INSTREAM RESOURCES AND WATER ALLOCATION PROGRAM REVIEW

DRAFT ENVIRONMENTAL IMPACT STATEMENT

Water Resources Program

Washington State
Department of Ecology

February 1987

Washington's Water Resources Program

Instream Resources and Water Allocation Program Review

DRAFT
ENVIRONMENTAL IMPACT STATEMENT

State of Washington
Booth Gardner, Governor

Department of Ecology
Andrea Beatty Riniker, Director

Olympia, WA
February 1987

FACT SHEET

Proposal: The Department of Ecology (Ecology) is considering revision of its surface water planning and allocation program. This draft Environmental Impact Statement (DEIS) discusses five alternatives. These are 1) No action, or status quo: objective - to maintain Ecology's current policies and programs which focus on protection of instream flows at either the 90 percent habitat level or 50 percent exceedance flow level to protect instream resources; 2) Out-of-stream emphasis: objective - to maximize the availability of secure supplies of water for future out-of-stream use while maintaining "survival" levels of instream flow for fish and other instream values; 3) Instream emphasis: objective - to maximize preservation and enhancement of instream resources; 4) Needs assessment and allocation: objective – a balanced assessment of needs and allocation of water based on those needs among instream and out-of-stream uses; and, 5) Coordinated resources planning: objective - to provide instream flow protection at levels consistent with the policies and management of instream resources by resource management agencies.

Sponsor of the Proposal: Department of Ecology.

Date of Implementation: The anticipated date of implementation is October 1, 1987, following selection of a program and adoption of its implementing regulations.

Lead Agency: Department of Ecology, Mail Stop PV-11, Olympia, Washington 98504-8711.

Responsible Official: Hedia Adelsman, Program Manager, Water Resources Program, Washington State Department of Ecology.

Contact Person: Ken Slattery, Department of Ecology, Mail Stop PV-11, Olympia, Washington 98504-8711
(206) 459-6114.

Authors and Principal Contributors: The principal authors of this document are Ken Slattery and Cynthia Nelson. Water Resources Planning and Management staff who also contributed to the draft EIS descriptions of the affected environment and the micro-alternatives in the appendix are: Jim Bucknell, Brad Caldwell, Nina Carter, Karol Erickson, and Rod Sakrison.

Date of Issue of Draft EIS: The data of issue of this draft Environmental Impact Statement is February 27, 1987.

Deadline for Comments: Public comments are due at Ecology's headquarters office no later than April 15, 1987.

Date and Time of Public Hearings on the Proposal:

Monday, March 16, 7:00 P.M., Federal Building, 825 Gadwin, Richland WA
Tuesday, March 17, 7:00 P.M., Public Health Center, 1101 W. College Avenue, Spokane WA
Wednesday, March 18, 7:00 P.M., Douglas County PUD, 1151 Valley Mall Parkway, East Wenatchee WA
Monday, March 23, 7:00 P.M., Clark County PUD, 1200 Fort Vancouver Way, Vancouver WA
Tuesday, March 24, 7:00 P.M., Puget Power Building, 10608 N.E. 4th, Bellevue WA
Wednesday, March 25, 7:00 P.M., City Library, 210 Central, Bellingham WA

Final Agency Action: The department will adopt a course of action based on the Final EIS. No decision will be made until at least seven days after issuance of the Final EIS.

Subsequent Environmental Review: This EIS is part of a phased environmental review. Supplemental environmental impact statements may be prepared for subsequent related actions.

Location of Prior EIS, Reports and Background Data: Department of Ecology, Mail Stop PV-11, Olympia, Washington 98504-8711

This Environmental Impact Statement supersedes Ecology's June, 1979 Final Environmental Impact Statement and Program Overview for the Western Washington Instream Resources Protection Program.

Cost and Availability of the Draft EIS: The draft EIS is available free of charge by calling or writing Ms. Cindy James at: Department of Ecology, Mail Stop PV-11, Olympia, Washington 98504-8711
Telephone - (206) 459-6111

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SUMMARY

The action proposed in the draft EIS is consideration of revisions to the policies and guidelines followed by Ecology in its surface water planning and allocation program. This program is based on the authority of Chapter 90.54 RCW. Adoption of any of the five alternatives or combination thereof other than the No Action alternative will likely result in the development of new implementing regulations, policies and guidelines. Statutory changes might also be recommended by Ecology.

During a November 1985 instream flow workshop sponsored by the State Ecological Commission, attendees identified 21 key instream flow issues. Ecology later added another 16. These issues were evaluated in a year long process involving a broad-based advisory committee. Alternatives for addressing each of these issues were listed by Ecology with the help of the committee. The result of this work is contained in Appendix I. The committee's meetings were public. Simultaneously with these meetings, Ecology conducted a public involvement process for the EIS scoping. Six public hearings are scheduled during the public comment period on this EIS.

Alternatives

The DEIS describes five alternative approaches to address a number of the key unresolved instream flow and water allocation issues. Each alternative is based on different objectives, standards and criteria. Implementation of some of these alternatives would likely require statutory changes as well as changes in existing Ecology regulations. The alternatives include 1) continuation of the status quo (no action), 2) emphasis on water supplies for out-of-stream development, 3) emphasis on instream resource protection, 4) a balanced assessment and allocation approach, and 5) an approach emphasizing coordination and consistency with other resource management plans. No preferred alternative will be identified until the Final EIS is published.

The no action (status quo) alternative would continue the current allocation system and priorities. The present program focuses on preservation of instream flows to protect 90 percent of optimum habitat for fish as defined by the Instream Flow Incremental Methodology, with instream flows not to exceed the 50 percent exceedance flow. Other instream resources are also informally assessed and factored into this flow determination. Planning would continue on the basis of individual water resource inventory areas. Consideration of future out-of-stream needs would be minimal. No changes would be made in the present approach to water conservation. The maximum net benefits test would not be precisely defined and would be considered case by case.

The out-of-stream use alternative would emphasize water availability for diversion. Instream resources would be maintained by a "survival" level of instream flow predicated on preventing extinction of fish and other instream resources. Conservation measures would be financed by the state.

The instream protection alternative would emphasize preservation and enhancement of instream resources. Optimum instream flows would be set based on fisheries needs and those of other instream resources. Conservation measures would be required for new diversions and changes of use. A maximum net benefits test which incorporated environmental as well as socioeconomic criteria would be developed and applied only to water allocations in excess of the optimum instream flow.

The needs assessment and allocation alternative would assess and provide for the needs of both instream and out-of-stream uses in flow setting. This strategy would emphasize a three-tiered planning approach. Statewide policies, guidelines and priorities would be established, regional plans would assess water needs and evaluate use preferences, and basin plans would set instream flows consistent with the regional plans. No priorities or criteria have been included in the alternative. Instream flow levels could vary from "survival" to optimum. A statewide conservation program would be adopted. Criteria for applying a maximum net benefits test would be developed and applied to allocations (including instream flows) in excess of the "survival" flow level.

The coordinated resource planning alternative would establish instream flows consistent with the policies and management of agencies responsible for those instream resources. This alternative would focus on interaction with other agencies' planning for fish, wildlife and other instream resources. Instream flows would be set at optimum only when needed to implement management plans. On streams for which management plans do not require these levels, instream flows could be set as low as the "survival" level. If, at the time an instream flow was under review, full beneficial utilization of the instream flows had not occurred as a result of the management practices of the responsible resource management agency, Ecology could revise flows downward to as low as "survival" levels. Voluntary water

conservation would be encouraged. A maximum net benefits test would be developed, but would not be applied to instream flows.

Environmental Impacts

The severity of potential adverse environmental impacts varies with each alternative. With the status quo alternative, some long-term decline in instream resources would be expected as new water rights lowered flow levels. Impacts on aquatic and some other instream resources would be connected with seasonal low flows, which are often limiting to production under natural conditions. The out-of-stream development alternative would result in severe impacts to the fishery resources of the state, as well as to aesthetics, water quality, and other instream resources. The instream protection alternative would have insignificant adverse impacts to instream resources and would affect instream resources positively through its enhancement provisions. The alternative which seeks to balance the assessment of needs and allocation of water to instream and out-of-stream needs would variably impact instream resources. The extent and location of effects would depend on regional and local decisions. These would be set within a framework of state policies and guidelines which are as yet undetermined. The effects of the coordinated resource management alternative would vary in accordance with the management plans for instream resources prepared by other resource management agencies and with the extent and effectiveness of implementation of those plans. Ecology would reserve the authority to lower the instream flows if implementation were unsuccessful.

Adoption of any of these approaches or a combination thereof would occur in the form of regulations to implement the state program. No mitigation is anticipated beyond that included in the alternatives. Some alternatives contain measures which would lessen potential environmental effects, such as conservation programs. Unavoidable adverse environmental impacts would depend primarily on the instream flow level selected in each case. Adverse environmental impacts from any of the alternatives would not occur until water rights were issued and water actually diverted.

Socioeconomic Effects

Socioeconomic effects of each alternative have been assessed for five sectors of the economy: fishing (sport, commercial, tribal); outdoor recreation and tourism; residential, commercial and industrial development; and, energy use and development. Sectors which profit directly or indirectly from high levels of instream resource protection would be benefited by alternatives containing such standards. Other sectors which are oriented to offstream diversion of water would fare better under alternatives emphasizing out-of-stream water availability. One type of resource preference and use will be at the expense of the other. The status quo alternative would set fairly high levels of instream protection, benefiting instream-related uses while considerably limiting future out-of-stream use. The out-of-stream use emphasis alternative would benefit offstream economic development while severely impacting instream resources such as fisheries and water-dependent related recreation. The instream protection alternative would highly favor instream-related activities and resources at the expense of sectors with offstream water needs. The needs assessment and allocation alternative would have mixed impacts and benefits: on streams dedicated to instream protection, related economic sectors would continue to benefit, while on streams dedicated to offstream use, economic development would be favored. The coordinated resource planning alternative would also have mixed socioeconomic effects, although instream resources would have the advantage. On streams managed for optimum fish production, for example, related industries would benefit. For streams protected at "survival" levels, offstream interests would be expected to benefit.

Phased Review

This draft EIS will be part of a phased review in that the EIS will be supplemented as necessary at a later date with more specific environmental analysis. Promulgation of regulations covering actions not adequately addressed in this programmatic EIS, or future actions having new significant environmental impacts could trigger preparation of supplemental EISs.

CHAPTER 1 - PURPOSE AND NEED

Introduction

Because Ecology's Water Resources Instream Protection program has become increasingly controversial over the past few years, the objective of this programmatic EIS is to fully examine various planning and water allocation strategies and their potential impacts and receive public input on the alternatives. There have been disagreements over the meaning of statutory language, and also over the application of the law. The extent to which instream resources are required to be protected and the inclusion of out-of-stream interests in the flow-setting process are two major areas of disagreement. Other conflicts arise over the application of a maximum net benefits test, the water uses which might be exempted from instream flows, and whether some streams should be set aside for total preservation.

At a workshop held by the State Ecological Commission in November 1985 to discuss the instream flow and water allocation program and hear from different interest groups, participants identified twenty-one issues. Ecology agreed to address these issues in the program review, later adding 16 more issues. Issues potentially affecting the environment have been addressed in this EIS. An assessment of all of the issues is provided in the Issue Analysis Papers, Appendix I.

Ecology has chosen to prepare this Environmental Impact Statement (EIS) on its Instream Flow and Water Allocation Program for three primary reasons. First, the State Environmental Policy Act (SEPA) process provides a useful and credible mechanism to evaluate programmatic alternatives. Second, SEPA provides an effective vehicle for involvement of the public in the choice-making process. Third, it is anticipated that as a result of the Instream Flow and Water Allocation Program Review, Ecology may develop proposed legislation and/or regulations and procedures that could potentially impact the environment, thus triggering the SEPA process. Rather than writing a report now and a largely redundant EIS later, one report can serve several purposes.

This is a programmatic EIS intended to evaluate a public, nonproject proposal. The central question addressed by this EIS is: What sort of program should be adopted by the state to most effectively and responsibly carry out the function of allocating its scarce water resources? This EIS is intended to be used as a decision-making tool. Once it is finalized, Ecology may initiate actions that could substantially alter the framework, criteria, methods and procedures of the Instream Flow and Water Allocation Program.

Ecology intends to use this EIS in phased review. (See SEPA rules, WAC 197-11-060(5).) This EIS will be supplemented, when necessary, by more detailed environmental documents as specific statewide or more geographically limited proposals are made. The assessment of impacts in this programmatic EIS is necessarily general in nature. Future supplemental EISs will have more detailed analysis.

Background and Authority

Water Resources Development in Washington

The first human occupants of this land that is now Washington State were Indians, who it is believed migrated from present day Alaska after crossing an ice bridge from Northeastern Asia across the Bering Strait. The rivers and marine waters of this land provided such abundant sustenance to these peoples that they were able to develop an advanced culture and unique art forms. The Indians' subsistence level exploitation of water and related resources was essentially harmonious with nature, and resulted in little alteration of natural processes and ecosystems. Coastal and Columbia River Indians relied very heavily upon fish. Because salmon and steelhead are funneled into rivers and streams in large numbers and are vulnerable to capture, they provided a mainstay in the diet of tribes, and formed a basis of unique cultural, economic and religious practices of native peoples. Rivers and marine waterways also provided convenient transportation avenues where navigable by native craft.

Euro-American exploration of the western United States, including Washington, also depended upon rivers for transportation. The Lewis and Clark expedition traveled up the Missouri and down the Snake and Columbia Rivers to reach the Pacific Ocean. Trappers in search of beaver pelts followed the waterways west. Euro-American settlement of what is now Washington State began in earnest in the middle part of the 19th century. Settlements that would become Seattle, Tacoma, Olympia, Port Townsend, Walla Walla and Spokane and others were universally located on or near water. Water was necessary for transportation, domestic supply, and power.

The earliest irrigation in Washington is believed to have occurred in present day Walla Walla before 1820. Intensive irrigation development of the Yakima basin began in the 1850s. The early settlers of the Olympia area developed a mill

at Tumwater Falls on the Deschutes River. Lumber mills and shipping facilities sprang up at many sites along Puget Sound. Rivers were used to transport logs downstream to the Sound and the mills.

Hydroelectric power plants began to appear about the turn of the century. The growing cities of Seattle and Tacoma initiated development of large municipal water supply projects on the nearby Cedar and Green rivers in the early 1900s. A major Federal irrigation project in the Yakima basin involving construction of five storage reservoirs was initiated in 1905.

The periods of rapid population growth in Washington coinciding with the two World Wars resulted in increased development of water resources across the state for power, agriculture, industry and municipal supply. Construction of Rock Island Dam on the Columbia River was begun in 1930. Bonneville Dam, a Federal project was initiated in 1933. The massive Grand Coulee Dam was initiated in 1933 for power and irrigation purposes. Irrigation from the project began in the 1950s, and dramatically altered much of Central Washington. Eleven massive dams now span the Columbia River in Washington, and four dams impound the Snake River in Washington, totally altering the character of these rivers.

Today, an estimated one and one-half million acres of land are under irrigation in Washington. Large surface water municipal diversions exist on many streams, and hydropower projects exist on many others. Flood control dams and levees have added to the alterations. The historical and continuing exploitation of water resources is a cornerstone of the prosperity of Washington's citizens.

This has come at no small environmental price. Because of human occupation and modern development, few of Washington's major rivers remain in pristine condition. On many streams, including the Columbia River, large natural populations of anadromous fish have been dramatically reduced, in many cases as a direct consequence of the exploitation of the state's water resources. Wildlife, water quality, recreation, aesthetics and environmental values have also been altered due to this development.

Water Laws

The first Washington territorial law over water was enacted in 1863. It provided for use of the English common law riparian doctrine of water rights (Mitchell 1967). Under this doctrine, owners of land abutting a stream or lake possess correlative rights to make reasonable use of the waters of the stream or lake. It is a doctrine of water law that is common in the wetter eastern portion of the United States. Only California, Oregon and Washington laws contain vestiges of the riparian doctrine among western states.

The dry nature of most of the West called for the use of a new doctrine of water law which came to be known as prior appropriation. The central tenets of this doctrine are "first in time is first in right" and that water must be put to beneficial use. Under this doctrine, it is permissible to remove water from the channel and transport it to nonriparian land for use. Conflicts among users are resolved on the basis of whose use was established first. In 1873, the Washington territorial government began recognizing the doctrine of prior appropriation in some parts of the state to facilitate large scale irrigation development. Eventually it was affirmed statewide.

Washington became a state in 1889. The state constitution contains one clause related to water as follows: "The use of the waters of this state for irrigation, mining, and manufacturing shall be deemed a public use." The first state legislature in 1890 required the filing of water right claims with the superior court and required hearings and adjudications to solve disputes and to determine priorities. In 1891, the legislature passed a water right law requiring that prospective water appropriators post a notice at the proposed point of diversion and file a copy with the county records office. This was similar to requirements for mining claims. Under this system, both riparian and appropriative rights were under development, leading to much conflict, controversy and litigation (Mitchell 1967).

The state was not responsible for water rights until 1917, when the State Water Code (Chapter. 90.03 RCW) was passed following many years of failed legislative proposals. The code established appropriation as the exclusive means of establishing new rights to surface water. It established a state permit system administered by the State Hydraulic Engineer, (a new position established by the code), defined criteria under which appropriation requests were evaluated, and provided an improved process to confirm and prioritize existing rights and vested claims (predating 1917). In 1945 the State Ground Water Code (Chapter. 90.44 RCW) was passed, extending the appropriation system to ground water. These codes are still in effect, though they have been amended many times and are now administered by Ecology (Ecology 1983).

Very little regard was given to instream flow needs until the 1940s. In 1949, the Legislature declared it to be the policy of the state "...that a flow of water sufficient to support game fish and food fish populations be maintained at all times in the streams of this state." This legislation, codified as RCW 75.20.050 in the State Fisheries Code, provides that the director of Ecology "may refuse to issue any permit to divert water.....if in the opinion of the director of Fisheries or the director of Game, such permit might result in lowering the flow of water in any stream below the flow necessary to adequately support food and game fish populations in the stream." As an alternative to denial of the permit, Ecology has issued numerous permits conditioned with low flow provisions recommended by Game and Fisheries. Under this authority, approximately 250 streams (nearly all very small) have been closed to further appropriation, and low flow provisions have been applied to individual permits on approximately 250 other streams.

The Minimum Water Flows and Levels Act (Chapter 90.22 RCW) was enacted in 1967 to provide a more formal process to protect instream flows. Under this Act, the Department of Ecology shall, when requested by the department of Fisheries or the Game Commission, establish minimum stream flows and lake levels to protect fish, game, birds, or other wildlife resources or recreational or aesthetic values or to preserve water quality. The Act sets forth public hearing procedures for the establishment of minimum flows and lake levels, but does not define criteria for the determination of these flows or levels. Ecology used this authority in 1971 to adopt minimum flows for the Cedar River, a major source of water supply for the Seattle metropolitan area. The Departments of Game and Fisheries recommended that minimum flows be set on many other streams as well.

Additional water allocation authority is provided by the 1967 law establishing the Department of Water Resources. This Act requires the department "To develop and maintain a coordinated and comprehensive state water and water resources related development plan, and adopt such policies as are necessary to insure that the waters of the state are used, conserved and preserved for the best interest of the state." The Act also requires inclusion in the plan of a description of development objectives and recommended means of accomplishment, and allows the department to include in the plan the plans, programs, reports, research and studies of other state agencies (RCW 43.27A.090 (6)).

The Act requires assembly and correlation of information on water supply, power development, irrigation, watersheds, water use, future possibilities of water use and prospective demands for all purposes, and assembly and correlation of state, local and federal laws, regulations, plans, programs and policies affecting water, natural resources, and development and uses thereof (RCW 43.27A.090 (7) and (8)). It also requires cooperation with federal, state, regional, interstate and local public and private agencies in planning for drainage, flood control, use, conservation, allocation and distribution of existing water supplies and development of new projects (RCW 43.27A.090 (9).

The functions of the Department of Water Resources were transferred to the Department of Ecology with its establishment in 1970 (RCW 43.21A.060). The State Ecological Commission was established at the same time to provide review and approval of Ecology's proposed regulations. Although the statutory language creating the department exempted regulations proposed by the former Department of Water Resources from review by the Ecological Commission, in writing the implementing regulations Ecology chose to submit proposed water resource program regulations to Commission review. The commission may prohibit adoption of a regulation if five or more of its seven members disapprove (RCW 43.21A.190). The Pollution Control Hearings Board was also created in 1970 to hear appeals of Ecology's decisions and orders (Chapter 43.21B RCW). (Appeal of the adoption of rules by Ecology is made directly to superior court.)

The Water Resources Act of 1971 (Chapter 90.54 RCW) provides that "Perennial rivers and streams of the state shall be retained with base flows necessary to provide for the preservation of wildlife, fish, scenic, aesthetic and other environmental values, and navigational values." The Act also provides that "Lakes and ponds shall be retained substantially in their natural condition. Withdrawals of water which would conflict (with these flows or levels) shall be authorized only in those situations where it is clear that overriding considerations of the public interest will be served" (RCW 90.54.020 (3)(a)).

The Water Resources Act declares a broad range of out-of-stream and instream water uses to be beneficial, requires that the allocation of water among potential uses and users be based generally on the securing of maximum net benefits to the people of the state, and requires that adequate and safe supplies of water be preserved and protected in potable condition to satisfy human domestic needs (RCW 90.54.020).

The Act directs Ecology to develop and implement a state water resources program by modifying existing regulations and adopting new ones. This may be done in segments (RCW 90.54.040). It requires rule-making to reserve and set aside waters for future beneficial use, and allows Ecology to withdraw waters from appropriation while information is being collected (RCW 90.54.050). The Act requires that Ecology fully inform and involve the public and other

agencies (RCW 90.54.060), periodically report to the legislature (RCW 90.54.070), and to vigorously represent the state's interests before federal and interstate agencies. In addition, it requires compliance with its provisions by all state agencies, local governments and municipal corporations (RCW 90.54.090).

Ecology adopted the Water Resources Management Program regulation in 1976 to provide guidelines for the instream flow and water allocation activities authorized by the Water Resources Act. This regulation establishes sixty-two Water Resource Inventory Areas (WRIAs) as planning units, lists possible basin plan elements, and defines terms (Chapter 173-500 WAC).

Ecology is vested with exclusive authority under state law to establish instream flows and levels on state waters. In establishing such flows, Ecology is required to consult with and carefully consider the recommendations of the departments of Fisheries and Agriculture, the Game Commission, the State Energy Office, and affected Indian tribes. These and other state agencies are not precluded from presenting views on instream flow needs at public hearings or from participating in proceedings of other agencies (federal or state) to present views on instream flow needs (RCW 90.03.247). (The Federal Energy Regulatory Commission sets operational minimum flows for many hydropower projects it licenses.) The establishment by administrative rule of reservations of water for out-of-stream use or instream flows for instream use constitute appropriations of water with priority dates as of the effective date of adoption (RCW 90.03.247).

Accomplishments

Under the authorities discussed above, Ecology has established instream flows on 172 major streams or stream reaches of the state, and has closed over 300 streams and lakes to further consumptive appropriation. Ecology has also adopted rules allocating or reserving water for out-of-stream uses for a number of areas in the state. These actions are illustrated in the Instream Resources Protection Study Report, Figure 2, Appendix II. Ecology began development of basin plan regulations in 1974. These programs addressed instream water needs and analyzed the level of existing demand to define the quantity of water available for further appropriation. Between 1974 and '78, Ecology adopted five basin management plans: the Little Spokane (Ch. 173-555 WAC), Colville (Ch. 173-559 WAC), Okanogan (Ch. 173-549 WAC), Methow (Ch. 173-548 WAC) and Chehalis (Ch. 173-522 WAC) Water Resource Inventory Areas. In addition, basin plans without instream flows were adopted for the Walla Walla (Ch. 173-532 WAC) and John Day/McNary Pools (Ch. 173-531A WAC). Instream flows and water allocation policies for the Snake River main stem were developed in 1974 and for the main stem of the Columbia River in 1980 (revised 1982) in the Columbia River Instream Resources Protection Program (Ch. 173-563 WAC).

To meet changing priorities, in 1979 Ecology began development of modified basin management programs. This new effort, the Washington Instream Resources Protection Program (WIRPP), established a high priority for protecting instream resources through establishment of instream flows. The initial focus of the program was on western Washington, where relatively little planning had been accomplished previously.

Ecology published an overview of the program and an Environmental Impact Statement in June 1979, and work then began on individual basin instream programs. These instream programs focus principally on the development and adoption of regulations intended to preserve and protect instream values. These regulations include protective measures such as instream flows and stream closures. These programs are generally narrower in focus than the basin management plans previously developed in that they do not attempt to address the allocation of remaining water in excess of instream flows.

Since 1979, instream resource protection programs have been completed for eleven inventory areas including the Nooksack (Ch. 173-501 WAC), Snohomish (Ch. 173-507 WAC), Cedar-Sammamish (Ch. 173-508 WAC), Green-Duwamish (Ch. 173-509 WAC), Puyallup-White (Ch. 173-510 WAC), Nisqually (Ch. 173-511 WAC), Chambers-Clover (Ch.. 173-512 WAC), Deschutes (Ch. 173-513 WAC), Kennedy-Goldsborough (Ch. 173-514 WAC), Kitsap (Ch. 173-515 WAC), and Wenatchee (Ch. 173-545 WAC). Figure 1 is a map illustrating areas of the state where instream flows and other instream protection measures have been adopted.

Instream flows protect streams only from consumptive appropriations approved after adoption of the flows. When the flow of the stream falls below a specified level, water rights provisioned to those flows must cease diversion until the instream flow is met or exceeded (RCW 90.22.030 and 90.54.900). When a stream is closed to further consumptive appropriation, no further rights are issued for diversion during the closure period. Water rights issued prior to the establishment of these measures cannot, under existing law, be affected. Additional details regarding Ecology's current program can be found in the description of the no action (status quo) alternative and in Appendix I.

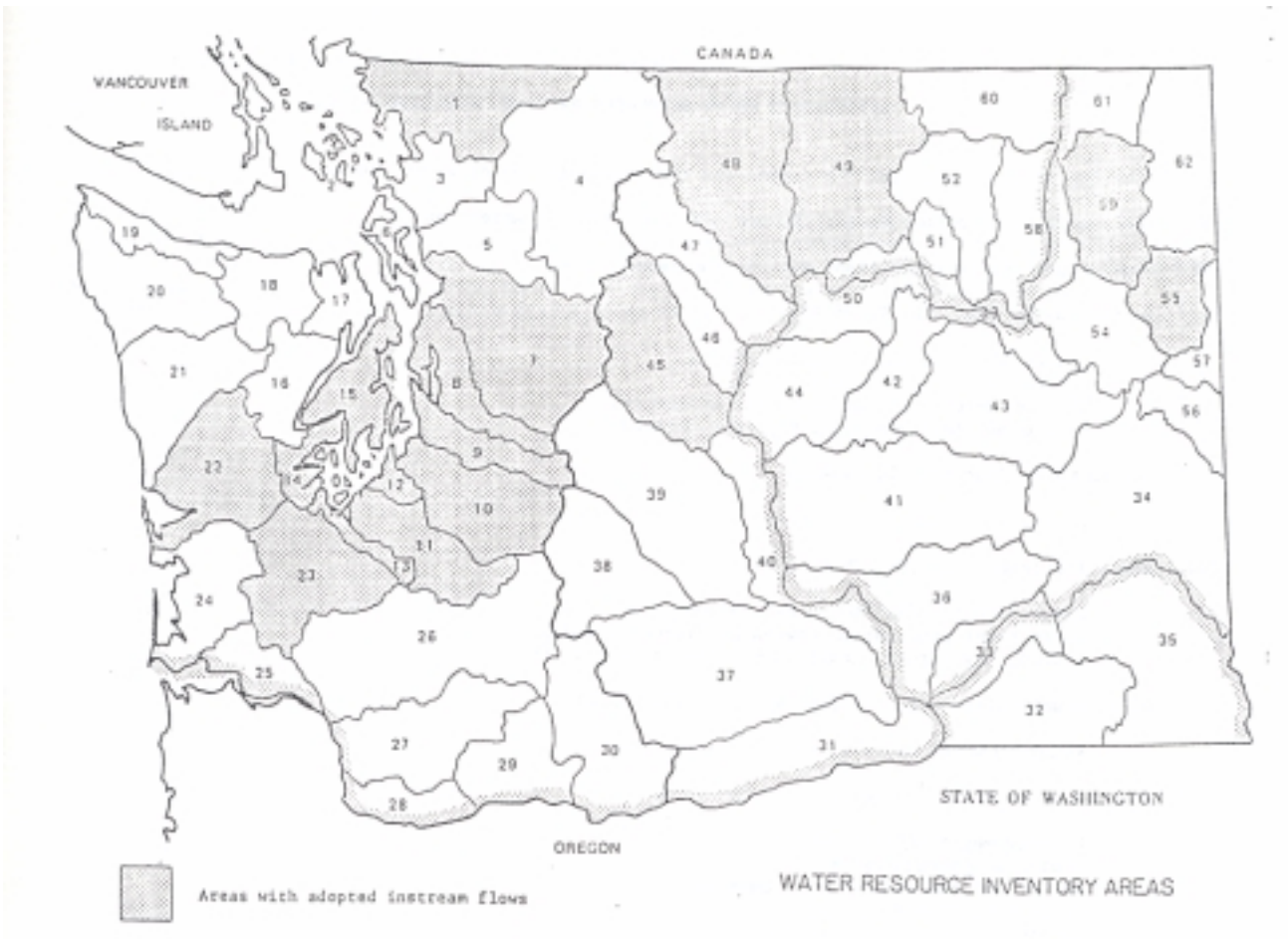

Figure 1

Areas With Adopted Instream Flows in Washington

In late 1985, Ecology's Water Resources Program initiated a comprehensive review of its surface water resources planning program. There had been no significant changes in the program since 1979 when Ecology issued a Program Overview and Environmental Impact Statement for the Western Washington Instream Resources Protection Program. Since then, the department's emphasis has been on establishing instream flows on individual basins.

In recent years instream flow statutes, policies, and procedures have been scrutinized and have become a continuing source of controversy, both legislatively and administratively, and occasionally in the courts as well. Many people believe that existing statutes and regulations do not adequately define key water resource terms and concepts embodied in the law. Much of the ongoing conflict is the result of differing interpretations of statutory language.

In September, 1985, the State Ecological Commission advised against adoption of Ecology's proposed instream flow regulations for the Skokomish-Dosewallips Water Resource Inventory Area (WRIA 16), because its members believed the regulations would not adequately protect pristine streams in the east Olympic Peninsula area. In response to public concerns, the Commission sponsored a public instream flow workshop in November, 1985. Workshop participants and Ecology staff identified 37 major issues that had caused difficulties among interest groups and the agencies involved in setting instream flows. Ecology Director Andrea B. Riniker committed the agency to address these issues through a comprehensive administrative review of the instream flow and water allocation program. Following the workshop, Ecology developed a work plan, and in February, 1986, the department appointed a 20 member Instream Flow and Water Allocation Advisory Committee.

The Advisory Committee was formed by the Department of Ecology to assist in the sorting and evaluation of the many difficult instream flow and water allocation issues currently facing the department. It was also intended that it make recommendations to Ecology on how to best design and implement the instream flow and water allocation program.

Over a period of eight months, the Advisory Committee held five meetings during which they discussed instream flow and water allocation issues. These meetings were open to the public, and notices were sent to those persons and organizations on Ecology's program review mailing list. Unfortunately, the committee was unable to fully agree to a comprehensive solution to all issues. The committee did, however, discuss a number of promising potential solutions that Ecology was asked to evaluate further.

In addition, the five committee meetings provided an unprecedented forum for the expression of views on these issues. This process may lead to a better understanding of the needs of the widely varied interests that were represented, and could help defuse future conflicts. The committee developed a set of recommendations for Ecology's consideration to improve the Instream Flow and Water Allocation Program and to resolve the ongoing controversy surrounding the program to the extent possible. The complete advisory committee report which includes the committees' observations and recommendations is included in Appendix III. The committee report is the basis for the fourth alternative evaluated in this EIS.

Ecology's water resources staff began scoping a programmatic Environmental Impact Statement (EIS) for the program review as the Advisory Committee's discussions commenced. Ecology's Water Resource Program staff consulted with the Advisory Committee regarding the scope of the proposed program review EIS. Staff indicated that Advisory Committee recommendations would be incorporated into the EIS alternatives.

Following is a summarized chronology of Washington's water resources program:

Figure 2

WASHINGTON'S WATER RESOURCES PROGRAM CHRONOLOGY

1863--Territorial law recognizes the common law riparian doctrine of water rights

1873--Territorial law recognizes the appropriation doctrine of water law

1891--Legislature enacts water right notice requirement

1917--Surface Water Code (Ch. 90.03 RCW)

- Established the water rights process
- Defined appropriation procedures
- Defined water right adjudication procedures
- Office of State Hydraulic Engineer created

1945--Ground Water Code (Ch. 90.44 RCW)

- Extended the appropriation system to ground water

1949--State Fisheries Code (Ch. 75.20.050)

- Water flow for fish to be maintained
- Water right application review by Fisheries and Game
- Ecology may refuse permit to maintain flows for fish

1967--Water Rights Claims Registration Act (Ch. 90.14 RCW)

- Required water users to submit claimed uses

1969--Minimum Water Flows and Levels Act (Ch. 90.22 RCW)

- Ecology may establish minimum flows
- Protects instream values
- WDF or WDG may request minimum flows
- Flows established by regulations
- Notice and Hearing(s) required
- Future rights subject to flows
- Existing rights not affected

1971--Water Resources Act of 1971 (Ch. 90.54 RCW)

- Instream uses are beneficial
- Streams retained with base flows
- Preservation of instream values with exception for overriding considerations of the public interest
- Allocation among potential uses based on maximum net benefits
- Instream flows and allocations established by regulations
- Hearings required
- Existing rights not affected

1976--Adoption of the Water Resources Management Program regulations (Ch. 173-500 WAC)

--Beginning of comprehensive basin management programs

1979--Addition of RCW 90.03.345 re: minimum flows are appropriations with priority dates.

--Publication of EIS/Program Overview for the Western Washington Instream Resources Protection Program
--Beginning of instream resources protection programs

1980--Addition of RCW 90.03.247 re: Ecology's authority to establish minimum flows is exclusive

1985--Initiation of Instream Flow and Water Allocation Program Review.

- Assembly of the Instream Flow and Water Allocation Advisory Committee

1986--Scoping of Program Review EIS

--Completion of Advisory Committee process.

- Five advisory committee meetings
- Final committee report sent to director of Ecology

1987--Publication of Instream Flow and Water Allocation Program Draft EIS

Issue Treatment

The 37 issues raised at the 1985 Instream Flow workshop have been discussed in this document. Those issues considered to have potential environmental impacts have been addressed in the EIS itself. Those deemed to not have potential adverse environmental impacts have been described only in the Issue Analysis Papers (Appendix II). Issues requiring further policy development will be addressed during the formulation of regulations or in supplemental EISs as needed.

CHAPTER 2 - ALTERNATIVES

Introduction

Five alternatives are analyzed in this environmental impact statement. Each of these alternatives represents a distinct approach to planning for instream flows and water allocations. It is intended that these alternatives encompass the range of "reasonable" alternatives as required by the State Environmental Policy Act regulations (WAC 197-11-440).

Each alternative consists of elements drawn from the Issue Analysis Papers (Appendix I). These analyses contain specific potential issue solutions identified during the course of the instream flow and water allocation program review. The five alternatives presented here address the major issues that were identified in the program review. Three major issues addressed in each alternative are 1) the instream flow and water allocation process, 2) instream flow standards, and 3) maximum net benefits. In each case compatible elements were incorporated within each alternative.

Each alternative has a different emphasis as follows:

Alternative 1: No Action (Status Quo)

Alternative 2: Out-of-Stream Use Emphasis

Alternative 3: Instream Protection Emphasis

Alternative 4: Needs Assessment and Allocation

Alternative 5: Coordinated Resource Planning

These alternatives do not represent all possible combinations of program elements. Also, no preferred alternative is selected in this draft EIS. Ecology believes it important to receive public comments on these alternatives before selecting a preferred approach. It is Ecology's intention to select a preferred alternative in the final EIS. The preferred alternative may consist of a combination of elements from several or all of the five alternatives presented herein.

It is important to note that in the identification of these alternatives (and in the Issue Analysis Papers, Appendix I), existing laws, regulations, policies and procedures were not considered to be a constraint on potential program elements. The assumption is that the law could be changed by working with the State legislature if necessary to implement an improved instream flow and water allocation program. Each alternative description that follows includes a brief discussion of actions that in Ecology's view would be required to implement the alternative.

For the convenience of the reader, each alternative description begins with a short objective statement and a summary of the major elements that comprise it. Reviewers desiring more detail are encouraged to read the entire alternative description.

ALTERNATIVE 1: NO ACTION (STATUS QUO)

Objective

Maintain Ecology's current policies and programs which focus on the preservation of instream flows intended to protect at least 90 percent of the fish habitat available at the optimum flow for fish through instream flow provisions and stream closures, and to provide a sustaining flow for other instream values.

Summary

This alternative would continue Ecology's current policies and procedures for instream flows and water allocation. The program would focus on establishment of new instream flow regulations and revision of existing instream flow rules. Planning would continue to be done on the geographic basis of the sixty-two Water Resource Inventory Areas (WRIAs).

Little or no consideration would be given to assessing or satisfying the needs of future out-of-stream uses; nor would the effect on these needs be considered in the process of establishing instream flows. Exemptions for several categories of

small consumptive uses could be considered. Instream flow waivers would be possible but no criteria would be defined. They would continue to considered on a case-by-case basis.
Water conservation would continue to consist of the current relatively conservative water duties, and grants and loans to water supply entities for rehabilitation of water systems. Water right transfers would be allowed subject to existing rights and instream flows. Maximum net benefits criteria would continue to be undefined and considered subjectively on a case-by-case basis.

No changes in existing laws would be required to implement this alternative, but updating of existing regulations would be advisable.

Instream Flow and Water Allocation Process

Instream flows would be established in Instream Resources Protection Programs by administrative rule for priority WRIAs. (WRIA priorities would be determined by Ecology in consultation with other agencies.) As required by statute, Ecology would consult with and carefully consider the recommendations of the Departments of Fisheries, Game, and Agriculture and the State Energy Office, as well as affected Indian tribes prior to proposing instream flows for establishment. Public meetings would be held as necessary during program development. The standard state rule-making process involving public notice, hearings, written comments, documentation, and an adoption proceeding would be followed to establish instream flows as administrative rules. Existing basin and instream programs would be reviewed when deemed necessary to incorporate new information.

These programs would focus on the instream flow needs of fish (especially anadromous fish) as the primary criterion. Other instream uses would be considered secondarily. Where fish are not a concern, the most important non-fish instream value would receive primary consideration. Some streams could be closed to further consumptive appropriation based on lack of available water, anticipated impacts on existing rights or instream values, or to protect the public interest.

IFIM studies would be done for the more important fish-producing streams that are likely to be subject to new water right requests. Shortcut modeling methods or the toe-width method would be used on lower priority streams. Hydrographs of streams would be developed using gaged or correlated streamflow data as appropriate.

Non-fish instream values would be documented to the extent possible, but no attempt would be made to use objective methods (if any are available) to determine instream flow needs of these uses. Ecology would seek the recommendations of experts on the expected instream flow needs for recreation, aesthetics, water quality, wildlife and navigation. Adjustments could be made to proposed fishery-based instream flows to accommodate these other needs. Existing water use might be estimated if this information would be useful for determining appropriate instream flow levels or stream closures. A limited effort would be made to improve flow conditions on a few selected heavily appropriated streams.

No special attempt would be made to maximize the efficiency of new or existing water uses. Current standard water duties that assume a reasonable amount of conveyance loss would continue to be used for new water rights and in general adjudications of existing water rights. No attempt would be made to locate and regulate inefficient water use systems except on a complaint basis. No attempt would be made to change current institutional constraints limiting water conservation. The Departments of Social and Health Services and Ecology would continue their loan and grant programs for system development and improvements for municipal and agricultural water supply systems. These programs result in improved water use efficiency by updating and rehabilitating inefficient facilities.

Water right transfers would be allowed, but only if existing rights and instream flows (even if junior to the transferred right), were unaffected. No register for transferable rights or extraordinary assistance to potential transferees would be provided. Transfers from out-of-stream to instream use would not be permitted.

The need for water sources for future out-of-stream uses would not be considered in establishing instream flows. No attempt would be made to balance instream and out-of-stream use. Instream flows would be determined and proposed for adoption without regard to the effect they may have on the availability of water for future out-of-stream uses.

Categorical exemptions to the instream flows and closures would be defined in each basin regulation. Normally, these would be limited to riparian (non-feedlot) stockwatering and single domestic use. Two-tiered instream flows involving normal and critical instream flows might be established on some streams needed for municipal water supply

development. In addition, under the instream flow waiver provision of RCW 90.54.020 (3)(a), Ecology could invoke a temporary or permanent waiver if it determined that "overriding considerations of the public interest" would be served.

Water right applications for water from a stream under investigation would be withheld from action until after adoption of regulations if received within six months of the expected date of adoption. Instream flows for water right applications for water from streams not yet addressed by a regulation would be determined on a case by case basis.

Enforcement of instream flow regulations would be undertaken primarily on a complaint basis. Unauthorized diversion would also be enforced against on a complaint basis. Voluntary compliance would be sought before issuing enforcement orders.

Instream Flow Level

Instream flows could be set at the optimum level for fish where the optimum flow is less than or equal to the 50 percent exceedance flow according to Ecology's hydrographs. Where the optimum flow exceeds this level, the proposed instream flow would be capped by the 50 percent exceedance flow. Instream flows would be established with the objective of protecting at least 90 percent of the habitat available at the optimum flow for key fish species and life-stages. Closure of the stream to further consumptive appropriation would be considered if the 50 percent exceedance flow cap would not protect 90 percent of the optimum flow habitat for a key species/life-stage.

Maximum Net Benefits

No criteria, methods or procedures would exist in regulations or otherwise for determining "maximum net benefits". Ecology would continue on a case by case basis to weigh available information to reach a conclusive determination of maximum net benefits in its water allocation and appropriation processes. Information upon which to make this determination could be required from applicants for reservations and larger appropriations.

Establishment by rule of "minimum" or "base" flows, as determined by Ecology, or the establishment of a closure for the express purpose of protecting instream values, would not require a determination of maximum net benefits. The allocation by regulation of any flows in excess of Ecology's minimum or base flows, including instream flows above the minimum or base level, would be subject to a maximum net benefits determination. Only a few very large appropriations would be subjected to a maximum net benefits determination on a case by case basis.

Implementation

No changes in existing laws or regulations would be required, but changes in the existing planning regulation (Chapter 173-500 WAC) to clarify and codify Ecology's interpretation of the laws would be advisable for instream flow criteria, stream closures, instream flow emphasis, exemptions, waivers, and the inapplicability of maximum net benefits to instream flows. Definitions by rule of a number of key terms in the statutes would be needed (i.e.: base flow, minimum flow, protection, preservation, maintenance, overriding considerations of the public interest, and maximum net benefits).

ALTERNATIVE 2: OUT-OF-STREAM USE EMPHASIS

Objective

Maximize the availability of secure supplies of water for future out-of-stream use while maintaining survival levels of instream flows for fish and other instream values.

Summary

This alternative would alter the instream flow and water allocation program significantly so that the emphasis of the program would be on assuring the availability of secure supplies of water for future out-of-stream use. Instream flows would be set at low "survival" levels intended to protect fish and other instream values from extinction. Higher instream flows would not be considered.

Riparian stockwatering (except feedlots) would be exempt from the instream flows, and stream flows for this use would be regarded as a purpose of establishing instream flows. Instream flows could be waived temporarily or permanently if

necessary to provide a secure supply of water to a high priority out-of-stream use of water. Out-of-stream water allocation preferences would be established by regulation according to local desires.

Existing water duties would be used to determine allocation and appropriation quantities. Any water conservation undertaken would be the financial obligation of the state, and no regulatory actions would be pursued to achieve conservation. A maximum net benefits test for water allocations made by administrative rule (but not for individual appropriations) would be implemented with this objective in mind.

Extensive changes in existing water laws and agency regulations would be required to implement this alternative.

Instream Flow and Water Allocation Process

Instream flows, use preferences and general water allocations (by use) would be established in basin plans by administrative rule of the Department of Ecology. The existing sixty-two WRIAs would serve as the basic geographic planning units. Ecology would consult with and receive recommendations from the four statutory consultation agencies (Fisheries, Game, Agriculture and Energy) and affected tribes. In addition, Ecology would also seek recommendations from federal, state and local development agencies and utilities. Public meetings would be held to determine local water use preferences and needs.

The standard state rule-making process involving public notice, hearings, written comments, documentation, and an adoption proceeding would be followed to establish instream flows, use preferences, closures, and allocations as administrative rules. Existing basin and instream flow program regulations would be reviewed and updated in accordance with the objectives of this alternative, including the reduction of instream flows from current levels to "survival flows". Water rights already subject to instream flows would be revised to use the new instream flows assuming they are lower than the existing flows.

These programs would focus on the assessment and satisfaction of needs for future out-of-stream uses. IFIM studies would not be performed by the Department of Ecology (other agencies might choose to do so to support their recommendations). Survival level flows for all instream uses would be determined using professional judgement after considering stream hydrology and available instream use information.

Ecology would determine the existing level of water use in order to determine the quantity of water available for appropriation. No attempt would be made to improve flow conditions on heavily appropriated streams. Riparian stockwater (except feedlots) would be exempted from instream flows. Specific allocations would be made where appropriate for riparian stock drinking water. Single domestic supply could be exempted on a case by case basis.

An applicant for a water right could petition Ecology for a permanent instream flow waiver at the time the right was applied for. Anyone holding an existing water right could also petition the department for a temporary instream flow waiver. The applicant would have the burden to show that a waiver was necessary to protect the public interest and to prevent undue hardship. Ecology could grant a waiver upon a finding of "overriding considerations of the public interest".

Water conservation would be limited to the use of existing water duties in the issuance of new water rights. Similar duties for vested rights could be determined in adjudications. Ecology would attempt to avoid undue financial burden on water right holders. Water conservation would be voluntary and would be the financial obligation of the state. If right holders effected efficiency improvements at their own expense, they would be permitted to sell the saved water or transfer it to other lands.

Ecology would establish a register of existing water rights available for transfer. Rights could be transferred without regard to effects on instream flows, but transfers would be subject to protection of existing out-of-stream appropriations. Ecology would allow seasonal transfers within the same watershed, subject only to existing out-of-stream rights. Transfers from out-of-stream to instream use would not be allowed. No attempt would be made to improve flow conditions on heavily appropriated streams.

Water right applications from an area under investigation filed prior to the effective date of adoption of a regulation would not be subject to the regulation. Water right applications for areas not yet addressed by a regulation would be subject to review by Fisheries and Game. Survival flows could be attached to individual water rights on a case by case basis.

Enforcement would be undertaken on a complaint basis. No systematic enforcement would be carried out.

Instream Flow Level

Instream flows would be set as low as possible, but at levels that would assure the continued survival of self-perpetuating populations of fish and wildlife, and the continued subsistence of other instream values. Ecology would not perform IFIM or other fishery studies, or studies to determine instream flow needs of non-fish instream values, although such studies performed by other agencies to support survival flow recommendations could be considered by Ecology. Unless other information was presented by instream flow interests, instream flows would be set using an appropriate low flow parameter, such as the "7 day/10 year" low flow, the lowest mean monthly flow of record or the 98 percent exceedance flow. Streams could be closed to appropriation to protect existing water rights, or if necessary to protect survival level instream flows.

Maximum Net Benefits

Ecology would establish criteria, methods and procedures for assessing maximum net benefits of water allocations made by administrative rule. Maximum net benefits would not be assessed for individual water rights. (Water rights would be issued on a first come, first served basis, but would be subject to any general allocations and use preferences in effect by administrative rule.)

The maximum net benefits test would be defined so as to determine, on a stream by stream basis, the use or mix of uses that would result in maximization of economic benefits from development of new out-of-stream appropriations of water. The test would be used along with local preferences to determine the out-of-stream allocations of water and preferences of uses that would be adopted as administrative rules. Survival level instream flows would not be subject to the maximum net benefits test. Instream flows higher than the survival level would not be considered for establishment.

Implementation

Significant changes in existing laws would be required. Legislation amending existing instream flow laws (Chapters 90.54 and 90.22 RCW and RCW 75.20.050) would be necessary to adopt survival flows as a statewide instream flow standard. Generally, the emphasis of existing laws favoring the preservation of instream values would need to be altered. Limitations on transfers of rights to protect instream flows would need to be eliminated.

Ecology would need to update the existing planning regulation (Chapter 173-500 WAC) and other existing regulations, including basin plans and instream programs, in order to be consistent with the objective of this alternative. New regulations would be needed for maximum net benefits, exemptions, waivers, stream closure and revising existing water rights with new lower instream flows. The State Water Code (Chapter 90.03 RCW) would need revision to allow the sale of conserved water by the conserver.

ALTERNATIVE 3: INSTREAM PROTECTION EMPHASIS

Objective

Maximize preservation and enhancement of instream resources.

Summary

This alternative would emphasize protection of instream resources as the focus of the instream flow and water allocation program. This would be achieved by adoption of optimum instream flows as the standard of protection and establishment of appropriate stream closures. Allocations of water for out-of-stream use above optimum flows would be established by regulation.

Depending on local and regional demands, instream flow levels could vary from the optimum level only after extensive consultation with and the consent of affected tribes and state fish and wildlife agencies, a thorough examination of alternatives, and a public hearing in the affected area. Instream flows could be waived only on a temporary basis in emergency situations. No categorical exemptions from the instream flows would be allowed.

Conservation would be emphasized for out-of-stream uses in the approval of new water rights and changes in use, water right transfers and other Ecology programs. Ecology would make a concerted effort to improve instream flow conditions on heavily appropriated streams.

Maximum net benefits criteria would be established and would include environmental factors. Optimum instream flows would be exempt from maximum net benefits testing. Other allocations above optimum flows would be subject to this test.

Existing water laws and regulations would need to be amended to implement this alternative.

Instream Flow and Water Allocation Process

Instream flows and other allocations would be established in basin plans by administrative rule. Planning would be based geographically on the current WRIA system. The established administrative procedures for rule-making would be followed, including public notice, meetings, hearings and adoptions.

Optimum flow recommendations for instream resources would be obtained from state fish, wildlife and recreation agencies and affected tribes. This approach to instream flows would attempt to fully satisfy instream flow needs. Allocations of blocks of water for out-of-stream use above optimum flows would be made by rule-making. Existing basin and instream programs would be updated according to the standards of this alternative. Streams could be closed seasonally by administrative rule due to a lack of water availability, to protect optimum flows or senior rights, or to otherwise protect the public interest.

IFIM studies would be performed on as many streams as deemed feasible. Shorter versions of IFIM involving less field work would be researched and used for lower priority streams. Non-fish instream flow needs would be assessed and considered equally with fish flow needs.

Ecology would consider the current level of water use when establishing instream flows and closures. Future out-of-stream demands would not be considered in setting instream flows. Attempts would be made to improve instream flow conditions on overappropriated streams. An active relinquishment program for unused and under-used water rights would be instituted. Purchase or condemnation of existing out-of-stream water rights and transfer to instream flows would be encouraged. If this proved insufficient in restoring instream flows, use of the public trust doctrine to return water rights to the public domain would be considered.

Conservation would be an integral part of the water allocation and appropriation processes. New water rights would be required to conform to predetermined efficiency criteria. A statewide policy would be developed and conservation pursued where feasible over the long term or necessary to protect instream flows in the near term. A system for phasing in conservation for existing rights would also be developed and put in effect. Other Ecology programs such as water rights adjudication, relinquishment, transfers, and irrigation system rehabilitation grants and loans would also incorporate conservation objectives.

No categorical exemptions from instream flows and closures would be allowed. Exceptions to optimum flows could be made under certain circumstances. For example, if a municipal drinking water supplier had examined demand and available supplies, applied the requisite conservation measures, fully implemented demand control measures, explored all alternative sources of water, and developed a long range plan for water supply, and it appeared that an additional surface water diversion would still be needed, an exception could be granted. This would be subject to the full agreement of Ecology, affected tribes, and state fish and wildlife agencies. A full review of the information provided by the applicant and discussion of trade-offs and mitigation would occur before less than optimum flows would be accepted. A public hearing would be held in the affected area to determine public desires in regard to such an exception.

An interim procedure for water rights would be adopted to minimize degradation of optimum flows during the planning and updating stages. Any water right applications received following the initiation of a new instream program or update of an existing program would be withheld from action until after adoption of the regulations. For water rights from streams without an adopted instream flow and where no program is in progress, instream flows would be placed on new water right permits on a case by case basis. Ecology would accept and utilize the optimum flow recommendations of the departments of Game, Fisheries, State Parks and affected tribes as conditions on these rights. Ecology would develop a public notification system for water right applications to facilitate greater public review and comment on out-of-stream use proposals.

Enforcement of instream flows and regulation of illegal diversions would receive greater emphasis. The department would attempt to have the statutory limit on penalties increased. Patently spurious water rights claims would also be regulated.

Instream Flow Level

Instream flows would be set at an optimum level for anadromous and resident fish and other instream resources based on recommendations of Game, Fisheries, State Parks and affected tribes. Fish flow needs would be based on IFIM or similar studies. Objective methods would be researched and implemented for other instream uses. Optimum flows would be determined from these studies using a weighting system for optimization among various instream uses.

Some streams could be preserved in pristine condition and protected from development by stream closures. This could occur in conjunction with the Northwest Power Planning Council's protected areas status, the national or state wild and scenic rivers programs, or in accordance with recommendations of Game, Fisheries, State Parks and affected tribes.

Maximum Net Benefits

Ecology would by rule establish criteria and a procedure for assessing maximum net benefits of new water allocations and appropriations in excess of the optimum flow levels. These criteria would incorporate consideration of environmental factors including intangible values. Instream flows set at optimum levels and closures as described above would not be subject to a maximum net benefits test.

Implementation

Existing water laws would need to be changed to establish a statewide optimum instream flow standard. The state Department of Agriculture and the State Energy Office would be removed from the law as required instream flow consultation agencies. Revision of the planning regulation (Chapter 173-500 WAC) would be needed to establish this approach. Criteria and procedures would need to be established by rule for maximum net benefits and for improving heavily appropriated stream conditions to allow out-of-stream to instream use transfers, and to establish a conservation and efficiency program. Regulations would also be needed to authorize stream closures to preserve optimum flow conditions.

Existing instream flow regulations would need to be updated to the new optimum flow standard. Ecology would develop a public notification system for water right applications. Existing laws would need amendment to allow more active enforcement against instream flow violations, illegal diversions, and spurious claims including stiffer penalties. The Minimum Water Flows and Levels Act would need to be amended to repeal the section establishing riparian stockwatering as a purpose of minimum flows (RCW 90.03.040).

ALTERNATIVE 4: NEEDS ASSESSMENT AND ALLOCATION

Objective

Provide for a balanced assessment of needs for water among instream and out-of-stream uses within a region, and allocate water based on that assessment.

Summary

This alternative is based generally on ideas discussed by the Instream Flow and Water Allocation Advisory Committee assembled by Ecology during 1986. Some but not all of the elements included herein were consensus recommendations of that committee. Appendix III is the final report of the advisory committee.

This approach would alter Ecology's current instream flow and water allocation program significantly in that the program would consider instream and out-of-stream use in a more balanced manner. Ecology would broaden the scope of its planning by using a hierarchical, three-tiered planning approach and by addressing the needs of all anticipated future water uses. Plans would be implemented by adoption of regulations through standard rule-making procedures including extensive public involvement and improved coordination with all water interests.

Establishment of instream flows would remain an important component of water resource planning. Instream flow levels could vary from "survival" to optimum flow levels. Some streams would be set aside for preservation and others

would be favored for out-of-stream use. No categorical exemptions would be allowed from instream flows, but temporary waivers for the protection of public health could be allowed.

Ecology would develop and implement a statewide conservation program under this alternative. Conservation would be incorporated in regional and basin plans. Water right transfers that would improve water use efficiency and decrease dependency on surface water would be encouraged.

Ecology would develop and implement maximum net benefits criteria, methods and procedures for water allocations and appropriations. The maximum net benefits test would include environmental as well as socioeconomic factors. "Survival" level instream flows would not be subject to the maximum net benefits test, but higher levels of instream flow would be.

Changes in existing laws and regulations would be required to implement this alternative.

Instream Flow and Water Allocation Process

Ecology would broaden the scope of its planning in several important ways beyond the current emphasis on instream flows. Ecology would use a hierarchical, three-tiered planning process that would involve statewide, regional and basin planning levels, and would attempt to address the needs of all future water uses. Lower level plans in the hierarchy would support and elaborate the policies and guidelines established at the higher, more general levels.

Statewide planning would establish the framework of policies, procedures, methods, definitions, priorities, and criteria to be used at the regional and local planning levels. Included would be guidelines for instream flows and other allocations and stream closures, interim procedures for water rights, criteria and methods for maximum net benefits and instream flow waivers, water conservation, public involvement, interagency coordination, standards for data used in planning, and definitions of key terms in water statutes. Regions, consisting of logical groups of WRIAs, would be specified by administrative rule, and would be prioritized for the sequencing of plan development for these regions.

Regional plans would be developed before basin-specific plans were begun. All potential water uses would be included in regional assessments of needs. Regional studies would evaluate the hydrology and existing utilization of each stream, assemble relevant data, assess the need for water for various water uses in region, set basin planning priorities, and identify additional studies needed to develop and implement basin plans. Regional plans would evaluate and establish regional use preferences for each stream located in a region. Use preferences for the streams in a region would be discussed among the major water interests through regional policy and technical committees. Some streams could be recommended for preservation, whereas others could be recommended for out-of-stream use.

Basin plans using the existing system of WRIAs would follow the completion of a regional plan for an area. Instream flows would be established for each stream, and would be tied to the use preferences established at the regional planning level. Closures could be used to protect existing rights and instream flows or to protect selected streams (as identified in regional plans) in pristine condition. IFIM and other technical studies would be carried out at this level. Water would be allocated to future out-of-stream use in basin plan regulations or by water supply reservations. No categorical exemptions would be allowed from the instream flows. Ecology would develop strict criteria for instream flow waivers (temporary only) based on preservation of public health during water emergencies.

Ecology would consult with the departments of Fisheries, Game and Agriculture, the State Parks and Recreation Commission, the State Energy Office and affected Indian tribes concerning instream flow needs. Improved coordination would be sought with all water interests during plan development. Ecology would attempt to take into account the resource plans of other interests. Existing basin plans and instream programs would be revised and incorporated into regional and basin plans whenever possible.

Data collection and analysis would be improved to provide a better foundation for regional and basin planning. IFIM studies would be performed for high priority streams. Less expensive and faster methods would be researched and used for lower priority streams. Ecology would improve its methods for assessment of stream hydrology and non-fish instream flow needs and would develop better techniques for estimating the existing level of water use and the potential demand of existing rights on streams. No exemptions would be allowed from instream flow requirements. Criteria and procedures would be developed for temporary waivers from instream flows during health emergencies.

A water conservation and efficiency program would be developed and incorporated in regional and basin plans, and in the water appropriation program of Ecology. Mandatory conservation standards would be used for new allocations and

appropriations. Improved efficiency for existing rights would be sought by establishing incentives to conserve. Voluntary efficiency improvements for existing rights would be preferred over a regulatory approach.

Purchase of existing rights and transfers of rights would be encouraged subject to the protection of other existing rights and instream flows. Improvements in flow conditions of heavily appropriated streams would be sought and transfers of out-of-stream rights to instream rights would be permitted if consistent with basin and regional plans.

Any water right application filed following the initiation of a regional planning effort would be withheld from action until after adoption of a regional plan and instream flows. For water rights from streams without an adopted instream flow and where no regional or basin program is in progress, instream flows would be placed on the rights on a case by case basis following consultation with Game, Fisheries, State Parks and affected tribes. Ecology would develop a public notification system for water right applications to facilitate more extensive public review and comment on out-of-stream use proposals.

Stronger enforcement to protect instream flows, to protect existing rights, and to stop unauthorized use would be implemented.

Instream Flow Level

Instream flows would be set in basin plans at variable levels ranging from optimum to "survival" levels depending on the value of each stream for instream resources and the regional determination of the preferred use of each stream (discussed above). Instream flows would be based on studies of the needs of fish and other instream resources, and the recommendations of Game, Fisheries, State Parks and affected tribes. A weighting system would be developed for optimization of instream flows among instream uses based on regional use preferences. Stream closures would be used on selected streams to retain them in pristine condition (or their current condition) or to protect existing rights.

Maximum Net Benefits

Maximum net benefits criteria, methods and procedures would be developed and specified by administrative rule for water allocations and larger appropriations. The maximum net benefits test would include environmental as well as socioeconomic factors, and would incorporate equal consideration of intangible as well as tangible costs and benefits. Establishment of "survival" level instream flows would not be subject to the maximum net benefits test, but adoption of higher levels of instream flow would be.

Implementation

Laws governing water right transfers may require amendment to facilitate transfer from out-of-stream to instream use. The State Parks and Recreation Commission could be added to the laws as a required consultation agency for instream flows.

The three-tiered planning process and varying instream flow standards could be implemented without any changes in laws. Changes would be needed in the existing statewide planning regulation (Chapter 173-500 WAC) to establish the regional and basin planning framework, instream flow criteria and methods, criteria for closures, instream flow waiver procedures, processes for public involvement and interagency coordination, and definitions of terms. New regulations would be needed governing water conservation and maximum net benefits. Existing basin plans and instream programs would be reviewed by inclusion in new regional assessments. Ecology would develop a public notification system for water right applications.

ALTERNATIVE 5: COORDINATED RESOURCE PLANNING

Objective

Plan for and manage water in a manner that is consistent with the written plans and policies and the actual management of instream resources by those agencies with primary responsibility for fish, wildlife, recreation, scenic and aesthetic, water quality, navigation and other environmental values.

Summary

The central focus of this alternative is greater coordination and interdependence between Ecology's water resource planning with other ongoing resource planning and management, particularly for fish and wildlife and other instream values. Several high priority planning regions could be identified for the development of regional water assessments, but the basic planning unit would continue to be the WRIAs.

Public involvement and interagency coordination would be improved. The data base for instream flow and water allocation decisions would also be improved. Exemptions from instream flows could be allowed on a case by case basis for single domestic and riparian stock uses depending on the size of the stream and the existing level of use. Criteria would be developed for instream flow waivers.

Water allocations and appropriations above the instream flows could occur, but full assessment of alternative sources would be required. A water conservation program would be implemented and water right transfers would be encouraged.

Instream flows would be set at optimum levels when such flows would be necessary to implement written resource management plans and policies of other state resource management agencies (e.g. Game, Fisheries, and Parks). Optimum flows would also be considered when necessary to help implement written resource management plans and policies of appropriate federal, tribal and regional agencies (e.g. National Park Service, U. S. Forest Service, Northwest Power Planning Council and Indian tribes). Stream closures would also be considered on this basis. Otherwise, lower instream flows (as low as survival levels) could be established by Ecology. Failure to achieve full beneficial instream utilization of the protected water flows could result in revision of the flows downward.

Maximum net benefits criteria and procedures would be developed. Instream flows would not be subject to a maximum net benefits test.

Modification of existing laws may be required and revision of existing regulations and development of new regulations would be necessary to implement this alternative.

Instream Flow and Water Allocation Process

Under this alternative, Ecology's instream flow and water allocation plans would be closely coordinated with other ongoing natural resource planning for instream flow values (such as watershed plans for fisheries and state and federal scenic river plans). Ecology would endeavor to make its water resource plans consistent with the plans of other resource management entities, and would in turn fully participate in the development of those other plans.

Ecology would update and expand its existing planning, water allocation and water appropriation regulations to provide clear policies, procedures and definitions for the state's instream flow and water allocation program. Ecology would continue to do its planning on the geographic basis of the WRIAs established in Chapter 173-500 WAC. However, Ecology could also identify several planning regions consisting of multiple WRIAs in areas of the state where regional plans would be beneficial for assessing future water needs and priorities. In these areas, regional plans would be completed prior to establishment of basin plans. Existing basin and instream programs would be revised to be consistent with this alternative.

Ecology would utilize the standard state rule-making procedures for its plans. Public involvement opportunities would be increased during program development and in review of proposed regulations. Citizens advisory committees and technical committees would be used where appropriate. Ecology would consult with and obtain the recommendations of the four statutory review agencies and affected tribes. In addition, Ecology would invite the participation of all other interested resource agencies.

IFIM or similar types of studies (shortcut methods for lower priority streams) would be carried out to provide data on fish flow needs. Objective methods would be researched and implemented for other instream uses. Proposed instream flows would be determined from these studies using a weighting system for optimization among various instream uses, taking into full account the recommendations of Game, Fisheries, State Parks and affected tribes. Stream closures to protect existing rights, instream flows or pristine conditions of selected streams would be adopted in regulations as appropriate.

Single domestic in-house use and riparian stockwatering would be exempted from the instream flow requirements if no alternative source were available. However, these uses could be denied based on cumulative effects on instream flows or existing rights. Ecology would adopt regulations defining "overriding considerations of the public interest" to establish criteria for temporary waivers of instream flows and closures based on public health reasons.

Future out-of-stream water needs would not be considered in setting instream flows and therefore, instream flows would be a de facto priority use of water among future uses. Water in excess of the instream flows on streams open to consumptive appropriation would be available for allocation by administrative rule and/or appropriation. Surface waters inhabited by natural anadromous fish runs or supporting other regionally significant instream values would be regarded as a water source of last resort for out-of-stream use. Applicants wishing to divert such surface water would be required to thoroughly explore all alternative potential water sources including conservation, groundwater, purchase or condemnation of existing rights, and expansion of existing projects.

A water conservation and efficiency program would be developed and incorporated in regional and basin plans, and in the water appropriation program of Ecology. Mandatory conservation standards would be used for new allocations and appropriations. Improved efficiency for existing rights would be sought by establishing incentives to conserve. Voluntary efficiency improvements for existing rights would be preferred over a regulatory approach. Ecology would promote public education of the need to conserve water and methods for improving water use efficiency.

Ecology would attempt to improve flow conditions on currently heavily appropriated streams, but existing water rights would not be affected. Voluntary water right transfers, including those from out-of-stream to instream use would be encouraged.

Any water right applications filed following the initiation of a regional and/or basin planning effort would be withheld from action until after adoption of the regional or basin plan and instream flows. For water rights from streams without an adopted instream flow and where no regional or basin program is in progress, instream flows would be placed on the rights on a case by case basis based on the recommendations of Game, Fisheries, State Parks and affected tribes. Ecology would develop a public notification system for water right applications to facilitate expanded public review and comment on out-of-stream use proposals.

Stronger enforcement of instream flows, to protect existing rights, and to stop unauthorized water use would be implemented.

Instream Flow Level

Instream flows would be set at an optimum level for anadromous and resident fish and other instream resources only if necessary to implement specific, written resource management plans and policies of other state resource agencies (such as the watershed plans and harvest management policies of the state fisheries agencies and tribes, and river and related land management plans administered by the State Parks Commission. Optimum flows would also be considered when needed to help implement federal, tribal and regional resource management plans and policies (such as federal wild and scenic river designations, fish management plans of tribes, and fish and wildlife and power plans of the Northwest Power Planning Council). Optimum flows would ordinarily be based on the recommendations of state, federal and tribal resource managers.

Instream flows as low as a survival level could be considered if these resource management plans and policies did not support the natural production of fish (i.e.: hatchery based management), or full preservation of other instream resources. In addition, retention of the optimum flows following a periodic review of an instream flow regulation would depend upon the performance of the responsible resource management agencies in achieving and documenting full beneficial instream utilization of the preserved water and habitat.

Closure of a stream to further consumptive appropriation could be considered to preserve existing rights and instream flows or if water is deemed to be unavailable for additional out-of-stream use. Closure to protect instream flows would only be considered if necessary to implement or support the specific, written resource management plans and policies of other agencies. Retention of a closure following a periodic review of the regulation would depend upon the performance of the responsible resource management agencies in achieving and documenting full beneficial instream utilization of the preserved water and habitat.

Maximum Net Benefits

Maximum net benefits criteria, methods and procedures would be developed and specified by administrative rule for water allocations and at least larger appropriations. The maximum net benefits test would include environmental as well as socioeconomic factors, and would incorporate the equal consideration of intangible as well as tangible costs and benefits. Establishment of instream flows at optimum or lower levels and stream closures would not be subject to the maximum net benefits test.

Implementation

The State Parks and Recreation Commission could need to be added to the Water Code (Ch. 90.03 RCW) as a required consultation agency for instream flows.

Statewide rule-making would need to be undertaken by Ecology to revise the existing planning regulation (Chapter 173-500 WAC) to define instream flow criteria and methods, criteria for stream closures, standards for documentation of instream needs, instream flow waiver and exemption criteria, public involvement and interagency coordination processes, and definition of key terms. New rules would be needed for conservation and maximum net benefits. Ecology would develop a public notification system for water right applications.

CHAPTER 3 - AFFECTED ENVIRONMENT - EXISTING ENVIRONMENTAL CONDITIONS

Introduction

The following section describes selected elements of the natural and human environment that could be affected by the alternatives identified in this EIS. These elements are taken from the State Environmental Policy Act Rules (WAC 197-11-444).

Aquatic Resources and Habitats

Fish Species, Distribution and Abundance - The inland waters of Washington provide habitat for 76 species of fish, of which 46 are native and 30 introduced. Fourteen of these species are anadromous: they spawn in freshwater but spend most of their adult lives in marine waters. Resident fish spend all of their lives in freshwater. Several salmonid (salmon and trout) species have both anadromous and resident forms, such as rainbow trout with its anadromous form, steelhead, and sockeye salmon with its freshwater form, kokanee. A complete list of these fishes and their distribution can be found in Inland Fishes of Washington (Wydoski and Whitney 1979). A detailed listing of salmon distribution in Puget Sound and along the coast can be found in A Catalog of Washington Streams and Salmon Utilization, Volume I and Volume II (Williams et al. 1975). Five species of Pacific salmon (coho, chum, chinook, pink, and sockeye) and two species of anadromous trout (rainbow, cutthroat) inhabit Washington streams. They support the most valuable sport and commercial fisheries in the country outside of Alaska.

