A GUIDE TO INSTREAM FLOW SETTING IN WASHINGTON STATE

WASHINGTON STATE DEPARTMENT OF ECOLOGY

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A GUIDE TO INSTREAM FLOW SETTING IN WASHINGTON STATE

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DEPARTMENT OF ECOLOGY
WATER RESOURCES PROGRAM

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Fact Sheet

Title:	A Guide to Instream Flow Setting in Washington State
Description:	This document is intended for use by watershed planning and other groups developing recommendations for instream flows for water bodies within Washington State. The document discusses the existing statutory requirements, how to assess instream flow needs and develop instream flow recommendations, and finally the rule-making process itself. Common assessment methods are also examined.
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SUMMARY

This guidance document provides an overview of the issues involved in the process of setting instream flow levels in Washington State. It is designed to assist watershed planning groups and others who are developing instream flow recommendations for specific watersheds, including:

- those involved in watershed planning under Chapter 90.82 RCW (commonly referred to as the "2514" process: ESHB 2514 was the bill in the 1997 legislative session that established the 2514 or watershed management planning process),
- groups working on instream flows outside the 2514 process, and
- state agencies, including the Department of Ecology (Ecology) and the Department of Fish and Wildlife (WDFW).

The term "instream flow" refers to a stream flow regime adopted as a rule. Once formalized, it is used for two primary water management purposes: to determine whether water is available for new out-of-stream uses and regulate those new uses, and to define the stream flows that need to be met in the stream.

This instream flow guidance document is necessarily general in nature, since each watershed has its own unique set of circumstances. It is non-prescriptive and is intended as a starting point for groups entering into flow discussions.

This document:

- Provides an overview of the state legal requirements pertaining to instream flows,
- Describes how to assess instream flow needs,
- Discusses ways to develop an instream flow recommendation, and
- Reviews the state rule-making process, including unique requirements for adopting rules developed through the 2514 process.

The most common instream flow assessment methods are discussed in Appendix A, to assist groups in determining how to gather stream-specific information. Also included in the appendices are excerpts of relevant statutes, a sample instream flow rule and an extensive list of additional resources.

This document focuses only on the development of instream flow recommendations; it is not intended to address all the related issues involved in planning the future of water management in a watershed. It does not discuss factors that watershed groups should weigh in determining whether to undertake the establishment of an instream flow rule, nor does it discuss the actual implementation of an instream flow

rule. Ecology is currently preparing an environmental impact statement – EIS – to address watershed planning and management issues, of which instream flows are a part. That document, entitled "Statewide Non-project Environmental Impact Statement for Watershed Planning under Chapter 90.82 RCW," is expected to be released in draft form in March 2003.

I. INTRODUCTION

1. A review of terminology

There is a difference between a general understanding of the term "instream flow" and its legal and regulatory meaning. While one might assume the meaning to be "the amount of water flowing in a stream," this description is too general for legal use, since flows can fluctuate widely. In this document, a distinction is made between the terms "stream flow" and "instream flow," as discussed below.[1]

The amount of water in a stream, at any point in time, is influenced by many factors, including:

- recent rainfall
- snow or glacial melt
- temperature
- vegetative cover
- characteristics of the soil and geology
- amount of water moving through the soil (ground water) and feeding into the stream
- human activities (including land use and diversions).

Seasonal fluctuations are common, often with more water, higher levels and faster flows in the winter or spring months, and less water, lower levels and slower flows in the summer and fall months. Flows also vary from place to place along the stream: at narrow points of the channel the water may be fast moving, whereas at a wide point in the stream the same amount of water may move quite slowly. In this document, the amount of water found in a stream at any given time is referred to as "*stream flow*."

The term "*instream flow*" is used to identify a specific stream flow (typically measured in cubic feet per second, or cfs) at a specific location for a defined time, and typically following seasonal variations. Instream flows are usually defined as the stream flow needed to protect and preserve instream resources and values, such as fish, wildlife and recreation. Instream flows are most often described and established in a formal legal document, typically an adopted state rule. Once defined, an "instream flow" is used for water management decisions, including regulatory decisions regarding whether additional water can be appropriated for future uses, and to define what flows need to be met in the stream. An instream flow can be described as a water right for the instream resources and values the stream supports.

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[1] In this document, the terms "stream" and "river" are used interchangeably. Thus, flows are referred to as "instream" flows although such flows apply to both rivers and streams.

In this document, the term "instream flow" is considered to be the same as the terms "minimum instream flow" and "base flow." These terms are derived from existing laws, which are discussed further in Chapter 2 of this document.

2. Why are stream flows important?

Adequate stream flows are important for many reasons. Flows affect the overall health of aquatic systems and related stream functions. For example, stream flow is a crucial determinant in the health of fish stocks. Fish feed on insects drifting in the currents. Young salmon are carried along by flowing waters. Low summer flows can result in a reduction of spawning habitat and therefore fewer fish. As flows subside during the summer, shallower depths increase a fish's vulnerability to predators. Less water heightens competition for food. Fish can be stranded if the water continues to recede.

Stream flow is an important aspect of water quality. In Washington, more and faster flowing water generally means higher oxygen levels and cooler water temperatures (although other factors are involved). Adequate oxygen and cool water are generally needed by many fish, including salmonids. Reduced flows can also lead to higher concentrations of pollutants that are discharged to a stream. If the amount of water is reduced, but the amount of the pollutant is not, pollutant levels can rise above accepted state water quality standards. This is why stream flows are considered when Ecology processes water quality permits.

Wildlife depend on adequate water supplies. Many wildlife species are stream or riparian dependent ("riparian" refers to aquatic systems with flowing water - e.g. rivers, streams, springs - as well as the adjacent areas). If stream flows are reduced, the associated riparian vegetation may change as well.

Sufficient stream flows are also required to support fishing, recreation, stockwatering, navigation, irrigation and other uses of water. Stream flows contribute to the scenic and aesthetic qualities of natural settings and they influence ground water levels, as well as other surface water bodies (e.g., wetlands, lakes, and ponds).

High flows have their own role in supporting a healthy stream. High flows rejuvenate the channel: for example, they affect its shape, clean out debris, impact streamside vegetation, create habitat and provide food sources for some species. Numerous ecological processes are directly regulated by flows that vary over time, including high flows.

3. Why set instream flow levels?

There are three primary reasons for setting instream flows. Until a decision is made on what stream flows are needed in the stream to protect fish and other instream resources, it will be difficult to know if there is any water to allocate for future out-of-stream needs. Secondly, if stream flows are a limiting factor for salmon production in a watershed, it will be problematic to plan for salmon recovery until instream flows are set and achieved. And finally, knowing what stream flows are needed helps to determine whether to invest in conservation, storage and other measures to meet out-of-stream and instream needs. Setting instream flows defines the stream flows needed to protect instream resources and values, and therefore provides the key benchmark for future water management decisions.

4. Overview: the process of recommending an instream flow

The following list is designed to provide planning groups with an introduction to the general steps leading up to developing an instream flow rule. Although it is presented as a series of sequential steps, the actual process may be linear, iterative, or with steps occurring simultaneously. (While the following list assumes that no instream flows are set, it can also be used when reviewing an existing rule.) The rest of this document examines this overall process in more detail.

- Identify all statutorily protected instream resources or values present in the stream.
- Gather and evaluate existing watershed-specific information on instream resources, hydrology, diversions, existing water rights, applicable historical information, etc., as well as other factors which may limit instream resources.
- Determine how to evaluate stream flows for the resources identified, including any additional information that is needed.
- As needed, conduct studies to determine what stream flows are needed to protect instream resources and to evaluate past, current and the potential future hydrology in the basin.
- Review and evaluate study results to determine the stream flows needed to protect and preserve the identified instream resources and values.
- Evaluate current and future water uses, including both instream and out-of-stream uses.
- Consider management alternatives to meet instream and out-of-stream needs.
- Develop an instream flow recommendation, through the local evaluation and decision process, that protects instream resources.
- Develop and propose a rule to establish the instream flow.

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II. STATUTORY FRAMEWORK FOR INSTREAM FLOWS

This chapter examines the statutory provisions related to establishing instream flow rules. It summarizes the statutes in the Revised Code of Washington (RCW) that frame the task of establishing instream flow rules, focusing on the two statutes that provide the substantive requirements for establishing instream flows. While geared towards those groups making instream flow recommendations under Watershed Planning, Chapter 90.82 RCW, this discussion is equally pertinent to those working outside the watershed planning process, as well as those in Ecology and WDFW developing instream flows.

Statutory requirements related to the procedures for creating a rule under the Washington Administrative Code (WAC) are described in Chapter 5 of this document. The text of the RCW sections cited in this chapter can be found in Appendix B.

Watershed Planning, Chapter 90.82 RCW

Chapter 90.82 RCW provides the statutory framework for current watershed planning. It contains a number of requirements related to instream flows and, as discussed below, defines instream flows based on RCWs 90.03, 90.22, and 90.54.020(3)(a).

Sections 040 and 060 of Chapter 90.82 RCW require the governments initiating the watershed plan to decide whether or not they will develop recommendations for instream flows. If there is no existing instream flow rule for the watershed, the initiating governments must decide whether to collaborate with Ecology and the planning unit to set instream flows or whether they will leave this task to Ecology. If there is an existing instream flow rule for the basin, the initiating governments must decide whether or not to request that Ecology modify the existing rule. Section .080 outlines the procedural requirements for developing and recommending instream flows through watershed planning.

Section 070 describes the water quantity element of watershed planning, which is a required element for plans developed under this act. This section requires that the watershed assessment include "an estimate of the surface and ground water available for appropriation, taking into account the minimum instream flows adopted by rule or to be adopted by rule under this chapter for streams in the management area including the data necessary to evaluate necessary flows for fish." The section also requires watershed plans to address strategies "for increasing supply water in sufficient quantities to satisfy the minimum instream flows for fish and to provide water for future out-of-stream uses."

This statute defines the term "minimum instream flow" as "a minimum flow under chapter 90.03 or 90.22 RCW or a base flow under chapter 90.54 RCW." Similarly, the act requires that the instream flows be "in accordance with RCW 90.54.020(3)(a) and chapter 90.22," and that watershed plans not "conflict with existing statutes." Thus, to determine the requirements for instream flows under Watershed Planning, it is necessary to look to the existing requirements for minimum instream flows under Chapters 90.03 and 90.22 RCW, and for base flows under Chapter 90.54 RCW.

Water Code, Chapter 90.03 RCW

Section 247 recognizes that Ecology is given the exclusive authority for setting instream flows based upon the authority of Ch. 90.03, 90.22, and 90.54 RCW. In establishing "minimum flows and levels," Ecology is required to consult with the departments of Fish and Wildlife, Community, Trade, and Economic Development and Agriculture, and affected Indian Tribes.

Section 345 provides instream flows adopted by rule the status and protection accorded to water rights, with priority (the effective date) as of the date of rule adoption. Ecology's authority to establish flows under Ch. 90.22 and 90.54 RCW is also recognized. (Note: Priority dates accorded to instream flows created through the 2514 process will generally have a priority date of two years after funding is first received.)

While the Water Code provides basic guidance on the process for setting instream flows, it in turn refers to Ch. 90.22 and 90.54 RCW for the substantive requirements for establishing such flow rules.

Substantive Statutory Requirements for Instream Flows

The substantive statutory requirements for establishing an instream flow rule are contained in two chapters of the Washington code: Chapters 90.22 and 90.54 RCW.

Minimum Water Flows and Levels Act, Chapter 90.22 RCW

Section 010 says that Ecology "*may* establish minimum instream water flows or levels for streams, lakes or other public waters for the purposes of protecting fish, game, birds or other wildlife resources, or recreational or aesthetic values of said public waters whenever it appears to be in the public interest to establish the same." However, if the Department of Fish and Wildlife requests the protection of fish, game or other wildlife resources, or if Ecology determines it necessary to preserve water quality, then Ecology *"shall* . . . establish such minimum flows or levels as are required to protect the resource or preserve the water quality." [Emphasis added.]

Section 020 states that if flows are to be established or modified, this "shall be provided for through the adoption of rules." It also specifies the requirements around conducting public hearings.

Section 040 states that "it shall be the policy of the State and Ecology shall be so guided in the implementation of RCW 90.22.010" to retain adequate flows for stockwatering. Thus, in setting flows under RCW 90.22.010, adequate stream flows should be retained for stockwatering requirements under RCW 90.22.040. The term "stockwatering requirements" is not defined, but can reasonably be interpreted to be the amount of water required for the number of livestock that would reasonably be expected to access the river from grazing on adjoining lands now or in the foreseeable future. As stated in Section 040, such stockwatering does not include water for "feedlots and other activities that are not related to normal stockgrazing land uses."

Section 060 requires a statewide list of priorities for the evaluation of instream flows. "In establishing these priorities, the department shall consider the achievement of wild salmonid production as its primary goal." Ecology is currently preparing an update to this priorities list.

Water Resources Act of 1971, Chapter 90.54 RCW

Section 020 of this act provides a "general declaration of fundamentals for utilization and management of waters of the state." Related to instream flows, subsection 020(3) reads as follows:

> (3) The quality of the natural environment shall be protected and, where possible, enhanced as follows:
>
> (a) Perennial rivers and streams of the state shall be retained with base flows necessary to provide for preservation of wildlife, fish, scenic, aesthetic and other environmental values, and navigational values. Lakes and ponds shall be retained substantially in their natural condition. Withdrawals of water which would conflict therewith shall be authorized only in those situations where it is clear that overriding considerations of the public interest will be served.

Section 040 requires that Ecology "develop and implement in accordance with the policies of this chapter a comprehensive state water resources program which will provide a process for making decisions on future water resource allocation and use."

Integrating the Substantive Statutory Requirements

Chapter 90.22 RCW allows Ecology to adopt instream flows for any or all of the listed resources and values. However, Ecology must adopt instream flows where requested by the Department of Fish and Wildlife to protect fish and wildlife, or where needed to preserve water quality.

