributions to harvest of these species in Washington State. (6)

Chinook salmon spawn primarily in the main stem Deschutes River and Percival Creek, while important coho spawning areas include Mitchell, Huckleberry, Johnson, Thurston (Deschutes tributaries), and Percival creeks. A conservative catch value of over \$80,000 annually for coho between 1974 and 1978, with an upper limit close to \$150,000 for the 1977 brood year, is recognized. The Department of Fisheries has calculated that the average value of the chinook run over the past five years exceeded \$2 million annually. Now that the Capitol Lake dredging project, including Percival Cove, has been completed, 1980 hatchery releases will be increased to 1,150,000 chinook yearlings (143,000 lbs) and eight million chinook fingerlings (80,000 lbs). These 1980 releases will contribute a total of 120,000 adult chinook to the fisheries, a contribution valued at well over \$3 million, based on 1976-77 estimated values. The chinook production is directly related to streamflow maintenance and water quality. (6) Approximately 3,800 chinook were artificially spawned at the Deschutes spawning facilities while 2,700 were allowed to spawn naturally in 1979. The Department of Fisheries retained about 6.5 million eggs for state hatcheries. Coho salmon escapement for the Deschutes River in 1979 amounted to about 6,650 fish. Juvenile coho remain in the freshwater streams for one year prior to migrating to salt water.

Department of Fisheries preferred chinook salmon spawning flows in the main stem of the Deschutes River as determined by the USGS - toe width methodology are as follows:

River Mile 9.0; 292 cfs
River Mile 10.5; 238 Cfs
River Mile 15.4; 236 cfs
River Mile 19.4, 218 cfs

These preferred fisheries flows illustrate the increasing streamflow needs for spawning nearer the mouth of the Deschutes River.

The Department of Fisheries considers the highest priority for this basin to be the maintenance of water quality at the mouth of the Deschutes River, throughout Capitol Lake, within Percival Cove, and in Budd Inlet. The obvious reasons are to protect the sizable investment in artificial, as well as natural, fishery production that occurs in these areas. Maintenance of water quality is directly related to instream flows. Maintenance of present water quality within Capitol Lake is also dependent on adequate flows according to Department of Fisheries studies and those conducted by Washington State University in 1974-75. The latter studies concluded that while Capitol Lake is eutrophic, severe algae and macrophyte problems are minimized because of the relatively low time of water retention in this area and periodic saltwater flushing. The Capitol Lake swimming beach is closed on occasion because of periodic algae blooms plus coliform bacteria problems. (6)

Maintaining adequate dissolved oxygen levels in Capitol Lake is also highly significant for conditions in the West Bay of Olympia Harbor. A very serious water quality problem (low dissolved oxygen) is present during summer and fall months in Budd Inlet. A significant freshwater discharge from Capitol Lake is essential to maintain fish life in the west bay of Olympia Harbor. (6) There are also independent drainages in the Deschutes Basin that have importance for fisheries instream uses: McLane Creek, Woodward Creek, Woodland Creek, and Green Cove Creek provide habitat supporting chum and coho salmon. Spawning escapements have been estimated at over 12,000 chums occurring after substantial harvest in Puget Sound and terminal area catches in Eld Inlet by the Squaxin Indian Tribe. The other major independent drainage used by chum salmon is Woodward Creek, where escapements approach 1,000 spawners annually. Other minor drainages support small coho populations, and possibly chum. (6)

Allison Springs, a recent addition to the Department of Fisheries hatchery rearing program, is located on a tributary to Mud Bay near the mouth of McLane Creek.

The Department of Game has requested closure of the Deschutes River to further consumptive appropriation of water during the entire year in order to protect a rare endemic fish, the Olympic mudminnow (Novumbra hubbsi Schultz), and to prevent any damage to the very important runs of steelhead and cutthroat trout. Spawning area and temperature are both affected by flow. Another fish of special concern, the shorthead sculpin (Cottus confusus) inhabits the upper reaches of the Deschutes River. (Bisson, Peter A. 1977). This sculpin is extremely sensitive to high temperatures and may be the most temperature-sensitive fish in Washington. Consequently, the short head sculpin could be affected by any decrease in flow. (17)

Spawning area for steelhead is greatest, according to direct measurements, at a flow of about 250 cfs in a reach approximately four miles upstream from Vail and downstream from the confluence with the Lake Lawrence outlet stream. That flow level is needed through the end of June for steelhead spawning, incubation, and emergence. It is apparent from the hydrograph of the Deschutes River near Olympia at river mile 3.4 that an adequate spawning flow is seldom available after mid-May under natural flow conditions. Consequently, spawning and incubation

habitat is frequently a limiting factor in May and June, and some redds may be desiccated. Further withdrawal of water at this time of the year may damage steelhead populations in the Deschutes River.

The Deschutes River winter steelhead sport catch has been as high as 852 in 1977. The sports catch of Deschutes River steelhead was tabulated from punchcard estimate summaries for the 13 seasons from 1965-66 to 1977-78. These catch estimates were compared with the lowest flows recorded near Rainier during age 0 (3½ year before catch) and age 1 (2½ years before the catch). The data indicates a loss of 25 steelhead from the catch for every/cfs loss during the two rearing seasons. This is a clear indication that rearing flows are limiting to steelhead production. (17)

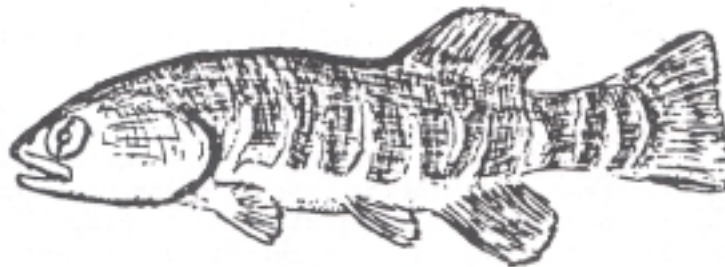


Figure 6 Olympic Mudminnow 6.6 cm.

The Olympic mudminnow is an attractively colored native fish which is restricted to a small geographic area in southwestern Washington. This fish occurs in only one stream that flows into Puget Sound - the Deschutes River. (It also inhabits the Chehalis River Basin and some streams. This fish inhabits sloughs and oxbow lakes, such as the one between Henderson Boulevard and the golf course in Tumwater. The oxbow lakes require occasional high flows or floods to recharge them. Flows that are too low for extended periods could cause water level in oxbows to drop too low for fish survival. (17)

Adequate water flow is important to the maintenance of riparian vegetation and wetlands which support significant numbers of wildlife, including waterfowl which are hunted in the Deschutes valley. (17)

Wildlife

The bald eagle, a threatened species in Washington, occurs in the Deschutes River Basin throughout the year. The Nongame Wildlife Program of the Department of Game lists 18 sightings of bald eagles in the Deschutes Basin during 1978. Sightings have been recorded in all

parts of the basin. Bald eagles in Western Washington depend, to a large degree, upon salmon produced in the rivers. Because of the dependence of eagles upon salmon, the Department of Game supports the flow recommendations of the Department of Fisheries for the protection of salmon. (17)

Ospreys are rarer than bald eagles in Western Washington, according to a recent analysis by the Washington Natural Heritage Program. One osprey nest has been sighted in the Deschutes Basin. Ospreys are almost exclusively dependent upon fish for food, so that flows which protect fish will protect ospreys. (17)

Recreation

Recreation within the Deschutes River Basin is increasing in importance, and the need for water related recreation is expected to increase in proportion to the increase in population. Although the scarcity of fuel will reduce long distance travel for many basin residents, the Deschutes River is located relatively close to the urban centers of Tacoma, Olympia, Tumwater, and Lacey and opportunity and need for recreation will undoubtedly increase. Boating, sailing, picnicking, camping, and fishing needs can be met only by increasing public access along the Deschutes River, Capitol Lake, Henderson Inlet, Budd Inlet, and Eld Inlet. Sailboating is very popular in the saltwater areas. Outdoor recreation corridors are being proposed for various sections of the Deschutes River. These will provide additional streamside access for picnicking, fishing, boating, and camping. Nature trails for nonconsumptive wildlife viewing are also important. Improved access to state owned tidelands within Budd Inlet is also planned. Portions of the Deschutes River are considered to be excellent for family oriented canoe trips due to the river's gentle flows and lack of serious water hazards.

Hunting and fishing are popular recreational activities conducted within the basin. Good populations of blacktail deer attract several thousand hunters each fall. Duck hunting is popular on many of the area's ponds and lakes. Bear and grouse are also hunted in the forest regions.

Navigation

The Deschutes River is considered navigable for kayaks and canoes throughout its mid and lower reaches; however, it is only lightly used for this activity. Budd, Eld, and Henderson inlets are heavily used by boaters for both fishing, sailing, and recreation. Approximately 80 seagoing vessels a year use the Port of Olympia facilities located in Budd Inlet. The port is considered to be a regionally important log exporting site and plays an important part in the Deschutes River Basin's forest products industry.

Scenic and Aesthetic Values

The Deschutes River Basin has retained much of its rural scenic characteristics that have existed since early settlement. The floodplain is dotted with small farms and tree lined streams and ponds. Mt. Rainier forms a picturesque backdrop with its white snow-capped crest on the eastern horizon. The fjord-like saltwater inlets of southern Puget Sound are probably unsurpassed in

aesthetic quality any place in the Pacific Northwest. Lake shores and streamsides are popular summertime camping and fishing locations for the basin's estimated population of over 80 thousand persons. The natural attributes of high scenic and aesthetic values are considered to be highly influential in this area's dramatic increase in growth during the past decade and contribute greatly to the high quality of life enjoyed by basin residents. Areas of special high scenic value include the northern regions of the basin that provide views of the Olympic Mountains located 30 miles to the northwest.

IV. OTHER WATER USES

Municipal and Industrial Use

The cities of Lacey and Tumwater depend heavily on ground water resources for their municipal and industrial water needs. The City of Olympia pumps a maximum of about 18 mgd (million gallons per day) and services 32,000 people. Most of this water is surface water supplied by McCallister Springs located east of the basin's boundary. Olympia plans to increase water production capacity to 23 mgd by the year 2000. It is assumed that many new areas will be developed within the city during the next decade. In order to meet this growth, well fields are planned in the vicinity of the Capitol City golf course west of Patterson Lake.

The City of Lacey has recently contracted a ground water study to determine the amount of water that will be needed through the year 2000. Lacey services about 22,500 persons at the present time. Average use is about 90 gallons per day per person. Estimates are that an increase from the existing 9.163 mgd peak flow to 13.128 mgd in the year 2000 will be required. Existing capacity for Lacey is 9.43 mgd but only 6.4 mgd firm capacity. Lacey used an average of 2.03 mgd in 1979. High iron content problems are experienced in one of the more productive wells. Lacey is also planning to develop future ground water resources in the general vicinity of the Capitol City Golf Course. (9)

Tumwater depends totally on wells within the Deschutes floodplain and the Olympia Airport. The city has a total well capacity of 3,030 gallons per minute or 4.363 mgd at the present time and services about 7,250 persons. Service area projections for the year 1989 are 11,100. Wells located along the lower Deschutes River do not fluctuate with low flow periods in the Deschutes River, indicating that these artesian wells have penetrated a deeper and more substantial aquifers than the shallow surface aquifers that maintain base river flows. (10)(9)(8)

Irrigation

Irrigation rights within the Deschutes River Basin consist of less than 1 percent of the total ground and surface water rights in the basin. About 36 cfs is used for irrigating 3,400-3,704 acres within the basin. Depletion of ground and surface water is estimated to be about 4,200 acre-feet annually. (2)(7)

VII. PRESENT ADMINISTRATIVE STATUS

Current Administrative Status of Streams ad Lakes - Deschutes Basin, WRIA 13.

<u>Stream</u> <u>Section Range, and Township</u> <u>of Mouth or Outlet</u>	<u>Tributary to</u>	<u>Action</u>	<u>Dates</u>
Deschutes River NW¼, SW¼, Sec. 26, T18N, R2W	Budd Inlet	Low Flow (275 cfs) (60.0 efs)	7/6/54
McLane Creek SW¼ NW¼ Sec. 19, T18N, R2W	Eld Inlet	Low Flow {0.50 cfs)	8/21/40
Percival Creek SW¼ NE¼ Sec. 22, T18N, R2W	Capitol Lake	Closure	9/26/72
Spurgeon Creek NE¼ NE¼ Sec. 19, T17N, R1W	Deschutes River	Low Flow (0.50 cfs)	11/3/49
Unnamed Spring (Manor Spring) NE¼ NW¼ SEA Sec. 6 T18N, R2W	Eld Inlet	Low Flow (0.50 cfs)	11/28/55
Unnamed Stream (Ayers Creek) SW¼ NW¼ Sec. 7, T17N, R1W	Deschutes River	Low Flow (1.0 cfs)	1/17/50
Unnamed Stream (Swift Creek) NW¼ SW¼ Sec. 19, T18N, R2W	McLane Creek	Closure	4/6/64
Unnamed Stream SE¼ NW¼ Sec. 16, T16N, R1E	Deschutes River	Low Flow (bypass 1/2 low flow)	12/1/53
Unnamed Stream and/or Slough NW¼NW¼ Sec 1, T17N, R2W	Deschutes River	Low Flow (bypass 1/2 low flow)	5/10/54
Unnamed Stream NW¼ NW¼ Sec. 33, T19N, R2W	Eld Inlet	Low Flow (1.5 cfs)	10/19/72
Unnamed Stream NW¼ NW¼ Sec. 25, T19N, R2W	Gull Harbor	Low Flow (1.0 cfs)	3/25/55
Woodland Creek (Himes Creek) NW¼ SW¼ Sec. 33, T19N, R1W (1.8 cfs) (1.5 cfs) (1.0 cfs)	Henderson Inlet	Low Flow (2.5 cfs) (1.8 cfs) (1.5 cfs) (1.0 cfs)	1/22/51
Woodward Creek SW¼ NW¼ Sec. 19, T19N, R1W	Woodward Bay	Closure	8/24/49

VIII. PROPOSED ADMINISTRATIVE STATUS

The Department of Ecology proposes under the authority of Chapter 90.54 RCW, Chapter 90.22 RCW, and Chapter 173-500 WAC to establish instream flows for the Deschutes River below river mile 41 for the period November 1 through April 14. All tributaries of the Deschutes River and that portion of the Deschutes River above river mile 41 (Deschutes Falls) are proposed to be closed to further consumptive use during the entire year. The Deschutes River main stem below river mile 41 is proposed for closure from April 15 until October 31. The department further proposes to adopt closures previously established under administrative procedures for Percival and Woodward creeks and low flow limitations previously established for two unnamed streams that are tributary to Puget Sound. (See proposed administrative rules.) These actions are deemed necessary in order to insure the long-term protection of the instream resources of fish, wildlife, water quality, recreation, scenic, aesthetic and other environmental values.

McLane and Woodland creeks and Patterson, Long, Chambers, and Hicks lakes are proposed for closure to further consumptive appropriation. The department proposes to establish one control station on the Deschutes River that will provide monitoring and regulatory control of the proposed instream flows.