Salmonid Habitat - These salmonids dominate streams and rivers in Washington by being well adapted to typical stream habitats in this region. Clean, oxygen-rich, cool flowing streams are needed for rearing along with clean gravels for spawning. The combination of abundant precipitation, steep gradients, and gravel left by glaciers has created over 10,000 individual streams draining to Puget Sound alone which are suitable for salmonids.

Natural stream channels contain log jams and large woody debris that create a complex aquatic habitat of riffles, pools, runs, glides, and side channels. Stream bottoms range from silt to clean gravels to boulders. Large woody debris and boulders provide 1) shade and cover from bird predation, 2) efficient feeding stations where little energy needs to expended to maintain the fish's position in calm water but where nearby fast currents bring an array of insects for food, and 3) stability to the stream channel by holding gravels that high flows would otherwise move downstream out of the system and into the ocean.

Water flow is an important element of fish habitat. Too much flow can scour a stream bed and reduce water quality. Too little flow may degrade or expose otherwise suitable habitat, desiccate eggs in the gravel, and result in increased water temperature. Stream flows fluctuate greatly under natural conditions. Land use conversions and land management practices are human activities that can considerably alter a stream's flow regime.

Each fish species/lifestage will reside in favorable microhabitat within the stream. For instance, water of approximately one to three feet depth and one to three feet per second velocity is preferred by most spawning salmon, whereas slower water over a broad range of depths is selected by rearing salmon. Other factors such as cover are also important selection criteria for many species/lifestages. The abundance of suitable habitat varies greatly with varying rates of stream flow. Figure 3 illustrates the availability of habitat for Chinook salmon spawning, juveniles and adults. These are results from an Instream Flow Incremental Method (IFIM) study by Ecology. It shows typical flow versus habitat relationships. Most often, habitat availability is very low at low stream flow levels. As flows increase, depths and velocities increase, improving habitat conditions until an optimum flow is reached where habitat availability is maximized. Additional streamflow reduces available habitat as depths or velocities exceed preferred levels. Ecology, Fisheries, Game and tribes use this type of information to evaluate and determined desired instream flows for fish. Ecology and Fisheries carry out the studies that provide this data.

Hydrology is an important factor to fish and other aquatic organisms. Hydrologic characteristics of Washington streams are discussed in the section on physical characteristics of water. High or low streamflows are often an important factor in determining the level of production in a stream. Most Washington streams (except those with large glaciers or located at high altitudes) reach low flow levels in late summer and early fall. This is a stressful period for fish and other organisms as they are forced to occupy less physical area. Wetted area has long been recognized as an important factor for rearing fish. Some salmon species also begin their upstream migration and spawning activities during this period. Fisheries studies show a clear correlation between total fish production and the level of lowest persistent flow during fresh water life phases. "Wet" summer and fall years consistently produce more fish than "dry" summer and fall years.

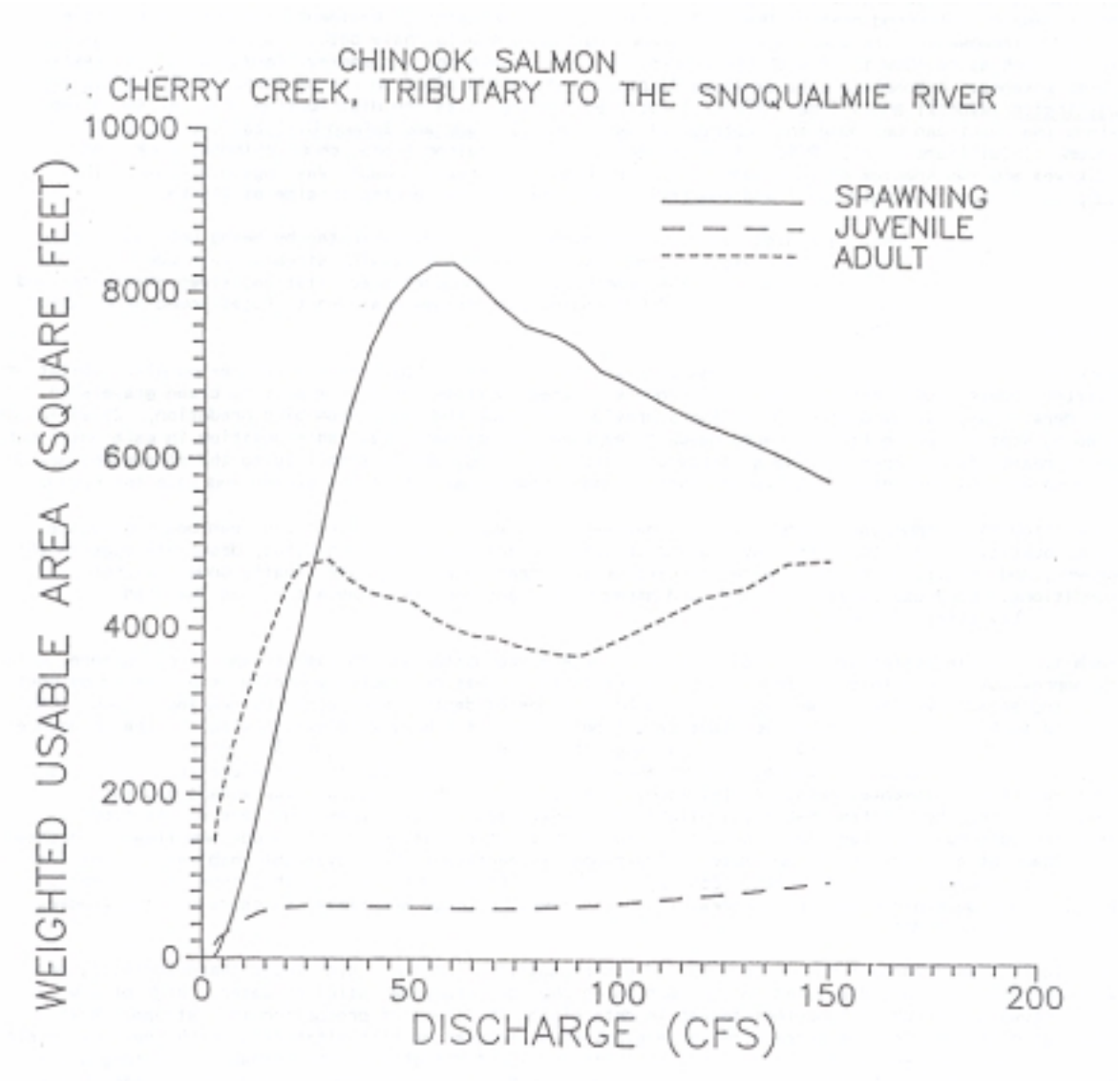

Figure 3

Chinook Salmon IFIM Results

Figure 4 in the Instream Resources Protection Study Report (Appendix II) illustrates a typical relationship of wild smolt production and stream flow, and contains a more extensive discussion of streamflow and fish production relationships.

Large diversions and dam building have affected the natural salmonid production of a number of Washington streams. Construction of Grand Coulee Dam alone cut off passage to about one-third of the accessible salmon and steelhead habitat in the entire Columbia River basin. Other dams on the Columbia and Snake Rivers and their tributaries were at least partially responsible for the drastic reduction in the size of fish runs returning to the largest salmon-producing stream in the world. Irrigation storage and diversion projects on a number of Columbia River tributaries such as the Walla Walla, Okanogan and Yakima have severely reduced returning fish runs. Power developments on tributaries such as the Wenatchee, White Salmon, Cowlitz and Lewis Rivers have also seriously affected natural fish runs by blocking passage to upstream areas and inundating habitat. Estimates of average annual salmon and steelhead runs before development in the Columbia River drainage range from 10 to 16 million fish. Present (1986) average annual run size is about 2.5 million fish (Northwest Power Planning Council (NPPC) 1986). In the Puget Sound drainage, power and water supply dams on many rivers affect natural fish production. Irrigation in basins such as the Dungeness and Nooksack basins reduces stream flows formerly used by fish. On many of these streams, hatcheries have been constructed to replace lost or reduced natural fish production.

Overfishing has been a long-term problem for salmon and steelhead. Competition among groups exploiting these fish has been fierce and has often resulted in legal disputes of national and international magnitude. The initial severe reduction of the numbers of fish returning to the Columbia basin was due more to excessive harvest than environmental degradation. Environmental effects have made restoration more difficult than simply controlling harvest levels.

Restoring natural fish is a central objective of the Northwest Power Planning Council and other efforts in the region such as the Yakima Basin Water Enhancement Project (NPPC 1986). (Reclamation and Ecology 1982,1985, 1986). These efforts generally focus upon protecting remaining habitat, restoring access to blocked habitat and improving degraded habitat. Fish management agencies are reluctant to accept new stream-altering projects that would result in further reduction of natural habitat. They are also generally opposed to hatchery mitigation of new impacts on natural production. Hatcheries are regarded as necessary to replace lost natural fish production that cannot be recovered.

Salmonid Life History - Fertilized eggs of salmon and trout incubate in the stream's gravel and hatch into larvae with yolk sacs attached to their bellies. The larvae absorb the yolk sac over time and emerge from the gravel as fry. The fry may stay for a few days to more than a year in the stream (depending on the species) before their downstream migration to the ocean. A critical factor for survival is the timing of the fry or juvenile's arrival at the estuary. If the estuary is not at a peak of productivity (rich in plankton for food), then most arriving salmonids will starve. When the fish are ready to migrate to the ocean, they become smolts: their bladder enlarges, their body shape alters, and their body coloration changes to all silver. This migration usually takes place at night and coincides with spring run-off. In the ocean, many of the smolts turn north and head for the Gulf of Alaska where they disperse over feeding grounds. They start feeding on plankton and later progress to shrimp and herring. As they reach maturity as two to five year old fish, they seek out their streams of origin by sensing the earth's magnetic field and using their sense of smell to navigate.

This life cycle is fraught with hazards. Fortunately, salmon and steelhead are prolific in egg production (up to 4,000 per female). The survival of eggs is affected by siltation, scouring, dessication and water quality. Fry and juveniles are subject to disease, stranding by fluctuating water levels, predation, and competition for space and food. Downstream migrants may have to pass through turbines and avoid diversion into canals and ditches. Estuarine conditions determine the survival of arriving smolts. Environmental conditions in the ocean, including food supply and predation (including man) determine the numbers of fish left to return to their stream of origin. Upstream passage problems at dams and natural barriers and a gauntlet of sport, commercial and tribal fisheries await the returning fish. Flow conditions, water quality and channel conditions during adult holding and spawning determine the success of the returning fish in spawning the next generation. Two percent survival from the fry stage to returning spawner is considered a good success rate.

Salmonid-Stocking Rates, Catch, Run Size, Hatcheries - Artificial propagation of salmonids contributes to a sizeable proportion of the total numbers of fish returning to Washington streams. More fish are probably stocked in Washington waters than in any other state. In 1985, the stocking of salmon eggs, fry, and smolts was 261 million by Washington Department of Fisheries, 55.6 million by western Washington Indian tribes, 36 million by federal agencies, and 12.5 million by cooperative groups (high schools, fishing clubs, etc.) for a total of 365.1 million salmon. A majority of the salmon produced in Washington are wild fish, but the hatchery component may be 40 percent of the total production.

According to the Washington State Department of Fisheries (Fisheries) the total salmon catch (sport and commercial) in Washington in 1984 was 4.4 million (Fisheries 1984). The preliminary total salmon run size (escapements (see glossary) plus catch) in Washington in 1985 was 8.7 million (Fisheries 1985). The majority of those salmon were pink salmon.

Washington's pink salmon appear only in odd-numbered years. In 1985, the Washington Department of Game (Game) stocked 31 million trout and western Washington Indian tribes stocked 2.4 million steelhead smolts. The 1984-1985 steelhead season produced a total catch (sport and commercial) of 355,000 steelhead (Game 1985).

The numbers of hatcheries and fish stocked by the state and federal agencies have remained at fairly stable levels for the last few years, but tribal hatcheries nearly doubled their number of salmonids stocked from 30.8 million in 1984 to 58 million in 1985. In Washington, Fisheries has 39 hatcheries and 15 satellite facilities, Game has 31 hatcheries with about 12 satellite facilities and 17 western Washington Indian tribes have hatcheries. There are 3 federal hatcheries not on the Columbia River, and 54 federal hatcheries and 40 satellite facilities along the Columbia River and its tributaries. Altogether about 144 hatcheries and 67 satellite facilities stock 398.5 million salmon and trout eggs, fry, and smolts in Washington.

Aquaculture - The contribution to total anadromous fish production in the state of Washington private aquaculture is currently small but growing. Only limited statistics are available at this time. Fisheries is now establishing a reporting system to gather data on private aquaculture. Numerous proposals are under consideration for development of commercial salmon net-pen rearing facilities. Several private hatcheries across the state raise trout to commercial size.

Commercial production of salmon, so-called salmon farming, is booming throughout the world. In Washington, salmon are raised in both fresh and marine water. Even salmon reared in marine water are raised initially to smolt size in fresh water hatcheries. The demand for fresh water for rearing fish is growing rapidly. Fresh water-reared salmon production in the state grossed in excess of an estimated 10 million dollars in 1985. This compares to about 3.5 million dollars brought in for commercial production of trout (Hurlburt). Six commercial growers raised 3.8 million coho salmon to commercial size in fresh water in 1986. Pacific and Atlantic salmon are raised to smolt size in moderate numbers. Many of these fish are placed in marine net pens to be raised to commercial size.

Washington currently has about 10 existing or permitted commercial salmon net pen operations, and an additional 20 such operations are proposed (Saunders). These operations, in turn, depend upon upland, freshwater operations to provide salmon smolts. These smolt rearing facilities require large volumes of fresh water. As more marine facilities are permitted, freshwater production will also have to expand to provide the smolts, thus increasing the demand for fresh water. Much of the smolt production occurs at several operations near Rochester in Thurston County. Ground water is used in these hatchery and rearing facilities.

Salmonid Management - Population growth has increased the demand for salmon and steelhead. Loss of natural habitat has occurred since non-Indian settlement began. In order to keep pace with habitat losses, fisheries agencies have tried to supplement wild runs of fish with massive hatchery production. This often leads to a harvestable surplus of fish in the near future, but long term problems. Hatcheries are built to supplement wild populations or to compensate for habitat losses. Hatchery survival of eggs and fry is very high whereas survival of eggs and fry in the wild is much lower. Theoretically, fish runs can be harvested at a 95 percent removal level if the eggs and fry are reared in a hatchery where they have very high survival rates, but natural runs can often only be harvested at a 50 percent harvest rate if eggs and fry rear in the stream with normal high natural mortality. If the method of harvest does not select between hatchery and wild fish, then over a period of years the wild fish run can be eliminated or severely reduced if harvested at the 95 percent harvest rate used for hatchery fish. If the harvest rate is reduced to the 50 percent rate to protect the wild stock, resource managers are criticized for the "waste" of surplus adults returning to the hatchery in greater than needed numbers. This has led to whole rivers being designated as hatchery or wild rivers by resource agencies. Wild fish are protected on wild production-designated rivers and are allowed to become extinct on rivers managed for hatchery production. Conflicts over hatchery versus wild fish can probably be minimized with careful, intelligent management plans. Hatchery and wild fish each have their place in Washington and can both prosper when managed properly.

Aquatic Invertebrates - Aquatic insects are usually the major source of food for salmonids in streams. The most common types are stone, may and caddis flies, and chironomids. Most graze on algae growing on rocks on the stream bed, or feed on colonies of bacteria and fungi growing on the decaying organic matter. The larval forms of these aquatic insects are available as "drift". They continually drift downstream with the current, usually picking riffle areas with cobble and boulders to re-attach themselves. Terrestrial insects usually fall in the water by accident from streamside vegetation. Aquatic insect drift is the most common source of food for salmonids, but during summer low

flow periods terrestrial insects become more important when there is less water velocity to move insect drift through the stream. Headwaters of streams may not be inhabited by fish but are important for production of invertebrate drift as a food supply for downstream salmonids.

Threatened and Endangered Species - No federal or state threatened or endangered fish species exist in Washington. However, the Olympic Mudminnow (Novumbra hubbsi) is listed as a State Sensitive Species and is classified by State Game Commission as Protected Wildlife, and could become listed on the state's threatened species list. Significant numbers of the bald eagle, a federally listed species, occur in Washington. A recent Montana study showed a direct correlation between sockeye salmon and bald eagle populations, so that a lowering of salmon populations could decrease the bald eagle populations in Washington.

Riparian plants

This discussion of plants concentrates on the area most likely to be affected by water resource development and instream flows, the riparian zone. Riparian plant communities are characterized by high diversity, density, and productivity of plant species. Vegetation can be affected over the short or long term by varying levels of streamflow. Important interactions occur between the aquatic and riparian ecosystems.

Riparian zones occur along rivers and streams, appearing as strips of predominantly broadleaf trees and shrubs along larger rivers. In arid lands, a riparian zone is often a band of vegetation restricted to the immediate vicinity of the stream. Because of close proximity to aquatic ecosystems, these areas have certain soil characteristics and vegetation requiring moister than normal conditions. On stabilized bars and immediately along the stream bank, hydrophytes (plants characteristic of wet soils) occur. With increasing distance from the stream bank, the riparian vegetation grades into vegetation typical of uplands.

Riparian plants adjust to a narrow band of inundation, with various species distributing themselves according to length of inundation. Flow-related characteristics such as the velocity and amount of energy available in the stream to carry sediment are important in maintaining riparian habitats. Winter and spring high flows influence sediment deposition. Interrelationships in the riparian zone are very complex. For example, a decrease in the amount of water in a stream can cause out of the ordinary sediment deposition, leading to changes in the substrate, benthic fauna and the species supported by it. Long-term alteration of water levels will cause the riparian zone boundary to migrate. Delta formation can also be affected.

Undisturbed riparian habitats of native species are becoming very rare. Such areas support many fauna flora. Disturbed riparian zones often have less diverse structure and species, and fewer wildlife species associated with them. Riparian areas have been the sites of extensive development in urban and suburban areas. Riparian areas have also been extensively disturbed by forestry and agricultural activities. A list of threatened, rare and sensitive plants has been compiled by the Washington Natural Heritage Program (Washington Natural Heritage Program 1984).

Wildlife Resources and Habitat

This discussion of wildlife resources focuses on the area most likely to be affected by water resource development and instream flows, the riparian zone. Riparian habitats are characterized by high diversity, density, and productivity of animal species. Numerous species can be affected by varying levels of streamflow. Fisheries needs and production have been discussed in the previous section on aquatic resources. Important interactions occur between the aquatic and riparian ecosystems, and riverine aquatic organisms are significant parts of many food chains.

Riparian zones provide important habitat for a wide variety of terrestrial and aquatic wildlife. Wildlife have specific requirements for food, water, cover, breeding and rearing space, hiding and resting areas, and thermal protection. Riparian areas provide these requirements for many species. Many species not directly dependent on these areas use them as preferred habitat at times, or as travel corridors.

Some amphibians and mammals and many waterfowl are totally dependent upon riparian or wetland areas. Other species may live in different habitats but reach maximum population densities in riparian or wetland areas. Some may use several habitat types, spending a significant amount of time in these areas during part of their life cycle. Shorebirds and waterfowl use the waters or shorelines of riparian areas for feeding or resting.

Foraging and watering are major uses of riparian zones. The needs of many species with differing types of foraging strategies and preferred foods can be met in riparian areas. Beaver and muskrat are totally dependent on food from

riparian and wetland vegetation. Some wildlife feed on fish, crayfish and other aquatic or amphibious organisms. Other wildlife feed on riparian vegetation. Some types of species found in riparian habitats include, among others, birds, mammals, amphibians and reptiles. Predators such as hawks, owls, eagles and coyotes frequent riparian areas, drawn by the abundance of prey species. Bald eagles and ospreys are particularly dependent upon riparian (and wetland) habitats (U.S. Forest Service 1985). Wildlife species which use riparian habitats are listed in Management of Wildlife and Fish Habitats in Western Oregon and Washington, compiled by E. Reade Brown for the U.S. Forest Service, 1985. Lists of threatened and endangered species and species of concern have been compiled by the Non-game Program, Department of Game. Federally listed species were incorporated into the list with state threatened and endangered species and formally addressed in the Washington Department of Game's Policy 602, signed February, 1983. The species of concern list is maintained in-house by the Non-game Program (Juelson 1987).

Riparian areas provide habitats for breeding and rearing young. Proximity to water is an essential element of many species' breeding and rearing areas. Hiding and resting cover is also necessary. Many species make use of riparian shrubs as cover, while others make use of the water to escape. Waterfowl use riparian areas for cover, and predators make use of perches in riparian vegetation. Large animals use riparian zones as travel corridors to migrate between summer and winter ranges and for other habitat needs. Vegetation which moderates temperature extremes is known as thermal cover. Riparian vegetation often provides such cover. Fish benefit from riparian vegetation providing cover from predators. Terrestrial insects falling from riparian vegetation provide an important food source for fish. Aquatic insects frequently have aerial life stages, during which they become a major food source for insectivorous fauna.

Water: Physical Properties

Climate - The Cascade Mountains divide the state into two distinct climatic regions. The area west of these mountains has a temperate maritime climate with dry, moderately warm dry summers and mild wet winters. The eastern portion has an arid to semiarid climate with greater extremes in temperature during summer and winter than western Washington. Throughout the state, precipitation is highest in the winter and lowest in the summer, averaging about 40 inches per year statewide but ranging from 5 inches annually in the driest part of central Washington to over 200 inches a year in the Olympic Mountain rain forests. Snowfall is heavy in the Olympic and Cascade Mountains, very light in the western Washington lowlands and moderate across eastern Washington. Summers are relatively dry on both sides of the mountains, with the Puget Sound lowland area averaging less than one inch of precipitation per month during July and August (Ecology 1977).

Mean annual temperature ranges from less than 40 degrees Fahrenheit in the high Cascades to 50 degrees in parts of the Columbia Plateau. Average summer daily maximums are usually in the 60s in the mountains, the 70s in the Puget Sound area, and in the 90s in the hottest portions of eastern Washington. Winter average daily minimums range from 5 degrees in the upper Columbia drainage to the 50s in the Puget Sound lowlands. In the mountains, temperatures can be expected to normally decrease about 3.5 degrees with each 1000 foot increase in elevation.

Surface Water Hydrology - The state of Washington can be divided into three major hydrologic regions: the Columbia River and its tributaries, Puget Sound and its adjacent waters, and the coastal drainage area. The Columbia River Basin dominates the surface drainage of the state, covering about 70 percent of the land area. The Columbia River originates in the Canadian Rockies, and also drains large portions of Montana, Idaho and Oregon as well as Washington. Major tributaries to the Columbia in Washington State include the Snake, Walla Walla, Yakima, Chelan, Entiat, Wenatchee, Methow, Okanogan, Spokane, Pend Oreille, Lewis, and Cowlitz rivers and Crab Creek in the Columbia Basin.

The Puget Sound drainage covers about 20 percent of the state's land area, including rivers that drain into Puget Sound, Hood Canal, the Strait of Georgia, and that part of the Strait of Juan de Fuca east from and including the Elwha River. Larger streams within the Puget Sound drainage generally originate in the Cascades or Olympic mountains, and are characterized by steep headwaters that grade into broad lowland river valleys. Major rivers in this province include the Nooksack, Skagit, Stillaguamish, Snohomish, Cedar, Green, Puyallup, Nisqually, Deschutes, Skokomish, Hamma Hamma, Duckabush, Dosewallips, Quilcene, Dungeness and Elwha.

Coastal drainages cover about 10 percent of the state and include all streams, except the Columbia, that flow directly into the Pacific Ocean or the Strait of Juan de Fuca west of the Elwha River (Pacific Northwest River Basins Commission 1979). Coastal rivers originate in the Olympic mountains or the Coast Range and drain to saltwater. Major rivers in this region include the Quillayute, Hoh, Quinault, Queets, Humptulips, Chehalis, and Willapa.

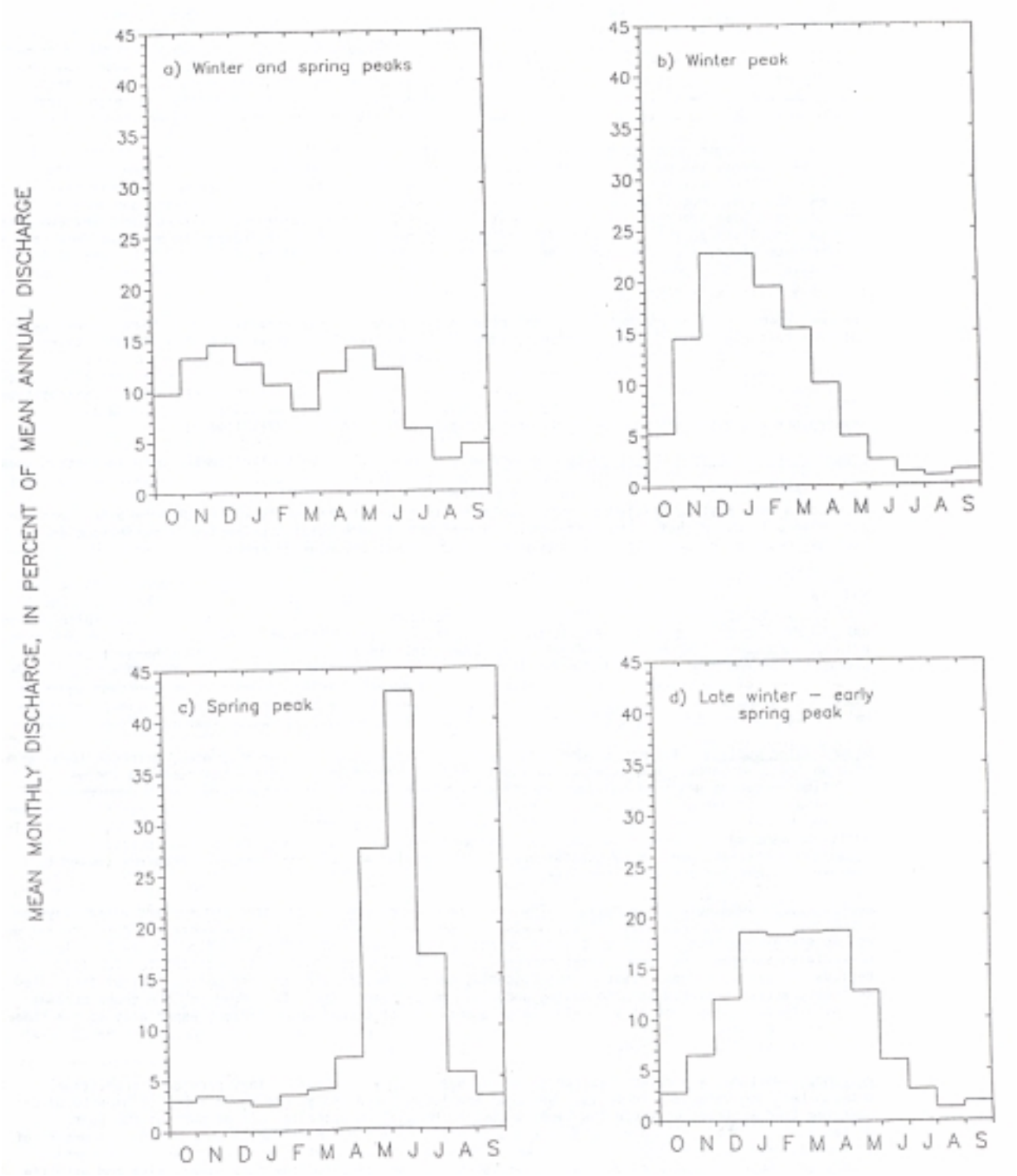

Figure 4

Typical Stream Flow Patterns in Washington State

Surface water runoff varies widely over different parts of the state and through the seasons. Average annual runoff ranges from less than 0.5 inches near Potholes Reservoir in central Washington to 180 inches in the peaks of the Olympic mountains. Statewide, average annual runoff is 26 inches compared to a national average of less than 10 inches for the conterminous states.

Although the total quantity of runoff over the state is higher than the national average, low streamflows occur in both eastern and western Washington during mid to late summer and early fall. Seasonal patterns for nearly all Washington streams show high flows in the winter and spring and low flows in late summer, reflecting the prevailing precipitation and temperature pattern, but the exact timing of high and low flows depends on many factors. Four general seasonal patterns of streamflow can be identified for Washington streams as shown in Figure 5. The first type, Figure 5a is typical of high mountain streams that experience high flows in both early winter and spring. Low flows occur in winter due to precipitation being tied up in snow and ice, and late summer and early fall, when snowmelt has been depleted and precipitation levels are low. Figure 5b shows typical low to mid-elevation streams west of the Cascades that have low flows only in late summer and early fall. High winter and spring flows in these areas reflect high precipitation levels and snowmelt respectively; low summer and fall flows are due to snowmelt depletion, low precipitation, and receding ground water discharge to the channel. Figure 5c illustrates a typical northeastern Washington river pattern, where the colder winters result in relatively low flows throughout the winter, and spring snowmelt causes a sharp peak in early summer. Figure 5d shows a typical pattern for southeastern Washington, where the winters are milder and elevations are generally lower than in northeastern Washington. The hydrograph shows a single broad peak that lasts from late winter to early spring, with low flows from July to October. Many smaller streams in Washington go dry during part of the low flow season during an average year, especially in eastern Washington.

Seasonal low flows for individual streams in Washington are highly dependent on local basin characteristics and can vary considerably from one basin to the next. Low summer flows generally consist almost entirely of ground water discharge, which in turn is affected by the local geology, topography, and precipitation patterns. Low flow characteristics of streams in Washington have been characterized in a series of reports by the United States Geological Survey (USGS 1973a, 1973b, 1975a, 1975b, 1976).

In addition to the numerous streams and rivers in Washington, over 8,000 lakes and reservoirs have been identified (IAC 1985). Ecology has also inventoried 851 dams that impound water to a depth of 10 feet or more, or which retain at least 10 acre-feet of water (Ecology 1981).

Surface Water Quality - The quality of Washington's surface waters is generally good to excellent, although some problem areas exist. In rivers originating in mountain areas, the water near the headwaters is typically cold, low in nutrients and other dissolved solids, and high in dissolved oxygen. In rivers originating from glaciers, suspended sediment levels may be very high and the water may contain significant levels of colloidal particles that color the water and increase turbidity levels. At lower elevations during low flow periods in late summer and early fall, streams generally have higher levels of dissolved solids, higher temperatures and lower dissolved oxygen levels than in higher elevation streams.

Ecology has set water quality goals for 215 river and marine water segments throughout the state. Of these, 94 segments (43 percent) are expected to meet the prescribed goals by 1988, 62 segments (29 percent) will not meet the goals due to non-point pollution sources, and 59 segments (27 percent) will not meet the goals due to natural or irreversible causes (U.S. EPA 1985). Five rivers and marine segments have been identified as high priority waters experiencing water quality problems: the Duwamish Waterway and River to the limit of tidal influence; Commencement Bay, including the main and inner bay to the Puyallup River; the inner and outer areas of Grays Harbor; the Yakima River from its mouth to its headwaters; and the Spokane River from its mouth to the Washington/Idaho border. Swimming and fishing are among the uses impaired in these waters (U.S. EPA 1984).

The most commonly cited parameters for all river and marine segments experiencing problems were fecal coliform bacteria, temperature, nutrients, turbidity, and dissolved oxygen (U.S. EPA 1985). Typical point sources of pollution include industrial and sewage outfalls. The most significant non-point sources of pollution identified by Ecology, in order of priority, are agricultural practices (including dairy waste), forest practices, on-site waste disposal, and urban run-off (U.S. EPA 1984). Streamflows affect water quality by influencing the amount of water available for dilution of contaminants. Temperature and dissolved oxygen levels are also generally related to flow levels.

Ground Water Quantity and Occurrence - Ground water underlies all of Washington but only in certain areas is it available in sufficient quantities at a reasonable enough depth to be put to beneficial use. Well yields throughout the state vary from a few gallons to many thousands of gallons per minute. The depth to which a well must be drilled to

obtain an adequate ground water supply may range from a few feet to more than a thousand feet. The differences in availability are related primarily to variations in geology, quantity of precipitation, topography, and surface drainage patterns.

In western Washington, the major aquifers are chiefly alluvial and glacial deposits consisting of sand and gravel with highly variable well yields. Much of eastern Washington is underlain by basalt aquifers that can yield as much as 2000 gallons per minute to large wells. Recharge from direct precipitation in eastern Washington is generally small, but many areas receive additional recharge from streams draining adjacent mountain areas or from irrigation seepage. The limited amount of direct recharge from precipitation and high levels of use for irrigation cause water level declines of over 10 feet per year in some areas of the Columbia plateau. Alluvial and glacially-derived deposits are important aquifers along the Columbia River downstream from Grand Coulee Dam, in the Spokane, Okanogan, Yakima, and Walla Walla River valleys and in the Ephrata-Moses Lake and Pasco areas (U.S. Water Resources Council 1978).

Ground Water Quality - Natural ground water quality in Washington is generally good, although local areas of high iron, manganese, and other contaminants occur. Ground water quality has received increasing attention in recent years as numerous aquifers have been found to be contaminated, with undoubtedly more contamination as yet undiscovered. Ground water contamination in urban areas has resulted from improper handling of toxic wastes, leaching from solid waste dumps, and leaking of underground storage tanks. In addition, many agricultural areas have experienced ground water quality problems from pesticides and intensive fertilizer use. Many coastal areas have experienced seawater intrusion problems caused by overuse of limited fresh water supplies.

Surface and Ground Water Interaction - The relationship between ground water and surface water plays an important role in the hydrology of the state. Ground water is usually a major contributor to streamflow, and as streamflow levels decline, the percentage of ground water-derived streamflow increases. In most unregulated streams, the ground water component of streamflow is close to 100 percent for low flow periods nearly every year. East of the Cascades, many tributary streams lose part or all of their flow as they traverse semiarid or arid basins underlain by permeable deposits. However, the trunk streams draining those basins generally receive large quantities of ground water inflow, especially at the lower ends of the basins. West of the Cascades, recharge from precipitation is large enough in the alluvial basins that aquifers contribute to streams most of the time.

Wetlands - Wetlands are often referred to as marshes, swamps, or bogs. They provide a transition between land and water environments. Wetlands are lands where the ground water table is usually at or near the land surface, or where the land is covered by shallow water for all or part of the year. Wetlands are further defined as lands where saturation is the dominant factor determining the nature of soil development and the types of plants and animal communities living in the soil or on its surface (McMillan 1986). In their natural state, wetlands are important for the following: fish and wildlife, scenic and recreational values, flood peak reduction, storm and erosion control, sedimentation and pollution control, agriculture, water supply, and education and research.

Approximately 235,000 acres of wetlands exist in the 15 coastal counties of western Washington. Of that total, about 67,000 acres are vegetated wetlands (marshes or swamps). The remainder are open water, unvegetated shore, or aquatic bed habitats. Approximately 22 percent (or 51,200 acres) of this area consists of persistent wetlands adjacent to lakes, streams, bays, and estuaries with little or no salinity. Eighty-five percent of these are vegetated wetlands consisting of marshes, wet meadows, sloughs, shrub swamps, bogs, and forests (Boule 1983). Although more localized, wetlands in eastern Washington are even more varied than those in western Washington in terms of seasonality, species composition, salinity, and pH (McMillan 1986).

The availability of a water supply is essential to the existence of wetlands. In many coastal wetlands, freshwater inflow is a major component. Many inland wetlands are not inundated year round and may not even be readily recognizable as wetland habitat. Such areas may be quite sensitive to changes in stream flow, lake levels, and ground water levels. Many upland wetlands are associated with lakes and streams. These wetlands are very sensitive to small changes in the water surface elevation of the lake or stream they depend on.

Land development is often detrimental to the state's wetlands resources. During the period from 1900 to 1940 dramatic losses of wetland areas occurred. Although the trend of losses has slowed since that time (Boule 1983), recreational and residential development is occurring at an accelerated rate along the shoreline. This has resulted in the alteration or destruction of wetlands and buffer areas (Kunze 1984). Although there is no specific information on total losses of wetlands in Washington State, studies have shown that between 45 and 62 percent of Washington's original salt marsh habitat has been lost (McMillan 1986). On the other hand, irrigation in parts of eastern Washington has increased wetland area due to application of water to formerly arid lands, leakage from canals, and higher water tables.

Aesthetics: Scenic resources

A definition of "aesthetics" from the Random House Dictionary of English Language states that aesthetics pertains to a sense of the beautiful to a love of beauty or to pure emotion and sensation as opposed to pure intellectuality. Aesthetics is also a philosophical theory or idea of what is aesthetically valid at a given time and place. Aesthetics rely primarily on vision and perception (Walker and Havens 1973). A visual experience which gives pleasure and enjoyment, aesthetic values are "in the eye of the beholder". Discussions about aesthetics are generally vague and inconclusive because an objective method to quantify aesthetic experience has not been widely adopted. In spite of this, there are ways to qualitatively judge and consider aesthetics in nature.

Landscape aestheticians have proposed three criteria to assess the "aesthetics" of an area. Basic aesthetic criteria are unity, variety, and vividness (Pepper 1937). Each criterion is complex by itself, but together they represent what have become regarded as aesthetic qualities. Paradoxically, they appear to conflict but their balance and combination lead to an aesthetically pleasing environment. Unity is that characteristic whereby all the parts join to make a harmonious whole. Variety shows the complexity of different and numerous parts; "richness" or "diversity" express the same concept. Vividness is the characteristic that give a strong visual impression.

Washington state's landforms, vegetation and waterbodies are so diverse and plentiful that all of these aesthetic criteria are met throughout the State. Of particular importance for this EIS are Washington's many fresh waterways. Its lakes, rivers, streams and waterfalls, the steep gorges of the Columbia River, and the canyons and scablands of eastern Washington contribute to Washington's great abundance of scenic beauty. Few water bodies and surrounding lands are untouched by human developments. Pristine waters and unlogged lands in Washington are considered to be of high aesthetic value because they retain the qualities of unity, variety and vividness that create an aesthetic experience.

There are 8,000 lakes and 50,000 miles of stream in Washington state (IAC 1985). All of these water bodies have some scenic and aesthetic values. Some river segments or shorelines have been inventoried and ranked according to their undeveloped and aesthetic values. Federal and state laws have required inventories of Washington's scenic resources: the National Wild and Scenic Rivers Act, the State Wild and Scenic Rivers Act, the Shoreland Management Act, the Northwest Power Act, the Natural Areas Preserve Act. Only a few river segments outside of National Parks and Wilderness Area have been afforded protection from development. Parts of the Skagit, Sauk, Suiattle and Cascade Rivers are designated as National Wild, Scenic or Recreational rivers. The National Park Service has made a nationwide inventory of rivers to determine segments for potential inclusion in the National Wild and Scenic river system. Twenty rivers in Washington are included in the inventory as having segments potentially deserving inclusion in the system.

Under the state scenic rivers program, portions of the Skykomish, Beckler and Tye rivers in Snohomish county are designated state scenic rivers. However, this does not prohibit development that is potentially harmful to aesthetic natural values. (See section on Relationship to Other Resource Planning for a more complete discussion of the state and federal rivers programs.) The Yakima Canyon between Ellensburg and Yakima is designated a scenic and recreational highway. The Columbia Gorge has recently been designated a National Scenic Area to protect its unique aesthetic qualities.

Scenic and aesthetic values are listed in the state Water Resources Act of 1971 as beneficial uses of water (RCW 90.54.020(1)). Scenic and aesthetic values are uses for which instream values are to be established (RCW 90.22.010 and RCW 90.54.020(3)(a)). Lack of a well defined and accepted method for quantitatively assessing the incremental effects on aesthetic values of changing instream water flows has hampered Ecology's ability to give full consideration to aesthetics in establishing instream flows. Flow-related aesthetics have been assessed only in a subjective way in establishing flows. This has usually occurred on a case by case basis in response to specific development proposals.

Recreation

Washington is among the states most richly endowed with water-related scenic and recreational resources. Rivers, streams, lakes and reservoirs provide freshwater opportunities for some of the most popular and spectacular types of recreation (National Park Service 1986). Recreation related to water is a major pastime in Washington and covers many types of activities. Some of these depend on water, while others can be classified as water-oriented. Water-dependent uses include white water kayaking and canoeing, flat water boating, fishing and swimming. Water-oriented recreation includes activities like camping, picnicking, hiking, backpacking and viewing.

Demand for water-related recreation has grown steadily. A tremendous surge in participation has occurred in white water sports, including white water kayaking, canoeing and rafting. Local manufacturing and industry supported by

these sports is a relatively recent development. There are currently several local manufacturers of kayaks and canoes, and as many as 35 or 40 white water rafting outfitters (Doug North 1986). The numbers of people enjoying swimming and boating in various waters have also increased. Fishing is another sport which continues to grow in popularity. Backpacking, hiking and camping have all experienced steady increases in demand in recent years.

Similar recreation activities occur around water on both sides of the Cascade mountains, such as white water boating, rafting, fishing and swimming. In the National Park Service's recently published "River Recreation in Washington, An Initial Inventory and Assessment", over 2500 miles of streams and rivers were evaluated. Of the stream reaches identified as having high recreational value, the distribution was 50 percent (46) in the Puget Sound region, 9 percent (8) in the coastal region, and 41 percent (37) in the Columbia River region (National Park Service 1986). The state also has numerous waterfalls which are popular viewing sites. Gregory Plumb's Waterfalls of the Pacific Northwest lists close to 300 falls in the state (Plumb, 1983).

Although aquatic lands and beaches have high priority for resource protection, several problems exist. Adequate funding is lacking, and another major problem is lack of public access (IAC 1985). Difficulties have been experienced in trying to establish a policy for preservation of state rivers possessing exceptional scenic and recreation values. The State Scenic River Act, Chapter 79.72 RCW, was passed in recognition of the value of scenic river resources. The Act designates parts of the Skykomish, Beckler and Tye Rivers as state scenic river segments, as previously mentioned. The State Parks and Recreation Commission has re-initiated work under the State Scenic Rivers Act to identify additional segments to be considered by the state legislature for inclusion in the state system. Management plans will be developed for the currently designated segments. (See section on Relationship to Other Resource Planning.)

The Department of Ecology has also identified "Rivers of Statewide Significance" under the authority of the Shoreline Management Act, Chapter 90.58.030 RCW. Ninety-one rivers and streams are listed; this list is available upon request from Ecology. Under the state Scenic and Recreational Highways Act, the Yakima River Canyon between Ellensburg and Yakima has been designated a scenic and recreational highway and the highway corridor is managed to preserve these values. While only part of one river, the Skagit, has been designated in Washington State under the National Wild and Scenic Rivers Act, 26 others have been found to qualify for study or potential candidacy. These have been identified by the Department of Interior, National Park Service in their 1982 national rivers inventory. Recreational groups support the designation of additional streams in the system.

In eastern Washington, the Columbia River and its tributaries offer many recreation opportunities. Boating and camping along the reservoirs on the Columbia and Snake rivers are popular activities. The Columbia Gorge has recently been designated a National Scenic Area in order to assure preservation of its unique scenic and recreational value.

Many types of recreational activities have shown significant increases. A mid-1970s survey showed that 23 percent of the state's residents participate in fishing, and 42 percent of this is from a streambank (or pier). The number of anglers is expected to continue to increase. The SCORP document concludes there is a critical need for preservation of fisheries habitats and resources (IAC 1985).

Recreation is listed in the Water Resources Act of 1971 as a beneficial use of water for which instream flows are to be established (RCW 90.54.020). A lack of methods for assessing recreational flow needs has hampered Ecology's ability to fully incorporate recreational flows in the instream flow setting process. In most cases, recreation has been regarded as a secondary consideration for instream flow establishment. Information on recreational water needs has been gathered during the public involvement stage of instream resource program development, and has generally been limited to flows needed for white water boating activities.

Water Use and Availability

Water availability is a function of 1) hydrologic characteristics and 2) the level of existing use, including established instream flow appropriations. General hydrologic conditions and instream flows are discussed in other parts of this report. Figure 5 illustrates water use in acre-feet for the state in 1980.

Water availability is one major determinant of land use. As an example, until water was brought to the central Columbia basin by the federal Columbia Basin Project, much of that area was semiarid range and dry land farms. Now 600,000 acres are under irrigation on relatively small farms, and numerous communities have either sprung up or grown rapidly to service the agricultural sector. Without the water brought by the project, these dramatic changes would not have happened.

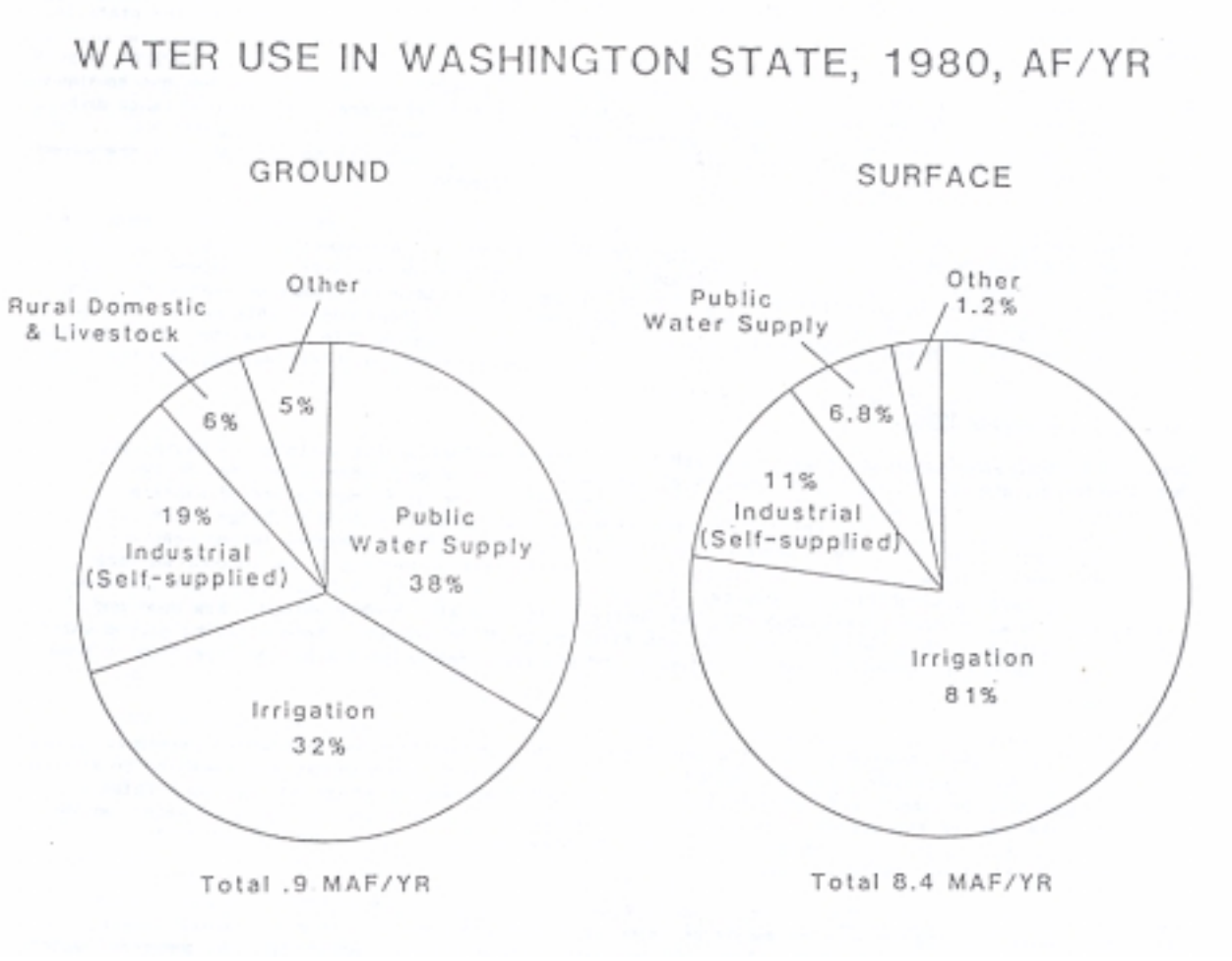

Figure 5

Water Use in Washington State

Water availability to meet new demands is a problem in many areas of eastern and western Washington. A major factor affecting water availability is the climate of the Pacific Northwest. Although much of our state receives adequate precipitation on an annual basis, the pattern in which it is received creates some problems. Most of our precipitation is received during winter, whereas summer and early fall tend to be rather dry. Nearly all streams in the state reach their lowest flows during this period. Water demand for many uses, including irrigation and municipal use, peaks during this dry period. The low flow period is also a critical period for instream uses including recreation, aesthetic values, water quality, and fish and wildlife. In many cases the level of fish production is determined by flows during this low flow period (Ecology 1986).

Areas of eastern Washington where water availability is critical include the Walla Walla basin, the Okanogan basin, and the Yakima basin. Many small streams in eastern Washington have been fully appropriated for many years. Shortages of available ground water occur in many areas of eastern Washington. Aquifers are being depleted in some areas where withdrawals exceed recharge rates. In western Washington, availability is most critical in the San Juan Islands, Whidbey Island, eastern Jefferson County, southwestern Pacific County and parts of the Kitsap Peninsula due to poor surface and/or ground water availability or quality. In the rapidly growing central Puget Sound metropolitan region, surface water sources are abundant, but instream uses are also highly valued. New dams and diversions conflict with growing recreational and fish and wildlife demands. Some existing ground water supplies have been threatened by toxic pollutants, and sea water intrusion has become a problem in some aquifers.

Instream flow requirements make a number of streams less reliable water supply sources than would otherwise be the case. Availability of water to meet both existing instream and out-of-stream needs and additional out-of-stream uses is very limited. As noted in the previous section, many Washington streams already support water supply and hydroelectric projects which may have tied up all available water. Generally, the smaller the stream or river, the less likely it is that a secure supply of water can be obtained from it. Larger rivers appear better able to provide for out-of-stream uses without deleteriously affecting instream values.

Municipal and Domestic Water Use - This discussion relates principally to residential water use for drinking and maintenance of outside amenities associated with a residence. It also includes use by a city or other jurisdiction for irrigating parks and other public lands. Industrial and commercial water use, often obtained from a municipal system is discussed in another section.

The cities of Seattle, Tacoma, and Everett operate municipal water supply projects on the Cedar and Tolt Rivers, the Green River, and the Sultan River, respectively. These systems provide the majority of the domestic water supply for the central Puget Sound metropolitan region, although these systems are supplemented significantly with ground water, particularly Tacoma. Other large surface water municipal systems in western Washington include Bellingham (Middle Fork Nooksack River and Whatcom Creek), Olympia (McAllister Creek), Bremerton (Union River), Port Angeles (Elwha River and Morse Creek), Aberdeen (Wishkah and Wynoochee Rivers), and Hoquiam (Hoquiam River). Large surface water municipal systems in eastern Washington include the Tri-Cities (Columbia River), Yakima (Naches River), and Wenatchee (Columbia River). Other major municipalities rely principally on ground water sources. New surface water diversions are being considered by Seattle (North Fork Tolt River), Bellevue (North Fork Snoqualmie River), Tacoma (Green River), Jefferson County (Dosewallips River), Kitsap County (Hamma Hamma River), Yakima (Rattlesnake Creek), and Walla Walla (Mill Creek).

Many small independent private and public domestic water systems, ranging in size from a single service to thousands of services, exist throughout Washington. If self supplied, these systems typically rely on ground water or springs rather than surface water.

The Department of Social and Health Services (DSHS) uses four water supply system size classes: class 1, community water system with 100 services or more or serving a transitory non-community population in excess of 1000 persons per day, class 2, community system with 11-99 services or serving a transitory non-community population of 300 to 999 persons per day, class 3, serving a transitory non-community population of 25 to 299 persons, and class 4, community system with fewer than 10 services or serving fewer than 25 people in a transitory non-community system population (DSHS 1983).

For statistical purposes, DSHS counts all non-community systems separately. DSHS estimates there are 589 class 1 community systems, 1,789 class 2 community systems, 5,813 (known) class 4 community systems, and 2,220 non-community systems (serving transitory populations) in the state of Washington. Thirteen percent of class 1 community, 3 percent of class 2 community, 1.6 percent of class 4 community, and 6.3 percent of non-community systems use surface water.

In areas of dispersed housing development, many people rely on single domestic water systems. The majority of these use a well or a spring as a source, but a significant number use water from streams and lakes.

Industrial and Commercial Water Use - Water use in this classification is generally either used in a chemical or mechanical process or used for cooling. For example, pulp mills require massive quantities of fresh water for the pulping process. Some new industries are also heavy users of water such as manufacturers of semiconductor chips. Other heavy water users are food processing and some mining and mineral processing. Though there are exceptions, most industrial and commercial uses obtain water from municipal systems. Industrial water accounts for half or more of the use of water from some municipal water systems. In some industrialized areas away from major cities, public utility districts have been formed to supply industrial water (e.g.: the Ferndale/Cherry Point area in Whatcom County).

Agricultural Water Use - Agricultural water use can be divided into three categories: agricultural domestic use, stock watering, and irrigation. Of these, irrigation is by far the largest user of water on a statewide basis. Agricultural domestic use is relatively insignificant and for the most part is supplied from wells. Stock watering occurs both on a riparian basis (i.e.: drinking directly from a stream) and a diversionary basis. The raising of stock occurs statewide, although commercial ranching tends to be concentrated in central Washington and commercial dairying in northwestern Washington.

Irrigation occurs mainly in eastern Washington. It is concentrated within the Yakima basin (one-half million acres), Okanogan basin (32,000 acres), and Columbia basin (600,000 acres) where federal projects have been built to supply irrigation water. Extensive private irrigation development has occurred in the Horse Heaven Hills using direct pumping of Columbia River water (about 42,000 acres), in the Wenatchee basin using water supplied by gravity from the Wenatchee River and tributaries (about 15,000 acres) and in areas near the Snake River using water pumped from the Snake River (about 60,000 acres). Smaller irrigation developments using surface water occur throughout eastern Washington, especially along river and stream valley bottoms. Smaller irrigation systems typically do not involve storage facilities, and must rely on natural stream flows.

Scattered surface water irrigation occurs throughout lowland areas of western Washington. Concentrated areas of surface water irrigation are in the Dungeness basin (48,000 acres), the Nooksack basin (11,000 acres) and the Chehalis basin (16,000 acres). Smaller amounts of irrigation occur in most of the lowland river bottoms of the Puget Sound area and southwest Washington (Geological Survey 1977).

Given current technology, the areas of the state with the most significant potential for future irrigation development using surface water are in the eastern undeveloped portion of the Columbia Basin Project area (about 450,000 acres), the Horse Heaven Hills (about 270,000 acres), and the Lower Snake River area (about 165,000 acres). Private irrigation development occurred at a rapid pace during the 1960s up until the late 1970s. Since then, however, sharply higher power costs, high interest rates, and soft markets for agricultural products have combined to slow down new development.

Navigation - Commercial navigation occurs on several Washington rivers, notably the Columbia River from its mouth to the confluence with the Snake River, the Snake River up to Lewiston, Idaho and the Cedar River basin (Lake Washington Ship Canal. Recreational navigation is discussed under recreation. Corps of Engineers navigation projects, consisting of locks and channel improvements, make commercial navigation possible on these rivers. The estuaries of a number of other Washington rivers (Duwamish, Snohomish, Puyallup) are used for ports, but commercial navigation generally does not extend upstream. Log storage and transportation were historically important on many rivers and still occur on some rivers.

Navigational water requirements relate primarily to maintenance of safe water depths and lockage water. Navigation needs occasionally conflict with other water uses. On the Columbia and Snake Rivers, lockage water is unavailable for hydropower generation. Conversely, hydropower tends to dictate the pattern of streamflows, affecting water depths and currents that must be negotiated by commercial navigation. On the Cedar River/Lake Washington system, navigation water levels and lockage requirements conflict with municipal supply withdrawals by the City of Seattle and fish flow needs.

Hatcheries and Fish Rearing - Fish hatcheries have been built by the state and federal governments and Indian tribes on many streams of the state to supplement natural production or to replace lost natural production (see section on aquatic resources.) Private fish hatcheries are scattered throughout the state. Most hatcheries use surface water for at least part of their water supply (surface water includes water from springs). Hatcheries require large quantities of high quality

water. Typically, surface water is diverted, passed through the hatchery, and returned to its source downstream. Little if any of the water is consumed, although a dewatered bypass reach may be created. Ground water from wells may be used exclusively or mixed with surface water in the hatchery and released into the stream, increasing stream flows downstream from the hatchery.

Dams, Diversions and Reservoirs - As in other western states, water has been an essential ingredient in the settlement and economic development of Washington. Settlers used rivers as transportation corridors and a source of food fish as well as for out-of-stream uses such as domestic, irrigation and power. Irrigation began in earnest in the 1850s in the Yakima Valley and earlier in the Walla Walla area. Municipal water supply and electric power systems for the larger settlements grew into major engineering projects in the early 1900s.

Development of the Columbia River's vast power potential began in 1930, with the construction of Rock Island Dam near Wenatchee. Bonneville Dam and Grand Coulee Dam (one of the worlds largest) were both started in 1933 as Depression Era public works and economic development projects. Currently the Columbia River is controlled by eleven mainstem dams in Washington and numerous storage dams upstream in British Columbia and Montana. Four mainstem dams in Washington span the Snake River, a major tributary to the Columbia River.

In addition, large dams have been built on many other Washington rivers including the upper Skagit (power and flood control), Sultan (power and municipal supply), Tolt (power and municipal supply), Cedar (power and municipal supply) Green (municipal supply and flood control), Nisqually (power), North Fork Skokomish (power), Elwha (power), Wynoochee (industrial supply and flood control), Cowlitz (power), Lewis (power), White Salmon (power), Yakima (power and irrigation), Okanogan (irrigation), Pend Oreille (power), and Spokane (power). Run-of-river power or water supply diversions (no storage) operate on many other rivers.

Energy

Energy Requirements - According to the Northwest Power Planning Council (NPPC), data indicate that electric energy demand will continue to grow in the Northwest as population increases, though at rates considerably lower than historical growth rates (NPPC 1986). Demand growth for electric power in the Northwest slowed from between four and eight percent per year during an extended period preceding the late 1970s to the current rate of less than 2 percent per year (NPPC 1986). There was actually a reduction in demand during the early 1970s due to higher electricity rates, an economic recession, and implementation of conservation programs (Energy 1985).

The NPPC's 1985 Electric Power Plan projects a likely growth rate in demand of between 1.2 and 1.8 percent per year through the year 2005. Given this range of likely growth rates, the council projects that the current electric power surplus will last until 1992 to 1996, when additional power resources are likely to be necessary to meet the region's needs (NPPC 1985). Bonneville Power Administration's (Bonneville) medium load forecast indicates a need for additional resources beginning in 1994 (Bonneville 1986). Projections of the Pacific Northwest Utilities Conference Committee (PNUCC) show that additional resources will be needed by 1993 (PNUCC 1986). All three of these forecasts are based on the power that could be supplied under critical (low flow) water conditions, essentially a worst case scenario.

Energy conservation is an important element of the NPPC power plan. However, due to the current surplus, the emphasis is now on assuring that new construction is energy efficient. Retrofitting conservation measures in existing structures has been somewhat de-emphasized for the duration of the energy surplus. The power plan lists conservation as the first priority resource for meeting future demand growth. Additional hydropower development is the second priority in the resource portfolio. Firming up existing non-firm hydropower generation through various strategies including combustion turbines and load management is listed third, cogeneration is listed fourth, and new thermal generation is listed fifth. These priorities were based on minimizing economic and environmental costs to the region. The plan calls for sequential development of these resources with timing depending upon the actual rate of load growth, and calls for the securing of options for priority generating resources by the Bonneville Power Administration (NPPC 1985).

Cost effectiveness thresholds for new resources were set by NPPC at 5.0 cents per kilowatt-hour (kwh) and 4.5 cents per kwh for new generating resources. Washington Nuclear Plants (WNP) 1 and 3, which are partially completed but on hold, were not included in the resource portfolio because of legal, financial, and regulatory uncertainties that could block attempts to complete them. However, the power plan recommends that they continue to be preserved if possible as cost-effective future generating resources (NPPC 1985).

Energy Production - Existing energy production occurs in a number of ways in Washington including hydroelectric, thermal (coal, oil, gas, wood, waste or nuclear fueled), wind turbines, and solar generation. Among these, hydroelectric and thermal generation are dependent on a reliable supply of water. This discussion will focus on these water-dependent forms of energy production and not on the other modes unrelated to water.

Hydropower - The Pacific Northwest in general and Washington in particular rely heavily on electric power production from hydroelectric sources. Hydropower represents about 78 percent of the installed capacity and produces about seventy percent of the electrical energy used in the Northwest (NPPC 1985: 5-1). Large and small hydroelectric plants have been constructed on many Washington rivers and streams since about the turn of the century. Many small plants were removed from production during the 1940s through 1960s as very inexpensive power became available from development of large hydro plants on the Columbia River system. Some of these small plants (generally run-of-river) have been under consideration for redevelopment as part of a trend toward development of small, decentralized facilities.

Renewable energy, including small hydropower, received a major boost from several federal energy laws passed in the late 1970s and early 1980s. These laws eased licensing requirements for some small facilities, provided attractive tax incentives, and required utilities to purchase the production of small production facilities at relatively high rates. These changes resulted in a brief but frenetic boom in small hydropower proposals during the first half of the 1980s. At one point there were as many as 700 small hydropower proposals in Washington under pursuit by prospective private and public developers. Currently, about 230 projects remain under serious consideration. Many proposed projects faced serious environmental issues; others were not economically feasible. In general, the lack of need for additional generating capacity during the current energy surplus has resulted in a soft market for new electrical energy resources. In addition, legal problems arose with the somewhat laissez-faire approach to small hydropower development adopted by the Federal Energy Regulatory Commission (FERC), leading to costly delays and great uncertainty (Energy 1985). Recently enacted federal legislation (the Electric Consumer Protection Act) requires that FERC take a broader view, including greater deference to fish and wildlife and state and regional plans than it has in the past (U.S. Congress 1986). Some concern has been expressed that the federal renewable energy development incentives can result in the construction and required utility acquisition of relatively high cost resources that result in extending the current energy surplus (NPPC 1986: 2-4).

Despite these problems, 23 small and micro-scale hydroelectric projects with 35.51 megawatts of capacity came on line between 1980 and 1985 in Washington. Several large utility-owned hydropower projects, all additions at existing dams or diversion facilities came on line during that period with a total capacity of 245 megawatts (Energy 1985).

Interest in small hydropower development is focused particularly in the Nooksack, Skagit, Snohomish and Cowlitz basins in western Washington. Most of these proposals would be new run-of-river facilities many are in relatively remote areas. Many could impact anadromous or resident fish, wildlife resources, recreation and scenic values. In eastern Washington, proposals have been concentrated in the Yakima basin and the Columbia Basin Irrigation Project. Both of these areas have many existing dams, canals, and pipelines. Most development interest in these areas has involved retrofitting hydropower on existing water impoundment and transmission facilities. In the Yakima basin, many of these proposals have been controversial because of potential effects on anadromous fish passage and habitat areas.

Hydropower development is subject to state and local permits as well as federal licensing requirements. Ecology administers water rights, water quality certification, and short term exceptions to water quality standards which must be obtained prior to construction. Ecology normally incorporates instream flow conditions on these approvals as needed. In addition, Ecology reviews various shoreline development permit approvals by local government.

Thermal Power Production - Large thermal power plants supply an important component of Northwest energy generation. Because they are more expensive to operate than hydropower plants, they are often held in reserve and used when demand exceeds hydropower generation capability.

Thermal plants are dependent upon a reliable water source for cooling purposes. Existing operating large thermal plants in Washington include two nuclear power plants built and operated by the Washington Public Power Supply System (WPPSS) on the Hanford nuclear reservation, and a coal-fired plant near Centralia Washington owned by Pacific Power and Light. The Hanford plants draw cooling water from the Columbia River. The Centralia plant diverts water from the Skookumchuck River. An unfinished and postponed nuclear plant owned by WPPSS is located near Satsop. If and when it is completed, its cooling water would be diverted from the Chehalis River, with replacement water for instream

flows being released from Wynoochee Dam. Newer plants are required to cool water before returning it to the stream of origin. Evaporative cooling results in a significant loss of water to the atmosphere.

Cogeneration is a growing facet of the thermal power sector. Cogeneration is the use of waste heat, usually industrial steam, to produce power. Cogeneration facilities presently exist at 16 industrial installations in Washington (mostly forest products plants) and are being considered at 17 additional plants. Also in the forefront of energy development now are biomass or garbage-fueled electric plants or garbage) electric plants. A 40 megawatt wood waste fueled plant in Kettle Falls was brought on line in 1983 by Washington Water Power, Inc. Development of waste fueled plants is being strongly considered currently by Seattle, Tacoma, and King and Snohomish counties and a number of other local governments and industries (Energy 1985). Conventional plants involving boilers and steam turbines require cooling water to condense and recirculate steam.

Land and Shoreline Use

Offstream demand for water is related to the development and use of land. Water is a necessary ingredient in most forms of land use involving human occupation and use. The most intensive water demand-creating forms of land use are urban development and irrigated agriculture. Changes in land use can alter surface and ground water hydrology and quality.

Metropolitan areas of the state continue to undergo conversions of land use from agriculture and forestry to urban and suburban development in response to a growing population's demand for more housing and services. Conversion in the central Puget Sound area has been particularly rapid. Outside urban areas, old growth timber has been rapidly removed from much of western Washington and the Cascade Mountains. Exceptions are the acreages preserved in national parks, monuments and wilderness areas.

Stream flows, water levels of lakes and streams, and water quality are related to shoreline conditions. Water attracts human occupation and use of land. Water may be the most important aesthetic feature in a shoreline environment. Location and health of riparian vegetation and wildlife is dependent on water flows and levels.

The total land area of Washington State is 66,572 square miles or 42,604,800 acres. Ownership of the land is in Table 1:

Table 1

Land Ownership in Washington State

Ownership	Acreage	Percent of Area
State	3,733,319	8.5%
Bureau of Land Management	311,131	0.7%
Indian	2,527,236	5.8%
National Forest	9,069,709	20.8%
Other Federal & County	2,884,028	6.6%
National Parks & Recreation Areas	1,910,683	4.4%
SUBTOTAL	20,436,106	46.8%
Private Land	22,168,694	50.8%
Total Upland	42,604,800	97.6%
Inland Water	1,033,080	2.4%
TOTAL ACRES	43,642,880	100.0%

Of the total land area, 6.3 percent is classified as Urban Buildup, 22.3 percent is Range and Open, 53.2 percent is Forest and Alpine, and 18.2 percent is Crop Land (DNR 1983).

Control of land use on private lands is primarily a function of local government. Most counties and cities in the state have zoning ordinances. Uses and activities permitted on state and federally owned land are normally determined by a designated land management agency (e.g. Washington State Department of Natural Resources and U.S. Forest Service).

The Shoreline Management Act of 1971 (Chapter 90.58 RCW) applies to all shorelines of the state, including both "shorelines" and "shorelines of statewide significance." The Act applies to all marine waters of the state, streams with a mean annual flow of 20 cubic feet per second or more, and lakes larger than 20 acres. It also applies to adjacent land areas extending landward 200 feet from the ordinary high water mark and to all marshes, bogs, swamps, floodways, river deltas, and floodplains associated with water bodies subject to the Act (Ecology 1976).

The Act designates as "shorelines of statewide significance" natural rivers and associated wetlands in western Washington downstream from a point where the mean annual flow is 1,000 cubic feet per second (cfs) or more. In eastern Washington, includes natural rivers and associated wetlands downstream from a point where the mean annual flow is 200 cfs or more, or that portion of the stream downstream from the first three hundred square miles of drainage area, whichever is greater. Various marine waters are also named. Streams and rivers constituting shorelines of the state and shorelines of statewide significance are named in the Ecology regulation Chapter 173-18 WAC. Washington State has 2,337 miles of marine shoreline and an unknown mileage of freshwater shorelines (Ecology no date).

In 1972, Ecology adopted policy guidelines (Chapter 173-16 WAC) for the development of master programs by local governments. This established a categorization system to encourage and regulate uses in each type of environment. The categories established were: Natural Environment, Conservancy Environment, Rural Environment, and Urban Environment. Each local city and county jurisdiction has developed a Shoreline Master Program to guide and control shoreline development. Shoreline substantial development permits are issued by local government in accordance with the local master program. Permit approvals are reviewed by the Department of Ecology for compliance with the local program and Ecology's implementing regulations.

Conservation

Conservation is defined by Webster's New World Dictionary as " the act or practice of conserving; protection from loss, waste, etc.; preservation..."

Although no specific water resources conservation program has been established existing statutes allow development and implementation of such a program. For example, RCW 43.27A.090(6) directs Ecology to develop and adopt "such policies as are necessary to insure that waters of the state are used, conserved, and preserved for the best interest of the state" (underlining added).

While state law encourages water resources conservation, there are also aspects of the law that serve to discourage efficient agricultural use such as "use it or lose it" provisions Chapter 90.14 RCW and the inability of Ecology to allow saved water to be spread onto new lands or sold to others.

Although no formal program has been adopted and in spite of some barriers, several conservation-related activities and policies exist, including:

- The City of Tacoma has a conservation program designed to reduce demand for water during water-short years. This program stemmed from Ecology's water resources management program for the Green-Duwamish River Basin Chapter 173-509 WAC which allows instream flow requirements to be reduced during critically water-short years. The conservation by Tacoma is viewed as a "sharing of the burden" with other uses during drought periods.

- As part of its public water supply reservation program, Ecology requires that anyone filing a petition with the department to reserve water for future public water supply include in that petition, "a summary of ongoing and planned conservation programs" (WAC 173-590-070).