Substantial overlap exists in the resources and values that are to be preserved or protected under Ch. 90.22 and RCW 90.54.030(3)(a). The overlap includes fish, wildlife and aesthetics. A number of the values that do not explicitly overlap (RCW 90.22 – "recreational values" and RCW 90.54 -- "scenic" and "navigational values") are often clearly related. For example, recreational boating flows for fishing, pleasure, and whitewater are consistent with navigational values. Scenic values likewise support both aesthetic and recreational values. However, there are some notable differences. Ch. 90.22 RCW provides for flows to protect "water quality." RCW 90.54.030(3)(a) provides flows to preserve "other environmental … values" in addition to fish, wildlife, and scenic values. Likewise, RCW 90.22.040 requires flows provide adequate water for "stockwatering requirements."

The legislature indicated its intent that these provisions be integrated and applied together when it directed watershed planning groups and Ecology to set flows based upon the standards of both Minimum Water Flows and Levels and the Water Resources Act of 1971. Thus, flows to be set by rule must consider the values identified in *both* RCW 90.22 and 90.54.020(3)(a).

RCW 90.22.010 provides for the "protection" of instream resources and RCW 90.54.030(3)(a) provides for the "preservation" of those resources. Although neither statute defines those terms, both terms share the common dictionary definition of "keeping from harm, or injury." In that usage, protection or preservation of fish, wildlife, scenic, recreation, navigation, water quality, and other environmental values requires sufficient flows to maintain those values over the long term.

Chapter 90.54 RCW states that the objective is to protect, and where possible enhance, the "natural environment." Although the term "natural environment" is not defined, the language that follows in the statute indicates that the natural environment includes "wildlife, fish, scenic, aesthetic and other environmental values, and navigational values."

The legislature has, on a number of occasions, expressed its intent to maintain productive and healthy levels of fish and wildlife. Construction Projects in State Waters, Chapter 77.55 RCW (formerly 75.20) declares "it is the policy of this 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." More recently, EHB 2993, 57th Leg. (2002) amended Ch. 90.54 RCW to affirm the state's water resource management objectives of providing sufficient water (1) for residential, commercial and industrial needs, (2) for *productive fish populations*, and (3) for productive agriculture. [Emphasis added]

Further discussion of how to relate the statutory requirements to assessing stream flow needs is provided in Chapter 3. Chapter 4 provides additional discussion of the choices involved in recommending an instream flow for a given watershed.

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III. ASSESSING INSTREAM FLOW NEEDS

The first step in developing an instream flow recommendation is to assess the stream flow needs for a given watershed. The steps involved in this assessment are generally as follows:

1. Identify all statutorily protected instream values or resources present in the stream.
2. Gather and evaluate relevant existing and historic watershed-specific information on instream resources, biology, geology, hydrology, water use, etc., and other factors that affect instream resources.
3. Determine any studies needed to assess stream flow requirements for the instream resources and values, and identify the study methods to be used.
4. As needed, conduct studies to determine what stream flow levels are needed to protect instream resources, and to evaluate past, current and the potential future hydrology in the basin.
5. Organize and present the data in a form that will assist in the evaluation of stream flow needs and development of an instream flow recommendation.

Under Chapter 90.82 RCW, instream flow assessment is part of a collaborative effort between Ecology and the watershed planning unit (see RCW 90.82.080(1)(a)(ii)). Chapter 90.82 RCW also directs state agencies to provide technical assistance to planning units, when requested by planning units and as resources allow. Technical assistance from various state agencies, including advice from experts in instream flows, can be obtained through the Ecology watershed lead assigned to support the planning unit.

Step 1: Identify Instream Resources and Values for the Watershed

As described in Chapter 2, existing state laws identify the types of instream resources and values to be protected by instream flows. Fish and wildlife, aesthetic and scenic values, recreation, navigation, riparian stockwatering, water quality and other environmental values are all mentioned in one or more of the statutes that govern instream flows. The first step in assessing instream flow needs for a given watershed is to identify the instream resources and values to be protected in that watershed.

All of the potential resources and values identified in the existing laws should be considered when assessing instream flow needs. Planning groups first need to identify the resources and values which need to be protected in a given water body, stream or stream reach, and for which stream flow requirements should be assessed. As groups develop instream flows recommendations, they will need to determine if a recommendation developed for one resource adequately protects other instream resources that are present

in the identified stream. For example, a stream may have a threatened species of fish that is the focus of an instream flow recommendation from a planning unit. Even though the stream may not have a water quality problem that warrants detailed review, the planning unit must consider whether the recommended flow for fish adequately protects water quality.

Fish are identified as an instream resource to be protected in all the statutes related to instream flows. Chapter 90.82 RCW gives particular emphasis to fish throughout, and refers to coordinated state programs focused on recovery of threatened and endangered salmon. Chapter 90.22 RCW emphasizes priority for setting instream flows to protect wild salmonid fish (RCW 90.22.060).

Consideration of fish in a given stream will require an assessment of the species and life stages of fish present in the stream, and any fish management objectives for the stream (such as prioritizing the identified species and establishing target numbers to be met). Other instream resources and values require similar stream-specific consideration. For example, a stream with impaired water quality may require an in-depth analysis of pollution sources and the trade-offs between reducing the pollutants or increasing flows.

The instream resources and values, and the resulting needs analyses, will often vary by stream within a watershed. Mainstem rivers, tributary streams, subbasins and lakes may support different instream resources and require different assessments.

Step 2: Gather Existing Information for the Watershed

The following list of assessment topics identifies the types of information that may be used for instream flow assessment, to be gathered as needed for a given stream or watershed. This is not an exclusive list since additional types of information may be needed for a given stream or watershed.

1. Biology

- Have any studies been done to determine stream flow needs for fish habitat?
- What species and age classes of fish are in the area of the stream and when are they present?
- What types of vegetation are in the stream and in the area, such as riparian trees, floodplain vegetation, estuarine vegetation, etc.?
- What is the composition of the biological communities in the area of the stream?
- Has a "limiting factor analysis" been conducted for key species in the watershed?
- Are there any ESA-listed species in or around the stream?

2. Hydrology

- Are the number and size of water diversions known? What affect have diversions, land use, human structures etc. had on the stream?
- Are there gauges on the stream? Does hydrologic data exist for the stream?
- When do the lowest flows occur? The peak flows? In what months does the majority of flow occur?
- What is the rate of change between the highest and lowest (peak and base) flows?
- What are the sources of the flow (e.g., springs, rainfall, snowmelt, glacial melt)?
- Is the relationship between ground and surface water known (i.e., have the "gaining" and "losing" reaches of the stream been identified)?
- What are the relationships between water bodies in the watershed (e.g., estuaries to rivers, wetlands to lakes, etc.)?
- Are there sea water and fresh water mixing zone effects?
- Are there trends in water levels (surface water or aquifers) and their quality?
- What are the effects of the interactions between the stream and the floodplain (i.e. the area bordering a stream)?
- How do different flow levels affect the connectivity of side channels to the main channel?

3. Water Quality

- Are there existing water quality concerns, such as lowered levels of dissolved oxygen, temperature problems, excessive collection of silt ("siltation"), existing pollution sources or other factors?
- Are there toxic chemicals in the water that affect the health of living organisms?

4. Geomorphology

- What is the nature of the stream channel (e.g., alluvial, bedrock, canyon, valley, floodplain, or estuary?)
- Is the water body a headwater (i.e. a small stream that is the source of a river) or a lowland stream? What is its size?
- What is the shape and slope of the channel? Has it been significantly altered?
- What is the "aspect" of the channel; i.e., in what direction is its primary exposure?
- Are there natural lakes in the system and how do they affect hydrology?
- Is the sediment in the stream stable or is sediment building up or being reduced on the bottom? And if the stream is not in equilibrium, why is this occurring?

In addition to the above general list of assessment topics, instream flow assessments usually require detailed consideration of two specific topics:

- *The stream flow habitat requirements of fish.* Different stream flows provide habitats of varying quantity and quality to fish, and the aspects of habitat that are valued usually vary by fish species and by life stage of each species. In gathering information for an instream flow assessment, any existing empirical or computer modeled data that describes the relationship between stream flows and fish production will be important to secure and understand.
- *The hydrology of the stream.* When assessing hydrology for a watershed, it often becomes important to understand both the historical and current hydrology of the basin. (This information can be difficult to obtain, especially if there is no actual flow data and all stream flow data must be synthesized from a model.) Current hydrology may be affected by land use, water use/diversions, reservoirs and other factors. A good understanding of how these factors interact and affect stream flow is required to understand what hydrology might be possible for the stream, its "hydrological potential".

Since stream flows vary from year to year, the assessment also requires consideration of the annual frequency of stream flows: i.e., it is important to evaluate the rate at which the river might drop or rise. Fish production is affected by the level, frequency and duration of flows. Under natural flow regimes, a "good water year" (higher flows) can boost fish production and sustain the fish population during years with lower stream flows. In developing an instream flow recommendation, it is important to consider both the quantity of flow and the frequency with which it should occur.

Step 3: Identify Studies and Methods

Choosing a method to assess stream flows requires consideration of the resources present in a stream and the management objectives for those resources. It also requires consideration of the relative value of, and risks to, those resources, as well as the costs of different methods and degrees of assessment.

A number of stream flow assessment methods are currently available. The most recent review of methods was conducted by the Instream Flow Council, an organization of state and provincial instream flow specialists (Annear et al, 2002).

Many of the existing instream flow methods focus on fish, and generally use stream flows as an indicator to determine the amount of available fish habitat. The methods vary in assumptions, complexity, cost to implement, and the variables they evaluate. The methods also vary in sophistication and precision,

ranging from simple visual judgments to estimate the sufficiency of flows, to elaborate computer models requiring intensive field data verification. The most commonly used methods in Washington State have been Toe-width and PHABSIM/IFIM (**P**hysical **HAB**itat **SIM**ulation System, which is a component of the **I**nstream **F**low **I**ncremental **M**ethodology). A detailed description of instream flow methods, including method objectives, constraints, and cost and expertise to implement, is contained in Appendix A.

More complex water management issues generally require more rigorous flow assessment methods. Important factors for method selection include the:

- relative value of the resources to be protected,
- degree of competition for available water supplies, and
- available time, funding and staffing.

In addition, there are factors that affect the applicability of specific methods. For example, some methods are better suited for smaller or larger stream sizes, require a longer hydrological period of record, or were designed for different types of water bodies (e.g., lowland rivers vs. upper watershed streams). Design constraints for various methods are described in Appendix A.

The methods commonly used in Washington have been sustained in both technical and legal reviews, and can be appropriately applied in many streams in the state. However, where the water management problems and potential solutions are highly critical and complex, it may be wise to invest in more advanced methods. Recently developed models include the Indicators of Hydrologic Alteration (IHA) and the Ecosystem Diagnosis and Treatment (EDT) methods, which are further described in Appendix A. The selection of methods, or combination of methods, is a management decision that must be made in the context of each watershed.

When applying an existing method that has been peer reviewed and is generally accepted by the scientific community, additional peer review is not required. However, peer review should be conducted when developing or using a new method, or applying an existing method in a manner that has not been done before.

Currently, fish habitat is the instream value that is most commonly quantified, and knowledge in this area continues to be refined as scientific methods improve. However, there are also tools available for evaluating instream values other than fish. Whittaker et al (1993) evaluated the relationship between

stream flows and recreational values, concluding that one of the most effective methods for evaluating flows for recreation is user survey-based methods. In one such survey-based study, Brown and Daniel (1991) investigated the relationship of flow levels to the public perception of scenic quality along the Cache La Poudre River in northern Colorado, a "wild and scenic river." They concluded that positive reactions to scenic beauty increased as flows got higher to a point, but then decreased with further flow increases.

Step 4: Presenting the Data

Once existing information has been gathered for the watershed and the instream flow assessment studies completed, the resulting data must be summarized and analyzed. Hydrological information should be summarized in hydrographs with exceedance curves for all key streams. (Exceedance curves represent the stream flows expected to be exceeded a specific percentage of the time: e.g., the 50 percent exceedance flow would be exceeded 50 percent of the time.) The results of fish habitat computer modeling should be used to display the predicted relationship between stream flow and habitat of key fish species. In addition, the distribution of important and sensitive resources can be mapped, and the causes of any low flow periods can be identified and listed. Diversions of water should also be quantified and mapped. Where available, trends in these data should be documented and displayed. This analysis and display of data will assist in developing an instream flow recommendation for the watershed.

IV. DEVELOPING AN INSTREAM FLOW RECOMMENDATION

Once the stream flow assessment is complete, the next step in setting instream flows is to develop an instream flow recommendation.

All streams have a different hydrology, and support different species of fish, birds and wildlife. In addition, natural resource management objectives vary with and among watersheds. As a result, the development of a specific instream flow recommendation for a given watershed is ultimately a management decision informed by science – i.e., the recommendation is driven by values and policies, based on the interpretation of technical information.

The instream flow recommendation will identify the timing and range of stream flows for specific streams and/or stream reaches at specific locations along the stream. Instream flows are usually described as a specific stream flow to be met at a specific measurement point -- a "flow control point" such as a stream flow gauge -- during a specific time period. Instream flows can be developed for reaches on a mainstem river or for major or important tributaries – often a combination is required to meet the water management needs and objectives of the watershed. Since resources and management objectives may vary among subbasins, instream flow recommendations usually include multiple flow control points for a watershed. Additional control stations can provide data to focus and facilitate the development of water management solutions at the subbasin level.

Collaborative Process for Developing an Instream Flow Recommendation

State statutes require a number of process steps in developing an instream flow recommendation. For example, the Water Code states: "In establishing . . . minimum flows, levels or similar restrictions, the department [of Ecology] shall, during all stages of development by the department of ecology of minimum flow proposals, consult with, and carefully consider the recommendations of, the department of fish and wildlife, the department of community, trade and economic development, the department of agriculture, and representatives of the affected Indian tribes." (RCW 90.03.247) Consultation with the department of fish and wildlife is also referred to in the Minimum Water Flows and Levels act, RCW 90.22.010.