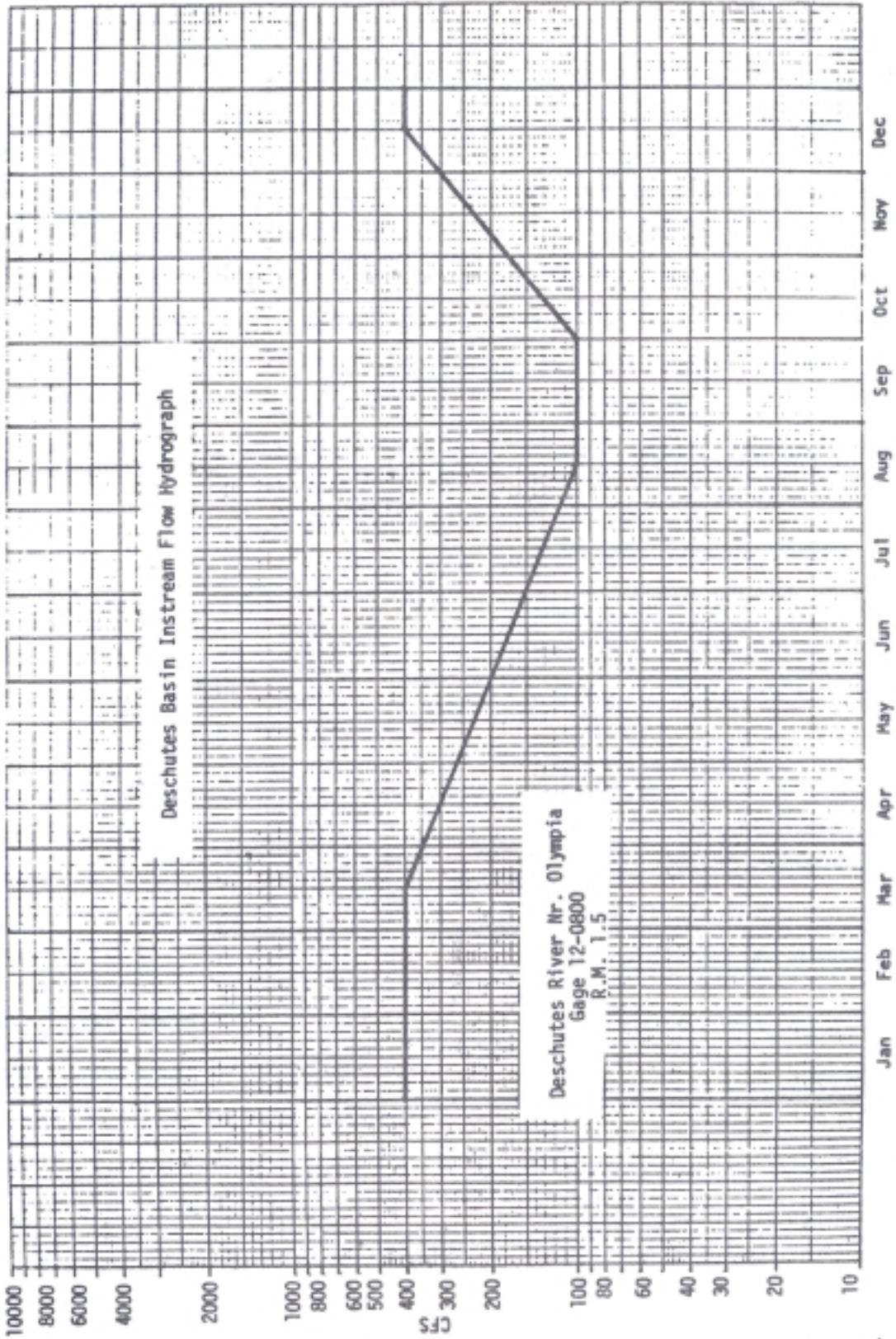
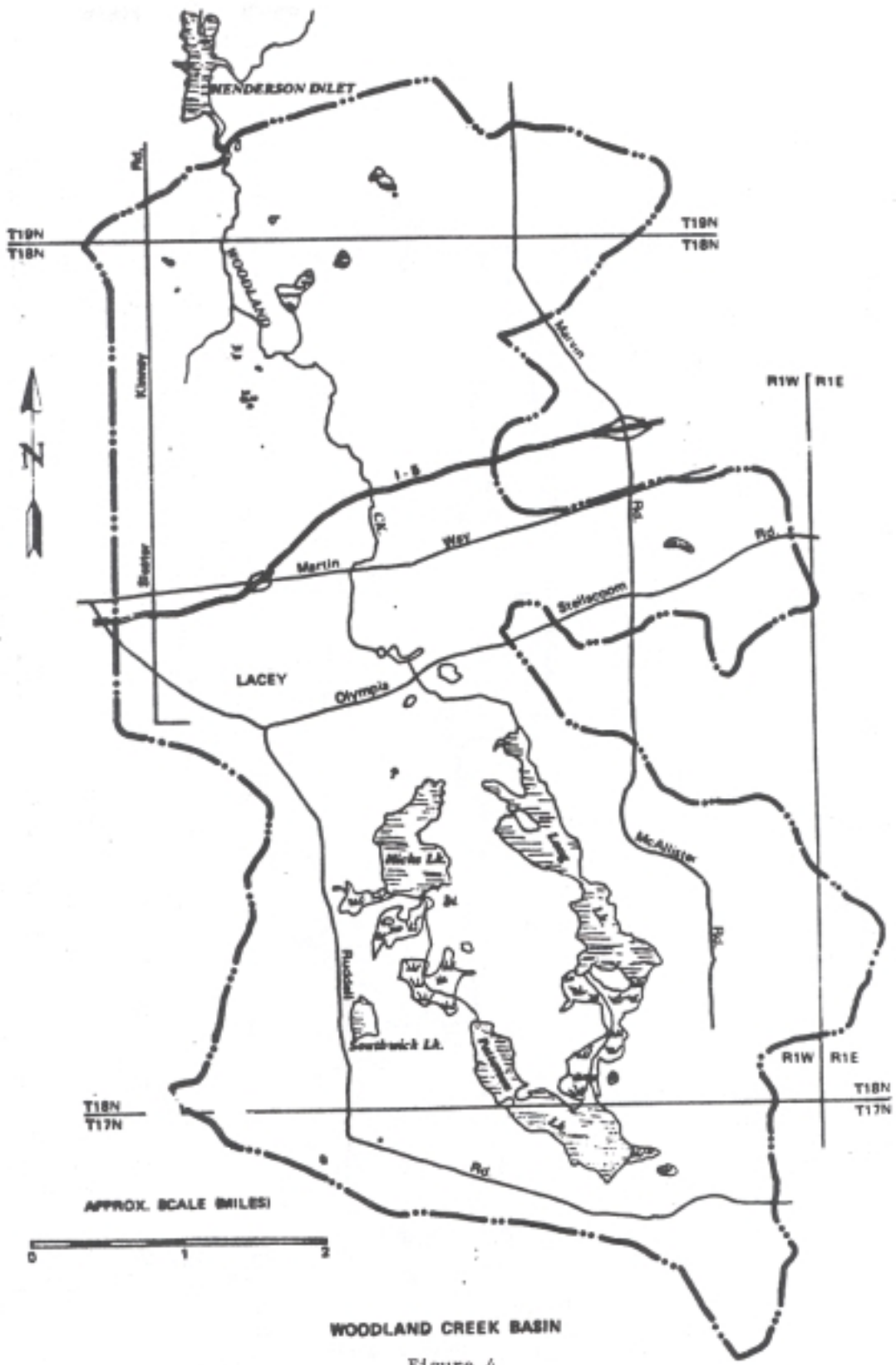


Figure 3



WOODLAND CREEK BASIN

Figure 4

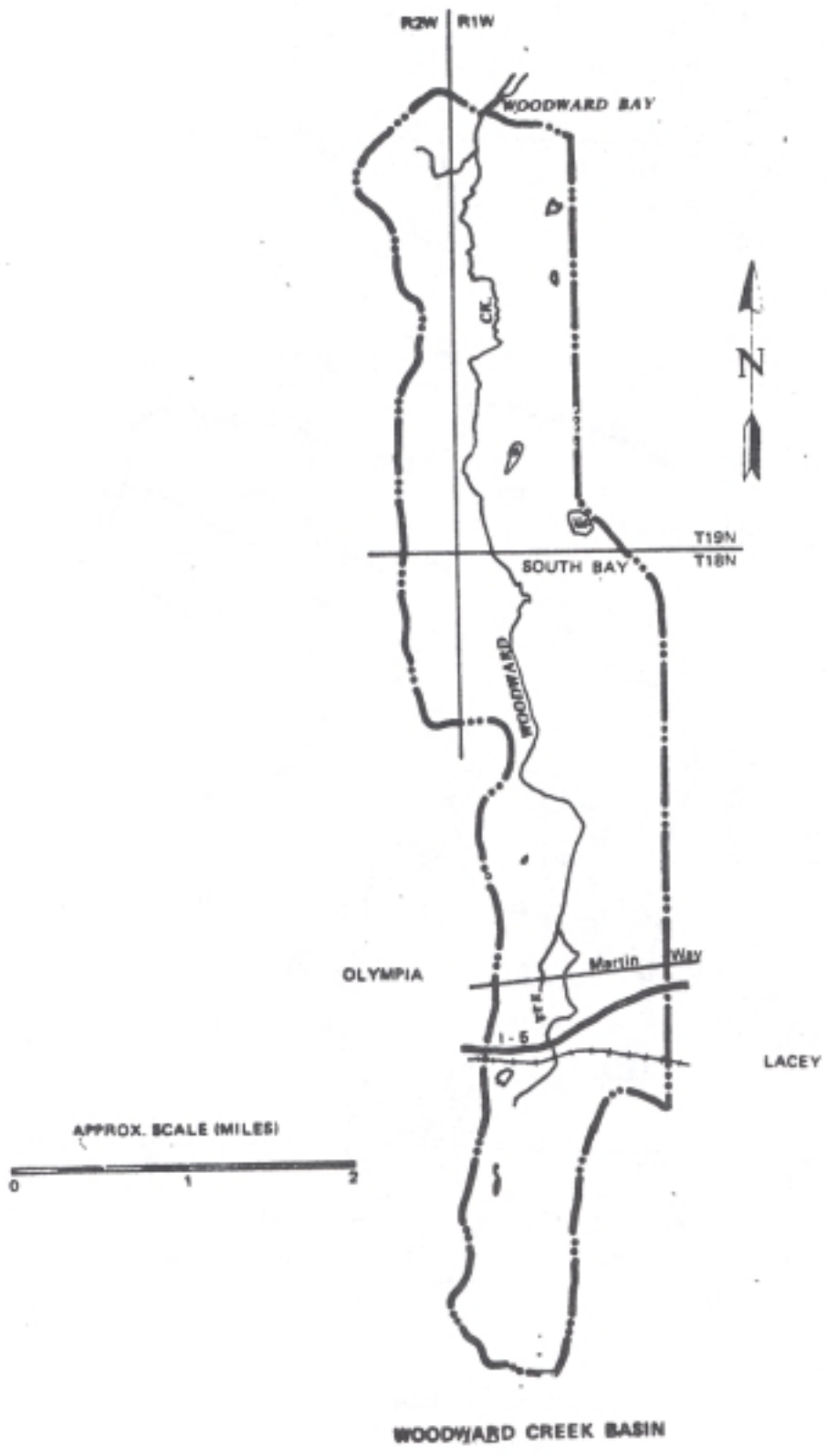
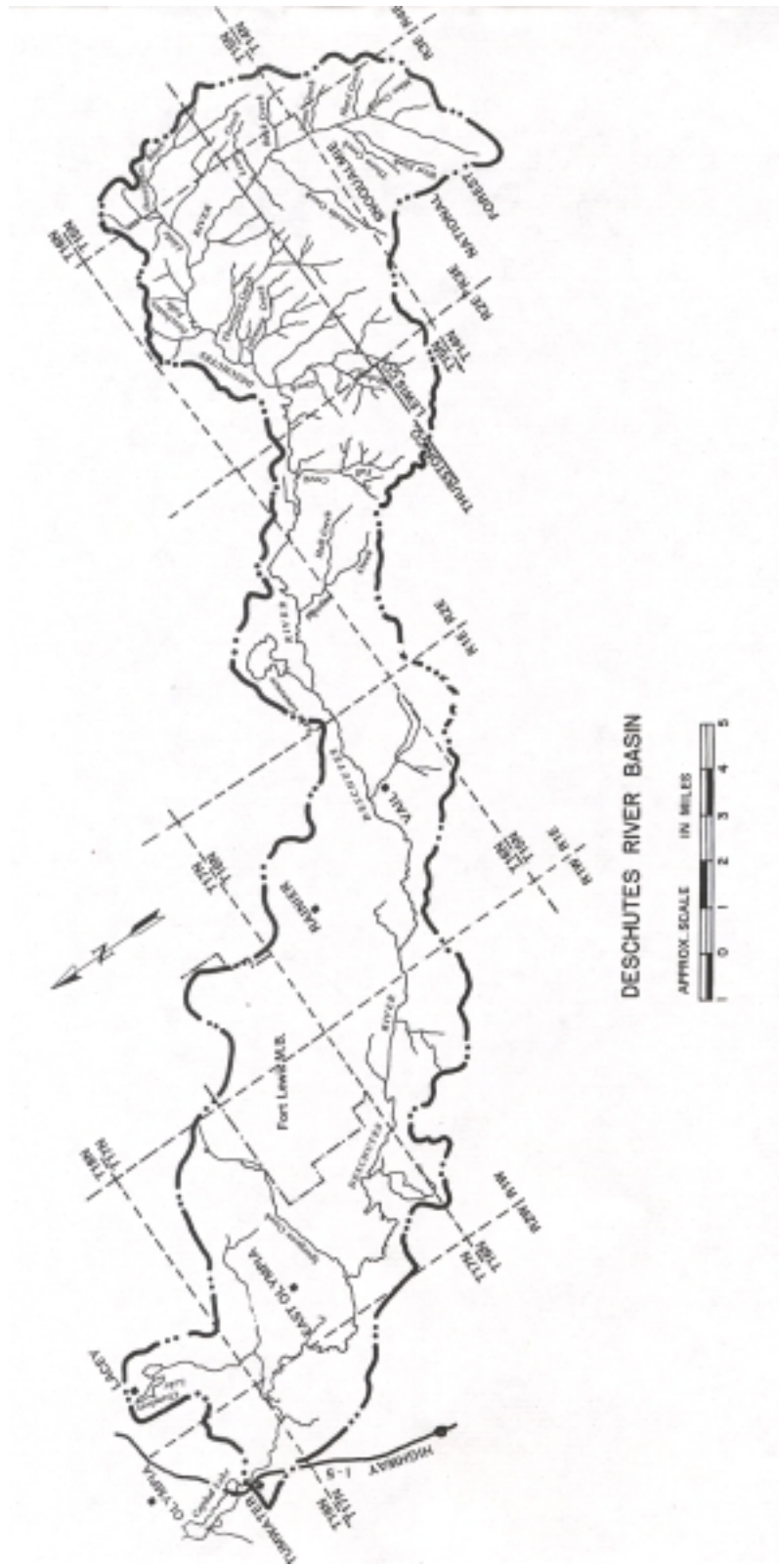


Figure 5



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- (17) Department of Game, Hal Beecher, March 1980.

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ACKNOWLEDGMENTS

Primary credit for the development of the Des chutes River Basin Instream Resources Protection Program is given to the efforts of the multidisciplinary planning team members. Principal planning team members included Ray Johnson (Department of Fisheries), Hal Beecher (Department of Game). Nancy Nelson and Eric Knudsen represented the U.S. Fish and Wildlife Service. Jack Davis, Black Hills Audubon Society, provided valuable information on bird species and habitat requirements. Len Esteb, John Cunningham, and Don Hertzog represented Olympia, Tumwater and Lacey. Mike Peters and Jack Rensil represented the Squaxin Island Indian Tribe. Kris Kauffman and Ken Slattery, from the Department of Ecology, provided technical advice and editing. Mr. Gene Fox prepared the Basin technical report. Invaluable advice and support was given by Vic Shaver and Walt Bergstrum from the DOE S.W. Regional Office. Recognition is also given to all the other private, county, state and federal representatives who gave their time and support in the preparation of the Deschutes River Basin I.R.P.P.

APPENDIX A

Administrative Rules, Deschutes River Basin

Chapter 173-513 WAC

Adopted June 20, 1980

Chapter 173-513 WAC
Instream Resources Protection Program-
Deschutes River Basin, Water Resource
Inventory Area (WRIA) 13

NEW SECTION

WAC 173-513-010 GENERAL PROVISION. These rules apply to waters within the Deschutes River Basin, WRIA 13, as defined in WAC 173-500-040. This chapter is promulgated pursuant to chapter 90.54 RCW (Water Resources Act of 1971), chapter 90.22 RCW (Minimum Water Flows and Levels), and in accordance with chapter 173-500 WAC (Water Resources Management Program).

NEW SECTION

WAC 173-513-020 PURPOSE. The purpose of this chapter is to retain perennial rivers, streams, and lakes in the Deschutes River Basin with instream flows and levels necessary to provide protection for wildlife, fish, scenic, aesthetic, environmental values, recreation, navigation, and water quality.

NEW SECTION

WAC 173-513-030 ESTABLISHMENT OF INSTREAM FLOWS. (1) Stream management units and associated control stations are established as follows:

Stream Management Unit Information

Control Station No. Stream Management Unit Name	Control Station Location, River Mile and Section, Township and Range	Affected Stream Reach
12.0800-00 Deschutes River	3.4 Sec. 35-18N-2W	From the confluence of the Deschutes River with Capitol Lake upstream to the Deschutes Falls at river mile 41.

(2) Instream flows established for the stream management unit described in WAC 173-513-030(1) are as follows:

INSTREAM FLOWS IN THE DESCHUTES RIVER BASIN
(in Cubic Feet per Second)

Month	Day	USGS Gage 12-0800-00 Deschutes River
Jan	1	400
	15	400
Feb	1	400
	15	400
Mar	1	400
	15	400
Apr	1	350
	15	(Closed)
May	1	(Closed)
	15	(Closed)
June	1	(Closed)
	15	(Closed)
July	1	(Closed)
	15	(Closed)
Aug	1	(Closed)
	15	(Closed)
Sept.	1	(Closed)
	15	(Closed)
Oct	1	(Closed)
	15	(Closed)
Nov	1	150
	15	200
Dec	1	300
	15	400

(3) Instream flow hydrograph, as represented in the document entitled "Deschutes River Basin Instream Resource Protection Program," shall be used for identification of instream flows on those days not specifically identified in WAC 173-5133-030(2).

NEW SECTION

WAC 173-513-040 SURFACE WATER SOURCE LIMITATIONS TO FURTHER CONSUMPTIVE APPROPRIATIONS. (1) The department of ecology, having determined that further consumptive appropriations would harmfully impact instream values, closes the following streams and lakes to further consumptive appropriation for the periods indicated.

New Surface Water Closures

<u>Stream or Lake</u> <u>Section, Township and</u> <u>Range of Mouth or Outlet</u>	<u>Tributary to</u>	<u>Period of Closure</u>
Deschutes River below Deschutes Falls (river mile 41) NW $\frac{1}{4}$ SW $\frac{1}{4}$ Sec. 26, T. 18N., R. 2W.	Puget Sound (Budd Inlet)	Apr. 15 to Nov. 1
Deschutes River above Deschutes Falls (river mile 41) and all tributaries of Deschutes River E $\frac{1}{2}$ NE $\frac{1}{4}$ Sec. 10k T. 15N., R. 3E. (Deschutes Falls)		All year
McLane Creek and all tributaries SW $\frac{1}{4}$ NW $\frac{1}{4}$ Sec. 33, T. 18N., R. 2W.	Puget Sound (Eld Inlet)	All year
Woodland Creek and all tributaries SW $\frac{1}{4}$ NW $\frac{1}{4}$ Sec. 19, T. 19N., R. 1W.	Puget Sound (Henderson Inlet)	All year
Long Lake SE $\frac{1}{4}$ NE $\frac{1}{4}$ Sec. 22, T. 18N., R. 1W.	Woodland Creek	All year
Patterson Lake SE $\frac{1}{4}$ SW $\frac{1}{4}$ Sec. 35, T. 18N., R. 1W.	Woodland Creek	All year
Hicks Lake NE $\frac{1}{4}$ SW $\frac{1}{4}$ Sec. 27, T. 18N., R. 1W.	Woodland Creek	All year

(2) The following stream and lake low flows and closures are adopted confirming surface water source limitations previously established administratively under the authority of chapter 90.03 RCW and RCW 75.20.050.

Existing Low Flow Limitations and Closures

<u>Stream or Lake</u> <u>Section, Township</u> <u>and Range of Mouth</u>	<u>Tributary to</u>	<u>Action</u>
Percival Creek SW $\frac{1}{4}$ NE $\frac{1}{4}$ Sec. 22, T. 18N., R. 2W.	Capital Lake	Closure

<u>Stream or Lake</u> <u>Section, Township</u> <u>and Range of Mouth</u>	<u>Tributary to</u>	<u>Action</u>
Unnamed Stream NW ¹ / ₄ NW ¹ / ₄ Sec. 33, T. 19N., R. 2W.	Puget Sound (Eld Inlet)	Low Flow (1.5 cfs)
Unnamed Stream NW ¹ / ₄ NW ¹ / ₄ Sec. 25, T. 19N., R. 2W.	Gull Harbor	Low Flow (1.0 cfs)
Woodward Creek SW ¹ / ₄ NW ¹ / ₄ Sec. 19, T. 19N., R. 1W.	Woodward Bay	Closure

NEW SECTION

WAC 173-513-050 GROUNDWATER. Future groundwater withdrawal proposals will not be affected. by this chapter unless it is verified that such withdrawal would clearly have an adverse impact upon the surface water system contrary to the intent and objectives of this chapter.

NEW SECTION

WAC 173-513-060 LAKES. In future permitting actions relating to withdrawal of lake waters, lakes and ponds shall be retained substantially in their natural condition. Withdrawals of water which would conflict therewith shall be authorized only in those situations where it is clear that overriding considerations of the public interest will be served.