- The Department of Social and Health Services requires that meters be installed on water systems applying for either Referendum 27 or Referendum 38 funds for system improvements. This metering enables system managers to better

manage their systems and reduces consumption through improved awareness of use and the ability to charge customers based on the volume used.

- The City of Seattle's Comprehensive Regional Water Plan (COMPLAN) includes a formal long-term conservation program aimed at ensuring efficient water use. This program includes waste reduction through system improvements conservation through demand reduction and has resulted in estimated savings of 4 million gallons/day. The COMPLAN also includes a water shortage emergency plan for drought response with stages ranging from cutting nonessential uses to water rationing (Seattle 1985).

- The Yakima River Basin Water Enhancement Project is evaluating a combination of structural and non-structural measures to help resolve Yakima River Basin water-related problems. (See section of this EIS on the Enhancement Project). Conservation and efficiency improvement measures currently under investigation include structural and non-structural improvements including delivery system automation, canal lining, converting open ditches to pipelines, reuse of drain water, on-farm water management practices, reregulating reservoirs and conjunctive use of surface and ground water. Water savings would be reallocated to supplemental irrigation supply and instream flows (Reclamation and Ecology 1986).

Dispersed, unplanned water conservation is also occurring as a result of higher costs of water and to pump water. Improvements in irrigation technology include low pressure sprinklers, drip irrigation, water reuse and lower water demand crops.

Interest in water conservation is increasing. Conservation is increasingly viewed by many as a reasonable and cost-effective alternative to development of new water supply projects. The Western Governor's Association (WGA) passed a resolution in July 1986 aimed at raising the level of interest in water conservation and is working up to identify changes to western water law to develop effective water conservation programs. Efforts to this point to encourage conservation in municipal, industrial or agricultural sectors have been minimal to this point. Many methods could potentially be used to achieve more efficient water use in any of these areas.

Historic and Cultural Resources

For purposes of this Environmental Impact Statement, cultural and historical resources are defined as any significant archeological or historic districts, sites, buildings, structures or objects that may be evaluated in terms of the criteria in the Federal Code of Regulations, 36 CFR 60 and 36 CFR 63.

Many sites adjacent to the state's waterbodies have significant cultural or historical importance. Both Native American and pioneer settlements tended to be along rivers, Puget Sound and lakes because they provide a medium for transportation, trade and social life. Artifacts and ruins have been found in areas once inhabited by Native Americans or pioneers. Riverine sites have been documented in the cultural and historical resources portion of the Pacific Northwest Rivers Assessment Study. The State Archaeological and Historic Preservation Office conducted this study which was a survey of all river segments of cultural or historic significance. Sites in the survey are listed and ranked according to the following categories: National Historic Landmark, National Register Properties, State Register Property, City or County Landmark, Native American Burial, Multiple Inventory Properties, Inventory Properties (Office of Archaeology and Historic Preservation 1985).

Other sites throughout the State may not have specific artifacts or buildings, but may still be of vital cultural and historic importance. Native American societies tended to settle along streams, rivers, deltas or marshlands. These areas along the waterways were the basis for Native American lifestyles. Rivers and fish were the focus of the Native American economy, transportation, social life, spiritual ceremonies, and artistic endeavors.

Sites of particular cultural, historical or archaeological interest to Native Americans are found throughout the state. Water and associated land developments may impact such historically or culturally important sites. This can occur from inundation or from construction related activities. Development may also affect fisheries resources important for present-day Native American communities. Potential impacts to sites can be addressed or eliminated by requiring that the developer collect data about the site's cultural or archeological attributes, survey the site, employ an archaeologist to excavate or oversee the excavation of the site, or relocate or redesign the project.

CHAPTER 4 - SOCIOECONOMIC CONDITIONS

Introduction

Water allocation policies and instream flow criteria could affect the future economy of the state. The type and intensity of future economic development can in turn have a significant effect on the future demand for and use of the state's water resources. The following section describes current economic and demographic conditions to establish a baseline for assessing impacts of alternative policies proposed in the program review.

The State's Economy

The economy of the state suffered a serious recession in 1982-83, the second in little over a decade. The economy is now considered to have rebounded, but there is continuing concern over the vitality and future of the state economy (House Ways and Means Committee 1985). The direction of economic development in the state will have a significant effect on the allocation of water resources and the beneficial uses of those waters. Conversely, water resource policies may also affect the course and form of future economic development in the state.

Washington's economy has traditionally been based on the timber, metals, and agricultural industries. These industries have suffered severe declines due to periods of high interest rates, higher power costs and sagging international markets for their products. Whereas the forest products industry accounted for 7.7% of the total state employment in 1960, in 1983 it employed only 3.7% of the state work force, partially due to factors mentioned as well as increased reliance on technology. Since 1968, employment in aerospace and forest products, two important industries to the state, has shrunk, declining from 26% in 1968 to 17% in 1983. Over 50,000 jobs have been lost in manufacturing and construction since 1980. Even though high technology has emerged as a force, in the economy it still supports only a small proportion of the state economic and employment base.

In contrast, the service sector of the economy, which employed 17.4% of the total employment in 1960, is now at 26.6%. Wholesale and retail trade has also increased in the last 20 years from 21.4% in 1960 to 24.8% in 1983. Services, retail trade, and finance have grown from 33% of state employment in 1960 to 45% in 1984. On average, jobs in these growing sectors of the state economy pay less than jobs in the declining sectors. Wages and salaries in services and retail trade are roughly half of those in manufacturing.

The shift away from the unionized and highly-paid traditional industries to a lower paid service and trade-oriented economy has had a dramatic effect on per capita income in Washington (arguably the most relevant measure of the well-being of the state's residents). Since 1979 there has been a 10% drop in per capita wage and salary income. If this downward spiral in income levels in the state continues, fewer jobs will be created in other sectors of the Washington economy, as less money will be in circulation to drive new business development (House Ways and Means Committee 1985).

Demographics

The population of the state is currently just over 4.3 million (OFM 1985). By 2000, the population is projected to grow to 5.8 million (OFM 1984). The state's growth rate has been consistent over the past two decades and is anticipated to maintain a rate about twice the national average. During the period of 1970-1980, smaller metropolitan areas dominated growth, while central cities with populations exceeding 2,000 grew very slowly. In fact, 95% of the state's population growth occurred outside the incorporated cities during the 1970's (Agenda 2000 1985).

The distribution pattern of population growth within the state has recently returned to more growth in the central Puget Sound region and slower growth elsewhere, in part due to the slowdown of the forest products and nuclear industries. If the average trends between 1960 and 1980 were to continue, the fastest growth would occur in Western Puget Sound, the Olympic Peninsula, Clark County and northeastern Washington. Northern Puget Sound and the Tri-Cities could expect above-average growth, followed by average growth in Spokane, Yakima, Pierce, Lewis and Cowlitz Counties.

Cities and towns have been annexing territory at an increasing rate over the last five years. Recent annexations have been more numerous than between 1960-1980, but the annexed areas have also been smaller in area and ppopulation (Agenda 2000 1985)

Economic Development in Washington

In response to difficult economic times, Governor Booth Gardner has announced a strategic framework for economic development. The plan is a multifaceted economic development program to promote business growth, attract industry, stimulate trade, and encourage tourism. The emphasis of the industrial growth plans are to attract high technology industries to the state. One of the elements of the plan, Team Washington, provides a structure for coordinating state and local economic development efforts. Designated economic development organizations in each county are the principal contact through which the state can affect local economic development (Team Washington 1985). Major commercial economic growth is occurring in King County (Seattle and east of Lake Washington) and Clark County (Vancouver and surrounding area). New military facilities and expansion of existing operations contribute to economic growth and job creation. The Trident submarine base in Kitsap County has spurred considerable growth on the Kitsap Peninsula. The proposed Everett Naval base is expected to boost the economy in Snohomish County.

Sectors of the Economy

Water resource allocation policies can have both adverse and beneficial effects on the various sectors of the economy. The degree to which a sector of the economy utilizes water is related to the structure of the industry and trends within the economy.

Fishing (sport, commercial and tribal) - The value of fisheries resources can only be partially assessed by economic measures. No standards are available to express in tangible terms the values native American people attribute to fishing as a way of life, and for subsistence and ceremonial uses. Fisheries resource managers and tribal leaders are resistant to "putting a dollar value" on the fish. Doing so could lead to an excessively narrow economic basis for resource allocations affecting fishery resources.

Commercial fisheries have enjoyed bountiful harvests in Washington's waters in the past 100 years. Fish runs in the Columbia River were massive by current standards in the early part of the century. In 1930 salmon and steelhead harvests were up to ten times larger than today. In 1965, the commercial fishery harvest was 111 million pounds of marine fish, valued at $6,500,000. The Department of Fisheries estimated the 1984 Puget Sound yield for commercial and sport salmon at $55.5 million (Puget Sound Water Quality Authority EIS 1986). Recent work published by the Bonneville Power Administration (Calculation of Environmental Costs and Benefits Associated with Hydropower Development in the Pacific Northwest 1986) indicates an annual net value for commercial salmon catches at $96.12 million for the state.

Recreational fishing may have accounted for 2,600,000 angler days in 1965, representing $3,400,000 in expenditures (Pacific Northwest River Basins Commission 1972). The 1986 Bonneville report estimated non-market values for resident sport fishing at $117.5 million for the state of Washington.

The value of all wildlife activities, including fisheries, was thought to be about $800 million in 1983 (Game unpublished 1985). With a multiplier effect, the total economic value to the state of its fish and wildlife resources is believed to be near 3 billion dollars annually. It is estimated that 44,000 jobs in Washington are related to this sector of the economy, and that $310 million in state and local taxes are collected from wildlife activities.

In 1983, fresh fish exports contributed 140 million dollars to the export economy of the state, although that was a 26% decline from 1983 (Odum, 1985). Habitat management programs and hatcheries will account for an estimated $70 million in outlays in the state in 1986 (Caldwell Ecology).

Some estimates of the value of fisheries have been made. The per day per capita value of recreational fishing has been estimated for cold and warm water fisheries in the state of Idaho (Coom et. al. 1985). The net economic value to the nation was estimated to be $43 per trip. When expenses were included, the total monetary value was $66 per trip. The unit values varied: whether the fishing was for cold or warm water fish, the number and size of the catch and the area of the state in which the trip occurred. The extent of a fishing trip ranges from less than one day to a several day outing further varying the per day value. Working documents from the Yakima Enhancement Project Studies have placed the value of a single returning chinook salmon to the Columbia River at about $300 dollars. This value represents the value of the fish that are caught in various fisheries divided by the number of escaping fish required to perpetuate the run (USBR 1986).

Current recreational fishing is estimated to be in the range of 23 million annual activity occasions. Fishing from a boat is the fastest rising recreational activity in Washington. About 40 percent of all recreational fishing takes place from a

bank or pier. Annual activity occasions will probably increase a little less rapidly than they did in the last ten years, but about 1 million additional fishing days will still be added each year. If these estimates are applied to the increasing number of recreational fishing days in Washington, the economic significance to the state's economy is obvious (IAC 1985).

Outdoor Recreation - The scope and variety of recreational resources makes Washington a premier state for leisure activities. Water resources are an important feature of Washington's unique natural heritage that are enjoyed in a wide range of activities. Each year a vast majority of the state's residents visit a shoreline.

Recent trends in outdoor recreation have implications for water resource policies. There is currently less money budgeted for park facilities at the local, state and federal levels. Available resources must be used in the most effective manner to keep up with the growing demand in outdoor recreation. In cases of finite or decreasing supply, such as free-flowing streams, demand may exceed supply.

Real per capita income in Washington has declined since 1979, and people have less money to spend on recreational activities. Therefore, outdoor recreation policies need to better utilize existing recreational facilities and emphasize providing recreational areas closer to home. The supply of the facilities that accommodate the most use, such as camping, moorage, picnic tables and swimming pools, have experienced insufficient growth in supply. Recreational activities that depend on water-related facilities in proximity to urban areas will be increasingly popular.

Facilities for swimming at beaches are provided almost entirely by local and private sources. Almost two-thirds of all boating activities occurs in freshwater in Washington. Fishing is enjoyed by roughly one million Washington residents, as well as tourists. Fishing is done 42% from the bank and 58% from a boat. While there is a growing need for increased sport fishing opportunities, especially those accessible to urban population centers, land use changes have created increased pressure and resources conflicts over the multiple use of water resources.

The recent Bonneville Power Administration study of hydroelectric costs and benefits estimated values for several resources and related uses, among them riparian areas and free-flowing rivers. The values were based on non-hunting and fishing activities. The value of riparian land for recreation and aesthetic appreciation was estimated at $3,625 per acre of habitat. It was noted that this resource is substantially below normal levels in the Northwest (BPA 1986). Assessments of the value of free-flowing rivers supporting recreation and aesthetic enjoyment were also made in the study. A rough estimate of the per-mile value was $226,000, based on a study done in the Seattle area.

Tourism - Tourism is closely related to outdoor recreation in Washington State. Eighty percent of all visitors when asked their reasons for travelling to Washington recalled scenery, mountains, and waterways. Seafood, outdoor recreation and rain rather than culture or cosmopolitan cities were remembered. Most visitors to Washington are middle class, middle aged and well educated.

Tourism is a significant contributor to the state economy. Tourism accounts for $2.3 billion dollars in annual overnight visitor expenditures, over half in King County alone. There are 58 million overnight visits annually in Washington 22.7 million by out-of-state visitors. Restaurants, lounges, hotels and motels receive over half of all tourism dollars spent in Washington. Significant expenditures are also made for transportation, shopping, groceries, liquor, and campgrounds.

Most employment in the tourist industry is low paid, seasonal and part-time work, which attracts young people seeking entry level positions. The wages earned by these employees largely remain in the local economy, giving tourism a relatively large multiplier effect. Tourism also has significant secondary economic effects in transportation, construction and manufacturing where wages are higher and more stable (House Ways and Means Committee 1985).

Agriculture - Washington agriculture has been successful in exporting a wide variety of farm products, making Washington a prosperous farm state. Washington ranked fourth nationally in 1983 in net farm income, even though it was 15th in gross income. The agricultural economy relied heavily on wheat (56.7%), vegetables (19.2%) and fruits (12.4%). Washington ranked fourth nationally in wheat production, first in apples and cherries, and second in potatoes (U.S. Department of Agriculture).

The United States market for Washington agricultural products has had little growth and is highly competitive. Exports are increasingly important to profitability. Washington has not been able to enjoy the worldwide boom in U.S. grains, such as corn, soybeans and other grain crops which are largely grown in the Midwest (Odum 1985). Exports have been slowed by the 1981-83 recession, the strong dollar and increased worldwide competition. The productive capacity of

Washington agriculture has grown, but high energy and transportation costs and declines in farm level real prices have resulted in reduced farm income.

Washington agriculture must look to more diverse, smaller markets for their products. World population growth and increased incomes should create new worldwide market opportunities. Apples and potatoes are two products where effective marketing could result in finding markets for greater supply. Barley is a coarse grain that could be exported in greater quantities if foreign livestock markets recover.

The demise of the sugar beet industry has already taken many irrigated acres out of production. Despite the profitability of potatoes, a decline in potato production is predicted (WSU 1985). This could result in up to 100,000 irrigated acres being taken out of the production in Washington. Wine making, although highly publicized, is not yet a significant agricultural sector in the state. Worldwide and domestic competition, especially from the older and better organized California wine industry, limits the potential for grapes becoming a major product. Dairying is expected to continue to decline as federal buy-out policies further reduce the numbers of producers.

Commercial and Industrial Development - Metal and forest products are traditional heavy industries in Washington. Both of these industries have been hit hard by recession and increased world competition. The loss of high-paying manufacturing jobs has been of great concern to economic analysts. Future industrial development in Washington has been directed toward the high-tech area. There have been successful attempts to attract high-tech firms to this area, especially in fast-growing Clark County. Firms that locate plants in Washington cite a favorable business climate in this state for beginning industries.

The main reason most new companies locate in Washington is because the founder is a native of the state. Other reasons listed are favorable tax incentives, proximity to markets and the quality of the state's educational institutions, which provide an available trained labor force. Reasons infrequently cited are available health services and the state efforts to maintain the environment. The types of high high-tech firms that see more strengths in locating in Washington are biotechnology, research and development, and semiconductor companies. These firms probably rely on domestic markets for their products since there are limited opportunities for export of finished goods to the Pacific Rim countries (Washington High Technology Coordinating Board 1985).

Trade - Washington ports are very well situated to service rapidly expanding trade with other Pacific Rim countries. The top waterborne exports from Washington have traditionally been logs, lumber, aluminum and agricultural products. Forest products-related exports have declined while agriculture, especially corn (24%), soybeans (33%) and apples (17%) have shown strong growth. The top export markets for Washington agriculture in 1983 were Japan ($2.3m), Canada ($1.9m), South Korea ($.76m), Taiwan ($.48) and China ($.23m). Exports to Taiwan increased by 80% that year. Eleven of the top twelve export markets are in the Far East, where Washington has sent mostly raw materials (logs), agricultural products or fish. Foreign competition from newly exporting agricultural nations and the strength of the dollar will work against expanding these markets.

Importation and transportation of foreign raw and finished goods is an important economic activity of Washington ports. Raw materials such as minerals (e.g.: bauxite) and manufactured goods (e.g.: automobiles and electronics) from the Orient enter through Washington ports. Seattle and Tacoma have major marine port facilities. Smaller ports are located at Olympia, Everett, Bellingham, Bremerton, Port Angeles, Grays Harbor and Anacortes. Agricultural products and fuel are shipped to and from port facilities on the Columbia and Snake Rivers.

Energy development and use - Low-cost, abundant electrical energy has been one of the attributes that has attracted industry and employment to the Northwest. However, over-optimistic projections of energy needs led to an overbuilding of expensive thermal power plants and a current energy surplus. Electric energy costs have risen dramatically due to construction of this excess capacity. The default of WPPSS on two incomplete nuclear plants has also brought a new awareness to the area that regional power planning must ensure the lowest cost electrical energy in the future (NPPC 1985).

In recent years the cost of electricity has risen in the region and the cost advantages that key industries previously enjoyed have been eliminated. Although industry is the heaviest user of electrical energy (39%), many of the basic industries are experiencing stagnation. This is particularly true of lumber, pulp and paper, basic chemicals, food processing, and metals. The newer industries that are being attracted to Washington are less energy intensive industries. Although they will experience growth in the future, combined industrial load growth will only be in the range of 0.0 to 2.2% per year.

Residential use is the second largest energy user (36%). It is dependent on the number of households, as various economic assumptions regarding income, energy-using appliances, and conservation tend to balance each other out. Population growth will result in new residential energy demands in the 0.5 to 3.0 percent per year range.

Commercial energy use is the third largest user (20%). The number of employees and total floor space are the most important forecasting variables. A number of economic and engineering factors such as an estimated increase in percentage area air-conditioned and conservation tend to cancel each other. Demand growth forecasts range from -0.3 to 3.3 per year in response to assumptions of the future level of business activity.

Energy use in agriculture increased dramatically in the 1970s as the number of irrigated acres doubled. New irrigation development usually uses pressurized sprinkler systems. Deep well pumping and high lift requirements to new irrigated lands require large amounts of electrical energy. Since 1977, the portion of regional energy use by irrigation has remained constant (5%). Agricultural products are sensitive to increases in the cost of production and sharply higher electrical rates have limited the growth of irrigated agriculture.

Thermal and hydroelectric power planning, licensing of new facilities and rate setting are increasingly concerned with identification of the lowest cost alternatives. The Northwest Power Planning Council has determined the marginal cost of a new generic coal plant in the regional power system to be 4.0 to 4.5 cents per kilowatt hour. This is the accepted avoided cost limit that is used to regulate rate increases, estimate the financial feasibility of new projects and to prioritize potential low cost sources. These priorities currently make conservation the least cost alternative for the region, being in the range of 3.0 to 3.5 cents per avoided kilowatt hour (NPPC 1985).

With a projected twenty year surplus of power in the Northwest, there are few economic incentives for energy developers to commit capital to risky new energy development ventures when surplus power can be acquired at lower cost from nearby utilities. Public utilities have a more secure expectation that the surplus will be available through the public utility preference in federal statutes. Investor-owned utilities, which produce 47% of the electrical power in the northwest, cannot be assured that the less expensive surplus power will be available in the long run. These energy companies will share in a larger portion of the energy production in the future because much of the projected residential and commercial growth will occur in their suburban service areas. The uncertainty in regional forecasts will largely be felt in the areas most likely to grow, in a period when economic projections make it most difficult to forecast needs.

Hydroelectric power development has recently experienced a period of extensive small source development stimulated by the power purchase guarantee of the Public Utilities Regulatory Procedures Act (PURPA). Economic feasibility of small hydroelectric projects is often marginal in the short run, but some are constructed on the long-term expectation of profitability.

Economic Impacts and Water Allocation Policies

Trends in the economy of the state will affect water allocation policies, which in turn affect the feasibility of projects. Some trends will affect the development of additional water resources projects, such as suburban development in the Puget Sound region, growth in new industries, and more emphasis on outdoor recreation. Other trends will have a negative effect on the feasibility or necessity for water resources projects, such as lower fossil fuel prices, a strong U.S. dollar, limited growth in exports, greater attention to instream resource requirements, water conservation, declining per capita income in the state, and an emphasis on economic development of high high-tech industries and tourism. On balance the economic factors that will predominate will tend toward conservation and less water use for reasons of greater efficiency, cost reduction, and structural shifts in the economy.

CHAPTER 5 - RELATIONSHIP TO OTHER RESOURCE PLANNING AND ISSUES

A number of resource planning activities are in progress by federal, regional, state, tribal, and local governments. Some of the resource planning programs that relate most closely to the instream flow and water allocation planning carried out by Ecology are discussed in this section.

United States - Canada Pacific Salmon Treaty

The U.S. - Canada treaty became law on March 18, 1985. The treaty commits both countries to conserving and rationally managing salmon stocks, and providing for optimum salmon production. The treaty aims to stop overharvesting and calls for each country to rebuild naturally spawning salmon stocks by 1998 (Columbia River Intertribal Fish News (CRITF) July-Sept. 1985).

The need for this treaty was evident many years prior to its ratification. The United States and Canada had discussed salmon fishery controls since the 1950s. An earlier attempt to negotiate an agreement was scuttled in 1982 by Alaska's refusal to participate. The formation of the Pacific Salmon Treaty Coalition eventually led to the Pacific Northwest interests being able to work together and the successful completion of the treaty.

Several steps are necessary to fulfill the treaty's potential. Each party must control interceptions and overfishing. Depressed stocks of chinook salmon are to be rebuilt to the maximum sustainable level by 1998. The treaty provides the first step in rebuilding the runs by controlling interception. Once this is accomplished, rebuilding the runs will require that habitat be available for large numbers of returning salmon. Availability of surface water to meet habitat requirements will be important.

The baseline numbers of salmon have been based on current production. This means that to meet treaty requirements, fish populations for each river cannot be degraded below their current levels. In addition, steps must be taken to increase production of stocks which have been identified as depressed runs. The various parties to the treaty must act to enhance these stocks. The implementation of the treaty will be closely related to the watershed planning program now being undertaken by Game, Fisheries and Indian tribes.

Watershed Planning

Washington State courts have ordered that the state fisheries agencies and tribes develop Comprehensive Resource Production and Management Plans (CRPMPs). These plans are to be developed by fisheries managers for each watershed and are intended to enhance fish production, harvest and management. To help develop these plans, the Washington State Legislature in 1985 called for a watershed planning and fisheries enhancement program (Chapter 75.50 RCW).

The Watershed Planning Project for the State of Washington is coordinated and staffed by the Washington Department of Fisheries, Department of Game, and Indian tribes. During the planning process, planners will list constraints and opportunities for habitat protection, production and harvesting of fish, and institutional aspects of fish management. By early 1987, WDF will propose a strategy listing options to overcome constraints or ways to take advantage of the opportunities in watershed planning and management. As a critically important component of habitat, instream flows may become a focus of watershed plans (Fisheries, Game and Northwest Indian Fisheries Commission 1986).

Staff in Ecology's Instream Flow Program and the agencies and tribes responsible for the watershed planning effort share information about the status of watersheds throughout the state. Ecology intends to be closely involved in the development of these comprehensive watershed plans and strategies.

Northwest Power Planning Council Programs

In 1980, Congress passed the Pacific Northwest Electric Power Planning and Conservation Act (P.L. 96-501). The Act created the Pacific Northwest Electric Power and Conservation Planning Council, now referred to as the Northwest Power Planning Council (Council or NPPC) to serve as a publicly accountable body to provide the states and ratepayers of the region a voice in the region's energy planning and related fish and wildlife activities. The Council's eight members are appointed by the Governors of Washington, Oregon, Idaho and Montana (two each).

The Council developed the Columbia River Basin Fish and Wildlife Program in 1982 (revised in 1984) to guide efforts to restore Columbia River fish runs, as well as to improve conditions of resident fish and wildlife. A key component of the Fish and Wildlife Program is the Water Budget for passing migrating salmon and steelhead smolts downstream through the Columbia and Snake Rivers. The water budget is a reallocated block of water used to supplement instream flows in these rivers during the spring. Some loss of hydroelectric generation capability results from this reallocation (NPPC 1984). Other important program elements include efforts to restore anadromous fish in a number of tributary streams including the Wenatchee and Yakima Rivers.

The Council first adopted the Northwest Power Plan in 1983 (revised in 1986) to plan for an adequate and reliable supply of electrical power over the next 20 years at the lowest cost to the region. The power planning function was originally conceived of as, coordinated way to determine how to meet an expected electricity shortfall in the Pacific Northwest (NPPC 1986). This has evolved into a process to determine the best way to cope with an energy surplus that may last twenty years.

Ecology has provided comments to the Council during the formulation of both the Fish and Wildlife Program and the Northwest Power Plan and their amendments, and continues to review and comment on Council activities and issue papers including those relating to fish and wildlife and hydropower. In conducting its planning efforts for the Pacific Northwest, the Council has consistently recognized the role of states in accordance with provisions in the Northwest Power Act.

Although Ecology's water resource planning, allocation and management functions are not bound by the Council's programs, Ecology endeavors to be consistent with them to the extent possible within of state law.

Current Council activities under the Fish and Wildlife Program include:

a study of the salmon and steelhead losses resulting from hydropower development;

the Hydropower Assessment Study which includes collection of available data on anadromous fish, other fish and wildlife resources, and recreational, and cultural or historical resources to be protected from development. The activity addressing resident fish, wildlife, and other river values is called the Pacific Northwest Rivers Study. A follow-up effort, Protected Areas Study, is just beginning;

actions taken as part of the Council's Five-Year Action Plan;

publication of various issue papers including those on: mainstem spill at U.S. Army Corps of Engineers dams; hydropower responsibility for salmon and steelhead losses, salmon and steelhead planning, research, and computer modeling; and genetic considerations in salmon and steelhead planning.

Puget Sound Water Quality Authority

The Puget Sound Water Quality Authority (PSWQA) was created by the Washington State Legislature in 1983 and charged with conducting several studies of Puget Sound's water quality to determine sources and risks of water pollution. The Authority was to give the State Legislature reports of its findings and recommend legislative and regulatory changes to improve Puget Sound's water quality.

In 1985, the State Legislature reexamined the Authority's structure, funding and mandate. They revised the enabling legislation, reduced the Authority membership from 21 to 7, gave the Authority a funding source, and staff, and the following policy to implement:

"...to develop a comprehensive plan for water quality protection in Puget Sound to be implemented by existing State and Local governments..." (RCW 90.70.001)

Throughout 1986, the Authority researched, drafted, and publicized its plan for Puget Sound. The final plan was adopted in December 1986. It states goals and objectives for short and long term management of Puget Sound's water quality. It recommends research needed to develop guidelines, standards and timetables to protect and clean up the Sound. The plan will be revised periodically and the Authority will publish biennial "State of the Sound" reports (Puget Sound Water Quality Authority 1987).

If the Water Resources Program is identified in the plan to help manage Puget Sound's waters, then Water Resource management activities must be evaluated and incorporated as applicable the provisions of the plan (RCW 90.70.070). Water Resources activities will probably not be discussed in the Authority's first plan but may be included in the second or third plans. The areas most likely to be addressed, as they relate to both water quality and water resources, are urban runoff, stormwater runoff, wetland preservation, estuarine fresh water inflow, and recreational uses of rivers.

Hood Canal Coordinating Council (HCCC)

The HCCC was established as a result of Governor Booth Gardner's request that the Ecological Commission develop a regional planning policy for Hood Canal. This was done through an agreement among Jefferson, Mason and Kitsap counties in the fall of 1985 to develop recommendations for accomplishing goals outlined in the Washington State Ecological Commission report "The Future of Hood Canal".

The overriding concern of the HCCC is the enhancement and protection of water in the Hood Canal watershed. This includes the lands and activities that occur on lands which drain into the Canal and the streams and marine waters of the Canal area. The first goal of the HCCC is to "maintain and improve the water quality in Hood Canal". Other goals include preserving and enhancing aquaculture, shellfish, and fishing industries, preserving and enhancing recreational activities, preserving natural habitat areas and ensuring that upland management remains compatible with HCCC policy.

From December 1985 to the present, the HCCC has met regularly in communities around Hood Canal. These public meetings, were organized around these general topics: intergovernmental organization, nonpoint source pollution, land use, forest management practices, and physical properties (soils, hydrology) of Hood Canal. The result of these meetings was the Hood Canal Regional Planning Policy, adopted in November 1986.

The policy discusses a variety of resource use and development issues, focusing particularly on water quality. One policy requires that future development proposals be reconciled with the concept that further loss of salmon and trout habitat is unacceptable (HCCC 1986).

State and Federal Wild and Scenic Rivers

Wild, Scenic or Recreational River segments can be designated by Congress under the federal Wild and Scenic Rivers Act (Public Law 90-542). Stream segments eligible for inclusion in the national system must be free-flowing and possess outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural or other similar values. Wild river areas must be free of impoundments and inaccessible except by trail in primitive areas. Scenic river areas must be free of impoundments with largely undeveloped shorelines which may be accessible by roads in places. Recreational river areas may have some shoreline development and impoundment or diversion, and access by road or railroad.

Generally the Departments of Interior and Agriculture are responsible for studying and recommending to Congress additions to the national system. Once a segment is designated, Interior or Agriculture prepares a management plan for the segment. Designation results in strong limitations on new dams and other development (Congress 1968).

In Washington, portions of the Skagit, Sauk, Suiattle and Cascade Rivers have been designated in the federal system. These segments are administered by Agriculture's U.S. Forest Service (Congress 1978). The Forest Service has published its management plans for these segments (USFS 1983).

In 1982, the Department of Interior, National Park Service, published the Nationwide Rivers Inventory. The inventory compiled data on the nation's significant free-flowing streams to 1) provide baseline information for decision-making regarding development and conservation of rivers, 2) to assist and encourage non-federal river conservation, and 3) permit identification of additional rivers for the National Wild and Scenic Rivers System. Rivers on the inventory are free-flowing, relatively undeveloped and possessing one or more outstanding characteristics as identified in the Act. Twenty-six Washington rivers are included in the inventory (USDI, National Park Service 1982).

State designation of scenic rivers occurs under the authority of the State Scenic River Act (Chapter 79.72 RCW). The Act establishes a committee of participating agencies (state and local) to assist the State Parks and Recreation Commission in assessing and recommending river segments for inclusion in the state system, and preparing management plans for designated segments. Additions to the system require legislative approval. State designation principally affects management of publicly owned lands. The Parks Commission may purchase lands or public

easements, but eminent domain may not be used to acquire land or access rights. The Act directs state and local governments to pursue policies to conserve and enhance the conditions of rivers in the system.

According to the Act, a state scenic river should be free-flowing without diversions that hinder recreational use, have a relatively unmodified channel, good water quality and quantity, a natural setting with open space, have some land already in public ownership or capable of purchase or dedication. When passed in 1977, the Act included as initial segments of the state system parts of the Skykomish, Beckler and Tye Rivers in Snohomish counties. No segments have been added since that time, and due to resource constraints, State Parks has not finalized a management plan for the initial segments. However, State Parks has recently re-initiated work under the Act to identify additional segments for inclusion in the state system and to finalize a management plan for the existing segments.

National Forest Planning

The 1974 Forest and Rangeland Renewable Resources Planning Act (RPA) and the 1976 National Forest Management Act (NFMA) directed the U.S. Department of Agriculture Forest Service to evaluate its resources and develop plans which would look at environmental consequences of alternative standards and guidelines for resource management. The NFMA requires development of alternative guidelines for seven specific management practices. These relate to silvicultural systems, size and dispersal of openings, biological growth potential, management intensity and utilization standards, unit of measure, air quality, and utility and transportation corridors. Forest plans in the Pacific Northwest Region (Region 6) are also required to analyze alternative management strategies for the northern spotted owl.

The Regional Plan guides planning at the Forest level, identifying issues and alternatives. The Forest Plans analyze the consequences of implementing various management strategies, and evaluate impacts on various objectives. Forest Plans contain the provisions of NFMA, the implementing regulations, the Regional Guide, and other documents. Land use determinations, prescriptions, and standards and guidelines are a statement of the Plan's management direction.

Each Plan contains an analysis of the management situation, which analyzes benchmarks of resources such as timber, present net value, forage, wildlife habitat and recreation. Forest planning will determine forest management and use. This in turn will affect the hydrology and quality of waters from the National Forests, among other resource outputs.

Coordinated Water System Planning

Coordinated water system planning, authorized by the Public Water System Coordination Act (Chapter 70.116 RCW) is a process for public water suppliers (two or more service connections) in an area to consider common water supply problems. The coordinated water system plan, adopted by the local water utilities, covers one or more public water systems. It identifies present and future needs of the participating water systems and the most efficient means to meet those needs. The plan must contain the elements of a comprehensive water plan, as required by the Department of Social and Health Services, with the addition of future service area designations, assessment of the feasibility of shared source, transmission, and storage facilities and other mutual regional concerns. County approval of the coordinated water system plan is sought and when received the plan is sent to Ecology for review. Final approval is by the Department of Social and Health Services. Once approved, the plan guides source development and system improvements.

Water Supply Reservations

Any person desiring to reserve water for future public water supply may file a petition with the Department of Ecology requesting establishment of a reservation for future public water supply, provided they have a Coordinated Water System Plan approved by the secretary of the Department of Social and Health Services (Chapter 173-590 WAC).

The public water supply reservation program is the preferred method to secure future water sources when current public water supply facilities are adequate, but future capacity to meet expected demand growth is in doubt. A regulation establishing a reservation for future public water supply and water rights subsequently issued under that reservation has a priority date as of the effective date of adoption. All subsequent rights issued for other uses are junior in priority to rights issued under the reservation.

Reserving waters by administrative rule is considered the same as an appropriation of water by permit under the Water Code (RCW 90.03.345 RCW). For that reason, the department must be sure that the waters will be available and put to beneficial use. Both surface and ground waters may be reserved for any beneficial out-of-stream use including domestic, industrial, irrigation and other uses. Instream uses may not reserve water in this manner.

Yakima River Basin Water Enhancement Project

The Yakima River Basin Water Enhancement Project (YRBWEP) planning study is a cooperative effort of the United States Bureau of Reclamation (Reclamation) and Ecology. The goal of the planning study is to identify measures that will help resolve critical water supply problems in the Yakima River basin of central Washington. The study's four central objectives are:

1) provide water to increase instream flows for protection and enhancement of anadromous fish;

2) provide water to supplement irrigation supplies on some presently irrigated lands that do not now have an assured water supply;

3) provide water for new irrigation development on the Yakima Indian Reservation;

4) develop a comprehensive water management plan for the basin to improve efficiency in utilization of available water supplies (Reclamation and Ecology 1982).

The Yakima basin is one of the largest drainage basins contained wholly within the state of Washington. It is estimated the basin once supported in excess of one-half million returning adult salmon and steelhead. Irrigation development beginning as early as the 1850s and later dam building in the basin and on the Columbia River contributed to a dramatic reduction of these runs to as few as several thousand fish by 1980. The basin now supports one-half million acres of irrigated farmland. Three drought years in the 1970s underscored the vulnerability of both fisheries and agriculture to the basin's limited water supply.

Studies of the feasibility of additional storage alternatives and water conservation measures began in 1979 and have been documented in three reports. (Reclamation and Ecology 1982, 1985, 1986). The most recent report discusses a process plan formulation and evaluation, and presents four alternative plans for further analysis. Each alternative involves a mix of new storage and conservation (Reclamation and Ecology 1986). The next phase of the planning study will be preparation of a Planning Report and Environmental Impact Statement, public review, and, selection of a preferred alternative that can be recommended to Congress and the state legislature.

The significance of the Yakima Enhancement study to the state's instream flow and water allocation program review relates to the basin's physical and cultural setting. The basin has all of the significant water-related issues that must be faced statewide: fully appropriated streams, inadequate instream flows, existing rights including tribal water claims and treaty fishing rights, depressed (but recoverable) fisheries, competing water uses, uncertain water supplies and water conservation opportunities. The YRBWEP planning studies provide one model of state/federal cooperative planning in a regional (multiple WRIA) setting.

Local Land Use Planning

Counties and cities are authorized by state law to carry out land use planning and to adopt related ordinances necessary to implement land use plans. Most often these ordinances take the form of zoning. Through these plans and ordinances, local government can control and direct growth and land use conversions. An administrative system is normally established to approve building and development in accordance with the zoning ordinances.

Cities and counties are also authorized by the state Shoreline Management Act (Chapter 90.58 RCW) to zone and control development along shorelines within their jurisdiction. Each jurisdiction has developed a shoreline master program establishing policies, shoreline zones, and permitted uses. Local government administers a permit system for approval and conditioning of proposed shoreline developments.

Local land use planning and administration is an important function that is, or should be, closely coordinated with state water resource planning and management. Water resource plans and regulations may determine whether water is available to support growth. Natural water features such as lakes and streams are amenities that tend to attract developments, especially for housing and recreation. Land development affects the demand for water. It may also alter runoff patterns and can drastically affect water quality and channel morphology in small basins. Protection and rehabilitation of urban and suburban streams has been undertaken in many parts of the Central Puget Sound region by local government and private groups.

Indian Treaty Rights

Indian treaty rights pertain to the states' water allocation program in at least two ways, those being reservation-related rights referred to as Winters doctrine rights, and treaty-based fishing rights. For a more in-depth discussion, see Appendix I. Reservation-related rights are among the federal reserved rights which reserve water at the time of reservation establishment to satisfy the purposes for which the land has been set aside. The priority date for such rights is the date of creation of the reservation. Most such rights are as yet unquantified in Washington. These rights are generally affirmed and quantified as part of state general adjudications of water rights on a basin by basin basis.

In addition to reserved water rights, treaties and court decisions support tribal rights to take fish in usual and accustomed areas. The U.S. v. Washington Phase I decision allocated approximately 50% of the salmon in the case area to tribal fishing, and recognized the tribes as co-managers of the fishery with the state. In the U.S. v. Washington Phase II case, the tribes made the argument that the right to take fish implied a right to have the fish and habitat protected. Tribes view the taking of fish as a property right; property rights imply protection of the exercise of the rights. Although this case has been heard in several forums, no final resolution has been reached on the validity or extent of the environmental protection right or the obligation of the state to preserve fish habitat supporting tribal fisheries.

CHAPTER 6 - ASSESSMENT OF SIGNIFICANT ENVIRONMENTAL IMPACTS

Introduction

This section of the EIS evaluates the probable significant impacts on the natural and human environment of each alternative. Because these alternatives are programmatic, describing general program directions, the impacts are necessarily general and qualitative.

The selection and implementation of a planning process and subsequent adoption of instream flow regulations and water allocations do not themselves impact the environment. Only when water rights are issued and use initiated, or when applications are denied in accordance with the regulation, are environmental or socioeconomic impacts possible. On a pristine stream, the level of instream flow protection is immaterial as long as no water rights are requested, because until then no change occurs in the stream flow levels.

To evaluate impacts, it has been assumed that appropriations would reduce water levels to the instream flow level proposed in each alternative. Although some time would be required for streams with plentiful water to be dewatered to "survival" levels, impacts have been assessed at that level as appropriate.

The baseline which has been assumed is the current condition of the environment and various resources. Some rivers and streams are still in pristine condition, while others have been extensively impacted. The current status of the natural and built environment is the standard against which each alternative's impacts have been assessed. For example, the baseline for fisheries is the current level of fish production. Each time a water right is issued which lowers flows below those currently available and optimal for fish, production is impacted.

Aquatic Resources and Habitats

No Action (Status Quo) Alternative - This alternative would protect aquatic resources fairly effectively but not fully. The 50 percent exceedance flow cap and 90 percent minimum habitat protection limit would result in incremental impacts on fish production and other aquatic resources over the long term by allowing available habitat to be reduced. Habitat might be reduced by up to 10 percent by appropriations on streams where optimum fish flows exceed the 50 percent exceedance flow and flows are set at that level.

Generally, the 50 percent maximum is more likely to present a problem on creeks and small to medium-sized rivers during the summer and fall rearing and spawning seasons. This would be mitigated on many (but not all) small streams by closure to additional appropriation. According to available IFIM studies, larger rivers (e.g. Skagit and Lewis) appear to normally have adequate water to meet or exceed optimum flows. On large rivers, optimum flow requirements typically fall below the 50 percent exceedance level.

In some areas, offstream diversions have already severely impacted fish populations. On these streams, establishment of suboptimum instream flows using the 90 percent of habitat and 50 percent exceedance flow standards could lead to further declines in fish populations and other aquatic species. On anadromous streams with present full utilization of habitat and optimum flow availability, application of these standards would cause declines in productivity. In other streams, excessive harvest, fishing of mixed hatchery and natural stocks, pollution or other environmental problems presently prohibit the full utilization of available habitat. In some cases these factors may be more limiting to fish production than low flow levels. If outside causes of low production were changed, low instream flows could become the limiting factor in production.

Closure of small streams to additional consumptive appropriation would be beneficial for aquatic resources. Closure preserves the natural flow minus the amount of diversion under existing water rights.

The exemption of single domestic use from instream flow requirements and closures, may in some locations (especially on small streams), impact instream resources. Each of these exempted diversions has only a minor impact by itself. Single domestic rights are typically issued for 0.01 to 0.02 cubic feet per second (cfs) maximum rate of diversion and one to two acre-feet of water per year. (One acre-foot per year = 0.0014 cfs or about 0.62 gallons per minute on annual average basis.) Less than even this small amount is normally consumed. In most cases, the water used in-house is returned to the ground and eventually to the stream through an on-site waste treatment system. Some water used outside is lost to evapotranspiration. If the average exempted single domestic diversion right is issued for 1.5 acre-feet per year, and it is conservatively assumed that all of the water is consumed, 48 such rights would be required to have an average consumptive impact on the stream of one tenth of one cfs. This could be significant on a very small creek but

of virtually no consequence on larger streams. As more exempted single domestic diversions were authorized, the cumulative consumption of flows could slightly increase the frequency of minimum flows being violated. This in turn would slightly increase the likelihood of enforcement against rights subject to the flows.

Only limited conservation would occur under this alternative. In addition, only a limited effort would be made to improve flow conditions on heavily appropriated streams. Where diversions were reduced, there could be beneficial effects on aquatic resources.

Out of Stream Alternative - Extensive out-of-stream development limited only by low "survival" level instream flows would severely impact aquatic resources. The flows would be set at levels well below the average or median flow level. Under natural conditions, a broad range of stream flow conditions affect the production of aquatic organisms. Under this alternative only a low level of flow would be protected from development. This would increase the frequency and duration of low instream flow levels capable of damaging aquatic species.

No IFIM studies would be performed by Ecology to determine fisheries needs. No methodology has been established to ascertain threshold "survival" flow needs for fish. The assumption in this approach is that fisheries stocks could maintain viability at these low levels of flow. Use of professional judgement would be necessary, putting the resource at some risk in the event of misjudgment. In larger streams, remnant fish populations would probably survive but be unable to sustain recreational or commercial fisheries. In small streams, continued production of many aquatic species, especially larger cold water fish like salmon and steeled, would be doubtful at low stream flow levels.

Other factors which are not usually critical would become more so at very low water levels, including reduced cover, food supply, and water quality (especially temperature), predation, and competition for space and food. If a population were on the edge of viability, prolonged low levels of streamflow could cause its extinction. Fish migration could be interrupted or prevented by stressful conditions and low streamflows.

The possibility of a permanent waiver from instream flows means water levels could be further reduced. Exempted small water uses could also incrementally impact flow levels. The cumulative effects of extensive withdrawal on aquatic resources would be severe. Only limited conservation would occur under this alternative.

Instream Protection Alternative - This alternative would provide full protection to instream resources in future instream flow setting. The preservation of optimum flows would benefit aquatic organisms and secondarily water-dependent species. Out-of-stream diversions subject to the optimum flows might probably have a beneficial effect on the flow conditions for aquatic species by reducing overly high flows.

A strong conservation program and transfers of water from offstream to instream could increase instream flows. The restoration of flows on currently heavily appropriated streams could enhance fish production on a number of stream systems. The potential improvements in water temperature, quality, and quantity could also favorably impact aquatic organisms. The cumulative effects of this alternative on instream species would likely be positive.

Needs Assessment and Allocation Alternative - The effects of this approach on aquatic resources would vary. In cases where optimum flows or closures were set, effects would be beneficial in that present productivity and populations would be maintained. Where "survival" flows were set, aquatic resources would be affected as discussed in the second alternative. Instream flow improvements, water conservation, and offstream to instream transfers could improve habitat conditions on selected streams.

The overall effect of this approach would be a cumulative negative impact on actual or potential production of aquatic resources compared to existing conditions. This would be due to the reduction in habitat on streams selected for future development combined with limited capability to enhance other already impacted streams.

Coordinated Resource Planning Alternative - The effects of this approach on aquatic resources would likely be mixed. Optimum flows or closures would be set where compatible with resource plans developed by Fisheries, Game and the tribes, or possibly other agencies. Aquatic resources would benefit from flow maintenance or enhancement. In areas where resource plans did not favor natural production of fish, or where resource management prohibited the full utilization of the habitat, Ecology could set or revise flows to as low as the "survival" level. The effects of "survival" flows on other "non-managed" aquatic resources would be the same as discussed for the out-of-stream alternative. Exemption of single domestic and stock use would slightly increase the frequency of instream flow shortfalls. Instream flow improvements, water conservation and offstream to instream transfers could help improve habitat conditions on selected streams.

Riparian Plants

No Action (Status quo) Alternative - Impacts to riparian plant communities would be relatively minor, as this alternative would protect fairly high levels of flow. Some minor adjustment in the distribution of riparian vegetation might occur over time if flows were reduced enough of the time.

Out of Stream Alternative - Because of significantly reduced flows and more frequent and longer periods of low flow, this alternative would be likely to impact riparian vegetation. The margin of the riparian zone could migrate toward the stream channel, putting pioneering riparian vegetation at greater risk of damaging floods. In extreme dewatering situations, the channel could be encroached upon by vegetation, especially if flows were stabilized with no flooding (as with a reservoir). The remaining vegetation-free zone might become much narrower than under natural conditions. Stabilization might also result in changed riparian species and distribution. Dewatering could impact rare or unique plant species.

Instream Protection Alternative - The effects of this alternative would likely be beneficial in that ecosystem functions would be maintained in their natural condition, with flows freely fluctuating within a natural range. The restoration of flows on streams previously overappropriated might allow the reestablishment of riparian vegetation. Since development of new dams and diversions would be less likely under this alternative, impacts from flow stabilization at low flow levels discussed in the previous alternative would be less likely.

Needs Assessment and Allocation Alternative - The effects of this alternative would be mixed. In streams where optimum flows were set, riparian plants would generally be affected as described under the previous alternative. In streams where flows were set at low levels effects could be severe, as described under the out-of-stream alternative, depending on the characteristics of the affected stream. In total, a net loss of riparian habitat compared to the existing situation.

Coordinated Resource Management Alternative - The effects of this alternative would also be mixed. In streams protected by optimum flows as indicated by resource management plans, riparian vegetation would be affected as described above for the instream protection alternative. This would be subject to change if Ecology later reduced flows. Areas in which flows were set at low, "survival", or other suboptimal levels would undergo impacts such as those described under the out-of-stream alternative. The geographic extent of such flows might be less than under the out-of-stream alternative.

Wildlife Resources and Habitats

No Action (Status quo) Alternative - Under this alternative, more than adequate water would be available for wildlife to drink. Habitat availability might be affected, depending on the seasonality of use compared to timing of reduced flows. Because this alternative could lower flows and affect fish populations, wildlife dependent upon fish for food would likely be impacted. Reduced water levels could impact prey species and their habitat (see discussion of effects on riparian vegetation above). Since aquatic organisms provide food for numerous water-dependent or water-using species, reductions in the numbers of fish and benthic organisms would affect predators and scavengers. Use of streams by wildlife such as furbearers or waterfowl for foraging, cover, and breeding could also be affected. In areas where existing rights have impacted wildlife resources, impacts related to water levels would continue. Significant impacts on wetlands would not be anticipated; near heavily appropriated streams, wetlands may have been affected through interference with the flow regime, water levels, and recharge.

Out of Stream Alternative - Because this alternative would prohibit the total dewatering of streams by diversions, adequate water would probably remain to supply wildlife drinking water. Impairment of water quality through reduced dilution ability might negatively affect suitability for drinking. Withdrawal of the water's edge away from riparian cover might expose wildlife using water in mid-channel to greater risk from predators (including man).

Significantly reduced streamflows would result in moderate to severe effects on fish and other aquatic organisms, indirectly affecting wildlife dependent upon these species as prey. Some species might benefit in the short term from low flows and the inability of aquatic species to escape. Reduction of prey species abundance would eventually be detrimental.

Severe and long-term reductions in flow levels could change the composition and distribution of riparian vegetation. This could in turn affect wildlife distribution and species composition. Chronic low flows might result in insufficient

water to meet habitat requirements for foraging, breeding, and hiding. Rare, unique or threatened or endangered species could be impacted by long-term flow alterations and associated changes in habitat.

Wildlife and bird migration routes could be affected directly and indirectly. Dewatering of streams could eliminate prey, or routes of travel for some species. Development encouraged by this alternative, including dams, roads, and pipelines could interfere with migration.

Effects on wetlands from reduced flows might include disruption of the local hydrologic regime and subsequent changes in floral and faunal composition. Wetlands deprived of adequate inflow could eventually undergo eutrophication and disappear. If ground water recharge to the associated stream were affected, associated wetlands could be impacted by changes in hydrology. Lowered inflow to estuarine wetlands might affect biological productivity in these critically important areas.

Instream Protection Alternative - Preservation of optimum flow levels would benefit terrestrial and aquatic species dependent on water flows. Abundance of prey species would mean more stable and numerous populations of species at higher levels in the food chain. This alternative would retain a more natural range of flows than the two previous alternatives, and the interdependent ecological characteristics of plant and animal communities would be maintained. This alternative would provide good protection for most wetlands in that natural flow regimes would undergo little change.

Needs Assessment and Allocation Alternative - Impacts would depend upon the water allocation for each stream. Those with optimum flows would not be significantly affected, as in alternative three. Those streams selected for lower instream flows and favored for water development would be affected as in alternative two. The cumulative effect of this alternative would be a net reduction in the quantity and diversity of wildlife directly and indirectly dependent on water flows.

Aquatic and wildlife populations and habitats remaining intact might receive more human pressure due to the relatively greater scarcity of such areas, which might create more use-related impacts. Reduction of fish populations in some streams might have far-reaching effects on marine ecosystems, as well as localized terrestrial and aquatic systems.

Under this alternative, wetlands would be affected in different ways depending on the water allocation for associated streams. Depending on the extent of ground water flow, wetlands dependent upon "survival" flow streams could be negatively impacted. Changes in species and ecosystem composition could result. For streams and affected wetlands for which optimum flows were set there would be little effect.

Coordinated Resource Management Alternative - Same as in the previous alternative.

Water: Physical Properties

No Action (Status Quo) Alternative) - This alternative would result in changes in the hydrologic characteristics of streams by allowing the diversion of above-average flows. Low flow characteristics would not be affected unless waivers were granted or exempted uses were significant. Flows at or approaching the instream flow level would become more frequent and of longer duration.

Water quality would not be greatly affected because protected flows would be relatively in line with the normal flow range. Reduced flows could result in a minor reduction in dissolved oxygen due to lower turbulence. Summer temperatures could be slightly higher than under natural conditions. Less water would be available for dilution of pollutants.

In streams which have been over-appropriated, streamflow, temperature, and water quality are often problems. Very limited restoration of flows on heavily appropriated streams would be attempted under this alternative, except such activities as are currently established practice.

This alternative is not foreseen to have much effect on ground water. No formal coordinated surface and ground water planning by Ecology presently occurs. One effect of setting instream flows and seasonal closures is the probability of increased reliance on ground water.

Erosion, sediment transport and deposition should not be affected to any appreciable degree unless sizable dams were constructed.

Waterfalls and other features are discussed under scenic resources.

Out of Stream Alternative - The primary effect of this alternative on stream water would be to greatly reduce the amount left instream. Stream flows at all but the lowest levels would be reduced by diversions. Flows at the "survival" level would be more frequent. In extreme cases of intensive offstream development, the instream flow could become the maximum flow due to the effect of diversions.

The proportion of streamflow made up by ground water inflow would be greater. Water velocity and depth would be reduced. Streambank erosion might be lessened; reduced streamflow and velocity would affect transport of sediment and bedload. Delta formation could be impacted. A further effect might be salt water intrusion upriver from estuaries with associated impacts on wildlife and vegetation.

This alternative could severely affect water temperature, dissolved oxygen, dilution ability and other aspects of water quality due to chronic low flows. The saltwater/freshwater balance in estuarine areas might be affected by streamflow changes.

Instream Protection Alternative - Only water above optimum flow levels would be available for appropriation under this alternative. High flows would be reduced by the amount appropriated. For streams with few present diversions, flows approaching the optimum would become more frequent as increased diversions reduced overly high flows. Low to medium flow characteristics would not change. Water quality problems, such as high temperature and low oxygen, would not be worsened under this alternative.

Conservation, offstream to instream transfers, and efforts to improve flow conditions of heavily appropriated streams would tend to restore more natural flow and improve water quality conditions.

Transport of sediment and bedload material, and interaction between fresh and salt water in inter-tidal areas would function normally. Some minor reduction in flooding might result from appropriation of high flows.

Impacts to ground water would be expected as development occurred to provide uninterrupted water supplies.

Needs Assessment and Allocation Alternative - The needs assessment and allocation alternative would have mixed effects. In those streams where water has already been extensively diverted, and for streams allocated for development and subject to a low instream flow, effects might either continue to be significant or become so in the manner discussed for the out-of-stream alternative. Water quality problems already present might be exacerbated by lowered stream flows. For streams for which optimum flows were maintained, the effects would be the same as those described in the instream protection alternative. Conservation, offstream to instream transfers, and efforts to improve flow conditions of heavily appropriated streams would tend to restore more natural flow and improve water quality conditions.

Coordinated Resource Planning Alternative - The effects of the coordinated resource planning alternative would be mixed. In streams with optimum flows, effects on water quality and quantity would be minimal. Conservation, offstream to instream transfers, and efforts to improve flow conditions of heavily appropriated streams would tend to restore more natural flow and improve water quality conditions. In streams where flows were either set low initially or lowered at a later time, the impacts on water quality and quantity would generally be as previously described for the out-of-stream alternative.

Aesthetics: Scenic Resources

No Action (Status Quo) Alternative - Under current statutes and practice, aesthetics are considered on a case-by-case basis. No particular method has been adopted by the department to quantify aesthetic flow needs or water levels. A continuation of current practice would require subjective evaluations of such needs by Ecology. No extraordinary effort would be made to be consistent with Federal Wild and Scenic designations. State law requires that Ecology be consistent with State Scenic River designations. Some reduction of aesthetic value could occur at some water features due to reduced stream flow.

Out of Stream Alternative - The out-of-stream alternative would likely have negative effects on aesthetic values. The reduction of flows to low levels would impact waterfalls and other outstanding natural or scenic features. Lowered inflows could impact lakes. There would be little opportunity or incentive to cooperate with state and federal programs

protecting scenic or wild rivers. Water allocation policies and low instream flows could directly conflict with these resource preservation programs.

Instream Protection Alternatives - The instream protection alternative would preserve aesthetic resources to the greatest extent of the five alternatives. Flows would be set taking into account optimum flows for all statutorily cited instream resources including aesthetics, although no method currently exists for measuring incremental effects on aesthetic value from varying levels of flow.

For streams selected to remain pristine, aesthetic resources would be fully protected. Optimum flow levels would also provide the opportunity to cooperate with state and federal programs related to wild or scenic rivers. Lakes would be protected by having both the inflow and minimum lake levels protected. Waterfalls and other outstanding features would also be preserved. A method for better quantifying aesthetic flow requirements would need to be developed.

Needs Assessment and Allocation Alternative - Under the balanced assessment and allocation alternative, aesthetic resources would receive variable treatment. On streams with optimum flows, impacts would generally be minimal. On streams with very low flows, aesthetics would likely be severely impacted. Valuable aesthetic resources would be considered in the regional planning and assessment. Streams which remained fully protected could experience increased use, as they became relatively more scarce.

Coordinated Resource Planning - The effects on aesthetics under this alternative would be variable, but generally positive. In cases where outstanding natural features and water falls have been formally recognized and identified by the state or federal government as deserving of special consideration, instream flows would be set at levels adequate to protect these features. If necessary, closures would prohibit all development that would affect these features. In areas lacking in highly valued features, or where other agencies' plans and policies elected not to provide protection, flows lower than optimum would probably be considered. Local aesthetic features would likely be impacted under lower flow regimes.

Recreation

No Action (Status Quo) Alternative - Under this alternative recreation resources would receive partial protection. In setting instream flows, no technical methods would be used to determine recreation flow needs. Recommendations for recreation flow needs would be sought from experts. Recreation would be a secondary consideration, generally after fish.

The flows set under this alternative would probably satisfy the needs of some user groups. For other recreation uses, they would be lower than desired. Recreation than can accommodate itself to or benefit from 50 percent exceedance flows would continue to be provided for under this alternative. Lower summer flows would make boating more difficult but could improve swimming and wading conditions. Any flow-related reduction in populations of fish would have a negative effect on recreational fishing. Under the current approach to instream flow setting, generally the instream flow is set lower than the 50 percent exceedance flow during the high flow spring run-off. This would not protect the heavy run-off quantities used by white water kayakers and canoeists. White water boating seasons would be shorter due to diversions.

Out-of-Stream Alternative - Since the out-of-stream alternative would set flows at a very low level, many types of recreation would be poorly protected. Both water-dependent and water-related recreation would be severely impacted. There would be reduced frequency of flows suitable for kayakers, canoeists, boaters, and rafters. Fishing interest and success would probably be lowered due to reduced fish populations. For summer swimming in rivers, decreased flows might create pools, which might benefit swimmers.

Numbers of people who drive or hike to waterfalls or other features for viewing might be reduced. National and state wild and scenic river programs could be impacted, especially in stream reaches not protected by federal ownership from development. The already unmet demand for various types of recreation would be further aggravated by increasing population and a reduction in the number of suitable recreation sites and free-flowing rivers.

Instream Protection Alternative - The flows for the instream protection alternative would be developed using both fisheries requirements and those of other instream activities and resources including recreation. Recreation requiring high flow levels might benefit most from this approach. Since restoration of flows on heavily appropriated streams would be a goal on at east some rivers, river recreation might be enhanced compared to current levels.

Fisheries-related river recreation activities would benefit the most from this alternative relative to the other alternatives, as a result of healthy fish populations. Wildlife viewing and water-related hunting would also be likely to benefit. Recreational viewing of scenic resources would also receive favorable treatment under this approach.

Opportunities to cooperate with state and federal programs to designate and protect rivers would exist. Other rivers not designated by those agencies but still having recreational attributes would also remain available for public enjoyment.

Needs Assessment and Allocation Alternative - Under the needs assessment and allocation alternative, the impacts on recreation resources would vary. The impacts from very low flows would be as those described in the offstream alternative; the impacts of setting optimum flows would be those described under the instream protection alternative. Reduction in recreation opportunities due to allocation of some streams to out-of-stream use might lead to elevated demand and overcrowding on remaining stream recreation resources.

Coordinated Resource Planning Alternative - Under this alternative, recreation resources would be maintained on streams where optimum flows were established. If resource agencies designated a stream for natural production or a management strategy which required optimum flows, or if State Parks designated a river under the scenic rivers program, this would lead to optimum flows being set.

The impacts to recreation resources and activities would be mixed, since flow levels could vary. Instream flows set at less than optimum would likely negatively affect recreation. A heavier demand on remaining resources would be the result of flow reductions on some streams.

Water Use and Availability

In many areas summer low flows are already inadequate to satisfy demands of both instream and offstream uses. As population and demand increase, additional surface water sources in the state will reach this point. Each alternative would affect water availability for offstream use differently, but under any scenario, water quantity eventually becomes a limiting factor. Effects of the alternatives on instream values have been discussed in previous sections. Effects on out-of-stream uses are discussed in the following sections.

Municipal and Domestic Water Supply

No Action (Status Quo) Alternative - Under this alternative, future municipal and group domestic water supply would be limited by instream flows based on the standards of the 90% of optimum habitat protection as indicated by IFIM studies, and the 50% exceedance flow. Water supply diversions would be restricted during low flow periods in the summer and early fall during many years, the same period of highest water supply demand. Shortages could occur and voluntary conservation measures would be advised. Water rights issues under this alternative could be expected to be curtailed on a average of 50 percent of the time.

Alternative or supplemental ground water sources, transfer of existing rights, or expensive storage would have to be pursued to obtain acceptable system reliability. Where no alternative or supplemental sources were available, development of new water supplies would be precluded and growth restricted. Conservation measures could be instituted to alleviate this.

Some small surface water streams would be available for appropriation, although relatively high instream flows would apply, particularly on smaller streams. Stream closures are often recommended by the resource agencies for small streams, especially in urban areas, and this limits the surface supplies available for small water systems. More group and single domestic water systems are supplied by ground water and springs than by diversions from streams, so relatively less impact might be felt by these entities. Single domestic supply (at least in-house use) would be exempted from instream flows under this alternative. In some cases this could result in the proliferation of single domestic diversions.

Out-of-Stream Alternative - Under this alternative, more water would be available for municipal and domestic uses because of low instream flow levels. The frequency of regulation to protect "survival" level instream flows would be low. Maximum yields could be developed from rivers protected only by "survival" level instream flows. Single domestic use would be exempted even from these low instream flows. There might be little incentive for competing municipalities to cooperate in water supply project development, and streams would be selected for development of municipal and domestic supplies based on least cost. This alternative would allow proliferation of small, often inefficient water systems. Development could be located anywhere a free flowing stream was available. Interference

with other rights could occur if out-of-stream diversions were not carefully designed and located. Conservation and efficiency improvements would not be required.

Instream Protection Alternative - New municipal and domestic water diversions (including single domestic use) would be severely constrained by being subject to optimum instream flow provisions. Interruptions of diversions would occur frequently. For relatively long periods during the year, water would possibly be unavailable from surface water sources. Mandatory conservation programs would be implemented for new and existing water supply systems, reducing total demand and leaving more water instream. Ground water resources would be developed wherever possible in lieu of or to supplement surface water diversions. Water systems with few supply options would tend to combine into more efficient operations. Annexations of small systems by towns and cites might occur if they were considered water-rich, and other surface and ground water supplies were limited. Existing water rights might be subject to preemption to allow instream flow enhancement and restoration on heavily appropriated streams. Water availability for offstream diversion would be severely limited under this alternative and could limit or stop growth in some areas.

Needs Assessment and Allocation Alternative - This alternative could accommodate municipal and domestic supply development, especially in fast-growing regions. Municipal and domestic diversions would be permitted on selected streams. This would reduce the uncertainty over which rivers would be acceptable for development of new water sources. It might not result in the least possible cost for water, normally the overriding criteria for source selection. New development would be subject to mandatory conservation requirements. Incentives would be provided for efficiency improvements for existing projects.

Coordinated Resource Management Alternative - This alternative would diminish water supply opportunities on streams that were managed for optimum instream flows by Ecology and other resource agencies. Streams designated for less than optimum instream flows would yield relatively more municipal and domestic water supply. Probably relatively few streams within a region would be available for unrestricted development of new water supplies, and these might not be the lowest cost sources of supply. Conservation and efficiency requirements would be mandatory for new development, and incentives would be provided for existing system efficiency improvements.

Industrial and Commercial Supply

No Action (Status Quo) Alternative - A continuation of current policies could eventually cause some hardships on industries in need of secure future water supplies. Current application of the habitat and hydrology-related standards results in unreliable surface water supplies, and would continue to be the case under this alternative. This could lead to conservation practices being widely adopted.

Out-of-Stream Alternative - The objective of this alternative would be to maximize out-of-stream water supplies for maximum economic development. Commercial and industrial uses would benefit from this approach. No incentives for conservation would occur.

Instream Protection Alternative - Under this alternative, only water above the optimum flows would be available for out-of-stream use. This would result in limited and unreliable supplies. Water rights issued subject to instream flows would be interrupted relatively frequently for extended periods of time. Commercial and industrial users would likely invest in water-efficient methods of manufacturing and other conservation measures, would rely heavily on ground water, or would locate elsewhere (out of the state).

Needs Assessment and Allocation - The needs assessment and allocation alternative would have mixed impacts on commercial and industrial uses. In areas with highly valued instream resources such as anadromous fisheries, relatively less water might be available for offstream uses. Commercial and industrial water supply needs and availability would be assessed at the regional level.

Coordinated Resource Planning Alternative - The coordinated resource planning alternative would be likely to cause hardship on future commercial and industrial water supplies in some locations due to unreliability during summer and fall low flows. Designation of some streams for optimum flow management might lead industries to locate in areas with streams managed for lower levels of flows.

Agricultural Supply

No Action (Status Quo) Alternative - Under this alternative, future water supplies for agricultural diversion would be limited by relatively high instream flows. In many areas, existing agricultural diversions occur under rights which are subject to no instream flow provisions, and which are only interruptible to protect senior water rights. Future agricultural water rights would be conditioned to the instream flows and would be interrupted when flows reached the specified levels. Supplemental water sources or storage would be needed for irrigation of perennial crops using interruptible rights. Non-feedlot riparian stockwatering would be exempted from instream flows. Agricultural domestic use would be treated as other domestic use. Single domestic in-house use would be exempted. Where instream uses were not of great concern, lower instream flows might be set. Water rights issued under this alternative would be subject to interruption an average of 50 percent of the time, which would result in uncertainty of supply and increased ground water development.

Out-of-Stream Alternative - Under this alternative, more water would be available for offstream agricultural use than under the status quo alternative. Riparian stockwatering would be exempted from instream flows. The continued use of current water duties and the obligation of the state to pay for any water conservation activities would favor agriculture. The ability of farmers to effect conservation and reuse or sell the saved water would also be advantageous to farmers. Single domestic use would be exempted on a case-by-case basis. Establishing a water right transfer register and allowing seasonal transfers of water within watersheds could improve water availability for agriculture. If this alternative were adopted, existing regulations would be reviewed for compliance with the new standards. In some cases, more water might become available as instream flows were lowered to survival levels.

Instream Protection Alternative - Under this alternative, water availability for new agricultural development would be severely limited. The extent to which this would occur would depend somewhat on the value of local instream resources. Future water rights would be subject to optimum level instream flow provisions, and existing water rights might be preempted where instream flows on heavily appropriated streams were to be enhanced or restored. Where important instream resources exist, the instream flows would be set to protect optimum conditions and water would likely be available only seasonally for out-of-stream use. This might lead to more efficient use and distribution of water appropriated under existing rights. The likelihood of more on and offstream storage site development would increase with this alternative. These can have significant adverse environmental effects.

Needs Assessment and Allocation Alternative - This alternative would have varied impacts on agriculture. Because regional needs would influence water allocations and instream flow levels, in areas where a strong case could be made for future agricultural needs, selected water sources could be allocated for development. In other streams selected for full instream resource protection, water would be generally unavailable for out-of-stream agricultural use.

Coordinated Resource Planning Alternative - This alternative would have varied effects on agricultural water supply. For those streams managed for optimum flows by Ecology and other resource agencies, the amount of available water would be severely limited. For streams excluded from optimum flow management, more water would be available. If Ecology decided to lower instream flow levels on streams first targeted for optimum flow management, this could make more water available for agriculture.

Hatcheries and Fish Rearing

No Action (Status Quo) Alternative - Under the current situation, hatcheries and other fish rearing facilities could continue to obtain unconditioned water rights for nonconsumptive use. To be exempted from instream flows, the facility would have to return the diverted water to the stream near the point of diversion. Otherwise it would be regarded as a consumptive use and conditioned with instream flows. Most hatcheries have backup ground water supplies. Some hatcheries use all of the water available in the stream at the diversion point.

Out-of-Stream Alternative - Under this alternative, future fish culture facilities might be impacted through reduced water availability. The lack of emphasis on maintaining a fishery or conditions suitable for fish might also impact these facilities. Some hatcheries depend upon capture of wild fish as an egg source. Facilities with senior rights would have water supplies protected by virtue of those rights. Extensive offstream diversion downstream with resulting impacts on water quality and quantity could also affect hatcheries.

Instream Protection Alternative - Under the optimum flow regime existing hatcheries would fare well since little water would generally be available for additional consumptive water rights. Future hatcheries would need to be able to meet

the optimum flow requirements through any bypass reach they would create. This might influence the location and design of fish culture facilities.

Needs Assessment and Allocation Alternative - The flow and water needs of existing and future fish culture facilities would be factored into regional and basin plans. Streams where flows were set at "survival" levels would not be particularly suited to hatchery development. Other streams with flows set at optimum would have conditions more favorable for hatcheries.

Coordinated Resource Planning Alternative - This alternative would emphasize fish production, setting flows based on resource agency plans and recommendations. It is assumed that these management plans would take into account the real effects on natural production from existing and proposed fish culture facilities, and the water needs of these facilities.

Navigation

No Action (Status Quo) Alternative - Navigation would continue to benefit from flows set under the habitat and hydrology-related standards of this approach. Use of the Columbia, Snake and Cedar Rivers for commercial navigation would likely continue unchanged.