Watershed Planning (Ch. 90.82 RCW) specifies that developing an instream flow recommendation is part of a "collaborative effort" between Ecology and the watershed planning unit. Ecology is directed to "attempt to achieve consensus" among the members of the planning unit.

Ch. 90.82 RCW also states that Ecology is required to engage in government-to-government consultation with affected tribes in the management area being addressed by the watershed plan. If affected tribal governments are initiating governments for the watershed planning unit, Ecology will seek to conduct consultation through the planning process, but may consult directly with the tribe if the tribe prefers. Where affected tribal governments are not participating in watershed planning, Ecology will consult directly with tribal governments, while maintaining open communication and collaboration with the watershed planning unit.

Management Purposes for an Instream Flow Recommendation

Until recently, state-adopted instream flows served one primary purpose – to define the stream flows that governed whether and when additional water could be appropriated and used from the stream. Once adopted, the instream flow becomes a water right for fish and other instream resources, and it generally takes precedence over water uses authorized after the date the instream flow rule is adopted.

More recently, instream flows are also being used to define the water management needs or objectives to be achieved in the stream. While the instream flow rule is "senior" to water rights issued after the rule, the instream flow rule is "junior" to water rights existing at the time the rule is adopted, and therefore does not affect existing water rights. There are numerous streams where the adopted instream flows are not currently being met. Determining how to achieve instream flows is one of the primary purposes of watershed planning.

Instream flow recommendations need to address both management purposes:

- to determine whether and when to allow new water uses from a stream, and
- to define the stream flows that need to be met in the stream.

Together, these two purposes ensure that instream resources and values are protected and preserved. To meet this statutory mandate, the recommended instream flows must be biologically defensible. However, in order for an instream flow to actually be secured in the stream, the recommended flows should also be hydrologically achievable, as described below.

Biologically Defensible and Hydrologically Achievable

Where instream flow recommendations are developed to protect fish, they need to be sufficient to support the varying life stages and species of fish in the stream segments at the time of year that the fish would be

present. When developing an instream flow to protect one instream flow resource or value (e.g., fish), the potential effect on other instream resources and values must also be considered. The recommended instream flow must adequately protect and preserve these other resources and values. Accordingly, the instream flow recommendation must include documentation of the consideration of all instream resources and values that are present in the stream, and how these resources and values might be affected by the recommended instream flows.

The determination of biologically defensible instream flows is affected by a number of factors and choices. The natural resource management objectives for a stream, management choices that are made regarding the level of protection required by those resources, the historic and current conditions of the resource (e.g., distribution and abundance of a fish species), tradeoffs between competing instream resources (e.g., different species of fish), and uncertainties in the science relating stream flows to fish production, all influence the determination of instream flows that would defensible. In most cases, these factors and choices combine to create a defensible range of stream flows that are sufficient to protect and preserve instream resources and values.

Within this acceptable range, instream flow recommendations must consider the stream flows that are possible to achieve in a given stream, by determining the "hydrological potential" of the stream. This requires an evaluation of both the current and historic hydrology of the stream, however, it is not narrowly defined by the stream flows found in the stream today, nor by the stream flows that existed prior to development within a watershed. Instead, determining the potential of a stream requires an assessment of how existing and future land use, water use, storage systems (natural and constructed), and other watershed factors, affect the stream's "hydrological potential." This evaluation will indicate the range of potential stream flows that could be achieved in the stream through a variety of water management activities. Within the range of biologically defensible stream flows, the instream flow recommendation should be adjusted in consideration of the hydrological potential of the stream.

There are several approaches to developing instream flow recommendations that are biologically defensible in consideration of hydrological potential, as discussed below.

Instream Flows Will Vary

At any given location on the stream, stream flows vary naturally throughout the year due to seasonal changes. Stream flows will also vary from year to year to reflect differences in annual water supply,

resulting in flows that occur at different frequencies over time. Planning groups can consider different approaches for taking these variations into consideration in the instream flow recommendation.

Instream flow recommendations need to reflect the seasonal flow changes. The intervals at which instream flows vary (monthly, every two weeks, weekly, etc.) are described in the recommendation, and displayed in an annual hydrograph ("instream flow curve") that represents the instream flow recommendation.

Because water supply varies annually as a result of the weather and climate cycles, the instream flow recommendation may also vary from year to year. Instead of a single flow curve, the recommended instream flow can be several flow curves, representing the instream flow for different types of years (e.g., average, high water, drought, etc.).

Another possible approach is to define instream flows based on the water available in each year. This could be a range of flows represented by two flow curves, where the instream flow for a given year is based on the water conditions for that year. The flow curves would represent a biologically defensible range of stream flows, within which the annual stream flow is selected through a prescribed water management process established within the watershed.

The instream flow recommendation may also address the frequency with which these stream flows should be achieved. Since fish production generally declines during extreme low flows, the recommendation could provide for higher stream flows to be achieved every few years. Accordingly, an instream flow recommendation may include both a quantity (a stream flow level) and a frequency (how often the stream flow level is required to be achieved). For example, the recommendation may stipulate that a higher instream flow should be achieved every four years, while a lower instream flow can be accepted for the other three.

Given the two management purposes of instream flows, it is also possible for the instream flow recommendation to propose two different flow curves, so that both purposes are addressed – one flow curve related to new water uses from the stream, and a second flow curve related to the stream flow objectives to be achieved in the stream. For example, a higher flow curve related to new water uses could protect the occasional "good water year" needed to preserve a healthy population of fish. This would reduce or remove the availability of new water rights from stream. At the same time, a defensible

watershed management program could include a lower flow curve to identify the stream flow objectives to be achieved by a certain future date through implementation of the watershed plan.

The use of ranges, frequencies, varying, and/or multiple stream flows, as long as they are applied in a manner that is scientifically defensible, can help reconcile the instream flow recommendation with natural conditions and can provide an effective way to integrate water management objectives in the watershed. However, these features are more difficult to implement than a single flow curve, and will require increased attention to water management in the basin.

Level of Protection

With all the variables that must be considered, determining the appropriate stream flows to ensure the needed level of protection requires applying judgment to sound scientific information. As described in Chapter 2, the statutes provide a variety of terms and phrases that indicate intent, even though they are not specifically defined. When interpreted together, the statutes require instream flows that are sufficient to protect and preserve instream resources and values over the long term.

The determination of stream flows that are sufficient to protect and preserve the instream resources and values that are present in any given stream is affected by two key factors. The first factor is the science, and the technical evaluation of what stream flows are sufficient to protect and preserve the instream resource or value. Selected stream flows must be biologically defensible, and must provide the necessary protection within a reasonable level of confidence. The other important consideration is the natural resource management objectives for the resources – whether the objective is sustained populations, a healthy fishery, meeting quality standards, etc., as appropriate to the resource.

Natural resource management objectives are expected to vary within and among watersheds. As a result, the decision regarding which specific stream flows will protect and preserve instream resources and values should be made at the watershed level.

Competing Instream Values

In some circumstances, conflicts may arise between stream flow needs for different fish and wildlife species. For example, chinook salmon and steelhead need water for spawning at different times of the year, and the amount of water available in an upstream reservoir may be insufficient to accommodate both uses because of the timing difference. Resolution of such conflicts should be based on a rational balancing of the resources and values in question, such as the extent to which a species survival may be

jeopardized, the extent to which a species or a value would benefit from additional water, and the economic and social value of the instream resources affected.

The phrase "optimum flow level" is often associated with balancing different stream flow needs for different species and life stages of fish. The preferred stream flows for each species of fish and their different life stages can be summarized in a graph of overlapping curves. By considering the relative importance of the species, other factors that affect survival, and the fish management objectives for the stream, the graph can be used to determine a mix of seasonal flows that will optimize the stream flows to benefit the greatest number of species and life stages of fish.

There may also be conflicts between different instream values. For example, a resident fish population may prefer a lower flow on a stream than would be needed to maintain recreational boating. These cases require site-specific decisions on the relative value of the instream resources and the tradeoffs resulting from different stream flows.

Relation to Federal Programs

In some watersheds, federal programs have resulted in prescribed stream flow conditions. Planning groups will need to be aware of the effect of any such programs in order to understand how they influence stream flows and instream flow requirements. When developing recommendations for state instream flow rules, these federal flow conditions should be considered, and where appropriate, they should be incorporated into the instream flow recommendation.

For example, the state has approved or otherwise formally endorsed instream flow requirements for many hydroelectric power generating facilities through the licenses issued by the Federal Energy Regulatory Commission. The stream flow conditions contained in the license may be appropriate to include in the instream flow recommendation. Licenses issued for hydroelectric projects have expiration dates, so it might be appropriate in some cases to have interim instream flows while at the same time identifying long-term flow objectives.

Similarly, the conditions established under a habitat conservation plan approved under the federal Endangered Species Act may be included in the instream flow recommendation, especially where the state has approved or otherwise formally acknowledged the federal stream flow requirements. The instream flow requirements established by other federal water management programs, such as the Yakima River Basin Water Enhancement Project, can also be included in the instream flow recommendation.

Relation to Tribal Rights

Many watersheds in Washington have established tribal treaty rights or pending tribal claims to water that relate directly to ensuring sufficient stream flows for fish. While an instream flow rule does not alter or affect these rights and claims, the development of instream flow recommendations represents an opportunity to consult tribal governments regarding the relationship between their rights and state instream flow rules. By law, Ecology must consult with tribal governments when developing and evaluating instream flow recommendations. Watershed planning groups are also encouraged to contact any Tribes with an interest in instream flows in their planning area to discuss the relationship between tribal rights and claims and the instream flow rules.

Managing Uncertainties

In developing an instream flow recommendation, it is appropriate to address uncertainties in existing information and other decision risks. An approach used in the past is to include a margin of safety by increasing the recommended stream flows in the rule by a slight amount. Another approach is the use of "adaptive management," where management decisions are periodically reviewed and refined based on collection and evaluation of new information.

Adaptive management can be applied to instream flows. For example, an instream flow can be adopted into rule with the stipulation for review at prescribed intervals. However, to be effective, adaptive management requires a management framework to prioritize risks, identify data gaps, collect and evaluate new information, and to define procedures for review and revision of management practices. In other words, it must be integrated into the implementation of a watershed management plan.

In addition to clear procedures, changes in the instream flow will affect other water management features in the basin and will require important decisions up front. For example, if under adaptive management it is decided that the instream flow will be changed, it will be necessary to decide at the time the adaptive process is established how to address any water rights that have been issued since the instream flow was first put into rule.

Relation to Out-of-Stream Uses

Existing statutes require water to be managed in a manner that supports and values both instream and out-of-stream uses. For example, in the Water Resources Act, RCW 90.54.010(1)(a) states: "Adequate water supplies are essential to meet the needs of the state's growing population and economy. At the same time instream resources and values must be preserved and protected so that future generations can continue to

enjoy them." The Watershed Planning act, Ch. 90.82 RCW, requires watershed plans to include strategies to meet both instream and out-of-stream needs.

In order to achieve instream flows in a given basin, the interplay of different water management strategies and decisions needs to be considered. The water needs of the basin, which include both instream resources and out-of-stream uses, and the strategies to meet the needs of both, will necessarily be considered together in order to develop a watershed management plan to meet those needs if they are not presently met. The need to integrate these strategies was one reason for the provisions of Chapter 90.82 RCW that give an early priority date for instream flows (taking effect at year two of the four-year planning process), but postpone their due date and adoption pending development of the overall watershed plan.

Watersheds vary in their current condition. Some may have enough water today to meet both instream and anticipated out-of-stream needs. Other watersheds may get by with careful management of their water resources, through efficiency and demand management measures. However, some watersheds may need more active programs, including the use of reservoirs and conveyance systems to maintain stream flows and to store and deliver water for both out-of-stream and instream uses. For example, a watershed plan might include development of a new storage reservoir to provide water for both new out-of-stream uses and supplementation of stream flows during low flow periods.

Another alternative is to develop a watershed plan that reconciles instream and out-of-stream needs through agreements that carefully manage and allocate the water available in any given year. For example, the watershed plan could institute a program where the annual water supply is shared to meet both instream and out-of-stream uses. As a result, by agreement, both out-of-stream uses and instream flows may be adjusted downward during water short years.

Development of integrated water management strategies to meet both the instream and out-of-stream needs of a watershed presents and requires some fundamental choices for the watershed. Where scientifically defensible, and within the parameters of law as described above, these choices can be included in the instream flow recommendation, as a key feature of a watershed plan.

V. ADOPTING AN INSTREAM FLOW RULE

Once an instream flow recommendation has been developed, the next step is to proceed to a formal review and adoption of the instream flow as a state rule. This chapter first describes the rulemaking process in general, and then discusses how that process works in the context of watershed planning under Ch. 90.82 RCW. While the rulemaking process does not officially begin until a recommendation is submitted, there are important steps to undertake while the recommendation is still under development.

General Overview of the Rulemaking Process

Rules are legal requirements formally adopted by state agencies and compiled in the Washington Administrative Code (WAC). Ecology has the responsibility and authority to adopt instream flow rules, pursuant to RCW 90.22.010, RCW 90.03.247 and RCW 90.82.080. (See Appendix B for the text of these statutes.) State rulemaking is governed by a law known as the Administrative Procedure Act (APA), Chapter 34.05 RCW; rules also must comply with the Regulatory Fairness Act, Ch. 19.85 RCW.

Under state law, the rule development process begins long before an instream flow recommendation is adopted by Ecology. All proponents of a rule are required to maintain a **rulemaking file** to document the rule development process and compliance with state guidelines. The public will use this file to determine whether the rule making followed the requirements of the APA and other procedural laws. The requirements for rulemaking files are outlined in RCW 34.05.370. However, since the process for developing an instream flow rule will include documents that will not be part of the public rulemaking file, an additional file with preliminary drafts, notes, internal memoranda and other such documents should also be maintained. Ecology must create and maintain these files for all instream flow rules.