NEW SECTION

WAC 173-513-070 EXEMPTIONS. (1) Nothing in this chapter shall affect water rights,. riparian, appropriative, or otherwise existing on the effective date of this chapter, nor shall it affect existing rights relating to the operation of any navigation, hydroelectric, or water storage reservoir or related facilities.

(2) Domestic use for a single residence and stock watering, except that use related to feedlots, shall be exempt from the provisions of this chapter if no alternative source is available. If the cumulative effects of numerous single domestic diversions would seriously affect the quantity of water available for instream uses, then only domestic in-house use shall be exempt.

NEW SECTION

WAC 173-513-080 FUTURE RIGHTS. No rights to divert or store public surface waters of the Deschutes River Basin, WRIA 13, shall hereafter be granted which shall conflict with the purpose of this chapter as stated in WAC 173-513-020.

NEW SECTION

WAC 173-513-090 ENFORCEMENT. In enforcement of this chapter, the department of ecology may impose such sanctions as appropriate under authorities vested in it, including but not limited to the issuance of regulatory orders under RCW 43.27A.190 and civil penalties under RCW 43.83B.335.

NEW SECTION

WAC 173-513-100 REGULATION REVIEW. The rules in this chapter shall be reviewed by the department of ecology at least once in every five years.

Appendix B.

Glossary

GLOSSARY

ACRE-FOOT: A unit for measuring the volume of water or sediment. It is equal to the amount of water needed to cover one acre of land with water one foot deep. This is 43,560 cubic feet, or 325,851 gallons.

ALLOCATION: The process of legally dedicating specific amounts of the water resource for application to beneficial uses by means of water rights.

AMBIENT: The natural conditions (or environment) at a given place or time.

ANADROMOUS FISH: Fish that spend a part of their lives in the sea but ascend rivers at more or less regular intervals to spawn. Examples: Salmon, some trout, shad, and striped bass.

AQUIFER: An underground bed or stratum of earth, gravel, or porous stone which contains water. A geological rock formation, bed, or zone that may be referred to as a water-bearing bed.

BASE FLOW: As defined in the Water Resources Act of 1971 (Ch. 90.54 RCW), base flows are the flows administratively established "necessary to provide for the preservation of wildlife, fish, scenic, aesthetic and other environmental values, and navigational values."

BIOCHEMICAL OXYGEN DEMAND (BOD): The amount of oxygen required to decompose a given amount of organic compounds to simple, stable substances within a specified time at a specified temperature. BOD serves as a guide to indicate the degree of organic pollution in water.

CLOSURE: Administrative measure to keep water resources from further appropriation for consumptive uses. Generally, domestic household use and normal stock watering are exempted from closure when there is no practicable alternate source of supply.

COLIFORM: Any of a number of organisms common to the intestinal tract of man and animals, used as an indicator of water pollution.

CONFLUENCE: A place where two or more streams meet; the point where a tributary joins the main stream; a fork.

CONSUMPTIVE USE: The amount of water used in such a way that it is no longer directly available. Includes water discharged into the air during industrial uses, or given off by plants as they grow (transpiration), or water which is retained in the plant tissues, or any use of water which prevents it from being directly available.

CONSUMPTIVE USE REQUIREMENT (crop): The amount of consumptive use for irrigation each year for a particular type of crop. Measured in acre-feet or feet per acre.

CONTROL STATION: Any streamflow measurement site at which a regulatory base flow has been established.

CUBIC FEET PER SECOND (cfs): A unit of measure for the rate of discharge of water. One cubic foot per second is the rate of flow of a stream where one square foot is flowing at one foot per second. It is equal to 448.8 gallons per minute.

DISCHARGE: In simplest form, discharge simply means outflow. The term can describe the flow of water from a faucet or from a drainage basin covering hundreds of square miles.

DISSOLVED OXYGEN: Amount of oxygen dissolved in water; reduction below saturation can be damaging to fish and fish eggs.

DISSOLVED SOLIDS: The total amount of dissolved material, organic and inorganic, contained in water or wastes. Excessive dissolved solids can make water unsuitable for industrial uses and/or unpalatable for drinking.

DIVERSION: The physical act of removing water from a stream or other body of surface water.

DRAINAGE AREA: The area of land drained by a stream, measured in the horizontal plane. It is the area which is enclosed by a drainage divide.

DRAINAGE BASIN: A part of the surface of the earth that is occupied by a drainage system consisting of a surface stream or a permanent body of water together with all tributary streams and bodies of impounded water (lakes, ponds, reservoirs, etc.).

EFFLUENT: A discharge or emission of a liquid or gas, usually waste material.

EMISSION: A discharge of pollutants into the atmosphere, usually as a result of burning or the operation of internal combustion engines.

ENDANGERED SPECIES: Any species which, as determined by the Fish and wildlife Service, is in danger of extinction throughout all or a significant portion of its range other than a species of the class Insecta determined to constitute a pest whose protection would present an overwhelming and overriding risk to man.

ESCAPEMENT: Adult fish that “escape” fishing gear to migrate upstream to spawning grounds.

ESTUARY: Shallow coastal water, usually associated with the mouth of a river, including adjoining bays, lagoons, shallow sounds, and marshes where tidal effects are evident and fresh water and sea water mix.

FINGERLINGS: Fish whose size ranges from approximately one to three inches.

FLOOD: Any relatively high streamflow or an overflow that comes from a river or body of water and which causes or threatens damage.

FLOOD PLAIN: Lowland bordering a river, subject to flooding when stream overflows.

FRY: young fish from the time of hatching to approximately one inch in size.

GAGING STATION: A particular location on a stream, canal, lake, or reservoir where systematic measurements are made on the quantity of water flow.

GROUND WATER: Water in the ground lying in the zone of saturation. Natural recharge includes water added by rainfall, flowing through pores or small openings in the soil into the water table.

HABITAT: The natural abode of a plant or animal, including all biotic, climatic, and soil conditions, or other environmental influences affecting life.

HEAVY METALS: A group which includes all metallic elements with atomic numbers greater than 20, the most familiar of which are chromium, manganese, iron, cobalt, nickel, copper and zinc but also include arsenic, selenium, silver, cadmium, tin, antimony, mercury, and lead, among others.

HOLDOVERS: Fish that take up residence in reservoirs rather than completing migration to the sea; may complete migration the following year.

HYDRAULIC CONTINUITY: A cause and effect relationship between water under the ground with water standing or flowing on the surface.

HYDROGRAPH: A graph showing varying streamflow, (or stream discharge) with respect to time during a year as determined at a specific cross-sectional location in the stream.

HYDROLOGIC CYCLE: The continual exchange of moisture between the earth and the atmosphere, consisting of evaporation, condensation, precipitation (rain or snow), stream runoff, absorption into the soil, and evaporation in repeating cycles.

IMPOUNDMENT: A body of water formed by confining and storing the water.

INSTREAM VALUE: The attitude of society towards the instream use of water for aesthetic, fish and wildlife, recreation, hydroelectric, and general environmental purposes.

NONCONSUMPTIVE USE: Use of water in a manner which does not consume the resource. Fishery, aesthetic, and hydropower uses are examples of nonconsumptive use.

PUBLIC INTEREST: The sense of local, county, or state values at a given point in time.

PUBLIC WATERS: All waters not previously appropriated.

REARING AREA: The place where juvenile fish live. It must meet certain environmental requirements for food supply, cover, and temperature.

REDD: The spawning ground or nest of various fish.

RESERVATION: An approved priority claim to water for a future beneficial use.

RIPARIAN: Pertaining to the banks of streams, lakes, or tidewater.

RIVER BASIN: The total area drained by a river and its tributaries; watershed; drainage basin.

RUN: A group of fish that ascend a river to spawn.

RUNOFF: That part of precipitation which appears in surface streams. This is the streamflow before it is affected by artificial diversion, reservoirs, or other man-made changes in or on stream channels.

SALMONOID: Fish belonging to the family salmonidae, including salmon, trout, char, and allied freshwater and anadromous fishes.

SMOLT: An anadromous fish that is physiologically ready to undergo the transition from fresh to salt water; age varies depending on species and environmental conditions.

SMOLTIFICATION: The biological process whereby an anadromous fish becomes capable of undergoing the transition from fresh to salt water.

SPAWNING: The laying of eggs, especially by fish.

SPILLWAY: The channel or passageway around or over the dam through which excess water is spilled around the turbines.

STORAGE: Water naturally or artificially impounded in surface or underground reservoirs.

STORAGE RESERVOIR: A reservoir in which storage is held over from the annual high-water season to the following low-water season. Storage reservoirs which refill at the end of each annual high-water season are “annual storage” reservoirs. Those which cannot refill all usable power storage by the end of each annual high-water season are “cyclic storage” reservoirs.

STREAMFLOW: The discharge or water flow that occurs in a natural channel. The word discharge can be applied to a canal, but streamflow describes only the discharge in a surface stream course. Streamflow applies to discharge whether or not it is affected by diversion or reservoirs.

WATERSHED: The area from which water drains to a single point. In a natural basin, the area contributing flow to a given place on a stream.

CONVERSION TABLES
(U. S. and Metric)

VOLUME

Unit		Liters	U.S. Gallons	Cubic Feet	Cubic Meters	Acre-Feet
1 Liter	=	1.0	0.2642	0.0353	0.00	0.00000081
1 U.S. Gallon	=	3.785	1.0	0.134	0.00379	0.00000307
1 Cubic Foot (62.4 lbs water)	=	28.317	7.481	1.0	0.02832	0.0000230
1 Cubic Meter	=	1,000	264.2	35.315	1.0	0.0008107
1 Acre-Foot	=	1,233,500	325,851	43,560	1,233.5	1.0

1 U.S. Gallon = 231 cubic inches = 0.83 Imperial Gallons (= 8.3 pounds of water)

1 Liter = 1,000 cubic centimeters = 1.05 quarts (= 1,000 grams of water)

1 Cubic Hectometer = 810.7 acre-feet

RATE OF FLOW

Unit		gpm	cfs	mgd	cu m/sec	maf/yr
1 U.S. Gallon per Minute (gpm)	=	1.0	0.002228	0.001440	0.0000631	0.00000161
1 Cubic Foot per Second (cfs)	=	448.8	1.0	0.6463	0.02832	0.000724
1 Million U.S. Gallons per Day (mgd)	=	694.4	1.547	1.0	0.04381	0.00112
1 Cubic Meter per Second (cu m/sec)	=	15,850	35.31	22.82	1.0	0.0256
1 Million Acre- Feet per year (maf/yr)	=	619,960	1,381	892.9	39.1	1.0

1 Liter per second = 15.85 gallons per minute

1 Cubic Foot per Second = 1.98 acre-feet per day = 724 acre-feet per year

Other

1 Acre = 43,560 square feet (209 x 209 feet) = 0.405 hectare

1 Hectare = 10,000 square meters = 0.01 square kilometer = 2.47 acres

1 Kilowatt-hour (KWH) = 0.001 megawatt-hour (MWH) = 3,413 nTU

Appendix C

Public Involvement and Comments with DOE Response

Deschutes River Basin Instream Resources Protection Program Information Workshop March 18, 1980.

U.S.D.I. F&WS letter dated April 3, 1980.*

City of Lacey letter dated April 4, 1980. Subject: Deschutes River Basin Workshop.*

City of Olympia letter dated April 16, 1980.*

City of Lacey letter dated April 17, 1980.* Subject: Deschutes River Basin Instream Resources Protection Program.

DOE letter dated April 22, 1980.

Olympia Brewing Company letter dated April 29, 1980.*

Department of the Army letter dated May 8, 1980.*

City of Tumwater letter dated May 20, 1980. Subject: Deschutes River Basin Instream Resource Protection Program.*

A summary of the Deschutes River Basin I.R.P.P. Public Hearing, May 21, 1980.

Black Hills Audubon Society Commentary and Recommendations, May 21, 1980.*

Statement of the USF&WS on the proposed Deschutes River Basin Instream Resources Protection Program. May 21, 1980.

Testimony regarding Deschutes River Basin Instream Resources Protection Program presented by South Sound Fly Fishers, May 21, 1980.*

Washington Natural Heritage Program, May 23, 1980.*

DOE Information Briefing to the Thurston County Commissioners, June 4, 1980.

Squaxin Island Tribe letter dated June 6, 1980.*

City of Olympia letter dated June 9, 1980.

Department of Game letter dated June 9, 1980.

Washington Environmental Council letter dated June 11, 1980.

Sierra Club letter dated June 12, 1980. Subject: Deschutes River Basin I.R.P.P.

Washington State Farm Bureau letter dated June 13, 1980.*

DESCHUTES RIVER BASIN INSTREAM RESOURCES PROTECTION
PROGRAM INFORMATION WORKSHOP

1. The DOE conducted an information workshop on the Deschutes River Basin I.R.P.P. on the 18th of March at 3:00 p.m. at DOE Headquarters. The purpose of the workshop was to provide information the progress of the Deschutes Program and to gain feedback from the attendees and program participants. The following subjects were discussed:
 - a. Robert Kavanaugh, DOE Deschutes River Basin Program Planner, welcomed the attendees and reviewed the draft program contents.
 - b. Next, the program milestones were presented that include past, present, and future program actions.
 - c. A slide presentation was given that showed scenes of the Deschutes River, Percival Cove, salmon, steelhead, cutthroat, Olympic Mud minnow, eagles, and osprey.
 - d. Mr. Ray Johnson, D.F. biologist, discussed the importance of the sports and commercial fishery resources in the basin. Johnson stressed the chinook salmon enhancement program and the importance of maintaining adequate flows to insure high water quality standards are maintained. The draft section on "fish" in the draft program was issued for review and comment. The D.F. was in general agreement with the minimum flows and closures proposed in the draft program.
 - e. Wildlife instream flow needs were summarized by Mr. Hal Beecher from the Washington Department of Game. Beecher stressed the importance of maintaining summer time rearing flows for steelhead trout. He also covered the water resource needs for the Olympic Mud-Minnow, eagles and ospreys. The D.G. desired a total closure of the Deschutes River rather than a partial summer time closure as proposed in the draft WAC 173-513.
 - f. Mr. Gene Fox presented a brief review of the Deschutes Instream flow hydrograph.
 - g. Mr. Vic Shaver, DOE S.W. Regional representative, discussed water quality problems within the basin. Special concerns were indicated with respect to Budd Inlet and Capitol Lake. Both experience low D.O. situations. Sewage outfall problems are also common in Budd Inlet.
 - h. Mr. Jim Kramer, Thurston Regional Planner, discussed the impact of the Basin's looming population. Estimates are that this area will have a population of 200,000 within the next 20-40 years.
 - i. The DOE groundwater personnel were absent from the workshop, however, most of the questions on this subject were covered by Mr. Kauffman and Vic Shaver. The municipalities are interested in establishing a groundwater reservation to insure that their future water needs can be met. They were invited to submit a request to DOE whenever they are ready. Much discussion revolved around the wording of the ground water section in draft WAC 173-513-050. The cities desire further assurances that DOE will not curtail future well drilling activities. DOE agreed to consider each request on an individual basis. The municipalities and DOE agreed to meet in the near future to further clarify the cities' needs and the wording of the regulation, however, it was understood that no minimum flows or closures would be compromised.
 - j. Mr. Paul Ludwig, SCS, reviewed the draft program in the area of water related recreation. He also briefly discussed the SCS stream corridor recreation management program. Ludwig questioned the view that the Deschutes was a good canoe stream due to the summer low flow conditions.
 - k. Municipal and industrial water needs were reviewed by the various municipality representatives. Mr. Siffert, DSHS, suggested that elected city representatives become involved in this discussion. He was assured that the representatives were selected by the city mayors to represent Olympia, Lacey, and Tumwater. Olympia reviewed the draft material and agreed with the existing data. Lacey representative, Don Hertzog, desires to revise the future water needs upwards as did Tumwater representative, John Cunningham. Bob Meyers, Olympia Brewery Engineer, discussed the artesian wells owned by his company. He stated that these well levels did not fluctuate with low Deschutes River summer flows. Well depths are approximately 100 ft.

1. Mrs. Nelson, U.S. F. & W.S. agreed with the intent of the Deschutes River Basin I.R.P.P., but cautioned that minimum flow levels should not be negotiated away.
- m. Squaxin Indian tribal representatives, Michael Peters, stressed the importance of McLean Creek to the tribal Chum salmon fishery. He voiced concern over maintaining high water quality in all the basin streams.
- n. Mr. Jack Davis, Audubon Society representative, favored the program but voiced concern over the adverse impacts on Deschutes River water quality caused by clear cutting in the upper tributaries. This basin is presently being logged at a more rapid rate than ever before.
- o. Robert Kavanaugh, DOE, summarized the meeting and requested review of draft materials as soon as possible.
2. The meeting adjourned at 5:15 p.m. with the following understanding:
 - a. A groundwater update meeting will be held in the near future with DOE and the Tri Cities.
 - b. No minimum flows or closures will be compromised at subsequent meetings.
 - c. The milestones established will be maintained and each participant will be provided a copy of the draft program for review.
 - d. Review and corrections of existing draft material handouts is needed within the next few days.
3. The following persons attended:

Jack Davis	Audubon
Paul Ludwig	SCS
Hal Beecher	Department of Game
Jim Kramer	Thurston Regional
Gloria Murphy	SWW Health Systems Agency
Michael Peters	Squaxin Island Tribe
Don Hertzog	City of Lacey
Tom Hare	City of Olympia
Len Lateb	City of Olympia
John Maxwell	Economic & Engrn Svc.
Ray Johnson	Wash. Dept. Fish
Rich Siffert	DSHS
Jim Hudson	DSHS
Jerry Louthain	DOE
Kris Kauffman	DOE
John Cunningham	City of Tumwater
Vic Shaver	DOE – SWRO
Bob Meyers	Olympia Brew
Gene Fox	DOE
Ray Johnson	D.F.
Nancy Nelson	U.S. Fish and Wildlife Service
Eric Knudsen	U.S. Fish and Wildlife Service

RK:nld

2 Enclosures

cc: all attendees
Ken Slattery



United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
2625 Parkmont Lane, S.W., Bldg. B-3
Olympia, Washington 98502

U.S. DEPARTMENT OF INTERIOR – FISH AND WILDLIFE SERVICE

LETTER DATED April 3, 1980

April 3, 1980

Mr. Robert Kavanaugh
Deschutes Program Planner PV-11
Department of Ecology
Olympia, Washington 98504

Mr. R. G. Starkey, Acting Field Supervisor.

Dear Mr. Kavanaugh:

1. Your continuing interest and support is appreciated.
2. After recent discussions with the Tri-Capitol cities we do not feel that they expect total unrestricted uses of groundwater resources where these withdrawals would significantly adversely impact on nearby surface waters.