Out-of-Stream Alternative - Under this alternative flows could be lowered to "survival". "Survival" level flows could impair navigability of the major rivers where commercial traffic now occurs. Most major rivers used for navigation have significant water volume, so impacts from consumptive rights might be negligible. Such flow levels could, however, severely impact the recreational navigability of smaller rivers, which is discussed in the recreation section. Although extensive reductions in flow could impact interstate navigation and involve the federal government under the Commerce Clause of the Constitution, this is not likely.

Instream Protection Alternative - Navigation would benefit from optimum flows, as more water generally benefits navigation as well as other instream values. This would be especially true on small streams.

Needs Assessment and Allocation Alternative - This alternative would examine regional priorities for water allocation. If diversions from the major commercially traveled rivers were extensive enough, navigation could be impaired. Navigational needs would be taken into account during regional assessments.

Coordinated Resource Planning Alternative - This alternative would likely benefit navigation by setting optimum flows on anadromous streams. The Snake, Columbia and Cedar Rivers are used by anadromous species; it is assumed that in many cases, flows set to satisfy fisheries needs would provide for navigation.

Dams, Reservoirs and Diversions

No Action (Status Quo) Alternative - Under this alternative, the development of run-of-river diversions would generally be discouraged due to relatively high instream flows and stream closures. Restrictions could increase construction of new storage facilities for out-of-stream uses to obtain reliable year round sources of water. Water stored during periods of high flow could be released for out-of-stream use when diversions would either be restricted by instream flows or prohibited by closures.

Out-of-Stream Alternative - Because the likelihood of regulation would be relatively low, this alternative would encourage development of run-of-river projects. This alternative could decrease the need for storage dams in some areas, but likewise provide economic incentives for new dams because of very low bypass flow requirements.

Instream Protection Alternative - This approach would discourage development of run-of-river diversions due to high instream flows and closures. It would, however, increase the need for construction of storage dams and reservoirs to provide a reliable source of supply for out-of-stream use.

Needs Assessment and Allocation Alternative - Run-of-river diversions would be discouraged on some streams with higher instream flows, but favored on those with low instream flows. Storage dams might be less necessary due to some streams' low instream flows. Storage projects would probably be prohibited on streams selected for preservation.

Coordinated Resource Planning Alternative - Run-of-river diversions would probably be infeasible on streams selected for optimum instream flow protection but possible on those for which lower flows were established. Storage dams and reservoirs might be necessary in some areas to develop reliable water supplies.

Energy

No Action (Status Quo) Alternative - Under this alternative, current water resources policies affecting energy development would continue. The major junctures between energy and instream flows relate to hydroelectric development and cooling water requirements. Since no statewide policy for hydro development exists, project applications would continue to be handled on a case-by-case basis with Ecology's instream flow requirements generally following present standards. Major projects which would require cooling water are generally handled by the state Energy Facility and Site Evaluation Council (EFSEC), of which Ecology's director is a member. No formal mechanism has been developed for cooperating with the Northwest Power Planning Council in its optioning of future projects, or in implementation of the protected areas status. Some means of taking these policies into account would have to be developed.

Under the no action alternative, Ecology would continue to become involved in the hydropower development process either when minimum flows were being discussed with other resource agencies or when a water right was applied for. A third possible route of involvement would be intervention in a FERC licensing proceeding. The policy of negotiating project-specific instream flows for hydroelectric projects would continue. These minimum flows could be independent of those set by the basin program. Ecology also incorporates instream flow provisions on water rights and water quality certifications that are issued for hydropower development, and would continue to do so. Ecology regards these provisions as binding on the project.

Out-of-Stream Alternative - If subject only to Ecology's requirements, hydroelectric bypass projects would have a more assured water supply than under the current policies. This increased availability would be due to the low "survival" level of instream protection, the possibility of permanent waivers, and a maximum net benefits test basis which sought to maximize economic benefits from offstream development. Hydroelectric projects would have greater flows available more of the year than if fisheries concerns dictated the flow level.

In reality, unless federal laws and policies regarding federal licensing were also changed, hydro projects would probably still have to comply with federal requirements for higher bypass flows. Considerable deference is given by the FERC to state, federal and tribal fish and wildlife agency recommendations for instream flows. Although the fish and wildlife agencies and tribes can set conditions or recommend to the FERC the instream flow levels on hydro licenses, Ecology would enforce its own flow levels if those were different.

Thermal energy development would also benefit by the lowering of instream flows to "survival" level. However, Ecology would only be one voice in the EFSEC process which would determine project license conditions, including instream flow constraints.

Instream Protection Alternative - This alternative would set flows severely limiting water for offstream use, including energy development. Hydroelectric projects would need to be sized to pass optimum instream flows. This would render many hydro projects infeasible. Cooling water for thermal projects would need to be obtained from rivers with sufficient available quantities to meet instream flows and energy-related needs, or run the risk of frequent seasonal shutdowns. This might redirect energy development to streams lacking in potential effects on anadromous fish, or to larger rivers. It might also influence the construction and allocation of storage.

Needs Assessment and Allocation Alternative - Under this alternative, regional assessments of need would be made. If energy development were a high priority, selected streams could be designated for such use. Because water conservation would be a high priority, it is conceivable that energy conservation to make the most efficient use of existing facilities would be encouraged, thus reducing water demand. Development of energy facilities might be somewhat restricted based on regional priorities, the need for power, and indigenous instream resources.

Coordinated Resource Planning Alternative - Since this alternative would give first priority to state agency resource management plans and because instream flows would be subject to change, one consequence for energy development might be some uncertainty. Streams subject to optimum flows under agency management plans would be reviewed for accomplishment of objectives. If objectives were not being met, flow requirements might be lowered. This would increase availability of water and sites for energy development. In the short term developers could be assured that at

least those streams identified by resource agencies as requiring optimum flows would be unavailable for development, and that those identified for less than optimal flows would likely be more acceptable for development.

Land and Shoreline Use

No Action (Status Quo) Alternative - Under the current policies of the state and local governments, there is little administrative connection between water availability and land development. County comprehensive land use plans do not often take into account surface and ground water availability. Under this alternative, as instream flows were set at levels which precluded year round surface water supplies, offstream users would seek ground water sources. In-house domestic uses would be exempted from instream flows but larger consumptive uses would not. Continuation of present trends would mean additional ground water development, especially in areas lacking secure surface water supplies, and proliferation of single domestic diversions to serve housing developments along shoreline areas. Additional storage projects might be built to redistribute flows seasonally, affecting shoreline areas and other lands through construction and inundation.

Out-of-Stream Alternative - Under this alternative, greater availability of water to maximize offstream economic development would likely lead to more intensive and extensive industrial, agricultural and municipal development. Shoreline areas could be affected by water project construction. Because single domestic use could be exempted, location of primary and recreation residences along shorelines would probably continue.

Instream Protection Alternative - This alternative would significantly impact land use and development. Availability of water supplies from large surface and ground water sources could become more significant factors in land use decisions sooner than under other scenarios. Elimination of the exemption for single domestic in-house use would discourage construction along rivers and lakes. This alternative might lead to construction of water storage projects sooner, as seasonal demand exceeded natural water availability.

Needs Assessment and Allocation Alternative - This alternative would emphasize regional planning. Water availability would be evaluated by regional and local interests in making land use decisions. Closed steams and with high instream flows would support less development than those with lower instream flows. The availability of water supplies would be an important factor in business and development decisions. Future land use patterns could be strongly influenced by levels of instream flow.

Coordinated Resource Planning Alternative - This alternative could limit land and shoreline development in areas where optimum instream flows were maintained. Development would more feasible near streams with lower instream flows. The extent of water availability from surface water sources would become a factor in land use decisions, as discussed in the previous alternative.

Water Conservation

No Action (Status Quo) Alternative - Water conservation and efficiency improvements would not be pursued beyond the use of appropriate standard water duties for new and adjudicated water rights. State grants and loans for irrigation system improvement and rehabilitation would have the side benefit of reducing the amount of diversion for selected existing irrigation systems. No statewide conservation program would be undertaken.

Out-of-Stream Alternative - Efficiency improvements would be primarily dependent upon state funding. The ability of a water right holder to sell or use conserved water would result in some efficiency improvements.

Instream Protection Alternative - A conservation and efficiency program would be mandatory for new and existing water rights. This could result in maximum water savings and reduced demand.

Needs Assessment and Allocation Alternative - Conservation would be mandatory for new rights. Incentives would be provided for existing rights to improve efficiency. This would result in some, but not the maximum possible, efficiency.

Coordinated Resource Planning Alternative - Same as previous alternative.

Historic and Cultural Resources

No Action (Status Quo) Alternative - The most frequent impacts by water resource-related activities on historic and cultural resources are on Indian religious sites and practices, and fisheries production, with corollary effects on ceremonial practices and culture. Water development projects which inundate or result in construction of roads or pipelines into culturally significant areas are one cause of impacts. Protection of Indian religious areas is not directly addressed under Ecology's current water policies.

The more extensive impacts on fishing, which relate to water quantity, have to do with the quantity of fish available for treaty-based commercial and ceremonial fishing. Commercial fishing for Indian tribes perpetuates a cultural heritage and way of life for many tribal members. The health of many tribal economies depends largely on the availability of fish. Since the current policies allow incremental losses to the fishery resource, a continuation of the status quo would negatively affect tribal fishing.

Out-of-Stream Alternative - The offstream development alternative would have more severe impacts than a continuation of the status quo. Water development projects could become more prevalent, with potential impacts on both religious sites and disruption of archaeological sites through construction and inundation.
The "survival" level of instream flow would not satisfy tribal treaty fishing rights. The severe impacts to fish populations would significantly reduce numbers of fish and in turn impact ceremonial and commercial tribal fishing. Other commercial fishermen for whom fishing is a way of life would also be impacted.

Instream Protection Alternative - The instream protection alternative would have the least impacts on native cultural resources and needs of any of the alternatives. The potential for disruption of religious sites would be minimized by requiring optimum instream flows for water development projects.

The effect on tribal fisheries might be positive. Flow restoration on over-appropriated streams would likely lead to enhanced fish production in some currently depressed streams. Setting optimum flows would maximize fish production and affect both tribal and non-Indian fishing cultures.

Needs Assessment and Allocation Alternative - Under this alternative, impacts might be varied. Protection of religious sites could be raised during regional planning and taken into account in this way. This might minimize disruption. In the regional assessment of water needs and subsequent instream flow level decisions, treaty fishing rights would be an important consideration. Because these fishing rights are discussed in terms of usual and accustomed fishing areas, and because of the locations of individual tribes and reservations, the decision to set "survival" flows on some streams while protecting others would be likely to cause conflict. Individual tribes depend on fish from a relatively small number of streams. It is unlikely a tribe could accept the allocation of one of its streams to out-of-stream development. Differential treatment of streams could complicate the cooperative management and allocation of fisheries between the state and tribes.

Coordinated Resource Planning Alternative - The management of the fisheries resource would be of primary concern in the watershed plans being developed by the state fisheries agencies and the tribes. Ecology assumes that tribal concerns are to be reflected in these plans, so that if requested flows were adopted, tribal fishing needs would be satisfied. On streams where Ecology set low instream flows due to resource agency plans and policies or lowered flows due to lack of water resources utilization, it is assumed that this would have minimal impact. This is based on the assumption that high priority streams would have been identified by tribes in the watershed planning process and implementation. This alternative would incorporate tribal religious area concerns to the extent that agency resource management plans addressed them.

CHAPTER 7 - SOCIOECONOMIC EFFECTS

Introduction

This section provides an assessment of the expected socioeconomic effects of each alternative. Although economic analysis is not a requirement of the State Environmental Policy Act (SEPA), the SEPA rules provide that the analysis of any impact relevant to the agency's decision, whether or not environmental, may be included in an EIS (WAC 197-11-440(8)).

This analysis of the socioeconomic effects takes the perspective that both economic gains and losses may be felt from various policy options. The degree to which these effects will be felt depends on the structure and health of the state's economy and the long-term direction of economic development and water use in the state of Washington. The distribution of costs and benefits is important. Two options may have the same overall costs and benefits, but affect different economic sectors or geographic regions very differently.

Four other factors affect this assessment: 1) substitutability - whether there are readily available substitutes for the resources, or are they unique (this is relevant to the supply of resources); 2) income - how preferences for these resources changes with shifts in income levels (this is related to the demand for the use of resources); 3) technological change - how the value of competing, productive uses of the resources are affected by technological changes in the costs or availability of alternative resources (this affects the supply of resources); and 4) population growth - this causes the demand for the use of resources and values associated with those uses to move upward (prices as a measure of value will be affected).

Finally, it must be noted that many resources possess intangible qualities that resist quantification in conventional terms. This is certainly true of water, all uses of which result in some intangible value relating to quality of life and well-being.

Economic Impacts On Sectors of the Economy

The five alternatives in this EIS would have different effects on various sectors of the economy. In this assessment of economic effects the five alternatives are evaluated for five sectors of the economy: fishing (sport, commercial and tribal); outdoor recreation and tourism; agriculture; residential, commercial and industrial development; and energy use and development.

Fishing (Sport, Commercial and Tribal)

The degree of impact upon fishing that would result from the range of alternatives presented in this EIS depends to some extent upon the ability of government, water users and the industry itself to mitigate losses in the natural production of fish if less than full protection of natural habitat were provided. As discussed in earlier sections, many hatcheries have been built to mitigate losses due to water development and simply to increase the total production of fish. Hatchery success has been varied. Fisheries agencies are generally reluctant to accept new hatchery mitigation for losses of natural production. Recently, salmon net pen rearing has shown considerable promise as a means of efficiently raising salmon to commercially harvestable size. Whether these technologies would in the long run sustain various sectors of the fishing economy is still a question. Alternatives that would reduce the supply of fish from the traditional commercial fishing sectors could positively affect the prospects for aquacultural production of fish.

No Action (Status Quo) Alternative - Under this alternative, a reduction in the natural production of anadromous and resident fish important for commercial, tribal and sports fishing would occur over time as a result of streamflows being depressed below optimum flows by new diversions. Unless replaced by hatchery production, this loss would have a negative impact on the economic vitality of fishing and the industries it supports. Considerable loss has already occurred in this industry due to past environmental degradation and overfishing. Additional losses would lead to further reductions in the length of fishing seasons, further reduction in the commercial fishing fleet, increased competition among sectors of the fishing public, and possibly loss of the ability of some commercial and tribal fishermen to sustain fishing as livelihood and life-style.

Out-of-Stream Alternative - This alternative would result in the drastic reduction of the numbers of naturally reproducing anadromous and native stream fishes as a result of the reduction in available stream habitat. Unless replaced by hatchery production, this would result in virtual elimination of fisheries on these fish. The economic effect on the already hard-pressed fishing industry would be devastating and the public would be deprived of a valuable source

of protein. The rapidly growing sports fishing sector would be badly damaged if popular salmon and trout fishing became impossible. Tribal fishing would be virtually eliminated.

Instream Protection Alternative - This alternative would preserve the full potential for natural fish production by fully protecting the habitat upon which this production depends. It would also result in the restoration of higher levels of natural production potential in some heavily appropriated streams. This alternative would therefore have a positive effect on fisheries dependent upon natural production. This would result in increased income for commercial and tribal fishers, and improved prospects for sport fishers. This could stimulate growth in the fishing and tourism sectors and supporting services and industries.

Needs Assessment and Allocation Alternative - This alternative would result in a net reduction in total natural production potential as some streams would be dedicated to out-of-stream use. The effects on fishing would vary from place to place depending upon the degree of protection afforded to different streams. Overall, the economic effect would be negative for commercial, tribal and sport fisheries dependent upon naturally produced fish. Tribal and sports fisheries dependent largely or totally upon the production of any stream dedicated to out-of-stream use would be particularly impacted.

Coordinated Resource Planning Alternative - This alternative would result in full protection of flow-related habitat and natural production potential where required to implement the management plans of state fisheries agencies, tribes and federal and regional fisheries agencies. Full protection of habitat would not be provided for streams managed by these entities for other types of production (e.g. hatchery-based), or where these entities had not achieved full utilization of habitat after a reasonable passage of time. Assuming the fisheries management agencies did a good job of managing the resources by controlling harvests, avoiding mixed stock problems, and preserving adequate escapement levels of fish, this alternative would have no negative effect on the natural production of fish or the fishing sectors dependent upon natural production. Indeed the effect might be positive in the long term because fish managers would have incentive to improve fishery management to protect high instream flow levels. This could result in long-term economic benefits to the fishing sector.

Outdoor Recreation and Tourism

The socioeconomic effects of the five alternatives on these sectors depends on the types of water-dependent and related recreation, tourism and aesthetic appreciation occurring in an area. For example, three related recreational pursuits, kayaking, canoeing, and inner-tubing differ in preferences in terms of water flows and tend to be seasonal. Flows barely adequate for one pursuit may be excessive for other pursuits.

Most water-related and dependent outdoor recreation, tourism and aesthetic appreciation support commercial services (guide services, hotels, restaurants, and gasoline stations) and manufacturing (boat builders, specialized clothing, and other equipment). The economic health of these supporting commercial enterprises could rise or fall depending upon the degree of protection afforded to instream values.

No Action (Status Quo) Alternative - This alternative would result in some reduction of stream flows over time. Some recreational uses requiring high instream flows, such as kayaking, would experience negative effects due to the shortening of the season during which these uses can be practiced. Other uses such as swimming and wading that have optimum conditions during lower flows may be benefited by lower than present flow conditions. Economic effects would vary with each recreation subsector. Commercial enterprises supporting high flow activities (e.g. kayak manufacturers) might have less business as a result of this alternative.

Because this alternative protects a relatively high level of instream flow, negligible effects would result for tourism and aesthetic enjoyment.

Out-of-Stream Alternative - By reducing instream flows to very low levels, this alternative would negatively affect most if not all water-related or dependent outdoor recreation, tourism and aesthetic enjoyment and supporting commercial enterprises.

Instream Protection Alternative - By preserving a more natural range of instream flows and attempting to restore instream flows on heavily dewatered streams, this alternative would benefit most if not all outdoor recreation, tourism and aesthetic enjoyment and supporting commercial enterprises.

Needs Assessment and Allocation Alternative - The effects on recreation and supporting commercial enterprises would vary under this alternative depending upon the specific water allocation policies adopted for each stream. Streams protected by optimum flows would continue to support a full range of recreational pursuits without affecting length of seasons. Other streams subject to lower instream flows would be less able to support high flow recreation pursuits. Effects on commercial enterprise supporting this recreation would likewise vary.

Coordinated Resource Planning Alternative - Ecology would establish instream flow levels commensurate with the resource plans of state, local and federal recreation agencies. Important recreation streams under these plans would be protected with optimum instream flows for recreation. Other streams not so highly regarded would not receive full protection. Therefore potential economic effects would vary depending upon the agency plans and policies for each stream.

Agriculture

Agriculture, in particular irrigated agriculture and stock raising, is dependent upon the availability of affordable water supplies. The agricultural sector of the economy in Washington is currently depressed as a result of weak export markets in agricultural commodities, changing consumer preferences, and excess production capacity. The effect of any of these alternatives on agriculture would generally depend upon future growth prospects for agriculture. These prospects are uncertain at this time.

Existing irrigation and stock production presumably occurs under existing water rights. Under existing laws, Ecology may not affect these rights. Only the alternative three contemplates action that would affect unwilling holders of existing water rights in order to benefit instream uses.

No Action (Status Quo) Alternative - Because relatively high instream flows would normally be established under this alternative, water would not be available in assured supplies for new irrigation development. If no alternative water source were available at an acceptable price, additional agricultural development would be inhibited. This would be particularly true for high value perennial crops and stock watering that depend upon an assured water supply (noncommercial riparian stock watering would be exempted from instream flows). Annual and multiple cropping patterns tend to be more flexible in responding to an interruptible water supply. Alternative water sources such as ground water, purchase and transfer of existing rights and water storage would probably be more costly than a new unrestricted water right. Any increase in the fixed costs of production could reduce farm income, reduce the competitiveness of new farm production, and inhibit investment in new agricultural production.

Out-of-Stream Alternative - This alternative would be the least inhibiting for new agricultural development because instream flows and associated ground water development would be subject to low instream flows and relatively infrequent regulation. This would increase the state's potential agricultural production and farm income.

Instream Protection Alternative - This alternative would be very inhibiting to development of new agricultural production and increased farm income due to high instream flows. The strong water conservation element and the actions taken to improve instream flows on heavily appropriated streams in this alternative could affect existing agricultural production and income as well.

Needs Assessment and Allocation Alternative - Because of the current excess production capacity in the agriculture sector, agriculture would likely receive low priority in the short term in a needs assessment and allocation process. Over the longer term, if agriculture rebounded and the need for additional production capacity became evident, additional water could be allocated to agriculture under this alternative.

Coordinated Resource Planning Alternative - Agricultural water needs would be a secondary consideration following instream needs under this alternative. Generally the economic effects on agriculture would be similar to alternatives one and three discussed above. However, some streams not possessing high instream value could have relatively low instream flows, encouraging their use for out-of-stream purposes including agriculture.

Residential, Commercial and Industrial Development

Water is but one of the prerequisites for urban and industrial development. Other key ingredients include an adequate land base, energy, capital and markets. Where these other ingredients are available, water availability may become an important factor in determining whether development is possible.

The industrial sector in Washington throughout the 1980s has been depressed to the point that it is not anticipated that major new water allocations would be required for the basic industries: forest products, metals, and aerospace. Because population of the state has continued to grow and shift into the most populated areas, new commercial growth in the Puget Sound area is expected to require additional supplies. These needs are included in municipal and industrial water demands projections for the Puget Sound basin.

No Action (Status Quo) Alternative - Under this alternative, needs for domestic, municipal, commercial and industrial water supply would not receive consideration in the process of establishing instream flows and stream closures, and would thus be of inferior priority in receiving allocations of water. The relatively high instream flows that would be adopted would inhibit the acquisition of future water supplies from surface and interrelated ground water sources. Such sources would be insecure, that is subject to relatively frequent regulation to protect instream flows. This would necessitate the total reliance on ground water to meet future needs or development of supplemental sources such as ground water, storage, the acquisition of existing water rights, or implementation of conservation. These measures would result in higher costs to the end user of water, thus affecting the competitiveness of products and services. If no alternative source were available, future economic development in some areas might be prohibited by the lack of water supply. At a minimum, this alternative would affect siting decisions for new housing, commercial and industrial development. Single domestic supply would normally be exempted from instream protection measures.

Out-of-Stream Alternative - This alternative would be favorable for new housing and commercial and industrial development because more secure supplies of water would be available due to relatively low instream protection levels and the high priority placed on meeting out-of-stream needs. This would allow for strong growth potential in jobs and income in these economic sectors. Single domestic supply would normally be exempted from instream protection measures.

Instream Protection Alternative - This alternative would be most unfavorable for new urban and industrial development because of the high instream flow levels, stream closures, and the low priority placed on meeting out-of-stream needs. Also, strong conservation requirements and actions to improve flow conditions on heavily appropriated streams could reduce water supplies for existing developments. As in alternative one, it would be necessary for developers to secure alternative primary or supplemental water sources if any were available. Development could be totally inhibited in some areas where no alternative sources were available.

Needs Assessment and Allocation Alternative - In this alternative, the need for water to serve future development would be evaluated in a needs assessment. If these needs within a region were more important than competing needs, then water from one or more selected sources, including surface water, could be allocated to meet those needs. These may not be the lowest cost sources of supply, but at least a secure supply of water would be available. Economic growth in these sectors would be enabled by this alternative.

Coordinated Resource Planning Alternative - Urban and industrial water needs would be a secondary consideration following instream needs under this alternative. Generally the economic effects on this sector would be similar to alternatives one and three discussed above. However, some streams not possessing high instream value could have relatively low instream flows, encouraging their use for out-of-stream purposes. Single domestic supply would normally be exempted from instream protection measures.

Energy Development and Use

This sector includes hydroelectric and thermal power generation, both of which require a water supply. In this sector, the effect of an alternative is most dependent upon the frequency of interruption of the source of water supply. The energy development field is currently depressed in the Pacific Northwest due to excess capacity. An energy surplus may exist for another twenty years.

No Action (Status Quo) Alternative - Under this alternative, new energy uses would be subject to relatively high instream flows and selected stream closures. Energy use would be considered a lower priority water use than instream protection. As for other out-of-stream uses, an insecure water supply might make energy development infeasible. Storage of water would greatly add to costs. Alternative sources for thermal cooling might be prohibitively expensive or unavailable.

Out-of-Stream Alternative - This alternative would be favorable for energy development due to low instream flow levels and infrequent regulation to protect flows. However, near term economic benefits from additional energy development would be doubtful given the current energy surplus. Federal legislation that warps the energy market by

requiring utilities to pay the avoided cost of power to private energy developers ironically continues to foster development interest in this time of surplus energy, thus extending the surplus. Excess capacity is costly because the fixed costs of energy resources must be amortized whether or not those resources are producing income.

Instream Protection Alternative - This alternative would be most inhibiting to new energy development because of high instream flow levels and closures to protect instream values. The frequency and duration of regulation for out-of-stream water use would be high. Expensive and problematic alternative water sources (storage, ground water, existing rights) would be necessary. High development costs and limited returns would discourage new energy development.

Needs Assessment and Allocation Alternative - Under this alternative, the need for additional energy resources would be evaluated in regional needs assessments, and water would be allocated according to needs and priorities. Because in the foreseeable future, the region does not need additional power resources, it is likely that water for new energy development would not be a very high priority under such assessments. At such time as new hydroelectric and thermal energy resources were justified and necessary in the future, regional water plans could be adjusted in accordance with these needs. This alternative could provide a check against unwise, unnecessary, and uneconomic energy development during times when energy development is not needed for any purpose other than speculative investment.

Coordinated Resource Planning Alternative - Energy development water needs would be a secondary consideration following instream needs under this alternative. Generally the economic effects on this sector would be similar to alternatives one and three discussed above. However, some streams not possessing important instream values would have relatively low instream flows, encouraging their use for out-of-stream purposes.

CHAPTER 8 - EFFECTS ON OTHER RESOURCE PLANNING AND ISSUES

Any of the alternatives examined in this EIS, upon adoption, could impact resource planning efforts by other agencies. The nature of the impacts would vary with the instream flow process and standard selected and the objectives of the resource management agency. Impacts on other planning efforts have been evaluated in the same order as the resource planning efforts were previously described in the EIS.

The U.S./Canada Pacific Salmon Treaty

The alternatives that utilize an optimum flow instream flow standard would be consistent with implementation of the treaty requirement to manage for increased natural salmon production. This would be the case for alternatives three and five, the instream flow protection and coordinated resource planning alternatives. Alternative one would somewhat impair the state's ability to achieve long term increased natural salmon production because a lower than optimum protection level would lead to cumulative losses in production potential. The needs assessment and allocation alternative (Alt. four) could impact the state's ability to honor the treaty requirements if anadromous fish production were impacted through dedication of some streams to offstream use. Alternative two would detrimentally reduce available habitat making it impossible to meet the treaty obligations to increase natural production of salmon.

Watershed Planning

The alternatives containing optimum flow standards (three and five) would be favorable to the watershed planning effort by the departments of Fisheries and Game and the Indian tribes. Alternative one would probably conflict with management objectives on many streams where Ecology's instream flows afforded less than the desired level of habitat protection. Alternative two with its out-of-stream emphasis would contradict the efforts of the fisheries managers to optimize natural fish production. Alternative four could impact anadromous fish production depending on the location and current resources of any streams that would be dedicated to offstream development.

Northwest Power Planning Council Programs

The Northwest Power Planning Council programs most likely to be potentially affected by the alternatives would be the Fish and Wildlife Program and the "protected areas" program. Criteria for protected area status are currently under development. Protected areas status is proposed to protect certain areas from future hydroelectric project development. The effects of any of the EIS alternatives would be indirect and related to the instream flow standard and the amount of water left instream. If optimum flows were set or streams closed to further appropriation, as in alternatives one, three, five and four, hydroelectric development might be precluded. Under alternative two, the "survival" level flow standards applied statewide would conflict with the purpose of protected areas by setting very low levels of protection and potentially allowing impacts to the resources chosen for protected status through extensive offstream diversion. It is unlikely under alternative two that Ecology would cooperate with the Northwest Power Planning Council to protect areas from development.

The Council's Fish and Wildlife Program, which is attempting to restore and enhance Columbia basin fish and wildlife, could also be somewhat affected by some of the EIS alternatives. The status quo would be unlikely to have any impact, because instream flows have already been adopted by regulation under the Columbia River Instream Resources Protection Program, and these levels would not change. If the instream protection alternative were adopted, this would mean a revamping of flows in existing regulations to preserve optimum levels rather than the current levels. However, the Columbia River is currently extensively managed and regulated and it is unlikely that this network of overlapping jurisdictions would be interrupted. Under alternative four impacts would be minimal, since the existing flow regimes would probably be unchanged. For alternative five, it is assumed that although the coordinated resource planning process might look at the Columbia for optimum flows, such requests on the mainstem itself would probably be minimal since relatively little spawning is known to occur in the main river. However, it is possible that optimum flows would be requested for the tributaries. Alternative two would be directly contradictory to the fish and wildlife restoration and enhancement objectives of the Fish and Wildlife Program.

Puget Sound Water Quality Authority

Adoption of alternative one would be expected to minimally impact any planning or implementation of the Puget Sound water quality management plan. Alternatives three and five, which emphasize optimum instream flows, would also likely have little impact. Water quality would be preserved or improved, wetlands would be preserved, as would

recreation opportunities. Alternative two would be the most likely to run counter to the Authority's objectives, the results of low instream flows could include violation of water quality standards, impacts to wetlands and recreation opportunities, extensive land development and associated impacts to water, and severe reduction in fish and other aquatic organisms. Alternative four might have mixed impacts, depending on regional priorities, allocations, and the split between streams dedicated to preservation or development.

Hood Canal Coordinating Council (HCCC)

The status quo alternative (Alt. one) could conflict with the Hood Canal Coordinating Council's policy regarding no loss of salmon, if flows adopted under the present standards inadequately protect natural fish production. Alternative two would conflict with the HCCC goals on many points. Alternatives three and five would be likely to be compatible with HCCC's policies, depending on development and implementation of management plans by the resource agencies. Alternative four could either conflict or complement HCCC goals, depending on determination of regional priorities and allocations.

State and Federal Wild and Scenic Rivers

Alternative one could conflict with state or federal efforts to protect a stream from future development by preserving less than optimum recreation and aesthetic instream flows. Alternative two would directly conflict with efforts by such agencies to protect free-flowing streams. Alternatives three and five would be very compatible with the objectives of state and federal rivers protection, since optimum instream flows would be determined for recreation and aesthetic needs. Alternative four could meet the objectives of these agencies through regional assessments and use priorities and preservation of high priority streams in the allocation and instream flow setting process.

National Forest Planning

The National Forest Plans would be likely to be concerned with state water allocation policies in the area of fish production. At least some National Forests are managing riparian corridors to maintain, restore, or enhance anadromous or resident fish habitat. Alternative one might be compatible with Forest plans except where flows set by Ecology impacted fish habitat and populations. Alternative two would be likely to have the greatest potential conflict with enhancement plans. Alternatives three and five might best cooperate with National Forest fish habitat enhancement activities. Alternative four could have mixed impacts, depending on the juxtaposition of streams dedicated to offstream use, and natural stocks and habitat identified as high priorities for Forest Service management.

Coordinated Water System Planning and Water Supply Reservations

The status quo alternative (Alt. one) might impact coordinated water system planning and water supply reservations by elimination of many surface water sources from year round diversion. This might encourage planning and sharing of resources among different entities. Alternative two could possibly encourage proliferation of small uncoordinated supply systems, due to the relative ease of developing new offstream diversions. Under alternative three, the setting of optimum flows might lead to close coordination between suppliers in development of conservation, storage, shared resources and ground water development, but would also preclude many potential water supply sources. The fourth alternative might also encourage coordinations, since regional water supply planning would figure in the regional assessments and allocations. Where justified, streams would be designated for future supply development. The fifth alternative might also encourage cooperative planning since availability of supply would be restricted.

Local Land Use Planning

Presently there appears to be consideration of water availability in some local jurisdictions. The alternatives which set optimum flows (thus restricting surface water sources) might encourage greater consideration of water supply as a prerequisite for land development. The alternatives which set low levels of flow might discourage local consideration of water availability in local land use planning.

Indian Treaty Rights

The lack of quantification, uncertainty, and historical disagreement over treaty rights make it difficult to accurately assess potential impacts. It is Ecology's long standing policy that once Indian reserved rights were affirmed and quantified by adjudication and exercise of the rights initiated, these rights would be recognized by the state and protected in the same manner as any other right vis-a-vis junior appropriations. Until adjudicated, they are uncertain in

status and are regarded as claims to vested rights. Junior appropriations have no effect on unexercised reserved Winters rights. Tribal rights to instream flows that may exists as an adjunct to treaty fishing rights are even more uncertain at this time, as no definite decision has yet come from the courts. Therefore, discussion of the relationship of Ecology's alternatives to these "environmental rights" is somewhat speculative. If affirmed by the courts, it is assumed that tribal environmental rights would be recognized by the state and protected against junior appropriators in the same manner as other water rights.

Alternative one may impact treaty fishing rights because optimum flows and fish production would not be fully protected. Winters doctrine rights for offstream use have generally not been quantified, but would be adjudicated in state court in general adjudications by basin. Since reservation-related rights to water would have as priority dates the dates reservations were established, such rights would be senior to most current state-issued water rights. Once adjudicated, valid Indian water rights would be protected by the state's enforcement program.

The second alternative, which emphasizes out-of-stream economic development, would severely impact treaty rights. Indian commercial and ceremonial fishing would be significantly reduced, as would other non-Indian fishing, since this alternative would make no effort to maintain productive fisheries. If water were allocated to offstream development without consideration of Winters doctrine claims, considerable disruption could occur when reserved rights began to be exercised.

The third alternative, emphasizing instream resource protection, would be the most consistent with Indian treaty rights and claims of any of the alternatives. Setting optimum flows would protect existing fish production. Restoration of flows on heavily appropriated streams would enhance current levels of fish production and benefit tribal as well as other fishing interests. Adoption of optimum flows would have no effect on Winters rights, due to the latter having earlier priority. If confirmed by an adjudication, both the Indian fishing and reservation-related rights would have early priority dates. Affirmation and quantification of both types of rights could lead to reallocation of blocks of water which are presently appropriated by non-Indian water rights under the state appropriation system.

The fourth alternative would have mixed impacts on Indian rights. Those streams dedicated to instream resource protection would favor fisheries production and continue to benefit tribal fisheries. Streams protected with "survival" level flows would reduce fish production below present levels. Effects on Winters doctrine rights would be mixed, and could be similar to those discussed in alternatives two and three.

The fifth alternative, coordinated resource planning, would directly address treaty fishing rights through the watershed planning process. Ecology would normally set optimum instream flows as required on streams for which adequate watershed plans were developed by the state fisheries agencies and tribes. Until such time as insufficient success in utilizing habitat was demonstrated, optimum flow levels would be maintained. Continuation of optimum flows would be predicated on full use of available habitat, which could influence the restoration and enhancement of natural fish production. If cause for lowering flows were established, however, fish production might be lessened from current levels, with potential impacts to tribal fisheries. Effects on reservation-related rights would be mixed and could be similar to those described in alternatives two and three.

CHAPTER 9 - COMPARISON OF ALTERNATIVES

Environmental Impacts

Alternative one would continue to protect instream resources at relatively high levels, but would allow a long-term cumulative decline from current levels in overall fish production. Other instream resources such as water-dependent boating would be impacted to some extent, leading to some loss in the overall capacity to meet water-related and water-dependent recreation demand.

Alternative two would allow severe environmental impacts to instream resources, possibly eventually reducing overall natural fish production below levels able to sustain commercial and recreational fishing. Other instream resources and values dependent on more than minimal instream flows would also be severely impacted. This would include recreation, wildlife, water quality, navigation, and aesthetics, for example.

Alternative three would have beneficial environmental impacts, as all instream values would be considered in setting optimum instream flows. In some cases existing levels of flow might be enhanced or restored. Impacts to groundwater supply would occur in the future due to increased demand. Construction of storage projects may also be necessary.

Alternative four could impact some streams protected with low "survival" level flows as described in Alternative 2. Streams with optimum flows would undergo minimal environmental impacts. Overall there would be a decline in the total instream resource base due to impacts on those streams dedicated to diversion. Land development could follow patterns based on water allocation.

Alternative five's environmental impacts would also be mixed, as in Alternative 4. Those streams protected with optimum instream flows in accordance with management plans of other resource agencies would experience minimal environmental impact in the near term and for as long as management objectives were met. The protection of only lower than optimum flows on other streams would reduce fish habitat and the capability to meet other water-dependent and water-related needs.

Generally, alternative three would provide the most protection of environmental resources. Alternatives one, four and five would provide overall moderate levels of protection. Alternative two would provide the least protection of environmental resources.

Socioeconomic Impacts

Alternative one would continue existing policies. The relatively high instream flow and the significant numbers of streams closed to offstream appropriation during the summer low flow period would inhibit out-of-stream water supply development and might lead to more reliance on ground water and problems for areas of short supply, or to more storage projects. Voluntary conservation measures might become widely instituted. This alternative would not satisfy the needs of instream resources and activities, but would favor them over future out-of-stream use. Higher economic costs to out-of-stream uses would be balanced to some degree by the benefits derived from the protection of fisheries, recreation and tourism.

Alternative two would maximize traditional types of economic development (agriculture, industrial and commercial development). Easy availability of water could discourage conservation and efficiency improvements. Severe impacts on fisheries resources could reduce or possibly eliminate commercial and sports fishing for anadromous fish and would lead to conflicts with Indian tribes over treaty fishing rights. Severe impacts to other water-dependent and water-related sectors of the economy would probably occur, including negative effects on tourism and recreation. The quality of life for future residents of the state would be negatively affected.

Alternative three's optimum flow levels would have immediate negative economic effects on offstream use by foreclosing or inhibiting diversions at least part of the year in many locations. This would lead to increased reliance on ground water, storage, and widespread conservation. Future economic benefits from tourism and recreation would be maximized, but economic development requiring surface water supplies such as agriculture, industry and commercial development could be limited by a lack of secure water supplies or sharply higher water costs.

Alternative four would be likely to have mixed economic effects. The varying levels of flow on streams within a region would have implications for land use and development decisions. Differential treatment might conflict with treaty fishing requirements and some landowners desires for equitable treatment. In areas with high levels of instream flow,

there might be increased demand for ground water, storage, or conservation. Assuming that genuine out-of-stream water needs were provided for in this process with minimal disruption of instream values, this alternative would probably result in the optimization of economic benefits.

Alternative five would also have negative implications for economic development. Optimum flows on some streams would preclude some future development. Conservation, storage or increased ground water use might result. Water availability might influence the location of future development. Economical out-of-stream development may be possible on any streams with lower instream flows. Little loss should occur to instream uses that generate income (fishing, tourism and recreation) as long as these resources were well managed.

Generally, alternative four would probably result in the highest overall economic benefits among the alternatives. Alternatives one and five would provide fewer economic benefits due to inhibition of out-of-stream use development. The single purpose alternatives, two and three, would probably provide the least total economic benefits by totally reducing or eliminating potential benefits from either instream or out-of-stream uses.

Implementation

Ecology believes that alternatives one, four, and five could probably be implemented under existing statutes. Definitions, standards and procedures would be provided by new and amended administrative rules. Alternatives two and three would require some changes in existing laws to define a statewide instream flow standard and eliminate the administrative discretion the laws currently grant to Ecology in the determination of instream flow levels and water allocation priorities.

Resource Requirements

Ecology has evaluated the fiscal impact of each of the alternatives. In this analysis, it is assumed that it is desirable to complete the selected program approach statewide in fifteen years (i.e.: address each region or basin that could be addressed within that time frame). It is also assumed that selection of any alternative other than the status quo would necessitate review of the seventeen existing basin and instream plans to bring them into conformance with new standards and procedures.

Alternatives one and two would have no fiscal impact on the department because either of these alternatives could be completed within fifteen years without additional resources. Alternative three would have an additional cost of $527,000 per year for five additional headquarters and four additional regional positions. Alternative four would have an additional cost of $480,000 per year for four headquarters and four regional staff. Alternative five would cost an additional $415,000 for two additional headquarters and four additional regional staff. The regional staff required in alternatives three, four and five would be for enhancement of enforcement, conservation, relinquishment and water right transfers. Additional headquarters positions would be for additional data collection, conservation, and planning capabilities. The entire fiscal impact analysis is included in Appendix IV.

CHAPTER 10 – CONSULTATION AND PUBLIC INVOLVEMENT

In 1985, the Washington State Ecological Commission advised against adoption of a proposed instream flow regulation for WRIA 16, the Skokomish-Dosewallips Water Resource Inventory Area. In response to public concerns, the Ecological Commission sponsored an instream flow workshop in November, 1985. Participants and Ecology staff identified 37 major issues. Ecology Director Andrea B. Riniker committed the agency to a comprehensive administrative review of the instream flow and water allocation program.

In early 1986, Ecology's Water Resources Program initiated this comprehensive review of its surface water planning program. A 20 member advisory committee was appointed in February, 1986 to discuss the issues raised at the workshop. Janet Chalupnik, then chair of the Ecological Commission, served as chair of this group. The members of the Instream Flow and Water Allocation Advisory Committee are listed in the distribution list, which follows this section. The committee's five meetings were open to the public, and notices of the meetings were sent to Ecology's program review mailing list containing about 300 entries. The public was given an opportunity to comment at each meeting.

At the time of the first advisory committee meeting on April 10, 1986, Ecology also began an EIS scoping. This programmatic EIS was to examine a range of alternative approaches to planning and allocating the state's water resources. Public suggestions as to the scope and content of this EIS were solicited during a public scoping meeting held April 10, 1986. Public comments were also accepted during a comment period. Both oral and written testimony were received.

The draft EIS will be broadly distributed to interested parties. A period for receiving written comments will extend from the date of publication (approximately February 27, 1987) to April 15, 1987. Six public hearings to receive public comments will be held across the state (for dates, times and locations see fact sheet near beginning of this report).

Distribution List

<u>Ecological Commission</u>

Mrs. Ann Aagaard
Mr. C. C. Pittack
Mr. Fred A. Shiosaki, Washington Water Power Company
Ms. Donna Simmons
Mr. Robert D. Timm

<u>Advisory Committee Members</u>

Mr. Robert Barnes, Puget Sound Power and Light
Honorable Forrest Baugher, House Agricultural Committee
Mr. Hal Beecher, Department of Game
Ms. Mary Burke, Washington State Cattlemen's Assn.
Mr. Stan Cecil, Washington Environmental Council
Ms. Janet Chalupnik, American Lung Association
Ms. Polly Dyer, Olympic Park Associates
Mr. John Kirner, Tacoma Department of Public Utilities
Mr. Bob Lee, Department of Agriculture
Mr. Gil McCoy, Washington State Energy Office
Mr. Dennis McDonald, Northwest Indian Fish Commission
Mr. Ed McLeary, Washington Aquaculture Council
Mr. Tim McNulty, alternate
Mr. Tom Miller, Trout Unlimited
Mr. Richard Siffert, Department of Social and Health Services
Ms. Patricia Sumption, Friends of White Water
Honorable Doug Sutherland, City of Tacoma
Mr. Ron Van Gundy, Washington State Water Resources Assn.
Mr. Jim Webber, Columbia River Inter-tribal Fish Commission
Honorable Karla Wilson, House Natural Resources Committee
Mr. Robert Wubbena, American Water Works Assn.
Mr. Gordon Zilllges, Department of Fisheries
Mr. Jim Zimmerman, Washington Aquaculture Council

Legislative/Governor's Office

Mr. Ross Antipa, Senate Natural Resources Committee
Mr. Marti Brown
Mr. Tom Casey, House Research Center
Ms. Kayleen Cottingham, Senate Agriculture/Natural Resources Comm.
Ms. Ann Daly, Office of the Governor
Ms. Susan Gulick, House Office Building
Mr. Ken Hirst, House Agriculture Committee
Mr. Bill Koss, House Natural Resources Committee
Mr. Henry Yates, Senate Parks and Ecology Committee
Mr. Dave McCraney, Office of Governor
Honorable Mike Kreidler, Senate Parks and Ecology
Honorable Brad Owen, Senate Natural Resources Committee
Honorable Margaret Rayburn, House Agriculture Committee
Honorable Dean Sutherland, House Natural Resources Committee
Honorable Karla Wilson, House Natural Resources Committee

Indian Tribes

Chehalis Indian Tribe
Colville Confederated Tribes
Hoh Tribe
Jamestown Klallam Tribe
Kalispell Tribe
Lower Elwha Klallam Tribe
Lummi Fisheries Management
Makah Tribal Office
Nisqually Tribe
Port Gamble Klallam Tribe
Puyallup Tribe
Sauk-Suiattle Tribe
Shoalwater Bay Tribe
Skagit System Cooperative
Skokomish Tribe
Spokane Tribe
Stillaguamish Tribe
Suquamish Tribe
Swinomish Tribe
Upper Skagit Tribe
Upper Columbia United Tribes

Mr. James Anderson, Northwest Indian Fisheries Commission
Mr. Joe De La Cruz, Quinault Tribal Council
Mr. Gene Deschamps, Chehalis Indian Tribe
Mr. Kent Doughty, Nooksack Tribe
Mr. Tom Eli, Yakima Indian Nation
Mr. Donald Finney, Muckleshoot Tribal Fisheries Department
Mr. Steven Ralph, Point No Point Treaty Council
Mr. Paul Schissler, Swinomish Tribal Community
Mr. Lonne Selam, Sr., Yakima Indian Nation
Mr. Dave Somers, Tulalip Tribe
Mr. Timothy Wapato, Columbia River Intertribal Fish Commission
Mr. Brian Williams, Nooksack Tribe
Mr. Terry Williams, Tulalip Tribe
Mr. Brian Wood, Squaxin Island Tribe
Mr. Russell Woodruff, Quileute Tribal Council

Federal Agencies

Mr. Jim Anderson, National Park Service
Ms. Sandra S. Embry, U. S. Geological Survey
Ms. Jan Carpenter, Fish and Wildlife Program, Northwest Power Planning Council
Mr. Steve Foster, U.S. Army Corps of Engineers
Mr. Ron Hyra, National Park Service
Mr. Lee Lamb, U.S. Fish and Wildlife Service
Mr. Bill Lloyd, United States Bureau of Reclamation
Mr. William McLaughlin, Supervisor, Okanogan National Forest
Mr. Douglas MacWilliams, Supervisor, Mt. Baker-Snoqualmie National Forest
Mr. Gary O'Neal, Environmental Protection Agency
Mr. Peter Pacquet, Northwest Power Planning Council
Ms. Kathi A. Peacock, U. S. Dept. of Agriculture, Forest Service
Ms. Elain Rybak, U.S. Fish and Wildlife Service
Mr. Rollie Schmitten, National Marine Fisheries Service
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U.S. Environmental Protection Agency
U.S. Forest Service, Regional Forester, Region 6, Portland, Oregon
U.S. Geological Survey

State Agencies and Colleges

Evergreen State College
Interagency Committee for Outdoor Recreation
Office of the Attorney General
Office of Financial Management
Pollution Control Hearings Board
Washington Conservation Commission
Washington State Game Commission

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Mr. John Anderson, Department of Commerce and Economic Development
Mr. John Arnquist, Department of Ecology
Mr. R. H. Berg, Huxley College of Environmental Studies
Mr. Bill Bush, State Parks and Recreation
Mr. Al Butler, Edmonds Community College
Ms. Judy Merchant, Department of Fisheries
Ms. Kathy Callison, Puget Sound Water Quality Authority
Dr. Richard Cellarius, The Evergreen State College
Mr. Bernie Chaplin, Department of Transportation
Mr. Keith Chidlaw, University of Colorado
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Mr. Kurt Eschels, Energy Facility Site Evaluation Council
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Mr. David Fluharty, Institute for Marine Studies
Dr. William Funk, Washington Water Research Center
Mr. Clark Haberman, Southwest Regional Office, Ecology
Ms. Sue Higgins, Montana Department of Natural Resources
Mr. Fred Hosea, Department of Game
Mr. Howard Issacson, Department of Natural Resources
Dr. Ralph Johnson, University of Washington, School of Law
Ms. Carol Jolly, Department of Ecology
Mr. Kris Kauffman, Parks and Recreation Commission
Ms. Pam Kocha, House of Representatives
Mr. John Lilly, Oregon State Parks

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Dr. Marion Marts, University of Washington
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Mr. Duane Phinney, Department of Fisheries
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Mr. Russ Taylor, Department of Ecology
Ms. Nancy Ellison, Department of Ecology
Mr. Marvin Vialle, Department of Ecology
Mr. Phillip Wandscheider, Washington State University
Mr. Rob Whitlam, Office of Archaeology and Historic Preservation
Mr. Steve Zubalik, Washington State Energy Office

Counties

Mr. E. G. Preuschosf, Adams County Planning Department
Mr. Roger N. Diesen, Asotin County Planning Department
Mr. Terry Marden, Benton County Planning Department
Mr. Edward Loidhamer, Chelan County Planning Department
Mr. Ray Gilmore, Clallam County Dept. of Community Development
Mr. Rich Hines, Clark County Planning and Code
Mr. Kim Lyonnais, Columbia County Planning and Community Development
Ms. Sarah Deatherage, Cowlitz County Dept. of Community Development
Mr. Jerry Litt, Douglas County Regional Planning Commission
Mr. Paul Jehn, Ferry County Planning Department
Mr. Robert Boothe, Franklin County Planning Department
Mr. Jack Lyman, Garfield County Engineer
Ms. Billie Sumrall, Grant County Planning Department
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Mr. Oscar Granger, Island County Planning Dept.
Mr. David Goldsmith, Jefferson County Planning and Building Dept.
Mr. Gene Peterson or Ms. Ann Martin, King County BALD
Mr. Rick Kimball, Kitsap County Dept. of Community Development
Mr. Tom Pickerel, Kittitas County
Mr. Steve Anderson, Klickitat County Planning Department
Mr. Michael Zengel, Lewis County Planning Department
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Mr. Greg Williams, Snohomish County Planning Department
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Ms. Liese Hunter, Whitman Regional Planning and Resource Council
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Organizations/news/cities/towns

Black Hills Audubon Society
Ducks Unlimited
Fishing Vessel Owners Association
Hood Canal Environmental Council
KIRO Radio
League of Conservation Voters
The Nature Conservancy
North Cascades Conservation Council
Pacific Power and Light Company
The Olympian
Seattle Post-Intelligencer
Spokesman Review
Tacoma News Tribune
Tahoma Audubon Society
Vancouver Wildlife
Washington Alpine Club
Washington Kayak Club
Washington Rountable

Mr. Don Ahrenholtz, Farm Bureau
Mr. David Alden, Northwest Small Hydropower Assn.
Mr. Phil Anderson, Washington Charter Boat Association
Mr. Bob Arnold, Federation of Fly Fisherman
Mr. Mark Backman, Washington Water Report
Mr. Chan Bailey, Columbia Basin Development League
Mr. Doug Baker, Association of Washington Cities
Ms. L. Katherine Baril, Northwest Water Resources Committee
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Mr. Pete Beaulieu, Puget Sound Council of Governments
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Ms. Jennifer Bryson, Camp Dresser and McKee
Mr. Russ Busch, Evergreen Legal Services
Mr. Don Caha, Tacoma Department of Public Utilities
Mr. Ed Calahan, Skamania County Commission
Ms. Marie Cameron, League of Women Voters
Ms. Dee Camp, Omak Chronicle
Mr. Ron Campbell, Beak Consultants, Inc.
Mr. Stan Cecil, Washington Environmental Council
Mr. Dan Coyne, Washington State Dairymen's Federation
Ms. Pam Crocker-Davis, National Audubon Society
Ms. Bev Dahlin, Conservation Division, The Mountaineers
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Ms. Jean Durning, The Wilderness Society
Mr. Bill Eckel, King County Planning Department
Mr. Rollie Geppert, Ecosystems Inc.
Mr. Geoff Ethelson, Bellevue Department of Public Works
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Mr. John Floyd, Jefferson County PUD No. 1
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Mr. Merle Gibbens, South Columbia Irrigation District
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Mr. Robert Grant, Seattle Audubon Society
Ms. Virginia Gunby, Legislative Aid to Lois North, King County Council Dist. 4
Mr. Morey Haggin, Spokane Audubon Society

Mr. Randall W. Hardy, Seattle City Light
Mr. Robert Haugland, Olympic Peninsula Audubon Society
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Mr. Bob Montgomery, Northwest Hydraulic Consultants
Ms. Margaret Mosley, Water District No. 20, King County
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Mr. Robert E. Ordal, Alpine Lakes Protection Society
Mr. David E. Ortman, Friends of the Earth
Mr. David B. Parkinson, Seattle Water Department
Mr. Jerry Pavletich, Northwest Steelhead and Salmon Council of Trout Unlimited
Mr. Thomas Pero, Trout Magazine
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Mr. Dennis E. Rohr, Mid-Columbia PUD
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Mr. Robert Skanes, Washington State Sportsmen Council
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Mr. Larry Southwick, City of Bellevue
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Mr. Larry Weston, Fred S. James and Co. of Washington
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Mr. Dave Willy, NW Steelheaders
Mr. Al Wright, Mid-Columbia PUDs

Mr. Ted Wright, Kitsap County PUD No. 1
Mr. Mike Yeager, Washington Forest Protection Assn.

Libraries

University of Washington Library
Washington State Library for distribution to state system

Individuals

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Mr. Mel Cook
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Ms. Mary Gordon-Stairs
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Ms. Gloria Spiwack
Ms. Betty Tabbutt
Ms. Nancy Thomas
Mr. Gene Wallace

Notification of EIS availability sent to all municipalities.

GLOSSARY

Acre-foot - A unit of water volume measurement used to describe the quantity of storage in a reservoir, for example. It is the volume covering one acre to a depth of one foot, 43,560 cubic feet, or 325,851 gallons. This quantity is also used on water rights for irrigation quantities.

Adjudication - A process generally delineated along watershed or basin lines which examines the validity of all water rights and claims, and certifies valid claims in a state court.

Allocation - The process of legally encumbering specific amounts of the water resource for application to specific beneficial uses.

Anadromous Fish - Fish that migrate into fresh water from the sea to spawn after maturing in the ocean.

Appropriation - The act of diverting and putting water to beneficial. A water right established under the doctrine of prior appropriation.

Appropriation Doctrine - A legal doctrine of water law developed in the water scarce western United States wherein water rights are established by storing and\or diverting water and applying it to beneficial use. Conflicts between uses are resolved on the basis of "first in time is first in right." Water rights under this system are perpetual unless forfeited for non-use. Rights can generally be purchased or condemned and transferred.

Artificial Propagation - Spawning, incubating, hatching, and/or rearing fish in man-made facilities such as hatcheries.

Aquaculture - Propagation and rearing of marine or fresh water organisms, generally for purposes of sale, within an environment controlled by man.

Aquatic Insects - Invertebrates whose larval stage occurs under water and which provide an important food source for fry and juvenile fish.

Base Flow - In hydrology, a level of streamflow sustained during dry weather by ground water discharging to the stream.

Baseline - The present state of the environment.

Beneficial Use - Use of water for domestic, stock watering, industrial, commercial, agricultural, irrigation hydroelectric power production, mining, fish and wildlife maintenance and enhancement, recreational and thermal power production, and preservation of environmental and aesthetic values, and all other uses compatible with the enjoyment of the public waters of the state. (RCW 90.54.020 (1)).

Benthic Organisms - Organisms that live on the bottom of a body of water.

Bog - A wetland with poor drainage generally characterized by extensive peat deposits and acidic waters. Vegetation includes sedges, sphagnum moss, shrubs, and trees.

Bypass Reach - A reach of a stream with lowered water flow as the result of diversion and conveyance of water outside the channel. Typically water is returned to the channel after beneficial use is made of it. (Examples include many hydropower and hatchery projects.)

CFR - Code of Federal Regulations, the compilation of federal regulations adopted by federal agencies through a rulemaking process.

Cfs - Cubic feet per second, a unit of measure for the rate of discharge of water. One cubic foot per second is the rate of flow of a stream with a cross section of one square foot which is flowing at a mean velocity of one foot per second. It is equal to 448.8 gallons per minute.

Closure - Administrative measure to keep water resources from further appropriation for consumptive use.

Confluence - A place of meeting of two or more streams; the point where a tributary joins the main stream.

Consumptive Use - Water diverted offstream so that it is no longer directly available instream. Includes such uses as municipal and industrial supply, agricultural irrigation, stockwatering, domestic in-house use.

Cumulative Effects - The combined environmental impacts that accrue over time and space from a series of similar or related individual actions, contaminants, or projects. Although each action many seem to have a negligible impact, the combined effects can be severe.

Dewatering - Elimination of water from a lake, river, stream or reservoir.

Diversion - Taking water from a stream or other body of water into a canal, pipe, or other conduit. The physical structure for the removal of water from a stream channel.

Dissolved Oxygen - Oxygen that is present (dissolved) in water and therefore available for fish and other aquatic animals to use.

Domestic Use - Water used by a household generally including in-house use and the maintenance of outside amenities.

Ecology - The Washington State Department of Ecology, which is responsible for implementing many environmental protection laws and for administering water rights issuance and compliance.

Ecosystem - A community of living things interacting with one another and with their physical environment, such as a rain forest, pond, or estuary.

EIS - Environmental Impact Statement, a document that discusses the likely significant impacts of a proposal and alternatives. EISs are required by the national and state environmental policy acts.

Endangered Species - Any species which, as determined by the U.S. Fish and Wildlife Service, is in danger of extinction throughout all or a significant portion of its range.

Escapement - The number of migrating adult fish allowed to pass upstream to spawning grounds.

Estuary - Semi-enclosed body of water within which freshwater and seawater meet.

Exceedance Flow - A stream flow expected to be present or exceeded a specified percentage of time (e.g. the 50 percent exceedance flow would be met or exceeded 50 percent of the time.

Fingerling - A young fish from time of disappearance of the yolk sac to the end of the first year of growth.

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

Fry - The life stage of a fish that has hatched and emerged from the gravel and is less than two inches long.

Genetic Diversity - Variability, plasticity, resiliency, and adaptability of a species resulting from genetic makeup.

Ground Water - Water occurring beneath the lands surface in saturated strata called aquifers. Ground water may flows flow vertically or laterally toward a river, lake, or the ocean. Wells tap aquifers for human use.

Habitat - The place or type of natural site where a plant or animal normally lives and grows.

Harvest Management - The process of controlling the commercial, recreational, tribal, and natural fish harvest for the purpose of achieving a goal within the fishery.

Hydraulic Continuity - The existence of an interconnection 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.

Instream Flow - The level of flow set by the Department of Ecology by regulation to protect instream resources.

Instream Flow Incremental Method (IFIM) - A quantitative methodology developed by the Instream Flow Group, U.S. Fish and Wildlife Service, to assess the relationship between fish life stage habitat availability (spawning, rearing, juvenile, adult) and streamflow.

Instream Resources - Resources, values or activities, such as fish, other organisms, navigation, recreation and water quality, which require water in the stream channel.

Juvenile - For salmonids the lifestage of fish from two to six inches in length prior to smolt stage.

Kilowatt - A unit of electrical power equal to 1,000 watts.

Mainstem - The main channel of a river.

Maximum Net Benefits - Assessment of the economic, social and environmental costs and benefits of alternative water uses and sources in order to bring about a maximization of benefits accruing to the people of the state from a water allocation decision.

Mean Annual Flow - The average amount of water that flows past a given point in one year.

Mixed Stock - A run of fish comprised of groups of different species, strains, races, origins, and migration timing (used in particular reference to a mixture of hatchery and naturally producing fish).

Natural Propagation - Fish spawning, incubation, hatching, and rearing in natural rivers, lakes, and streams.

Nonconsumptive Use - Use of water in a manner which does not consume the water (e.g. fisheries, aesthetic appreciation, and recreation).

Optimum Flow - The level of instream flow which provides the most suitable flow conditions for optimization of an instream resource, for example, fish spawning, as determined by an IFIM study.

Outmigration - The activity of smolts moving downstream from fresh water to the sea.

pH - The degree of alkalinity or acidity of a solution.

Precipitation - The discharge of water, as rain or snow, from the atmosphere onto land and water surfaces.

Public Trust Doctrine - A legal doctrine with roots in Roman custom and English common law that requires that preservation of navigational and related environmental values in navigable bodies of water be considered in resource management decisions.

Public Water Supply - The system for the collection, treatment, storage, and distribution of potable water from the sources of supply to any community, collection or number of individuals, but excluding water supplies serving one single family residence.

RCW - Revised Code of Washington, the compilation of the laws of the state of Washington published by the Statute Law Committee.

Redd - A spawning nest where eggs are deposited and fertilized that is constructed by a fish by moving gravels with its tail.

Relinquishment - Reversion to the state of a right to divert or withdraw water.

Reservation - An allocation of water by administrative rule for a future beneficial use.

Resident Fish - Fish species which reside in freshwater during their entire life cycle.

Riparian Doctrine - A legal doctrine of water law developed in England and adopted by the relatively water rich eastern United states and western coastal states wherein land adjacent to a water body has an associated water right. All such rights from the water body are correlative (no priority) and are limited to reasonable use not detrimental to other riparians.

Riparian Vegetation - Vegetation growing along the shore of a river, lake, or stream.

Run - A group of fish of the same species consisting of one or more stocks migrating at a discrete time.

Run-off - The portion of the rain or snowmelt water that runs over the land surface and ultimately reaches streams.

Salmonid - A fish of the family Salmoniidae including salmon and trout.

Scouring - The vigorous flushing action of rapidly flowing water which resuspends sediments and relocates gravels in rivers and streams.

SEPA - The State Environmental Policy Act, a state law intended to minimize environmental damage. SEPA requires that state agencies and local governments consider environmental factors when making decisions on activities which may have significant adverse environmental impacts. As part of this process, environmental documents are prepared and opportunities for public comment are provided.

Smolt - A young salmon or anadromous trout that has undergone a physiological change to allow survival in salt water and is migrating to the sea from the fresh waters where it was born.

Spawning - The act of fish releasing and fertilizing eggs.

Species - A group of individuals of common ancestry that closely resemble each other structurally and physiologically and that can interbreed, producing fertile offspring.

Stream Reach - A section or segment of a river or stream.

Streamflow - The rate at which water passes a given point in a stream or river, usually expressed in cubic feet per second (cfs).

Substrate - River, stream or lake bottom materials.

Surface Water - Water flowing in a stream or present in a lake or pond.

"Survival" Flows - A minimum level of flow assumed to support a minimal, self-sustaining population of fish and other aquatic species and to assure the continuance of nonbiological instream values.

Threatened Species - Those species, determined by the U.S. Fish and Wildlife Service, which are likely to become endangered within the foreseeable future throughout all or a significant portion of their range.

Transfer - An approval issued by Ecology to allow a water right's point of diversion, place of use, or purpose of use to be changed.

Tributary - A stream that contributes its waters to a larger stream by discharging into it.

Turbidity - A measure of the amount of material suspended in the water. Increasing the turbidity of the water decreases the amount of light that penetrates the water column. High levels of turbidity may be harmful to aquatic life and make water unsuitable for drinking.

WAC - Washington Administrative Code, which contains all state regulations adopted by state agencies through a rulemaking process.

Water Duties - The minimum amount of water needed for a beneficial use such as irrigation of a particular crop in a particular location. Water duties are used to determine quantities granted under water rights.

Water Right - A legal right and property interest subject to certain limitations to obtain water from a specific source for application to beneficial use.

Wild Stocks - Genetically unique populations of fish which have maintained reproduction successfully without supplementation from hatcheries.

Wildlife - Mammals and birds, game and non-game species that are not domesticated.

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APPENDICES

APPENDIX I

ISSUE ANALYSIS PAPERS

The papers contained in this appendix were initially developed during the activities of the Instream Flow and Water Allocation Program Review Advisory Committee. The purpose of these papers was to evaluate 21 water resource issues identified at a November, 1985 instream flow workshop sponsored by the Washington State Ecological Commission and 16 additional issues identified by Ecology staff at a later time (see list of issues below). In identifying possible alternatives for addressing these issues, Ecology staff and the Advisory Committee were not constrained by existing statutes, regulations and policies. It was assumed that any of these could be changed if necessary to implement a desirable alternative. These detailed alternatives were the basis for a set of alternatives discussed by the advisory committee, and the five major alternatives in the Program Review EIS.

Instream Flow Issues Identified at the November, 1985 Ecological Commission Workshop:

1. Appropriate Level to Establish Flows (Issue Paper I) – Is the level the legislature intended a high (optimum), medium (sustaining), or low (survival) standard? Are Ecology's current criteria appropriate?

2. Maximum Net Benefits (Issue Paper V) – Should minimum or base flows be subject to a maximum net benefits (MNB) test? Should instream flows above the minimum or base flow level be subject to a MNB test? Should procedures for carrying out a MNB analysis be developed? How should a MNB test be done? (Quantitative and/or qualitative)

3. Balanced Assessment of Priorities (Issue Paper II) – In establishing instream flows, should offstream needs be assessed coincidentally with instream needs and as a coequal priority.

4. Procedures for Establishing Flows (Issue Paper I) – Should both the process and the specific technical procedures for establishing instream flows be reexamined and better documented?

5. Comprehensive Regional Planning (Issue Paper II) – Would a comprehensive regional or subregional water planning approach addressing all uses be a better approach then the present approach which addresses only instream needs on a stream by stream, basin by basin basis?

6. Indian Rights (Issue Paper IX) – Should uncertain Indian water claims for instream and offstream uses be factored into the water planning process? If so, how?

7. Intangible Values (Issue Papers I, IV, and V) – How can intangible values be factored into instream flow setting and other water allocation decisions in a more systematic way?

8. Public Participation Process (Issue Paper VII) – Is the current public participation process adequate? If not, what improvements can be made?

9. Future Changes to Instream Flows (Issue Paper III) – Adopted instream flows could be lowered after review, but appropriated water can't readily be recovered if it is later determined that higher instream flows are needed. Does this require a more conservative approach to setting instream flows?

10. Burden of Proof (Issue Paper I) – Should the burden of proof of the need for an instream flow level rest with instream water interests or with offstream interests?

11. Conservation (Issue Paper VI) – Should more emphasis be laced on conservation of water within existing supplies before allocating additional water?

12. Improved Data Bases (Issue Paper IV) – Can the data base for water allocation decisions including establishment of instream flows be improved? Can existing data be better shared/accessed?

13. Undefined Terms (Issue Paper I) – Should numerous undefined terms in the statutes be defined to reduce uncertainty and inconsistency, (e.g.: minimum flow, base flow, protection, preservation, maximum net benefits.)

14. Protection of Existing Rights (Issue Paper III) – Should existing water rights e given greater recognition and deference in the water allocation process? Should proposed changes of senior water rights in point of diversion, place of use, or purpose of use be subject to junior priority minimum flows?

15. Different Instream Flow Standards For Different Streams (Issue Paper II) – Should different instream flow standards be used for different streams on a case by case basis depending upon the resources present, competing uses, and the public interest?

16. Consider Long Term Needs (Issue Papers II and V) – Should the long term needs of both instream and offstream uses be thoroughly examined before making any water allocations?

17. Enforcement (Issue Paper X) – Should enforcement of instream flow provisions be given more emphasis? Are statewide procedures needed to assure consistent enforcement across the state? Should related issues such as relinquishment and wasteful practices be addressed?

18. Quantification of Instream Value (Issue Papers I and V) – Should procedures be defined to enable quantification of noneconomic values so that they may be fairly compared to economic uses of water?

19. Instream Flow Waiver (Issue Paper III) – Under what conditions should minimum flows be waived in order to respond to "overriding considerations of the public interest?" (RCW 90.54.020(2)) Should criteria be developed to guide waiver decisions?

20. Measuring Flows (Issue Paper IV) – Are improved procedures needed for measuring/ monitoring streamflows or estimating stream hydrology where data is unavailable?

21. Single Domestic and Stock Exemption (Issue Paper III) – Should minor exempted uses be more carefully evaluated for their effects on existing rights including instream flows?

Additional Issues Identified by Department of Ecology Staff:

22. State interagency coordination (Issue Paper VIII) – Relationship of Ecology to the departments of Game, Fisheries, Agriculture, and Energy and other interested state agencies.

23. Federal agency coordination (Issue Paper VIII) – Relationship of state water rights, instream flows, and other state authorities to the activities and authorities of federal agencies.

24. Local government coordination (Issue Paper VIII) – Relationship of Ecology to local government water interests.

25. Instream flows as water rights (Issue Paper III) – Date of priority for instream flows, priority date when revised, and relationship to changes in place or purpose of use or point of diversion for out-of-stream uses. Can instream flows be established through appropriation or by purchase of existing out-of-stream rights?

26. Applicability of RCW 75.20.050 (Issue Paper III) – Establishment of new surface water source limitations (SWSLs) after adoption of instream flows. Establishment of low flows as well as denial of rights. Review of SWSLs and adoption as rules including specifying closure periods.

27. Surface and ground water continuity (Issue Paper III) – Should Ecology establish analytical procedures and standards for determining hydraulic continuity between surface and ground water? What is the state's policy for allocating ground water in hydraulic continuity with surface water?

28. Hydropower (Issue Papers I and III) – Is hydropower use consumptive if it alters the natural flow regime or bypasses a significant length of stream? How should minimum flows be established for hydropower (regulation or case by case). Should the applicant be required to conduct necessary studies?

29. Adjustable instream flows (Issue Paper III) – Should adjustment mechanisms be incorporated in instream flow regulations for certain use classes (normal and critical flows)? If so, for what uses and using what criteria?

30. Water reservations (Issue Paper III) – Should water reservations be subject to instream flows (even if flows are not set at the time a reservation is established or petitioned)?

31. Applicability of instream flows (Issue Paper III) – What type of water rights are subject to instream flow conditions? What is the applicability of a new instream flow to existing water right applications and permits?

32. Stream closures (Issue Papers II and III) – Under what conditions should new stream closures be established? Should closure periods be specified for existing unadopted closures?

