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Revised 1-25-01

Guidelines
For Preparation of
Comprehensive Irrigation District Management Plans

February 2001

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Special thanks go to the consulting firm of Economic and Engineering Services, Inc. (EES) for their help in the production of this document.

To order additional copies of the Draft “Guidelines For Preparation of Comprehensive Irrigation District Management Plans,” please contact Paula Smith, Washington State Conservation Commission, PO Box 47721, Olympia, WA 98504-7721; phone: 360/407-6209 or e-mail: psmi461@ecy.wa.gov. It is available in hard copy format, as well as on CD, or you can visit our website at http://www.conserver.org/afw/files/

Acknowledgements

Each member of the "AFW Workgroup" (as they came to be called) gave substantial time and effort from their *already* busy careers, to contribute their knowledge and experience to these Guidelines. In doing so, they have provided an invaluable service to the state's Irrigation Districts and to all of us who live here and, therefore, benefit from those districts. Thank you, all, for your fine work. Thanks also go to the Irrigation Districts' Executive Committee who oversaw the Workgroup's efforts. (See next page for membership list.)

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Executive Summary

This manual is the resulting product of the substantial collaboration between Irrigation Districts, state and federal government, the Colville Tribes, and environmental stakeholders in the Irrigation District portion of the AFW process. The participants in Washington State's Agriculture, Fish and Water (AFW) Comprehensive Irrigation District Management Plan (CIDMP) development process set out to develop a voluntary and incentive based process for improving Irrigation District operations in response to both Endangered Species Act (ESA) and Clean Water Act (CWA) concerns.

This manual describes a step-by-step approach to how an Irrigation District determines its need for species conservation and water quality planning in light of ESA and CWA. This manual describes a process for districts to meet water quality standards and properly functioning habitat conditions. It does not set specific operational standards. The CIDMP process allows districts the flexibility to address ESA and CWA issues in an individualized manner specific to its operations.

The manual includes chapters explaining the background and intricacies of the ESA and the CWA. It outlines the process for attaining legal coverage under the ESA and CWA through the development of a CIDMP. However, the extent of legal coverage depends on the chosen compliance pathway, the substantive strength of the CIDMP and final agreement with the agencies responsible for ESA and CWA compliance.

The CIDMP process begins with the District completing an internal risk assessment to determine whether or not it needs to conduct conservation and water quality planning in light of ESA and CWA concerns. Should the District decide to prepare a CIDMP, it will conduct an assessment of its operations with the assistance of a Technical Advisory Team made up of governmental representatives and individuals interested in assisting the district in the process. The assessment findings identify the ESA and CWA issues to be addressed by the CIDMP. The District will consult with the Technical Advisory Team to set objective biological (Properly Functioning Conditions) and water quality goals to be addressed in the District's Action Plan.

The District will then prepare its Action Plan and Implementation Program for the CIDMP. Monitoring and adaptive management components of the CIDMP must be included to allow for modifications necessary to meet the objective biological and water quality goals that are identified by the assessment. The CIDMP will include identified funding needs and strategies to acquire the necessary funds to ensure the implementation of the CIDMP.

The completed CIDMP will then be presented to the proper compliance agencies for review and agreement. The CIDMP must be approved through normal administrative means under ESA and CWA to achieve compliance under those laws. After reaching agreement with the compliance agencies the District begins implementation of the CIDMP including the monitoring and adaptive management measures.

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Introduction to the Comprehensive Irrigation District Plan Manual

This manual is the resulting product of the substantial collaboration between Irrigation Districts, state and federal government, the Colville Tribes, and environmental stakeholders in the Irrigation District portion of the AFW process. The participants in Washington State's Agriculture, Fish and Water (AFW) Comprehensive Irrigation District Management Plan (CIDMP) development process set out to develop a voluntary and incentive based process for improving district operations in response to both Endangered Species Act (ESA) and Clean Water Act (CWA) concerns. The extensive collaboration during this manual's development has led to a better understanding by all participants of the varied values, legal requirements, constraints and needs associated with the ESA, the CWA and those who must conform with those laws. The participants worked collaboratively within technical workgroups and the Executive Committee to give substance to the outline, which would eventually lead to the content of the chapters contained within the CIDMP Guidelines manual.

The process described within and the supporting chapters should give the reader a general expectation for how the CIDMP development process will proceed. However, it is nearly impossible to provide for every specific circumstance or to shed light on all nuances of completing a CIDMP. Instead, one should view this planning process as being flexible and enabling. The AFW CIDMP process has not established a set of mandatory regulations or standards to be inflexibly applied. Instead, this manual outlines an agreed upon process that is open to refinement and adaptation in accordance with the needs of the CIDMP proponents, agency representatives and others participating in the CIDMP development.