We appreciate being included in the March 18 information workshop on the Deschutes River Basin Instream Resource Protection Program (IRPP). As stated at the meeting, we fully support the concerns of the State Departments of Fisheries and Game regarding the need to close the Deschutes and all tributary streams from April 15 to November 1 to further appropriations to protect fish, wildlife, and water quality. We also concur with the "tri-cities" request for clarification of the proposed regulations regarding its relationship to future groundwater appropriations. Conversely, we oppose their clear implications that this "clarification" should guarantee their rights to unrestricted future withdrawals. Such guarantees would be in direct conflict with our understanding of the purpose and intent of the Western Washington IRPP. If there was adequate water for all uses for all time, there would be no need for water resource management, IRPP's, or, for that matter, certain sections of the Department of Ecology. At the Green River IRPP Workshop, John Spencer described DOE's policy as being the identification and protection of adequate year-round flows to protect instream resources, with allocation authority limited to water in excess of those needs. Thus in our view, future water demands play a very small role in DOE's legally mandated actions to provide "base flows necessary to provide for preservation of wildlife, fish . . ." (90.54.020 RCW) and to "establish such minimum flows . . . as are required to protect [fish, game, or other wildlife resources]" (90.22.010 RCW).

2

Please consider this a formal request for immediate written notification if our view of the intent of DOE's IRPP is incorrect.

We look forward to reviewing your draft document for this basin.

Sincerely,

R. G. Starkey
Acting Field Supervisor

cc WDF – Johnson
 WDG – Beecher
 Black Hills Audubon – Davis
 Squaxin Island Tribe – Peters

DEPARTMENT OF
PUBLIC WORKS

City of Lacey



April 4, 1980

Robert Kavanaugh
Dechutes Program Planner
Department of Ecology
Mail Stop PV-11
Olympia, WA 98504

SUBJECT: Dechutes River Basin Information Coordination Work Shop

Dear Bob:

Thank you for the opportunity to attend the coordination workshop on the proposed closure to withdrawals of the Dechutes River. I have edited the proposed paragraph of "Municipal and Industrial Use" for the City of Lacey utilization and enclose it herewith.

As I stated at the workshop, I believe that the closure may well ultimately benefit the City of Lacey and will be interested in the results of the study. I am, however, concerned about the general tenor of the basis for the study and the attitude of the Department of Ecology representatives conducting the study, in that the prime purpose of the proposed action is in direct response to RCW 90.54.020 (3), only. Said section reads, "the quality of the natural environment shall be protected and where possible enhanced as follows:

- a) Perennial rivers and streams of the state shall be retained with base flows necessary to provide for preservation of wildlife, fish, scenic, aesthetic and other environmental values and navigational values. Lakes and ponds shall be retained substantially in their natural condition. Withdrawals of water which would conflict therewith shall be authorized only in those situations where it is clear that overriding considerations of the public interest will be served."

2

No acknowledgement is made of RCW 70.54.020(7), which has equal status under the law. Sub-paragraph (7) is quoted as follows: "Development of water supply systems whether public or privately owned which provide water to the public generally in regional areas within the state shall be encouraged. Development of water supply systems for multiple domestic use which will not serve the public generally shall be discouraged where water supplies are available from water systems serving the public."

3

CITY OF LACEY, LETTER DATED April 4, 1980

Mr. Donald E. Hertzog PE, Director of Public Works

Likewise sub-paragraph (8), states, "full recognition shall be given to the administration of water allocation and use programs to the natural interrelationships of surface and ground waters".

While you acknowledge as a secondary goal of the action the relationship of ground water it was consistently stated both at the work shop and in your subsequent notes thereof that there would be no compromise position in the goal towards protecting in stream uses and needs.

The public interest of RCW 90.54 is expressly stated and involves all sections thereof. To enter into this action specifically oriented to one small section of the Water Resources Act of 1971 and purposely excluding other sections is not something that we would condone as representing that public interest.

Accordingly, we urge the Department of Ecology to reorient the study to fully consider all aspects of RCW 90.54.

Please find enclosed a copy of Woodland Creek study by Advanced Engineering Consultants. We believe your last paragraph under surface water quality (draft pg. 14) should be revised to reflect the information contained therein.

Very truly yours,

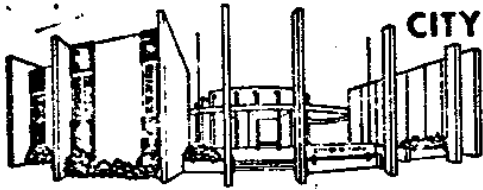

Donald E. Hertzog, P.E.
Director of Public Works

DEH/mp

"Municipal and Industrial Use....."

The City of Lacey has recently contracted a ground water study to determine the amount of water that will be needed through the year 2000. Lacey services about 22,500 persons at the present time. This amounts to about 90 gallons per day per person. Estimates are that an increase from the existing 9.163 mgd peak flow to 13.128 mgd in the year 2000 will be required. Existing capacity for Lacey is 9.43 mgd, but only 6.4 mgd firm capacity. Lacey used 742 million gallons in 1979. High iron content problems are experienced in one of the more productive wells. Lacey is also planning to develop future ground water resources in the general vicinity of the Capitol City golf course. (9)"

1. Your comments and support are appreciated.
2. Reference to RCW 90.54.020(7) was given serious consideration in the development of the Deschutes River Basin I.R.P.P.
3. Your suggested revisions have been made in the final document.



CITY OF OLYMPIA

City and County of Olympia, Washington
35 11 80

APRIL 16, 1980

WILBUR HALLAUER
DIRECTOR
DEPARTMENT OF ECOLOGY
ST. MARTIN'S COLLEGE
OLYMPIA, WA 98504

DEAR MR. HALLAUER:

AT A MEETING WITH YOUR STAFF ON APRIL 14, THE CITY OF OLYMPIA WAS ASKED TO COMMENT ON THE ATTACHED DRAFT OF THE IMPLEMENTING PROCEDURE FOR DETERMINING IF GROUNDWATER WITHDRAWAL HAS A "SIGNIFICANT EFFECT" ON A STREAM. THE FOLLOWING ARE THE CITY OF OLYMPIA'S COMMENTS.

2

THE FIRST PARAGRAPH READS "ANY GROUNDWATER WITHDRAWAL FOUND TO POTENTIALLY HAVE A SIGNIFICANT EFFECT ON A STREAM SHOULD BE SUBJECT TO THE CONDITIONS OF FUTURE SURFACE WATER AVAILABILITY PERTAINING TO SAID STREAM." THE CITY OF OLYMPIA FEELS THIS SHOULD BE CHANGED TO READ: ANY APPLICATION FOR GROUNDWATER WITHDRAWAL FOUND TO HAVE AN ADVERSE EFFECT ON A STREAM SHOULD BE SUBJECT TO THE CONDITION OF SURFACE WATER AVAILABILITY PERTAINING TO SAID STREAM. IT IS THE CITY CONTENTION THAT THE DEPARTMENT OF ECOLOGY SHOULD SHOW PRIOR TO ISSUANCE OF WATER RIGHTS PERMIT THE EFFECT GROUNDWATER WITHDRAWAL WILL HAVE ON A STREAM. IT ALSO SHOULD BE POINTED OUT THAT ANY DETERMINATION MADE SHOULD BE BASED ON PRESENT DAY FLOWS IN THE STREAM AND NOT A FUTURE LOW FLOW CAUSE BY SOME OTHER REASON.

IN THE SECOND AND THIRD PARAGRAPH IT STATES THAT ANY WELL WHICH DRAWS MORE THAN 80 PERCENT OF ITS PUMP RATE FROM A STREAM IS CONSIDERED TO HAVE A SIGNIFICANT EFFECT. THIS METHOD OF DETERMINATION IS TOTALLY WITHOUT JUSTIFICATION AND THE FOLLOWING EXAMPLE SHOWS WHY:

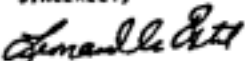
WELL #1

PUMPING RATE 5 CFS
% FROM STREAM 82%
WATER DIVERTED = 5 CFS X 0.82 = 4.1 CFS
SIGNIFICANT EFFECT BY THE DEPARTMENT DEFINITION

WELL #2

PUMPING RATE 10 CFS
% FROM STREAM 41 %
WATER DIVERTED FROM STREAM = 10 CFS X 0.41 = 4.1 CFS
NON SIGNIFICANT EFFECT BY THE DEPARTMENT DEFINITION

BOTH WELLS HAVE THE SAME FINAL EFFECT ON THE STREAM YET BY DEFINITION ONE HAS SIGNIFICANT EFFECT, THE OTHER DOES NOT. IT IS THIS TYPE OF REASONING THAT MAKES THE CITY OF OLYMPIA VERY NERVOUS ABOUT CLOSURE OF THE DESCHUTES RIVER BASIN. WE BELIEVE IT IS TIME THE DEPARTMENT OF ECOLOGY STOPS AND TAKES A LONG LOOK AT THE METHOD THAT IS BEING USED TO PROTECT IN STREAM FLOWS.

SINCERELY,

LEONARD A. ESTER
DIRECTOR OF UTILITIES

MJ

cc: ROBERT CAVANAUGH, DEPARTMENT OF ECOLOGY, DON HERTZOG, CITY OF LACEY, JOHN CUNNINGHAM, CITY OF TUMWATER

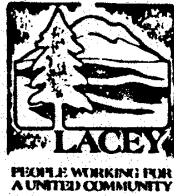
CITY OF OLYMPIA, LETTER DATED April 16, 1980\

Mr. Leonard Esteb, Director of Utilities

1. Your recommendation has been considered and found to be appropriate.
2. Please refer to DOE letter dated 22 Apr 1980
We are continuing to evaluate the groundwater situation and we plan to consult with you periodically until we have resolved the issue.

City of Lacey

April 17, 1980



POST OFFICE DRAWER "B"
LACEY, WASHINGTON 98503

*cc. Spencer
Ruffner*

Wilbur Hallauer
Director of Department of Ecology
St. Martin's College
Olympia, WA 98504

SUBJECT: Deschutes River Basin Instream Protection Program

Dear Mr. Hallauer:

At a meeting with your staff on April 14, the City of Lacey was asked to comment on the attached draft of the implementing procedure for determining if groundwater withdrawal has a "significant effect" on a stream. The following are the City of Lacey's comments.

2

The City of Lacey has previously commented on this subject in our letter of April 4, 1980, to Robert Kavanaugh. Reiterating our position taken at that time and particular in light of RCW 90.54.020(7), the City of Lacey feels that a categorical exemption of municipal water supplies should be allowed. It is our feeling that municipal water supplies have at least as high, if not higher, priority than that required for fish, power or agriculture use. We concede that those needs do need to be protected and in fact support the instream protection program, but believe that the municipal domestic water sources must also be protected.

3

The first paragraph of the attached draft prepared by your staff reads, "Any groundwater withdrawal found to potentially have a significant effect on a stream should be subject to the conditions of future surface water availability pertaining to said stream." The City of Lacey supports the position taken by the City of Olympia, that the subject paragraph should be changed to read, "Any application for groundwater found to have an adverse effect on a stream should be subject to the condition of surface water availability pertaining to said stream." We also agree that the Department of Ecology should show, prior to issuance of water right permit, the effect groundwater withdrawal will have on a stream. It also should be pointed out that any determination made should be based on present day flows in the stream and not a future low flow caused by some other reason.

4

Very truly yours,

D. E. Hertzog
Donald E. Hertzog, P.E.
Director of Public Works

DEH/sp

cc: Robert Kavanaugh, Department of Ecology
Leonard Esteb, City of Olympia
John Cunningham, City of Tumwater
City Manager

Mr. Donald E. Hertzog
Lacey City Engineer
Lacey City Hall
Lacey, Washington 98503

1. Your continued participation in our Deschutes River Basin IRPP is appreciated as are your experience and opinions in the area of groundwater management.
2. Our staff recommends that the municipal use of water not be exempt from the groundwater restrictions within WAC 173-513. An exemption of this magnitude could negate the purpose of the instream program. It is our opinion that Lacey's future municipal water resources should be developed from locally abundant groundwater aquifers. Our department will assist you in this development in every way possible through our existing permitting system.
3. The purpose of the instream protection program remains "to retain perennial rivers, streams, and lakes in the Deschutes River Basin with instream flows and levels necessary to provide protection for fish, wildlife, scenic, aesthetic, environmental values, recreation, navigation and preserve high standards of water quality.
4. The wording of WAC 173-513-050 GROUNDWATER has been changed as follows: "Future groundwater withdrawal proposals will not be affected by this chapter unless it is verified that such withdrawal would clearly have an adverse impact on the surface water system contrary to the intent and objectives of this chapter."



STATE OF
WASHINGTON
Diry Lee Ray
Governor

DEPARTMENT OF ECOLOGY
Mail Stop PV 11
Olympia, Washington 98504
206/753-2800

April 22, 1980

Leonard A. Esteb
Director of Utilities
City of Olympia
Eighth and Plum
Olympia, Washington 98501

Dear Mr. Esteb:

Your letter to Mr. Hallauer has been referred to me regarding your comments on our preliminary draft ideas for criteria to handle groundwater – surface water interference situations.

Unfortunately, we did not have time to discuss the technical elements of our proposal in any detail in the April 14 meeting. The notions set forth in our draft include two conditions to be met in regard to determining nonsignificance or significance of the relationship between proposed groundwater withdrawals and stream flows. This apparently was not clear.

Under the assumptions made in your well #1, our position would be that if the 80% figure was adopted, such a well, regardless of size, would be subject to stream flow conditions. In this case the applicant may wish to propose a different location for withdrawal and would have the information ahead of time to be able to do this. A minimum withdrawal quantity criteria perhaps should be added to exempt small wells.

In the case of well #2 our second proposed criteria would require that the minimum stream flow be greater than 82 cfs for a finding of nonsignificance. This assumes that the stream control reach measuring station is accurate to within five percent (.05 x 82 = 4.1 cfs). Using the Deschutes as an example, our current minimum flow of 100 cfs (during the proposed closed summer period) would mean, under this criteria, that any quantity impact less than 5 cfs would be insignificant; therefore, a well located more than 1,000 feet from the stream would not be affected as long as less than 5 cfs was from the stream.

For your further information we are providing a sketch which shows, with the assumptions specified, what the distance to surface water would be with the wells in your examples.

Leonard A. Esteb
April 22, 1980
Page Two

Your suggested language regarding the first paragraph of our draft is appropriate and will be incorporated in line with the discussion that we had on April 14.

The Department of Ecology is continuing to take a close look at methods available to protect stream flows and the relationship of future ground and surface water rights thereto. We hope that you continue to work with us regarding the Deschutes Basin program and look forward to receiving any information on the nature and location of future water supply source(s) for Olympia. As agreed at our meeting, we would be happy to analyze any proposed well or well field site using the proposed criteria or other suggested criteria you believe to be more appropriate for consideration.

Sincerely,

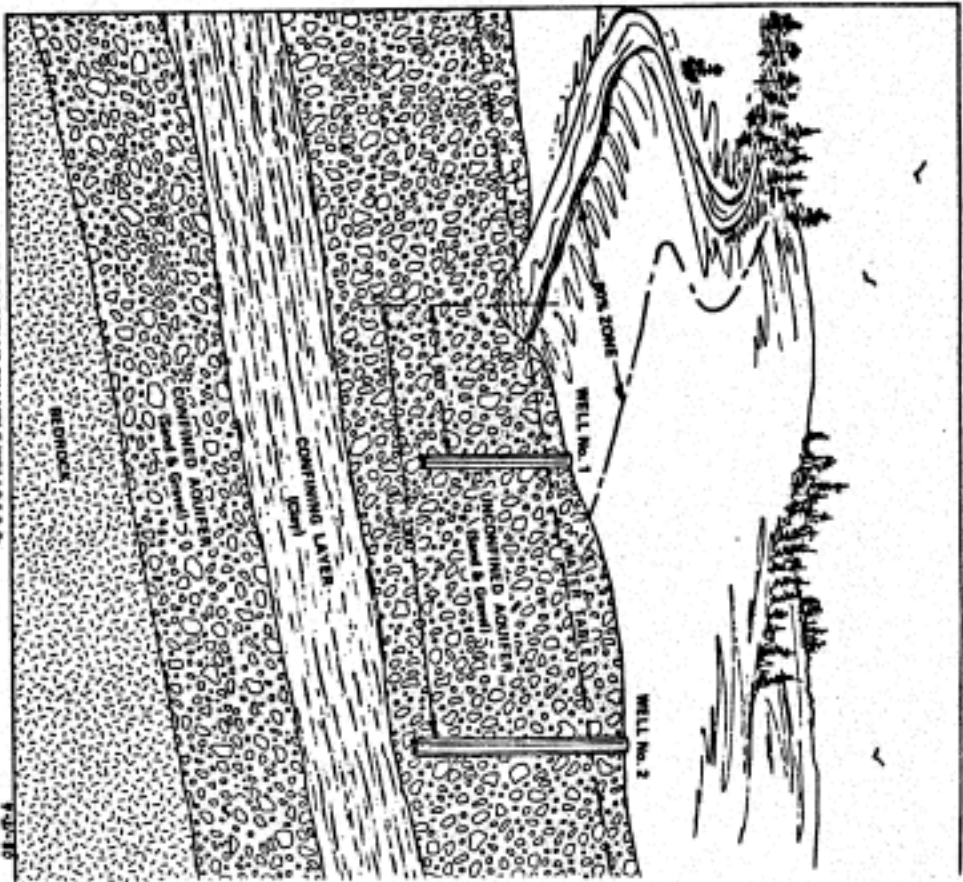
Kris G. Kauffman, P.E.
Water Resources Policy
Development Section

KGK:nld

Attachment

cc: Don Hertzog, City of Lacey
John Cunningham, City of Tumwater
Wilbur G. Hallauer, DOE
John F. Spencer, DOE
Eugene F. Wallace, DOE

cc: *Rele Grimstad*
Harry Tanaka
Ken Stattery
Stan Mahlum
Bob Kavanagh
Gene Fox



ASSUMPTIONS FOR CITY OF OLYMPIA'S EXAMPLE WELLS 1 & 2:

TRANSMISSIBILITY = 100,000 gpd/ft.

PUMPING TIME = 80 days.

STORAGE CONSTANT = 0.15.

ALL LAYERS ARE ISOTROPIC AND HOMOGENEOUS.

CONCLUSIONS:

WELLS LOCATED 1000 FEET FROM THE STREAM WILL DRAW 80% OF THEIR PUMPING RATE FROM THE STREAM (SHOWN AS DASH-DOTT)

WELL NO. 1 IS LOCATED 800 FEET FROM STREAM

WELL NO. 2 IS LOCATED 2000 FEET FROM STREAM

FIGURE 1. GENERALIZED CROSS SECTION SHOWING CITY OF OLYMPIA'S GROUNDWATER PUMPING EXAMPLES.