33. Ponds and lakes (Issue Paper III) – Should the setting of pond and lake levels be included as a discretionary element of a basin plan?

34. Waterfalls and exceptional stream reaches (Issue Paper I) – Should special water features receive consideration for preservation in their natural state?

35. Periodic regulation review (Issue Paper II) – Should a periodic review period be specified in Ecology regulations?

36. Representing the state's interest (Issue Paper II) – What should be the scope of activities of Ecology in "vigorously representing the state's interest?

37. Appeals (Issue Paper III) – What is the appropriate avenue of appeal of Ecology water regulations, orders or decisions?

ISSUE PAPER I: INSTREAM FLOW STANDARDS AND PROCESS

INTRODUCTION

Instream flows have only recently become a very controversial issue in Washington State, even though Ecology and its predecessor agencies have been establishing such flows on a systematic basis since 1949. Under the authority of several statutes, Ecology has established instream flows on hundreds of streams, and has established closures to further consumptive use on hundreds of others in order to provide protection for instream resource values.

How instream flows are defined, and the level at which they are established constitute major state water policy. Instream flows are critical for the maintenance, preservation, restoration, and enhancement of Washington's fisheries resources as well as for preservation of other instream values such as aesthetics, recreation, and water quality. The level at which they are established also has significant implications for future water resources development opportunities. Future projects can be made economically infeasible or very costly depending upon the level of the instream flow to which they are conditioned.

This issue paper addresses the procedures used in setting minimum flows, the degree of protection that Ecology should be providing for instream values, the need for statutory terms to be defined, how intangible values should be evaluated, who should have the burden of proof for determining instream needs, and whether and by what means some attempt should be made to improve flow conditions on heavily appropriated streams.

Procedures and Policies For Setting Instream Flows (Issues 1, 4, 9, and 130)

Issue Definition – Several key terms are not defined in the state's water laws, with the result that considerable latitude is left for interpretation. Differing views of what these terms actually mean in the context of the statutes have been a frequent source of conflict among parties administering, interested in, or affected by instream flows. Most of these ambiguous terms relate to the level of protection that should be afforded to instream values. For example, the terms "base flows," "minimum flows," "protect," "enhance" and "preservation of…values" imply to some a high, optimum streamflow level for instream values and to others a low survival level. Ecology has developed procedures for setting instream flows based on its own interpretation of these terms. The issues discussed in this section include the various interpretations of these undefined terms, whether Ecology's procedures for setting instream flows are appropriate, and how future changes to instream flows should be considered.

Background – The Minimum Water Flows and Levels Act (1969) permits Ecology to establish minimum flows or levels on stream and lakes by regulation for the purpose of protecting fish, game, birds or other wildlife, recreational or aesthetic values or water quality (RCW 90.22.010) (underlining added). The Water Resources Act of 1971 provides that the quality of the natural environment shall be protected and, where possible enhanced through the retention of base flows for preservation of wildlife, fish, scenic aesthetic, and other environmental values, and navigation values (RCW 90.54.020(3)) (underlining added).

In Webster's New World Dictionary for the American Language the word minimum is defined as, "the smallest quantity, number, or degree possible or permissible." The term base flow in hydrology is widely recognized as that component of streamflow sustained during extended dry periods by ground water discharging to the stream channel. The choice of these particular terms in the statutes appears to indicate an intent that instream flows be set at relatively low levels that could be expected to be present a relatively high percentage of the time.

The statutory objective of setting minimum or base flows is the protection and preservation of instream values. Webster's defines protect as, "to shield from injury, danger or loss." Similarly, preserve is defined as, "to keep from harm, damage or danger." Enhance is defined as "to make greater in value, augment."

Several present Department of Ecology and State Attorney General personnel were involved in the drafting, lobbying, and monitoring of progress of instream flow legislation. According to these "witnesses," the 1967 Minimum Water Flows and Levels Act was enacted to assure that various instream values not be terminated by excess appropriation of water through the existing permit system under the water code. The intent was that flows of a limited extent were to be retained instream in order to protect instream values of streams from extinguishment.

Ecology, Fisheries, and Game have found from experience that if instream flows are set at low levels such as the lowest flow of record, or at hydrologic base flow levels, and enough water rights are issued to consistently depress flows to this level, instream values such as fish, recreation, and aesthetics will not be adequately protected or preserved. They may

not be totally extinguished, but the reduction in value can be severe. It is clear that very low instream flows cannot, in most cases, achieve an acceptable level of protection and preservation.

Improvements in instream flow prediction methods such as the Instream Flow Incremental Method (IFIM) indicate that to preserve and protect all or nearly all of the instream physical habitat supporting naturally reproducing fisheries resources, flows considerably higher than these low levels would have to be established. Therefore, in reference to the above definition of minimum, although a "minimum" possible streamflow may be zero or some very low flow rate, the minimum permissible flow is regarded by Ecology as the lowest flow consistent with legislative intent capable of achieving the objective of protecting and preserving and where possible enhancing instream values.

Ecology and other states and local governmental entities are required by the Water Resources Act of 1971 to consider the needs of a broad range of water uses including instream uses (RCW 90.54.090). The Water Resources Act is not only an instream flow law. It recognizes both instream and out-of-stream uses as beneficial (RCW 90.54.020(1)), requires that allocations secure maximum net benefits for the people of the state (RCW 90.54.020(2)), and that adequate and safe supplies of water be preserved for human domestic needs (RCW 90.54.020(4)). Given this context, the Act was intended to require a balanced assessment of future water needs, and actions to secure a balanced allocation of water for the benefit of the public.

Because of the legislative history of the Minimum Water Flows and Levels Act (Ch. 90.22 RCW) and the Water Resources act of 1971 (Ch. 90.54 RCW), and the use of the terms minimum and base flow to protect and preserve instream values in these key authorizing acts, it has been Ecology's position that it was the intent of the legislature to establish flow protection levels that could reasonably be expected to be present in a stream. In addition, it has been Ecology's belief that the "where possible enhanced" language of RCW 90.54.020(3) has two primary thrusts. The first is to enhance conditions on streams not fully appropriated by retaining base flows. (This results in a better environment than if appropriations were allowed to totally dry up streams.) The second is to seek the allocation of storage water in order to provide more reliable base flows.

In selecting instream flows to propose for adoption since 1979, Ecology has used two main criteria: the relationship of fish habitat to streamflow and the hydrologic probability of occurrence of streamflow levels. As general criteria, Ecology has used the "50 percent occurrence flow" (the flow met or exceeded 50 percent of the time) that is calculated from 10-day averaged streamflow data, as an upper limit on the flows that it is willing to establish as minimum or base flows. Ecology has not usually been willing, given its interpretation of statutory authorities, to propose minimum or base flows for adoption for a given period that cannot be expected to be present at least half the time. Ecology acknowledges that its proposed flows therefore do not always protect the maximum possible amount of available habitat, although in many instances when water is available, 100 percent of the available habitat, according to instream flow studies, is protected.

As a general objective, Ecology has attempted to set instream flows that will provide for the preservation of at least 90 percent of maximum (optimum) habitat available (as predicted by an instream flow model) for key fish species and lifestages existing in a stream for most of the year. Ecology has found that except for very small streams, it is nearly always possible to meet this criteria even though instream flows are limited by the 50 percent exceedance flow cap. Where 90 percent of the maximum habitat availability cannot be preserved using the 50 percent exceedance flow limit, Ecology has often, but not always, closed the affected stream or stream reach to further consumptive appropriation. Ecology may propose flows that are considerably lower during at least some parts of the year (usually the low flow period) than the fisheries agencies' and tribes' recommendations.

Ecology believes that the instream flows it has established in recent years may go beyond the apparent legislative intent of prohibiting the drying up of streams. The flows recently set by Ecology approach, if not exceed, the point of being prohibitive to out-of-stream development on many streams.

Viewpoints – It is argued by some that Ecology's view of legislative intent is contradictory to other language in the statutes and impossible to apply. They believe that instream resources such as fish cannot be adequately protected or preserved by setting flows at less than optimum levels.

Some believe that using a hydrologic definition of base flow is not realistic, nor did the legislature have in mind the hydrologic definition of the term. For example, they point out that base flow during the summer-fall low flow period is virtually 100 percent of the water in most Washington streams. Thus, if applied literally, instream uses would be allocated all the water available in most streams during the summer-fall months and lesser amounts relative to total flow during other months.

In those cases when optimum flows for fish exceed the 50-percent exceedance flows, Game, Fisheries and tribes often recomme3nd a closure to further consumptive appropriation as an acceptable alternative to adoption of optimum instream flows. They believe that if an out-of-stream use of water is subject to an instream flow which is less than optimum for fish, then that out-of-stream use will be at the expense of fish habitat and actual or potential fish production. Fisheries and Game would like to see criteria defined for closing streams.

In addition to disagreeing with an interpretation of the statutes that leads Ecology to utilize the 50 percent occurrence flow, some interests are concerned that the 50 percent occurrence flow is based on, in some cases, a hydrograph that already is altered from natural conditions. (Ecology often adjusts hydrographs to remove the effect of existing and historical flow depletions. Where this is not done, the effect of existing diversions is acknowledged and accounted for in the determination of instream flow levels or closures.)

They are also concerned that a 10 percent reduction in habitat can result in a much greater percent reduction in harvestable numbers of fish, in some cases as much as 100 percent. Fisheries and Game have shown through studies that the level of low stream flows experienced by fish during rearing is directly correlated to the level of fish production. Low flows may also have synergistic effects by affecting water quality and temperature. Finally, they are concerned about the loss of high flow years that tend to result in high fish production levels. (See the Instream Resources Protection Study Report for additional details on the effects of reduced streamflow levels.)

Generally these interests believe that flows should be set at levels needed to maintain fish habitat and production potential at current levels. Fisheries, Game and tribes have asked for flows higher than necessary to support present run sizes, but only where runs have been depressed by some factor (other than stream flow) which is reasonably expected to be corrected.

Some interests are concerned about flows for other instream values, particularly recreation and aesthetics. They do not always agree that flows adequate for fish are satisfactory for all other instream values. They would support development of better methods for evaluating other instream flow needs. They also urge that Ecology take actions to retain high quality recreation and scenic river segments substantially in their natural condition.

Other interests interpret the statutes to mean that instream flows should be established at a low level such that the stream is not dried up or the fishery resource eliminated. They do not believe that fish populations need to be kept at present levels and don't feel that streamflow levels should be based on historical or potential fishery populations if the high instream flows required would make future water diversion infeasible from a potential surface water source.

Some are concerned that Ecology presently tends to treat all streams equally regardless of a stream's actual value for instream resources and without regard to alternative water needs. They urge that planning be reoriented to helping determine what sources will be appropriate for future development, and which streams should be preserved. They feel streams designated favorably for development should not have high instream flows or closures.

Offstream interests also believe that if Ecology's current policies were applied to the entire state, nearly every stream would have instream flows established that would severely restrict or eliminate water withdrawal potential. They do not believe that 90% of the optimum fish habitat should be preserved in streams not well-suited for a fishery resource. They also believe that the 50 percent exceedance flow is much too high an instream flow level for every stream, because it would mean that water is available for withdrawal only half of the time, making nearly all out-of-stream uses infeasible.

In general these interests believe that high instream flow levels cause most proposed withdrawal projects to require storage, because the withdrawals would be restricted so much of the time to protect the instream flows. In order to meet consumptive use demands, high instream flows tend to force water users to turn to expensive alternative sources of water as principal or supplemental sources of supply such as ground water (if available) or water storage facilities, with a resultant higher cost to the consumers using the water. For this reason, potential offstream water users such as municipalities and irrigators frequently voice opposition to high instream flow levels. They also point out that storage alternatives necessitated by high instream flows may not only be very costly for water users but may also be significantly more environmentally damaging than lower instream flows.

Water users also believe that the economic benefit of using water offstream should be given more consideration. Given the economic growth policy of the state, increased water withdrawals could benefit state residents by strengthening the economy, increasing jobs, and providing a broader tax base.

Alternatives

Alternatives for Objective A: Maintain instream values at optimum levels level.

1. Establish "optimum" instream flows (current practice in some cases).

   Discussion – Optimum flows have been established on some streams for all or parts of a year when consistent with hydrology. This alternative would result in optimum flows being the principal determinant of instream flows proposed to be established by Ecology.

   Effects – Establishing and protecting optimum flows would be beneficial for fish and other instream resources, particularly during the natural low flow period of the year. This would assure that new diversions would not (legally) reduce stream flows below those that would exist without the diversions. It would not create new water or affect existing rights.

   A statewide optimum flow standard would make it difficult to establish new out-of-stream water uses on all but larger streams where optimum flows (for fish at least) tend to be lower relative to hydrology, than on small and medium sized streams. The frequency and duration of regulation of new rights on any but the larger streams would be prohibitive to development of out-of-stream uses. This could limit feasible natural flow water supply diversions to only a few of the larger rivers in the state. It could result in more development pressure on ground water and could necessitate environmentally problematic reservoir storage. The cost of new water supplies would probably increase significantly.

   Implementation – A change in existing statues could make establishment of a statewide optimum instream flow standard much easier to implement. Ecology has historically interpreted existing laws as requiring the establishment of instream flows that are consistent with hydrologic conditions. Ecology could attempt to adopt a statewide optimum instream flow standard by administrative rule, but legal challenges would be likely. Existing sub-optimum instream flows on about 200 streams would need to undergo administrative review unless "grandfathered" in by a new law. Administrative rules and technical procedures would need to be developed to determine the optimum flow on any particular stream.

2. Close streams to further diversion (current practice in some cases).

   Discussion – Several hundred streams have been closed to further consumptive appropriation by administrative rules. The term closure is not used in existing water statutes. The water code provides that a water right may be denied if the proposed use is not beneficial, if no unappropriated water is available, if it would affect existing rights or if it would be detrimental to the public interest. Stream closure is an administrative mechanism born of necessity. It provides advance notice to a prospective water user that an appropriation request will be denied on one of the above grounds.

   Closures have been established on streams regarded as fully appropriated (where additional appropriation would be detrimental to the public interest or existing rights) and on smaller streams with little or no existing use, that support good fish runs or important recreational and aesthetic values (where it has been concluded that any additional diversions would impair instream values that are in the public interest to protect).

   This alternative suggests that streams be closed in order to protect optimum instream flows. This could be used as an alternative to establishing optimum instream flows during periods when those flows are normally unavailable due to natural hydrology (generally the low flow period).

   Effects – The effects of establishing closures to protect optimum flows would be the same as those for optimum flows (see alternative 1 above).

   Implementation – Ecology believes it has authority to close streams now based on water availability, protection of existing rights and to protect the public interest. Because no authority currently exists to preserve optimum instream flows across the board without regard to hydrologic limits, Ecology believes it also lacks authority to close a stream to protect an optimum flow. To implement this alternative would probably require the passage of legislation specifically authorizing Ecology to close a stream for this purpose. With or without legislation, administrative rules are needed that establish criteria for stream closures.

3. Allow direct appropriation of water rights for optimum instream flows.

   Discussion – Currently, Ecology does not allow direct appropriation of instream flow rights, preferring instead to establish flows by administrative rule. Historically, under the appropriation system, some physical construction to divert or store water for beneficial use has been required to obtain an appropriative right. In addition, once the right is established, it is appurtenant to a specific piece of land. Although the Water Resources Act declares instream uses to be beneficial, the Act also prescribes rule-making as the chosen mechanism for establishing instream flows. Several other western states do allow direct appropriation of instream flow rights by either government agencies or by any person. In these states, the burden of proof of need is on the appropriator.

   Effects – If this alternative was adopted, the effect would not be substantially different from the existing situation if the criteria for the appropriate level were not changed. In states where this method is used, the acquisition of instream flow rights has occurred slowly due in part to the fees and data collection required of the appropriator.

   Implementation – This alternative would probably require new legislation amending the state water code (Ch. 90.03 RCW). Administrative rules would probably be necessary to specify application and review procedures.

4. Seek federal wild rivers designation.

   Discussion – Under the Federal Wild Rivers program, Congress can designate selected rivers as wild, scenic or recreational (depending upon the level of existing development), and designate a federal management agency for such rivers and associated lands. Designation allows for preservation and enhancement of natural and recreational values. In Washington, portions of the Skagit, Sauk, Suiattle and Cascade Rivers in Skagit county have been designated. A number of other streams in the state have been studied for possible inclusion in the national wild rivers system, but little momentum has been generated to date to have segments added.

   Under this alternative, Ecology could develop recommendations for study or designation of selected river segments as part of its instream flow and water allocation planning process. This could be done in cooperation with other state and federal agencies and the office of the governor. Recommendations could be made to the state's Congressional delegation, congressional committees and appropriate federal agencies.

   Effects – Federal designation would prohibit or discourage federal construction or licensing of development that would conflict with river management objectives. It would also discourage state issuance of various development permits, including water rights for incompatible uses. Generally, designation results in preservation of natural values inherent in the river segment and associated lands.

   Implementation – Ecology has existing authority to represent the state's interests before federal authorities in matters pertaining to state water resources (RCW 90.54.080). Administrative rules could be developed that would allow the development of such recommendations as part of Ecology's water resources planning program.

5. Strengthen state scenic river program and seek designation of state streams.

   Discussion – Under the State Scenic Rivers System Act (1977), the legislature may designate state scenic river segments to be managed by the Washington State Parks and Recreation Commission. The 1977 Act also designated segments of the Skykomish River and several tributaries as state scenic rivers (Ch. 79.72 RCW). The purpose of designation is to preserve in as natural a condition as possible selected rivers of the state possessing outstanding natural, scenic, historical, ecological and recreational values, and to discourage overuse of these rivers. Designation of new segments for inclusion is proposed by a committee of participating agencies, including Ecology, but must be established by legislation. Management plans are also prepared by the committee. Local interests are included on the committee. State Parks has recently hired a planner to work on the Scenic Rivers Program, and intends to generate a more active program.

   Effects – State designation could discourage development interest on designated streams. An effective segment management plan could prescribe allowable uses and would have to be considered by Ecology in decisions on water right applications. A provision of the State Scenic Rivers Act requires that state agencies pursue policies to conserve and enhance conditions of designated rivers.

Implementation – Ecology has existing authority to participate on the committee of agencies that may propose new segments and develop management plans. If this alternative were selected, Ecology would need to amend existing regulations governing its water planning activities to allow for recommendations for designations to be made to the committee of participating agencies. Regulations could also specify the means for assuring consistency of the instream flow and water allocation program with state Scenic River designation.

Alternatives for Objective B: Protect instream values from extinguishment, but minimize impacts on offstream uses (survival flows).

1. Establish instream flows based on a low flow hydrologic parameter.

   Discussion – One of a number of hydrologically based low flow statistics could be used to set a relatively low instream flow standard. Examples are the 7 day/10 year low flow, a fixed percentage of the mean annual flow (e.g.: 20%), a fixed flow exceedance level (e.g.: 90% exceedance), or the lowest monthly average flow of record. Using this approach, a statewide standard could be set that could apply to all streams regardless of location. The instream flow for any stream could then be determined by evaluation of existing streamflow records or by correlation for ungaged streams. It would be unnecessary to perform specific instream flow studies for each stream.

   This method could be used to establish an interim instream flow on all streams that have not yet been addressed by rulemaking. In one variant of this approach, subsequent water rights subject to this flow would not be subject to later adopted higher instream flows. An alternative is to subject subsequent water rights to this interim instream flow, but also include a provision on these rights that they could also become subject to increased instream flows adopted at a later date based on specific instream flow studies.

   Effects – Setting a low hydrology-based instream flow, and then issuing a significant amount of water under subsequent rights could result in degradation of instream values. Low flows at or approaching the instream flow would occur with increased frequency and duration. This degradation could either be permanent or temporary depending upon whether conditioned rights were subject to increased instream flows at a later date. Water rights conditioned by the (relatively low) interim instream flow would enjoy a relatively secure water supply because they would subject to only infrequent regulation to protect the low instream flow. However, if instream flows could be raised above the interim level, this might discourage the establishment of new water rights due to the uncertainty of frequency and duration of regulation.

   Implementation – Ecology has existing authority to set a statewide instream flow standard under the Water Resources Act of 1971 (RCW 90.54.020(3)(a). However, because this standard would not adequately protect and preserve instream values as required by existing instream flow statutes, these laws would have to be amended to permit Ecology to use this approach as a statewide standard. Ecology would also need to amend existing rules (Ch. 173-500 WAC) to implement this alternative, and establish procedures for calculation of the selected hydrologic standard.

   Ecology could conceivably set low, hydrologically based instream flows on some selected streams by invoking the waiver provisions in RCW 90.54.020(3)(a) (overriding conditions of the public interest). Administrative rules are needed defining criteria for such waivers, and specifying whether permanent waivers could be established.

2. Establish flows based on a relatively low fixed percentage of the optimum IFIM flow (e.g.: 50 percent).

   Discussion – Ecology and the Department of Fisheries have been performing Instream Flow Incremental Method (IFIM) studies for several years for numerous streams addressed in the instream resources protection program. These studies result in data indicating the relationship of a habitat index to streamflow for each fish species and lifestage of interest. In this alternative, Ecology could refer to these output tables and determine the flows that would provide the selected percentage of habitat for preferred species and lifestages. These flows would then be adopted as the instream flows for the streams in question.

   Effects – Setting an instream flow in the above described manner, and then appropriating a significant quantity of water for subsequent water rights would result in degradation of existing instream values, including fish. Low flows at or approaching the adopted instream flow would occur with increased frequency and duration.

Average available habitat would be reduced, thus potentially reducing fish production. Non-fish instream values would also probably be negatively affected. Under this alternative, conditioned water rights would have a relatively secure source of supply, and would probably not be subject to frequent regulation, except perhaps on small streams.

Implementation – Under existing law, Ecology must assure the protection and preservation of instream values. This standard would not accomplish this directive for many if not most streams. Therefore Ecology believes that it would probably require a legislative change in the existing instream flow statutes in order to adopt this alternative as a statewide standard. Ecology could perhaps take this approach for selected streams without a legislative change by invoking the existing water provisions of RCW 90.54.020(3)(a) (overriding conditions of the public interest). Administrative rules are needed to establish criteria for such waivers. Performing IFIM studies for all streams would be very expensive and time consuming. Short cut methods could be used on lower priority streams.

Alternatives for Objective C: Preserve instream values at a level below optimum and above survival levels.

1. Set flows to preserve at least 90% of the IFIM optimum flow (current policy).

   Discussion – Ecology and the Department of Fisheries have been performing IFIM studies for several years for numerous streams addressed in the instream flow program. These studies result in data indicating the relationship of a habitat index to streamflow for each fish species and lifestage of interest. In this alternative, Ecology could refer to these tables and assure that instream flows proposed for adoption are not lower than the flow that would protect 90 percent of the amount of habitat that would be provided by the optimum flow for preferred species and lifestages. Ecology has used this standard in its instream resources protection program.

   Effects – Generally, a flow that provides 90 percent of the optimum habitat is considerably lower than the optimum flow due to the declining amount of habitat that is usually provided per unit of water in the increment between 90 and 100 percent of habitat. Therefore this alternative is beneficial for conditioned out-of-stream uses compared to the optimum flow. However, the flow represented by the 90 percent of optimum habitat flow may still be relatively high compared to water availability, especially on smaller streams, and particularly during the low flow period. Frequent regulation of conditioned rights may still be necessary, and some uses requiring a secure water supply may be discouraged.

   This alternative may result in some loss in fish habitat if sufficient water rights are issued capable of depressing stream flows to or approaching the adopted sub-optimum instream flow. (This also assumes that the stream in question is managed for natural fish production and is at or near its full utilization potential by fish.) Fisheries agencies have pointed out that any reduced production comes out of that portion of the fish run available for harvest.

   Implementation – Ecology believes this type of standard (sub-optimum, but providing a high level of protection) meets legislative intent in the instream flow statutes. Ecology can use this standard under its existing authority. Administrative rules establishing this standard would be advisable if this alternative is selected. IFIM studies on all streams would be an expensive undertaking. Some shortcut methods could be used on lower priority streams.

2. Establish a maximum hydrologic criteria for instream flows (e.g., 50% exceedance flow).

   Discussion – As discussed previously, the existing instream flow statutes appear to intend that instream flows be set within the realm of hydrologic reality. One way of meeting this criterion is use of a hydrologic cap on instream flows such as the 50 percent exceedance flow. Ecology develops discharge duration hydrographs based on daily data that illustrate exceedance levels for each day of the year. The 50 percent exceedance flow is a flow that is met or exceeded one half the time for any particular day of the year of interest. Water rights conditioned to an instream flow that is set at the 50 percent exceedance level will be subject to regulation one half the time during that period of the year.

   Frequently the optimum flow for anadromous fish during the low flow summer and early fall period exceeds average water conditions. A 50 percent exceedance cap has been used to limit the level of instream flows proposed for adoption by Ecology, in consonance with its interpretation of existing statutes.

Effects – Adoption of instream flows with a 50 percent exceedance cap, combined with the subsequent appropriation of sufficient quantities of water to reduce streamflows to or approaching a sub-optimal instream flow levels could result in the loss of an increment of fish habitat (and production if the stream is fully utilized to its potential production level). Other instream values may also be reduced as a result. These losses may be offset partially by the reduction in high flows in excess of the optimum flows due to diversions.

Conditioning flows at or approaching the 50 percent exceedance flows are a hardship for those conditioned water uses that need a secure source of supply. It may force users to other sources or to construct environmentally problematic storage facilities. For some uses the high costs that result may make project development infeasible.

Implementation – Ecology has authority under existing statutes to use a hydrologic cap on instream flow levels proposed for adoption. Such a cap is consistent with existing legislative intent to protect hydrologically realistic instream flows. If this alternative is selected, Ecology should adopt rules providing for use of the hydrologic cap, and defining methods for determining this level.

Quantification of Intangible Instream Values (Issues 7, 18, and 34)

Issue Definition – This issue focuses on the question of how to best incorporate intangible, noneconomic values into instream flow setting procedures and water allocation decision-making. Intangible, noneconomic values are resource attributes that have intrinsic value, but are difficult or impossible to evaluate monetarily. Intangible values include attributes like scenic beauty, aesthetically pleasing environments, and solitude. These types of values are often associated with "nonconsumptive" recreational pursuits. Free flowing water supports intangible values such as these and is increasingly enjoyed by Washington state residents in their recreational avocations. These values also attract many visitors to our state. Waterfalls and exceptional stream reaches are discussed in the next section.

Background – The Water Resources Act of 1971 recognizes certain intangible, noneconomic values of water as beneficial uses (recreation, aesthetic, and environmental values). Further the Act specifically names these values as uses to be preserved through the retention of base (instream) flows (RCW 90.54.020).

Because these attributes are not economic, and indeed are somewhat difficult to define, any attempt to assign values for comparative purposes is subjective. Aesthetic appreciation is a very personal matter and is related to one's perception of the surroundings. For example, our state has literally hundreds of waterfalls that, while viewed as desirable, receive no particular special recognition, whereas any one of them might be a central feature of a major park or preserve in another part of the country where waterfalls are not as common.

John Krutilla, a noted resource economist, argues that free-flowing natural streams become increasingly valuable as development of other streams for economic purposes causes them to become more scarce. Devising some means of reflecting that relative value is difficult in the absence of monetary criteria. The tendency is to create a system for assigning ratings to intangible attributes. A recently published guide, Waterfalls of the Pacific Northwest by George A Plumb, 1983, rates the scenic beauty of many waterfalls accessible to the public with a system ranging from one to five stars.

Until recently, Ecology used a rating system, encompassing various instream attributes, in its process for establishing instream flows. The ratings were assigned by a panel of agency experts familiar with the streams under evaluation. Attributes rated are wildlife, fish, scenic and aesthetic, navigation, water quality and other environmental values. The panel's ratings were totalled, and the sum was used with a transformation curve to derive a level of flow exceedance to be protected. (Department of Ecology Streamflow Preservation Program, WRIS Technical Bulletin No. 11, January 1976)

Weaknesses with this method include the undocumented nature of the transformation curve, and the fact that a stream could be outstanding in one or several attributes, but rate poorly overall due to the low value of other attributes. When more scientific fish flow methods became available, Ecology stopped using the old rating system.

Controversy concerning instream flow levels is generally focused on fishery needs. Therefore there has been a tendency to concentrate on fish flow needs with much less attention paid to the needs for recreation, aesthetic and environmental values. The lack of a broadly recognized and accepted methodology for non-fish instream flow needs contributes to this problem.

One methodology is described in a 1975 report entitled, Instream Flow Regimes for Fish, Wildlife, Recreation and Related Environmental Resources by Donald L. Tennant, 1975. The report describes a "quick, easy" instream flow methodology based on the author's observations of many Rocky Mountain and prairie region streams. Tennant provides a subjective evaluation of the level of resource protection afforded by stream flows at various percentages of the mean annual flow (maf).

In regard to non-fish instream uses, Tennant suggests that at ten percent of maf, recreational navigation is difficult even with a shallow draft craft, and natural beauty and stream aesthetics are badly degraded. At thirty percent of maf, conditions are good for fishing, floating and general recreation shallow draft craft, and aesthetics and natural beauty of generally satisfactory. At sixty percent of maf, conditions are excellent for fishing, boating and general recreation, and aesthetics and natural beauty are excellent to outstanding. A flow of two to three times the maf is considered best for kayaking and white water canoeing.

In recent instream flow programs, Ecology has focused on the issue of flows for fish, then consulted with white water and other recreation groups for advice as to the adequacy of the proposed fish flows for recreation and aesthetic enjoyment. Ecology staff may also visit streams at varying flow levels, and are able to make their own subjective judgements.

Occasionally, hydropower projects are proposed on waterfalls or steep gradient stream reaches incapable of supporting fish life. In such cases, instream flows may be dependent upon the perceived value of the falls or reach for scenic enjoyment. On several occasions, Ecology has asked project proponents to provide photographs of the falls or reach at various rates of flow in order to determine minimum bypass flows. Ecology has taken the position that no stream segment should be totally dried up by a new diversion.

The Water Resources Act of 1971 provides that the allocation of water in Washington to potential uses shall be based generally on achieving the maximum net benefits to the people of the state (RCW 90.54.02). The evaluation of alternative water uses, including intangible values, as part of a system for allocating water to meet maximum net benefits objectives is thoroughly discussed in issue paper no. 5. Because intangible values are not readily subject to monetary evaluation, they must be described in non-monetary terms and brought in as a qualitative factor to be weighted in the analysis.

Viewpoints – Offstream water interests generally advocate that water be allocated to maximize economic benefits. This view will normally result in a conclusion that water is best utilized for out-of-stream, economic purposes. To the extent that other uses such as intangible values are recognized, they are often viewed as resources that may be impacted in the interest of economic progress preferably without the expense of providing mitigation.

In contrast, environmental interests view the intrinsic values of free flowing streams as irreplaceable resources that should be protected from intrusion. They generally prefer that if water resources development must occur, it should be limited to watersheds already impacted by man's activities. They prefer that many unaltered wild rivers be placed in a preservation category. They also resist the notion that resource allocation decisions can or should be made by considering economic criteria only. They argue that the increasing scarcity of unaltered streams makes them that much more valuable to society.

Alternatives

Alternative A: Use preservation of intangible values as a primary factor in setting instream flows.

> Effects – Adoption of this alternative would help support the retention of flows together with other instream values. Depending on the weight given to these needs, instream flows could be set at something other than optimum for other instream values. Intangible values may be the only instream values present in some stream segments, and thus may be the only factors that can be considered. The existence of outstanding scenic qualities could be regarded as justification for consideration under various river preservation programs. Generally the environmental effects of this alternative would be positive. Development potential for hydropower and other uses could be negatively affected.
>
> Implementation – Scenic, aesthetic and other general environmental values are recognized in the law as beneficial uses, and as instream values for which instream flows are to be retained. To fully implement this alternative, procedures and methods should be researched and adopted. Information developed in the Northwest Rivers Study, the Protected Areas Study and the state Scenic Rivers Program could be utilized.

Alternative B: Do not use intangible values as a primary factor in setting instream flows.

> Effects – This alternative would disregard scenic, aesthetic and general environmental values, and other intangible factors when setting instream flows. Instream flows would be set considering only the economic values to be derived therefrom. This could lower the overall value associated with retention of instream flows, and perhaps result in less support and lower instream flow levels. Impacts on these values could then result, particularly in segments where they are the dominant or only instream value present.
>
> Implementation – It would be necessary to amend RCW 90.22.010 and 90.54.020 to remove scenic and aesthetic as values for which instream flows should be adopted.

Waterfalls and Exceptional Stream Reaches (Issue No. 34)

Issue Definition – This issue questions whether certain stream reaches should receive extra protection from water withdrawals because of their scenic and aesthetic qualities.

Background – Certain stream reaches possess exceptional scenic properties that some believe should be preserved in their natural state. Waterfalls, for example, generally lose some of their aesthetic appeal if natural streamflow levels are reduced. In addition, project facilities themselves (roads, dams or pipelines) may intrude upon the aesthetic qualities of such a site if a water right is granted for a proposed project. Preserving streamflows at natural levels for a waterfall, however, requires water withdrawals to be restricted at all points upstream of the waterfall (this could affect a considerable area). Determining the aesthetic effects of various streamflow levels on a waterfall is a subjective judgement that cannot easily be substantiated. Some waterfalls and outstanding aesthetic reaches are located entirely on private land with no public access. Should the possibility of future public acquisition of the site be considered?

Ecology is mandated by Ch. 90.54 RCW to "provide preservation of …aesthetic and other environmental values." Current policy in setting instream flows is to consider the effects of a proposed instream flow for fish on all other instream values, with particular emphasis on waterfalls and other exceptionally scenic areas. Usually the instream flow level that is proposed for preserving fish habitat is found to also be adequate for preserving aesthetic qualities, although each site is considered on a case-by-case basis. These decisions are admittedly judgemental given the lack of a more precise method for determining aesthetic impacts. In cases where an entire basin possesses exceptional scenic qualities, minimum flows tend to be higher and total closures more frequent than in basins with fewer scenic amenities. When a hydropower project is proposed for a waterfall site, aesthetic considerations may become a paramount consideration in determining the necessary bypass flows.

Several studies are currently underway to improve the state of knowledge regarding river segment values. The Northwest Power Planning Council has completed its Northwest Rivers Study which has developed an extensive data base of river segment attributes. It will be used in the NPPC's next phase of study to identify important reaches for fish and wildlife to be protected from hydropower development. The State Parks and Recreation Commission has initiated studies that will result in the classification of river segments and the consideration of high value segments for inclusion in the state Scenic Rivers system. The State Scenic Rivers Acct requires that state and local government carry out their programs consistent with a scenic river designation.

Viewpoints – Environmental interests would prefer to see waterfalls and other exceptional stream reaches preserved with natural streamflow levels or receive special consideration when setting instream flows. Water users would prefer to balance the costs and benefits derived from out-of-stream and instream uses.

Alternatives

Alternative A: Fully preserve waterfalls and exceptional stream reaches. Support studies to identify outstanding waterfalls and stream segments. Recognize outstanding waterfalls and segments in basin or regional water allocation plans and establish instream flows and stream closures that will fully preserve outstanding scenic features and segments. Support federal or state scenic river designation for selected segments.

> Effects – This alternative would improve the recognition and designation of deserving segments and water features and would discourage hydropower and other development of these resources. Instream flows and closures would protect the stream flows that make these features attractive.

Implementation – As noted above, the Northwest Power Planning Council and the State Parks and Recreation Commission are already sponsoring studies of rivers with an intention of protection. Ecology could lend greater support to these efforts, establish closer coordination with these efforts, and act to assure that its programs are consistent with protective designations.

Ecology has existing authority to establish instream flows for scenic and aesthetic values. Objective methods are lacking to determine flow needs. Subjective rating methods may be the only available approach.

Ecology has authority to deny water rights to protect the public interest (RCW 90.03.280). Under this general authority, Ecology may close a stream to developmental uses in order to protect public values. Administrative rules would be advisable to better define public interest values that should be considered in water allocation and appropriation.

Ecology could identify valuable segments and water features in its plans, and make recommendations for protective designation under one of these processes.

Alternative B: Allow development needs to override protection of waterfalls and exceptional reaches. Declare certain out-of-stream uses of water to be superior to preservation of waterfalls and exceptional stream reaches.

Effects – Scenic segments and features would be available for developments that could result in the loss of scenic and aesthetic value.

Implementation – The phrase "overriding considerations of the public interest" (RCW 90.54.020) could be defined to provide a waiver for selected uses from instream flows on these segments. "Public Interest" (RCW 90.03.280) could be defined to exclude waterfalls and scenic segments. Priorities of use favoring out-of-stream uses could be incorporated in water allocation plans.

Burden of Proof for Instream Flows (Issue 10)

Issue Definition – The principal question raised by this issue is: Should instream water interests be required to prove the need for their recommended instream flows, or should those desiring to take water out of streams be required to show that the desired flows of instream interests are unreasonably high? A related issue is who should be responsible for funding and carrying out instream flow studies?

Background – This issue has been raised by the Department of Fisheries which believes that it should not be the burden of fisheries agencies to prove that their recommended flows are those that are, beyond a doubt, needed to protect fisheries resources. They point out that there will always be some uncertainty, because even the best available instream flow methods are never likely to be totally reliable. In the face of uncertainty, fisheries agencies and tribes feel it is necessary to provide conservative (from their view) instream flow recommendations. Uncertainty is greatest when there is a lack of information.

Under current practice, Ecology requires that the instream flow recommendations of Game, Fisheries, and Tribes be substantiated by supporting information. (See RCW 90.22.010) This is usually in the form of results from studies to determine instream flow needs for fish. In this sense, a "burden of proof" is placed on fisheries interests. The Department of Agriculture and Energy Office also have the opportunity to participate in the review of these study results to provide any recommendations they wish to make.

As discussed in other issue papers, Ecology uses instream flow study results, the recommendations received, and the stream's hydrologic characteristics to develop its proposed instream flow. Ecology usually substantiates its decision in a technical report or memorandum. Entities not directly involved in making recommendations are free to request study results and use them to develop their own positions. If they disagree with Ecology's proposed flows, it is Ecology's view that they are burdened to substantiate their position. Ecology's final flows proposed for adoption are developed taking into account all information received from the various interests. In an appeal the burden of proof is usually on the appellant.

Detailed instream flow studies are expensive to undertake. Both Fisheries and Ecology have allocated resources for carrying out IFIM studies, but these resources are limited. The agencies can only accomplish a relatively small number of these studies every year. Therefore, streams are prioritized every year to determine where to do this work. In addition, a decision must be made regarding how many study sites to establish for each stream. Generally the more

study sites on a stream, the more reliable the results for the stream. There are inevitable compromises, because the more study sites established for each stream, the fewer the number of streams that can be covered. Because this work is intended to provide information for instream flow setting from a basin-wide perspective, the tendency is to limit the number of study sites for each stream, and provide coverage for a large number of streams.

Ecology uses the instream flows it adopts as a provision on subsequent consumptive water rights. However, Ecology acknowledges that its instream flows may not be appropriate in all cases for proposed diversions such as those for hydropower that bypass a portion of the stream and return all the water back to the stream in a downstream location. Ecology's more recent instream regulations allow for instream flows different from the adopted flows to be used as provisions for bypass projects. Ecology can require the applicant to carry out site specific studies to provide information needed to determine instream flows for the bypassed reach. These flows need not be incorporated in the regulation in order to be used as water right provisions. In this case the burden of proof is on the proponent. Proponent funded studies are also often required by the Federal Energy Regulatory Commission for proposed projects.

Viewpoints – Environmental interests support the idea that instream flows recommended by the fisheries agencies should be assumed to be appropriate unless other interests provide reliable evidence that they are not. They advocate that a conservative approach be taken in setting flows to guard against the danger of underestimating instream flow needs. They also support the idea that proponents should have the burden for financing instream flow studies, but believe that studies need to be done with close oversight by the fisheries agencies. They point out that once appropriated, water cannot be easily retrieved for instream uses.

Water users oppose the idea that fisheries agency's instream flow recommendations should be accepted unless they (water users) prove them to be excessive. They support use of state-of-the-art instream flow methods, but do not necessarily accept that they should be responsible for financing studies. Many would like to be involved in the instream flow setting process earlier than they are now, in order to balance the input Ecology receives from fisheries interests. Finally, they believe fisheries agencies and tribes should be subject to the same burden of proving the needs for fish that out-of-stream users must meet for their proposed uses.

Alternatives

Alternative A: Require fisheries agencies and other environmental interests to demonstrate that their requested instream flows are necessary to preserve and protect instream values. Require fisheries agencies, etc. to carry out studies or cooperate with Ecology in studies to document needs.

> Effects – This would result in a greater burden on fisheries agencies and instream interests to assist in documenting needs. Failure to do so could result in inadequate representation of these needs to the eventual detriment of instream values.
>
> Implementation – The tone of Chapter 90.22 RCW places a burden of proof on those requesting the establishment of instream flows to provide supporting data. RCW 90.22.010 requires that any instream flow request submitted by Fisheries or Game include documenting support. Ecology could adopt rules establishing study requirements and standards.

Alternative B: Allow instream flows to be appropriated directly, with requirements for the appropriator to document need.

> Effects – This alternative would place the burden of proof on those interests that directly benefit from instream flows. Study costs could be quite high for individuals and groups requesting that instream flows be established. This could discourage establishment of such flows.
>
> Implementation – This is the way the State of Alaska establishes instream flows. This alternative would probably require changes in existing laws, particularly Ch. 90.03 RCW in order to exclude instream flow appropriations from appurtenance and construction of works requirements. Extensive rule-making would need to follow.

Alternative C: Require out-of-stream use applicants to carry out instream flow studies on streams that do not have established instream flows, or to support any contentions they wish to make that proposed or existing instream flows are in excess of real need.

Effects – This would place a burden of proof on prospective water users. They would have to incur significant study costs to dispute established or proposed instream flows, or to be permitted to appropriate water on streams not having established instream flows.

Implementation – Ecology has authority under the water code to require studies by an applicant for a water right (RCW 90.03.290). This is the process that has been followed with regard to proposed hydropower developments in recent years.

Improving instream flow conditions on heavily appropriated streams.

Issue Definition – The question in this issue is whether an attempt should be made to improve instream flow conditions in streams heavily appropriated in the past to the detriment of instream values? If so how can this best be accomplished?

Background – Many streams in Washington experienced the development of consumptive, storage and bypass uses prior to the advent of legislation requiring the preservation of instream flows. Under the appropriation doctrine, an appropriation, once established, is perpetual and can only be forfeited due to non-use or waste. As a result, the legacy of overappropriation of streams is not easily overcome.

The appropriation doctrine is inherently inflexible. It was adopted by western states as a mechanism to provide a security of interest in scarce water, and a means of determining priority when disputes arise. These characteristics work against any attempt to redress poor past decision-making or to respond to changing societal values toward water.

Despite these problems, Ecology has some positive experiences in attempting to improve instream flow conditions on heavily allocated streams. Ecology has used its authority to issue water quality certifications under the Federal Water Pollution Control Act (section 201) to require an old hydropower project to provide some release of flows where there had previously been no such requirement. Ecology has also encouraged the reallocation of federal storage in the Columbia River basin to provide for improved instream flows. In several instances, appropriators have been convinced to convert from surface to ground water sources for greater security and health, with incidental benefits for instream flows. Ecology relinquishes rights that are unused for five consecutive years without acceptable cause. (This reduces the potential call on the resource.) Finally, Ecology is involved with the Bureau of Reclamation in studies of the feasibility of conservation and new storage in the Yakima basin specifically for the objective of improving instream conditions.

Ecology supported a 1979 change in Chapter 90.14 RCW that allowed any relinquished water rights to be applied to an adopted instream flow, but retain the original priority date. The legislature repealed this provision in 1981, so that now, as before 1979, relinquished water is returned to the pool of unappropriated waters available for appropriation.

Viewpoints – Fisheries, recreation, and environmental interests are very supportive of actions to improve streamflow conditions on heavily appropriated streams. Some object to the inflexibility of the appropriation doctrine to meet changing needs of state residents.

Water users holding existing rights would oppose any attempt to take back or condition existing water rights without full compensation. They view an appropriation as a property right protected by the taking provision of the United States Constitution.

Alternatives

Alternative Objective A: Do not attempt to improve conditions on heavily appropriated streams.

Effects – Under this alternative, heavily appropriated streams would continue to support diminished instream values or none at all, but would support the maximum feasible offstream water use.

Implementation – No action would be required to implement this alternative.

Alternatives for Objective B: Attempt to improve conditions on heavily appropriated streams.

Alternative 1: Convert existing rights into term permits with expiration dates. Issue only term permits for new applications.

Effects – This alternative would eliminate the "in perpetuity" characteristics of existing rights, and would allow the elimination of inefficient and low productive uses of water. Renewed permits could be issued subject to instream flows.

Implementation – This alternative would require wholesale amendment of existing water laws, particularly Ch. 90.03 RCW. The issue of taking property without compensation would surely be raised and could require many years in the courts to resolve. Term permits for new applications only would be controversial, but less so.

Alternative 2: Encourage purchase, grant or condemnation of out-of-stream rights and allow easier transfers.

Discussion – Currently, Ecology does not allow transfers of rights from offstream to instream use. This is because the law requires that a water right be appurtenant to land, and due to the custom that some construction work is required to appropriate water. The law does now provide for the transfer of a point of diversion, place of use or purpose of use, but these provisions appear to be intended to govern the transfer of rights among offstream uses. It should be noted that transfers can only be approved if they would not affect all water rights existing at the time of the transfer.

Several technical problems also would have to be addressed, such as determination of the amount of water subject to transfer. Enforcement of instream flow blocks of water injected into the priority list of rights would be difficult to enforce. It would be much easier to manage a system wherein purchased or condemned rights are retired and become unappropriated water. Where an instream flow was established, this would help improve the priority of the instream flow.

Effects – To the extent that grants of existing rights were received and public agencies and private individuals could afford to purchase rights or pay condemnation judgements, and within the constraints noted above, this alternative could result in incremental improvements in instream flow conditions. Assuming that an equitable determination was made of the amount that was beneficially used by the original right and therefore subject to transfer, there could be no negative effect on existing rights. Regulation of rights among each other and as related to the instream flow could be very complicated.

Implementation – Changes in the existing statutory provisions governing water right transfers (RCW 90.03.380) to waive appurtenance requirements, and recognize the legitimacy of appropriative instream rights would be necessary. To be effective in improving stream flow conditions, changes might be necessary in the present provision prohibiting a transfer from affecting all existing rights. Regulations governing such transfers might also be needed. Enforcement would need to be strengthened.

Alternative 3: Establish an aggressive relinquishment program.

Discussion – Relinquishment of a water right occurs if that right is unused for five consecutive years without "sufficient cause" (RCW 90.14.140). Under these circumstances, the water is relinquished regardless of whether or not Ecology is aware of the non-use at the time. Upon learning of such relinquishment, Ecology cancels the water right certificate.

Currently, Ecology pursues the relinquishment of unused water rights as they are identified in the course of other work. No attempt is made to actively seek out unused rights, except in general adjudications of water rights and claims, wherein unused rights are extinguished as an integral part of the process.

Under current law, relinquishment of a senior right benefits junior rights which "bump up" in priority. If an adopted instream flow exists, it also "bumps up" in priority. Even if no instream flow has been adopted, instream values are benefited in that forfeited rights cannot be reactivated. The water from a relinquished right reverts to the state as unappropriated water. The law would have to be changed to allow relinquished waters to apply to an instream flow without loss of the priority date of the original right.

Effects – This alternative could be beneficial over a long term for instream values on overappropriated streams by eliminating water rights senior to an instream flow. Whereas little water may currently remain to satisfy a recently established instream flow, relinquishments over time would enhance the standing of the instream flow.

Existing rights are not negatively affected by relinquishment of other rights, and indeed may be enhanced if senior rights are forfeited. If the law was changed to allow a relinquished right to apply to a minimum flow,

senior rights could be negatively affected. A number of the technical problems would arise, and regulation of rights could be complicated.

Implementation – Ecology has existing authority to administer the relinquishment of water rights. This occurs most commonly in the water right adjudication process. Ecology could implement a more active relinquishment program by raising its priority or providing additional resources.

In order for relinquished rights to apply to an instream flow without loss of priority date, it would be necessary to amend the relinquishment statute (Ch. 90.14 RCW) and perhaps the water code (Ch. 90.03 RCW).

Alternative 4: Establish an effective water conservation program.

Discussion – Water conservation is discussed in detail elsewhere in these issue papers (Issue Paper No. 6). Washington does not presently have a conservation program. Water is appropriated to new right sin a conservative fashion in accordance with area-specific water duties.

It has been suggested that conserved water could be applied to meet instream flow needs. Under current law, conserved water would be relinquished and become unappropriated. The law could conceivably be changed to allow conserved water apply to an instream flow without loss of priority date.

Effects – Effective water conservation could reduce the diversion demand of water rights senior to an adopted instream flow, thus increasing the likelihood of satisfying the instream flow. The law would have to be changed to apply conservation savings to an instream flow without loss of priority date. This would inject increments of the instream flow into the list of priorities, and require regulation of rights junior to those increments.

Reduced diversion might also mean reduced return flow which could be beneficial for water quality, but could (depending on the physical circumstances) affect the availability of water for downstream uses and instream flows at a later time.

Implementation – Ecology has existing authority to prohibit the waste of water and assure that diversions result in beneficial use. Legislation could improve existing laws and establish conservation as a priority for the department. Regulations would also be helpful to define a conservation program and establish standards.

Alternative 5: Encourage conversion of surface water diversions to ground water sources and encourage conjunctive use of surface and ground water to reduce demand for surface water.

Discussion – In some limited instances, Ecology has encouraged surface to ground source conversions. Frequently this has been done with domestic supply uses for health reasons. Where the new withdrawal is from an aquifer in direct hydraulic continuity with the surface water source, it has been possible to transfer the right without loss of priority. Otherwise, a new water right would be required.

Conjunctive use is the withdrawal of water from both ground and surface sources to supply a need. It tends to result in less demand from either source, and allows the user to establish a more secure supply. It may also involve artificial recharge of ground water aquifers using excess surface water.

Effects – Properly located wells have little or no effect on stream flows. Even where there is a hydraulic connection, the effect of the ground water withdrawal may be delayed until a period of the year when more than adequate streamflows are available. Therefore both of these mechanisms have the potential to benefit instream flows without harm to existing rights.

Implementation – Incentives may be necessary to encourage the conversion from surface to ground water. The loss of priority date and the expense of well drilling and pumping are disincentives. These problems could be addressed by legislation.

Alternative 6: Support development or reallocation of storage dedicated to improved instream flows.

Discussion – This alternative is being pursued by Ecology in several cases (Yakima and Green river basins). Ecology has also supported limited reallocation of federal storage in the Columbia River basin to improve instream flows.

The Water Resources Act directs Ecology to enhance the natural environment through instream flows and to prefer multipurpose impoundment structures giving due regard for the protection of fisheries resources (RCW 90.54.020). These provisions are used as a basis for seeking structural solutions to instream flow problems.

Effects – Construction of storage nearly always has serious environmental problems, particularly for fish and wildlife, due to inundation of habitat and water quality effects. Dams may also block fish passage, and may change a stream's sediment balance. Careful selection of sites and designs and help reduce these effects. Recreational and scenic attributes may also be altered. On the other hand, establishment of favorable operating rules may be beneficial for downstream fish and recreational values due to flow stabilization and the capability to augment flows during dry weather.

Implementation – Existing law is probably adequate in most cases to permit Ecology to advocate a favorable allocation of new storage or reallocation of existing storage for instream flow benefits. Administrative rules could provide better guidance for this option. Ecology's authority over existing projects is limited due to existing rights, although Ecology's water quality certification authority (section 401, Federal Water Pollution Control Act) has been used to require the release of instream flows from storage as part of the federal relicensing of a hydroelectric project.

ISSUE PAPER II: WATER RESOURCES PLANNING APPROACH AND SCOPE

Introduction

This issue paper addresses issues relating to the scope of Ecology's water resources planning activities. Specific issues include what objectives should a state water resources planning program have and what functions should it perform. The issue paper also raises the question of the appropriate geographic scope for water resource planning: state-wide, regional, single basins, or individual streams. It also addresses the question of consistency among streams; whether some streams should be given higher or lower levels of protection because of the nature of fisheries resources or value for water supply, for example. Other specific issues involve consideration of long-term needs, periodic regulation review, and representing the state's interests.

The Water Resources Act of 1971, Chapter 90.54 RCW, requires Ecology to develop and implement a state water resources program through adoption of rules. The act allows Ecology to develop the program in segments by physiographic regions or by specific problem areas.

Ecology's response to this directive was adoption of the Water Resources Management Program regulation, Chapter 173-500 WAC, in 1976. This regulation established the framework for Ecology's water resources planning program. The regulation divides the state into 62 Water Resource Inventory Areas (WRIAs) and prescribes the development of basin water management programs for each WRIA. The regulation provides that basin programs can include a variety of possible elements including identifying and fostering water resources projects, declaring preferences or priorities of use, closing streams to future appropriation, establishing instream flows, allocating and reserving water for beneficial use, withdrawing waters from appropriation to collect data, establishing appropriation limits, and designating water management areas.

Ecology's early basin management plans, developed between 1975 and 1979, were relatively comprehensive and incorporated many of these elements. Beginning in 1979 and extending to the present, however, Ecology's basin planning has tended to be more narrowly focused on establishing instream flows and stream closures, although several instream plans also incorporate water allocation policies. In addition, Ecology has been active in other program areas in seeking to identify needed water projects and reserving water for future human consumption needs. However, in general, Ecology's basin planning since 1979 has been narrowly focused and not comprehensive in nature.

Balanced Assessment of Priorities (Issue 3)

Issue Definition – This issue addresses the scope of Ecology's planning activities. As mentioned in the introduction to this issue paper, recent basin programs have focused on establishing instream flows and stream closures, with little attention given to future out-of-stream needs. At issue is whether Ecology should attempt to fairly balance the needs of both instream and out-of-stream uses. Two questions arise from this issue: 1) Should Ecology expand the scope of its current program to include the allocation of water to out-of-stream uses, and 2) Should Ecology consider out-of-stream needs when setting instream flows or look exclusively at instream values?

Background – RCW 90.54.020(3)(a) states that "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. 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." (Underlining added). (Issues related to overriding considerations of the public interest are discussed in detail in Issue Paper III.)

Ecology's interpretation of this language has been essentially as follows: The statute requires that base flows shall be retained. This is not optional. Ecology understands this to be a clear legislative mandate to establish such flows and preserve them through the administration of subsequent water rights. The importance of these flows is supported by the language stating that they can be abrogated only to serve overriding consideration of the public interest.

RCW 90.54.020(2) states, in part, that "Allocation of waters among potential uses and users shall be based generally on the securing of the maximum net benefits for the people of the state." (Underlining added). Ecology has maintained that the term "potential uses and users" in the maximum net benefits language relates to future uses established subsequent to the required establishment of base flows and that the base flows are intended to protect existing instream uses. In addition, the use of the term "generally" implies that the maximum net benefits test is to be a general guideline for water allocation decisions that need not override the guidance provided in RCW 90.54.020 (3) through (10). (The maximum net benefits issue is discussed in detail in Issue paper V.)

Using this interpretation, Ecology has established instream flows based only on considering the needs of instream values and not out-of-stream needs. Since 1979 Ecology has not expanded the scope of its basin programs to include allocation to uses other than instream flows because it has felt that establishing instream flow protection measures has been a higher priority than other possible basin plan elements since that time. This was done so that Ecology could focus its limited water planning resources on the task of establishing instream flows, a prerequisite to allocation of water to out-of-stream uses.

Viewpoints – In general terms, the environmental interests have expressed the view that instream flows should be the use that is provided for first in Ecology's programs. They argue that, historically, fish runs have been depleted in part because consumptive users have been allowed to take water at the expense of the fisheries resource and other instream values and that it is now time for instream resources to be a higher priority as the principal focus of Ecology's water resources planning programs. In other words, they maintain that offstream uses have gotten their water supplies for many years without regard to losses of instream values and that it is now time to emphasize protection for remaining instream uses.

Offstream water users generally support an increased emphasis on out-of-stream uses in Ecology's planning programs. They think that the instream resources protection program is too narrowly focused. They argue that resource managers have an obligation to plan for future human needs and that these must be treated at least as an equal priority with instream flows. Offstream users believe the state legislature intended that the maximum net benefits test should apply to all allocations, including the establishment of instream flows intended to protect existing resources.

Alternatives

Alternatives for Objective A: Consider only instream uses in the water resources planning process.

1. Use fish and wildlife as the primary planning criterion.

   Discussion – This approach would include consideration of only fish and wildlife concerns. It would ignore the need for water for other instream uses such as recreation and aesthetics as well as for consumptive uses.

   Effects – This alternative could result in protection of fish and wildlife resources, but may do so at considerable cost to other uses of water which would not be considered in the planning program.

   Implementation – Current statutes require Ecology to establish instream (base) flows for more than simply fish and wildlife. To implement this alternative would require a statutory change allowing Ecology to consider only fish and wildlife needs.

2. Consider all instream uses of water in the planning process.

   Discussion – This would allow all instream uses to be considered but would not allow for consideration of the needs for water for consumptive uses.

   Effects – This alternative could result in protection of fish and wildlife resources and could provide protection for additional uses such as recreation, scenic, aesthetic, and navigation. However, it would not include consideration of offstream uses.

   Implementation – Implementation of this alternative would not require any new legislation or administrative rules. This is essentially Ecology's current policy and could be carried out under existing authorities.

Alternatives for Objective B: Consider only offstream use in the water resources planning process.

1. Use agricultural water needs and/or domestic/municipal/industrial use as the primary planning criterion.

   Discussion – This approach would ignore instream resources and other offstream uses, but would fully protect agricultural interests.

   Effects – This alternative would protect selected offstream uses, but at considerable costs to the other offstream and instream uses of water.

Implementation – Protection of a single offstream use would not be consistent with existing statutes and would require new legislation and administrative rules for implementation.

2. Consider all offstream uses in the planning process.

   Discussion – This approach would ignore all instream uses but would consider all offstream uses of water.

   Effects – This would protect uses of water for all consumptive uses, but would not protect those uses requiring that a continuous supply of water remain in the stream.

   Implementation – This alternative would require amendment of existing statutes that require the retention of instream flows.

Alternatives for Objective C: Address a combination of instream and offstream uses in the water resources planning process.

1. Consider selected instream and offstream uses.

   Discussion – Under this approach, the planning process would consider only certain instream and offstream uses of water. For example, it might look at fish and wildlife habitat, recreation, and domestic/municipal supply, but could ignore aesthetics and agricultural uses.

   Effects – This alternative would provide a partial balance between instream and offstream uses, but those not included would likely suffer.

   Implementation – Current statutes clearly require Ecology to establish instream (base) flows to protect essentially all instream values. Ecology has not considered offstream needs in setting instream flows nor has it limited the instream uses being considered. As long as new offstream uses were subject to some level of instream flow, new legislation would probably not be required.

2. Subject all non-exempt water resources planning decisions to a maximum net benefits test.

   Discussion – This could apply to decisions regarding all uses of water unless exempted under specific criteria. For example, survival level instream flows could be exempted and provided without maximum net benefits test, or flows necessary to protect current resource levels could be exempted, with any higher flows subject to such a test.

   Effects – This approach would implement the maximum net benefits criteria, but would allow for exemption of identifiable high priority uses that may not land themselves to quantification in such a test.

   Implementation – This could be accomplished under Ecology's existing authority but would probably require adoption of one administrative rules by Ecology.

4. Consider all uses in the water resources planning process, but emphasize selected uses when significant existing or future demands and/or conflicts exist. Subject water resources planning actions to a determination of maximum net benefits which includes environmental consideration with exemption for an instream flow needed to maintain existing fish habitat and populations.

   Discussion – This combines features if several of the alternatives above. It allows for consideration of all instream and offstream uses, but also allows a narrowing of the scope when warranted. It supports the use of a maximum net benefits test which must include environmental considerations with exemptions for flow levels intended to protect existing habitat and populations.

   Effects – This would allow consideration of the uses that need to be addressed in a given area, without requiring excessive efforts directed towards less critical uses and should allow Ecology to tailor its programs to individual basin needs.

Implementation – This could be accomplished under Ecology's existing authorities but should be included in an administrative regulation adopted by Ecology.

Comprehensive Regional Planning (Issue 5)

Issue Definition – The question posed by this issue is whether Ecology should change the geographic scope of its planning efforts. This section discusses whether a state-wide, regional, basin, or individual stream approach is best for conducting the state's water resource planning functions.

Background – The current basin-by-basin approach to water resource management is prescribed in existing regulations (Chapter 173-500 WAC). It results in the establishment of instream flows or stream closures intended to preserve the fisheries and other instream resources in each basin or sub-basin being addressed. Those favoring a broader geographical approach such as regional or sub-regional planning argue that there may be water allocation trade-offs that can be identified using this approach that are not readily available in the existing program. They maintain that, within a larger sub-regional or regional area, there may be streams that should be heavily utilized for consumptive uses while other streams should be managed and preserved for instream uses. This approach would involve identifying the demands for instream and offstream uses and deciding which streams are best suited for each. Obviously, streams well suited for both types of use would present problems in determining which uses would be allowed, but the result of this approach is that selected streams could be more heavily utilized to satisfy offstream demands with less regard for instream uses, while other streams would be more fully protected from further offstream development with instream uses being the highest priority use. There may also be certain types of planning that could best be accomplished at a statewide level. For example, a program aimed at identifying candidate streams for total preservation might be well suited to a statewide effort.

Ecology has never undertaken comprehensive water resources planning on a broader scale than individual drainage basins (WRIAs). The decision was made to emphasize instream resources in Ecology's planning efforts and to do so on a manageable basin-by-basin scale. Once a level of protection for instream resources is established statewide, Ecology has indicated that it intends to conduct a more comprehensive water resources planning program utilizing the already-established instream resource protection programs as a starting point.

Viewpoints – Both environmental interests and water user interests can see some advantages to a regional approach. By looking at an entire region, it may become more obvious that certain streams deserve a high level of protection because they support a key fishery resource. Also, it may be possible to identify on a regional scale streams that could be managed with an emphasis on water supply. Water user groups might support a regional approach if it resulted in reduced uncertainty for them in acquiring future water supplies. Environmental interests are cautious, however, of making instream flows a low priority on any stream because most streams support at least some instream values, and because it is so difficult to recover instream flows once the water has been appropriated. Tribes whose fisheries are dependent upon only a few streams would probably find unacceptable the trading off of any stream to out-of-stream development.

Alternatives

Alternatives for Objective A: Conduct Ecology's water resources planning program on a basin-by-basin or stream-by-stream basis.

1. Develop planning programs for Water Resources Inventory Areas (current practice) or smaller areas.

   Discussion – Planning efforts at this level offer a good opportunity to address basin or stream specific issues but ignore the interrelationships that exist between various basins within a larger areas or region. This level of detail allows for development of specific programs aimed at solving specific management problems.

   Effects – This alternative would result in a continuation of current policy. It would result in adoption of programs of similar scope to those already adopted. They would not consider regional issues but could allow policy development based on the level of conflicts that exist between uses.

   Implementation – This is within Ecology's present authority. To do a precise job of prognostication would probably require additional staff trained in working such evaluations. However, existing staff could conduct a planning effort that identified likely major trends for the future in given areas.

2. Identify water allocation trade-offs among streams within a region.

   Discussion – This alternative would allow the identification of selected areas or streams that are desirable for various uses (e.g. some for instream uses, some for offstream uses) so that development of one stream could be "traded-off" against protection of another.

   Effects – This would allow developers to focus their activities in particular areas and, perhaps, avoid some of the costs of mitigation for their projects that they would otherwise incur. It would also provide protection for other streams.

   Implementation – This could probably be done within Ecology's existing authority but will require agreement between development and non-development interests on which streams should be designated for development and protection. This would likely require a means of resolving differences on such matters.

Alternatives for Objective C: Conduct a statewide water resource planning program.

1. Develop a statewide comprehensive water resources program.

   Discussion – This alternative would result in a statewide program which would essentially be the "state water plan." It would be a comprehensive water resources planning and management program for the entire state.

   Effects – This would provide a clear depiction of the state's policies and activities in water resources management.

   Implementation – This is within Ecology's current authority, but would require significant increases in staffing and funding to develop and conduct a truly comprehensive statewide planning program within an acceptable time frame.

2. Develop statewide guidelines or criteria to provide guidance and consistency to the planning program applied to substate geographic units.

   Discussion – This alternative would result in the development of planning guidelines for use in developing more specific program or plans for regions or individual basins.

   Effects – This alternative would provide an assurance of consistency from region to region within the state but could also allow for the development of similar but distinct programs for different areas.

   Implementation – This could be implemented with existing staff resources and is within Ecology's existing authority.

3. Develop statewide guidelines or criteria to provide guidance and consistency to the planning program applied to substate geographic units and conduct subsequent water resources planning activities on a regional (multiple WRIA) or basin-by-basin approach under the guidance provided by the statewide plan.

   Discussion – This approach would provide statewide consistency on a broad scale and allow development of more detailed and specific programs and plans throughout the state.

   Effects – This would result in development of statewide guidance for the planning program as well as case-by-case development of regional programs to examine regional resource issue and basin-specific programs to deal with more localized issues.

   Implementation – This is within Ecology's authority, but would require additional staff and funding if significant progress is expected.

Different Instream Flow Standards for Different Streams (Issue 15)

Issue Definition – The question raised by this issue is whether certain streams should have higher or lower levels of protection depending upon the specific characteristics of each stream. This issue is closely related to the issue discussed above, Comprehensive Regional Planning.

Background – Ecology's basin programs have attempted to establish relatively consistent levels of protection for instream values both between streams within a given instream program and among streams in different instream programs. Ecology's instream flows are normally based, in part, on the recommendations of the departments of Fisheries, Game, and the Indian tribes. Their recommendations are usually for the preservation of optimum fish and wildlife habitat conditions either through relatively high instream flow requirements or stream closures. These recommendations do not vary greatly from stream to stream and basin to basin in the level of protection deemed necessary for the protection of instream values.

Instream flow studies to identify fishery needs indicate that fish need a much higher percentage of the total water supply in smaller and medium sized streams than in larger rivers. In many (if not all) small streams, these studies indicate that fish need virtually all of the available water supply during the summer and fall in order to maximize potential production. Studies on larger streams indicate that it would be advantageous for fish production if less water was present during some parts of the year. (However, fishery agencies question such findings for the low flow, critical rearing period for some species.) If these studies are providing credible results, they may indicate that preferred sources of future withdrawals should be the larger streams in a region.

Existing laws are silent as to whether different instream flow standards can be applied from stream to stream. The law seems to great to Ecology considerable discretion to determine an appropriated level of protection for each stream.

Viewpoints – Environmental interests generally support the retention of optimum instream flows in all streams to fully protect fish and wildlife habitat and other instream values whether currently used or not. Although, as discussed in Issue paper II, Instream Flow Standards and Process, there is disagreement about what constitutes the proper level of protection, these groups generally maintain that protection is needed in all streams and favor a relatively high level of protection.

Water user groups generally support the use of different instream flow standards for different streams because it provides possible candidate rivers to meet identified future water supply demands with more certainty. They favor the identification of streams where a high level of protection is required and those where less protection is needed. These latter streams would then be likely candidates for future development.

Alternatives

Alternative A: Provide the same level of protection for the instream resources of all streams.

> Discussion – Under this alternative, all streams would be treated identically, regardless of the nature of the instream values and resource present.
>
> Effect – Depending on the level of protection selected, this could result in overprotection of streams with relatively less valuable resources and under-protection of streams with relatively more valuable resources. Nevertheless, it would provide some protection for all streams. Adoption of a statewide standard would provide some certainty to all parties concerning the level of protection that will be provided.
>
> Implementation – This alternative is within Ecology's authority and could be carried out at existing staff levels although additional staffing would result in the protection being established sooner.

Alternative B: Provide variable levels of protection for instream resources on a stream-by-stream basis.

> Discussion – This alternative calls for establishing the level of protection on a stream-by-stream basis.
>
> Effects – This would allow higher level of protection on streams viewed as having relatively high instream resource values and lower levels of protection on streams of lower values or where streams may be identified for further development. This could result in conflicts over the desired future use (and protection) for many streams.
>
> Implementation – This is within Ecology's authority and staffing capability, although, as before, additional staffing would speed up the process. Criteria for establishing the appropriate level of protection would have to be established, preferably by administration regulation.

Alternative C: Establish a minimum level of protection for all streams so they do not get dried up, but allow higher levels of protection on other streams where resources values are particularly important.

Discussion – This would provide minimal protection (survival flow) for all streams and a higher level of protection in streams with higher priority instream values.

Effects – This would allow identification of some streams for development and some streams for preservation but would not allow total eradication of instream values in any stream.

Implementation – This is within Ecology's authority but criteria would probably have to be established by administrative rule.

Consider Long-Term Needs (Issue 6)

Issue Definition – This issues concerns whether Ecology should attempt to determine and consider expected future needs for water for various potential uses, including both instream and offstream uses. The question is to what extent Ecology should attempt to identify the future long-term needs of such uses before establishing instream flows.

Background – Ecology's existing instream resources protection program examines the need for protection of instream values without regard to other uses. Therefore, the program does not fully consider projected future demands when establishing instream flows. However, future needs are considered in other portions of the water resources program such as reservations of water for identified future uses and ground water policies.

Viewpoints – Environmental interests maintain that fish populations have historically needed protection from excessive appropriation of water and that this need will not diminish. In fact, they would likely argue that, as habitat continues to be lost or degraded, the demand for fish and wildlife protection through instream flows will increase.

Those desiring a more thorough consideration of future demands argue that, as population increases, the demand for water for irrigation, municipal supply, and other consumptive uses will increase. They argue that these future demands must be considered in today's planning.

Alternatives

Alternatives for Objective A: Establish instream flows to protect instream resources without regard to other uses.

Discussion – This is Ecology's current policy. It establishes instream flow protection and then subjects future water rights to these flows.

Effects – This results in protection for instream flows but may cause conflicts with future demands for water from many streams.

Implementation – This is within Ecology's current authority and staffing capabilities.