In addition to the rulemaking file, Ecology prepares a number of internal documents for rulemaking. A "rule authorization document" (or RAD) is prepared to secure review and approval from agency management to proceed with rulemaking. And a "rule development plan"(or RDP) is prepared to outline the studies, public process, communication plan, resources and any other efforts needed for a specific rule.

Once these steps have been completed, the agency can proceed with the first formal step in rulemaking – the issuance of a **"Preproposal Statement of Inquiry" (CR-101)**. The CR-101 provides the public with a notice of the agency's intent to develop a rule. The CR-101 is published in the Washington State Register (WSR), the official publication in which all rules filed with the Code Reviser's Office are

published. The WSR is published bi-monthly and is available upon request from the state Code Reviser's Office.

Interested persons can also become informed about Ecology rulemaking activities by subscribing to "WAC Track," part of Ecology's Internet site (http://www.ecy.wa.gov/laws-rules/index.html). Subscribers receive e-mail notification every time new information is posted to Ecology's Laws and Rules Web site. WAC Track is updated two days after each filing with the Code Reviser's Office. Ecology also maintains a published agenda of all agency rulemaking activities, which is updated twice a year.

The next formal step in rulemaking is the filing of the **Notice of Proposed Rule Making (CR-102)**. It can be filed any time after 30 days from the date the CR-101 was published in the WSR. The CR-102 packet includes the proposed language for the rule, hearing dates, and comment period information, which is published in the WSR for public review and comment. However, before the CR-102 can be filed, there are several related evaluations that must be completed.

Where required, a Small Business Economic Statement (SBEIS) must be filed at the same time as the CR-102. The Regulatory Fairness Act (Chapter 19.85 RCW) was enacted "with the intent of reducing the disproportionate impact of state administrative rules on small business." This act requires the submission of a SBEIS to analyze the average cost of a proposed rule on small business when a proposed rule imposes more than minor costs on business within a given industry, or when requested by the Joint Administrative Rules Review Committee (JARRC). If a rule places a disproportionate economic impact on small business, the agency must mitigate the rule to reduce the burden on small business, within the context of the statutory mandate. A small business is any independently owned and operated for-profit business with fifty (50) or fewer employees.

The agency must also determine whether the rule will be a Significant Legislative Rule. Significant legislative rules are subject to additional rulemaking procedures and require a series of determinations regarding the purpose and effect of the rule. A significant legislative rule is defined in RCW 34.05.328 as a rule other than a procedural or interpretive rule that:

- adopts substantive provisions of law pursuant to delegated legislative authority, the violation of which subjects a violator of such rule to a penalty or sanction;
- establishes, alters, or revokes any qualification or standard for the issuance, suspension, or revocation of a license or permit; or
- adopts a new, or makes significant amendments to, a policy or regulatory program.

Adoption of an instream flow rule also requires review under the State Environmental Policy Act (SEPA) to evaluate the probable environmental consequences of rule adoption before final decisions are made. SEPA review is most valuable when done concurrently with the development of a proposal, so it is important to start the process early. This allows environmental considerations to be taken into account as preliminary decisions are made that shape the final proposal or alternatives that will be considered. It facilitates the use of identified studies needed for the proposal to provide the necessary SEPA analysis. An integrated approach to SEPA also allows agencies to combine public notice and comment periods to the extent possible.

If it is determined that the rule when implemented could result in a probable significant adverse environmental impact, an environmental impact statement (EIS) is required. If an EIS will be prepared, a "determination of significance and scoping notice" (DS/Scoping) is generally issued together with the CR-101. The draft EIS is issued with the CR-102 when possible, and the comment periods are combined. The SEPA process is completed with the issuance of the final EIS, which must occur at least seven days prior to final rule adoption (CR-103).

If the agency determines that the rule will not result in a significant adverse environmental impact, issuance of a "determination of nonsignificance" (DNS) is appropriate. Although this determination is typically made early in the rulemaking process, the DNS is issued with the CR-102 so that the impacts of the final proposal can be fully considered. This also allows the comment period on the DNS to be combined with the comment period on the CR-102. Comments received on the DNS are then considered and the DNS may be retained (no further documentation necessary), modified by issuance of a revised DNS, or the DNS may be withdrawn and reconsidered. If withdrawn, the agency must issue a new DNS or, if probable significant adverse environmental impacts have been identified, a DS/Scoping is issued and the EIS process is begun.

The final SEPA document (DNS or final EIS) accompanies the proposed rule to the Director for review and consideration prior to adoption.

Draft rule language should be reviewed by a variety of interested parties before filing the CR-102, so that the rule writer can understand and, as appropriate, incorporate these comments into the rule. In particular, Ecology must consult tribal governments and other state agencies throughout the development of instream flow rules, as specified in statute.

Upon filing of the CR-102, the proposed rule is then opened to a formal public comment period where hearings are held and the public is invited to submit comments to the agency. The APA requires at least one public hearing; and where the stream is located in one county, Ch. 90.22 RCW requires the department to hold the hearing in that county.

Ecology is obligated to consider all comments received during this formal review, and must prepare a responsiveness summary to address these comments. If public comments require substantial changes to the CR-102, the rulemaking process may require filing a revised CR-102.

The final step in rulemaking is for the agency to file the **Rule Making Order (CR-103**). No rule can be adopted before the intended adoption date identified in the CR-102. The CR-103 can be filed after the close of comments, but must be filed no later than 180 days after the publication of the CR-102. If the 180-day deadline is not met, the rule is automatically withdrawn and can no longer be adopted without filing a new CR-102 form. If applicable, the CR-103 packet must include a Concise Explanatory Statement, which is a summary of the entire process the agency used to adopt a rule, including responses to the comments received. The Implementation Plan and the Significant Legislative Criteria Documentation should also be included.

When the CR-103 form is signed by the Director of Ecology, the rule is considered formally adopted. Usually, unless specified otherwise on the CR-103, a rule becomes effective 31 days after filing the signed CR-103.

Instream Flow Rulemaking under Chapter 90.82 RCW

Chapter 90.82 RCW provides several unique requirements for instream flow rules, including exemptions from the rulemaking process under the Administrative Procedure Act.

Specific requirements related to the instream flow setting process for watershed planning groups who are including an instream flow element are described in RCW 90.82.080. The inclusion of this element must be agreed upon by a majority vote of the initiating governments.

For watersheds with an existing instream flow rule, members of local governments and tribes on the planning unit must record a unanimous vote in order to *amend the existing rule* through the watershed planning process. If no instream flows are set, "setting the minimum instream flows shall be a collaborative effort between the department and members of the planning unit" and Ecology "must

attempt to achieve consensus and approval among members of the planning unit." Consensus is achieved if all government members (including participating tribes), and a majority of nongovernmental members, vote to support the proposed instream flow rule.

Upon approval of an instream flow recommendation, Ecology can undertake rulemaking to adopt an instream flow rule in one of three ways. First, there is the regular rules adoption process, complying with the standard requirements of the APA as described above, with certain exemptions. Second, there is the option to do rulemaking by an expedited rules adoption process (also under APA, at RCW 34.05.353). And third, there is an alternative process which uses public hearings and notice provided by the county legislative authority. (The latter two processes are discussed later in this section.)

Where planning unit approval is obtained, the CR-102 packet will be based on the instream flow recommendation of a local planning group. Chapter 90.82 RCW states that a Small Business Economic Impact Statement is not required for adoption of a rule that has been approved by the watershed planning unit. The act also states that such rules adopted under the 2514 process are not significant legislative rules under the APA, and are therefore are not subject to additional evaluation under RCW 35.04.328. (See earlier discussion of Significant Legislative Rules.)

If approval is not secured by the deadlines established in Chapter 90.82 RCW, the act allows Ecology to complete work on the instream flow rule. However, in the absence of agreement and approval from the planning unit, Ecology must follow the standard APA procedures.

Section 080 also discusses how priority dates (that is, the effective date of the instream flow rule) will be established under varying circumstances. For any new instream flow levels set as a result of planning, the priority date will be two years after funding was initially provided to the initiating governments. (If planning unit members decide by a unanimous vote that a later priority date is desired, they may choose another date, but in no case can it be later than the rule adoption date.) If an existing instream flow is increased, then the flow level originally established by rule maintains its original priority date, and only the portion that has been newly set will have a priority date of two years after initial funding. If an existing instream flow is decreased, it retains its original priority date.

Expedited rulemaking process

The expedited rulemaking process was created for proposed rules that are procedural or interpretive in nature or that have been through extensive public involvement with negotiated or pilot rule-making (see RCW 35.04.353). With expedited rulemaking, there is no public hearing on the draft rule. There is still a 45-day period during which the public is able to submit objections to the rule. If any objections are received that cannot be resolved, then the rulemaking process must shift over to the standard APA procedure. Even with planning unit approval and support for expedited rulemaking, Ecology expects that public hearings will be warranted for all instream flow rules.

Alternative rulemaking process

Chapter 90.82 RCW allows Ecology to conduct rulemaking through a process that relies on the public notice and hearings conducted by the county legislative authority for their review and approval of the watershed plan. By agreement, the county legislative authority and Ecology can undertake a concurrent and integrated approach to plan approval and rule adoption.

For example, Ecology could publish a draft rule (CR-102) concurrently with the county's publication of the draft watershed plan, and they could advertise these publications in a joint public notice. The county legislative authority and Ecology could hold a joint public hearing to take testimony on the watershed plan and on the draft state rule or rules needed to implement the plan, including an instream flow rule. Pending the outcome of public review, the county could subsequently act to approve the plan in a timeframe concurrent with Ecology's adoption of the final rule.

A Guide To

Instream Flow Setting In Washington State

APPENDICES

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Appendices: Table of Contents

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Appendix A
Overview of Instream Flow Assessment Methods

This chapter looks at some of the most commonly used methodologies in Washington State. There are many tools available and no one particular method is advocated – planning groups must decide what study or studies will best address their concerns and also fit into practical parameters such as time and cost. Planning groups must also decide whether to use a method that has been previously peer reviewed, or whether they want to develop a new method or apply a method in a new manner that warrants additional peer review.

This section examines four methods in detail: PHABSIM, IFIM, Toe-width, and Ecosystems Diagnosis and Treatment (EDT). For each, the method and its objectives are described, along with how it works, constraints, and the cost, time, resources and personnel needed for implementation. Following a detailed look at these four, several other methods are briefly discussed.

Physical HABitat SIMulation System (PHABSIM), an Instream Flow Incremental Method (IFIM) Component

Description and objectives

PHABSIM is the most commonly used study method for instream flows in Washington State. The U.S. Fish and Wildlife Service developed it in the late 1970s (Bovee, 1982). It produces a computer model that shows the relationship between stream flow levels and the physical habitat for various life stages of one or more species of fish. Four key measurable elements of fish habitat are considered: depth, velocity (water speed), substrate (material on the stream bottom) and cover (material such as logs and boulders that provide shade and/or shelter from fast moving water or predators).

PHABSIM can generally be described as having three main components. First there are the actual field measurements of depth, velocity, substrate material and cover taken at specific sampling points on a cross section, at different flow levels. These data are used to create hydraulic models (that is, models that predict depth and water velocity at different points in the stream at different flows) which evaluate the four habitat variables at different flows. These data, in turn, are combined with "species suitability criteria," a model that evaluates how suitable a given habitat attribute is for the life stage and species under consideration. The final result is an index to the amount of microhabitat (that is, the immediate

environment of a fish in a stream) available for different life stages for different species at different flow levels.

How it works

This method involves putting site-specific stream flow and habitat data into a group of models collectively called PHABSIM (Physical Habitat Simulation). Within PHABSIM are models of fish habitat as affected by hydraulics. The most common model is IFG4, which uses multiple transects (cross sections) to predict depths and velocities in a river over a range of flows. The Departments of Fish and Wildlife and Ecology prefer 3-flow modeling (high, medium and low flows). IFG4 creates a cell (measurable area) for each measured point along a transect. Each cell has an average water depth and water velocity associated with a type of substrate or cover for a particular flow. The cell's area is measured in square feet.

After the IFG4 model is calibrated (that is, adjusted to the situation being modeled so that it accurately predicts depth and velocity distributions at measured flows) and run, its output is entered into a species suitability criteria model (HABTAT, or Habitat Simulation Program) which has habitat suitability criteria describing fish habitat preferences for depth, velocity, substrate, and cover. These preferences vary according to fish species and life stage (adult spawning and juvenile rearing). The output of the HABTAT model is an index of fish habitat known as Weighted Useable Area (WUA).

A summation of all the transect cells' areas results in the total number of square feet of preferred habitat available at a specified flow. This quantity is normalized to 1,000 feet of stream or river. The final model result predicts total WUA in units of square feet per 1,000 feet of stream. The WUA values are listed with their corresponding flows (given in cubic feet per second).

Constraints

There are several common criticisms of PHABSIM. The habitat suitability criteria are not universally accepted, since some subjectivity may be involved in its use of direct observation and/or expert opinions to characterize what the life requisites are for a given species. However, in Washington these criteria have been rigorously developed and tested. Another criticism is the species by species analysis of habitat, which may not account for interspecies competition. And although not a criticism per se, it is also important to remember that PHABSIM only considers four habitat factors. Other variables such as fish passage, food supply (aquatic insects), competition between fish species, and predators (birds, larger fish, etc.) may also be important, particularly at certain flows, such as extreme low flows. Even allowing for its

possible shortcomings, PHABSIM is used nationwide and is accepted by most resource managers as one of the best available tools for determining, in the broadest sense, the relationship between flows and fish habitat.

Cost, Time, Resources and Personnel

This method is relatively expensive as used in Washington, due to visiting sampling sites three times in order to get data at three different flow levels (low, medium, and high). It typically takes a week or so of field work spread over four to six months to take measurements, and then from six to twelve months to run the model, analyze data and write the report. Getting measurements at the appropriate times is crucial and is highly contingent on how fast stream flows are rising or falling.