POST OFFICE BOX 947 - OLYMPIA, WASHINGTON 98507 - 206/784-5003

April 29 1980

Mr. Robert Kavanaugh
Dept. of Ecology
Mail Stop PV-11
Olympia, Washington, 98501

Dear Mr. Kavanaugh:

Review of the draft Deschutes River Program document indicates two areas of minor concern with content.

On page 15, 1st paragraph, the discussion relates to brewery wells. Attribution thru ref (8) is to the City of Olympia. I don't believe the City of Olympia is properly positioned to comment on the Brewery water supply.

Page 20, 2nd paragraph, last sentence. I appreciate that the attribution probably refers to the total section. However, and again, neither of the three municipalities are in a position to comment on Brewery wells. Tumwater, perhaps, can make suppositions based on their wells being in the same aquifer.

While we do not disagree with either of the two statements, the sources quoted have no first hand knowledge on which to base them. As such, it would be suggested you drop the references.

2

OLYMPIA BREWING COMPANY LETTER DATED April 1980

Mr. Robert Meyers, Plant Engineer

1. Your interest and participation in the Deschutes River Basin IRPP is appreciated.
2. All reference to Brewery well has been deleted from the program document per your request.

Yours very truly,


Robert I. Meyers
Plant Engineer



DEPARTMENT OF THE ARMY
SEATTLE DISTRICT, CORPS OF ENGINEERS
P.O. BOX C-3785
SEATTLE, WASHINGTON 98124

NPSEN-PL-ER

8 MAY 1980

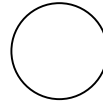
Mr. Robert Kavanaugh
State of Washington
Department of Ecology
Mail Stop PV 11
Olympia, WA 98504

Dear Mr. Kavanaugh:

We have reviewed the Deschutes River Basin Instream Resources Protection Program with respect to the U.S. Army Corps of Engineers' areas of responsibility for flood control, navigation, and regulatory functions.

Sincerely,


SIDNEY KNUTSON, P.E.
Asst. Chief, Engineering Division



Due to time constraints, the portions of this document that pertain to hydrology and hydraulics were not thoroughly reviewed. The lack of comments does not imply concurrence.

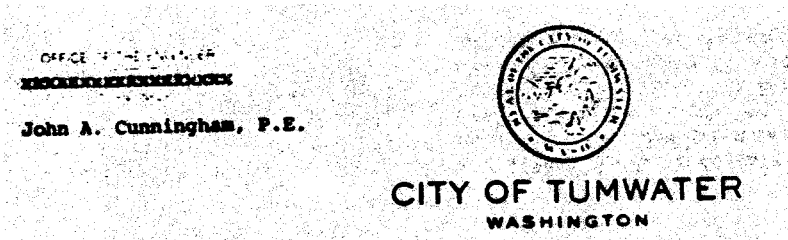
1

Thank you for the opportunity to review this document. If you have any questions, please contact Dr. Steven F. Dice, telephone (206) 764-3624.

DEPARTMENT OF THE ARMY LETTER DATED 8 May 1980

Mr. Sidney Knutson, P.E.

1. Your review is appreciated as would be any future relevant comments you might care to make on the overall program.



May 20, 1980

Mr. Wilbur Hallauer, Director
Department of Ecology
St. Martin's College
Olympia, WA 98504

RE: DesChutes River Basin Instream
Resource Protection Program

4

Dear Mr. Hallauer:

I have completed my review of the Administrative Rules being proposed by your department for the above program and would like to express my concerns regarding the rules and their formulation.

2

The greatest concern which I have with the proposed rules is that in their formulation, the Department of Ecology has relied very heavily on input from the Departments of Fisheries, Game and Wildlife, while receiving, and for that matter asking for very little information from those local agencies which are concerned with providing adequate supplies of potable water for domestic use. It would appear to me that the Department of Ecology has placed a much higher priority upon protecting the rivers waters for fish and wildlife than it has on providing for adequate future flows for domestic purposes. This action seems contrary to the requirements of the Water Resources Act of 1971 (RCW Chapter 90.54), which lists domestic and industrial uses among those to be considered in formulation of the department's base river flows and administrative rules. None of the local municipalities (all of who are planning to draw future domestic water supply from the DesChutes River area) were brought into the discussion arena until the base flows had already been established and the rules were being written.

3

It is my recommendation to you that the Department of Ecology delay final implementation of the DesChutes River Basin Instream Resource Protection Program and its associated Administrative Rules until such time as the department is able to provide each local municipality with an accurate assessment of exactly what the impacts of this program will be on our plans to obtain future domestic water supplies from the area surrounding the DesChutes River. To my knowledge, there has been very little research done by the Department of Ecology which can adequately predict the actual impact of this program on the future domestic water supply needs of the City of Tumwater. I believe that a concerted effort on the part of

your department to provide this information to the local municipalities would go a long way towards gaining the support of the local municipalities for your program. I believe that all municipalities are currently skeptical of the program because of a lack of willingness on the part of the Department of Ecology to provide us with an accurate assessment of the program's impacts on us both individually and collectively.

The above is not intended to belittle the work accomplished by your department to date in preparation of this program. It is my desire to expand the data available in the area of impacts to municipal water supply needs in order that a more comprehensive Instream Resource Protection Program may be developed for the DesChutes River, while at the same time, provisions are made which will allow for future expansion of municipal water supply from the area of the DesChutes River Basin.

If you have any questions regarding the above, please do not hesitate to contact me at 753-8570.

Very truly yours,

John A. Cunningham, P.E.
Tumwater City Engineer

CITY OF TUMWATER, LETTER DATED 20 May 1980

Mr. John A. Cunningham P.E.

1. Your attendance and participation in the Deschutes River Basin IRPP Planning Team is appreciated.
2. Initial data input by DF & DG is admittedly very important in establishing the proposed instream flow levels and closures. Our department has decided that the scope of the instream program must remain very narrow i.e., to the instream resources primarily. This does not ___ that we intend to exclude the importance of M & I water needs.
3. The impacts of the program on future groundwater use continues to be studied and you will be contacted and consulted with once more information is available.
4. We are looking forward to working with the City of Tumwater in future groundwater workshops.

A Summary of the Deschutes River Basin IRPP Public Hearing,
May 21, 1980

The Washington State Department of Ecology (DOE) hosted a public hearing on the Deschutes River Basin IRPP at the Lacey City Hall at 7:30 p.m. on May 21, 1980. The following presentations and public testimony were given:

- * Mr. Henry Yates, Doe Hearings Officer, opened the hearing at 7:30 p.m. The planning team members and panel members were introduced to the public. Approximately 30 persons were in attendance.
- * Mr. Ken Slattery, IRPP program manager, presented an overview of the total instream program that included the goals and scope of the program.
- * Robert Kavanaugh, Deschutes River Basin planner, presented a brief, 20-minute summary of the Deschutes IRPP that covered all major aspects of the draft program. A brief slide presentation highlighted the various environmental aspects of the Deschutes River Basin.
- * Next Mr. Yates opened the formal, transcribed portion of the hearing to the public.
- * Mr. Rod Nelson, Deschutes Basin farmer, voiced concern over the IRPP affecting his water rights and stressed the importance of the agriculture and forest products industry to the basin's economy.

Mr. Hal Beecher, Department of Game (DG) representative, supported the Deschutes River Basin IRPP but advocated a total closure of the river. Beecher stressed the maintenance of flows for steelhead and cutthroat trout. He also covered the presence of the Olympic mud minnow and the stickleback sculpin. Both the bald eagle and osprey are known to frequent the basin. He described the fact that, for every one cfs of reduced flow that occurs in the low flow period, 25 steelhead are lost to the sportsmen's harvest. (Beecher's Deschutes River Basin wildlife report was made available to the public.)

Mr. Dennis Ozier, South Sound Fly Fishers, supported the IRPP but voiced concern over the lack of DOE enforcement capabilities.

Mr. Jack Davis, Black Hills Audubon Society, supported the Deschutes River Basin IRPP. He voiced concern over diminishing habitat and adverse manipulation of the upper watershed with respect to clearcut logging. He fully supported the Department of Fisheries (DF) and DG recommendations. (See commentary memo dated May 21, 1980.)

Mr. Earl Engman, Washington State Sportsmen Council, supported the program and favored the DF and DG recommendations.

Mr. Ray Johnson, DF representative, voiced his department's support of the program. He outlined the economic importance of the fishery resource within the basin as being about \$3 million annually. He stressed the need to maintain adequate flows to alleviate the severe water quality problems that occur during summer low flow periods.

Mr. Tom Fare, City of Olympia Engineer, supported the overall program but opposed the closing of the Deschutes River on the grounds that DOE has not adequately addressed the issue of ground water use. Specifically, he asked that the program be delayed until the ground water situation can be clarified. He stressed the point that Olympia will depend on ground water resources to meet future growth needs.

Mrs. N. Nelson, U.S. Fish and Wildlife Service (USF&WS) spokesperson, presented the views of her agency as being in support of the program. She stressed the importance of maintaining adequate rearing flows to protect coho salmon. She also cautioned that DOE should insure that the ground water resources that are in continuity with the streams and rivers receive the proper protection. (See letter dated May 21, 1980 USF&WS.)

- * Mr. Rich Nelson, Deschutes farmer, viewed the IRPP as a threat to farm water rights and doubted the need for the program.
- * Mr. Don Hertzog, Lacey City Engineer, generally supported the IRPP but asked that the ground water situation be resolved in the near future. He requested that previous letters prepared by the City of Lacey be included in the final program document.
- * Mr. Len Johnson, Deschutes Basin resident, asked that the ground water problem be resolved and wanted assurances that his existing water right would not be affected.
- * Both the Nisqually and Squaxin Island tribes called to inform DOE that they supported the Deschutes Program.

The formal public hearing ended at this point, and no more public testimony was offered by the audience.

Next, the public was invited to discuss their views and problems with the DOE, DG, DF, and Deschutes River Basin panel members. The panel consisted of Kris Kauffman, Walt Bergstrom, and Ken Slattery from DOE. Ray Johnson represented DF, and Hal Beecher represented DG. Robert Kavanaugh moderated the discussion. A summary of public concerns is presented as follows:

- * Farm representatives voiced concern over the difficulty in obtaining the necessary permits from DOE and DF to construct flood protection revetments on the Deschutes River.
- * Another point the farmers brought out was that their water rights should preempt water needs for fishery production since there were no salmon within the Deschutes until recent years. One farmer doubted that there were any salmon within the Deschutes River.
- * Other related concerns involved the potential for increased recreational needs and pressures on private farm lands. Implied was the problem of littering and property damage.
- * One farmer questioned the need for any further water programs designed to control future use of water. His belief was that existing legislation was adequate.
- * A representative of Washington Sportsmen was concerned over the apparent inability of DOE to enforce the IRPP but stressed the need to adopt the program.

- * An environmentalist identified a problem in the IRPP's exemptions for domestic in-house use as stated in the draft Chapter 173-513 WAC. Her view was that the cumulative effect of large urban development within the McLane Creek watershed could decimate stream flows under the present program.

Prior to the commencement of the meeting, Mrs. Helen Engle, Washington Environmental Council, notified DOE that the council supported the adoption of the Deschutes River Basin IRPP and would provide written testimony at a later date. The council was especially concerned over potential habitat destruction within the upper Deschutes Basin from present forest practices in some areas.

The meeting adjourned at about 9:30 p.m. with requests for written comments to be sent to DOE no later than June 13, 1980.

BLACK HILLS AUDUBON SOCIETY

P. O. Box 2524
Olympia, WA 98507

May 21, 1980

COMMENTARY AND RECOMMENDATIONS: THE DESCHUTES RIVER BASIN INSTREAM
RESOURCES PROTECTION PROGRAM,
(WRIA 13) INCLUDING PROPOSED ADMINISTRATIVE
RULES

The most important instream resource in the Deschutes River Basin is water, a fact so obvious that it is often overlooked. Water is the essential element of an extensive ecosystem that extends from tributary watersheds in Lewis County through the inlets of South Puget Sound. The system is both vulnerable and fragile, mainly because of the unequal temporal distribution of precipitation. Manipulation of the watershed is becoming an increasingly important factor. It exaggerates the differential between winter and summer runoff, so that the effects of silt and pollution are more pronounced.

2

Ideally, a comprehensive management system for the Deschutes River Basin should be devised, based on an ecosystem study. A shortcut is to concentrate attention on one or more dependent species, assuming conditions that contribute to the welfare of such "indicators" will benefit the bulk of the ecosystem. Fish are the most conspicuous, the most commercially and recreationally valuable, and the best understood of the Deschute's wildlife. Accordingly, providing an environment conducive to fish propagation will incidentally foster salamanders and warblers. The approach is reasonably valid.

The Department of Game and the Department of Fisheries have established to our satisfaction that productivity of trout and salmon is dependent on and limited by the quantity and quality of water flowing in the mainstream of the Deschutes River. We recognize also that tributary streams, independent creeks and lakes cannot sustain additional withdrawals without sacrificing water quality and habitat. Therefore we endorse and support the proposed new sections to the Washington Administrative Code, Sections 173-513-010 through 173-513-100.

3

The closures and restrictions enabled by the new regulations should be regarded as a first step toward restoring and maintaining the Deschutes River Basin resources. It should be apparent that protection of the watershed and shorelines is a more immediate and pressing concern. On the Smith River of California, destructive forest practices were responsible for a decline of 80% on the steelhead run, 65% on coho, and 64% on chinook runs. That river is similar in many respects to the Deschutes.

4

In summary, this statement expresses approval of steps proposed by the Department of Ecology for the conservation of resources of the Deschutes River Basin. At the same time we offer the opinion that such steps are inadequate, and will remain so until problems of drainage impairment are addressed. Additional commentary is attached.

- Jack Davis

BLACK HILLS AUDUBON SOCIETY

Additional Comments: Precipitation at the headwaters of the Deschutes River and its tributaries may average 80 inches per annum and exceed 100" in some seasons (October through April). Normally, heavy vegetative cover on the higher terrain conserves water by retarding excessive runoff. Extensive clearcut logging has severely impaired that capacity, with the result that precipitation is transported through the drainage system far more rapidly than was true before harvesting. The differential between summer and winter mainstream flows is therefore more extreme; soil erosion and resulting sedimentation is destroying the gravel streambeds required for redds; and streambank erosion is becoming more pronounced. Add to these effects the loss of streamside shade, an array of pollution from forest practices, and the potential of the Deschutes River to sustain a healthy fishery has a dim near future.

Riparian habitat is essential to a number of bird species. Aside from the obviously water-dependent birds such as grebes, herons, waterfowl, bald eagles, spotted sandpipers, belted kingfishers, and dippers that occupy the Deschutes River, a less noticeable array of birds nest only in close proximity to the stream. These include green herons, several species of ducks, marsh wrens, yellow warblers, yellowthroats, and song sparrows. Most require fairly dense vegetation such as willow thickets for cover. The concentration of potential prey in turn influences hawks and owls to select suitable nest sites close by.

Most birds are territorial. For those species, loss of habitat is accompanied by a proportional reduction in populations. It is important to recognize that birds generally are not "displaced" by habitat loss, but destroyed. Current forest practices do not adequately protect streamside habitat, and one consequence is a threatened loss of diversity of species. This threat – decreasing diversity – has recently become the preoccupation of concern among research biologists.

The alteration of the Deschutes River estuary by impounding Capitol Lake created distinctive habitat conditions to which several species of birds have adapted. An excellent illustration of this adaptation is offered by the Barrow's goldeneye duck. The wintering population of this species in Washington may reach a maximum of 5,000 individuals, a total exceeding that of any other state. Perhaps half of that number use the South Puget Sound for feeding, and most of them assemble on the lower basin of Capitol Lake each evening to roost on the fresh water.

Other species of diving birds regularly feed in Capitol Lake. Increasing pollution of the lake may affect its usefulness in sustaining a dozen resident, and an additional dozen migratory species of birds.

The Deschutes River, the basin creeks, the lakes and salt water inlets are community treasures. Their continued degradation would be no less than a public disgrace. Any efforts to improve the water quality and protect the shorelines will have the support of Black Hills Audubon Society.

- Jack Davis

Black Hills Audubon Society, Statement 21 May 1980

Mr. Jack Davis

1. Your continued interest and participation as a planning team member in the Deschutes River Basin IRPP is highly valued and appreciated.
2. Your concerns over watershed management are shared equally by the DOE. To that end we are developing a Streamside Management Zone program that seeks to establish protective green belts of riparian vegetation in the areas being used for timber production. (DOE POC is Mr. Tom Halback, 753-6189.)
3. Hopefully, the State of Washington will not repeat the mistakes made on the Smith River in Ca. on the Deschutes River.
4. The importance of Capitol Lake to wintering Goldeneye ducks is recognized and incorporated within the program document in the wildlife section.

STATE of the U.S. FISH AND WILDLIFE SERVICE
on the proposed DESCHUTES RIVER BASIN INSTREAM
RESOURCES PROTECTION PROGRAM (WAC 173-513)
presented May 21, 1980

My name is Nancy Nelson and I'm here to present the views of the U.S. Fish and Wildlife Service on the proposed Deschutes River Basin Instream Resources Protection Program. We fully support the position of the Washington Departments of Fisheries and Game, and congratulate the Department of Ecology for their positive response to these concerns through development of the proposed program and regulations.

2 In the Deschutes Basin, the fish of greatest interest to most humans are chinook, coho, and chum salmon, steelhead and cutthroat trout. The requested closures will prevent further aggravation of the already occurring low-flow situation that impacts rearing and outmigrating juveniles as well as adults returning to spawn. Adequate spawning and egg incubation flow is seldom available even now after mid-May, which results in death of fish eggs as water levels drop. Studies by the Game Department have clearly shown that low flows in the Deschutes reduce the number of steelhead surviving to be caught by sportsmen. In addition, research by the Department of Fisheries has shown a similar relationship between low flow and reduced coho production.