Alternatives for Objective B: Consider future demands for water in determining the appropriate level of protection for instream resources.

1. Estimate quantities of water to needed for specified future uses over a specified planning horizon.

   Discussion – This alternative requires predicting future water needs over a specified period (e.g. the next 20 years) and using this prediction in determining appropriate levels of protection for instream resources.

   Effects – This would allow consideration of offstream future uses, but would involve problems in trying to accurately assess future needs.

   Implementation – This is within Ecology's authority, but may require additional staff skilled in prediction analysis to develop accurate demand forecasts.

2. Establish priorities of use for future uses.

   Discussion – This involves determining likely high priority and lower priority future uses without attempting to accurately quantify future demand.

   Effects – This would help to anticipate future water use conflicts and minimize them by making adjustments for them now, rather than dealing with them in the future after the conflicts have occurred. However, future conditions are difficult to predict and may not result in policies that are acceptable in the future.

   Implementation – This is within Ecology's authority and staff capabilities but may cause significant slow down in program process because of the additional workload for this type of analysis.

3. Consider the likely long term needs for all uses of water in establishing instream flows.

   Discussion – An estimate of future needs should include an evaluation of the needs for environmental protection in the future as well and should not be limited to consideration of future offstream uses.

   Effects – This would result in a program that would identify and deal with potential water resources issues, before they arise.

   Implementation – Although within Ecology's authority, significant delays can be expected at current staffing levels due to the added workload involved in trying to accurately assess future water resources demands.

Periodic Regulation Review (Issue 35)

Issue Definition – The question involved in this issue is whether Ecology's regulations should include a requirement for periodic review and, if necessary, revision of adopted programs.

Background – Ecology's current policy is to attempt to initiate a review of its adopted water resources plans within five years of their adoption. Language requiring such reviews has been included in many of the adopted regulations. Experience has shown some problems with the five-year review period. As more regulations are adopted, the total workload associated with developing new programs and updating old programs has increased. The review and revisions that have been done to date have been a large workload and have led to the language currently used which states that a review will be "initiated" within the five-year period, rather than implying that the review will be completed within that time. Under present policy, such a review may be accomplished in-house or may involve public review. Principal reasons for such reviews are: (1) changing public attitudes, (2) improved information and methodologies, and (3) identification of new water needs.

Viewpoints – Although the periodic review and updating of the adopted programs is generally viewed as a good idea, environmental interests are concerned that pressures to decrease instream flow requirements may be brought to bear on Ecology. They argue that although increasing instream flows would help in protecting instream resources from future withdrawals, it does nothing to affect those water rights already issued subject to the original flow level. On the other hand, a decrease in instream flow requirements could result in senior water right holders being curtailed before junior water right holders. This situation, they contend, would probably result in Ecology enforcing the lower flows against all users subject to the program. They view this potential "ratcheting down" as an undesirable possibility.

Water user groups generally prefer to see periodic revisions if new information shows that lower flows may be appropriate. They argue that all water rights constrained by the instream flows should be regulated consistently to the lower set of flows, to avoid the problem of regulating senior rights before junior rights.

Alternatives

Alternative A: Review adopted programs and regulations only when specific problems arise or when new data is available.

Discussion – Ecology currently attempts to review its adopted water resources regulation at least once every five years. This is becoming an increasingly large workload because of the increasing number of adopted regulations. The result is that, in order to keep this commitment, Ecology must assign more of its staff to review existing programs and less to development of new programs.

Effects – This alternative would allow ecology to concentrate on the development of new programs by only addressing those adopted program where problems are known to exist or when new information has become available.

Implementation – This is within Ecology's current authority and would alleviate the current workload on review of existing programs. Under this alternative, Ecology would not conduct such review unless problems or new data were brought to Ecology's attention.

Alternatives B: Conduct reviews at least once every five years.

Discussion – As more regulations are adopted, more staff is required to conduct reviews according to this schedule. Experience has shown that the review process is a major workload that significantly impacts Ecology's ability to develop new programs.

Effects – This would continue the current policy of periodic reviews, but would result in an increasing workload and programs are adopted.

Implementation – This could be carried out under existing authority, but staffing is inadequate to adhere to the schedule or once in five years for all programs.

Alternative C: Conduct reviews according to a different schedule such as an initial review in five years, followed by a 10 year period, or reviews conducted in specified years.

Discussion – This alternative would help spread the workload, but would not significantly reduce it.

Effects – This would essentially provide the same kind of reviews as the existing policy, but would spread the workload to allow existing staff to work more on new programs. However, as the number of adopted regulations grows, the workload for the review activities would also grow.

Implementation – This is within Ecology's existing authority, but existing staff resources would soon be inadequate to conduct the necessary reviews and develop new programs.

Alternative D – Establish an advisory committee to periodically review existing regulations and recommend when they should be revised.

Discussion – This alternative would not establish a fixed schedule for review, but would recommend reviews as the committee thinks they are needed.

Effects – This would result in an identification of which programs need changing and which do not. It should result in a reduced workload on Ecology.

Implementation – This is within Ecology's authority. It would alleviate the workload on existing staff, depending on how many recommendations for review were made by the committee.

Representing the State's Interests (Issue 36)

Issue Definition – At issue here is whether Ecology should place a higher priority on representing the state's interest in situations involving the Federal government, regional agencies and other states.

Background – RCW 90.54.080 states that "The state shall vigorously represent its interests before water resource regulation, management, development, and use agencies of the United States, including among others the federal power commission, environmental protection agency, army corps of engineers, department of the interior, department of agriculture and the atomic energy commission, and of interstate agencies with regard to planning, licensing, relicensing, permit proposals, and proposed construction, development and utilization plans. Where federal or interstate agency plans, activities, or procedures conflict with state water policies, all reasonable steps available shall be taken by the state to preserve the integrity of this state's policies."

The principal concern here is that, although water resources management and allocation has traditionally been viewed as a matter delegated to the states, various arms of the federal government have periodically intruded into this domain. Federal water and environmental agencies have tended to be well funded and somewhat expansive in nature. Congress and the courts have also assisted in the expansion of federal agencies' activities into areas traditionally reserved to the states.

Ecology has been involved in a number of issues in recent years under the general activity of "representing the state's interests." Staff have had numerous dealings with federal agencies that impact or conflict with state water management authority, including the Northwest Power Planning Council, the Federal Energy Regulatory Commission, the Bureau of Reclamation, the Army Corps of Engineers, the Forest Service, and others. Ecology also monitors the status of selected proposed federal legislation and provides comments as appropriate.

The two primary problems associated with this issue are the lack of consistency among state agencies and the priority of representing the state's interests relative to other work. Other state agencies also provide comments to and interact with these entities and these comments may or may not be consistent with one another. In such cases, the state is not speaking with a single, unified voice.

Although viewed as important, this activity has often required some decisions regarding priority of work relative to other work within the state and the department. As a result, Ecology has tried to be active in those issues perceived as being the most important and has often refrained from getting involved in others due to the lack of staff and financial resources to do so.

Viewpoints – Environmental interests support some federal programs that impact the state's historically exclusive domain over water resources. Examples are federal fish and wildlife programs such as the endangered species act and federal water quality programs and permitting authorities. However, federal water development projects are often opposed by these interests.

Water users, particularly agriculture, generally oppose federal regulatory intrusion into state water resources allocation and management functions, but have historically supported federal water project developments.

Alternatives

Alternative A: Do not represent the state's interests.

Discussion – Under this alternative, Ecology would not deal with entities outside of Washington State.

Effects – This would provide no protection against other entities adopting policies or taking actions that are contrary to the state's best interests.

Implementation – This would require a statutory change to existing statutes.

Alternative B: Respond to all opportunities for involvement.

Discussion – This alternative would be the most aggressive approach to representing the state's interests.

Effects – This would result in Ecology being involved in many water resource related issues, many of which pose no threat to the state.

Implementation – This is within Ecology's authority, but would require significant staff increases to handle the workload.

Alternative C: Respond only to perceived high priority issues (current practice).

Discussion – This involves reviewing issues and determining where the state's interests are affected and whether Ecology's involvement is important enough to warrant the workload.

Effects – This has resulted in a good representation of the state's interests on the most significant issues.

Implementation – This is consistent with Ecology's current authority and staffing levels.

Alternative D: Clearly delineate a policy of state involvement when the state's authority or interest is directly affected by the actions of other entities.

Discussion – This would provide a clarification of Ecology's role in such activities.

Effects – In addition to clarifying when Ecology should be involved in such activities, it could also increase the workload.

Implementation – This is within existing authority. The policy statement should be included in an administrative regulation adopted by Ecology.

Alternative E: Delineate a state policy on representing the state's interests and seek designation of Ecology as the state of Washington's representative on water resources issues involving the state's interests.

Discussion – This alternative would clarify the policies and seek to create a single voice for the state on such matters.

Effects – This should result in a stronger representation of the state's interests and should alleviate the problem of federal agencies such as FERC receiving inconsistent comments from two or more agencies of state government.

Implementation – Delineation of the policy is within Ecology's current authority. Designation of a state voice would require statutory changes by the Legislature and additional staff resources.

ISSUE PAPER III: WATER ALLOCATION POLICIES AND PROCESSES

Introduction

Instream flows are closely tied to many water right issues because water set aside for instream uses is no longer available for allocation to other uses. This section deals with the conflicts resulting from instream flows competing with other uses; adjustments, exemptions and waivers to instream flows; stream areas that should receive special protection (such as waterfalls); individual vs. program-based instream flows; and the applicability of the instream flow program to water allocated from ground water and ponds and lakes.

Instream Flows as Water Rights (Issues 14, 25, 30, and 31)

Issue Definition – Several controversies arise from conflicts between instream flows and out-of-stream water rights. This issue deals with the protection to be accorded to water rights senior to an instream flow when a change in point of diversion, place of use, or purpose of use for that water right is proposed. It also addresses whether instream flows can be established through appropriation or by purchase of existing out-of-stream rights.

Water right conflicts are normally resolved through the "first in time – first in right" rule under the appropriation doctrine, whereby earlier water rights have priority over those rights established later. The "first in time" decision is usually based on the priority date for the rights in question, which is generally the date the water rights were applied for. These issues deal with the first in time rule as it relates to instream flows.

Background – The water code was amended in 1979 to clarify that an adopted minimum flow is an appropriation with a priority date as of the date of its establishment (RCW 90.03.345). Consumptive water rights and storage rights established after the minimum flow is established are inferior in right to the minimum flow as would be the case with any other senior water right. Water rights in existence when an instream flow is established would not normally be affected by the instream flow because of savings provisions in the laws authorizing instream flows (RCW 90.22.030 and RCW 90.54.900). However, if a change is proposed for an existing water right, such as the point of diversion or place or type of use, a question may arise as to the relationship of the right proposed to be changed and a junior minimum flow.

The water code provides that a change cannot be approved if it would injure existing rights (RCW 90.03.380). Courts have determined that the term "existing rights" in this context means both senior and junior rights. Ecology's current policy is that water right modifications should be investigated to determine the potential effect on an existing minimum flow, and that if the effect is injurious, then the change must be denied, or if granted, the right must be provisioned to the minimum flow. This is most likely to occur when a change in point of diversion is proposed. If the diversion point is moved upstream on the same source, the length of affected stream would be increased, thus increasing the effect of the diversion on instream values protected by a minimum flow. Moving a diversion point downstream might conceivably enhance the instream values protected by a minimum flow. Moving the diversion point to another stream (only allowed in unique cases), for instance to another tributary on the same stream system, could be either positive or negative for instream values depending upon the specific set of facts.

It should be noted that normally a water right's priority date is the application date. Therefore, an application received prior to the establishment of an instream flow would have an earlier priority date than the instream flow. However, a 1979 amendment to the water code provides that when an application for a permit to make beneficial use of public waters is approved relating to a stream for which minimum flows have been adopted and are in effect at the time of approval, the permit shall be conditioned to protect the flows (RCW 90.03.247). The law appears to be quite clear on this issue that water right applications pending at the time an instream flow is adopted will, if issued a permit, be provisioned by those instream flows when the water right is granted, regardless of how long the application has been pending.

Other complications arise when an instream flow is revised. Should those rights subject to the original flows then be subject to the revised flows even if they are higher? Ecology has taken the position that if an instream flow is revised upward, water rights existing prior to the revision cannot be adversely affected. Therefore water rights constrained to the earlier instream flows would continue to be regulated according to the lower flows while new water rights would be regulated to the new, higher instream flows.

New data could lead to a lowering of the adopted instream flow levels. This could lead to conflicts between senior rights with higher instream flows and junior rights with lower instream flows. It has been Ecology's policy in this situation to only enforce the new lower instream flows in order to avoid senior-junior conflicts.

A similar issue is raised by the reservation program wherein a specific quantity of water is "reserved" for a future beneficial use such as municipal water supply. Should the reserved water rights be constrained by the instream flows in effect at the time the reservation is applied for, granted, or actually used? Ecology's position is that because reservations are defined as an appropriation (RCW 90.03.345), they should be constrained to the instream flows in effect at the time the reservation is adopted, and that rights issued under the reservation would not be affected by a subsequent increase in the instream flows (because the priority date or rights issued under the reservation is the effective date of the reservation).

Another water right issue related to instream flows is whether they can be established by appropriation or by condemnation or purchase of existing out-of-stream rights. The existing laws relating to instream flows do not specifically prohibit acquisition of instream flow rights through these means.

Ecology believes, however, that because the legislature set forth a specific procedure for establishing instream flows by administrative rule, that instream flows are not intended to be set through direct appropriation. The problem is that water rights must be appurtenant to specific lands and by custom, construction of storage and/or diversion works is required. Ecology has historically denied water right applications for instream appropriations where the purpose was solely for the maintenance of instream flows without any diversion.

With regard to the purchase or condemnation of existing out-of-stream water rights for instream purposes, the water code allows any person to exercise eminent domain to acquire water rights for a superior beneficial use. Courts must then determine what use would be for the greatest public benefit and therefore superior (RCW 90.03.040). It logically follows that if rights can be condemned that they can also be purchased. Instream uses such as fish and wildlife maintenance and enhancement, recreation and aesthetic values are declared to be beneficial uses in Chapter 90.54 RCW.

If a condemnation or purchase of a consumptive use water right for instream purposes was attempted, the position that would be taken and the procedures that would be followed by Ecology are not yet specified.

The Water Code allows for changes in point of diversion, place of use and purpose of use subject to approval by Ecology (RCW 90.03.300). A change in purpose of use from a consumptive, offstream use to instream flow use would require such approval. The code requires that changes may not affect existing rights, and courts have determined this includes rights both senior and junior to the changed right. This might prohibit the purchased instream flow rights from affecting any rights in the sequence of priorities.

A related problem is that RCW 90.03.380 also requires that a water right be appurtenant to land. It is not readily apparent to what land an instream flow right would be appurtenant. Though not addressed in the law, it has been customary in Washington to require that storage or diversion facilities be constructed to obtain a water right. This would ordinarily not occur for an instream flow right.

Determining the actual amount of water to be credited to instream flows could be difficult, as the average use rate for out-of-stream uses is usually less than the instantaneous maximum stated on the water right and is dependent on time of year, weather and other factors.

As an alternative to keeping the original priority date, if an instream flow has been established for that stream, Ecology could simply consider the water in question to now be unappropriated. The water would then be available to future out-of-stream appropriation (which would be subject to the existing instream flows). This would then have the effect of using the acquired water to help satisfy the instream flow level.

Viewpoints – Water users believe they should be able to change their water right point of diversion and place and type of use without affecting their priority relative to instream flows. Environmental interests argue that water right modifications are in effect a new appropriation and should be treated as such.

Environmental interests also think that pending applications and reservations should be affected by instream flows established before the water right is granted. Water users would prefer that they only be affected by instream flows (if any) in effect at the time of application or at the time the reservation is applied for.

When an instream flow is revised upward, water users believe that all pre-existing water rights should not be affected. Environmental interests would prefer to see instream flow increases affect all water rights constrained to instream flows.

Water users would prefer to not have offstream water rights be subject to condemnation for the purpose of instream flows, but would be less opposed to a purchase on a willing seller basis. They would resist any process that would result in a new instream flow with an earlier priority date than their own. They would object less to having the water returned to the public domain and made available for future appropriations subject to an instream flow.

Environmental interests would like to have a process available for giving instream flows an earlier priority date. Environmental groups and fisheries agencies would like to be able to purchase or condemn existing out-of-stream rights and transfer them to instream flow purposes while retaining the priority of the original right.

ISSUE 1. How should changes to point of diversion, type and place of use relate to instream flows?

Alternatives

Alternative A: Allow a change only when it does not injure an established instream flow (senior or junior) or provision the right to the current instream flow (current policy).

Effects – This alternative would have no significant effect on environmental values because pre-existing minimum flows would be protected from water right changes. Since this is the current Ecology policy, there would be no change from existing conditions. This would be a strong disincentive to water right transfers and therefore would be a disincentive to market-based adjustments for water use efficiency. This would reduce flexibility to reallocate water to meet new and higher value uses.

Implementation – No legislative action would be needed to implement this alternative. However, administrative rules would be helpful.

Alternative B: Allow any type of change, as long as the amount of water and the time of use is the same, without being constrained to instream flows.

Effects – This alternative could have a detrimental effect on instream values if points of diversion were allowed to be moved upstream with no provision for the minimum flow. Downstream changes would in general have a positive effect on instream values.

Implementation – Statutory changes in Chapter 90.03 RCW would be needed to allow impacts on instream flows due to water right changes.

Alternative C: Do not allow changes of any kind without changing the priority date to the date of revision.

Effects – This alternative would have the effect of gradually increasing the number of water rights affected by a minimum flow. Water right modifications would result in a less reliable water supply in many cases. Many potential water right changes would probably not be made for that reason. The overall effect would be to increase protection of instream values and decrease the availability of water for offstream use. This alternative would also discourage water right transfers from occurring.

Implementation – This alternative would require amending the water code section on transfers of rights (RCW 90.03.380).

Issue 2. Status of pending applications when an instream flow is established.

Alternatives

Alternative A: Constrain water rights to the applicable instream flow if the permit is approved after the instream flow was established, regardless of application date.

Effects – Because this is Ecology's current policy, there would be no change from the status quo. The effect is that a water right with a senior date of priority is provisioned to a junior instream flow if the appropriation permit is not issued until after the instream flow has been adopted.

Implementation – No changes in existing law would be necessary. If this is retained, it should be addressed in administrative rules.

Alternative B: Do not constrain water rights to instream flows if the application date is earlier than when the instream flow was established.

Effects – This alternative could result in a rush of water right applications just before an instream flow is adopted. Water rights stemming from old applications on file before a minimum flow was established would be exempt from minimum flows. The net effect would be favorable for out-of-stream uses, but unfavorable for protection of instream values.

Implementation – This alternative would require repeal of part of RCW 90.03.247.

Issue 3. When an instream flow is revised upward:

Alternatives

Alternative A: Constrain new water rights to the new, higher instream flow, but do not change the rights constrained to the earlier, lower instream flow.

Effects – This alternative is consistent with the premise that existing water rights should not be affected by instream flows. This provides some security for the water right holder in that the right's provisions are not subject to change. The effect on instream values may be negative if it is found that an existing instream flow was set at too low a level to adequately protect instream values, and water rights were issued subject to the inadequate flow provisions.

Implementation – Existing laws contain savings provisions for existing rights that prohibit Ecology from subjecting an existing water right to more stringent conditions than those to which it was originally provisioned.

Alternative B: Constrain all water rights that postdate the original instream flow to the new, higher instream flow.

Effects – This alternative would allow Ecology to provide more water to instream values if new data showed it was appropriate. Water availability and reliability would decrease. Considerable uncertainty would result for water right holders subject to changeable instream flow provisions.

Implementation – This alternative could not be implemented under current water law which protects existing rights from being adversely affected by junior appropriations including instream flows. Implementation of this alternative would require amendment of savings provisions in Ch. 90.22 and 90.54 RCW.

Issue 4. When an instream flow is revised downward:

Alternatives

Alternative A: Regulate all rights that postdate the original instream flow to the new, lower instream flow.

Effects – All water rights would be subject to the same instream flow. This provides for a practical enforcement program and should have no effect on instream values if the new instream flow is adequate (the downward change indicates the old instream flow was too high). This would be favorable to those water rights previously subject to the higher instream flow.

Implementation – Although this is current practice, the law does not address this situation, and it probably does not need to. If this policy is selected, it should be established by rule-making. Ecology could issue superseding certificates of water right containing modified instream flow provisions.

Alternative B: Constrain new water rights to the new, lower instream flow, but keep the higher instream flows in effect for the water rights constrained to the original instream flow.

Effects – This alternative would result in considerable inequity and probably legal challenges because senior rights would have to be regulated at a higher instream flow than junior rights, thus violating the "first in time is first in right" tenet of the appropriation system.

Implementation – To implement this alternative, it would probably be necessary to amend the water code specifically for the purpose of making an exception to the "first in time is first in right" principle.

Issue 5. How should the establishment of an instream flow affect a water supply reservation:

Alternatives

Alternative A: If the effective date of the instream flows predates the effective date of the reservation, rights established under the reservation are subject to the instream flows. Any subsequent increases in the instream flows would not affect rights established later under the reservation.

Effects – Under this alternative, a reservation can be made subject to an instream flow regardless of the relative dates of initiation of these processes. Because rights established under the reservation would retain the original priority date of the reservation, they would in effect be existing rights not subject to an increase in the instream flow. This may not be favorable for instream values if it is later determined that the instream flow is inadequate.

Implementation – RCW 90.03.345 provides that instream flows and reservations are appropriations with a date of priority as of the effective date of their establishment. Ecology can withhold adoption of a reservation until instream flows have been adopted. Thus, the effective date of the instream flow would predate the effective date of the reservation, and the instream flow would be senior.

Alternative B: Same as A. above except subsequent increases in instream flows would affect rights established later under the reservation.

Effects – This would be favorable to instream values.

Implementation – Under current law, a reservation is an appropriation. So long as it exists, it is senior to and unaffected by appropriations (including instream flows) established at a later date. However, Ecology has the capability to terminate reservations by repealing the rules establishing them, adopting amended instream flows, and readopting the reservation with a junior date of priority.

Issue 6. Should instream flows be established by direct appropriation?

Alternatives

Alternative A: Do not allow instream flows to be established by direct appropriation.

Effects – As long as there is another mechanism for establishment of instream flows, such as rule-making, that is responsive to public desires, there would be little effect on the environment of not allowing direct appropriation of instream flows.

Implementation – The law currently provides rule-making as the method of choice for establishing instream flows.

Alternative B: Allow direct appropriation of instream flows.

Effects – If this alternative was adopted, the effect would probably not be substantially different from the existing situation if the criteria for the appropriate level was not changed. One major effect would be to put the onus of initiating instream flow establishment, financing studies, and justifying proposed levels on those interests directly benefited by instream flow protection. In states where this method is used, the acquisition of instream flow rights has occurred slowly due to the fees involved and the data collection required of the appropriator to support the request.

Implementation – This alternative would require new legislation amending the state water code (Ch. 90.03 RCW). Administrative rules would probably be necessary to specify application and review procedures.

Issue 7. Should instream flows be established by condemnation or purchase of existing rights:

Discussion – Currently, Ecology does not allow transfers of rights from offstream to instream use. This is because the law requires that a water right be appurtenant to land, and due to the custom that diversion or storage works are required to appropriate water. The law does now provide for the transfer of a point of diversion, place of use or purpose of use, but these provisions appear to be intended to apply to the transfer of rights among offstream uses. It should be noted that transfers can only be approved if they would not affect any water rights existing at the time of the transfer.

Several technical problems also would have to be addressed, such as determination of the amount of water subject to transfer. Enforcement of instream flow blocks of water injected into the priority list of rights would be difficult if possible at all. It would be much easier to manage a system wherein purchased or condemned rights are retired and become unappropriated water. Where an instream flow was established, this would help improve the status of the instream flow.

Alternatives

Alternative A: Do not allow condemnation, grant or purchase of out-of-stream water rights for instream flows.

Effects – This alternative would make it difficult to improve instream flow conditions on overappropriated streams.

Implementation – No action would be required to implement this alternative, as this has been Ecology's interpretation of existing law. The law now requires water rights to be appurtenant to land, and by custom there must be some physical works to store or divert the water in order to establish and maintain a water right.

Alternative B: Allow condemnation (by a superior beneficial use as determined by a court), purchase, or grant and transfer of water rights and retain the original priority date for the amount of water transferred.

Effects – To the extent that grants of existing rights were received or public agencies and private individuals could afford to purchase rights or pay condemnation judgments, and within the constraints noted above, this alternative could result in incremental improvements in instream flow conditions. Assuming that an equitable determination was made of the amount beneficially used by the original right and therefore subject to transfer, there could be no negative effect on existing rights. Regulations of rights among each other and as related to the instream flow could be very complicated.

Implementation – Changes in the existing statute governing water right transfers (RCW 90.03.380) to waive appurtenance requirements, and recognize the legitimacy of appropriative instream rights would be necessary. To be effective in improving stream flow conditions, changes might be necessary in the present provision prohibiting a transfer from affecting any existing rights. Regulations governing such transfers might also be needed.

Alternative C: Allow condemnation, grant or purchase of water rights but have the corresponding amount of water be considered at that point to be unappropriated. All future appropriations of that water would be subject to any instream flow in effect. (This has the effect of using the transferred water to meet the instream flow).

Effects – The alternative would result in the ability to retire out-of-stream rights once acquired and have the water revert to unappropriated waters of the state as in the case of relinquished rights. The unappropriated water would then be available to satisfy an existing instream flow. Conflicts with existing water rights would be avoided.

Implementation – This could probably be done under existing law. Upon obtaining ownership of the water rights, the purchaser, grantee, or proponent of condemnation could voluntarily relinquish it, whereupon it would become unappropriated water.

Adjustments, Exemptions and Waivers to Instream Flows (Issues 19, 21, 28, 29, and 31)

Issue Definition – This issue deals with exceptions that could be granted to the instream flows in effect for a given area, including temporary reductions in instream flow levels, exemptions for certain water uses, and waivers for exceptional circumstances (overriding considerations of the public interest).

Background – Several mechanisms are available for making instream flows more flexible and tailored to individual conditions. Ecology has in several instances established "two-tiered" instream flows consisting of both "normal year" and "critical year" flows. Critical year flows are designed to be used during times of exceptionally critical water supply shortages, generally with an expected frequency of occurrence of one year out of ten or less. The criteria for determining when the water supply situation is severe enough that the instream flows should be lowered to critical levels (or some intermediate level) are generally not well defined except for the Green-Duwamish system. In the Green-Duwamish regulation, (Chapter 173-590 WAC) specific criteria for reducing the instream flow levels were established based on reservoir inflow forecasts, reservoir levels and cumulative water right quantities downstream. The decision of whether to grant relief from normal year instream flows is reserved for the Director of Ecology.

Instream flows apply only to out-of-stream consumptive use. Questions have arisen regarding whether certain out-of-stream water uses should be exempt from instream flow restrictions, and if so, which ones. Certain water uses are perceived by some to represent such a small quantity of water and are of sufficiently high priority to the public, such as single domestic use and stock watering, that it is believed they should not be included under the instream flow restrictions. Others feel that, despite the small quantity used, the cumulative effect of many small users results in a significant impact to the streamflow regime and senior rights that are subject to instream flows. Ecology currently exempts single domestic use (sometimes in-house use only) and non-feedlot stock watering from instream flows and stream closures.

The applicability of Ecology's adopted instream flows to hydropower projects, particularly run-of-river projects with no significant storage capacity, has also been questioned. These projects are consumptive within the stream reach that is bypassed by the project (between the project intake location and the powerhouse) but nonconsumptive downstream of the point where the water is returned to the stream. Hydropower projects are often proposed for atypically high gradient reaches, whereas Ecology's instream flows are generally set for the stream as a whole based on instream flow studies performed in more moderate gradient reaches. The criteria for determining whether a significant length of stream is bypassed or if the stream regime is significantly altered is open to question.

Hydropower projects generally have an instream flow assigned for the bypass reach by the FERC license and a state water right. New storage projects are normally constrained by instream flows specified at the nearest downstream control point. If there is no control point on the impounded reach or nearby downstream, it is sometimes necessary to specify a new control point on the water right to assure that no reach is dried up by the project.

Waivers of instream flow restrictions are also a significant issue. The statutes currently allow the waiver of instream flows in cases where "it is clear that overriding considerations of the public interest will be served" (RCW 90.54.020(3)(a)). The term "overriding considerations" has not been defined and is a potential source of controversy with regard to instream flows. Ecology has no date never formally granted a waiver to an instream flow although in one instance a water right was provisioned to instream flows lower than those specified in the applicable regulation. This case was a special circumstance involving a change in point of diversion for a water right predating the regulation. Ecology does not currently have a firm policy or procedures for determining "overriding considerations of the public interest."

Viewpoints – Environmental interests have supported the "two-tiered" approach to instream flows in cases where more water can be preserved instream during normal or wet years than would be the case with a single set of instream flows. Water users also generally prefer a two-tiered approach if it results in lower instream flows during dry years than with a single instream flow. The two groups differ considerably, however, on how the decision should be made to lower the instream flows to critical levels. Environmental interests generally would prefer that strict water conservation be required of water users before lowering instream flow requirements. In addition, they would like to see all other alternative sources exhausted before granting relief for out-of-stream users.

Water users want to have assurances that water will be available as much as possible throughout the summer and early fall, and therefore tend to use "worst-case" rainfall predictions when forecasting water availability. As a result, they tend to predict the need for critical streamflow conditions more frequently than do environmental interests. There is a need to define specific criteria for deciding under what conditions to reduce instream flows below the normal levels.

With regard to exemptions, environmental interests generally feel that all out-of-stream consumptive water uses, regardless of size, should be provisioned with instream flows regardless of the quantity used and type of use. They also feel that hydropower facilities should have specific instream flows applied to any bypass reach supporting aquatic life or other instream values, regardless of reach length and streamflow effects. Ranchers and dairy farmers would prefer that riparian stock watering be excluded from instream flows. Self supplied individual water users would prefer exemption of single domestic use, particularly if no alternative source is available. Senior right holders subject to instream flows could potentially object to exemption of small consumptive uses such as single domestic because they could affect senior rights' water availability. Hydropower proponents often advocate instream flows separate from those adopted by Ecology and if necessary based on site specific studies in a bypass reach.

In the case of waivers, environmental interests would prefer to rarely if ever have "overriding considerations" be invoked to waive an instream flow. They advocate that a waiver only be considered as a temporary measure when public health is endangered due to lack of water supplies after alternative supplies have been exhausted and conservation has reduced demand as much as possible. Fish and wildlife agencies would like to be involved in the decision-making process for any waiver under consideration.

Water users would generally prefer a lower standard for waiving an instream flow and advocate that permanent waivers for individual water rights be considered for special cases. They advocate the application of a maximum net benefits test to determine whether certain out-of-stream uses should be preferred over instream flow requirements.

Issue 1. "Adjustable" Instream Flows

Alternatives

Alternative A: Establish only one set of instream flows per control point.

Effects – This allows little or no flexibility for important out-of-stream water uses during drought conditions. During a health emergency, it might be necessary to declare "overriding considerations of the public interest" in order to meet basic human water needs.

Implementation – Two-tiered flows have been established in the past on only a few streams as a discretionary decision of Ecology. Deciding not to do so would also be discretionary.

Alternative B: Establish flexible instream flow provisions that are dependent on runoff and/or other conditions. Develop criteria for determining which level should be in effect at a given time.

Effects – This would provide for greater flexibility for reacting to drought conditions, but may cause some incremental impact on instream values during dry conditions.

Implementation – Ecology could propose and adopt multitiered or sliding scale instream flows as a matter of discretion, but it should be addressed in statewide administrative rules.

Alternative C: Same as B. above but applicable only to selected high priority out-of-stream uses and only on selected streams.

Effects – Same as B. above, but it would only affect selected streams.

Implementation – Same as B. above.

Issue 2. Instream Flow Exemptions

Alternatives

Alternative A: Do not exempt any consumptive use or bypass uses.

Effects – All such uses would be conditioned by instream flows, including so called "diminimus" (minor) uses. This would discourage use of surface water for small uses with little consumption such as riparian stockwatering and single domestic use. This could be a hardship for people who would have no alternative

source of supply, and could prohibit persons from developing private property even for their own residential use.

By treating all consumptive uses the same, it would avoid potential senior/junior priority problems, and would afford maximum protection of the instream flows.

Implementation – The law does not address the matter of instream flow exemptions, therefore no changes in law would be required. Ecology has exempted such diminimus uses in the past because it has assumed that if appealed by a user, the courts would likely find in favor of the user on the basis of equities.

RCW 90.22.040 would probably have to be repealed. This provision makes riparian stockwatering an express purpose of protecting instream flows. Ecology interprets this provision as a statutory exemption from instream flow requirements.

Some guidance at a statewide rule-making level would be advisable.

Alternative B: Exempt single domestic use, including outside amenities.

Effects – This would allow a landowner to supply a residence with a secure source of water from a spring, stream or lake. Ecology defines single domestic use as in-house use of water, and maintenance of outside amenities, including up to one-half acre of lawn and garden irrigation. These are usually issued for 0.01 or 0.02 cubic feet per second maximum instantaneous diversion rate and one to 2 acre-feet of water per year. The actual consumptive impact on a stream from this type of use is too small to measure.

This exemption could indirectly influence the occurrence of land development in some areas. Where groundwater is unavailable in adequate quantity or quality, surface water may be the only available source for a residence. If no uninterruptible source of surface water is available, landowners may be unable to build a residence.

Implementation – Although Ecology has used single domestic exemptions in many programs, no provision exists in law for it. Ecology could define “overriding considerations of the public interest” to include single domestic exemptions.

Alternative C: Exempt single domestic use, in-house use only.

Effects – Very little of the water used in-house is consumed. It is generally returned to a shallow aquifer through an on-site waste treatment system, and eventually returns to the stream of origin. Thus direct environmental effects of the diversion would be minimal.

Implementation – Same as previous alternative.

Alternative D: Same as B or C above except only if no alternative source is available.

Effects – This would allow Ecology to require an applicant to hook up to a public water system or obtain ground water, if these options were available, before a surface water source would be considered. This would avoid even the minimal environmental effects of exempting single domestic in-house use.

Implementation – Same as B. above.

Alternative E: Exempt riparian, non-diversionary stock watering.

Effects – The consumptive effect of stock on streamflow is minimal. However serious effects can result from unrestricted access of stock to a stream. Principal effects are damage to riparian vegetation, erosion and siltation, physical damage to fish redds, and introduction of animal wastes to the water.

Implementation – RCW 90.22.040 defines riparian stockwatering requirements as a purpose of maintaining instream flows. Ecology interprets this provision as a statutory exemption of this use from minimum flow requirements. This provision does not apply to feed lots.

Alternative F – Exempt stock watering diversions to riparian grazing lands (except feedlots).

Effects – By allowing stock growers to divert from streams to water stock, this alternative would result in no more impact on streamflows than allowing stock to drink directly from the stream, by would avoid the impacts of stock walking in and damaging the stream and riparian corridor. The exemption for stockwatering on riparian grazing lands as discussed in the previous alternative would be retained.

Implementation – RCW 90.22.040 could be amended to include as a purpose of instream flows the provision of water for diversion from a stream for stockwatering on riparian lands in lieu of allowing stock direct access to the stream.

Alternative G: Exempt fire protection use.

Effects – Fire protection is a use of water that is infrequently required. Average consumption is extremely small, though it may be high for a very short term. It is usually specified in water rights as a use in association with other uses such as irrigation and domestic supply.

Implementation – Emergency use of water to protect life and property does not require a water right. Ecology usually recommends that water rights be obtained for fire protection use if the system will involve a permanent diversion and/or storage works. Use for fire protection is generally regarded as exempt from instream flow requirements.

Alternatives

Alternative A: Develop criteria for the instream flow waiver provisions of RCW 90.54.020 (3)(a) ("overriding considerations of the public interest").

Effects – The considerable uncertainty now existing in regard to the meaning of this key phrase would be reduced. Appropriately written criteria could allow for greater flexibility in responding to public desires for water allocation. Limitations would be placed on the department's ability to override instream flow conditions.

Implementation – Ecology could propose and adopt rules defining "overriding considerations" and establishing criteria for judging waiver requests.

Alternative B: Do not develop criteria for "overriding considerations of the public interest." Ecology determines on a case-by-case basis.

Effects – Uncertainty over the meaning of this language would continue. Ecology would be free to interpret it on a case-by-case basis. Legal challenges could easily result.

Implementation – No action would be required to implement this alternative as neither the law nor existing regulations provide any guidance.

Alternative C: Do not consider "overriding considerations" regardless of the situation.

Effects – Instream flows would be "hard and fast" rules with no possibility of relief regardless of circumstances. This might be considered beneficial for instream values and harmful for out-of-stream use.

Implementation – Amend RCW 90.54.020 (3)(a) to repeal the waiver language.

Alternative D: Allow only temporary waivers to be invoked.

Effects – Waivers could be requested (and granted if merited) that would only last during an emergency situation. Instream values would experience short term effects. Vital out-of-stream use could continue.

Implementation – Regulations establishing criteria, etc. could specify that only temporary waivers will be considered, and the circumstances under which they might be allowed.

Alternative E: Allow permanent waivers under special circumstances when issuing water rights.

Effects – This could result in negative effects on instream values in order to assure an uninterrupted availability of water for the right(s) receiving the waiver.

Implementation – Regulations could be proposed that would allow this alternative to be followed.

Program-based Instream Flows vs Individual Water Right Restrictions (Issue No. 26,28)

Issue Definition – In the past, instream flow restrictions have been established for both individual water rights and entire basins. At issue is whether individual water right instream flow restrictions that differ from basin wide instream flows are appropriate to consider after a basin-wide instream flow regulation is established.

Background – After an instream flow program has been adopted for an entire basin, the question of whether a different instream flow can be applied to an individual water right often occurs. This situation usually arises when a development project is proposed for which no existing instream flow and control point would be appropriate. For example, a reservoir project should have an instream flow established immediately below the dam to ensure that adequate water is continuously released from the reservoir and to assure that the reach immediately below the dam is not dewatered. If no existing control point is in this vicinity, it will be impossible to use the existing instream flow regulation for this purpose. It would be cumbersome and time-consuming to revise the basin-wide instream flow program each time a development project results in the need for a new instream flow or control point, yet all water users in a basin should be treated equitably with regard to instream flows.

Ecology currently prefers the basin-wide program approach for setting all instream flows where a basin program currently exists or is being developed, but recognizes that projects bypassing a portion of a stream, such as hydropower diversions, only affect that bypass reach. Frequently, the existing instream flow monitoring points are not bypassed, and are therefore not useful for monitoring the project's instream flow compliance.

Instream flow studies carried out by Ecology and Fisheries are normally done on relatively low gradient reaches that are most likely to be representative of habitat favored by fish. Because bypass reaches (especially for hydropower) are typically steep gradient areas, Ecology's and Fisheries' flow studies are not suitable to represent the area affected by the project. Consequently, site-specific instream flow studies are usually required of the applicant by Ecology or other agencies to determine bypass flow requirements for the federal license and the state water right. Because they are so site-specific, individual hydropower instream flows are usually not incorporated into the basin programs.

Recent Ecology instream program regulations have recognized that such bypass projects may be a special case requiring site-specific instream flow studies and instream flow provisions.

Viewpoints – Some water users and developers would prefer to have project-specific instream flows (that differ from established basin-wide flow) attached to individual water rights without having to amend the adopted instream regulation in order to avoid involving the project in lengthy basin-wide program debates. A project proponent may also offer to fund in-depth, site-specific, state-of-the-art instream flow studies in hopes of showing that a lower instream flow would be more appropriate or at least adequate. Others may prefer not to have to fund expensive new site-specific studies.

Environmental interests tend to prefer that all instream flows be established through the basin-wide instream flow process to insure public participation and a thorough discussion of the issues involved. If existing instream flows are lower than they would desire for the particular project, environmental interests may advocate new flow studies. For hydropower projects, fish and wildlife agencies have special status in federal project licensing, and normally advocate new instream flow studies.

Alternatives

Alternative A: Allow individual instream flows for bypass projects when existing studies and instream flows do not represent the affected bypass reach.

Effects – This would usually result in greater certainty that instream values in the bypassed reach will receive adequate protection. It may be costly to a developer of a bypass project.

Implementation – Ecology could adopt or modify rules specifying the circumstances under which individual instream flows may be appropriate.

Alternative B: Do not allow any individual water right instream flows after a basin-wide instream flow program has been established; constrain all rights to the basin-wide flows.

Effects – This would result in greater consistency in the instream flows in a basin, but it would not be possible to monitor the effects of bypass and reservoir projects where an Ecology control point is not in the bypass reach or immediately below the reservoir. Flow provisions on a hydropower water right may conflict with those on a FERC license.

Implementation – Do not include special provisions for bypass projects or reservoir projects in instream flow regulations.

Applicability to Ground Water Withdrawals (Issue 27)

Issue Definition – This issue deals with the applicability of instream flow restrictions to ground water withdrawals.

Background – The physical relationship of ground water and surface water is well documented, but integrating ground water into instream flow regulations has proven to be difficult. Ground water contributions to streams constitutes the major source of streamflow for many rivers in the state during the summer and early fall. Ground water withdrawals from some areas adjacent to a stream have the same effect as withdrawing and water directly from the stream. In most instances, however, the degree of connection between ground water withdrawals and the resultant decrease in streamflow cannot be easily or precisely defined. This determination depends upon how well the hydrogeology is understood in the area. In these cases, questions arise as to whether ground water withdrawals should be constrained by instream flows and/or affected by closures to surface water appropriations. Strong restrictions on diversions from surface sources tend to cause water users to look to ground water as a source. When ground water withdrawals are also closely regulated, the result can be no economical source of water.

Ecology has developed guidelines for determining if a ground water withdrawal will significantly affect surface water flows based upon the area's hydrogeology, distance from the nearest surface water body, and the amount of water withdrawn. Prospective withdrawals that meet the criteria are constrained to applicable instream flow and are affected by applicable closures.

Viewpoints – Environmental interests advocate that proposed consumptive ground water withdrawals from strata in hydraulic connection with a stream should be subject to the same restrictions (instream flows or closures) that would apply to a surface water diversion. Prospective ground water users obviously do not wish to be constrained by such restrictions.

Alternatives

Alternative A: Apply instream flows to ground water withdrawals in significant hydraulic continuity with the stream. Improve current operating procedures for determining hydraulic continuity.

Effects – This would be beneficial for instream values as they would receive some protection from flow depletion that would occur due to ground water withdrawals. It would restrict the availability of water for development uses.

Implementation – RCW 90.54.020 (9) requires that Ecology fully recognize the interrelationship of ground and surface waters. Ecology could adopt rules to help implement this directive, and could also amend the existing operating procedure.

Alternative B: Do not constrain any ground water withdrawals to instream flows.

Effects – This would result in unrestricted development of wells in aquifers in hydraulic continuity with a stream. Significant streamflow depletion could occur with resulting impacts on instream values. Water would be more readily available for development uses.

Implementation – This may require repeal of RCW 90.54.020 (9), or a specific exception for wells in hydraulic continuity with surface water.

Ponds and Lakes (Issue No. 33)

Issue Definition – This issue addresses the applicability of instream flow restrictions to ponds and lakes.

Background – In addition to stream withdrawals, it is sometimes necessary to restrict water withdrawals from ponds and lakes to prevent the water elevation from being drawn down to undesirable levels. Excessive drawdown affects aesthetics and recreational use, may dewater wetlands and may also reduce or eliminate outflows to downstream areas.

A lake or pond tends to delay and attenuate changes in runoff from tributary streams. The geometry of the outlet of a lake or pond (assuming it has one) and the surface area are two factors that determine the degree of delay and attenuation that occurs. The effect of a water withdrawal is attenuated in similar fashion. A withdrawal on a large lake with a narrow, restricted outlet may result in such a minor change in the surface elevation of the lake that no appreciable reduction in outlet flow may occur.

Ecology is required by existing law to maintain lake levels (RCW 90.22.010) and to retain ponds and lakes substantially in their natural condition (RCW 90.54.020 (3)(a). Lake level restrictions may be established by court decree upon petition of property owners (RCW 90.24.010).

Lake level restrictions place an additional regulatory burden on affected water right holders, but are intended to protect lake levels for the public benefit. In practice, a relatively large water withdrawal is generally needed before a significant effect is seen in the associated lake level. Withdrawals from lakes tend to be primarily desired by riparian residents for domestic use, especially for nondrinking purposes.

Ecology instream flow regulations contain a section that requires retention of lakes and ponds in their natural condition; however no new specific lake or pond levels have been established through basin programs. In certain cases, minimum lake levels that were defined previously for individual water rights or by court decree have been incorporated into an instream flow regulation. Lakes and ponds that are tributary to streams with instream flows and closures normally carry those provisions as well.

Viewpoints – Some lakeside property owners may prefer no restrictions on withdrawals in order to obtain a water supply. Others (who already have a water source) probably want new uses restricted in order to hold lake levels up. Environmental interests tend to prefer withdrawal restrictions. Concerns often arise regarding the water quality in lakes due to runoff from riparian lands and seepage from failed septic tanks. Some may believe that discouraging water withdrawals from lakes will also discourage the land development that can lead to these problems.

Alternatives

Alternative A: Apply instream flow provisions and closures to ponds and lakes continuously tributary to streams with established instream flows.

Effects – This would assure that withdrawals from ponds and lakes do not affect instream flows and other water rights in downstream reaches. This could make development of some lakeshore properties impossible if no alternative source of water is available.

Implementation – Ecology could adopt this alternative as an administrative rule.

Alternative B: Establish methods and criteria to determine if diversions from ponds and lakes would significantly affect downstream flows and whether instream flows and closures should be applied.

Effects – This would protect downstream flows where protection is needed, but where it is not, no restrictions would be necessary.

Implementation – Ecology could establish such criteria in operating procedures.

Alternative C: Do not apply instream flows or closures to ponds and lakes.

Effects – This could result in reduction in the level of some lakes and ponds, and could negatively affect associated wetlands, water quality, wildlife, aesthetics and the outlet streams. Water would be available for out-of-lake use.

Implementation – This would require modification of several laws requiring that lake levels be retained and retained substantially in their natural condition.

Alternative D: Define minimum pond and lake levels; when the lake or pond falls below this level, regulate subsequently established water withdrawals upstream from the lake and from the lake directly.

Effects – This would protect the recreational and aesthetic value of the lake or pond from degradation by water withdrawals, but would affect the security of any water rights so provisioned.

Implementation – Ecology has authority to do this under Chapter 90.22 RCW through adoption of rules.

Closures (Issue No. 32)

Issue Definition – This issue addresses the criteria to be used in closing a stream to future water withdrawals.

Background – Some streams have been closed to future out-of-stream consumptive use in a basin plan because they have been judged to be fully appropriated. Note is made that existing statutes do not specifically authorize closing streams; rather, Ecology has the responsibility to deny permits (or reject applications) if water is not available for a proposed appropriation (RCW 90.30.290). Closure of streams or confirmation of existing administrative closures by regulation is an administratively convenient way of noting that water is not available for future appropriation requests. Streams have also been closed at the request of Fisheries and Game pursuant to the Fisheries Code (RCW 75.20.050).

The criteria used for closing streams as opposed to only setting instream flows has been an ongoing issue between environmental interests and water users. Ecology may decide to close a stream if the instream flow it feels is necessary is at or above the fifty percent exceedance flow for a significant portion of the year. This in essence declares that no water is available for out-of-stream uses during the closure period. If this condition exists for the summer period only, the stream may only be closed in the summer. The criteria for when a stream should be closed have not been precisely defined, and judgement is used on a case-by-case basis.

A related question arises with regard to confirmation of existing closures in new instream regulations. Should existing closures be simply reconfirmed, or should the original basis and need for the closure be reexamined? Ecology's practice has been to research the original documentation of the stream closure, and to confirm them as appropriate in basin regulations. Ecology usually specifies the period of the year during which the closure will be in effect.

Viewpoints – Water users generally would prefer to not have a stream closed, so that any water surplus to the instream flow level and other existing rights would be available for appropriation at least part of the year or during wet years. Environmental interests generally prefer to see a stream closed if little water is available because it results in water rights not being appropriated in the first place as opposed to having to enforce instream flows once the right is granted.

Both water users and environmental interests would probably like to see written criteria defined for when closures should be implemented and good documentation of the rationale used when a stream is closed.

Alternatives

Alternative A: Close streams as deemed appropriate on a case-by-case basis.

Effects – Streams may be closed under this alternative but probably not on a consistent basis. Legal challenges could be difficult to defend without clearly defined criteria.

Implementation – No changes in existing laws would be necessary, although specific recognition of closure as an authority would be helpful. Regulations recognizing closure as a legitimate action of the department should be adopted.

Alternative B: Incorporate existing administrative closures in new regulations if adequately documented. Specify closure periods for existing closures.

Effects – This generally would not change the existing situation. Administrative closures have usually been adopted into basin or instream regulations. Specifying a closure period leaves water available outside the critical low flow period, but may cause enforcement problems once these rights are established.

Implementation – No changes in existing laws would be necessary, although specific recognition of closure as a legitimate authority would be helpful. Regulations recognizing closure as a legitimate action of the department should be adopted.

Alternative C: Define criteria for closing streams.

Effects – This would assure consistent application of the closure mechanism, and provide greater legitimacy for it. The nature of the specific criteria would determine the potential effects on instream and out-of-stream uses.

Implementation – Ecology could adopt rules defining closure criteria. Specific recognition of closures in law or regulation would be advisable.

Alternative D: Do not close streams.

Effects – Ecology would continue to issue water rights subject to instream flow conditions until the stream was fully appropriated. Additional water rights would then be denied on a case-by-case basis due to unavailable water. Many rights might exist on paper but be unusable due to existing rights and the instream flows. Enforcement would be very difficult.

Implementation – No change would be required in existing law. Ecology would stop closing streams by regulation.

Appeals (Issue 37)

The question of the appropriate avenue of appeal for those dissatisfied with an instream flow regulation has recently been decided through the courts. The conclusion was that Ecology's regulations should be appealed to Thurston County Superior Court, and not to the Pollution Control Hearings Board (PCHB). Appeals of specific actions by Ecology, such as constraining an individual water right to the basin instream flow, can be brought before the PCHB. Since this question has been resolved by the court, it is no longer an issue and has not been given further consideration in this program review.

ISSUE PAPER IV: DATA AND TECHNICAL ANALYSIS

Data and Technical Analyses (Issues 12, 20, and 27)

Issue Definition – Many instream flow issues relate to the data base on which decisions are based. Two types of data are used extensively in establishing instream flows: 1) hydrographs that describe the stream's flow patterns, and 2) fish habitat relationships to streamflow levels. Both of these forms of data require collection and analysis which tends to be expensive and time-consuming. In addition, Ecology may use its records of existing water rights to estimate the existing level of use of water on a stream. The central questions in this issue area are 1) how much data is adequate for making decisions on instream flow levels and stream closures and 2) how reliable must that data be?

Background – Defining a stream's hydrograph is important for setting instream flows because it forms the framework for evaluating all other information. A hydrograph shows the natural flow variability and the probability of occurrence of various levels of streamflow. Generally, the more site-specific the available data on a stream, the more reliable a hydrograph will be. In many cases, however, there is a shortage of site-specific data available and some method must be used to estimate the flow regime based on data from a different stream or reach. Ecology uses several such methods now for ungaged streams; better methods are probably available.

An important question is whether more data (expensive and time consuming) should be collected and hydrograph derivation methods improved so that the reliability of Ecology's hydrographs is improved. A secondary issue is whether natural streamflow hydrographs should be used, or if hydrographs showing the existing streamflow regime that reflect the current level of water use and other hydrologic effects is more appropriate. Ecology has used both in the past depending on circumstances.

In addition to hydrographs, other data are useful in evaluating alternative instream flows. Often a major factor in setting flows is the relationship of fish habitat to streamflow levels. The Instream Flow Incremental Method (IFIM) model is often used to determine this relationship, but it requires extensive data collection and analysis. At issue is whether this model should be required for all instream flows set, or only for the larger or high priority streams.

Several versions of the IFIM model can be used, with varying costs and time constraints. Newer versions of the IFIM model are still being evaluated, with no consensus yet on the best method for a given situation. So called shortcut models are available that reduce data collection by making estimations of stream hydraulics using less field data than is required by standard IFIM models. Ecology is currently testing several shortcut models.

The effect of varying flow levels on water quality, wildlife, recreation, aesthetics and navigation are also important to consider. At issue is how much data collection and analysis is appropriate for these program elements. In addition, the relationship of these values to streamflow levels is difficult to determine quantitatively. Other agencies have developed indices or semi-quantitative methods for dealing with these types of values that Ecology could possibly adapt for instream flows. Some data is also furnished by the public during the program development process.

Ecology currently does not have specific standards for the amount of data necessary for setting instream flows. The amount of data collected and the degree of data analysis is determined on a case-by-case basis and is generally based on the amount of existing data and the importance of having a high level of accuracy or reliability. Hydrographs are based on site-specific data if possible or on data correlated from nearby gages. In recent programs IFIM data has been used for many of the instream flows established.

Data on water quality, recreation, aesthetics, and wildlife are not generally analyzed in detail, but are evaluated in a more qualitative manner than is fish habitat. Ecology does not generally collect site-specific field data for these values, such as collecting water quality samples or collecting recreational use data, but instead usually relies on previously collected data.

Knowledge of the existing level of use of water from a stream is important to determine if additional water is available for making future allocations of water from the stream, or if the stream should be closed to further appropriation. Ecology uses several sources of data for this purpose. Ecology maintains records of surface water rights issued since 1917, and claims for vested surface water rights preceding 1917. These records are an indication of the potential draw on a stream if all claims and rights were exercised simultaneously. In practice this does not occur on many streams. Actual use by all legal diversions is nearly always less than the paper rights on a stream, because not everyone with a right or claim exercises it at the same time. In fact some rights are used infrequently. An unknown factor is the extent of illegal water use.

Ecology has used a study by the United States Geological Survey (USGS) that estimates actual water use of water in the year 1975, but this study is now too old to use for current use. Estimating actual use requires extraordinary efforts involving much field and office work. The USGS study required about a year to compile and involved surveys and thousands of telephone calls.

Ecology has often consulted with local Soil Conservation Service and county officials regarding acres of irrigation in order to estimate actual use. Ecology has also used other methods such as analysis of satellite imagery to determine irrigation acreage. By correlating crop types with such imagery, some researchers have obtained reliable estimates of water use over large areas of irrigation.

Viewpoints – Both environmental interests and water users would like to see more accurate hydrographs and would generally like to see more data collected and better methodologies developed for deriving hydrographs when site-specific data is not available. Fish and wildlife agencies generally prefer an IFIM analysis performed for each potential instream flow where fish are present in significant numbers, but they would prefer an instream flow based on an inferior methodology than no instream flow at all.

Environmental interests would also like to see more consideration given to water quality, recreation, wildlife, and aesthetics. They recommend developing more objective methods for dealing with these variables than have been used in the past, and developing ways to graphically portray the relationship of these values to instream flow levels in a manner that is consistent among basin programs. They also question the use of gaged data, rather than natural flow data for deriving hydrographs of heavily used streams. Some interest has been expressed in using both types of hydrographs together.

Water users generally support the objective of improving the data base for instream flows and water allocation. They are particularly concerned about the reliability of Ecology's water right records when used to estimate existing water use. They believe more reliable data is needed for existing water use so that the existing demand on a stream system can be better determined.

Alternatives

I. Hydrographs

Alternative A: Improve methods used for deriving hydrographs used as a basis for setting instream flows.

Subalternative 1: Collect more low flow measurements to be used for correlating an ungaged basin to a gaged basin.

Effects – This could improve the accuracy of Ecology's correlations that have been used in the past to estimate hydrology of ungaged streams. Because this requires extensive field data collection over a period of up to a year for any given stream, it could delay the adoption of instream flows.

Implementation – Ecology would have to assign more personnel to collect streamflow data in the field. Ecology could develop specific operating procedures to guide data collection and analysis.

Subalternative 2: Develop or obtain runoff models calibrated for local hydrologic conditions based on basin characteristics.

Effects – This might improve the accuracy of hydrology estimation, but reduce field work since it would rely on existing rainfall and streamflow data.

Implementation – Ecology would need to acquire one or more computer models from other parties, train personnel in their use, and carry out verification studies.

Alternative B: Have hydrographs depict natural streamflow conditions (no man-caused influences such as diversions, effects of reservoirs, and effects of land use).

Effects – These hydrographs are useful for assessing the potential of a stream to support instream resources without the effects of development.

Implementation – Ecology's hydrologists can derive estimates of use over time and add depletions back into the streamflow records to obtain an estimate of natural flows. This method is very reliable where a project (irrigation, hydropower, water supply, etc.) has kept accurate records. For small dispersed uses, it tends to be less reliable.

Alternative C: Have hydrographs depict existing streamflow conditions.

Effects – These hydrographs are useful to assess actual flow conditions reflecting diversions and land use effects.

Implementation – Ecology's hydrologists can derive these hydrographs by using existing stream gaging records from recent years as the data base.

II. IFIM Data

Alternative A: Require an IFIM analysis for each instream flow set for streams supporting fish resources.

Effects – Because IFIM is considered to be the state of the art method to evaluate fish habitat versus flow relationships, use of IFIM lends credibility to analysis and decisions based on it. IFIM is a data intensive method requiring many accurate field measurements. As such, it is requires much time and agency resources to complete a study. Faced with the need to address hundreds of streams for instream flows, it may be impractical to use IFIM for all streams.

Implementation – Ecology could adopt rules that would require an IFIM study for any instream flow setting on a stream supporting significant fisheries resources. Ecology has two full time staff people currently assigned to carry out IFIM studies. (The Department of Fisheries also has two staff people devoted to IFIM studies, but this work is being eliminated due to budgetary restrictions.) As a practical matter Ecology can accomplish IFIM studies for a maximum of about eight study sites per year. To do additional studies would require more staff.

Alternative B: Do IFIM analysis only for high priority streams supporting important fish resources and of immediate interest for out-of-stream use development. Use shortcut IFIM techniques for lower priority streams.

Effects – This would assure state of the art studies for the most important streams where development interest and legal challenges are most likely. Less resource intensive methods could be used for low priority streams. Thus, Ecology could carry out this alternative with existing resources.

Implementation – Ecology has been and could continue to explore short cut methods that are based on the logic of the IFIM, but which involve less field data collection and more estimation of hydraulic parameters. In the past, before IFIM was available, very crude methods were all that were available. The shortcut methods now available appear to be much better than the primary methods used only a few years ago.

Alternative C: Collect stream specific observations to derive stream-specific fish preference curves.

Effects – This would result in greater reliability and credibility in study results than would otherwise be the case, because the criteria input to the model would be verified for the study stream, rather than generalized from other streams.

Implementation – Ecology's instream flow study staff has obtained equipment for doing this and has collected such data for recent instream flow studies. This alternative requires maintenance of the existing staff level and capability.

Alternative D: Select IFIM study streams based on information from the watershed planning process that has been initiated by Fisheries, Game and tribes. Focus on streams to be managed for natural production.

Effects – This would focus limited IFIM study resources on those streams deemed by the watershed planning process to be most important for natural fish production.

Implementation – Ecology could refer to completed watershed plans and coordinate the selection of study streams with the agencies and tribes.

III. Recreation, Aesthetics, Water Quality, Wildlife, and Navigation Data

Alternative A: Use an informal consultation process with experts on non-fish instream uses to determine if a tentatively proposed instream flow based on fish habitat considerations will also satisfy recreation, aesthetics, water quality, wildlife, and navigation considerations. Make adjustments accordingly.

Effects – This would provide for at least qualitative consideration of non-fish instream flow factors.

Implementation – Ecology could assemble a committee that would be consulted as needed.

Alternative B: Research existing methods and criteria or develop new methods and criteria for evaluating the instream flow requirements for recreation, aesthetics, water quality, wildlife, and navigation uses.

Effects – If methods could be found or developed, this could allow for quantitative consideration and incorporation of non-fish instream flow needs.

Implementation – Ecology could assign staff to research literature and consult with experts on presently available methods used elsewhere, or to develop ideas on how such methods could be developed.

ISSUE PAPER V: MAXIMUM NET BENEFITS (Issues 2, 11, 15, 16, and 18)

Issue Definition – In deciding how waters of the state should be allocated among potential users, Ecology is directed to secure maximum net benefits possible for the people of the state (RCW 90.54.020 (2). This issue paper discusses how Ecology could implement this directive in setting instream flows and in granting water rights. Specific issues include whether instream flows should be subject to a maximum net benefits test; whether the test should be applied to all water right applications, only some, or none; how the test applies to basin-wide or regional or statewide water allocations; how intangible values should be treated; what the geographic scope of the test should be; how the test should be applied; and when, if ever, the maximum net benefits test should be waived.

Background – The Water Resource Act of 1971 states that, "Allocation of water among potential uses and users shall be based generally on securing of the maximum net benefits for the people of the state. Maximum net benefits shall constitute total benefits less costs, including opportunities lost." (RCW 90.54.020(2)). Ecology has not developed specific criteria for the maximum net benefits test. However, the water code has always required that in order for Ecology to approve a water right application, the proposed use of water must be beneficial and the appropriation must not be detrimental to the public interest (RCW 90.03.290). In issuing permits to appropriate water for major water resources development projects, Ecology's regional offices may qualitatively weigh the available information and consider whether maximum net benefits would be achieved by the proposal. This evaluation includes a mixture of environmental, social and economic effects. Ecology believes that the maximum net benefits test is not intended to be a strict test of economics only.

Maximum net benefits can be determined at two levels: at the time an individual appropriation is evaluated, and as a part of Ecology's broader water resources planning functions (allocating and reserving water for beneficial use). Ecology's position has been that the test is appropriate when the department receives a major application for a water right in which the scale of the proposed diversion requires a fair evaluation of the economic, environmental and social effects to the state. In Ecology's view, the second approach is appropriate for considering the reservation of water for future uses and for programs allocating water for specific uses (but not for specific users).

RCW 90.54.020 requires the allocation of water to achieve MNB for the people of the state. However, it also requires that base flows be retained in streams and that withdrawals in conflict therewith be allowed only under conditions of overriding consideration of the public interest. This internal conflict in the law is a difficult issue.

Ecology has taken the position that instream flows adopted pursuant to Ch. 90.54 and 90.22 RCW, should not be subject to a maximum net benefits test because instream flows are designed to preserve existing resources rather than be an allocation for a new or expanded use. This is based on the language in RCW 90.54.020(2) which states that potential uses are subject to the maximum net benefits test. Ecology's position has been that water over and above the instream flow level should be subject to a maximum net benefits test, including water potentially to be used for fish habitat or other instream values as well as water for out-of-stream use.

Some, however, point to the language in RCW 90.03.005 which states, "It is the policy of the state to promote the use of the public waters in a fashion which provides for obtaining maximum net benefits arising from both diversionary uses of the state's public waters and the retention of waters within streams and lakes in sufficient quantity and quality to protect instream and natural values and rights" (underlining added). This language implies that instream values and diversionary uses are of equal weight in determining maximum net benefits. This language was added to the statute in 1979.

The language in RCW 90.54.020(2) states that "allocation of water among potential uses and users shall. . .". The word "allocation" is used, not "appropriation." Generally the term "allocation" is used to connote broad assignments of blocks of water to various beneficial uses. This approach has been used in the older basin management plans. The term "appropriation" has been regarded as synonymous with individual water rights. A question arises to what extent does the maximum net benefits test apply to individual water right applications? Perhaps the intent of this language was for the test to be used only in allocating water to beneficial uses through the planning process established in the Water Resources Act of 1971. Perhaps the language implies that if water is not "allocated" through this planning process (therefore no maximum net benefits test has been applied) then individual applications for "appropriation" (rights) must be subject to the test. If this is in fact the case, the question also arises as to which water right applications the test applies; all of them, or only the "larger" ones?

Ecology has taken the position that potential water users must show that a proposed use provides higher net benefits than other potential uses, and that the identified source of the water results in higher benefits than withdrawing the water from a different source. A question arises out of the "opportunities lost" language in RCW 90.54.020(2) concerning future potential uses. To what extent should the test "crystal ball" demands and uses that may arise in the future and weigh them against the proposed use? In other words, how far into the future should "opportunities lost" be considered in the test?

A major controversy of the maximum net benefits test is how to treat intangible value such as aesthetics, recreation, and water quality. There is concern that a maximum net benefits test will tend to make out-of-stream uses look more attractive than instream uses because the out-of-stream uses have clear and relatively easily quantified economic benefits. Ecology is required by statute to give full consideration to nonmonetary or intangible values of water, but in practice this is difficult to do on a quantitative basis.

Another difficult issue is the question of what the geographic scope of the maximum net benefits test should be. In evaluating a proposed water project, the maximum net benefits test could compare the proposed project only with other alternatives for that same stream, or could look at alternatives on a regional or even state-wide basis. The language of the statute suggests that benefits to the people of the state are superior to those enjoyed only locally.

A related concern is whether the maximum net benefits test can be waived. Ecology's current thinking is that proponents of water resources projects should be required to fully comply with the maximum net benefits procedures when the scale of the project and associated impacts warrants the preparation of an environmental impact statement under Ch. 197-11 WAC. The burden of providing adequate documentation of benefits and costs, including opportunities lost, should be on the applicant, consistent with RCW 90.03.270. Public comment as to the scope and nature of the analysis of maximum net benefits should be encouraged.

One problem with this approach is that diversion of water up to 50 cubic feet per second for irrigation (without a government subsidy) is categorically exempt from the State Environmental Policy Act (SEPA). Diversion of one cfs or less from surface water and 2,250 gallons per minute or less from ground water for any other purpose is also categorically exempt from SEPA.

Still, the idea of a threshold rate of diversion and withdrawal for triggering consideration of maximum net benefits is an attractive one. Ecology receives about one thousand water right applications each year. Evaluating maximum net benefits for each one of them, including the small ones with only local effects would be a considerable burden.

Viewpoints – Offstream water users would like to see the maximum net benefits test applied to instream flows and used as a primary criterion for allocation and appropriating water. They ague that because instream flows are treated under the law, they should be subject to the same review as any other proposed appropriation. They would also like the geographic scope of the test limited to the stream and the place of use where an offstream use is proposed, rather than alternative sources of water and regional and state costs and benefits.

Environmental interests do not feel that a maximum net benefits test should be applied to any level of instream flows they believe is needed for full protection of instream values. They also prefer to see a broader geographic scope when the test is applied to potential water projects.

Issue I – How should MNB test be applied?

Alternatives

Alternative 1: Apply MNB test to general allocations of water.

Subalternative a. – Determine MNB for allocation of blocks of water by administrative rule to selected beneficial uses for future appropriation.

Effects – This alternative would require Ecology to determine and document MNB for any general allocations of water made as part of its water planning process. The MNB test would be the determining criteria for which uses would be favored for future development or preservation.

Implementation – Specific methods and criteria could be established by administrative rule.

Subalternative b. – Determine MNB for water supply reservations.

Effects – Reservations made pursuant to RCW 90.54.050 would be required to meet a MNB test before they could be adopted by rule.

Implementation – Ecology currently considers a reservation to be an allocation requiring the MNB test. Specific methods and criteria need to be established by administrative rule.

Alternative 2: Apply MNB test to individual appropriations.

Subalternative a. – Analyze MNB only for appropriations not part of a general allocation for which MNB has been evaluated.

Effects – This would prevent duplication of effort where an adequate MNB analysis already exists.

Implementation – Administrative rules for the MNB test could specify this alternative.

Subalternative b. – Require appropriations over a selected threshold quantity to achieve MNB.

Effects – This would limit the application of the MNB test to only those appropriations with statewide cost and benefits implications. This would limit Ecology's workload on MNB analysis to larger projects.

Implementation – Ecology could establish a threshold by administrative rule.

Subalternative c. – Analyze MNB only for appropriations requiring an environmental impact statement under the State Environmental Policy Act.

Effects – Most appropriations are approved without an environmental impact statement. Larger projects may require an EIS, but several categories of sizable appropriations are exempt from EIS requirements.

Implementation – This alternative could be adopted by administrative rule.

Subalternative d. – Analyze MNB only for appropriations proposed for development with state support (grants and loans).

Effects – Only a limited number of municipal water supply and irrigation appropriations are developed with state assistance. Normally, an analysis of economic feasibility and environmental effects is performed for these projects.

Implementation – This alternative could be adopted by administrative rule.

Alternative 3: Do not apply the MNB test to individual appropriations.

Effects – MNB would only be done for general allocations and reservations established by administrative rule. Appropriations would remain subject to the beneficial use and public interest tests in the water code RCW 90.03.290, which require similar analysis.

Implementation – This alternative could be adopted by administrative rule by defining the word "allocation" to include only those general assignments of blocks of water made by administrative rule pursuant to Ch. 90.54 RCW.

Alternative 4: Do not apply the MNB test to any allocations or appropriations. Replace the MNB requirement with a general test of public interest.

Effects – This would eliminate the perceived bias of the MNB test that some believe favors economic over environmental and intangible values of water. A test of public interest would help assure that new water uses would not result in external impacts on public resources and values.

Implementation – Ch 90.54 RCW would have to be amended.

Issue II – What sort of criteria should be considered for the MNB test?

Discussion – The law does not currently indicate what factors should be considered in implementing the test.

Alternatives

Alternative 1: Consider only socioeconomic factors.

Effects – Under this alternative, the test would be skewed toward the economic costs and benefits of a proposed water allocation, without regard to nonmonetary environmental costs and benefits.

Implementation – Ecology could adopt rules specifying criteria for making MNB evaluations based on socioeconomic factors only.

Alternative 2: Consider socioeconomic and environmental factors, including intangible values, and public interest factors.

Effects – This alternative would provide for a balanced assessment of economic and noneconomic factors.

Implementation – Ecology could adopt rules specifying all of the factors to be considered in carrying out the MNB test.

Issue III – What sort of method should be used for assessing MNB?

Discussion – The law does not now specify what method should be used to implement the MNB test.

Alternatives

Alternative 1: Develop a highly quantitative (balance sheet) methodology.