On some streams, particularly large ones such as the Nooksack and Spokane, there are real safety concerns to consider. Measurements have to be taken in the water, which sometimes means using a boat and cable. (Recently radar-based systems have been developed that can take measurements remotely. These are likely to become state-of-the-art, however they are still quite new, very expensive, and will need some time to gain acceptance.)

Personnel need relatively intense training to carry out this method. The current IFIM training available through the USGS emphasizes 1-flow hydraulic modeling in IFG4. (See the USGS, Midcontinent Ecological Science Center – MESC – website: http://www.mesc.usgs.gov/training/mesc-training.html) (Ecology and WDFW prefer 3-flow modeling.) Consultants and others involved in setting up IFIM studies will find it helpful to review the *Instream Flow Study Guidelines* specific to Washington State, which are available on Ecology's web page under Instream Flows (ISF Primer/Background Flow Measurement Methods).

Costs vary depending on the intensity of the study, distance from office, and how many "false starts" there are (unstable flows, or missing a rising flow measurement). Estimates for collecting data for the 3-flow approach with seven or so transects, running the model and analyzing the data, and writing the report come in between $30,000 to $40,000.

Instream Flow Incremental Methodology (IFIM)

Description and objectives

See the discussion on PHABSIM. PHABSIM is a component of a "full" IFIM study, although people confuse the two. A computer-modeling approach, IFIM is generally used where resource values and controversy levels are high, and is considered state-of-the-art. IFIM is unique because it simultaneously analyzes habitat variability over space and time. It deals with several habitat features and predicts habitat levels based on those features, at varying flow levels. An IFIM approach can be applied to other instream values, such as recreation. It is a broad consideration of watershed processes and how they affect instream resources and values.

How it works

In IFIM, habitat suitability data comes in two forms: macrohabitat and microhabitat. Macrohabitat suitability refers to variables that vary as you move downstream, such as water quality, channel shape (morphology) and temperature. Microhabitat suitability refers to the same variables used in PHABSIM analysis: depth, velocity, substrate material, and cover. IFIM uses computer software to integrate these two measures of habitat into habitat units that are then related to flow over time, resulting in a Habitat Time Series (HTS). The HTS describes habitat changes, based on the factors entered, over time and at various flows. HTS requires a detailed understanding of population dynamics and limiting factors.

The proper application of IFIM includes an evaluation (subjective or objective) of: (1) potentially limiting factors, such as water quality and pollution; (2) watershed processes and how they affect the stream channel; (3) meso- (middle range) and macrohabitat factors not considered in microhabitat modeling; (4) natural hydrology and connection with ground water (connectivity); and (5) fish life history and species requirements as an organizing factor for WUA interpretation. All these factors must be considered when developing a flow recommendation using IFIM.

Constraints

Data collection and analysis are time consuming. Study design can take years to set up and all stakeholders need to have input. After the study is completed and the report written, deliberations can continue for months discussing the results.

Cost, Time, Resources and Personnel

See PHABSIM discussion and then factor in additional time since more variables are analyzed and modeled. Given that IFIM examines many variables is considered one of its strengths, integrating all those variables is time-consuming and challenging work.

Fairly substantial training is required and much is offered (such as from the USGS - http://www.mesc.usgs.gov/training/mesc-training.html).

In addition to the PHABSIM models, IFIM may include reviewing water quality, sediment, channel stability, temperature, hydrology and other variables that affect fish production.

Toe-width method

Description and objectives

In this approach, the "toe-width" of a stream is measured and put into an equation that yields a prediction of salmon and steelhead spawning and rearing flows. The "toe" of a stream refers to that point in a stream where the side of the stream meets the bottom. Typically it's where the more vertical dirt bank meets the horizontal gravel bed. The toe-width measurement is the distance from the toe of one streambank to the toe of the bank across the stream channel. Toe-width is measured where spawning is most likely to occur. This is usually where the tail of a pool (a "pool" is deep, slow water, the "tail" is its downstream end) meets the head of the riffle (shallow and fast-moving water), which is where the most inter-gravel flows occur. Inter-gravel flows are beneficial to fish eggs.

Most of the 250 instream flows set by rule in Washington State were done with Toe-width. It was a method created specifically in response to the Water Resources Act of 1971. Quick Toe-width estimates may be adequate for management purposes and results may compare favorably with those from IFIM/PHABSIM. For example, the Toe-width flow numbers on the Dosewallips River were only around 10-15% higher or lower than the IFIM flow numbers.

How it works

The toes of the bank on each side of the stream channel are located and measured based on the angle of the slope and the substrate. Measurements are then averaged and used in species and life stage specific equations for steelhead and salmon to calculate spawning and rearing flows.

Constraints

This method yields a single number for the flows fish prefer for spawning and rearing young ("spawning and rearing flows"). The relationship between habitat and flows is not addressed, which can be critical in a decision-making process. Toe-width tends to call for stream flows higher than average in very small streams and to call for stream flows that are lower than historical lows in larger streams. It is best suited for use in small and medium-sized streams. This method was developed primarily to assess salmonid rearing and spawning in alluvial streams in Western Washington, but the basic approach can be adjusted for application to other stream types.

Cost, Time, Resources and Personnel

The Toe-width methodology is the most commonly used (along with PHABSIM) by the Departments of Ecology and Fish and Wildlife for setting flows. A relatively simple tool to use, it yields a lot of useful information with a minimum of effort. Requiring only a measuring tape, the time it takes to drive to the stream, and 10 minutes to do calculations, a dozen Toe-width studies can be done in one day. The method takes only minutes to learn, and it can take as little as a week from data collection through report writing.

Ecosystem Diagnosis and Treatment (EDT) Method

Description and objectives

The EDT Method, a comprehensive, multivariable model, was developed by Mobrand Biometrics, Inc. in 1999. The basic premise is that habitat forms a template of limiting (survival) factors that impact the biological performance of a given fish species within a particular stream reach. This method rates the quality, quantity, and diversity of the habitat along a stream and compares this information to the needs of each life stage of a given population. The survival factors are rated theoretically rather than empirically, typically being based on simplified hypotheses derived from a combination of observational and professional experience. The output is a prediction of the abundance, and distribution potential of a population within a given ecosystem under alternative conditions. Based upon these theoretical predictions, a watershed planning unit can identify which factors(s) are most limiting for a given species and life stage and which reaches will most benefit from preservation and/or restoration efforts. Hence, EDT analyses try to forecast survival factors and should be coupled with adaptive management efforts to be most useful.

The variable ratings database contains estimates of survival rates based upon general experience with fish. Because these may require re-evaluation if outputs seem inaccurate (see below), there is much

subjectivity and the solutions are strongly assumption-laden and not easily testable for accuracy. Nevertheless, the EDT method has been accepted for use to predict fish productivity, albeit the National Marine Fisheries Service is using its own productivity method in the Columbia River basin. The EDT method seems best suited for documentation of the fish ecosystem within a watershed, although such representation is compromised by the use of temporal snapshots rather than mean environmental conditions over time within a stream reach.

How It Works

A total of 43 ecosystem attributes are rated on a scale of 1 – 4 for either suitability or quantity. An attribute such as sand is rated based upon the percentage of sand present within the bed. Temperature is stratified into four sectors ranging from cooler to warmer. The percent of stream reach that includes riffles, pools, and/or glides (runs) is also rated. These attributes form a database that can be assessed alongside optimal habitat needs for a given fish species. The user provides estimates of the survival and productivity of each life stage within each reach and month.

Constraints

For each fish species and life stage, the model simultaneously looks at rated values for up to 43 stream-reach attributes (potential limiting factors) within a given month. Actual parameters for depth, velocity, bed topography, natural-flow variation, and riparian intactness are not presently included. Although there is a fair amount of flexibility in EDT so that these aquatic and riparian conditions could be addressed, such attributes are not commonly used. Indeed, noting the riparian intactness along a stream reach is vital for assessing how successful instream flow restoration would be given that deforested sites might not show much salmonid recovery without concurrent riparian management. Therefore, the model cannot make instream flow recommendations for fish recovery. Although the EDT is not an instream flow tool and cannot easily be incorporated into IFIM analyses, the converse may be practical, i.e., IFIM results may possibly provide input into EDT analyses.

Cost, Time, Resources and Personnel

This methodology requires no field work. It does, however, require that several fish biologists and other experts convene to rate each of the 43 attributes for all the reaches within a stream, by month. The model can then be run and, based on the outcome, the ratings of some variables may need to be re-evaluated to better represent the actual habitat conditions.

Other methods

The Indicators of Hydrologic Alteration (IHA) method is an office technique that uses hydrologic records to characterize and compare hydrologic regimes and how they change over time. Also known as the Range of Variability methodology, it was developed by Richter et al. (1996) Daily stream flows reflecting natural (pre-human impact) and altered (post-impact) flow regimes are characterized using 32 parameters. These parameters are based on five fundamental characteristics of hydrological regimes: magnitude, timing, frequency, duration and rate of change. The IHA approach is to mimic the natural conditions in the river system. The hydrograph might change slightly (due to withdrawals), but its overall shape would remain much the same. Therefore the peaks may be lower but would occur at the same time. An advantage of this approach is that it looks at the *whole system,* not simply flow levels. Disadvantages include that is it untested for fish and does not consider ecological functions or processes. King County is currently undertaking flow analyses based on IHA concepts.

The Correlation method is based on the assumption that available data on one basin and is applicable to a nearby basin with apparently similar characteristics. The data considered would include flow records, area, slope, "predominant aspect" (that is, the general lay of the land), precipitation and other factors related to hydrology and geography. Current management dictates that for any flow assessment at least Toe-width measurements need to be done, and so the Correlation method might only be used for the initial, gross planning analysis of a basin, but probably not for decision-making. Since its use is so limited, a more in-depth analysis of Correlation as a flow assessment method will not be done in this document.

Other flow assessment methods or strategies are acceptable provided they are peer-reviewed and generally accepted by the scientific community. Valuable information can be gleaned from sources other than formal studies. For example, smolt radio-tracking, snorkeling surveys, and juvenile fish trapping can all yield useful information with regard to fish size, numbers, species and habitat utilization. One can calculate diversions using water rights information, or make hydrographs based on data from USGS or others.

Riverine habitats are diverse, and we don't yet have models to accurately describe them all. For example, we do not have good assessment tools for stream side-channel habitat, or certain wetlands, or for some types of rare plant and animal species. Planning groups should keep in mind that while instream flow assessment methods play a significant role in determining instream flow levels, they have their

limitations, are constantly improving, and finally, they are only one factor to be considered in flow discussions.

For more information

For a more complete discussion of flow assessment techniques, there are three key types of resources to check. For writing focused on instream flows, the Instream Flow Council is an excellent resource. See their 2002 publication, *Instream Flows for Riverine Resource Stewardship,* which discusses numerous assessment tools, or *The Instream Flow Incremental Methodology: A Primer for IFIM,* and the detailed reference sections at the end of each. A second source is the user surveys that played a part in determining the recreational instream flow needs at several hydroelectric projects (e.g. Nisqually, Lake Chelan, Sullivan Creek). Finally, books on recreation, such as whitewater guide books (by Douglass North and others), offer a third perspective.

For a more detailed historical perspective on the approaches Ecology has used in setting instream flows, refer to "Instream Flows in Washington State: Past, Present and Future," which can be found online at <http://www.ecy.wa.gov/programs/wr/wrhome.html.

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Appendix B

Excerpts of Statutes Related to Setting Instream Flows

The complete text of all laws and rules can be accessed through the internet:
http://www.ecy.wa.gov/laws-rules/index.html

Construction Projects in State Waters, Chapter 77.55 RCW (formerly 75.20)

RCW 77.55.050

Review of permit applications to divert or store water -- Water flow policy.

It is the policy of this 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.

The director of ecology shall give the director notice of each application for a permit to divert or store water. The director has thirty days after receiving the notice to state his or her objections to the application. The permit shall not be issued until the thirty-day period has elapsed.

The director of ecology may refuse to issue a permit if, in the opinion of the director, issuing the permit might result in lowering the flow of water in a stream below the flow necessary to adequately support food fish and game fish populations in the stream.

The provisions of this section shall in no way affect existing water rights.

Water Code, Chapter 90.03 RCW

RCW 90.03.247

Minimum flows and levels -- Departmental authority exclusive -- Other recommendations considered.

Whenever an application for a permit to make beneficial use of public waters is approved relating to a stream or other water body for which minimum flows or levels have been adopted and are in effect at the time of approval, the permit shall be conditioned to protect the levels or flows. No agency may establish minimum flows and levels or similar water flow or level restrictions for any stream or lake of the state other than the department of ecology whose authority to establish is exclusive, as provided in chapter 90.03 RCW and RCW 90.22.010 and 90.54.040. The provisions of other statutes, including but not limited to *RCW 75.20.100 and chapter 43.21C RCW, may not be interpreted in a manner that is inconsistent with this section. In establishing such minimum flows, levels, or similar restrictions, the department shall, during all stages of development by the department of ecology of minimum flow proposals, consult with, and carefully consider the recommendations of, the department of fish and wildlife, the department of community, trade, and economic development, the department of agriculture,

and representatives of the affected Indian tribes. Nothing herein shall preclude the department of fish and wildlife, the department of community, trade, and economic development, or the department of agriculture from presenting its views on minimum flow needs at any public hearing or to any person or agency, and the department of fish and wildlife, the department of community, trade, and economic development, and the department of agriculture are each empowered to participate in proceedings of the federal energy regulatory commission and other agencies to present its views on minimum flow needs.

RCW 90.03.345

Establishment of reservations of water for certain purposes and minimum flows or levels as constituting appropriations with priority dates.