3 Adequate flows not only provide physical habitat for fish and fish food organisms, but also are very important in maintaining the water quality necessary for their survival. The young salmonids produced in this basin spend varying amounts of time feeding and growing at the mouth of the Deschutes River, throughout Capitol Lake, within Percival Cove and in Budd Inlet. Studies of these areas by DOE, WSU and WDF have repeatedly documented the necessity of adequate water inflow to keep dissolved oxygen up and algae blooms and coliform bacteria counts down. Die-offs of returning adult chinook, coho, and sea-run cutthroat occur during low flow periods due to lack of oxygen in West Bay. Water quality is so critical in East Bay that it may well be the determining factor regarding issuance of permits necessary for the construction of the proposed East Bay Marina and other future developments in Olympia Harbor. DOE's recently completed study concluded that "the Deschutes River is the major contributor of dissolved oxygen to (Budd) inlet during late summer. Although it may not completely resolve the dissolved oxygen problem, a small continuous discharge during all phases of flushing Capitol Lake may add sufficient oxygen to prevent or minimize fish mortalities in the inlet." Further upstream, adequate flows are important to keeping water temperatures below 68°F, a critical temperature that is now regularly exceeded during the summer, with adverse effects on salmon and trout.

Streamflow is also important to wildlife, especially as it affects streamside vegetation where they feed, live, and hide. A number of wildlife species are dependent on fish for food, and their populations decline if fish numbers are reduced by low flows. A notable example is the threatened bald eagle, which occurs in the basin throughout the year and is dependent on salmon for food.

We believe that these fish and wildlife resources need the protection offered by the proposed program not only because of their own right to existence, but also for the significant economic, recreational and esthetic contributions they make to our quality of life. Substantial investments of public tax dollars have been made in fish ladders, rearing facilities, and the recent dredging of Capitol Lake to increase its natural salmon rearing area. As a result, the 1980 WDF chinook releases alone will be worth over \$3 million when harvested by recreational and commercial fishermen in Puget Sound and the Pacific Ocean. Sport angling for salmon is very popular year-round in this area's marine waters due to high numbers of returning adults, relatively good access for fishermen, and fishing areas semi-protected from winds and rough water. Freshwater areas in the basin receive moderate to intense sport fishing effort for salmon, steelhead and cutthroat trout throughout the fishing season, with winter steelhead catches as high as 852 in 1977. Some hunted waterfowl live in the Woodland Creek area, and the entire basin's stream-dependent wildlife contribute to recreational opportunities such as bird-watching and photography. These local recreational opportunities will increase in importance as our energy problems reduce mobility and the area's population grows. Our too often taken for granted quality of life must be protected for both present residents and potential newcomers.

In closing, I repeat our support of the proposed program, especially its applicability to future groundwater withdrawals. To quote your program document: "Summer base flows during extended dry periods... (depend heavily) on ground water for sustenance." Sine DOE's allocation authority is limited to water in excess of that needed to fulfill your numerous legal mandates to protect instream resources, groundwater withdrawals that would impact streamflows must be included in the regulation. Responsible, effective management of water, a finite resource, requires that decisions regarding base flows be made prior to passing out private rights to a public resource for perpetuity. Unlike eastern Washington, we are ahead of an overallocation disaster here. We urge you to learn from history and adopt the Deschutes program, as proposed, on June 20.
U.S.F. & WS Statement dated 21 May 1980

Mrs. Nancy Nelson

1. Your support and participation in the Deschutes River Basin IRPP is appreciated.
2. The relationship between Coho and steelhead population and the maintenance of adequate rearing flows is recognized by the DOE.
3. The existing DO problem within Budd Inlet was a factor that we considered when the proposed minimum flows and closures were established for the Deschutes River.

Testimony Regarding Deschutes River Basin
Instream Resources Protection Program

Presented By South Sound Fly Fishers
May 21, 1990; 7:30 p.m.
Lacey City Conference Room

Hello, my name is Mr. _____ and I am here tonight representing the South Sound Fly Fishers—an organization made up of around fifty dedicated fly fishers (both men and women) from this area. The Deschutes River basin, as defined by the plan, is probably, overall, the area in which the majority of our members pursue their pastime. (Some members did frequent the Toutle River, but I suspect their habits will change.)

As a club we are deeply concerned about the quality of the waters in the Thurston County area. We are, also, deeply committed to the improvement of fly fishing in the entire northwest—and as a means of doing such, improving the management and conservation of our fisheries resources (primarily trout, including steelhead and sea-run cutthroat, and salmon). We fish mainly for the recreational enjoyment of fishing—to have a good time and relax—and not only to catch the “big fish” (although that thought is always on our minds). Our club has long been a promoter of catch and release programs to ensure the continued propagation of fish.

Even more important than what we do with the fish after we catch them, is how the fish are being managed by the state agencies responsible for them. We normally look to the Departments of Game and Fisheries to do the managing—however, a crucial aspect of fisheries management has been delegated, by the Legislature, to the Department of Ecology. This duty is the setting of minimum or base flows. The Department of Ecology likes to quote from the “Water Resources Act of 1971” which states, in part, that the

page 2, Testimony SSFF

perennial rivers and streams of the state shall be retained with base flows necessary to provide for the preservation of fish. The act is compromised somewhat in that withdrawals of water that conflict with this requirement are to be authorized when it is in the public interest to do so. We actually prefer the 1969 act regarding minimum water flows and levels. This states that Ecology may set minimum water flows for the purpose of protecting fish and, in addition, Ecology shall, when requested by either Game or Fisheries, establish minimum flows as are required to protect fish. I believe that the Legislative directive to the Ecology Department is quite clear on this matter.

The South Sound Fly Fishers are in complete agreement with the Deschutes River Basin Instream Resources Protection Program and the proposed regulations as they are currently written. We would not like to see any changes made in them. We are very happy that the Departments of Ecology, along with Game and Fisheries, are finally implementing the 1969 and 1971 acts.

With reference to the proposed regulation concerning future groundwater withdrawals (WAC 173-513-050)—this absolutely needs to be included. If groundwater withdrawals have an effect on streamflows, then they too must be regulated. There is no point in regulating surface waters to protect the fisheries if, in effect, the regulations can be circumvented by groundwater withdrawals.

We do have one concern. Minimum flows are imperative to protect our fisheries. However, regulations to set such flows are only as good as they are enforced. We notice that Ecology will be closing all the drainages in the basin to further out-of-stream consumptive appropriations—except the mainstem Deschutes River, which will only be closed from April 15 through November 1. We agree with the concept of establishing minimum flows on the Deschutes for the remainder of the year. We only hope that if out-of-stream consumptive appropriations are made for these months that they will be monitored to ensure that the permits are being complied with and that the other uses of the river (that is, the fisheries resources) are not being damaged.

Thank you for this opportunity to express our views.

South Sound Fly Fishers, Statement dated 21 May 1980

Mr. Ozier.

1. Your interest in the Deschutes River Basin I.R.P.P. is appreciated.
2. The conflicts you allude to would only arise during a severe drought situation.
3. Some minor changes are programmed especially in the area of groundwater within appendix C 173-513-050.
4. Granted, enforcement remains a potentially serious problem for all the instream programs. We are hoping that the other state and federal agencies and the concerned public will assist by notifying our Regional Office whenever a problem is observed.



STATE OF
WASHINGTON
Diry Lee Ray
Governor

DEPARTMENT OF ECOLOGY
Mail Stop PV 11
Olympia, Washington 98504 206/753-2800

MEMORANDUM

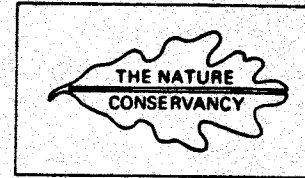
June 5, 1980

TO: Files

FROM: Robert Kavanaugh

SUBJECT: DEPARTMENT OF ECOLOGY INFORMATION BRIEFING TO THE THURSTON COUNTY COMMISSIONERS ON THE DESCHUTES RIVER BASIN INSTREAM RESOURCES PROTECTION PROGRAM

1. The Washington State Department of Ecology conducted an information briefing, subject above, on the 4th of June at 2:45 p.m. at the Thurston County Courthouse. The following subjects were discussed:
 - a. Mr. Ken Slattery, DOE Instream Program Manager, presented an overview of the overall western Washington Instream Protection Program.
 - b. Robert Kavanaugh, Deschutes River Basin Program Planner, presented a summary of the draft Deschutes River Basin Instream Protection Program and WAC 173-513. Copies of the draft program, draft groundwater SOP, Laws and Regulations of Water Resources, and the W.W.I.R.P.P. handout were presented to the Commissioners.
 - c. Mr. Slattery discussed the efforts by DOE to develop a working SOP in the area of groundwater management. Copies of the draft SOP were reviewed and discussed. The concerns of the City of Olympia with respect to the wording of the groundwater section were also covered. (Comm. Anderson departed)
 - d. The interest, views, opinions and support presented during the recent Deschutes River Basin Public hearing were also discussed and reviewed for the Commissioners' benefit. Copies of the memorandum of the hearing were presented for review.
2. Robert Kavanaugh requested that the Commissioners convey their views, corrections, and opinions of the draft program be sent to DOE by the 13th of June. Kavanaugh mentioned that he would be available for any questions and could give an additional briefing for Commissioner Anderson if Anderson desired. Mr. Williams was designated as the Co's future point of contact for the instream program.
3. Attendees included Chairman Del Pettit, Commissioner George Barner, Commissioner W. Anderson, Thurston Regional Planning Director Art O'Niel, Jim Kremer, Ken Slattery and Robert Kavanaugh.



WASHINGTON
NATURAL
HERITAGE
PROGRAM

3111 SEMINAR BUILDING (SE
THE EVERGREEN STATE COLL
OLYMPIA, WASHINGTON 9850
206-753-2449

May 23, 1980

Mr. Robert Kavanaugh
Water Resource Policy Development Section
Department of Ecology PV-11
Olympia, WA 98504

Dear Mr. Kavanaugh:

The Washington Natural Heritage Program is concerned with the protection of Washington's unique flora, fauna, and biotic communities. The Olympic mudminnow (Novumbra hubbsi) is a fish whose entire world population is limited to part of Western Washington. Its range includes the Deschutes River basin. We therefore endorse the efforts of the Department of Ecology to protect the habitat of this unique fish through closure/minimum flow restrictions for the Deschutes River.

Sincerely,

David Mladenoff
David Mladenoff
Program Coordinator

DM:sp

Mr. David Mandenoff
Program Coordinator
Washington National Heritage

1. Your support and endorsement of the Deschutes River Basin Instream Resources Protection Program is appreciated. The importance of the Olympic mud-minnow will continue to be stressed in our future water resource programs for the Deschutes River Basin.



SQUAXIN ISLAND TRIBE
COMMUNITY CENTER
98504 OLYMPIA, WA 98504
Route 1, Box 257 Shelton, Washington Phone 436-9781
Calvin J. Peters — Chairman
Bryan A. Johnson — Vice Chairman
Michael Peters — Secretary
Doreen Loggins — Treasurer
Michael Krize — Councilman
Florence Sigo — Tribal Historian

June 6, 1980

Washington State Department of Ecology
Mail Stop PV-11
Olympia, WA 98504

Attention: Hearing Officer

Gentlemen:

The Squaxin Island Tribe wishes to comment on the Instream Resource Protection Program for the Deschutes River Basin and proposed administrative rules implementing the program (Chapter 173-513 WAC).

We concur with the recommendations of Mr. Ray Johnson, Assistant Chief of Natural Production for the Washington Department of Fisheries, in his memo of February 8, 1980, to Mr. Bob Kavanaugh of the Department of Ecology. Low rates of flow in this system are already severely limiting to the fisheries habitat during summer months. Besides the Deschutes River itself, many smaller streams, such as Swift Creek and Woodland Creek, have been excellent producers of anadromous fish. Further consumptive water use cannot be allowed in these systems either.


The Squaxin Island Tribe has a guaranteed treaty right and considerable interest in maintenance and enhancing the salmonid resource. We are vitally aware of the importance of this issue and will protect our right for perpetuation of the resource in every forum available to us.

Mr. Calvin J. Peters
Tribal Chairman
Squaxin Island Tribe

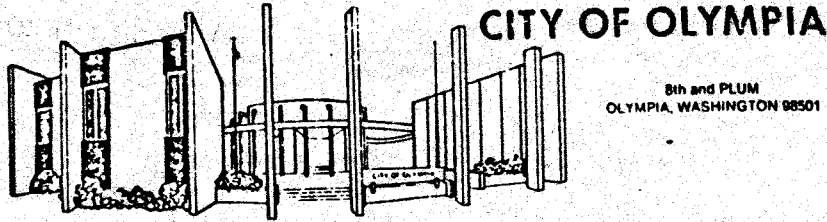
1. Thank you for your participation in the Deschutes River Basin Instream Protection Program as a planning team member. The program proposes to close McLane Creek and all tributaries, including Swift Creek, to future out-of-stream consumptive use.

Sincerely yours,

SQUAXIN ISLAND TRIBE


Calvin J. Peters
Tribal Chairman


Jack Rensel
Biologist



June 9, 1980

Wilbur Hallauer
Director, Department of Ecology
St. Martin's College
Olympia, WA 98504

Subject: Deschutes River Basin Instream Resources Protection Program

The City of Olympia would like this letter entered into the records as our written comment on the proposed regulations for the Deschutes River Basin. These comments are presented in response to several joint meetings held with your staff and in response to the public hearing. They also reflect discussions with the adjacent cities of Tumwater and Lacey, regarding future water supply availability for the greater Olympia area.

As discussed with your staff previously, the City of Olympia has sincere concerns with the adoption of regulations that would diminish the City's ability to meet future water supply requirements. Our position is, and has been, that these regulations are based on limited information and were formulated without answers to several technical questions. The promulgation of this regulation could have far reaching and long lasting impacts. Therefore, adoption of the regulation is inappropriate without first providing a thorough evaluation of the technical issues and potential conflicts concerning future supplies of potable water for the area. The City of Olympia does not oppose the objectives of the Department's In-Stream Resources Protection Program, if the program truly focuses on an equitable balance of future uses for combined benefit of all state residents. The possibility of closing the Deschutes River to future surface water diversions is not an issue with the City. Our concerns are related to the possible restriction of issuing future ground water rights throughout the basin, based on all ill-defined continuity relationship between ground water and surface water.

Wilbur Hallauer
Department of Ecology
Page two
June 9, 1980

We would suggest that the portion of the regulations which places a restriction on ground water development be limited to a specified set-back distance from the river where continuity between ground water and surface resources are known to exist. Until the continuity relationship between the river and the ground water is better known, it is appropriate for the Department of Ecology to either delay the adoption of the regulations or modify the segment of the regulations pertaining to ground water to the specified set-back distance until further technical data is available.

The updated Comprehensive Water Plan for the City of Olympia was recently completed. In this plan, the engineering consultant thoroughly studied the future water needs of the City of Olympia. To satisfy the current and future water needs they have recommended the City of Olympia proceed with developing a ground water source in the southeast area of our service area. These sites would lie north of the Deschutes River and west of the Chehalis-Western railroad tracks.

It is recommended that as an absolute minimum, the municipal use of ground water not be subject to the proposed regulations

The City of Olympia plans to conduct ground water geological investigations in the area for future sources of supply. We would be pleased to assist the Department of Ecology staff develop more complete data and establish the continuity relationships between the surface and ground waters. This information can then be used to properly develop the regulations after factual data is available.

Sincerely,

Mayor Lyle Watson

cc: Mayor Wes Barclift
Mayor Karen Frazer



WASHINGTON ENVIRONMENTAL COUNCIL
107 South Main Street / Seattle, Washington 98104 / (206) 623-1483

June 11, 1980

Water Resource Policy Development Section
Robert Kavanaugh, Project Planner
Department of Ecology
Olympia, WA 98504

COMMENTS ON THE DESCHUTES RIVER BASIN INSTREAM
RESOURCES PROTECTION PROGRAM

The WEC welcomes this opportunity to comment in support of the Deschutes River Basin IRPP as printed in the March 1980 document (WWIRPP Series No. 8).

The Council continues to support a long list of water resources concerns, both in water quality and water management, and we wish to commend the Department of Ecology for the excellent document on the Deschutes protection program which reflects many of our positions.

Comprehensive planning for protection is approached in this program and we are pleased to see the Department making this approach. Any strengthening of the DOE's capabilities as guardians of water resources is in the right direction, extending to coordination with county and regional planning agencies for land use, growth management, and whatever other major impacting forces affect the lands in the entire basin. Like forest practices in the upper watershed.

The WEC fully supports the Department of Fisheries and Department of Game recommendations, and further compliments the three agencies for their work together on this program. We feel the high regard for fisheries resources in the Deschutes program is well stated and urge adoption of the program with this provision intact. The newly expanding salmon production here is obviously most important with salmon runs dwindling elsewhere in the state - and with the recent losses (and expected losses for some years) from the volcanic event.

The high quality water resources of the state of Washington are coveted widely and should be the environmental priority of every resource agency and citizen organization involved in natural resources, wildlife resources, quality human environments and long range survival. Somebody must generate protective devices, planning strategies, and enforcement capabilities to maintain high water quality and guarantee fair management for the diversity of needs. We look to the Department of Ecology to do this for us, and for Washingtonians commenting on your program DEISes in 2080 and beyond.

Cheers on a good program. Adopt it intact and use it as a stepping stone to more comprehensive watershed protection.

Sincerely, *Helen Engle*

**Helen Engle, President, Washington Environmental Council
DEDICATED TO THE PROMOTION OF CITIZEN, LEGISLATIVE
AND ADMINISTRATIVE ACTION TOWARD PROVIDING A BETTER ENVIRONMENT**

Mrs. Helen Engle
President
Washington Environmental Council

1. Thank you for your review of the Deschutes River Basin Instream Resource Protection Program. As you know, the instream program is a first step toward the development of a Deschutes River Basin Program in future years. Additionally, a specific basin SOP will be written for water resources management of both surface and ground water in the Deschutes Basin.