Effects – This alternative would require much data collection and manipulation. It would provide for the full documentation of costs and benefits. Non-monetary factors could be listed, but could not be compared on the same scale as monetary effects.

Implementation – Ecology could adopt rules specifying a balance sheet methodology for evaluating MNB.

Alternative 2: Develop general guidelines allowing a qualitative judgement of benefits and costs.

Effects – This alternative would allow for a more general, judgmental assessment of MNB based on readily available information and public input. Inevitably, this would tend to be more subjective than a method based on a formula, but it may be more amenable to factoring in nonmonetary values.

Implementation – Ecology could adopt rules specifying this approach for MNB.

Alternative 3: Require water project applicants to perform detailed studies to document MNB.

Effects – This might be costly, especially for small, low budget proposals, but may be necessary if a highly quantitative method is selected.

Implementation – Guidelines for study requirements could be included in administrative rules to implement MNB.

Issue IV – Should some uses be exempted from MNB analysis?

Alternatives

Alternative 1: Exempt instream flows from MNB.

Subalternative a. – Exempt all levels of instream flow.

Effects – This would establish instream flows at all levels up to "optimum" flows as a defacto priority use of water. This would make offstream use of water during all or parts of the year on many streams infeasible for any water use requiring a secure source of supply. Use of water in excess of this level would be determined on the basis of MNB.

Implementation – Ecology could adopt rules specifying "optimum" flows as the statewide standard, and exempt them from the MNB test.

Subalternative b. – Exempt only some suboptimum instream flow level.

Effects – This would require an increment of instream flows to compete on the basis of MNB with potential uses for those available waters above the selected suboptimum instream flow.

Alternative 2: Exempt human domestic use consumption from MNB.

Effects – This would establish human domestic use as a defacto priority over all other offstream water uses.

Implementation – This would probably require an amendment to RCW 90.54.020.

IV. What is the appropriate geographic scope of MNB analysis?

Alternatives

Alternative 1: Statewide only

Effects – This would require that a broad view of the costs and benefits of an allocation be considered, and not only the local effects.

Implementation – The language of the statute (RCW 90.54.020) as currently written appears to require that a statewide perspective be used in assessing MNB. No change in the law would be required. Administrative rules could be adopted to implement this alternative.

Alternative 2: Regional only

Effects – This would require that the regional context only be considered in assessing water allocation benefits and costs. This could result in a provincial bias to decision-making that would not be in the overall interest of the state.

Implementation – This alternative would require a change in the statute (RCW 90.54.020(2)) which now requires that benefits "to the people of the state" be the measure of MNB.

Alternative 3: Local only

Effects – This would require that the local context only be considered in assessing water allocation benefits and costs. This could result in a parochial bias to decision-making that would not be in the overall interest of the state or region.

Implementation – This alternative would require a change in the statute (RCW 90.54.020(2)) which now requires that benefits "to the people of the state" be the measure of MNB.

ISSUE PAPER VI: CONSERVATION (Issue 11)

Issue Definition – Water conservation has the potential to alleviate some of the pressure on the states water resources by reducing demand. This could be beneficial economically, and could help to retain more water in the state's streams. Conservation does not come without a price, however, and can be difficult to put into practice. This issue paper discusses whether Ecology should make conservation a higher priority in its water management activities, and if so, how water conservation can best be accomplished.

Background – In recent years, conservation of various natural resources has been receiving increasing interest, with water being no exception. Because federal funding for new water projects is no longer readily available, and because water is increasingly recognized as a finite resource, states have become more interested in stretching existing water supplies. The Department of Ecology is working with other western states to identify potential conservation strategies.

Water conservation and the prohibition of wasteful practices are addressed in several places in Washington water law. RCW 90.03.005 requires Ecology to reduce wasteful practices in the exercise of rights to the use of water to the maximum extent practicable, taking into account sound principals of water management. RCW 90.03.290 provides that any water right application may be approved for a lesser amount of water than applied for, and in any event not approved for more water than can be put to beneficial use. RCW 90.03.400 provides that the wilful or negligent waste of water is a misdemeanor. RCW 90.54.020(6) provides that various government and private entities be encouraged to carry out practices of conservation of water. These laws provide a sound foundation for the development of a strong conservation element in the state's water resources management program.

Many agricultural and municipal water systems in the state do not make efficient use of water. Many were built many years ago and have not been well maintained. Leakage and excess application are very common in older irrigation systems. Transmission losses may be very significant especially in smaller public water supply systems. Losses at the point of use (on-farm, in-plant, in-house) are also very significant. Some larger water use entities such as larger irrigation districts and municipalities have undertaken their own conservation efforts by improving transmission facilities and educating the end user.

Ecology and the Department of Social and Health Services administer revolving funds for the improvement of existing water systems for irrigation and public water supply respectively. Reduction of transmission losses is almost always a result of these improvements. The state is constrained from financial assistance to the end user by a prohibition against lending state credit to individuals. This makes it difficult to address end user efficiency problems.

Water conservation is a classic "carrot and stick" problem for government. The two major options for obtaining conservation are 1) to provide incentives (the carrot approach) and 2) to regulate existing and future uses (the stick approach). Each of these options presents potential barriers to reaching the goal of conserving water.

A major problem associated with water conservation is that of incentives. Under western water law, there is often very little benefit to be captured by an individual water right holder when water is conserved. For example, if a water right holder increases his or her efficiency and only requires half as much water as previously used, that user loses the right to the unused water in accordance with the state's relinquishment laws (RCW 90.14.130 through 180). The conserver may not use the conserved water for a new date of priority for the use of the "saved" water and this may well be of little advantage to the individual if the stream is already heavily appropriated. In such a case, the individual that is incurring some cost due to the conservation effort is not the recipient of the benefits of the conservation.

In a basin that is overappropriated (i.e. there is not enough water to satisfy all water rights), any water saved through conservation measures would, in fact, be automatically appropriated by junior right holders. While this would benefit the junior users' rights, the benefits would not accrue to the person practicing the conservation and incurring the costs. (However, the conserver may receive some benefits in reduced pumping and transmission costs, and avoidance of regulatory action against waste of water.)

Another problem can occur if an upstream user improves efficiency. This can result in a reduction in return flows. These return flows may be relied upon by downstream users at a later date as a source of supply. If conservation impacts the water supply on which a downstream user depends, the downstream appropriators may be able to seek a legal remedy to protect their rights.

A utility which sells water, such as an irrigation district, water company or water utility, depends on the revenue generated by the sale of water to customers to financially sustain their operation. As customers conserve, revenues

decrease. A utility may then have to raise prices to sustain revenue. Depending on the elasticity of demand for the product, the utility may see another drop in revenue due to a decrease in resource use in response to higher prices. This tends to be answered with yet another rate increase and so on. This has been referred to as the "death spiral" in extreme cases, although unless demand is extremely elastic, supply and demand eventually reach equilibrium before the market collapses. These market effects have been a concern in the electrical energy field in the Northwest in recent years.

To provide incentives to conserve, someone must give up something; for the state it might mean the reallocation of scarce funds from other programs. For individual appropriators, it might mean acceptance of some alterations in the state's water laws that would affect traditional views of the doctrine of prior appropriation ("first in time is first in right").

The regulatory approach may be viewed as heavy handed by water users and other citizens. The constitutional issue of "taking without just compensation" can easily surface when regulatory action is used. Legal entanglements could bog down efforts to reach the original goal of achieving water conservation.

As society's priorities change over time uses regarded as beneficial and important and the criteria by which water right applications are evaluated also change. Difficult issues are raised in any attempt to apply new efficiency criteria to existing uses under valid water rights. Under the appropriation system, a water right is regarded as a property right and cannot be taken or altered without the right holder's consent or compensation. It is debatable whether water right holders can be compelled to upgrade the efficiency of a water system without confronting the taking issue.

When granting water rights, Ecology examines the quantity of water applied for and the uses to which it is to be applied, and may make adjustments to both the instantaneous and annual quantities to insure that they represent efficient use of the resource. Many older water rights do not have an annual quantity of use specified. Although wasteful practices can be regulated by Ecology, considerable effort and expense is required to identify and regulate those wasting water. Under current policies, Ecology will issue an order to correct the wasteful practice when it is identified in the normal course of other work. No attempt is currently made to seek out and identify such practices solely for the purpose of regulation. In similar fashion, unused or underused rights are not actively sought out for purposes of encouraging transfers of relinquishment, but when identified, these actions can be taken under existing law.

Ecology currently appropriates water of the state according to existing guidelines for water duties. Irrigation water duties were updated several years ago by Washington State University. These duties include a "reasonable" amount for evaporative and transmission losses. Ecology also has a schedule of water duties for other consumptive uses such as domestic and municipal supply. Ecology generally assigns an instantaneous quantity of use for the highest expected rate of diversion or withdrawal, and an annual quantity for the maximum allowable annual use under the water right.

Conservation is a very complex and difficult issue. Under existing law, inefficient water users have little or no incentive to conserve. If conservation does occur, the water saved may not be readily recoverable. In such cases, the conservation has little, if any, real benefit. In some cases conservation may actually be precluded if it adversely affects existing water rights. Some of the questions that need to be resolved include whether Ecology should take a more active role in water conservation; what the proper scope of the activity should be; whether it should be a statewide effort or be organized along some other geographical framework; and what incentives can be offered to promote conservation.

Viewpoints – Environmental interests could be expected to generally be supportive of conservation programs if it meant that less water would be removed from streams in the future. They would generally view any reduction in the quantity of future appropriations to offstream uses as beneficial. Similarly, they would support conservation efforts that would result in the retention in the stream of some of the water currently diverted for offstream uses.

The various offstream water user groups tend to have more mixed feelings about water conservation. On one hand, they would like a program that would enable them to increase their usable supplies without incurring the capital costs frequently associated with plans to augment a water supply. On the other hand, conservation programs often have a cost as well. In order for them to be voluntarily implemented, conservation programs must provide some benefits to the parties incurring the costs. Water uses would likely resist a purely regulatory approach. They would also advocate that conservation and efficiency principles be applied to all uses equally, including instream as well as out-of-stream uses.

Issue – Should Ecology adopt a water conservation and efficiency program?

Alternatives

Alternative 1: Do not develop a conservation and efficiency program. Appropriate and manage waters of the state according to current practices.

Subalternative a. – Utilize existing water duties as guidelines in appropriating water.

Effects – These water duties are not regarded as either excessively generous or conservative. They do allow for some inevitable inefficiency in transmission and use, but are based on modern water management practices. The effect of these duties is to provide some flexibility for the user, but to provide a ceiling on the quantity of use allowed under the right.

Implementation – No new implementation measures would be required. Ecology would continue its existing practices in issuing water rights.

Subalternative b. – Regulate against wasteful practices when they are identified in the course of other work, but do not actively seek out waste.

Effects – The effect of this alternative is the reduction of obvious wasteful practices when they come to the attention of water administrators. However, most waste goes on undetected.

Implementation – No new implementation measures would be required.

Subalternative c. – Permit water right transactions and transfers of rights and seek relinquishment of water rights in the course of other work.

Effects – Allowing water right transfers would permit water rights to move to higher value uses. Under existing law, only that portion of a right beneficially used may be transferred. Any wasted portion of a right would be relinquished. Relinquishing unused rights would reduce the total potential call on the water source. Unless this work is considered a priority, most of the opportunities to transfer and relinquish rights go undetected.

Implementation – Water right transfers and relinquishment are allowed under existing law.

Alternative 2: Develop and implement a conservation program.

Subalternative a. – Incorporate conservation standards in the water appropriation process including conservative water duties and additional requirements such as: consideration of alternate sources of supply, purchase or condemnation of existing water rights, and development of a water system conservation plan for water short years.

Effects – This would continue Ecology's current practice of placing an upper limit on the quantity of water allowed for a particular use in a given location. Consideration of alternate sources could result in some reduction in the amount of water diverted from streams (for example, a new irrigator might purchase an old water right or drill a well rather than creating a new diversion).

Implementation – Ecology could implement this alternative administratively, although some new regulations governing conservation in the water appropriation process would be useful.

Subalternative b. – Develop a statewide water conservation program providing broad policies, standards and guidelines that would govern the implementation of conservation in more specific activities such as water reservations, instream flow and water allocation programs, and regulations governing the issuance of water rights.

Effects – This alternative would establish comprehensive and encompassing state water conservation policies, standards and guidelines which could be applied to the more specific activities such as basin or regional planning and water appropriation. This alternative would provide a structured approach by first

developing statewide criteria and following them up with development of more specific (but consistent) policies for more geographically specific areas of the state. This approach would provide a degree of consistency statewide, but would also allow some tailoring of specific policies to specific areas.

Implementation – Depending upon the nature of the policies required, this could require some minor changes to the existing water resources statutes, but most of the program could be established by rule-making under existing law.

Subalternative c. – Initiate a study of the feasibility of water conservation, including an assessment of needs, enforcement, incentive options, cost effectiveness, acceptability, and institutional constraints. Then design a workable and publicly acceptable conservation and efficiency program based on the results of the study.

Effect – Such a study of water conservation would serve several purposes. It would allow study of the adequacy of existing water law to conduct a conservation program, it would allow Ecology to develop specific recommendations, and it would allow Ecology to seek public involvement in the process to determine what kind of conservation program is needed.

Implementation – Ecology has authority to conduct such a study, make recommendations for statutory changes (if necessary) and/or request funds from the Legislature. Implementation of the study recommendations may require legislative changes to the statutes.

ISSUE PAPER VII: PUBLIC INVOLVEMENT AND INFORMATION

Introduction – This issue paper includes two principal elements. The first is how best to involve interested parties in the instream flow planning process. The second is how best to inform and educate the public about Ecology's water resource planning activities.

Procedures for Establishing Flows (Issue 4, Public Involvement Aspects, see also Issue Paper II)

Issue Definition – What should be the proper scope of public involvement when setting instream flows?

Background – The current process through which instream flows are established by Ecology usually begins by consulting the Departments of Fisheries and Game, affected Indian tribes, the Department of Agriculture and the State Energy Office as required by the water code (RCW 90.03.247). During those consultations Ecology receives instream flow recommendations from those agencies. Based on these recommendations and discussions and Ecology's own analysis of supporting data, Ecology proposes a draft instream flow regulation. This regulation is then distributed for public and agency review and comment. In many cases, Ecology conducts public meetings to discuss the proposal. In all cases, Ecology holds public hearings allowing for official public testimony on the proposed regulations. Ecology also sends the proposal to the Washington State Ecological Commission for their advice and guidance. Based on the comments received during the public comment period, Ecology either adopts the regulation, or revises it and then may go through the public review process again if necessary before reconsideration for adoption.

Although the Department of Agriculture and the Energy Office tend to support out-of-stream water uses, Ecology does not currently involve out-of-stream water users in the process of developing proposed instream flow regulations. This approach is based on Ecology's current policy of looking exclusively at instream flow needs when setting instream flows, and not balancing instream and out-of-stream needs as discussed in Issue Paper I.

Viewpoints – The offstream users feel that all water interests should be involved throughout the process so that at least the potential impacts on future consumptive use can be evaluated. Environmental interests prefer that only environmental interests be included in the process of developing proposed instream flows. They argue that instream flows are intended to protect instream resources and that they should not be compromised by consideration of offstream uses.

Public Participation Process (Issue 8)

Issue Definition – This issue addresses whether Ecology's current public involvement, information and education processes are adequate. Some groups have suggested that Ecology expand its public information activities to provide more information about the state's water resources. More opportunities should be provided for public knowledge about and involvement in developing the state's water resources.

Background – In conducting its public participation activities, Ecology is guided by a number of statutes which are briefly summarized here. The Administrative Procedures Act, Chapter 34.04 RCW describes procedures that must be followed by Ecology and other state agencies when they adopt administrative regulations. Proposed regulations must be filed with the state Code Reviser, where they are kept on file for public inspection. Each filing must be accompanied by a statement generally describing the rule and how it is to be implemented. The Code Reviser's Office then publishes the full text of the proposed regulation and related notices in the Washington State Register. This register is mailed to approximately 600 individuals and organizations.

Ch. 90.22 RCW, Minimum Water Flows and Levels, requires that in establishing minimum water flows or levels to protect instream resources Ecology conduct a public hearing or hearings in the affected area. In addition, Ecology is required to publish Legal Notice of such hearings in a newspaper of general circulation in the county or counties in which the stream, lake, or other public water is located.

Ch. 90.54 RCW, The Water Resources Act of 1971, also includes several general public involvement requirements. RCW 90.54.060 (1) and (2) state that "the department … shall make reasonable efforts to inform the people of the state about the state's water and related resources and their management. The department shall not only invite but actively encourage participation by all persons and private groups and entities showing an interest in water resources programs of this chapter" and "the department shall similarly invite and encourage participation by all agencies of federal, state, and local government, including counties, municipal and public corporations, having interests or responsibilities relating

to water resources…" In developing its water resources management program, Ecology conducts its public participation process in accordance with this guidance.

Ecology's public involvement process while developing instream resources protection programs generally includes the following steps:

--Develop a mailing list of concerned/affected individuals and organizations;

--Conduct a public scoping meeting to inform people of Ecology's intent to develop a program and solicit their early input. This is generally announced via the mailing list, news releases, and Ecology's newsletter Baseline. Additional public meetings may be held during program development.

--Following development of a draft program report and proposed regulation, public notice is given in the Washington State Register, in legal notices, through advertisements and news releases, and a public meeting may be held. This may be combined with the required public hearing(s). Public meetings are less formal than hearings and allows Ecology to explain its proposal, allows people to ask questions, and are an attempt to insure that opinions are based on a factual understanding of the proposed program.

--The public meetings and hearings are announced by sending copies of the proposed program and regulation to everyone on the mailing list along with a meeting or hearing notice. In addition, Ecology provides news releases to the media in the affected area. Ecology also publishes information on the proposed program and regulation in the Legal Notices section of a newspaper or newspapers of general circulation in the affected area when the proposal is being proposed pursuant to Ch. 90.22 RCW.

--Occasionally, the media may choose not to use the news releases provided to them and because Legal Notices often remain largely unread, Ecology may purchase more visible advertising space in an attempt to increase public awareness of its programs. Other methods have also been tried such as displaying bulletin board posters at local post offices, grocery stores, or community centers.

--One or more public hearings are held in the affected area to solicit formal testimony on the proposal. Both oral and written testimony is accepted and weighted equally. Written comments are usually accepted for an announced period of 45 to 60 days.

--Once a public hearing is held, Ecology publishes a summary of all comments received as well as a response to each comment. This is mailed to everyone that provided comments and/or is on the mailing list. In this way, all parties can see all of the comments that were received as well as Ecology's responses to the individual comments.

--During any regulation or program development, Ecology is required to seek the advice and guidance of the Washington State Ecological Commission. This seven-member commission, appointed by the governor, consists of one member each representing labor, business, and agriculture, and four members representing the public at large. The Commission reviews the regulation and public comments made at the hearings. If five or more of the members oppose a regulation, Ecology cannot adopt the regulation. Commission members may receive public testimony at their meetings regarding proposed rules.

--Following the public and Ecological Commission reviews, Ecology holds a formal adoption proceeding, open to the public, wherein the director or deputy director decides whether to adopt the regulation, adopt it with amendments or reject it completely. If the regulation is adopted, a copy of the final regulation and an accompanying report are mailed to all participants so they are aware of the final result of the process.

In addition to the steps listed above for publicizing a proposed instream flow regulation, Ecology attempts to communicate general water resource information to the public. Presently, Ecology publishes a monthly newsletter entitled Baseline, which is mailed to approximately 2,100 individuals and organizations. It provides information on the entire Department of Ecology and frequently contains information on the water resources program. Several years ago, the department published a joint water resources/water quality newsletter entitled Waterline. This was discontinued due to budget constraints and Baseline was created to replace several similar program-specific newsletters.

Ecology also established and maintained the Water Resources Information System (WRIS) which was a system designed to index, store, and retrieve information on the state's water resources. It published and maintained

bibliographies of existing water resources data and information by basin. This activity was also discontinued due to budget constraints.

Viewpoints – Most people and organizations would like to see Ecology improve its public information process. It is hoped that this Program Review process will identify ways for this to be accomplished.

The complex and lengthy process for adopting regulations outlined above requires considerable effort and cost. If a simplified process was used, additional resources could be spent on other activities. Inevitably, some individuals feel that their input has not been adequately considered by Ecology. Frequently, both environmental and water user interests are not totally pleased with Ecology's decisions regardless of the number of opportunities allowed for public comments and participation.

Alternatives

Alternative A: Meet the minimum public involvement and information requirements prescribed by the Administrative Procedures Act (Ch. 34.04 RCW) and various laws specified by Ecology.

Discussion: The Washington State Administrative Procedures Act (Ch. 34.04 RCW) and various Ecology statutes currently requires the Water Resources Program to follow specific procedures when adopting administrative regulations. Under this alternative the program would notify and involve the public on a limited basis.

Effects: When adopting a regulation, Ecology would follow its current practice of consulting with legally mandated groups (Departments of Game, Fisheries, and Agriculture; the State Energy Office and affected Indian Tribes). Legal notices of proposed regulations would be filed by Ecology with the State Code Reviser's Office and subsequently published in the State Register. Notices of proposed regulations would also be sent to interested parties on the Water Resources mailing list and to newspapers in the affected area.

Ecology would conduct public meetings if there appeared to be a need. It would hold a public hearing in the area affected by the proposed regulation. The Ecological Commission would be requested to review the regulation and the related public testimony from the hearings. Ecology would compile a brief responsiveness summary on the public testimony, the Ecological Commission opinions and any changes made to the regulation as a result of the public review. The effects of this program would not be different than the current practice of public involvement in the Water Resources program.

Implementation: No changes in statute or administrative regulations would be required to implement the minimum public involvement program. Ecology staff would follow all steps required in the Administrative Procedures Act as they do now when adopting a new regulation.

Alternative B: Provide additional public involvement opportunities and information beyond the minimum requirements of the law.

Discussion: Under this alternative, Ecology would go beyond its legally mandated requirements of informing the public about instream flows or regulation developments.

Effects: The overall effect of this level of public involvement and information would be an increase in awareness of water resources issues by the general public through newspaper articles, reports and meetings. Another effect of this program would be a wider range of interest group involvement in discussions about instream flows and regulation adoption.

Implementation: Ecology would include more interest groups than only those that are legally mandated in its discussions about new administrative regulations, program developments or instream flow setting. Such groups might be federal or local natural resources or environmental protection agencies, other state agencies, private interest groups or associations. Ecology staff would publish regular articles in the newsletter Baseline. They would also send news releases or articles about water resources issues to local newspapers. Paid advertising space would become standard practice for notifying the public about a new regulation. Reports analyzing proposed regulations would be available to the public. Public meetings would be conducted to inform the public and seek their opinions about new regulations or changes to the water resources program.

Alternative C: Develop and implement a planned comprehensive public involvement and information component of the Water Resources Program.

Discussion: Under this alternative, Ecology would undertake a comprehensive effort to involve and inform Washington's citizens about the facts and problems of water resources. It would go beyond minimum requirements and current practices by creating new procedures, in addition to the legally mandated ones, to involve, inform, and educate the public about water resource allocation and instream flow issues.

Staff involved in educating the public about water resources could work with a technical advisory committee to clarify terminology and concepts. They could also consult with a variety of interests in order to clarify issues and conflicts. Education efforts could include conducting teacher training workshops to bring information about water resources into schools. Low cost pilot projects can be conducted to calculate the best use of staff in public education and participation.

Mechanics of public information dissemination and public involvement will be improved. Issues would be conveyed in clear, readable language and in a timely manner in pre-hearing or pre-meeting reports, fact sheets, letters, brochures or newspaper articles. Mailing lists would be edited and updated to improve contact with interested groups or individuals. Meeting times and places would be selected to best accommodate the audience. Advisory committees would be established to discuss water resource issues. Increase coordination and communication could occur with Ecology's public information office, other programs and the regional offices to improve quality and timeliness of news releases and articles pertaining to water resources. Visible advertising space could be purchased to inform the public about upcoming water resource decisions. Improved follow-up to citizen's questions and comments could be initiated to show how Ecology changed or did not change its proposals as a result of the citizen comments.

Effects: With such a program, more citizens in Washington would understand important water issues, future water needs and how their personal water use affects the state's water supply. Increased public awareness about water as a finite resource may lead to conservation efforts, alternate water supply choices and decreased conflict among all users. More public involvement in the decisions about specific water allocation problems may lead to better understanding by Ecology of the needs of all affected groups.

Implementation: Ecology's Water Resources program would develop administrative regulations, policies, criteria, procedures and work plans for an effective and efficient public involvement and information process. These would specify how and when the public, other governmental units and interest groups should be consulted when decisions are made in the Water Resources program. Specific resources could be dedicated to public involvement and education.

ISSUE PAPER VIII: INTERAGENCY COORDINATION

Interagency Coordination (Issues 10, 22, 23, 24, and 28)

Issue Definition – This issue focuses on the scope and form of interagency coordination in the water resources planning program. The key questions are whether other agencies, particularly at the state level, are given an adequate opportunity to have a voice in Ecology's water planning process, and can these agencies more effectively be brought into the water planning process?

The state water resources planning program faces a challenging task in coordinating its activities with private citizens, interest groups and federal, state, and local levels of government. Effective interagency coordination, like public involvement, requires considerable time and effort by Ecology planners. Ecology must determine how much interagency coordination is enough to that all interests are included in planning decisions.

Background – The Water Resources Act of 1971 requires that Ecology invite and encourage participation by all agencies of federal, state and local government having interests or responsibilities relating to water resources, and directs these agencies to fully participate to insure that their interests are considered by the department (RCW 90.54.060).

The Minimum Water Flows and Levels Act allows the state Fisheries and Game departments to request the establishment of minimum flows by Ecology (RCW 90.22.010). A 1979 amendment to the state surface water code requires that in establishing minimum flows, Ecology shall consult with and carefully consider the recommendations of the Departments of Fisheries, Game, Agriculture and the State Energy Office and affected Indian tribes (RCW 90.03.247).

In accordance with statutory directives, Ecology has always worked closely with the Game and Fisheries departments, and in more recent programs has also urged greater participation by Indian tribes. The Department of Agriculture and the Energy Office have only recently become more fully involved in the instream flow planning process. To a lesser degree, the Departments of Natural Resources and Social and Health Services (Water Supply and Waste Section) and the Parks and Recreation Commission have also been involved in direct coordination with Ecology.

Game and Fisheries have the expertise and a strong interest in identifying instream flows for fisheries resources. As such, they have made the commitment of resources necessary to work closely with Ecology, and they have had substantial impact on Ecology's decision-making.

State fisheries agencies and tribes have recently begun a new approach to fisheries management and problem solving called watershed planning. Ecology's instream flow programs will be considered in watershed plans and vice versa. Ecology intends to coordinate closely with the watershed planning teams when work is started.

Federal fisheries agencies (U.S. Fish and Wildlife Service and National Marine Fisheries Service) occasionally coordinate with Ecology on instream flow planning matters. Generally, however they have preferred to support the state fish and wildlife agency recommendations rather than providing their own. Federal water development agencies (Bureau of Reclamation and Corps of Engineers) have had some limited involvement in Ecology water planning programs, generally in river basins where these agencies have existing water projects or potential projects.

Ecology has also involved local government in its programs to varying degrees. Water and power utilities and planning agencies are often interested and involved in water planning programs. Where local agencies have shown a strong interest, Ecology has met with them to explain its program and to receive recommendations.

The Puget Sound Water Quality Authority was established by law in 1985 to coordinate efforts for cleaning up Puget Sound water quality problems. Stream flows are an important factor in water quality in the transmission, dilution and dispersal of water-born pollutants. Ecology intends to coordinate closely with the Authority in establishing and reviewing instream flows for Puget Sound drainage basins.

It has been Ecology's view that its responsibility under the law is to make opportunities available for other agencies to become involved in its planning process. Those agencies must then decide for themselves their appropriate level of participation.

A broad range of interagency coordination mechanisms have been attempted by Ecology over the years. Development of the Cedar River Instream Program was preceded by several years of meetings among a broad based Ad Hoc committee including local, state, and federal agencies. An advisory committee consisting of agencies, utilities and interest groups assisted Ecology in its development of the Columbia River Instream Program. Local advisory committees consisting of local agencies and citizens have been used in development of several, although not all, planning programs.

Generally, Ecology has attempted to gage the interest likely to be raised by a planning program, and each area's unique circumstances. The more difficult the expected issues, and the more diverse the expressions of interests are likely to be, the more apt Ecology has been to establish an advisory committee.

Viewpoints – Development oriented state agencies, such as Agriculture and Natural Resources, are interested in increasing their involvement in water planning to provide Ecology with a perspective to balance the views Ecology receives from fish and wildlife agencies. Increased participation by these agencies would be supported by water users.

Fisheries and Game probably prefer to maintain their active role in Ecology's water planning process. This view would probably be supported by other environmental interests.

Alternatives

Alternative A: Coordinate with other agencies in accordance with the water resources statutes.

Effects: Water Resources staff would meet with staff from the Departments of Fisheries, Game, Agriculture, the Energy Office, and Indian tribes during the development and adoption of instream flow plans and regulations (RCW 90.03.247). As these plans were being developed these agencies, as well as the Department of Natural Resources, Game, Transportation, and Social and Health Services and local and federal agencies as appropriate would be notified and invited to the public hearings concerning the plans (RCW 90.22.020).

Implementation: This alternative would not require any changes in current procedures or laws. Ecology would continue to work with its current contacts in local, state, and federal agencies. No increase in staff would be necessary.

Alternative B: Provide additional coordination beyond present legal requirements and current operating procedures.

Discussion: Natural resource agencies at all levels of government, in addition to the legally mandated agencies, would be invited to and be encouraged to actively participate in developing, as well as reviewing, proposed instream flow regulations. Ecology's Water Resources staff would establish better and more frequent personal contacts with water related employees in other agencies.

While contacting other agencies, Ecology's staff could research other interagency coordination projects. Water Resources staff could offer to make presentations to other agencies to create interest and participation in Ecology's water programs. Interagency projects could be identified and conducted after agencies increase their knowledge about each other.

Specific staff could be assigned to other water related planning programs including the Puget Sound Water Quality Authority, the Hood Canal Coordinating Council, the Pacific Northwest Power Planning Council, the Comprehensive Regional Production and Management Planning process (Fisheries' watershed plans), and the implementation of the U.S./Canada Treaty. Out-of-stream water allocation could also be coordinated with the state's economic development agencies.

A standing interagency water resources committee could be established. This committee could act as a catalyst to coordinate projects between the agencies. Some interagency coordination issues could be elevated to the Governor's Subcommittee on Natural Resources for further discussion and resolution.

Effect: This alternative would systematize and better organize the interagency coordination efforts in the Water Resources Program. Greater opportunities would be available for participation by a broader spectrum of agencies. An expanded intergovernmental coordination process could become part of a public involvement plan. The Water Resources Program could expand both processes simultaneously.

Implementation: Expanding interagency coordination would require staff to attend and host more meetings, contact more staff and begin exploring new interagency projects. It may not require new staff to implement just reallocating their time and assigning staff to specific agencies or interagency projects.

ISSUE PAPER IX: FEDERAL AND INDIAN RESERVED WATER RIGHTS

Federal and Indian Reserved Rights (Issue 6)

Issue Definition – This issue addresses how federal and Indian reserved water rights for instream and out-of-stream uses should be taken into account in the instream planning process.

Background – Federal and Indian reserved rights are derived from the federal reserved rights doctrine as formulated by a historical sequence of court interpretations of treaties between tribes and the United States. The federal reserved rights doctrine holds that when the federal government reserves land for federal purposes, by implication a reservation of then unappropriated water is also made to accomplish the principal purposes of the reservation. The priority date of a reserved right is the date on which the reservation was created. This applies to Indian reservations and national parks and forests, for example. Reserved rights are not invalidated through non-use. Unexercised reserved rights may become exercised at any time.

In Washington state, most federal lands other than Indian reservations are generally in upper basin areas where water availability and unquantified claims do not presently raise much concern. However, because tribal reservations are not limited to mountainous uplands and contain approximately 2,500,000 acres in this state, unquantified Indian reserved rights are of great concern to holders of appropriative water rights.

For Indian nations, primary purposes of the reservation requiring water for fulfillment may include domestic, agricultural and industrial purposes and fisheries propagation. Methods of calculating amounts of water necessary to meet the purposes of Indian reservations have varied. Whatever the method, it is apparent that many tribes may have unquantified and thus far unexercised reserved water rights, with priority dates dating back to creation of the reservation (the 1850's for most reservations in Washington). The right of tribes to water for instream uses on the reservation is also being established by courts. In Colville Confederated Tribes vs. Walton, the 9th circuit court recognized the existence of a treaty right to instream flows to support a fishery and maintain spawning grounds.

In addition to reserved water rights, treaties and subsequent court decisions support many Indian Tribes' rights to take fish in usual and accustomed areas. These fishing rights are distinct from land reservation-related rights. In U.S. v. Washington, Phase II, the tribes have argued that the right to take fish implies the right to have fish and their habitat protected. The tribes view the taking of fish as a property right; property rights imply such means as necessary to protect the exercise of the right. The tribes' view is that instream flows to preserve fisheries are among their reserved rights. The first decision regarding the protection of habitat said that an implied legal right to protection of fisheries habitat existed, that the state has a duty to refrain from degrading habitat to an extent that would deprive tribes of their moderate living needs, and further, that the state could not subordinate the fishing right to any other objectives or purposes it preferred.

Since 1982, Orrick's decision has been the subject of two 9th Circuit Court decisions, which have resolved neither the validity nor the extent of the environmental protection right. For the present, the state has no mandate per se from the courts to prevent impact to fisheries habitat, only the language in its own statutes. However, if the environmental right is eventually defined and the rights are treated as reserved rights to instream flows with treaty priority dates, existing water rights could be subordinated to instream fisheries needs. The standard against which Ecology'' adopted instream flows would be judged is unknown at this time.

As a result of the most recent U.S. v. Washington decision, it appears that no encompassing decision is likely to be made. Rather, it is likely that a series of specific cases will be required for the courts to define the extent of the environmental right. This may take many years.

Open communication between state officials and tribes has not occurred regularly until recently. Although some conflicts have been resolved over the years, two major areas of dispute continue to be fisheries and water allocation. In the case of water rights, the state has consistently held that it has jurisdiction over water on and off the reservation which is excess to Indian reserved rights. In some states, unquantified Indian reserved rights have led states to withhold issuance of water rights on or near reservations. In Washington state, the policy has been to grant water rights near reservations and on reservations if the water is excess to reserved rights. However, reserved rights have generally not been quantified. Water right applications within reservations were held for some time during the 1970's (?), but court decisions indicate the state has authority to regulate water on reservations under certain conditions (Indian Water Rights in the West, Western States Water Council).

The measure and scope of Indian reserved rights for instream uses are unsettled, as is the relationship to an "environmental right." The state's position on reserved instream rights and "environmental protection" has been that a reserved fisheries right would be limited by factors such as the United States construction of federal dams which impacted fisheries, that instream rights might conflict with the tribes irrigation rights, and that such a right could not be used to obtain an unrestricted fishery (April 1985 report by the Office of the Attorney General Committee on the State of Washington and Indian tribes). The committee report also states that the instream and out-of-stream rights need to be quantified with two points in mind: the original purpose of the reservation, and the fact that Congress knew non-Indians would be settling in the vicinity of reservations and would need water.

The implications for the instream planning process derive from two concerns: that quantification of reservation-related irrigation rights could preempt state-issued water rights for out-of-stream use or instream flows, and that the tribes' reserved fishing rights could require that high instream flows be protected against future and existing water rights to afford optimal habitat protection. Based on the extent of existing appropriation, it appears that resolution of these issues could have a significant impact on the state's water appropriation program.

Viewpoints – Generally, it has been the view of Ecology that federal reserved rights, including those associated with Indian reservations, should be determined and quantified in state general adjudications of water rights. Federal courts have consistently agreed that federal law (McCarren Amendment – 1952) requires that quantification occur in state courts if such courts are capable of doing so.

Ecology views any confirmed reserved right as the same as any right established under state procedures. The Department has stated that it will regulate state-issued water rights as necessary to protect court-determined reserved rights having an earlier date of priority. This is not necessary until the federal government or tribe is prepared to exercise a reserved right.

It has also been Ecology's position that the potential confirmation of reserved rights should not alter the Department's standards or processes for establishing instream flows in accordance with statutory direction. Should higher reserved instream flow rights be found to exist at some future point, these rights would be folded into the existing matrix of rights in accordance with court determined priority dates and would be protected by the state vis-à-vis junior rights.

The evolution of the Washington Instream Resources Protection Program from the original basin planning program was partially in response to the pending U.S. v. Washington case. In the instream flow planning process, tribes have participated in the instream flow discussions along with the Departments of Fisheries and Game. Their requests for optimum flows have been considered in the same light as those requests from the Departments of Fisheries and Game. Tribes would prefer that the state recognize their claims and reflect them in the establishment of instream flows and the administration of water rights.

Holders of existing state water rights fear that early priority dates of federal and Indian reserved water rights for instream and out-of-stream uses would displace many state water rights. In many areas of the state, this could eliminate or at least endanger millions of dollars of existing investment. Because reserved rights have been created by the courts, many water users argue that they have operated in good faith based on state and federal commitments, and that it would be patently unfair for their rights to be usurped by an unforeseeable series of court decisions. They would probably argue that the state and federal governments have a responsibility to bear the cost of developing new water sources or to provide compensation for displacement of water rights.

The possible assertion of early priority date instream flow rights is viewed as an opportunity to rectify overappropriation by some parties. Early priority instream flow rights to protect fish resources would benefit other instream values such as recreation and aesthetics.

Note to reader: Alternatives are listed in the following section, but they are not discussed because many of these matters are subject to pending litigation.

Issue I. Should Indian and Federal reserved rights (associated with federal land reservations) be considered in the instream flow and water allocation planning process?

Alternatives

A. Do not consider unadjudicated reserved right claims; recognize the existing allocation represented by adjudicated reserved rights (current practice).

B. Consider and attempt to fully satisfy or protect all reserved right claims whether affirmed or not.

C. Encourage the quantification and settlement or adjudication of reserved right claims.

D. Withdraw streams from appropriation if conflicts between state appropriations and reserved rights claims are likely to result. Hold all water right applications pending settlement or adjudication of reserved right claims.

E. Provision all water rights on streams subject to reserved right claims with a notice that the right may be subject to regulatory action to protect reserved rights that may be determined and exercised in the future.

II. Should environmental protection rights that may arise from Indian fishing rights established by treaty be considered in the instream flow and water allocation process?

Alternatives

A. Disregard environmental protection rights until fully affirmed by the courts or through a settlement, set instream flows under current standards.

B. Assume the eventual confirmation of the existence of environmental protection rights by adopting a non-degradation standard for instream flows and subsequent water rights (protect optimum flows or close streams as recommended by tribes).

C. Withdraw from appropriation streams producing anadromous fish contributing to treaty fisheries pending a more definitive decision by the courts or through a settlement.

D. Provision all water rights on streams contributing to treaty fisheries with a notice that the right may be subject to future regulatory action to protect Indian treaty fishing rights depending on the outcome of ongoing litigation.

E. Negotiate a settlement of environmental rights claims and levels of instream flows, including potential affecting existing state-issued water rights.

ISSUE PAPER X: ENFORCEMENT (Issue 17)

Issue Definition – The issue of enforcement has several aspects: should enforcement of instream flows receive more emphasis, and is a statewide instream flow enforcement procedure needed for consistency? How should relinquishment of unexercised rights and wasteful practices be addressed? How should invalid claims be handled?

Background – Enforcement of water resource violations is an issue which has received increasing attention over the past few years. Historically, most violations have been illegal diversions (i.e. diversions without a valid water right). Only recently has enforcement of instream flow provisions been done on a large scale, under the instream and basin management programs in Eastern Washington.

The maximum penalty which can be levied under the Surface Water Code is $100 per day. When regulation of water rights is anticipated to protect instream flows, water right holders subject to instream flow provisions are given forewarning that regulatory action is likely to occur. Notice of regulation action is given by the department when stream flows fall below the established minimum flow level. If a provisioned diversion continues, the violator can be fined $100 per day. The violation must be documented each day. Diversion works are also posted with a Notice of Cease and Desist.

If a violation continues despite posting, Ecology can request that a temporary injunction from a court be imposed. Continued diversion despite a court order may result in a contempt of court citation, possible jailing, and/or a more substantial fine than that imposed by the agency. Court orders are enforced by an officer of the court and are an effective deterrent. In extreme cases, the department could exercise powers of arrest in conjunction with law enforcement agencies, because violation of the water code is a misdemeanor.

Once Ecology has exercised its civil penalty authority, an appeal can be filed with the state Pollution Control Hearings Board. The Board may affirm or reduce the penalty. If the penalty is affirmed and still not paid, the department refers the case to the State Attorney General, and the department will receive a court order allowing garnishment of property for collection.

The Department of Ecology enforcement manual calls for an escalated enforcement response to repeated violations. This enforcement policy has been adopted for the agency as a whole. Diversion without a water right is subject to the maximum $100 per day penalty, and diversions which go beyond the authorized amount are subject to a $100 per day fine. Historically the levels of enforcement activity for water resources violations have not been consistent among regional offices. This is changing with the adoption of more instream programs and much greater emphasis on enforcement. There seems to be the perception on the part of many living on the west side of the Cascades that water quantity is never a problem. With a Pacific Maritime climate usually lacking in summer rainfall, low flows can in fact become a serious problem on the west side of the mountains.

In summary these enforcement procedures provide the required constitutional guarantees of due process, but are criticized by many as too unwieldy and cumbersome to effectively do the job, especially as related to the protection of instream flows. There is also concern that the statutorily established penalties are far too low and that more substantial penalties would lead to better compliance and a much more effective enforcement program.

Other topics related to enforcement are relinquishment of unexercised rights, wasteful practices, and problems associated with unquantified claims. For unexercised rights, the state law requires that these waters revert to the state for re-appropriation. Authority for relinquishment of water rights is provided in Chapter 90.14 RCW. Water rights revert to the state if not exercised for five consecutive years without sufficient cause for nonuse. Exceptions are provided for standby water supply or for municipal water supply. Ecology's current policy is that unused water rights will be relinquished (preferably voluntarily) when they are identified in the course of other work. Ecology does not have an aggressive relinquishment program due to priorities and staffing limitations.

Another issue is the wasteful use of water. In some cases, excess diversion capabilities have been built into diversion structures. Some irrigation systems with outdated facilities and practices divert much more water than can be used by crops. Many older water rights have no annual acre-foot limitation, whereas more recent water rights have both an instantaneous and an annual maximum. Ecology presently does not have an aggressive program to identify waste of water. (See Issue Paper VI on water conservation practices).

Unconfirmed water right claims pose another problem for enforcement. A person diverting water under a registered claim is almost immune from enforcement even if the claim is spurious. For a claim to be valid under the Claims

Registration Act, surface water had to be in continuous use prior to 1917, and for ground water prior to 1945. Numerous claims are recognized to be spurious on examination, but until an adjudication of water rights occurs these claims are beyond the reach of enforcement.

Ecology has an active program to adjudicate water rights throughout the state, but the adjudication process is a cumbersome and time consuming one under current law. Because not all problem areas can be addressed at once, Ecology prioritizes streams needing adjudication.

Viewpoints – The Departments of Fisheries and Game and others interested in protecting instream resources have been critical of Ecology's historic enforcement record. They argue that present enforcement procedures are too slow and cumbersome and that a strong, consistent instream flow enforcement program is necessary. They also note that although these are a positive step in the right direction, instream flow regulations are effective only to the extent they are strongly enforced.

Some resistance to regulation to protect instream flows has occurred in the agricultural community. In other cases, as in the recent instream flow regulatory action which occurred in Eastern Washington, some holders of senior water rights applauded the department's enforcement efforts because their senior water rights were also protected when junior rights were regulated.

Ecology recognizes that its enforcement against illegal diversion, wasteful practices and spurious claims has been historically weak. Efforts are now underway to improve enforcement capability and effectiveness. Ecology is also interested in streamlining the water rights adjudication process, because once an adjudication has been completed, it is much easier to identify and enforce against illegal diversions, waste and spurious claims.

Alternatives

Alternative A: Retain historical level of enforcement including:

1. Responding to complaints.
2. Seeking public cooperation to protect instream flows prior to taking regulatory action.

Discussion – This describes the status quo. Ecology presently attempts to respond to complaints with available personnel. Practices differ among regional offices. In 1986, the Central Office in Yakima instituted a hot line system in addition to early letters warning of the possibility of regulatory actions. With the hot line, water right holders were able to check daily on current flow levels. Regulatory action can be taken for violation of the terms of the water right, for example exceeding the amount of cubic feet per second set as the limit or the seasonal limitations on use if any exist, or for diversion without a permit. The majority of enforcement actions have traditionally occurred to protect senior water rights rather than to protect instream flows.

Effects – The effects of the current practice are mixed. In areas with instream protection or basin management programs, the minimum instream flows have been set, and water rights issued subsequent to program adoption can be regulated. In areas where such programs have not been adopted, it is more difficult to enforce the patchwork of administrative closures and low flows. Since the historical enforcement of water rights violations has not been vigorous, Ecology has to overcome local resistance to more active enforcement. Water rights enforcement has also been hampered by the low ceiling on fines imposed for violations.

Implementation – No change in current statutes or regulations would be required to maintain the status quo.

Alternative B: Enhance water right enforcement capabilities.

Subalternative 1. Increase statutory limit on penalties for water right violations.

Discussion – As discussed previously, the present statutory limit on water rights penalties is $100 per day. Although Ecology's general enforcement strategy is to increase the severity of penalties for repeated offenses, this is not currently possible for water rights violations. Sources outside Ecology have suggested that the maximum penalty be increased. A heavier penalty would serve as more of a deterrent. Where repeated violations occur, increased penalties would make these cases more worth pursuit by the Attorney General's office.

Effects – The effect of increased penalties would probably be less frequent violations of minimum flows, closures and permit conditions. This would have a beneficial effect on instream resources by keeping water in the stream. It would not affect legitimate offstream use. Enforcement activities also benefit senior water rights holders, by restricting impingement by junior diverters. Ecology's credibility would be improved. The Instream Resources Protection programs would be more stable and effective if enforcement were consistently applied.

Implementation – An increased penalty limit would require a change in statute by legislative action. A recommendation has been made by the enforcement arm of Ecology that this happen.

Subalternative 2. Increase regulatory emphasis on water violations in regulations and on water rights.

Discussion – Emphasis on regulation could be increased regardless of the penalty limit. A combination of increased emphasis and increased penalty would probably be more effective, however. Regulation of instream flows has generally been more consistent on the east side of the Cascades. This could be expanded and made consistent across the state. More emphasis on regulation could be incorporated into regulations as they are developed. This could educate those involved in the process.

Effects – The effect of increasing emphasis on enforcement of water rights would be that instream flows would be better preserved. There could also be a secondary deterrent effect on parties who might be inclined to invest in areas of uncertain water supply.

Implementation – Increased enforcement by regional office personnel would likely require more staff. Systems similar to that used by the Central Regional Office this past summer, with early written notification and a hot line with flow information would be very useful. Some groundwork would be required to accurately identify current water rights holders and landowners.

Subalternative 3. Increase cooperation between Ecology resource management and environmental quality enforcement personnel. Link water quality and quantity enforcement.

Discussion – In the regional offices, where operations and enforcement are carried out, staff are organized into sections of "resource management" and "environmental quality." The responsibilities of the environmental quality staff relate to water quality. The resource management staff deal with water quantity issues. Since staff and field time are limited resources, this alternative suggests that more cooperation in reporting and enforcing violations could occur between the two functions.

Effects – A better exchange of information, more enforcement coverage, and increased efficiency in enforcement could result.

Implementation – To implement such a strategy might require some reorganization or at least rethinking of regional office functions.

Subalternative 4. Increase cooperation between Ecology's and other agency's field personnel. Deputize Departments of Fisheries and Game agents to enforce instream flow requirements.

Discussion – One major source of information on water rights violations are the Departments of Fisheries and Game. These agencies staff are located in different areas than Ecology and spend quite a bit of time in the field. Increased cooperation could mean less than actually deputizing personnel from other agencies, and might consist of systematically checking with their field personnel on some regular basis.

Effects – The effect of deputizing or involving other agencies would be to expand the enforcement coverage for water rights violations. This would benefit instream resources and senior water rights holders.

Implementation – The implementation of such an agreement might require passage of new WACs, or an interagency Memorandum of Understanding. A system of interfacing with regional office staff would need to be developed.

Subalternative 5. Streamline violation notice system.

Discussion – The violation notice system could potentially be streamlined. Presently several steps are required to enforce violations. When diverters refuse to cease and desist upon request from Ecology, the department is obligated to obtain an injunction from a local court. This can be a cumbersome process, especially when the local jurisdiction does not look favorably upon Ecology's actions.

Effect – The effect of streamlining the violation system would be increased efficiency in issuing violation notices. Hopefully this would further deter violators and encourage them to comply with enforcement actions.

Implementation – These changes would require amendment of existing statutes.

Subalternative 6. Increase media notification of regulatory and enforcement actions.

Discussion – Increasing media coverage of regulatory and enforcement actions is something that the Department has already begun. For enforcement actions on instream flows, this could take place at the beginning of the season to indicate to the public at large the likelihood of regulation based on runoff forecasts. During the low flow season when enforcement actions were ongoing, newspapers could serve as vehicles for dissemination of flow information as well as for articles discussing actions.

Effects – Increasing media notification of regulatory and enforcement actions might have several consequences. The publication of names and offenses might act as a deterrent to violators. The credibility of the department in enforcement would be improved, as this is an area for which Ecology's lack of emphasis has been criticized. The public would become better educated about the instream resource protection programs and the need for allocating and enforcing minimum flow levels.

Implementation – Implementation of this strategy would require that Ecology set up contacts with newspapers and radio stations as appropriate, and make use of these throughout the regulation season.

Subalternative 7. Speed up adjudications process to eliminate questionable claims and allow enforcement against unauthorized diversions.

Discussion – The current means of addressing questionable claims is through an adjudication. This is a lengthy process which involve field exams, verification of historical use of water, and hearings before a superior court judge. This is the only process for confirming or disallowing claims. Until a claim is adjudicated, there is no means for the department to regulate against the person claiming the use of the water.

Effects – The effect of speeding up the adjudication process would be potentially to eliminate illegal use of water in an adjudicated basin. This would fine tune the instream resources programs by increasing the knowledge of water availability and use. Indian rights can be adjudicated by the state courts, and increased frequency of such processes would correspondingly increase the number of quantified federal rights.

Implementation – To increase the rate of progress in the adjudications process would require placing more emphasis on this activity within Ecology. An increase in the number of referees and staff would be necessary. A review of the statutes under which adjudications are performed might yield possibilities for streamlining the process. One procedure which is being developed in the Yakima adjudication is the elimination of adversarial hearings for uncontested water rights.

Subalternative 8. Eliminate immunity of patently spurious claims from enforcement.

Discussion – As discussed above, the means of addressing spurious claims is through a lengthy adjudication process. Many claims which have been filed with the department are obviously spurious; for instance, in many cases the date of initiation of use is too late to qualify as a vested claim. It would aid the department in taking enforcement actions if these claims could be dealt with more directly.

Effects – The effect of establishing a means of addressing spurious claims would be to make enforcement actions more fair and effective. Both instream resources and senior water rights could be better protected. It would also cause some hardship on parties who have been illegally withdrawing water.

Implementation – To implement such a course might require a change in the statutes which govern the adjudications process, Chapter 90.03 RCW.

Subalternative 9. Pursue an active relinquishment program.

Discussion – Relinquishments may occur as part of the adjudications process or separately. When it can be established that water has not been put to beneficial use for a period of five years, the water right reverts to the state.

Effects – The effects of relinquishments are to make water available again for appropriation which the department would otherwise consider unavailable.

Implementation – A more active relinquishment program could either be part of an enhanced adjudications program, or it could be a separate program. This would require an additional staffing or a reallocation of resources.

Subalternative 10. Establish standards and pursue elimination of wasteful practices through regulatory action. (Please see related discussion in the conservation issue paper.)

Subalternative 11. Develop statewide procedures to aid regional offices in enforcement activities.

Discussion – To date there has been little consistency among the four regional offices as far as water rights enforcement practices. One means of developing consistency would be to take those things which have proven the most successful and adopt an agency-wide policy. This would supplement the agency's enforcement manual.

Effects – The effect of consistent agency-wide enforcement of water rights would be to increase credibility of the agency and the instream protection programs.

Implementation – To implement such a program might require a task force to compare histories of enforcement actions, identify generic and area-specific problems, and develop an agency-wide policy statement and training program for enforcement.

Subalternative 12. Assign headquarters personnel to assist regions in instream flow enforcement actions.

Discussion – One of the problems which has plagued water rights enforcement is inadequate personnel. A means of augmenting field staff would be to make use of headquarters personnel on a seasonal basis for enforcement.

Effects – The effect of using headquarters personnel would be that the number of field staff available to enforce water rights violations would be increased. Staff would receive on the job training in a part of the job to which they would normally not be exposed. Absence from headquarters would mean reduced productivity and progress on other assignments.

Implementation – Implementation would require arrangements to rotate and train staff and alleviate expectations on other assignments. The budget and work plans would have to reflect such changes.

APPENDIX II

INSTREAM RESOURCES PROTECTION

STUDY REPORT

JANUARY 1986

PREPARED BY THE

WASHINGTON STATE DEPARTMENTS OF:

ECOLOGY, FISHERIES and GAME

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INSTREAM RESOURCES PROTECTION
STUDY REPORT

The Issue: Waters in the western states, including Washington, are allocated according to the appropriation doctrine. Historically, many streams, particularly in eastern Washington, were reduced in flow or appropriated to a dry stream bed due to extensive diversions of water for consumptive use. Many of these diversions were started prior to the establishment of the water rights permit system in 1917.

Irrigation is the predominant consumptive use of water in Eastern Washington, while increasing municipal, domestic, energy and industrial demands for surface water affect many Western Washington streams. While these offstream uses of water have grown, those values and resources dependent on a flow instream, such as fish, wildlife and recreation, have suffered losses. These losses have been rather dramatic in some parts of the state such as the Yakima River Basin where a combination of problems, including chronic low flows, resulted in near elimination of salmon and steelhead runs returning to the Yakima system to spawn. Another example is the Walla Walla River which once supported salmon runs. Because of diversions in Oregon and Washington, the Walla Walla River chronically dries up in some reaches, and no longer supports salmon runs. Recognizing these losses, and the benefits to be derived from retaining a balance and diversity of water uses, the State of Washington began to systematically protect instream values through the water rights process in the 1950s.

Authority/Background: In 1949, the Legislature declared it to be the policy of the state ". . . that a flow of water sufficient to support game fish and food fish populations be maintained at all times in the streams of this state." This legislation, codified as RCW 75.20.050 in the State Fisheries Code, provides that the director of the Department of Ecology (Ecology), "may refuse to issue any permit to divert water, . . ., if in the opinion of the director of Fisheries or director of Game, such permit might result in lowering the flow of water in any stream below the flow necessary to adequately support food fish and game fish populations in the stream." As an alternative to denial of the permit, Ecology has issued numerous permits conditioned to low flow provisions recommended by Game and Fisheries.

Under this legislation, approximately 250 streams (nearly all very small) have been closed to further appropriation, and low flow provisions have been applied to individual permits on approximately 250 other streams.

The Minimum Water Flows and Levels Act (Chapter 90.22 RCW) was enacted in 1967 and amended in 1969 to provide a more formal process to protect instream flows. Under this act, the Department of Ecology shall, when requested by the department of Fisheries or the Game Commission, establish minimum streamflows and lake levels to protect fish, game, birds, or other wildlife resources or recreational or aesthetic values or to preserve water quality. The act sets forth public hearing procedures for the establishment of minimum streamflows and lake levels, but does not define criteria for the determination of such flows or levels. Ecology utilized this authority in 1971 to adopt minimum flows for the Cedar River, a major source of water supply for the Seattle metropolitan area.

The Water Resources Act of 1971 (Chapter 90.54 RCW) provides that, "Perennial rivers and streams of the state shall be retained with base flows necessary to provide for the preservation of wildlife, fish, scenic, aesthetic and other environmental values, and navigational values." The act further provides that lakes and ponds shall be retained substantially in their natural condition. (RCW 90.54.020(3)(a)). Under this and the authorities discussed above, Ecology has established instream flows on 172 major streams or stream reaches of the state and has closed over 300 streams and lakes to further consumptive appropriation (includes many of the streams noted in the second paragraph of this section).

Anticipating the potential for conflict between instream and offstream water uses, the act states that "Withdrawals of water which would conflict therewith (with the base flows) shall be authorized only in those situations where it is clear that overriding considerations of the public interest will be served." (RCW 90.54.020(3)(a)) (parenthetical material added).

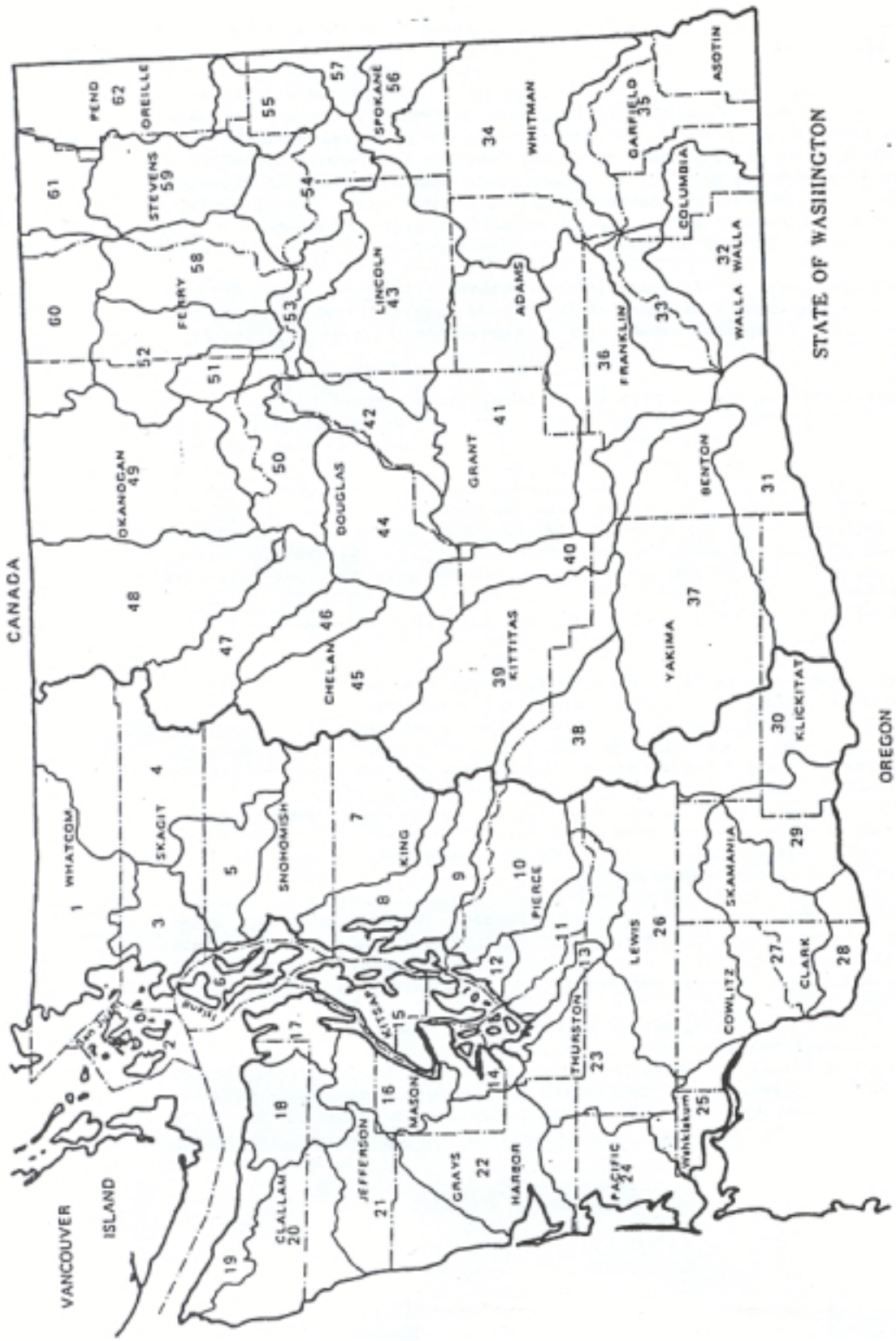
Ecology is vested with exclusive authority under state law to set instream flows and levels on state waters. In establishing such flows, Ecology is required to consult with and carefully consider the recommendations of the departments of Fisheries and Agriculture, the Game Commission, and the Energy Office as well as affected Indian tribes. These and other state agencies are not precluded from presenting views on instream flow needs at public hearings or from participating in proceedings of other agencies (federal or state) to present views on instream flow needs. (RCW 90.03.247) (The Federal Energy Regulatory Commission may also set operational flows for hydropower projects it licenses.)

For planning and management purposes, the state is divided into 62 Water Resource Inventory Areas (WRIAs) (see Figure 1). Chapter 173-500 WAC, adopted by Ecology in 1976, provides for the formulation of a water resources management program for each WRIA or group of WRIAs. During the early 1970s, Ecology initiated a basin planning process to address basin specific water allocation policies, including instream flows. Between 1974 and 1978, Ecology adopted eight basin management programs for some of the more serious water problem areas of the state. These programs addressed instream water needs and analyzed the level of existing demand in order to define the quantity of water remaining available for further appropriation.

To meet changing priorities, in 1979 Ecology began development of modified basin planning programs. This new effort, the Washington Instream Resource Protection Program (WIRPP), established a high priority for protecting instream resources (primarily fish and wildlife) through the establishment of instream flows. Because of their importance for fish and wildlife and growing demand for out-of-stream water use, western Washington streams and the main stem of the Columbia River have been treated as high priority waters in this program.

Ecology published an overview of the program and a draft Environmental Impact Statement (EIS) in April 1979. Following public and agency review, the final program EIS was published in June 1979 and work began on individual basin programs.

Figure 1.


WATER RESOURCE INVENTORY AREAS
STATE OF WASHINGTON
CANADA
OREGON
VANCOUVER ISLAND
1 WHATCOM
2
3 SKAGIT
4
5
6
7 SNOHOMISH
8 KING
9
10 PIERCE
11
12
13 THURSTON
14 MASON
15
16
17
18
19
20 CLALLAM
21 JEFFERSON
22 GRAYS
23
24 PACIFIC
25 Wahkiakum
26 LEWIS
27 CLARK
28
29 SKAMANIA
30 KLICKITAT
31
32 WALLA WALLA
33
34 WHITMAN
35 GARFIELD
36 FRANKLIN
37 YAKIMA
38
39 KITTITAS
40
41 GRANT
42
43 LINCOLN
44
45
46 CHELAN
47
48
49 OKANOGAN
50
51
52
53
54
55
56 SPOKANE
57
58 FERRY
59 STEVENS
60
61
62 PEND OREILLE
ASOTIN
COLUMBIA
BENTON
ADAMS
DOUGLAS

The WIRPP is a water resources planning effort that focuses principally on the development and adoption of regulations into the Washington Administrative Code intended to preserve and protect instream resource values. These measures include minimum instream flows and closure of streams and lakes to further consumptive water rights appropriation.

Instream flows protect streams only from consumptive use appropriations approved after adoption of the flows. When the flow of the stream falls below a specified instream flow level, those water rights provisioned with those flows must cease or reduce diversion until the instream flow is met or exceeded. Water rights issued prior to the establishment of instream flows are not affected. Streams which have already been fully appropriated are not affected by this program until existing water rights are abandoned and relinquished.

When a stream is closed to further consumptive appropriation, no further rights will be issued for consumptive water diversion during the period of closure. Closures are normally necessary only for the low flow period of the year (generally midsummer to early fall in Washington streams) but may cover the entire year depending on the situation in a specific stream.

Whenever possible, Ecology prefers to establish instream flows on streams rather than closing them to future uses. However, where it is determined that the level of existing diversions seriously affects the welfare of instream uses, or where any new diversions would irreparably harm instream values, the stream may be closed to further consumptive appropriation. Many small streams have been closed for this reason, even where few if any consumptive diversions exist.

Ecology works with a number of interested groups and agencies and the public in developing instream protection measures which are tailored to the specific conditions and needs of the individual basins. Public workshops are held by Ecology prior to formulation of instream measures. Once proposed regulations are developed, public hearings are held. In addition, proposed regulations are subject to review and approval by the seven member Governor appointed Ecological Commission. Ecology responds to all substantive public and agency comments and considers them when developing final proposals for consideration of adoption by the director of Ecology at a final adoption hearing.

Because the establishment of instream flows and levels and stream closures may significantly affect future water development opportunities, these measures can generate considerable controversy. Adopted instream flows become a constraint on subsequently established out-of-stream (consumptive) water rights. In areas experiencing increased water demand for out-of-stream use, such constraints on future water appropriation are often resisted by irrigators, municipalities, industries, and prospective hydropower developers.

Seldom are all interested parties fully satisfied with the final adopted regulation but, to date, only one of the instream flow settings has been appealed. This appeal, originally filed in 1979 by the City of Seattle in regard to the Tolt River, may be resolved out of court soon as Ecology has begun a review and revision of the regulation (Chapter 173-507 WAC) at issue in the appeal.

Accomplishments: As of January 1, 1986, instream resource protection programs are completed for the:

- Snohomish Basin (WRIA 7)
- Cedar-Sammamish Basin (WRIA 8)
- Green River Basin (WRIA 9)
- Puyallup River Basin (WRIA 10)
- Nisqually River Basin (WRIA 11)
- Chambers-Clover Creek Basin (WRIA 12)
- Deschutes River Basin (WRIA 13)
- Kitsap Peninsula stream systems (WRIA 15)
- Wenatchee River Basin (WRIA 45)
- Kennedy-Goldsborough area stream systems (WRIA 14)
- Nooksack River Basin (WRIA 1)

In addition, instream flows have been established for the main stem Columbia River. The Okanogan River Basin (WRIA 49), the Methow River Basin (WRIA 48), the Colville River Basin (WRIA 59) the Little Spokane River Basin (WRIA 55) and the Chehalis River Basin (WRIAs 22 and 23)).

Basin instream programs are in various stages of development in the Stillaguamish River Basin (WRIA 5), the Skokomish-Dosewallips Inventory Area (WRIA 16), the Skagit River Basin (WRIAs 3 and 4), the Quilcene-Snow Basin (WRIA 17), and the Willapa River Basin (WRIA 24).

Figure 2 shows the areas of the state where basin management programs have been developed and where the instream resources protection programs are established, in progress, or scheduled.

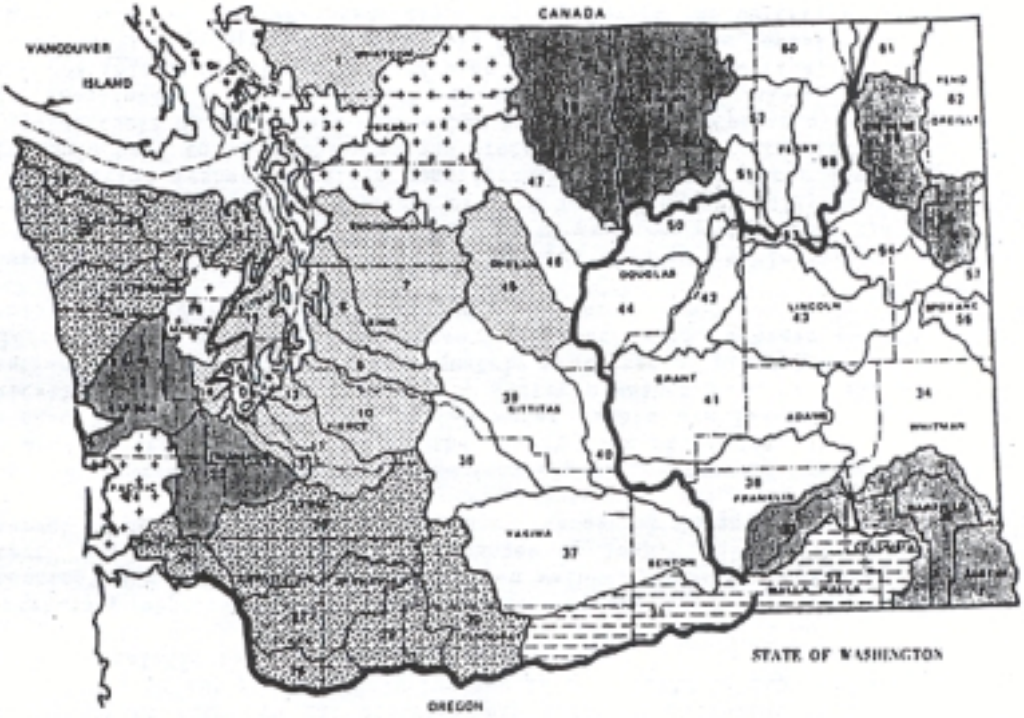
Interagency Coordination

In accordance with statutory requirements, Ecology invites the participation of Game and Fisheries, the State Energy Office, the Department of Agriculture, and affected tribes at every stage of instream program development, including prioritization of streams to be addressed by new regulations. (See RCW 90.03.247.) These agencies and tribes work closely with Ecology, participating in studies, providing data, making instream flow recommendations and reviewing proposed regulations and draft reports.

Indian tribes have become increasingly involved in assisting the development of Ecology's instream flow programs. Phase II of U.S. v. Washington is still under appeal, but so far, decisions under that case and related cases appear to affirm the principle that Indian treaties, in reserving Indian rights to catch fish, also require that the state (and the United States) act to protect the environment on which these fish depend. What remains undetermined by the courts are the precise standards within which this responsibility is to be carried out. This will probably be determined over time as individual cases are decided in the future.

Figure 2.