The establishment of reservations of water for agriculture, hydroelectric energy, municipal, industrial, and other beneficial uses under RCW 90.54.050(1) or minimum flows or levels under RCW 90.22.010 or 90.54.040 shall constitute appropriations within the meaning of this chapter with priority dates as of the effective dates of their establishment. Whenever an application for a permit to make beneficial use of public waters embodied in a reservation, established after September 1, 1979, is filed with the department of ecology after the effective date of such reservation, the priority date for a permit issued pursuant to an approval by the department of ecology of the application shall be the effective date of the reservation.

Minimum Water Flows and Levels Act, Chapter 90.22 RCW

RCW 90.22.010

Establishment of minimum water flows or levels -- Authorized -- Purposes.

The department of ecology may establish minimum water flows or levels for streams, lakes or other public waters for the purposes of protecting fish, game, birds or other wildlife resources, or recreational or aesthetic values of said public waters whenever it appears to be in the public interest to establish the same. In addition, the department of ecology shall, when requested by the department of fish and wildlife to protect fish, game or other wildlife resources under the jurisdiction of the requesting state agency, or if the department of ecology finds it necessary to preserve water quality, establish such minimum flows or levels as are required to protect the resource or preserve the water quality described in the request or determination. Any request submitted by the department of fish and wildlife shall include a statement setting forth the need for establishing a minimum flow or level. When the department acts to preserve water quality, it shall include a similar statement with the proposed rule filed with the code reviser. This section shall not apply to waters artificially stored in reservoirs, provided that in the granting of storage permits by the department of ecology in the future, full recognition shall be given to downstream minimum flows, if any there may be, which have theretofore been established hereunder.

RCW 90.22.020

Establishment of minimum water flows or levels -- Hearings -- Notice -- Rules.

Flows or levels authorized for establishment under RCW 90.22.010, or subsequent modification thereof by the department shall be provided for through the adoption of rules. Before the establishment or modification of a water flow or level for any stream or lake or other public water, the department shall hold a public hearing in the county in which the stream, lake, or other public water is located. If it is located in more than one county the department shall determine the location or locations therein and the number of hearings to be conducted. Notice of the hearings shall be given by publication in a newspaper of general circulation in the county or counties in which the stream, lake, or other public waters is located, once a week for two consecutive weeks before the hearing. The notice shall include the following:

(1) The name of each stream, lake, or other water source under consideration;

(2) The place and time of the hearing;

(3) A statement that any person, including any private citizen or public official, may present his or her views either orally or in writing.

Notice of the hearing shall also be served upon the administrators of the departments of social and health services, natural resources, fish and wildlife, and transportation.

RCW 90.22.040

Stockwatering requirements.

It shall be the policy of the state, and the department of ecology shall be so guided in the implementation of RCW 90.22.010 and 90.22.020, to retain sufficient minimum flows or levels in streams, lakes or other public waters to provide adequate waters in such water sources to satisfy stockwatering requirements for stock on riparian grazing lands which drink directly therefrom where such retention shall not result in an unconscionable waste of public waters. The policy hereof shall not apply to stockwatering relating to feed lots and other activities which are not related to normal stockgrazing land uses.

RCW 90.22.060

Instream flow evaluations -- State-wide list of priorities -- Salmon impact.

By December 31, 1993, the department of ecology shall, in cooperation with the Indian tribes, and the department of fish and wildlife, establish a state-wide list of priorities for evaluation of instream flows. In establishing these priorities, the department shall consider the achievement of wild salmonid production as its primary goal.

Water Resources Act of 1971, Chapter 90.54 RCW

RCW 90.54.020

General declaration of fundamentals for utilization and management of waters of the state.

Utilization and management of the waters of the state shall be guided by the following general declaration of fundamentals:

3) The quality of the natural environment shall be protected and, where possible, enhanced as follows:

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

(b) Waters of the state shall be of high quality. Regardless of the quality of the waters of the state, all wastes and other materials and substances proposed for entry into said waters shall be provided with all known, available, and reasonable methods of treatment prior to entry. Notwithstanding that standards of quality established for the waters of the state would not be violated, wastes and other materials and substances shall not be allowed to enter such waters which will reduce the existing quality thereof, except in those situations where it is clear that overriding considerations of the public interest will be served. Technology-based effluent limitations or standards for discharges for municipal water treatment plants located on the Chehalis, Columbia, Cowlitz, Lewis, or Skagit river shall be adjusted to reflect credit for substances removed from the plant intake water if:

(i) The municipality demonstrates that the intake water is drawn from the same body of water into which the discharge is made; and

(ii) The municipality demonstrates that no violation of receiving water quality standards or appreciable environmental degradation will result.

RCW 90.54.040

Comprehensive state water resources program -- Modifying existing and adopting new regulations and statutes.

(1) The department, through the adoption of appropriate rules, is directed, as a matter of high priority to insure that the waters of the state are utilized for the best interests of the people, to develop and implement in accordance with the policies of this chapter a comprehensive state water resources program which will provide a process for making decisions on future water resource allocation and use. The department may develop the program in segments so that immediate attention may be given to waters of a given physioeconomic region of the state or to specific critical problems of water allocation and use.

(2) In relation to the management and regulatory programs relating to water resources vested in it, the department is further directed to modify existing regulations and adopt new regulations, when needed and possible, to insure that existing regulatory programs are in accord with the water resource policy of this chapter and the program established in subsection (1) of this section.

Watershed Planning, Chapter 90.82 RCW

RCW 90.82.020

Definitions.

Unless the context clearly requires otherwise, the definitions in this section apply throughout this chapter.

(3) "Minimum instream flow" means a minimum flow under chapter 90.03 or 90.22 RCW or a base flow under chapter 90.54 RCW.

RCW 90.82.040

WRIA planning units -- Watershed planning grants -- Eligibility criteria -- Administrative costs.

(2)(c) By December 1, 2001, or within one year of initiating phase one of watershed planning, whichever occurs later, the initiating governments for each planning unit must inform the department whether they intend to have the planning unit establish or amend instream flows as part of its planning process. If they elect to have the planning unit establish or amend instream flows, the planning unit is eligible to receive one hundred thousand dollars for that purpose in accordance with (a)(ii) of this subsection. If the initiating governments for a planning unit elect not to establish or amend instream flows as part of the unit's planning process, the department shall retain one hundred thousand dollars to carry out an assessment to support establishment of instream flows and to establish such flows in accordance with RCW 90.54.020(3)(a) and chapter 90.22 RCW. The department shall not use these funds to amend an existing instream flow unless requested to do so by the initiating governments for a planning unit.

RCW 90.82.060

Initiation of watershed planning -- Scope of planning -- Technical assistance from state agencies.

(6) The organizing grant shall be used to organize the planning unit and to determine the scope of the planning to be conducted. In determining the scope of the planning activities, consideration shall be given to all existing plans and related planning activities. The scope of planning must include water quantity elements as provided in RCW 90.82.070, and may include water quality elements as contained in RCW 90.82.090, habitat elements as contained in RCW 90.82.100, and instream flow elements as contained in RCW 90.82.080. The initiating governments shall work with state government, other local governments within the management area, and affected tribal governments, in developing a planning

process. The initiating governments may hold public meetings as deemed necessary to develop a proposed scope of work and a proposed composition of the planning unit. In developing a proposed composition of the planning unit, the initiating governments shall provide for representation of a wide range of water resource interests.

RCW 90.82.070

Water quantity component.

Watershed planning under this chapter shall address water quantity in the management area by undertaking an assessment of water supply and use in the management area and developing strategies for future use.

(1) The assessment shall include:

(g) An estimate of the surface and ground water available for further appropriation, taking into account the minimum instream flows adopted by rule or to be adopted by rule under this chapter for streams in the management area including the data necessary to evaluate necessary flows for fish.

(2) Strategies for increasing water supplies in the management area, which may include, but are not limited to, increasing water supplies through water conservation, water reuse, the use of reclaimed water, voluntary water transfers, aquifer recharge and recovery, additional water allocations, or additional water storage and water storage enhancements. The objective of these strategies is to supply water in sufficient quantities to satisfy the minimum instream flows for fish and to provide water for future out-of-stream uses for water identified in subsection (1)(e) and (g) of this section and to ensure that adequate water supplies are available for agriculture, energy production, and population and economic growth under the requirements of the state's growth management act, chapter 36.70A RCW. These strategies, in and of themselves, shall not be construed to confer new water rights. The watershed plan must address the strategies required under this subsection.

RCW 90.82.080

Instream flow component -- Rules.

(1)(a) If the initiating governments choose, by majority vote, to include an instream flow component, it shall be accomplished in the following manner:

(i) If minimum instream flows have already been adopted by rule for a stream within the management area, unless the members of the local governments and tribes on the planning unit by a recorded unanimous vote request the department to modify those flows, the minimum instream flows shall not be modified under this chapter. If the members of local governments and tribes request the

planning unit to modify instream flows and unanimous approval of the decision to modify such flow is not achieved, then the instream flows shall not be modified under this section;

(ii) If minimum stream flows have not been adopted by rule for a stream within the management area, setting the minimum instream flows shall be a collaborative effort between the department and members of the planning unit. The department must attempt to achieve consensus and approval among the members of the planning unit regarding the minimum flows to be adopted by the department. Approval is achieved if all government members and tribes that have been invited and accepted on the planning unit present for a recorded vote unanimously vote to support the proposed minimum instream flows, and all nongovernmental members of the planning unit present for the recorded vote, by a majority, vote to support the proposed minimum instream flows.

(c) If approval is not achieved within four years of the date the planning unit first receives funds from the department for conducting watershed assessments under RCW 90.82.040, the department may promptly initiate rule making under chapter 34.05 RCW to establish flows for those streams and shall have two additional years to establish the instream flows for those streams for which approval is not achieved.

(5) If the planning unit is unable to obtain unanimity under subsection (1) of this section, the department may adopt rules setting such flows.

RCW 90.82.120

Plan parameters.

(1) Watershed planning developed and approved under this chapter shall not contain provisions that: (a) Are in conflict with existing state statutes, federal laws, or tribal treaty rights; (b) impair or diminish in any manner an existing water right evidenced by a claim filed in the water rights claims registry established under chapter 90.14 RCW or a water right certificate or permit; (c) require a modification in the basic operations of a federal reclamation project with a water right the priority date of which is before June 11, 1998, or alter in any manner whatsoever the quantity of water available under the water right for the reclamation project, whether the project has or has not been completed before June 11, 1998; (d) affect or interfere with an ongoing general adjudication of water rights; (e) modify or require the modification of any waste discharge permit issued under chapter 90.48 RCW; (f) modify or require the modification of activities or actions taken or intended to be taken under a habitat restoration work schedule developed under chapter 246, Laws of 1998; or (g) modify or require the modification of activities or actions taken to protect or enhance fish habitat if the activities or actions are: (i) Part of an approved habitat conservation plan and an incidental take permit, an incidental take statement, a management or recovery plan, or other cooperative or conservation agreement entered into with a federal

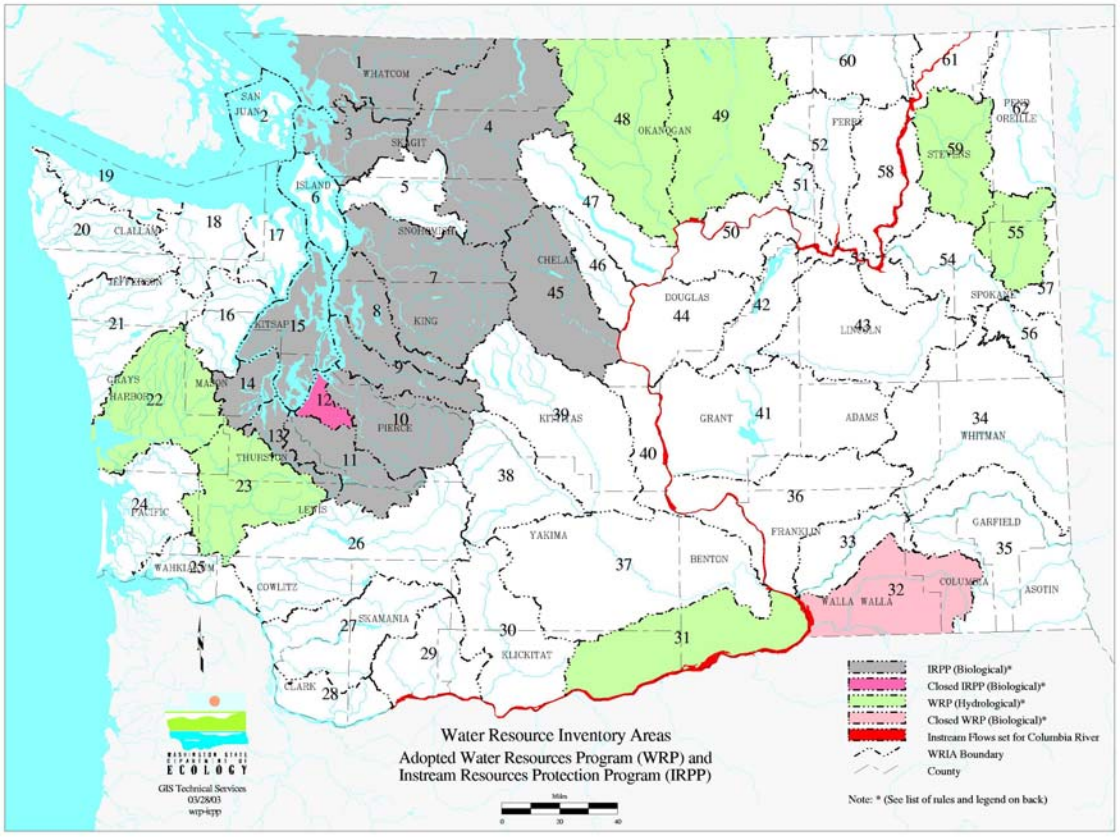
or state fish and wildlife protection agency under its statutory authority for fish and wildlife protection that addresses the affected habitat; or (ii) part of a water quality program adopted by an irrigation district under chapter 87.03 RCW or a board of joint control under chapter 87.80 RCW. This subsection (1)(g) applies as long as the activities or actions continue to be taken in accordance with the plan, agreement, permit, or statement. Any assessment conducted under RCW 90.82.070, 90.82.090, or 90.82.100 shall take into consideration such activities and actions and those taken under the forest practices rules, including watershed analysis adopted under the forest practices act, chapter 76.09 RCW.