AAUW - Life Washington Branch
AAUW - Washington State District
Air Quality Council
Alpine Runners
Alpine Lakes Protection Society
American Institute of Planners -
Washington Chapter
American Society of Landscape Architects
Bach Hills Audubon Society
Blue Mountain Audubon Society
Cascadia Wilderness Club
Chickamaul District of Garden Clubs
Citizens for Better Government
Clubs for the Improvement of
Nursing Homes
Common Agency of Pollution
Control
Columbia Valley Environmental Council
Concerned About Toxins
Countryside Wilderness Alliance
EART - Care Organization
Environmental Education Project
of Washington
Everett Garden Club
Fishing Homes Association
Greenpeace - Seattle
Hood Canal Environmental Council
Intermountain Alpine Club
Klamath National League of America
Klamath River Conservation Group
Knappton Audubon Society
Lakewood Salmon Chapter
Northwest Seafood and Salmon
Council of Trout Users
Laker-Sweeney Garden Club
Lamar-Columbia Basin Audubon Society
Linn Technology Society
Pugnet Sound Section
Mason Island Environmental Council
Mountain Community Club
Nasqually Delta Association
No Oil Port
North Cascades Audubon Society
North Cascades Conservation Council
North Central Washington Audubon Society
North University Garden Club
Northwest Fly Anglers
Northwest Seafooders Council
Northwest Seafood Science Council
of Trout Users
Oak Harbor Garden Club
Olympic Citizens Against Toxic Storage
Olympic Park Association
Olympic Peninsula Audubon Society
Pacific County Environmental Council
Pichuck Audubon Society
Protect the Puget Sound Estuary
Queen Anne Garden Club
Recreational Equipment, Inc.
Save a Valuable Environment
Save Cypress Island Committee
Seattle Audubon Society
Seattle Garden Club
Seattle Recycling, Inc.
Seattle Club - Cascade Chapter
Seattle Club - Columbia Group
Shaggy Ape Club
Shaggy Environmental Council
Shaggy's Concerned About
Nuclear Power
Shaggy River League
Stouffville District Washington State
Federation of Garden Clubs
Southwest Washington Environmental
Team
Stokere Mountain, Inc.
Stokere Audubon Society
Steephead Trout Club of Washington
Tacoma Mountaineers
Tahirose Audubon Society
The Mountaineers
The Planners
The Team Forest, Inc.
Thurston Action Committee
Yachroma
Vancouver Audubon Society
Washington Fly Fishing Club
Washington Keys Club
Washington Roadside Council
Washington State Environmental
Health Association
Willapa Hills Audubon Society
Willapa Valley Audubon Society
Wild Population Growth - Seattle

12 June 1980

DESCHUTES RIVER BASIN INSTREAM RESOURCES PROTECTION PROGRAM

The Sasquatch Group of the Sierra Club supports the proposed Administrative Rules for the protection of instream flows in the Deschutes River Basin. This is an important first step in developing a balanced water program for the basin. We urge the Department of Ecology to give priority to this rapidly growing area of the state and do a complete basin study as soon as possible. Many other factors in addition to water use affect the water quality of the Deschutes River, particularly forest practices in the Bald Hills and other parts of the watershed. These factors should be addressed by a complete basin study.

Particularly at this time, when western Washington's wildlife, including fisheries, has been severely affected by the eruption of Mt. St. Helens, we need to protect our fisheries resources. Population growth in the Deschutes Basin is greater than in other areas of the state, and Thurston County's Zoning Ordinances has not yet been adopted. With increased competition for water resources, we need this immediate protection for some of the most basic environmental values: salmon rearing, aquaculture in the inlets of Puget Sound, and the other benefits of good water quality.

We are concerned with the exemption for new domestic in-house uses for single residences and stock watering. We are losing agricultural lands to residential development, and no effective way of reversing this trend has been found. The new residential users, with the water uses (and pollution) accompanying modern lifestyles could have more impact than one might expect. The right to water for home use is guaranteed by statute, but perhaps RCW 90.54.040 (3) provides a way to limit the possible impact of uncontrolled residential use. It appears that the policies of the statute guaranteeing new water appropriations to new homes is in conflict with protection of the instream resources and the Department of Ecology could at least investigate a modification of that law that would be fair but still protect the environment.

Doris Cellarius
for the Sasquatch Group of the
Cascade Chapter of the Sierra Club

Mrs. Doris Cellarius
Sasquatch Group of the
Sierra Club

1. Thank you for your participation and review of the Deschutes River Basin Instream Resources Protection Program.
2. The problem of exempting domestic in-house use of water will be addressed once the Deschutes River Basin Program is started. Due to the narrow scope of the instream program, no changes can be made in the existing exemption. However, the regional office already impacts the domestic in-house use to some degree by their review of environmental impact statements and local permits. DOE's Southwest Region can be expected to use a conservative approach in matters of this kind with the philosophy of developing a balanced water allocation program.



February 8, 1980

MEMORANDUM

TO: Mr. Bob Kavanaugh, Program Planner, Department of Ecology

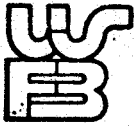
FROM: Ray Johnson, Assistant Chief, natural Production

SUBJECT: Recommendation for Deschutes Basin Instream Resources Protection Program

The Department of Fisheries expressed a number of their concerns regarding fisheries problems in the Deschutes Basin by Memo from Ray Johnson and Earl Finn dated February 7, 1980. We believe that this information and the studies performed to date are sufficient to show that flows in the Deschutes River are the determining factor in water quality, fisheries production, recreation and further development in Olympia Harbor. We, therefore, recommend that the Deschutes River be closed to further consumptive water rights based on this evidence.

We also recommend the closure of Woodland Creek and McLane Creek. Woodland Creek is an excellent coho stream with excellent rearing habitat throughout the lower three (3) miles or more; yet, the upper watershed has intermittent flows. It is essential that the remaining flows for this upper watershed be protected since this area is the only spawning habitat available for coho that rear in lower stream reaches. McLane Creek's closure is justified by its existing low flows as well as its considerable importance for coho and chum production. For example, chum salmon escapement in Swift Creek, a lower tributary, has been estimated as high as 12,789 spawners following substantial harvest. A major fishery occurs on McLane Creek stocks in Eld Inlet by the Squaxin Tribal fishery.

kn



WASHINGTON STATE
FARM BUREAU
DEPT OF ECOLOGY
RURAL & TRANS CENTER
OLYMPIA, WA. 98504
6/16/80 5:00 AM '80
171 W. 21ST. P.O. BOX 2569, OLYMPIA, WASHINGTON 98507
TELEPHONE (206) 357-9975

Mr. Wilber G. Hallauer, Director
Washington State Department of Ecology
MS PV-11
Headquarters
Lacey, Washington 98504

Dear Mr. Hallauer:

Please accept this letter as testimony of the Washington State Farm Bureau regarding proposed Administrative Rules, Instream Resources Protection Program, Deschutes River Basin in particular and your Water Resources Program, pursuant to the Water Resources Act of 1971 in general.

The 5000 member families who make up the Washington State Farm Bureau are active farmers and ranchers. We are the state affiliate of the American Farm Bureau Federation whose 3.2 million member families makes us the largest farm organization in the world.

Our principle concern is to insure that an adequate supply of water is available for domestic use and for beneficial uses of farmers and ranchers which will permit them to farm successfully. The abundant food supply provided the United States for domestic and international use depends in large measure on water for irrigation purposes. Just as the economy of the United States depends on agriculture to maintain a reasonable balance of payments and avoid international fiscal disaster.

We believe that your decision to move ahead with an instream flow program, one element of an entire water resource program, before designing River Basin Programs, was a mistake which will cost agriculture in our state dearly.

Presumably, a River Basin Project would consider the needs of all water users in the Basin and, if properly planned and implemented, would provide a balanced allotment of water based upon the priority of needs.

Unfortunately, when instream flows are alone considered, only a limited number of water uses are considered, principally commercial and sport fishing. Needs of agriculture are not considered and even domestic use, which must be the number one priority, has been categorized as "other water uses" after maintenance of instream flows for the protection of fishery resources.

This was particularly true in the matter of the Deschutes River Basin hearing where farmers were told, as rivers and streams were being closed to new permit holders, that they could search for ground water – dig wells – to meet their needs. The wells, of course, could only be located in areas where they would have no effect on the maintenance of instream flows in the rivers and creeks which are to be closed to all but a few beneficial users.

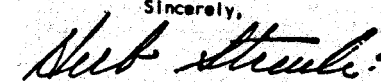
We do not believe that this would have happened if the entire Deschutes River Basin Project had been reviewed in light of all needs and uses. Incidentally, Mr. Hallauer, wells cost money and untold frustration in slogging through the bureaucratic maze required to obtain a permit to do virtually anything.

An example of the permit system at work can best be observed in the matter of a farmer trying to protect his property from riverbank erosion, as well as stop silting of streams and rivers. The process involves so many state and federal regulations and agencies many farmers simply will not attempt it. A program that would help this situation and help government better serve the people it is in place to serve would be a concept similar to the "one stop center" for obtaining business permits. We believe the Department of Ecology should take the lead in establishing such a program.

We were pleased to find that the Deschutes River Basin instream project will be reviewed annually rather than every five years; however this is really not the solution to the six month closing of the Deschutes and total closing of its tributaries when water is needed for agriculture. We recognized that this closure does not affect senior water right holders, or appears not to affect them. But we also know that their water can be reduced based upon stream flows established for maintenance of instream flows.

We urge you to rethink your water resources program. We desperately need a balanced program that will first consider an entire river basin and all the needs of water users before decisions regarding instream flows are made. The priorities of the program now will make comprehensive River Basin Programs impossible after the instream flows has been established based upon the needs of only a few.

We appreciate the opportunity of expressing our views and would enjoy working more closely with you and your department to insure that the needs of all are met, not just the needs of a select few.

Sincerely,

Herb Strull
President

br/bj



STATE OF
WASHINGTON
Dir. Lee Ray
Governor

DEPARTMENT OF ECOLOGY
Mail Stop PV 11
Olympia, Washington 98504
360/763-2800

July 8, 1980

Mr. Herb Streuli, President
Washington State Farm Bureau
P.O. Box 2569
Olympia, Washington 98507

Dear Mr. Streuli:

Your letter of June 13, 1980 expressing concerns over the Deschutes River Instream Resources Protection Program has been included in the official record of the proceedings which resulted in the adoption of the proposed administrative rules, chapter 173-513 WAC.

Your letter suggests that adoption of the program for the Deschutes and similar proposals in other areas of Western Washington will eliminate the future availability of water for agricultural and domestic uses. We do agree that the proposals will limit certain types of water withdrawals from certain sources identified as critical, but we do believe that options are available to those desiring to develop new projects.

In accordance with state law, the department's actions cannot affect any existing water rights. A water right is a form of property right that cannot be taken without condemnation and compensation. Existing agricultural and domestic water uses with water rights and valid claims are not subject to instream flows and stream closures established under these programs.

It is apparent to the department that in much of Western Washington, farming as a use of land is diminishing in total area as urban and suburban development occurs. In many locations, such as the Deschutes River Basin, adequate irrigation water rights have been issued in the past to cover projected needs. Irrigation water for any future projects can be obtained through purchase and transfer. This is a common practice in water-short regions, and is provided for by state water law. An applicant need only locate currently unused valid rights, negotiate a purchase and apply to the department for the necessary changes in point of diversion and place of use. If other existing water rights are determined to be unaffected by the change, then approval is normally made.

The Deschutes regulations include a section exempting domestic use for a single residence and stockwatering (except feed lots) from the provisions of the chapter. Domestic use includes household water plus water for outside amenities including up to one-half acre of lawn and garden irrigation. These withdrawal uses will be allowed from limited sources in the future. If the cumulative impact of numerous such diversions would be detrimental to instream resources, then only in house domestic uses would be permitted if no alternative source was available.

Mr. Herb Streuli
July 8, 1980
Page Two

In your letter, you recommend that the department develop complete basin management plans rather than the more limited instream resources program. We agree that development of full basin plans would be preferable; however, given limited resources to get the job done we have focussed on the instream flow element of a complete basin plan. Whereas an instream program requires six to nine months to complete, basin programs developed in the past have taken from two to four years. Our goal is to complete the twenty-five instream programs slated for Western Washington, then return to those basins expected to have significant demands in the future for development of complete basin management plans.

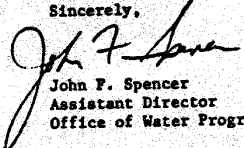
Even with a complete basin plan, the first step undertaken by the department is the determination of instream flows. This is properly done without the need for a comprehensive evaluation of other potential future uses of the streams being studied. This is in accordance with the Water Resources act of 1971 which states in part, "... the quality of the natural environment shall be protected and, where possible, enhanced as follows: perennial rivers and streams of the state shall be retained with base flows necessary to provide for preservation of ... (instream uses)." (RCW 90.54.020(3)-(a)). This act, when considered in combination with chapter 90.22 RCW (Minimum Water Flows and Levels), provides a very strong priority for the establishment of instream flows in the state's river and streams. It is the department's view that this must be done before any allocations to other uses are made. To do otherwise would make instream flows we set meaningless.

Your comments regarding the difficulties a farmer faces in getting necessary permits for streambank revetments and other projects are appreciated. You are apparently familiar with the "one stop" permit system the department administers under the Environmental Coordination Procedures act. Use of this system is not limited to businesses, however. Individual farmers are entitled to use this service too, and we would encourage them to do so. This would assure a quick response on the part of all state permitting agencies having an interest in the project.

The farmer using the system would have to contact only one agency (Department of Ecology) and fill out one application form. Enclosed is a brochure outlining how the "one stop" system works. We would be pleased to provide more copies should you desire them.

I wish to express my appreciation for your interest and look forward to your participation, and the participation of farmers in our future planning projects.

Sincerely,


John F. Spencer
Assistant Director
Office of Water Programs

JFS:nld
Enclosure

APPENDIX D

Department of Game letter dated March 6, 1980. Subject: Deschutes River Basin WRIA 13.

Department of Game letter dated April 14, 1980.*

Statement of the Washington Department of Fisheries, May 21, 1980.*

Department of Fisheries letter dated May 30, 1980.

Department of Fisheries letter dated May 30, 1980. Subject: Preferred Spawning Flows – Deschutes River.

Department of Game letter dated June 9, 1980.



STATE OF
WASHINGTON
Diry Lee Ray
Gruenmer

DEPARTMENT OF GAME
905 E. Heron
Aberdeen, Washington 98520

March 6, 1980

TO: Bob Kavanaugh, Department of Ecology

FROM: Hal Beecher, Department of Game

RE: Deschutes River Basin, WRIA 13

The Department of Game requests closure of the Deschutes River to further consumptive appropriation of water in order to protect a rare endemic fish, the Olympic mudminnow (*Novumbra hubbsi* Schultz), and to prevent any damage to the very important runs of steelhead and cutthroat trout which may now be limited by spawning area and adverse temperatures. Spawning area and temperature are both affected by flow. Another fish of special concern, the shorthead sculpin (*Cottus confusus*) inhabits the upper reaches of the Deschutes River (Bisson, Peter A. 1977. Occurrence of the shorthead sculpin, *Cottus confusus*, in a headwater tributary of the Deschutes River, Washington. Northwest Science 50 (1):43-45); this fish is extremely sensitive to high temperatures and may be the most temperature-sensitive fish in Washington. Consequently, it would be sensitive to any decrease in flow, and it is also sensitive to logging practices.

Spawning area for steelhead is greatest, according to direct measurements, at a flow of about 250 cfs at reach B, approximately 4 miles upstream from Vail and downstream from the confluence with the Lake Lawrence outlet stream. That flow level is needed through the end of June for steelhead spawning, incubation, and emergence. It is apparent from the hydrograph of the Deschutes River near Olympia at R.M. 3.4 that an adequate spawning flow is seldom available after mid-May. Consequently, spawning and incubation habitat is frequently a limiting factor in May and June, and some redds may be dessicated. Any further withdrawal of water at this time of the year would damage steelhead populations in the Deschutes River. The maximum acceptable temperature for salmonids is 68°F (20°C). This temperature is regularly exceeded in the Deschutes River during the summer, and trout populations suffer consequently. Any withdrawal of water would exacerbate the existing high temperatures and would have a direct adverse impact upon rearing steelhead and cutthroat trout and upon adult cutthroat entering the river in late summer and early fall.

The Deschutes River winter steelhead sports catch has been as high as 852 in 1977. The sports catch of Deschutes River steelhead was tabulated from punchcard estimate summaries for the 13 seasons from 1965-66 to 1977-78. These catch estimates were compared with the lowest flows recorded near Rainier during age 0 (3½ year before catch) and age 1 (2½ years before the catch). Correlation coefficients, r, were calculated for the catch with a) age 0 low flow, b) age 1 low flow, c) age 0 low flow + age 1 low flow, and d) age 0 low flow x age 1 low flow. Values of r were a) 0.1980 with age 0 low flow, b) 0.4374 with age 1 low flow, c) 0.5427 with age 0 + age 1 low flows, and d) 0.4641 with age 0 x age 1 low flows. The

Bob Kavanaugh
March 5, 1980
Page 2

highest correlation of 0.5427 had a significance probability between 0.10 and 0.05. The most widely accepted significance level is .05, but .10 and higher levels are frequently accepted when there is a risk of an undesirable consequence (such as loss of a fish run) of accepting the null hypothesis. Thus, the correlation between combined rearing flows and catch for Deschutes River steelhead can be considered significant. Using these same data, a straight-line regression equation was fitted. The slope was 25, indicating a loss of 25 steelhead from the catch for every/c.f.s. loss during the two rearing seasons. This is a clear indication that rearing flows are limiting to steelhead production.

The Olympic mudminnow is an attractively colored native fish which is restricted to a small geographic area in southwestern Washington. Its nearest relatives inhabit the Alaska tundra, the midwest and southeastern United States, and eastern Europe. The Olympic mudminnow is not only a distinct species, but it is so different from other members of the family Umbridae that it has been placed in a separate monotypic genus. This fish occurs in only one stream that flows into Puget Sound – the Deschutes River. (It also inhabits the Chehalis River basin and occurs north along the west side of the Olympic Peninsula to the Quinault basin, with isolated introduced populations in the Ozette area.) This fish inhabits sloughs and oxbow lakes such as the one between Henderson Boulevard and the golf course in Tumwater. The oxbow lakes require occasional high flows or floods to recharge them. Flows that are too low for extended periods could cause water level in oxbows to drop too low for fish survival.

Flooding is important to the maintenance of riparian vegetation and wetlands which support significant numbers of wildlife, including waterfowl which are hunted in the Deschutes valley.

The bald eagle, a Threatened Species in Washington, occurs in the Deschutes River basin throughout the year. The Nongame Wildlife Program lists 18 sightings of bald eagles in the Deschutes basin during 1978. Some of those sightings were of two eagles. Sightings have been recorded in all parts of the basin. Bald eagles in western Washington depend, to a large degree, upon salmon produced in the rivers. Because of the dependence of eagles upon salmon, the Department of Game supports the flow recommendations of the Department of Fisheries for the protection of salmon.

Ospreys are rarer than bald eagles in western Washington, according to a recent analysis by the Washington Natural Heritage Program. There are several osprey nests in the Deschutes basin. Ospreys are almost exclusively dependent upon fish for food, so that flows which benefit fish will benefit ospreys.

Rare plants occurring in the Deschutes basin include *Erythronium oregonum*, *Calypso bulbosa*, *Isopyrum hallii*, and *Synthyria schizantha*, according to the Washington Natural Heritage Program.