STATUS OF BASIN PLANNING – JANUARY 1, 1986



LEGEND

INSTREAM REGULATION ADOPTED

Columbia Main Stem, June 1980 (Revised, Oct. 1982)

WRIA–1 Nooksack, Dec. 1985
WRIA–7 Snohomish, Sept. 1979
WRIA–8 Cedar-Sammamish, Sept. 1979
WRIA–9 Green-Duwamish, June 1980
WRIA–10 Puyallup-White, March 1980
WRIA–11 Nisqually, Feb. 1982
WRIA–12 Chambers-Clover, Dec. 1979
WRIA–13 Deschutes, June 1980
WRIA–14 Kennedy-Goldsborough, Jan. 1984
WRIA–15 Kitsap, June 1981
WRIA–45 Wenatchee, Dec. 1982

INSTREAM PROGRAM IN PROGRESS

WRIA–3, WRIA–4 Skagit
WRIA–5 Stillaguamish
WRIA–16 Skokomish-Dosewallips
WRIA–24 Willapa

BASIN PROGRAM WITH INSTREAM FLOWS

WRIA–22, WRIA–23 Chehalis, March 1976
WRIA–33, WRIA–36 Lower Snake, 1974
WRIA–48 Methow, Dec. 1976
WRIA–49 Okanogan, July 1976 (Revised, June 1984)
WRIA–55 Little Spokane, Dec. 1975
WRIA–59 Colville, July 1977

BASIN PROGRAM WITHOUT INSTREAM FLOWS

WRIA–31 John Day-McNary, June 1980
WRIA–32 Walla Walla, Dec. 1977 (Revised, Dec, 1982)

FUTURE INSTREAM PROGRAM

WRIA–17 Quilcene-Snow
WRIA–18 Elwha-Dungeness
WRIA–19 Lyre-Hoko
WRIA–20 Soleduck-Hoh
WRIA–21 Queets-Quinault
WRIA–25 Grays-Elokoman
WRIA–26 Cowlitz
WRIA–27 Lewis
WRIA–28 Salmon-Washougal
WRIA–29 Wind-White Salmon
WRIA–30 Klickitat

Although Indian treaty rights are not the central focus of this report, it is advisable that these rights be kept in mind in any debate over what constitutes an appropriate standard for instream flows. If the courts do eventually establish standards for the state's environmental protection obligations under the treaties, the adequacy of instream flows that have previously been set may be subject to review. There are no major coastal or Puget Sound stream systems and only a few Columbia River tributaries in Washington that do not directly support fisheries of interest to one or more tribes.

The Treaty Between the Government of the United States and the Government of Canada Concerning Pacific Salmon (1985) defines the allocation of various salmon species among U.S. and Canada fisheries and establishes a long-term goal of conservation to rebuild salmon runs throughout the Northwest and Canada, particularly naturally spawning stocks.

The principles underlying the treaty are to prevent overfishing and to provide for optimum production of fish. In addition, each nation is to receive benefits commensurate with the production of salmon originating in its waters. These principles imply that each nation is obligated to protect and preserve fish habitat currently used or feasible for use by greater numbers of returning fish in the future.

The Pacific Northwest Electric Power Planning and Conservation Act of 1980 (P.L. 96-501) established the Northwest Power Planning Council and directed it to develop and adopt a program to protect, mitigate, and enhance fish and wildlife on the Columbia River and its tributaries. (The Columbia River drains about two-thirds of Washington State.)

Pursuant to this act, the council adopted a Columbia River Basin Fish and Wildlife Program in 1982 and adopted an amended program in 1984. An important focus of the program is the protection of remaining unaffected fish habitat and improvement of the quality and utilization of usable habitat in the basin. Development of the program has been closely coordinated with the Pacific Northwest states, affected Indian tribes and the public.

The council has adopted measures intended to help restore the depleted fisheries resources of the Columbia River basin, including measures to increase instream flows on the Columbia and Snake rivers. The program also calls for numerous habitat and passage improvements for tributaries to the Columbia River such as the Yakima and Wenatchee rivers. Tributaries such as these are regarded in the program as off-site mitigation areas for restoring fisheries eliminated by mainstem Columbia River power development.

The act does not supplant the states' authority over water appropriation, but it does establish a national policy for the restoration and preservation of Columbia basin fish and wildlife.

The departments of Fisheries and Game have a vital interest in the instream flows established by Ecology in its regulations. Fisheries is expressly required to preserve, protect, perpetuate, and manage the food fish and shellfish in state waters and offshore waters. (RCW 75.08.012) In similar fashion, the Game Commission (and the Game Department) is directed by law to preserve, protect, and perpetuate wildlife and game fish. (RCW 77.12.010) Either Game or Fisheries may make recommendations for instream flow protection in regard to water right applications (RCW 75.20.050), or with respect to instream flows being considered for establishment as regulations by Ecology (RCW 90.03.247). Either agency may also request that Ecology establish minimum flows or levels to protect fish, game, or other wildlife resources. Ecology is required to act upon such requests. (RCW 90.22.010).

Because several key terms are not defined in the legislation, considerable latitude is left for interpretation. Differing views of what these terms actually mean in the context of the statutes have been a frequent source of conflict among parties administering, interested in, or affected by instream flows. These are discussed in the following paragraphs.

In Webster's New World Dictionary for the American Language the word "minimum" is defined as, "the smallest quantity, number, or degree possible or permissible." The term "base flow" in hydrology is widely recognized as that component of streamflow sustained during extended dry periods by ground water discharging to the stream channel. The choice of these particular terms in the statutes may indicate an intent that instream flows be set at relatively low levels that could be expected to be present a relatively high percentage of the time.

The statutory objective of setting minimum or base flows is the "protection" and "preservation" of instream values. Websters defines "protect" as, to shield from injury, danger or loss." Similarly, "preserve" is defined as, "to keep from harm, damage or danger."

Ecology, Fisheries, and Game have found from experience that if instream flows are set at low levels such as the lowest flow of record, or at hydrologic base flow levels, and enough water rights are issued to chronically depress flows to this level, instream values such as fish, recreation, and aesthetics are not adequately protected or preserved. It is clear that low instream flows cannot, in most cases, achieve a reasonable standard of protection and preservation.

Improvements in instream flow prediction methods such as the Instream Flow Incremental Method (IFIM) indicate that to preserve and protect all or nearly all of the instream physical habitat supporting naturally reproducing fisheries resources, flows considerably higher than these low levels would have to be established and protected from any appropriation that could itself or in concert with other appropriations depress streamflows. Therefore, in reference to the above definition of "minimum," the minimum possible streamflow may be zero or some very low flow rate, however, the minimum permissible flow should be regarded as the lowest flow consistent with legislative intent capable of achieving the objective of protecting and preserving instream values.

Ecology's Rationale and Interpretation of Legislative Intent

Ecology is required by the Water Resources Act of 1971 to consider the needs of a broad range of water uses including instream uses. Because of the legislative history of Ch. 90.22 RCW and Ch. 90.54 RCW, and the use of the terms "minimum" and "base" flow to "protect" and "preserve" instream values in these key authorizing acts, Ecology believes that it was the intent of the legislature to establish flow protection levels that could be expected to be present in a stream much of the time.

In considering instream flows to propose for adoption, Ecology utilizes available technical data on instream flow needs, but also considers the hydrologic probability of occurrence of the flows recommended by Fisheries and Game. Ecology may propose flows that are considerably lower at least during some parts of the year than the agencies' recommendations. As general criteria, Ecology uses the "50 percent occurrence flow" (the flow met or exceeded 50 percent of the time) that is calculated from 10-day average streamflow data. Ecology is not comfortable, given the existing interpretation of statutory authorities, in proposing minimum or base flows for adoption for a given period that cannot be expected to be present at least half the time. Ecology acknowledges that its proposed flows may not protect the maximum possible amount of available habitat.

However, as a general objective, Ecology attempts to set instream flows that will provide for the preservation of at least 90 percent of maximum (optimum) habitat availability (as predicted by an instream flow model) for key species and lifestages of existing fish in a stream. Ecology has found that on most all but very small streams, it is possible to meet this criteria even though instream flows are limited by the 50 percent exceedance flow cap. Where 90 percent of the maximum habitat availability cannot be preserved using the 50 percent exceedance flow limit, Ecology often closes the affected stream or stream reach to further consumptive appropriation.

Ecology believes that the instream flows it has established in recent years may go beyond the apparent legislative intent of merely prohibiting the drying up of streams. The flows now set by Ecology approach if not exceed the point of being prohibitive to out-of-stream development.

Several present Department of Ecology and State Attorney General personnel were involved in the drafting, lobbying, and monitoring of progress of these two laws through the state legislature. According to these "witnesses," the 1967 Minimum Water Flows and Levels Act (EHB 140) was enacted to assure that various instream values not be terminated through excess appropriation of water through the existing permit system under the water code. The intent was that flows of a limited extent were to be retained instream in order to protect instream values of streams from extinguishment.

The Water Resources Act of 1971 (EHB 394, codified as Chapter 90.54 RCW) affirmed the stream maintenance policy established by the 1967 Act. Although there has been discussion over the years that minimum flows under the 1967 Act are different from the base flows under the 1971 Act, the state attorney who drafted the language in question in both acts has said and written that they were intended to be the same.

The 1971 Act does differ from the 1967 Act in two important ways. The section requiring that base flows be retained instream with respect to subsequent withdrawals also includes an escape clause allowing for a waiver of base flow requirements under conditions of overriding considerations of the public interest (RCW 90.54.020(3)(a)). In addition, the 1971 Act requires that water allocations among potential uses and users be based on securing maximum net benefits to the people of the state. (RCW 90.54.020(2)) It is Ecology's view that the establishment of a minimum or base flow is intended to protect existing instream values (rather than potential instream use) and is therefore not subject to a comparison of net benefits with other, potential developmental water uses. Ecology believes that this section could allow that waters in excess of base/minimum flow levels be allocated to instream flows higher than base/minimum flows subject to a test of maximum net benefits in comparison to other potential uses and users. These two sections in the 1971 Act should enhance Ecology's flexibility in making water allocation decisions including the establishment of instream flows. Ecology has been working on methods and standards for maximum net benefits analysis.

Fisheries' and Game's Rationale and Interpretation of Legislative Intent

Fisheries and Game base their interpretation of the statutes on consideration of all pertinent laws in their entirety. They point to the purpose statements found in the opening sections of both chapters 90.22 and 90.54 RCW which refers to protecting or preserving the state's fish, wildlife, or natural resources. They also point to other sections of Chapter 90.54 RCW where reference is made specifically to retaining flows necessary to provide for preservation of fish and wildlife resources. Fisheries and Game feel that Ecology's method of determining intent is contradictory to other language in the statutes and impossible to apply. All three agencies agree that instream resources such as fish cannot be protected or preserved by setting flows at the smallest possible or 'minimum' level. Fisheries and Game feel that the definition of "minimum" must be used in the same context as it is used in the law, not taken by itself. The "minimum" flow to "protect" or "preserve" (i.e.: "shield from loss") is something entirely different from the smallest possible quantity.

Fisheries and Game further argue that using a hydrologic definition of 'base flow' to determine intent is not realistic, nor did the legislature have in mind the hydrologic definition of the term. For example, they point out that 'base flow' during the summer-fall low flow period is virtually 100 percent of the water in most Washington streams. Thus, if applied literally, fish would receive all the water available in most streams during the summer-fall months and lesser amounts relative to total flow during other months.

Even though Fisheries and Game believe that flows should be set at levels to maintain existing habitat and resources, their flow requests to Ecology normally do not totally reflect that belief. Later discussion will show that the production of rearing salmonids is directly related to the level of flow during the low flow summer-fall period (including unusually high flows). Thus, any reduction of natural flows during the low flow period reduces fish production. They have agreed, however, to base their flow recommendations largely on IFIM habitat analysis, since that is the

state-of-the-art methodology, and to accept the reduction in fish production that may occur as a result. The instream flows they recommend are usually the optimum flows indicated by IFIM studies for key species and lifestages of fish in a stream.

In those cases, when optimum flows for fish exceed median flows, Game and Fisheries often recommend a closure to further consumptive appropriation as an acceptable alternative to adoption of optimum instream flows. If an out-of-stream use of water is subject to an instream flow which is less than optimum for fish, then that out-of-stream use will be at the expense of fish habitat and actual or potential fish production.

Game and Fisheries optimum flow recommendations may exceed average natural flow year round in small streams (5 cfs or less), may exceed average natural flow during late summer and early fall in many medium-sized streams and rivers, but in very large rivers (e.g., Skagit, Snohomish, Snoqualmie, Cowlitz, lower Columbia, and Snake) available studies suggest that optimum flows for fish are substantially less than average natural flow year round.

Fisheries and Game, in addition to disagreeing with an interpretation of the statutes that leads Ecology to utilize the 50 percent occurrence flow, also point out that the 50 percent occurrence is based on, in most cases, a hydrograph that already is altered from natural conditions. In particular, low flows during the summer-fall may have been lowered below natural conditions by virtue of existing withdrawals. Watershed development such as logging and urbanization also tend to increase high flow levels and decrease low flow levels.

Fisheries and Game do not agree that Ecology usually protects 90 percent of the habitat. They also point out that a 10 percent reduction in habitat can result in a much greater percent reduction in harvestable numbers of fish, in some cases as much as 100 percent.

In summary, Fisheries and Game feel that flows should be set at levels needed to maintain fish habitat and production potential at current levels. In certain cases, Fisheries and Game have asked for flows higher than necessary to support present run sizes, but only where runs have been depressed by some factor (other than stream flow) which is reasonably expected to be corrected. Fisheries and Game seldom ask for enhancement flows even though that is provided for in RCW 90.54.020.

Effects of Instream Flow Levels

All three agencies agree that adoption of high instream flow levels could cause most subsequently proposed diversions to be infeasible without storage due to the frequency and duration such diversions would be regulated to protect the instream flows. In order to meet consumptive uses demands, high instream flows tend to force water users to turn to expensive alternative sources of water as principal or supplemental sources of supply such as ground water (if available) or water storage facilities. For this reason, potential offstream water users such as municipalities and irrigators frequently voice opposition to these high instream flow levels. This sets the stage for sometimes vociferous water conflicts that Ecology can find itself attempting to resolve.

Figure 3 is a hydrograph of the Dosewallips River that was recently used by Ecology to evaluate proposed instream flows. Included on the graph are the instream flows recommended by the departments of Game and Fisheries, and the instream flow regime that was subsequently proposed for adoption by Ecology. As the graph indicates, Ecology's proposed flows are considerably lower than those recommended by Game and Fisheries, particularly during the summer-fall low flow period. In this case, Ecology established a limit on the low flow period instream flows by using the 50 percent exceedance flow (median flow) line as an upper bound during this period. Without specifically analyzing the hydrology of the Dosewallips River, interpretation of IFIM analysis available to the agencies regarding this river indicates that Ecology's flows could reduce available fish habitat by as much as 6 to 8 percent depending on the species and lifestage of interest and the specific period of the year being considered. (This analysis assumes that sufficient consumptive use would be allowed subject to these flows that would consistently reduce higher natural flows to this level.)

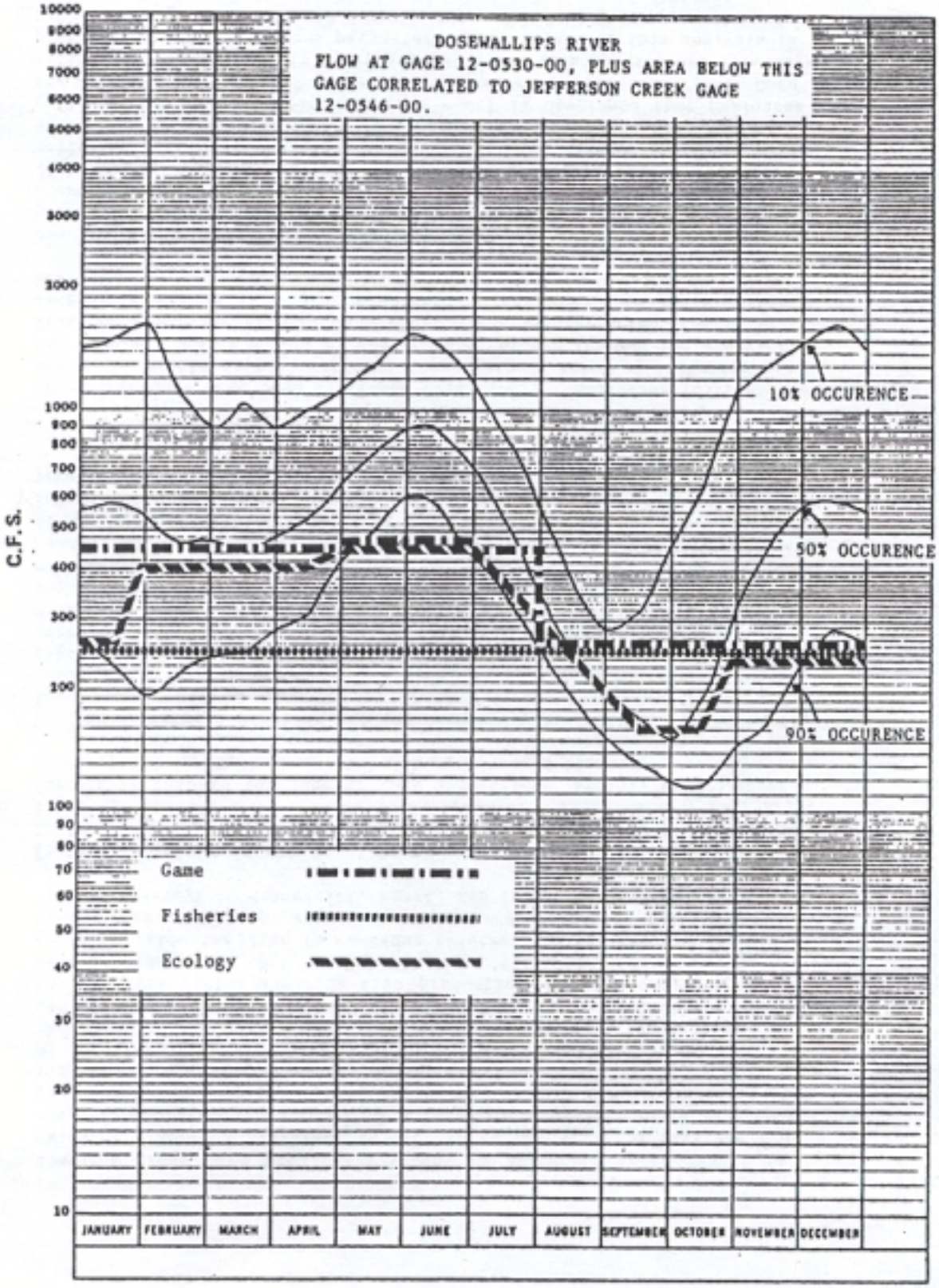
The three agencies agree that habitat availability is but one important factor affecting fish production. Other environmental factors such as water quality, food supply, predation, and harvest may also affect production, although each of these factors in turn is affected by stream flow. Studies by Fisheries and Game indicate a direct correlation between the level of low flows experienced by salmon and steelhead fry and juveniles during their freshwater life phase and subsequent adult run sizes of the same year class. Resident fish production is also related to low flows experienced during rearing. These studies suggest that lower sustained rearing flows for the fish result in lower production of adults. Fisheries relies on this relationship to predict adult coho salmon run sizes. One example of this relationship of flows to coho production is shown in figure 4.

While rearing flows are probably the most critical factor for coho salmon production, spawning and incubation flows are probably the most important for pink and chum salmon because they do not have significant juvenile rearing periods in freshwater. Because many salmon (pink, chinook, early chum, and sockeye) spawn during the low flow period of the year from August through mid-October, diversion of water often directly impacts availability of their spawning habitat. According to IFIM analysis, optimum salmon spawning flows, particularly in small to medium sized streams, are frequently in excess of the 50 percent (median flow) level used by Ecology to limit instream flows.

Keeping in mind the relationship shown in Figure 4, one can visualize the impact to coho salmon of limiting instream flows at a level somewhere in the middle of the graph. Those runs occurring during the higher flow years, the largest runs, would no longer be realized if water rights are issued to such an extent as to limit flows to the instream flow level. A fixed number of the returning adults are needed for spawning escapement. Thus the impact on that portion of production available for harvest is even greater than the impact on the total run.

Many streams have previously been impacted by consumptive water rights issued from them prior to the establishment of minimum instream flows. As long as no further water rights are granted on a stream for which instream flows have been established, no further effects result to

Figure 3


DOSEWALLIPS RIVER
FLOW AT GAGE 12-0530-00, PLUS AREA BELOW THIS GAGE CORRELATED TO JEFFERSON CREEK GAGE 12-0546-00.
C.F.S.
10000
9000
8000
7000
6000
5000
4000
3000
2000
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800
700
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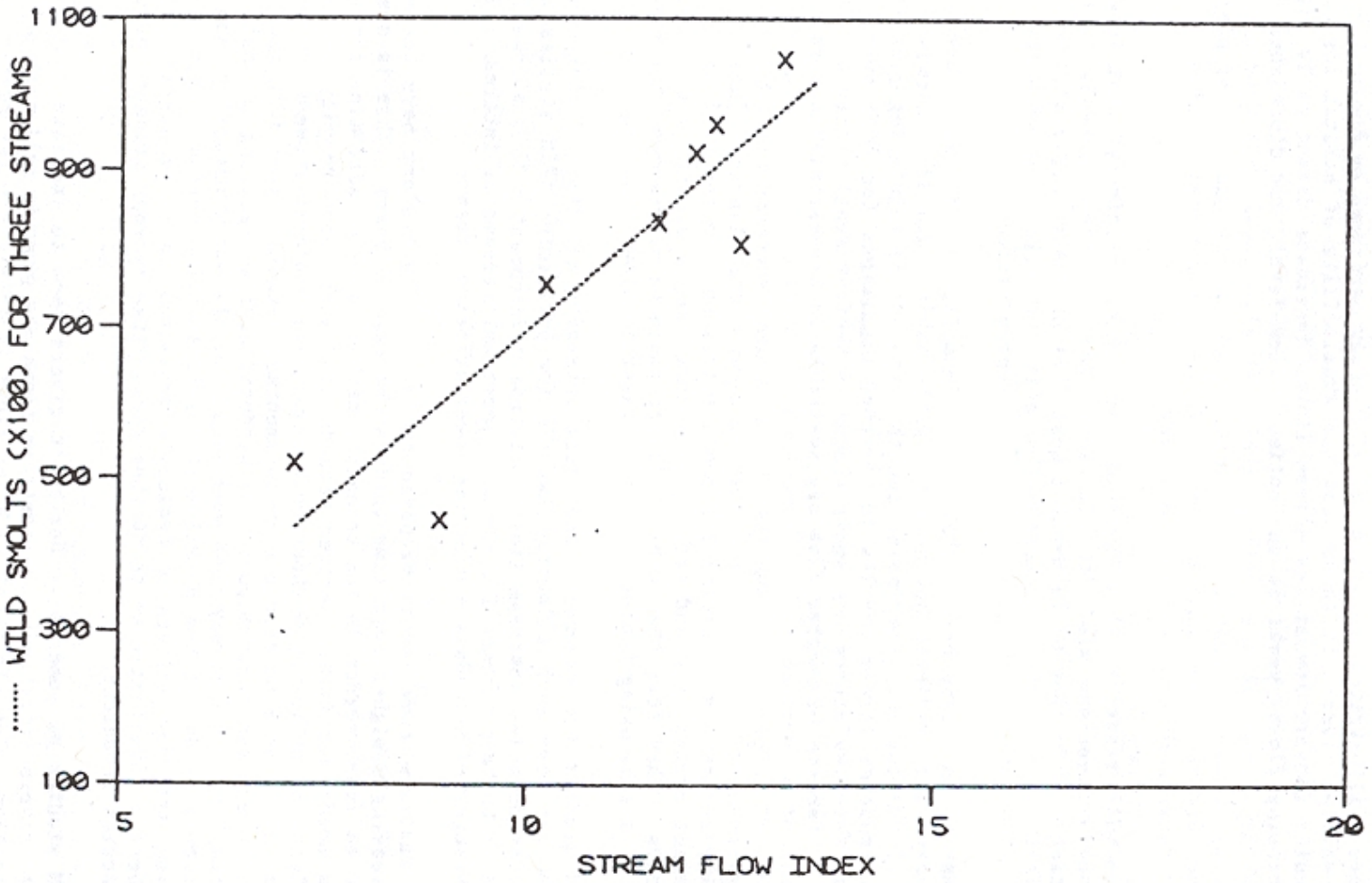
200
100
90
80
70
60
50
40
30
20
10
10% OCCURENCE
50% OCCURENCE
90% OCCURENCE
Game
Fisheries
Ecology
JANUARY
FEBRUARY
MARCH
APRIL
MAY
JUNE
JULY
AUGUST
SEPTEMBER
OCTOBER
NOVEMBER
DECEMBER

Figure 4. Combined wild coho smolt production from three streams (Little Pilchuck, Big Beef, and Mill Creeks) related to a summer stream flow index.



existing fisheries resources regardless of the level of instream flow adopted. Subsequent approval of a large water project (such as a hydropower or water supply project), involving storage and/or diversion of a significant quantity of water, or the consumptive appropriation over time of significant quantities by numerous small diversions, could result in the chronic loss of the increment of habitat between the Ecology flows and the flows recommended by Game and Fisheries. If available habitat is the critical factor limiting fish production, then average production will be reduced in that stream. Whereas, the Ecology flows may be adequate to allow the fish to continue existence in the stream, any reduction in the numbers of returning adults may affect the availability of fish for harvest in commercial, sport, and Indian fisheries.

Fisheries biology is not an exact science. Although research continues to improve our understanding of the needs of fish and the factors affecting their health, much remains to be learned. Fisheries interests argue forcefully that in the face of this uncertainty, Ecology should adopt a conservative approach when establishing instream flows.

Ecology's instream programs are reviewed every five years. Instream flow requirements may be adjusted up or down during these reviews as new information is considered. Once made, an offstream allocation (water right) remains a legal right in perpetuity, and as long as the right is exercised, it cannot easily be reclaimed by the public. If it is later discovered that inadequate flows have been set as conditions on water rights, fish production may have been reduced with no easy opportunity available to recover the water and the fish production. If on the other hand it is found that less water is needed as the state of understanding of the factors affecting instream fish production improve, instream flow levels could be lowered, making additional water available for out-of-stream uses.

Instream Flow Methods

Several methods have been developed over time for analyzing instream flow needs. The more sophisticated of these methods focus on fisheries needs and involve complex models of open channel hydraulics and the behavior of fish under varying natural conditions. The leading method currently in widespread use is the IFIM, developed by the U.S. Fish and Wildlife Service.

Use of this method involves the collection of field data on hydraulic parameters (depth and velocity) that vary with streamflow and other characteristics of the aquatic environment such as cover (items used by fish for holding and hiding) and channel substrate. Data are also collected that describe the stream-specific preferences for these parameters by fish species and lifestages to be analyzed. From the data collected, a site-specific hydraulic model is developed that evaluates the changes in depth and velocity that occur as flow is varied. Once calibrated, this model is interfaced with the fish species and lifestage preferences for the various parameters. The result of this analysis is a table showing the predicted incremental relationship between flow and available habitat for each fish species and lifestage of interest.

Figure 5 illustrates results of an IFIM study performed by Ecology on the Dosewallips River. It shows that the availability of habitat for chum spawning is very low at low stream flows, increases dramatically with increasing flows, peaks at an "optimum" flow level, and diminishes for flows in excess of the optimum level. It also shows that (for this stream) as habitat approaches the optimum level, the quantity of habitat gained diminishes per unit of increased flow. The shapes of these curves vary considerably from stream to stream.

It is with regard to this "zone of diminishing efficiency" that interagency contentions are often focused. Ecology often contends that setting a flow that would protect most (but not necessarily all) of the habitat would be the most reasonable, efficient allocation of water, and may leave water available for offstream appropriation.

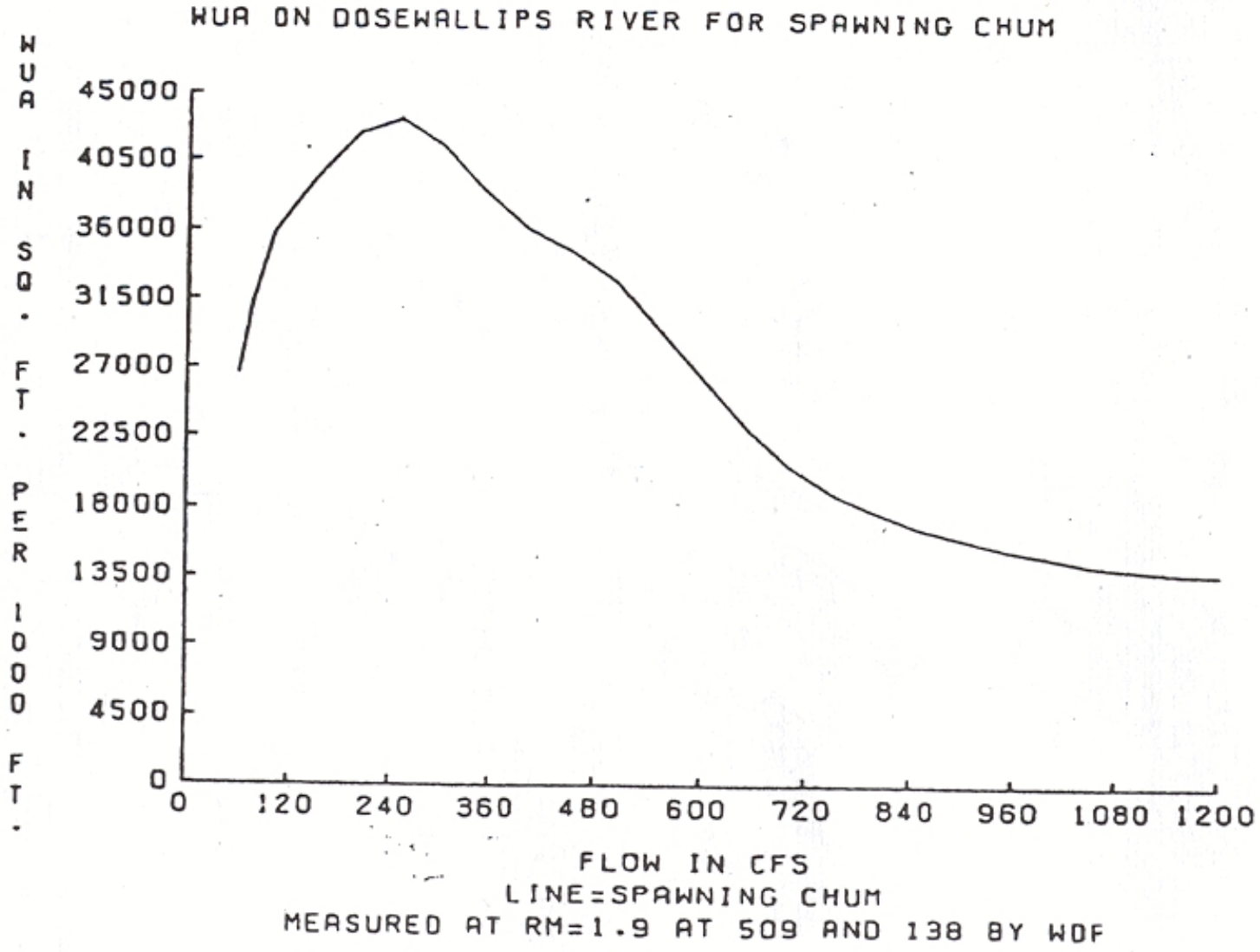
Fisheries interests prefer that the optimum flow be adopted in order to preserve all predicted potentially usable habitat for the reasons previously discussed. They point out that the act of regulating flow in a multi-species stream results in worsened conditions for some species, while favoring others. A small change in habitat availability can mean the difference in whether fish are available in harvestable numbers. The amount of production gained in excess of escapement needs can be totally harvested. They also argue that IFIM, though "state of the art," is not so precise that results can be relied upon carte blanche. They especially resist any "formula" for habitat loss because the reliability of inherent assumptions and model performance varies greatly among study streams. They fear that habitat losses could be programmed on a statewide basis by using Ecology's current instream flow standards.

IFIM studies are expensive and labor intensive efforts. Ecology and Fisheries have each allocated two FTE for performing IFIM studies to provide data for instream flow regulation development. This allows IFIM studies to be performed for the more important streams of interest. Less sophisticated methods are used for lower priority streams.

The instream flow levels proposed and adopted by Ecology have become increasingly higher over time through the last 10 years. This is due in part to improvements in the technical methods used to determine instream flow needs for fish. Earlier methods used were based heavily on the analysis of hydrology without much regard for biological needs, because those needs were undefined or undocumented. Studies using IFIM indicate that to achieve maximum potential production, fish residing in small and medium sized streams may need much or all of the water naturally available, particularly during the normal summer-fall low flow period. This information has also influenced Ecology's decisions to close significant numbers of small streams to further consumptive appropriation to protect fisheries resources.

IFIM studies on some large Northwest rivers seem to indicate that for large rivers, relatively low instream flows may provide full fish habitat protection. The effect of such low flows is less clear for rearing than for spawning, because the habitat parameters for rearing are not as well understood and are less adaptable to existing modeling techniques. A common example of this problem is the flow needed to inundate riverside channels which serve as important rearing areas for coho salmon.

Figure 5.


WUA ON DOSEWALLIPS RIVER FOR SPAWNING CHUM
WUA IN SQ. FT. PER 1000 FT.
45000
40500
36000
31500
27000
22500
18000
13500
9000
4500
0
0
120
240
360
480
600
720
840
960
1080
1200
FLOW IN CFS
LINE=SPAWNING CHUM
MEASURED AT RM=1.9 AT 509 AND 138 BY WDF

Frequently, IFIM results indicate optimum rearing flows that would be too low to put water in these side channels. The IFIM results conflict with empirical observations of well documented fish behavior and with research findings (discussed earlier) that show that the higher the flow is during the normal low flow period, the higher is the resulting coho production.

Alternative Instream Flow Standards

Alternative instream flow criteria result in varying levels of protection for instream values and varying levels of impacts on potential offstream water uses. This analysis examines three possible alternative sets of criteria for instream flows that result in a broad range of instream value protection. These three levels are labeled: a) survival flows, b) sustaining flows, and c) optimum flows.

Although instream values include many aspects other than fish, the debate over what constitutes an appropriate level of protection in Washington streams has generally centered around how much water is needed for fish life. Other stream values such as wildlife, recreation, aesthetics, water quality and navigation are also factored into the analysis, but only infrequently are they a major concern. Therefore, this discussion of instream flow criteria will focus primarily on the instream flow needs of fish resources.

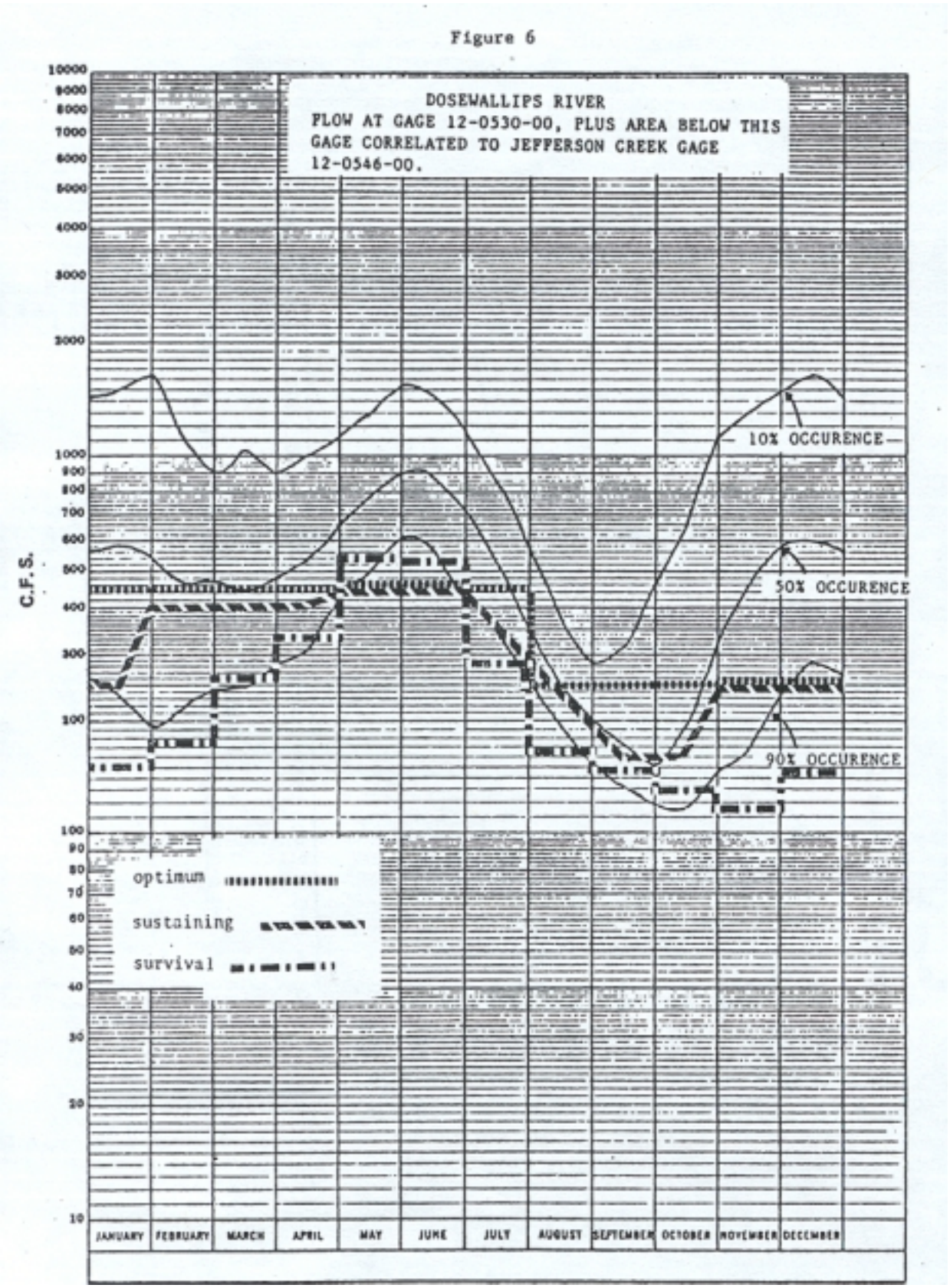
Survival Flows – The goal of a survival flow is to ensure the continued survival of a self-supporting fish population in a stream. (However, there will not be adequate production to sustain a fishery.) Solely for purposes of this analysis we have defined survival flows as the lowest monthly average flow on record for each month of the year. These are flows that fish and other instream values have historically "survived" for very short periods of time, though it is doubtful they thrived under such conditions.

Sustaining Flows – The goal of the sustaining flow is to maintain a population of fish capable of producing harvestable adults. Sustaining flows are characterized by Ecology's current instream flow establishment criteria. In its proposed flows, the department attempts to assure protection of at least 90 percent of the maximum habitat predicted to be available at the IFIM optimum flow level. Another objective is to protect at least the amount of habitat available under median flow conditions. Frequently, on small and medium sized streams, instream flows during the low flow period are limited to the 50 percent exceedance flow. Flows set using those criteria may result in a gradual reduction over time in total fish production if sufficient water is subsequently appropriated to affect stream flows significantly.

Optimum Habitat Protection Flows – The goal of this instream flow standard is the maintenance of the full range of potential fish habitat and production. This goal can be achieved by setting instream flows at the IFIM optimum flow level. This is often the rate of flow that according to incremental (IFIM) analysis would provide the maximum possible area of habitat for fish species/life stages of primary concern. Theoretically, if flows were set at this level, subsequent appropriations conditioned to these flows would have no effect on fish production owing to reduced stream flows.

Figure 6 is a hydrograph of the Dosewallips River showing alternative instream flow levels based on the three alternative standards discussed above.

Figure 6


DOSEWALLIPS RIVER
FLOW AT GAGE 12-0530-00, PLUS AREA BELOW THIS GAGE CORRELATED TO JEFFERSON CREEK GAGE 12-0546-00.
10% OCCURENCE
50% OCCURENCE
90% OCCURENCE
optimum
sustaining
survival
C.F.S.
10000
9000
8000
7000
6000
5000
4000
3000
2000
1000
900
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600
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30
20
10
JANUARY
FEBRUARY
MARCH
APRIL
MAY
JUNE
JULY
AUGUST
SEPTEMBER
OCTOBER
NOVEMBER
DECEMBER

Effects of Alternative Instream Flow Standards

Instream flows based on the three standards previously described would have differential effects on out-of-stream water uses such as municipal supply, irrigation and hydropower. Generally the higher the instream flows are set, the more constrained is the ability of out-of-stream use to develop and maintain an assured and cost effective water supply. The major effect of higher instream flow conditions is the increased frequency and duration of curtailment of out-of-stream use that is necessary to preserve the flows instream. This, in turn, substantially increases the cost of water delivery and would cause cost increases for goods and services produced from using the water.

Table 1 provides the monthly average percent likelihood of curtailment (on any day of the month) of out-of-stream use for the three instream flow standards as applied to the Dosewallips River.

These percentages were taken directly from a discharge duration hydrograph of the river, derived from daily flows recorded over a twenty-year period.

Table 1 Dosewallips River
Percent Likelihood of Curtailment
Of Conditioned Water Rights

Month	Survival	Sustaining	Optimum
Jan.	<10	25	35
Feb.	<10	40	45
Mar.	10	40	50
Apr.	10	25	35
May	20	<10	<10
Jun.	10	<10	<10
Jul.	<10	15	40
Aug.	<10	40	50
Sep.	30	45	75
Oct.	20	40	60
Nov.	<10	25	25
Dec.	<10	10	10
Year Average	11	26	36

The table indicates that the survival level standard results in the lowest annual average likelihood of curtailment (11 percent) of conditioned water rights. The sustaining level standard results in an annual average likelihood of curtailment of 26 percent. The optimum standard would have the highest annual average percent likelihood of curtailment of the three standards (36 percent). Monthly percentages range from less than 10 percent in some months for each standard to 30 percent for the survival level, 45 percent for the sustaining level and 75 percent for the optimum level (all in September).

The greatest likelihood of curtailment occurs for all three standards during the late summer and early fall natural low flow period. This is generally a critical period for water management when water is in highest demand for municipal supply and irrigation as well as for fish, water quality, recreation and other instream uses. This is normally not a critical period for hydropower, because during this period, run-of-river hydropower facilities are frequently out of service anyway, and the demand for power is low. Hydropower would be most affected by the relatively high likelihood of curtailment from January through April for both the sustaining and optimum standards. It is during this period that hydropower has its greatest value in the Northwest due to electric heating loads.

Instream flows that result in a high likelihood of curtailment discourage out-of-stream water use, and may render such use economically infeasible. Municipal water systems require a high level of reliability (they are generally designed to be 98 percent reliable in terms of water availability). Irrigation of high value perennial crops such as grapes and orchards also requires a very highly reliable water source, as these plants may die or suffer a number of years of lost or reduced production if denied water over an extended period. Small hydropower facilities can be developed successfully with an interruptible supply of water; however, high instream flows leading to frequent and prolonged curtailment reduces annual energy production capability and can render small hydropower facilities infeasible.

If no alternative water source is available for a critically needed out-of-stream use, high instream flows may ironically encourage the incorporation of reservoir storage (at considerable economic and environmental cost) in water supply projects in order to obtain a firm and dependable water supply. This is because water placed in storage during high flows need not be released to meet downstream instream flow deficits at a later time when natural flows are at a low level. A reservoir project that is subject to instream flow conditions is generally required to release only an amount of water equal to inflow to the reservoir when instream flow conditions are not being met downstream. Stored water could then be drafted to meet out-of-stream needs. (Some recent proposed reservoir projects do include instream flow augmentation as a project purpose.)

Reservoir construction has well documented environmental consequences that could conceivably outweigh the impacts of lower instream flows (that might obviate the need for such extensive storage capacity.)

Stringent restrictions on surface water development may alternatively force prospective out-of-stream water users to develop ground water as a supplemental or primary source of supply. Ground water in acceptable quantity and quality may or may not be available where the need is identified. Washington has local areas experiencing ground water overdrafting and other areas with serious natural or man-caused contamination where development of ground water is likely to be infeasible.

The effects of the three alternative instream flow standards previously described on fish habitat availability, according to IFIM analysis, are illustrated in Table 2 for anadromous fish species and lifestages of interest in the Dosewallips River. The left hand column lists the species and lifestages evaluated and approximate period of the year when they are most important to consider for establishing instream flows. The range of flows for each standard for each species/lifestage is given along with the range of habitat availability (expressed as percent of the maximum possible area) for each species/lifestage.

Table 2. Percent of Maximum Available Habitat
for Three Instream Flow Levels in the Dosewallips River

Species/lifestages (period of year)	Survival flow cfs	%	Sustaining flow cfs	%	Optimum flow cfs	%
Steelhead spawning (Jan. – June)	512-545	72-100	250-450	94-100	450	100
Steelhead rearing (Aug. – Nov. 15)	115-164	92-95	160-300	95-100	250	100
Chum spawning (Sep. 15 – Jan. 31)	115-152	85-91	160-400	93-100	250	100
Pink spawning (Sep. 1 – Oct. 31)	128-147	86-90	160-250	92-100	250	100
Chinook spawning (Aug. 1 – Nov. 15)	115-164	62-80	160-300	79-97	250	92
Chinook rearing (Aug. 1 – Nov. 15)	115-164	99-96	160-300	87-96	250	90

The table shows, not surprisingly, that the optimum habitat standard provides greater average habitat availability than the other two standards. Chinook salmon would have less than optimum habitat, but they are not among the most important species in the Dosewallips River and should have adequate habitat available to support their relatively low numbers.

Both survival and sustaining flow standard would protect a relatively high level of habitat availability during portions of the periods of species/lifestage importance. However, average habitat available would be less than 100 percent of the maximum. The sustaining flows would meet the stated criteria of providing at least 90 percent of the predicted optimum health habitat area for the four key species/lifestages of interest in the Dosewallips River (steelhead spawning and rearing and chum and pink spawning).

If a significant quantity of water was allocated to offstream use subject to these flow regimes, and if such quantity depressed natural flows to the established instream flow, then only the optimum standard would preserve the full amount of fish habitat for key species/lifestages that was available prior to the initiation of such diversions. The habitat reductions that would occur with the survival and sustaining standards could, over time, under conditions of full habitat utilization, reduce the average production level, and particularly could reduce potential year class production resulting from natural high summer flow years.

Other instream flow values including wildlife, most recreational pursuits, scenic and aesthetic enjoyment, recreational navigation, and water quality would not be greatly affected under the three flow regimes. High instream flows are generally considered desirable by kayakers and other white water sports enthusiasts. Kayaking and rafting generally have relatively short seasons when conditions are considered optimum. Reduction of natural spring freshet flows down to the levels represented by any of the three standards discussed herein for fish would probably be regarded as undesirable by white water enthusiasts.

Moderate to high flows tend to enhance the aesthetic appreciation of waterfalls, cascades and riverine views. Lower to moderate flows tend to be preferred for swimming, wading, boulder-hopping, and innertubing and canoeing. These activities occur most heavily during the summer. Very low flows could affect the ability to navigate using innertubes or canoes.

Low flows increase water travel time, and may therefore affect water temperatures during warm low flow periods. Low flows might also affect dissolved gas levels by reducing turbulent mixing of air and water, and could also encourage the growth of aquatic plants.

APPENDIX III

REPORT OF THE INSTREAM FLOW AND WATER ALLOCATION ADVISORY COMMITTEE

To the Washington State Department of Ecology

by Janet Chalupnik, Chair

December 15, 1986

SUMMARY

This report documents the work performed by the Instream Flow and Water Allocation Advisory Committee. The committee was established by the Department of Ecology to assist in the sorting and evaluation of many difficult instream flow and water allocation issues currently facing the department. Unfortunately, the committee was unable to agree on a comprehensive resolution to these issues. However, the committee did discuss a number of promising potential solutions that Ecology should further evaluate.

BACKGROUND

Following is a brief description of the events leading to the formation of the committee and the process the committee followed in its work. The committee worked closely with staff members of the Water Resources Program, who provided materials and presentations for the committee.

In early 1986, Ecology's Water Resources Program initiated a comprehensive review of its surface water resources planning program. The planning program is based on The Water Resources Act of 1971 (Chapter 90.54 RCW), the Minimum Water Flows and Levels Act (Chapter 90.22 RCW) and the Water Resources Management Program regulation (chapter 173-500 WAC adopted in 1976). There have been no significant changes in the program since 1979 when Ecology issued a Program Overview and Environmental Impact Statement for the Western Washington Instream Resources Protection Program. Since then, the department's emphasis has been on establishing instream flows on a basin by basin basis.

In recent years instream flow statutes, policies and procedures have been scrutinized and have become a continuing source of controversy both legislatively and administratively, and occasionally in the courts as well. Neither existing instream flow statutes nor regulations provide adequate definitions for key water resource terms and concepts embodied in the law. Much of the ongoing conflict is the result of differing interpretations of statutory language.

In September, 1985 the State Ecological Commission advised against adoption of Ecology's proposed instream flow regulations for the Skokomish-Dosewallips Water Resource Inventory Area because its members believed the regulations would not be protective enough of the pristine streams in the east Olympics area. In response to public concerns, the state Ecological Commission sponsored a public instream flow workshop in November, 1985. Workshop participants and Ecology staff identified 37 major issues that have caused difficulties among interest groups and the agencies involved in setting instream flows. Ecology Director Andrea B. Riniker established a commitment to address these issues through a comprehensive administrative review of the instream flow and water allocation program.

Following the workshop, Ecology developed a work plan for the program review which called for the establishment of an advisory committee. In February, 1986, the department appointed a 20 member Instream Flow and Water Allocation Advisory Committee to discuss the issues raised at the workshop. (See attached for list of members). Janet Chalupnik was asked to serve as chairperson for the committee. The Advisory Committee was to assist Ecology in evaluating issues and identifying alternatives. It would also make recommendations to Ecology on how to best design and implement the instream flow and water allocation program.

Concurrent with the Advisory Committee's discussions, Ecology's water resources staff began scoping a programmatic Environmental Impact Statement (EIS) for the program. Ecology's Water Resource Program staff consulted with the Advisory Committee regarding the scope of the proposed program review EIS. Water Resources staff indicated that Advisory Committee recommendations would be incorporated into the EIS alternatives.

Over the last eight months, the Advisory Committee has held five meetings during which they discussed the instream flow and water allocation issues. These meetings were open to the public, and notices were sent to those persons and organizations on Ecology's program review mailing list. The 37 issues identified at the November 1985 workshop were synthesized into 10 "issue clusters" to make Ecology's and the Committee's work more manageable.

During the first Committee meeting on April 10, 1986, the committee agreed on ground rules under which it would operate. One important rule was that there would be no voting, and the group would operate on a consensus basis. (It was recognized there might be irreconcilable differences on some issues) Another ground rule was that existing water rights were not to be affected by any solutions the committee might recommend.

Ecology staff presented issue papers and an outline of possible solutions to the issues, and answered general from the Committee. The committee made recommendations regarding the scope of Ecology'' proposed environmental impact statement.

The second committee meeting on May 8, 1986 had three objectives to agree on the scope of the committee's work; to review the alternatives outlined by Ecology at the first meeting; and to agree on a process to reach consensus on recommended solutions to the issues. In addressing the first task, the Committee used an issue ranking sheet, devised by Ecology staff, to determine issue priorities for discussion. Out of the ten issue clusters (covering 37 issues) the Committee decided to focus its attention on the following priority issues and defer discussion of the others until later if time allowed:

Planning scope:

Should the state's water allocation planning be done on a statewide, regional, or local basis or a combination of these?

Should different instream flow standards for be used for different streams?

Instream Flow Standards and Process:

What should be the appropriate level for stream flows?

Water Allocation Policies and Procedures:

How should instream flow requirements be balanced with new water rights issued in the future?

Maximum Net Benefits:

Should a maximum net benefits test include economic factors only or should it include social and environmental indicators as well?

What level of instream flow (if any) should be subject to a maximum net benefits test?

To work toward a consensus on solutions for these issues, the Committee divided into five interest-based subcommittees (fisheries, non fish instream, instream development, municipal and industrial and agriculture). Each group was asked to independently formulate an ""deal" water resource allocation program around the issues listed above. They were asked to devise an instream flow and water allocation program they thought could be acceptable to the other interests represented by the committee. Ecology was also asked to draft three alternatives representing the "status quo," "environmental," and "development" viewpoints. The intent of this work was to determine if there was common ground among the interests on which a comprehensive solution could be based.

The Committee met for the third time on June 11, 1986 to discuss the subcommittee alternatives. To help the Committee review each other's ideal programs Ecology presented a matrix of the issues and the recommendations of each subcommittee. The matrix proved helpful in understanding what each subcommittee wanted as a solution to each issue, but no consensus could be reached on which program or mix of programs was the most acceptable.

It was apparent that consensus would be difficult in such a large group, so it was greed that each subcommittee would nominate a representative and an alternate to participate in a smaller work group. The work group was charged by the larger committee to recommend solutions to the issues that could be considered for adoption by the larger committee. The work group met twice before the fourth meeting and discussed a number of solution concepts. The most significant and promising concept aired was the idea that Ecology should broaden its water allocation planning by using a three tiered planning approach. The work group also discussed the issue of interim procedures for new water right requests during the planning process. No consensus was reached on a set of recommendations to the larger committee.

In the fourth meeting on August 1, 1986, the committee was briefed on the work group's efforts. Again no comprehensive consensus on solutions was reached, but Committee members agreed to defer some issues and focus on: the scope of planning, levels of instream flows and application of maximum net benefits. The committee did agree to the following recommendations:

- Definitions of key terminology should be developed and incorporated into administrative rules.
- Ecology should develop statewide priorities and policies to guide state water resource planning.
- Ecology should develop a list of priority basins and streams that it would address first during statewide planning.

The committee also discussed but did not fully agree on the following general proposals:

- No new water resources legislation would be submitted by any party during the 1987 session.
- Support for an Ecology budget increase for water resource planning.
- The need for interim procedures for new water right requests during planning.

The Committee met for the final time on September 4, 1986. Ecology staff presented educational information on the water rights process and a possible three tiered planning process. A major portion of the meeting was devoted to a survey designed by Ecology to assess the Committee's opinion about the three key issues. Some Committee members had difficulties with the survey because they felt it excluded some concerns. In addition, key definitions and concepts contained in the survey had not been fully discussed and approved by the Committee.

With the understanding that there were several reservations about the survey, the Committee completed the survey during the meeting. The tentative results showed:

1. Consensus on the need for a three tiered planning process.
2. No consensus on the level of instream flows, and whether different instream flow standards should be used on different streams.
3. No consensus on whether to apply a maximum net benefits test for the setting of instream flows.

The Committee had many questions and explanations of their own while completing the survey. Rather than officially agreeing with the tentative results arrived at during the meeting, the Committee decided to take the survey back to their respective organizations, discuss it and return it to Ecology. The survey and comment letters were to provide the basis for the development of this report on the committee's work. Almost all committee members returned a survey.

RECOMMENDATIONS

I have reviewed the committee submittals and was present at all of the committee meetings. Following is my sense of the recommendations that would be supported by most of the advisory committee members. These are arranged by issue cluster per Ecology's issue papers.

I. Planning Approach and Scope

Generally, Ecology should broaden its scope of planning beyond the current emphasis on instream flows, although establishing instream flows should remain one of the central objectives of the water allocation program. A more comprehensive approach should assess needs for both instream and out-of-stream uses. Ecology should consider long term needs for all uses, and should devise strategies for quantifying, verifying, and meeting future demands.

Ecology should adopt a hierarchical three tiered planning process. This would involve first establishing statewide policies, procedures, priorities and definitions; then making regional assessments of existing water use, future needs and water availability, and general stream by stream use preferences; and finally adopting basin-specific instream flows, allocations and reservations for future use. Regional and basin plans need to be closely coordinated with ongoing resource planning by other agencies and local government. Regulations and policies at all three levels should be reviewed periodically.

About half of the committee, especially municipal water users, strongly supported the concept of different instream flow standards for different streams, depending on the value of instream resources and out-of-stream needs in streams as determined in the three tiered planning process. This concept would allow Ecology to fully allocate water to instream values on some very valuable streams for instream use. Conversely, Ecology could set lower instream protection levels on other steams whose waters could then be allocated to out-of-stream uses. Instream use interests are uncomfortable with this idea because they feel that instream values will be harmed if there is less than full protection for even a limited number of streams. Concern was expressed by some water users and instream interests that this would result in inequitable treatment of people interested in different streams.

Another concept discussed, but not agreed on, is the idea of meeting future municipal demands from one of the larger rivers in the Puget Sound region through a regional interbasin transfer project. Some believe that larger streams are better able to satisfy diversions without harm to instream values.

Some committee members believe that Ecology should document and protect intangible instream flow values, waterfalls and other exceptional stream reaches. Methods should be developed for assessing the flow needs of these values. Some support was expressed for full preservation of scenic stream segments. It was suggested this be done by establishing closer linkages to the State and Federal Wild land Scenic Rivers programs, and by providing full protection against development for streams listed in the Nationwide Rivers Inventory as having outstanding characteristics.

II. Instream Flow Standards and Process

Ecology should not allow any stream to be dried up by future appropriations. However, no clear committee consensus or preference was reached on the level of flow that should be preserved. As noted above, some support (but no consensus) was expressed for the concept of different instream flow standards for different streams.

Ecology should seek to clarify key terms and concepts in existing instream flow laws through administrative or legislative action. Undefined terms used in the context of instream flows include “minimum flows,” “base flows,” “protection,” “preservation,” “maintenance,” “where possible enhance,” “overriding considerations of the public interest,” and “maximum net benefits.”

The current practice of capping instream flows with the 50 percent exceedance flow is unacceptable to some committee members. On the other hand, other members object to instream flows being set above a low “survival” level without an analysis of maximum net benefits to the people of the state.

Many (but not all) on the committee would like to see the concept of different instream flow standards for different streams evaluated as an alternative in Ecology’s Draft EIS. Criteria for instream flows should be determined through legislative or administrative action (as part of the statewide planning recommended in Issue Cluster I above).

No agreement was reached on the issue of who should have the burden of proof for determining the level at which instream flows should be protected. Ecology should address this issue in future efforts.

Ecology should attempt to improve instream flow conditions on overallocated streams without impacting existing water rights.

III. Water Allocation Policies and Processes

The committee agreed that existing water rights should not be affected by Ecology’s water planning programs. Most of the issues in this cluster are very specific, and somewhat technical water right matters that the committee did not spend much time on.

The committee did discuss two issues from time to time: instream flow exemptions and waivers, and stream closures. The committee generally agrees that Ecology’s current and past practice of exempting small, individual diversionary consumptive uses should be discontinued. Ecology should adopt rules to implement the temporary waiver provision for instream flows (criteria for invoking “overriding consideration of the public interest”) in the Water Resources Act of 1971. The Committee supports development of criteria for temporary instream flow waivers on the basis of health emergencies. The Committee believes that only temporary waivers should be considered; permanent waivers were not supported.

As with high instream flows, stream closures limit future water source options and in effect allocate any remaining water to instream flows. Closures may be an appropriate action to protect existing rights and instream flows, to protect

the public interest, or to recognize that no water remains available for appropriation. Criteria for stream closures should be established by rule.

IV. Data and Technical Analysis

Ecology should improve its data collection and analysis capabilities and procedures. Data collection should be scheduled well in advance of the start-up of regional or basin planning. Some committee members doubt the reliability of Ecology's existing water rights information system in determining the level of existing use from a stream. Ecology should assemble a technical advisory committee consisting of agency and non-agency representatives to assist in it improving data collection and analysis procedures.

V. Maximum Net Benefits

The committee did not fully agree on very much in this issue area. Water use interests generally support the use of an economic test to determine water allocations, including the establishment of instream flows above a minimal level. Fish and environmental interests fear such a test would be biased toward developmental uses of water to the detriment of instream values. Most committee members agreed that as long as the provision exists in the law, Ecology should establish, by rule-making with full public review, criteria, methods and procedures for the maximum net benefits test incorporating both socioeconomic and environmental factors. Some would prefer that it be replaced with a public interest test that would include these factors.

No agreement was reached on the critical issue of which level of instream flow (if any) should be subject to a test of maximum net benefits. Some water use interests advocate use of the test for any allocation, including instream flows, above a "survival" (low) level of instream flow. Fish and environmental interests would generally accept use of the test for allocations in excess of the "optimum" (high) instream flow level. If maximum net benefits is to be a viable management concept, this is a key issue that must be resolved, perhaps through legislation or an in depth study followed by administrative regulations.

A few members advocate elimination of the concept of maximum net benefits from the law, because they believe that it will not be possible to fairly incorporate intangible values in the analysis. If the concept is retained, some way of incorporating intangible values must be found.

VI. Conservation

Ecology should develop an effective water conservation program as an integral part of both its water resource planning and water appropriation functions. Additional legislative authority should be sought if necessary, and administrative rules should be adopted to establish standards and procedures. Existing water rights should be recognized. Water made available by conservation should be allocated to priority instream or out-of-stream needs in accordance with the regional and basin plans affecting the stream. Water users advocate that conservation principles apply to instream as well as out-of-stream allocation and use.

VII. Public Involvement and Information

Ecology should develop a public involvement and information plan for the instream flow and water allocation program to encourage greater public participation in the three tiered planning framework recommended above. The public, including landowners, needs better notification of participation opportunities. Regional and basin citizen advisory committees should be considered during the scoping of planning activities. Ecology should consider establishing public involvement guidelines by administrative rule.

VIII. Interagency Coordination

Improved coordination is needed between Ecology's water resource planning and the resource planning being done by other agencies and local government. Ecology should attempt to foster the integration of various planning efforts so that they do not work at cross purposes and confuse the public.

IX. Federal and Indian Reserved Water Rights

Because unquantified reserved right claims are a major uncertainty for existing and future water rights and instream flows, Ecology and the claimants should seek to determine their validity and to quantify them. No consensus was reached on whether unquantified reserved rights should be incorporated in the water resources planning process, or how this could be done.

X. Enforcement

This issue area was not discussed in detail, but members generally recognize and support Ecology's current efforts to improve enforcement of its instream flow regulations and water right provisions. Continued improvements and emphasis in enforcement are supported by the committee.

APPENDIX IV

FISCAL IMPACT ASSESSMENT

INTRODUCTION

Five alternatives are analyzed in this environmental impact statement. Because they vary in terms of complexity, they also vary in terms of what would be required to implement them. In order to fully evaluate these alternatives, it is necessary to consider the costs of implementing each of them. This comparison of costs is intended to provide a general idea of which of the alternatives would be most expensive to implement and which would be least expensive. Absolute dollar values are estimates of costs based on current costs of staffing. Direct costs such as salaries, benefits, goods and services, equipment, and travel are included.

The estimated indirect costs of supporting increased staff levels are also identified. As a general rule, an additional .12 FTE is required for every full FTE of staff and an additional .482 of the salary is required for indirect expenditures related to that staff person such as telephone service, rent, word processing, data services, etc.

In addition to the direct and indirect expenditures, the agency incurs one-time costs when new positions are created and filled. For example, as the staff increases, new cars must be purchased. The need for other equipment such as personal computers and office partitions also increases. These one-time start-up costs are now estimated at $6,500 per new position.

Assumptions

As in any analysis of this type, certain assumptions are necessary so that the comparison is meaningful and understandable.

1) Current staffing for the Instream Flow and Water Allocation Program is assumed to be 5 FTEs (full time equivalents). In reality, this includes parts of more than five people's time but is equivalent to five people working full time. Total direct costs for this activity are approximately $207,000 per year. Indirect costs would increase these figures to 5.6 FTEs and $280,000.

2) Costs of the various alternatives are compared to the existing level of staffing. Therefore, the existing level of staffing is treated as zero cost, even though it actually includes 5 FTEs and $207,000 per year in direct expenditures.

3) The estimates are intended to give a general idea of the relative costs of implementing the five alternatives. The dollar amounts are approximate and should not be relied upon as fully accurate for accounting purposes.

4) All estimates are based on what is required for implementation of the alternative at a reasonable level. Higher levels of staffing would, in most cases, increase the rate of implementation of the alternative but would also increase the costs.

5) Increased staffing would generally require funding by the Legislature. It is assumed that such funding would be equally available for each of the alternatives discussed.

ALTERNATIVE 1: NO ACTION (STATUS QUO)

This alternative would maintain Ecology's current policies and programs which focus on the preservation of instream flows intended to protect at least 90 percent of the fish habitat available at the "optimum" flow for fish and provide a sustaining flow for other instream values.

Estimated Costs of Implementation

As stated above in the assumptions, this alternative would not require any additional staffing or funding. Therefore, for the purposes of this comparison, there is no cost.

It should be noted that implementation of this alternative at an increased level would require staffing and funding increases.

ALTERNATIVE 2: OUT-OF-STREAM USE EMPHASIS

This alternative would maximize the availability of secure supplies of water for future out-of-stream use while maintaining survival levels of instream flows for fish and other instream values.

Estimated Costs of Implementation

This alternative would be accomplished at existing staff levels. Although the thrust of this alternative is quite different from the current policies and programs, the existing staff could be utilized to accomplish many of the extensive changes in existing laws and agency regulations that would be required for implementation. Therefore, this alternative would have no costs.

It should be noted that implementation of this alternative at an increased level would require staffing and funding increases.

ALTERNATIVE 3: INSTREAM PROTECTION EMPHASIS

This alternative would maximize the preservation and enhancement of instream resources.

Estimated Costs of Implementation

This alternative would require increased staffing for several activities. First, there would be a need for increased studies of instream flow requirements to determine the optimum flow levels for the various streams and stream reaches. This would require an additional Fish Biologist 3 at an estimated annual cost of $37,000. Because of the extensive amount of consultation and coordination that would be required by this alternative, an additional Environmental Planner 2 would also be required at an estimated annual cost of $39,000. This position would also be required to help develop the necessary statewide policies on issues such as conservation and maximum net benefits determinations. Additional regional staff would also be required to pursue a more active relinquishment program, water right transfers, purchases or condemnation of existing water rights, and the processing of water rights with increased emphasis on instream resources protection. This would necessitate the hiring of 4 Environmentalist 2 positions (one for each region) at an estimated annual cost of $142,000.

Total direct costs for this alternative would be approximately $218,000 per year. Indirect costs and the one-time start up costs would increase this total by about $138,000 for a total cost (direct + indirect) of approximately $390,000 per year.

It should be noted that implementation of this alternative at an increased level would require additional staffing and funding increases.

ALTERNATIVE 4: BALANCED ASSESSMENT AND ALLOCATION

This alternative would provide for a balanced assessment of needs and a balanced allocation of water among instream and out-of-stream uses.

Estimated Costs of Implementation

This approach would require the use of a three-tiered planning approach that would involve statewide, regional, and basin planning levels. Based on previous experience in water resources planning, it is estimated that, at present staffing levels, it would take about 1 year to complete the first tier of statewide activities. Following that, it would require about 2 years for development of a regional program followed by an additional year to develop basin-specific programs and policies. In other words, work could not be completed for any given region of the state for at least 4 years with work on successive regions being accomplished every 3 years thereafter. If the state were to be divided into seven or eight regions, it would require approximately 30 years to complete this planning process. Therefore, although it can be done at existing levels of staffing, additional staff would likely be required to speed up the process. While an increase in staffing would not be expected to significantly speed up the process in any one region, it would allow work to proceed concurrently in more than one region. Therefore, under the scenario described above, the time required to complete this process for the entire state could be decreased from 30 years to 15 years by doubling the staff.

If the current headquarters staff level of 5 FTEs were to be doubled to 10 FTEs, the following costs can be anticipated. Direct costs would be about $207,000. In addition, increased water rights activity for transfers and increased enforcement would also require additional regional staffing. This would necessitate the hiring of 4 Environmentalist 2 positions (one for each region) at an estimated annual cost of $142,000. Total direct costs would be about $350,000.

Indirect costs (including the one-time start up costs) of about $182,000 would increase the costs of this alternative to about $531,000 per year.

ALTERNATIVE 5: COORDINATED RESOURCE PLANNING

This alternative would provide for instream flow protection at a level that is consistent with the policies and management of instream resources by those agencies with primary responsibility for fish, wildlife, recreation, scenic and aesthetic, water quality, navigation, and other environmental values.

Estimated Costs of Implementation

In order to ensure consistency with the water resources planning and management efforts of other agencies, Ecology would have to increase its coordination role. The existing staff could likely handle a good deal of the workload, including development of regional water assessments, improvements to the data base for instream flow and water allocation decisions, and development of a conservation program. However, the increased coordination and public involvement activities would likely require the addition of one Environmental Planner 2. This would cost approximately $39,000 in direct costs and about $19,000 in indirect costs (including one-time start-up costs of $6,500).

In addition, increased enforcement of water right conditions and improved water rights implementation would require hiring one Environmentalist 2 for each of the four regional offices. This would result in direct costs of approximately $142,000 and indirect costs (including the one-time start-up costs) of $78,000. The total direct cost of this alternative would be approximately $181,000 and the total indirect costs would be about $97,000. Total costs would, therefore, be about $278,000 per year.

ALTERNATIVES COST COMPARISON SUMMARY
INSTREAM FLOW AND WATER ALLOCATION ALTERNATIVES
DRAFT EIS

Alternative Number	New Position(s) Required	Direct Costs	Indirect Costs	Total Costs	
1	None	N.A.	N.A.	$0	$0
2	None	N.A.	N.A.	$0	$0
3	1-Fish.Bio. 3	$38,000	$19,000	$57,000	
	3-Env. Planner 2	$132,000	$63,000	$195,000	
	5-Env. 2	$178,000	$97,000	$275,000	
	TOTAL COSTS	$348,000	$179,000	$527,000	$527,000
4	4-Env. Planner 2	$176,000	$84,000	$260,000	
	4-Env. 2	$142,000	$78,000	$220,000	
	TOTAL COSTS	$318,000	$162,000	$480,000	$480,000
5	2-Env. Planner 2	$132,000	$63,000	$195,000	
	4-Env. 2	$142,000	$78,000	$220,000	
	TOTAL COSTS	$274,000	$141,000	$415,000	$415,000