Appendix C

WRIAs and Areas with Regulations

The Water Resources Act of 1971 established 62 "Water Resource Inventory Areas" (WRIAs). As of this writing, Ecology had adopted regulations affecting flows in 19 WRIAs, as well as the Columbia River.

Water Resource Inventory Areas



Water Resources Inventory Areas with Regulations

WRIA	Name	WAC Citation	Date filed
WRIA 1	Instream Resources Protection Program **Nooksack** River Basin	Ch. 173–501 WAC	12/4/85
WRIA 3 and 4	Instream Resources Protection Program -- **Lower And Upper Skagit** Water Resources Inventory Area (WRIA 3 And 4)	Ch. 173-503 WAC	3/14/01
WRIA 7	Instream Resources Protection Program **Snohomish** River Basin	Ch. 173–507 WAC	9/6/79
WRIA 8	Instream Resources Protection Program **Cedar–Sammamish** Basin	Ch. 173–508 WAC	9/6/79
WRIA 9	Instream Resources Protection Program **Green–Duwamish** River Basin	Ch. 173–509 WAC	6/6/80
WRIA 10	Instream Resources Protection Program **Puyallup** River Basin	Ch. 173–510 WAC	3/21/80
WRIA 11	Instream Resources Protection Program **Nisqually** River Basin	Ch. 173–511 WAC	2/2/81
WRIA 12	Instream Resources Protection Program **Chambers–Clover** Creek Basin	Ch. 173–512 WAC	12/12/79
WRIA 13	Instream Resources Protection Program **Deschutes** River Basin	Ch. 173–513 WAC	6/24/80
WRIA 14	Instream Resources Protection Program **Kennedy — Goldsborough** Basin	Ch. 173–514 WAC	1/23/84
WRIA 15	Instream Resources Protection Program **Kitsap**	Ch. 173–515 WAC	7/24/81
WRIA 22 and 23	Water Resources Program **Chehalis** River Basin	Ch. 173–522 WAC	3/10/76
WRIA 31 and parts of 32, 33, 36, 37	Water Resources Program for **John Day–McNary** Pools reach of the Columbia River	Ch. 173–531A WAC	6/24/80
WRIA 32	Water Resources Program in the **Walla Walla** River Basin	Ch. 173–532 WAC	12/14/77
WRIA 45	Instream Resources Protection Program **Wenatchee** River Basin	Ch. 173–545 WAC	6/3/83
WRIA 48	Water Resources Program in the **Methow** River Basin	Ch. 173–548 WAC	12/28/76
WRIA 49	Water Resources Program in the **Okanogan** River Basin	Ch. 173–549 WAC	7/14/76
WRIA 55	Water Resources Program in the **Little Spokane** River Basin	Ch. 173–555 WAC	1/6/76
WRIA 59	Water Resources Program in the **Colville** River Basin	Ch. 173–559 WAC	7/22/77
	Instream Resources Protection Program for the main stem of the **Columbia River** in Washington State	Ch. 173–563 WAC	6/24/80
	Water Resources Management Program for the main stem of the **Snake River** in Washington State (Expired 7/1/99)	Ch. 173–564 WAC	1/3/93

Appendix D
Example of an Instream Flow Rule

The following is the instream flow rule for WRIAs 3 and 4, the Upper and Lower Skagit, done in 2001. As discussed in Chapter 4, there are a number of choices that planning groups need to make about what to include in their rule. This WAC is provided only as an example – the specific content of a rule may vary from stream to stream and watershed to watershed.

Chapter 173-503 WAC

INSTREAM RESOURCES PROTECTION PROGRAM -- LOWER AND UPPER SKAGIT WATER RESOURCES INVENTORY AREA (WRIA 3 AND 4)

NEW SECTION

WAC 173-503-010 General Provision. These rules apply to waters within the Lower and Upper Skagit water resources inventory area (WRIA 3 and 4), as defined in WAC 173-500-040, excluding the Samish River subbasin, Fidalgo, Guemes, Cypress, Hope and Goat islands. This chapter is promulgated pursuant to chapter 90.54 (Water Resources Act of 1971), chapter 90.22 RCW (Minimum water flows and levels), and chapter 173-500 WAC (Water resources management program).

NEW SECTION

WAC 173-503-020 Purpose. The purpose of this chapter is to retain perennial rivers, streams, and lakes in the Lower and Upper Skagit water resources inventory area and Cultus Mt. Tributaries with instream flows and levels necessary to provide for the protection and preservation of wildlife, fish, scenic, aesthetic, and other environmental values, and navigational values, as well as recreation and water quality.

Chapter 90.54 RCW (Water Resources Act of 1971) requires that utilization and management of waters of the state be guided by a number of fundamentals, including:

Uses 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 purposes, and preservation of environmental and aesthetic values, and all other uses compatible with the enjoyment of the public waters of the state, are declared to be beneficial. (RCW 90.54.020(1))

The quality of the natural environment shall be protected and, where possible, enhanced, as follows:

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

Waters of the state shall be of high quality. Regardless of the quality of the waters of the state, all wastes and other materials and substances proposed for entry into said waters shall be provided with all known, available, and reasonable methods of treatment prior to entry. Notwithstanding that standards of quality established for the waters of the state would not be violated, wastes and other materials and substances shall not be allowed to enter such waters which will reduce the existing quality thereof, except in those situations where it is clear that overriding considerations of the public interest will be served. (RCW 90.54.020 (3)(b))

In administering and enforcing this regulation, the department's actions shall be consistent with the provisions of chapter 90.54 RCW.

NEW SECTION

WAC 173-503-030 Findings. Ecology finds that (1) The magnitude or variability of flows are important in maintaining the aquatic ecosystem that sustains both fish and other valuable resources. Criteria to limit total withdrawals of water from the Lower Skagit River were developed to protect the aquatic ecosystem in the region covered by this rule.

(2) To protect the estuary area below River Mile 8.1 the duration of flow inundation of at least one foot of depth, in selected estuary habitat, can be reduced no more than 10% from existing conditions

from the date of enactment of this regulation. This criterion applies to the period of February through August to withdrawals from the Skagit River. Total withdrawals greater than 836 cubic feet per second during that period will result in a greater than 10% deviation from existing conditions and therefore would result in harm to the fisheries resources and aquatic ecosystem in the region covered by this rule.

(3) Protection of the aquatic ecosystem of the estuary in the months of September through January requires that the total withdrawals of water from the Skagit River not exceed 1/10 of the 50% exceedence flow for each month, based on the period of record (1/1/41 – 12/31/95) for the US Geological Survey (USGS) stream gage on the Skagit River near Mt. Vernon, WA (Sta. #12-2005-00) in order to maintain channel morphology and other estuarine and riverine functions. This equates to a low point of 830 cubic feet per second during the month of September. Total withdrawals greater than 830 cubic feet per second during the month of September will not protect and preserve fish, wildlife and other environmental values and therefore would be harmful to fisheries resources and the aquatic ecosystem in the region covered by this rule in violation of chapter 90.54 RCW.

(4) The rules setting minimum flows in the Lower and Upper Skagit River (WRIA 3 and 4) (WAC 173-503-040) and finding certain waters available (WAC 173-503-050)are necessary to protect and preserve wildlife, fish, scenic, aesthetic and other environmental values.

NEW SECTION

WAC 173-503-040 Establishment of instream flows. (1) Stream management units and associated control stations are established as follows:

STREAM MANAGEMENT UNIT INFORMATION

Stream Management Unit Name Control Station No.	Control Station by River Mile and Section, Township and Range; Latitude and Longitude	Stream Management Reach
Skagit Mainstem:		
Skagit River near Mt. Vernon, WA		From mouth of Skagit River including tidal fluctuation to

USGS Sta. #12-2005-00	River Mile (RM) 15.7	headwaters.*

Cultus Mountain Tributaries:

Mundt Creek	Stream gage will be installed at RM 3.4 (Sec/Twn/Rng; Lat/Long)	From mouth to headwaters.
Turner Creek	Stream gage will be installed at RM 4.2 (Sec/Twn/Rng; Lat/Long)	From mouth to headwaters.
Gilligan Creek	Stream gage will be installed at RM 3.2 (Sec/Twn/Rng; Lat/Long)	From mouth to headwaters.
Salmon Creek	Staff gage periodically recorded will be installed at RM 4.3 (Sec/Twn/Rng; Lat/Long)	From mouth to headwaters.

* Other additional control stations and instream flows may be established in WRIAs 3 & 4 to improve water management.

(2) Instream flows are established for the stream management units in WAC 173-503-040 (1) as follows (See Figures 1 through 3):

INSTREAM FLOWS AS MEASURED AT USGS STA.#12-2005-00

(Instantaneous cubic feet per second)

		USGS Sta. #12-2005-00
Month	Day	Skagit River
Jan.	1–31	10,000
Feb.	1–29	10,000
Mar.	1–31	10,000
Apr.	1–30	12,000
May	1–31	12,000

Jun.	1–30	12,000
Jul.	1–31	10,000
Aug.	1–31	10,000
Sep.	1–30	10,000
Oct.	1–31	13,000
Nov.	1–15	13,000
	16–30	11,000
Dec.	1–15	11,000
	16–31	10,000

INSTREAM FLOWS FOR CULTUS MOUNTAIN TRIBUTARIES, WRIA 3

(Instantaneous cubic feet per second)

Month	Day	RM 3.4 Mundt Creek	RM 4.2 Turner Creek	RM 3.2 Gilligan Creek	RM 4.3 Salmon Creek
Jan.	1-31	6.4	7.9	19.8	4.0
Feb.	1-29	6.4	5.4	19.8	4.0
Mar.	1-15	6.4	5.4	19.8	4.0
	16-31	9.4	5.4	27.7	4.0
Apr.	1-30	9.4	7.9	31.7	4.0
May	1-31	9.4	7.9	31.7	1.4
Jun.	1-30	9.4	4.9	31.7	1.4
Jul.	1-31	7.6	4.9	39.6	1.4
Aug.	1-31	7.6	4.9	39.6	1.4
Sep.	1-30	7.6	4.9	39.6	4.0
Oct.	1-31	7.6	7.9	23.8	4.0
Nov.	1-30	9.4	7.9	27.7	4.0
Dec.	1-31	9.4	7.9	27.7	4.0