STATE OF
WASHINGTON
Diry Lee Ray
Governor

DEPARTMENT OF GAME
905 E. Heron
Aberdeen, Washington 98520

April 14, 1980

Mr. John F. Spencer, Assistant Director
Office of Water Programs
Department of Ecology
Olympia, Washington 98504

Dear Mr. Spencer:

The Department of Game is pleased that the Deschutes River Basin Instream Resources Protection Program will close the basin to further consumptive appropriation of water during the low flow period. This will contribute substantially to protection of fish, wildlife, and other instream values of this important basin. However, we have requested total closure of the basin. Total closure would protect habitat for wintering waterfowl and for a rare fish, the Olympic mudminnow, which occurs only in a small part of western Washington.

2

The Deschutes Basin is an important wildlife and recreation area close to a rapidly growing urban area. The proximity of a population center to the streams and lakes of this basin underscores the basin's importance at a time of fuel shortage and expense. The Deschutes River provides an excellent sport fishery for steelhead and cutthroat trout which are currently limited by flows.

We recognize that other environmental problems in the basin also impact fish and wildlife. Most notable of these is the rapid clearcutting of the upper watershed, which causes a deterioration in water quality and alters the flow regime in an adverse way.

3

Deschutes River water is critical for maintaining water quality in Budd Inlet in late summer when sea-run cutthroat come through the inlet into the Deschutes River. Without adequate flow, the cutthroat would not survive the inlet.

4

It is apparent that the Game Department has a vital interest in the Deschutes Basin. We support this program as far as it goes, but we repeat our request for total closure.

Sincerely,

THE DEPARTMENT OF GAME
Hal A. Beecher
Hal A. Beecher, Ph.D.
Research Analyst 2

DEPARTMENT OF GAME, LETTER DATED 14 April 1980

Dr. Hal Beecher, Research Analyst

1. Your continued interest and support is highly valued.
2. At the present time it is the view of DOE's water programs that during the winter flood periods adequate water is present within the Deschutes River for out-of-stream consumptive use.
3. DOE is presently developing a Streamside Management Zone program that seeks to alleviate the potential water shed deterioration problems within the Deschutes River Basin.
4. DOE recognizes the summer time water quality problems within Budd Inlet and serious consideration will be given towards maintaining adequate summer time flows by closing the Deschutes River from April-October to out-of-stream consumptive use.

HAB:cv



STATE OF WASHINGTON

Doug Lee Ray
Governor

DEPARTMENT OF FISHERIES

115 General Administration Building, Olympia, Washington 98504 206 753-6600

Statement of the Washington Department of Fisheries
before the

WASHINGTON STATE DEPARTMENT OF ECOLOGY

Deschutes River Basin
Instream Resources Protection Program
Including
Proposed Administrative Rules
(Water Resource Inventory Area 13)

Lacey, Washington
May 21, 1980

Salmon Production from the Deschutes River Basin provides important contributions to both sport and commercial harvests in Washington State. Major chinook and coho runs originate in the Deschutes River, while several smaller independent drainages support large chum populations and moderate sized coho runs.

The high value of this basin's salmon resource has come primarily as the result of substantial public investment.

1. Three major fishways provide passage over Tumwater Falls at the mouth of the Deschutes River. Fish ladders are also located at the Capitol Lake Dam and on Percival Creek.
2. Artificial production releases from Percival Cove now total 1,150,000 chinook yearlings and 8,000,000 fingerlings annually, totalling more than 220,000 pounds. The 1980 releases will contribute approximately 120,000 salmon to the catch, valued at more than 3 million dollars.
3. A satellite rearing station at Allison Springs, located in Mud Bay, is a recent addition to our program for production of chum salmon and delayed release chinook.
4. Three stream rehabilitation projects in the McLane Creek drainage have been completed in recent years to enhance the natural production of chum salmon.

The success of both artificial and natural salmon production in the basin is directly related to stream flow. For example, our studies show that preferred spawning flows for chinook salmon are 300 cfs in the lower Deschutes River, yet at the time of peak spawning during late September and October there is normally less than one-half this discharge. Another illustration is the rearing needs of coho salmon. There is a proven direct relationship between the lowest rearing flows during the year and the resultant adult returns.

Maintenance of suitable water quality is also directly related to instream flows, and Fisheries considers this the highest priority for the Deschutes River, Capitol Lake, Percival Cove, and Budd Inlet. A number of studies by different agencies and for different purposes have defined severe water quality problems. These have become more visible in recent years, with substantial fish kills that have included salmon and trout, closures of the Capitol Lake swimming beach, and algae and plant growth in Capitol Lake that must be controlled by periodic salt water flushing which has been only partially effective at best. It is clear that with reduced Deschutes River flows in summer and fall, that these existing problems will become more serious.

For these reasons the Department of Fisheries supports the Deschutes River Basin Instream Resources Protection Program proposal for the closure of the Deschutes River and other waters as described in the draft document.

DEPARTMENT OF FISHERIES STATEMENT DATED 21 May 1980

Mr. Gordon Sandison, Director

1. Your continued support in the instream program is highly valued.
2. Your concerns over low flows within the Deschutes River is recognized and forms the basis for our proposed minimum flows and closures within the basin. Hopefully, some measure of protection will also be offered to an already deteriorating water quality problem within Budd Inlet.



STATE OF WASHINGTON

Dou Lee Ray
Governor

DEPARTMENT OF FISHERIES

115 General Administration Building, Olympia, Washington 98504 206-753-6600

May 30, 1980

MEMORANDUM

TO: Bob Kavanaugh
Project Planner
Department of Ecology

FROM: Ray Johnson
Assistant Chief, Natural Production
Department of Fisheries

SUBJECT: Preferred Spawning Flows – Deschutes River

The following are preferred flows for chinook salmon spawning in the mainstem Deschutes River, as determined using the USGS Toe Width methodology:

1	River Mile 9.0 -----	292 cfs
	River Mile 10.5 -----	238 cfs
	River Mile 15.4 -----	236 cfs
	River Mile 19.4 -----	218 cfs

These calculations illustrate the increasing streamflow needs for spawning nearer the mouth, and we therefore project that preferred flows in the lowermost spawning area, which is very heavily used, would be 300 cfs or higher.

Deschutes chinook spawn during late September through October, and naturally occurring flows are typically far below these desired levels. The Department of Fisheries therefore considers this to be another important justification of your proposal to close the Deschutes River to further surface water appropriation from April 15 through October 31.

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Mr. Ray Johnson
Assistant Chief
Natural Product
Department of Fisheries

1. The data on preferred spawning flows will be included in our final program document within the Fisheries section. Thank you for your support.



STATE OF
WASHINGTON
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DEPARTMENT OF GAME
905 E. Heron
Aberdeen, Washington 98520

June 9, 1980

Mr. Bob Kavanaugh, Planner
Department of Ecology
St. Martins College
Lacey, Washington

Dear Mr. Kavanaugh:

This letter is in response to the Deschutes River Basin, Instream Resources Protection Program from Region 6 of the Game Department whose management responsibilities include this basin.

We support the proposed administrative rules for closure of the Deschutes River and the other WRIA 13 streams. The program accurately portrays the high wildlife values of this drainage and has recommended the appropriate management action of no further water right issuance.

We wish to thank and support Mr. Hal Beecher for his involvement and coordination on behalf of Game. His reports and March 6, 1980 letter reflect our position and concerns in this basin. Hal's analysis and the Department of Fisheries memorandum of February 7, 1980 illustrate both the significance and sensitivity of the fisheries resource of the Deschutes.

In support of the proposed closure under 90.54 RCW we remain firm behind the January 10, 1973 letter from Game Director Crouse to Ecology Director Biggs requesting adoption of preservation flows under 90.22 RCW. Intensive studies by the United States Geological Survey and Fisheries were conducted in 1970 at three sites on the Deschutes and refined spawning and rearing flows were developed for salmon and steelhead. Evaluation of these needs indicated then that low-flows limited salmonoid production in this basin. Continued allocation of water only diminishes the salmonoid resources and limits opportunities for enhancement efforts by state agencies.

The proposed administrative wording outlined in WAC 173-513-080 appears to reflect the intended closure, however a statement that water right applications will be denied in closed waters should be added. This proposed management intent should not be reworded in the administrative rules signed into law as this will cause regional management uncertainties similar to those occurring within the adjacent Chehalis Basin.

Closure of the Deschutes to further water right allocation is the proper management action for instream resource protection. The two self-defeating flow protection mechanisms used by DOE, of issuing water rights forever with a flow proviso and irrational assumptions of 50%

B. Kavanaugh
June 9, 1980
Page 2

returns on allocated water, are not appropriate for this system, or any other. We expect Ecology to uphold their legally adopted water management programs and not supercede written agreed-upon procedures by implementing illegal damaging changes to these programs as has occurred in the adjacent overstressed Chehalis system.

For the purpose of our review and input to the program our fisheries personnel in the Aberdeen Region would like to be kept advised of all I.R.P.P. activities in the following counties:

Pacific	Kitsap
Grays Harbor	Mason
Clallam	Thurston
Jefferson	

Thank you for the opportunity to respond to the Deschutes Basin water management plan. We support adoption of those closures listed and request that streams not closed be studied by DOE to determine precise amounts of water available for allocation. After the available water is applied for, closures should be put into effect on those streams while they still flow year-round. Both our field regional personnel require specific allocation quantities by stream, to implement this program.

Yours truly,

THE DEPARTMENT OF GAME
John W. Hunter
John W. Hunter
District Fish Biologist

JWH:p

cc: Hal Beecher
Nielsen
Collins
Penttila
Hansen
Ray Johnson
Hosea

I. Basin Overview

The Deschutes River basin (WRIA 13) supports an important recreational fishery for steelhead and cutthroat trout. The proximity of this fishery to the Olympia-Tumwater-Lacey area underscores the importance of this basin as we face energy shortages. Much other stream-oriented recreation is centered around the basin. The Deschutes River basin, including Woodland Creek, supports a number of species of waterfowl, some of which are hunted. The basin's wildlife is important for non-consumptive use, such as bird watching. Several species of special concern inhabit the basin, including the endemic Olympic mudminnow and the Threatened bald eagle.

II. Flow Recommendations

The Department of Game recommends that all waters in the Deschutes River basin (WRIA 13) be closed to further appropriation.

Spawning area for steelhead is greatest, according to direct measurements, at a flow of about 250 cfs at reach B, approximately four miles upstream from Vail and downstream from the confluence with the Lake Lawrence outlet stream. That flow level is needed through the end of June for steelhead spawning, incubation, and emergence. It is apparent from the hydrograph of the Deschutes River near Olympia at RM 3.4 that an adequate spawning flow is seldom available after mid-May. Consequently, spawning and incubation habitat is frequently a limiting factor in May and June, and some redds may be desiccated. Any further withdrawal of water at this time of the year would damage steelhead populations in the Deschutes River. The maximum acceptable temperature for salmonids is 68°F. (20°C). This temperature is regularly exceeded in the Deschutes River during the summer, and trout populations and trout populations suffer consequently. Any withdrawal of water would exacerbate the existing high temperatures and would have a direct adverse impact upon rearing steelhead and cutthroat trout and upon adult cutthroat entering the river in late summer and early fall.

“Formal methodologies for determining instream flow requirements for wildlife purposes do not exist” (Kadlec 1976). Flows can affect wildlife habitat and wildlife food chains.

Flow regime, together with topography, controls riparian vegetation, which is extremely valuable wildlife habitat. Riparian vegetation is not a climax vegetation. It persists at early successional stages, which are very productive, because occasional floods prevent the vegetation from reaching a climax stage. Floods, therefore, are an important part of the natural flow regime. When minimum flows are established, it is essential for wildlife, as well as for fish, that these flows not become de facto maximum flows. Natural fluctuations, including flooding, must be allowed in the flow regime to protect riparian habitat. Minimum flow recommendations by the Game Department do not consider riparian habitat maintenance because no methodology exists. The Game Department regards any alteration of the natural flow regime as detrimental to riparian wildlife habitat.

A number of wildlife species are dependent upon fish for food. Instream flows can affect these wildlife species by affecting their food supply. While extremely low flows facilitate the capture of fish by piscivorous wildlife, continued heavy predation, together with other adverse aspects of low flow, could reduce the fish population, causing a crash of the wildlife populations dependent upon fish.

The list of fish-eating wildlife is long, including kingfishers; several species of herons; ducks, especially mergansers; ravens; crows; eagles and ospreys; several members of the weasel family; raccoons; and bears. Species of special concern in the basin and which are dependent upon fish are discussed under Species of Special Concern.

III. Analysis of Game Fish Populations

Multivariate analysis is needed to fully assess the many factors which influence salmonid production (see Figure 1, Zillges 1977). One factor, even one with a substantial effect, can be masked by the combined effects of other factors; univariate statistical tests would often not indicate significance of a factor which is an important variable, perhaps even the most important variable, in a multivariate model which explains a significant portion of the variation in the dependent variable (steelhead production). Univariate statistical tests are, therefore, not very strong, and they may not be capable of detecting a relationship where one exists.

In this report univariate tests of correlation (r) between stream flow and steelhead production are used, despite the lack of strength of such tests. Correlation coefficients can be regarded in two ways: 1) A t-test can be used to determine the probability (P) that a particular value of r could be obtained when the true correlation was zero. If $P \leq 0.05$, then only a rare event (≤ 1 in 20) could have produced that value of r, given a true correlation of zero; it is more likely that $[r] > 0$ and there is a relation between flow and production. The lower the value of P, the more likely that flow and production are related. P is a function of both r and the number (n) of sample points.

The correlation coefficient, r , is an indicator of the degree to which the independent variable is a good predictor of the dependent variable; r^2 equals the percent of the variation in the dependent variable which is explained by variation in the independent variable.

Using the same set of data from which the correlation coefficient was calculated, a regression equation can be calculated using the least squares method. The regression equation takes the form: $S=a+bF$, where S is some measure of steelhead or cutthroat production, F is a measure of low flow in c.f.s., a is the S intercept, and b is the slope of the regression line. The unit of the slope, b , is fish/c.f.s.. The correlation coefficient, r , is an indicator of the validity of b .

The Deschutes River winter steelhead sports catch has been as high as 852 in 1977. The sports catch of Deschutes River steelhead was tabulated from punchcard estimate summaries for the 13 seasons from 1965-66 to 1977-78. These catch estimates were compared with the lowest flows recorded near Rainier during age 0 (3½ years before catch) and age 1 (2½ years before the catch). Correlation coefficients, r , were calculated for the catch with: a) age 0 low flow, b) age 1 low flow, c) age 0 low flow + age 1 low flow, and d) age 0 low flow x age 1 low flow. Values of r were: a) 0.1980 with age 0 low flow, b) 0.4374 with age 1 low flow, c) 0.5427 with age 0 + age 1 low flows, and d) 0.4641 with age 0 x age 1 low flows. The highest correlation of 0.5427 had a significance probability between 0.10 and 0.05. The most widely accepted significance level is .05, but .10 and higher levels are frequently accepted when there is a risk of an undesirable consequence (such as loss of a fish run) of accepting the null hypothesis. Thus, the correlation between combined rearing flows and catch for Deschutes River steelhead can be considered significant. Using these same data, a straight-line regression equation was fitted. The slope was 25, indicating a loss of 25 steelhead from the catch for every 1 c.f.s. loss at lowest flow during the two rearing seasons. This is a clear indication that rearing flows are limiting to steelhead production.

No data are available to relate cutthroat production to Deschutes River flows. However, cutthroat trout are generally more sensitive to flows than are steelhead.

IV. Species of Special Concern

Species of special concern include Endangered Species, Threatened Species, and species recognized by experts as being endemic, rare, declining, or vulnerable to disturbance. The first two categories include only species listed in the Federal Register

under the Endangered Species Act(s). The third category includes species being listed only by other organizations and agencies. The entire list, incorporating all three categories, was compiled by the Nongame Wildlife Program of the Game Department and the Washington Natural Heritage Program.

In this report two terms, occurrence and sighting, will be used and must be distinguished. Occurrence of a species in an area refers to regular use for an important activity, such as nesting. Occurrence indicates that one or more individuals of a species depend significantly upon that location. A sighting indicates only that a species has been observed at a particular location; the individual may have been passing through an area that is non-essential to it. A sighting can also be an unproven occurrence, but "occurrence" implies evidence of importance of the area to the species.

The Olympic mudminnow is an attractively colored native fish which is restricted to a small geographic area in southwestern Washington. Its nearest relatives inhabit the Alaska tundra, and midwest and southeastern United States, and eastern Europe. The Olympic mudminnow is not only a distinct species, but it is so different from other members of the family Umbridae that it has been placed in a separate monotypic genus. This fish occurs in only one stream that flows into Puget Sound – the Deschutes River. (It also inhabits the Chehalis River basin and occurs north along the west side of the Olympic Peninsula to the Quinault basin, with isolated introduced populations in the Ozette area.) This fish inhabits sloughs and oxbow lakes such as the one between Henderson Boulevard and the golf course in Tumwater. The oxbow lakes require occasional high flows or floods to recharge them. Flows that are too low for extended periods could cause water level in oxbows to drop too low for fish survival.

Another fish of special concern, the shorthead sculpin (Cottus confusus) inhabits the upper reaches of the Deschutes River (Bisson, 1977); this fish is extremely sensitive to high temperatures and may be the most temperature-sensitive fish in Washington. Consequently, it would be sensitive to any decrease in flow, and it is also sensitive to logging practices.

The bald eagle, a Threatened Species in Washington, occurs in the Deschutes River basin throughout the year. The Nongame Wildlife Program lists 18 sightings of bald eagles in the Deschutes basin during 1978. Some of those sightings were of two eagles. Sightings have been recorded in all parts of the basin. Bald eagles in western Washington depend, to a large degree, upon salmon produced in the rivers. Because of the dependence of eagles upon salmon, the Department of Game supports the flow recommendations of the Department of Fisheries for the protection of salmon.

Ospreys are rarer than bald eagles in western Washington, according to a recent analysis by the Washington Natural Heritage Program. There are several osprey nests in the Deschutes Basin. Ospreys are almost exclusively dependent upon fish for food, so that flows which benefit fish will benefit ospreys.

Rare plants occurring in the Deschutes basin include Erythronium oregonum, Calypso bulbosa, Isopyrum hallii, and Synthyris schizantha, according to the Washington Natural Heritage Program.

V. Identification of Sensitive Water Resource Habitat

Capitol Lake and Budd Inlet are waters through which sea-run cutthroat trout and steelhead must migrate, and it is essential that water quality in these bodies of water be adequate for the fish to survive passage. This is likely to be a problem during cutthroat migration in late summer and fall.

A marsh near the mouth of Woodland Creek supports a great diversity of wildlife.

VI. Economic Importance of Wildlife

No data are available on the economic importance of wildlife in the Deschutes basin.

VII. Literature Cited

Bisson, P.A. 1977. Occurrence of the shorthead sculpin, Cottus confusus, in a headwater tributary of the Deschutes River, Washington. Northwest Science 50(1):43-45.

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