(3) Instream Flow Hydrograph. Figure 1

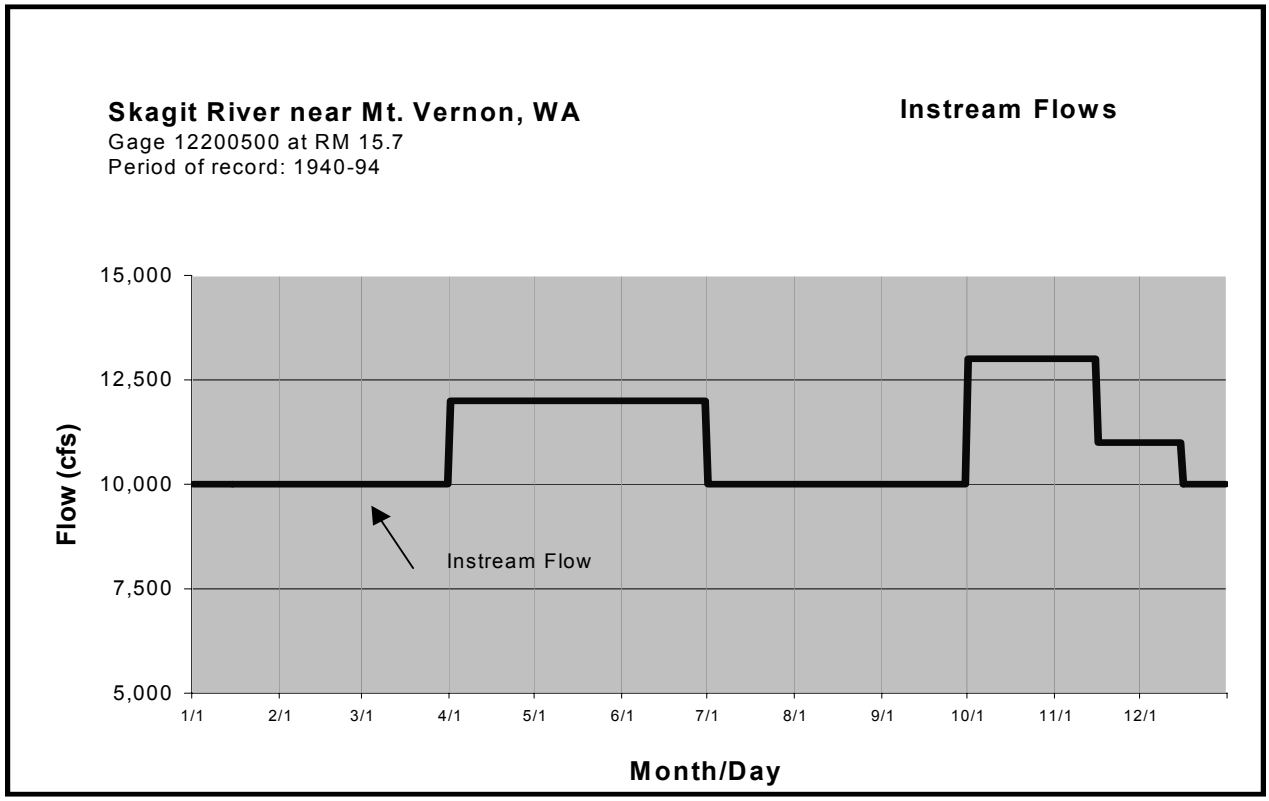


Figure 2

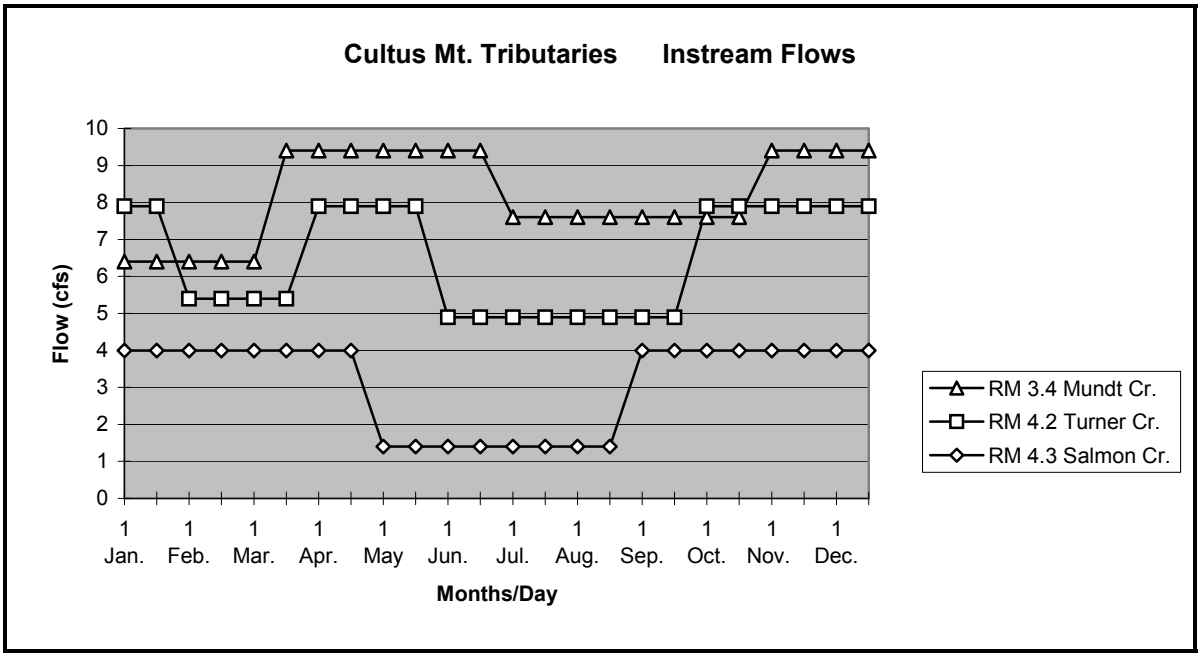
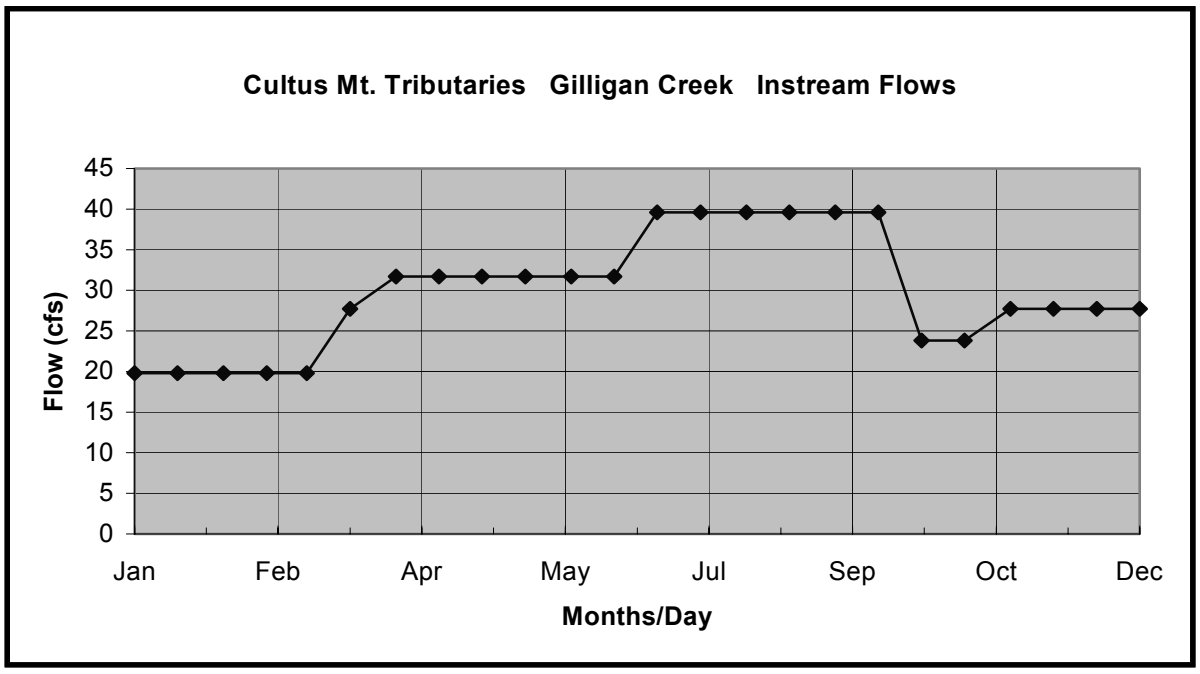


Figure 3



(4) The instream flow hydrographs, as represented in Figures 1 through 3 in WAC 173-503-040(3) shall be used for identification of instream flows.

(5) Future consumptive water right permits issued hereafter for diversion of surface water in the Lower and Upper Skagit (WRIA 3 and 4) and perennial tributaries, and withdrawal of ground water in hydraulic continuity with surface water in the Skagit River and perennial tributaries, shall be expressly subject to instream flows established in WAC 173-503-040 (1) through (3) as measured at the appropriate gage, and also subject to WAC 173-503-060.

(6) Future consumptive water rights issued to applications pending at the effective date of the regulation are superior in priority date but shall be conditioned on the instream flows established in WAC 173-503-040 (1) through (3). (RCW 90.03.247)

NEW SECTION

WAC 173-503-050 Water Availability Determination. (1) The department has made a determination that 200 cubic feet per second is available to be appropriated through ground water withdrawal or surface water diversion for further instantaneous consumptive appropriation in the Lower and Upper Skagit watershed (WRIA 3 and 4). These waters are available for appropriation, subject to existing rights, exemptions in WAC 173-503-070, and instream flows in WAC 173-503-040(2). This determination was based upon review of existing water right records and existing water use, and is consistent with the findings section (WAC 173-503-030) of this regulation.

(2) The department advises that water rights issued to appropriate these waters determined to be available by this rule will be interruptible rights.

(3) After these instantaneous diversion or withdrawal of the 200 cfs quantities identified in paragraph (1) of this section have been allocated by Ecology, the Lower and Upper Skagit Watershed WRIA 3 and 4) shall be withdrawn from further consumptive appropriations. This rule may be reopened to further consumptive appropriation only if further information demonstrates that such appropriations can be made consistent with the finding section (WAC 173-503-030) and the instream flow section (WAC 173-503-040). If further information demonstrates that the amount in the availability determination set forth in paragraph (1) of this section should have been less than 200 cubic feet per second, Ecology will not be bound by the 200 cubic feet per second number when processing individual water right applications.

NEW SECTION

WAC 173-503-060 Ground Water. If the department determines that there is hydraulic continuity between surface water and the proposed ground water source, a water right permit or certificate shall not be issued unless the department determines that withdrawal of ground water from the source aquifer would not interfere with stream flows during the period of stream closure or with maintenance of minimum instream flows. If such findings are made, then applications to appropriate public ground waters may be approved subject to the flows established in WAC 173-503-040(2).

NEW SECTION

WAC 173-503-070 Exemptions. (1) Nothing in this chapter shall affect existing water rights, including perfected riparian rights, federal Indian and non-Indian reserved rights, or other appropriative rights existing on the effective date of this chapter, nor shall it affect existing rights relating to the operation of any hydroelectric or water storage reservoir or related facilities.

(2) Nonconsumptive uses which are compatible with the intent of this chapter may be approved.

NEW SECTION

WAC 173-503-080 Policy statement for future permitting actions. (1) No rights to divert or store public surface waters of WRIA 3 and 4 which would conflict with the provisions of this chapter shall hereafter be granted, except as provided in RCW 90.54.020 (3)(a).

(2) Consistent with the provisions of chapter 90.54 RCW, it is the policy of the department to preserve an appropriate minimum instream flow in all perennial streams and rivers as well as the water levels in all lakes in the Lower and Upper Skagit watershed (WRIA 3 and 4) by encouraging the use of alternative sources of water which include (a) reuse; (b) artificial recharge and recovery; (c) conservation; and (d) acquisition of existing water rights.

NEW SECTION

WAC 173-503-090 Enforcement. In enforcement of this chapter, the department of ecology may impose such sanctions as appropriate under authorities vested in it, including but not limited to the issuance of regulatory orders under RCW 43.27A.190 and civil penalties under RCW 43.83B.335, RCW 90.03.400, RCW 90.03.410, RCW 90.03.600, RCW 90.44.120 and RCW 90.44.130.

NEW SECTION

WAC 173-503-100 Regulation Reviews. Review of the rules in this chapter may be initiated by the department of ecology whenever new information is available, a change in conditions occurs, or statutory modifications are enacted that are determined by the department of ecology to require review.

Appendix E

Bibliography/References

This bibliography is divided into two sections: Instream Flow Management and Methods, and Water and Water-related references.

Instream Flow Management and Methods

For additional instream flow-related documents, see also the bibliography in Annear/Instream Flow Council's *Instream Flows for Riverine Resource Stewardship* and Stalnaker, et al.

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Appendix F

Websites

The websites listed below have information and links related to instream flows. It is not an exhaustive list, but a list to get one started. Tribes, environmental groups, and consulting firms also have information related to flows and water management.

FEDERAL and TRIBAL AGENCIES

Army Corps of Engineers (COE)	http://www.nwd.usace.army.mil/ps/	Fish Management Division. Responsible for operation of some dams.
Bonneville Power Administration (BPA)	http://www.bpa.gov/indexmain.htm	Dams on the Columbia and Snake
Environmental Protection Agency (EPA)	http://www.epa.gov/OW/	Office of Water – all water quality aspects
Federal Energy regulatory Commission (FERC)	http://www.ferc.fed.us/	Hydropower licensing & related environmental analyses
U.S. Fish and Wildlife Service (Pacific Northwest Region)	http://pacific.fws.gov/	ESA for wildlife, non-anadromous fish (e.g. bull trout) and other species.
U.S. Geological Survey (USGS)	http://iwww.mesc.usgs.gov/sre/sre.html	Water information and measurement methodologies. Instream Flow Incremental Methodology (IFIM)
National Oceanographic and Atmospheric Administration (NOAA)	http://www.noaa.gov/	Fisheries, weather
National Marine Fisheries Service - PNW Region	http://www.nwr.noaa.gov/1habcon/habweb/listnwr.htm http://www.nwr.noaa.gov/	ESA; anadromous fish, marine mammals, etc. ESA-listed species in the watershed
Natural Resources Conservation Service (NRCS)	http://www.nrcs.usda.gov/	Agriculture; best management practices; stream restoration. Formerly SCS.
Northwest Indian Fisheries Commission (NWIFC)	http://www.nwifc.wa.gov/	Fisheries planning & issues
Northwest Power Planning Council (NWPPC)	http://www.nwppc.org/fw/Default.htm	Fish & wildlife issues as impacted by power planning

LOCAL AGENCIES

Local agencies **Go through OFM website to select specific county information**	http://www.ofm.wa.gov/enviro/envirotoc.htm	Environmental indicators and links to demographic information
Conservation Districts (Access via Conservation Commission's website)	http://www.conserver.org/index.shtml http://www.conserver.org/salmon/index.php3	Agriculture, stream restoration, technical assistance Limiting factors analysis

STATE AGENCIES

Code Reviser's Office	http://slc.leg.wa.gov/	All state laws and regulations
Department of Ecology **SEPA** **Shorelands** **Watershed Planning** **Water Quality Program** **Water Resources Program**	http://www.ecy.wa.gov http://www.ecy.wa.gov/programs/sea/sepa/e-review.html http://www.ecy.wa.gov/programs/sea/shorelan.html http://www.ecy.wa.gov/ watershed/index.html http://www.ecy.wa.gov/programs/wq/wqhome.html http://www.ecy.wa.gov/programs/wq/303d/ http://www.ecy.wa.gov/programs/wr/wrhome.html http://www.ecy.wa.gov/programs/wr/rules/rul-home.html	Home page –links to programs State Environmental Policy Act compliance Shorelands & wetlands Info on grants, planning activities WQ standards, 303(d) streams for low flows; TMDLs, more General water resources Policies, Rules, Laws & Case Law
Department of Fish and Wildlife **SaSI 1992 Salmonid Stock Inventory**	http://www.wa.gov/wdfw/recovery.htm http://www.wa.gov/wdfw/fish/sassi/intro.htm http://www.wa.gov/wdfw/wildlife.htm	Salmon recovery & management Salmonid inventory Fish concerns in SaSI
Governor's Office	http://www.governor.wa.gov/esa/	September 1999, *Extinction is Not an Option: A Statewide Strategy to Recover Salmon.* (Sometimes called the Governor's Salmon Strategy or SSRS). Many links.
Department of Health	http://www.doh.wa.gov/	Water supply planning; drinking water

Department of Natural Resources (DNR)	http://www.wa.gov/dnr/ http://www.wa.gov/dnr/htdocs/fr/nhp/wanhp.html	Watershed analysis for forestry purposes Plants of concern
Office of Archaeology and Historic Preservation within the Office of Community Development	http://www.ocd.wa.gov/info/lgd/oahp/	Historical and cultural information
Salmon Recovery Funding Board (within the Interagency Committee for Outdoor Recreation)	http://www.wa.gov/iac/index.html	Funding for salmonid projects