The CIDMP process should be viewed as a unique voluntary approach to meeting the long-term goals of all parties to the agreement in a cooperative and mutually beneficial manner.

Endangered Species and Clean Water

In Washington there are presently 15 stocks of salmon, steelhead and bull trout listed as endangered or threatened under the Federal Endangered Species Act (ESA). In addition, there are 660 bodies of water listed under the Environmental Protection Agency's (EPA) 303(d) list for water quality problems under the Clean Water Act (CWA). The relationship of salmon and water is unquestionable, but the issue of how to recover salmon populations and improve water quality to be compliant with the ESA and the CWA; provide harvestable levels of fish for tribal cultural and economical needs; meet the desires of fishermen and special interest groups; and maintain viable industries can appear to be an insurmountable challenge.

The Governor's Salmon Strategy and the Genesis of the AFW Process

In 1998, "Extinction is not an Option" was released by Governor Gary Locke as a plan for salmon recovery in the State of Washington. The three parts to the general recovery strategy (the Forest Module, Agriculture Module, and Urban Module), each were to develop guidelines for improving land and water management practices that would be more sensitive to better protect rivers, streams and riparian habitats.

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Each strategy would be developed independently, but when combined would improve the health of the watersheds by promoting riparian and aquatic functions to provide for colder, cleaner and a much-needed water supply for salmonids and contribute to ecological improvements.

The Agricultural Strategy subsequently developed two distinct pathways for addressing endangered species and water quality issues. The first focused directly on farming practices through a revision of the Natural Resources Conservation Service's (NRCS) Field Office Technical Guide (FOTGs) used in developing farm plans.

The second focused on cooperating with Irrigation Districts in the development of a planning manual for achieving water conservation and water quality improvements in their water delivery and drainage systems. Together these two separate processes became known as the Agriculture, Fish and Water (AFW) process. The agriculture strategy involving both of these processes is a voluntary, incentive-based approach, and can provide regulatory certainty under the Endangered Species Act (ESA) and the Clean Water Act (CWA) for those who participate.

In July 1999, the Board of Directors of the Washington State Water Resources Association (WSWRA), representing Washington's Irrigation Districts, developed a white paper entitled "Programmatic Response-Irrigation District Operations" to describe their preferred method for addressing endangered species and water quality issues.

Over the past several months, various participants of workgroups, task groups and the Executive Committee worked to give substance to the outline which led to the eventual content of the chapters contained in this CIDMP Guidelines manual. The process was a broad collaborative effort to create a planning process that is both responsive to the long-term water needs of Irrigation Districts and the long-term environmental goals of aquatic habitat restoration, clean water and salmon recovery. Although this document was funded and developed primarily for and by the Irrigation Districts in order for them to develop their CIDMPs and be in compliance with the Clean Water Act (CWA) and Endangered Species Act (ESA), any irrigator (company or individual) should be able to use portions, or all, of this guidance document to assist them in fulfilling their own specific requirements under the CWA and ESA.

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AFW CIDMP Process Goals

The Goals and Objectives of the AFW Irrigation District Process are as follows:

1. Develop guidelines and science-based CIDMPs that provide a streamlined and efficient opportunity for Irrigation Districts to protect fish and water quality sufficient to comply with the ESA and CWA, and thereby contribute to harvestable levels of fish.

2. Provide assurances for the Irrigation Districts that district actions, in accordance with approved Guidelines and CIDMPs, will be in compliance with ESA and CWA.

3. Establish an adaptive management program to ensure that Guidelines and CIDMPs are meeting the objectives of the ESA and CWA, as well as the needs of participating Irrigation Districts.

The CIDMP guidance document is only a portion of the Irrigation District process and will assist the Irrigation Districts in achieving the aforementioned goals and objectives.

The Comprehensive Irrigation District Management Plan Manual

This manual describes a step-by-step approach to how an Irrigation District determines its need for species conservation and water quality planning in light of ESA and CWA. The manual also includes chapters explaining the background and intricacies of the ESA and the CWA.

The centerpiece of the planning process is the assessment phase of the CIDMP planning process. It is from this phase that the plan of action and the compliance pathways will emanate. The description of the assessment phase and the assessment matrix contained within are the product of much discussion and a comparison of methodologies utilized by the U.S. Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS) for determining species' biological needs, and EPA and the Washington Department of Ecology (Ecology) for water quality assessment. The assessment chapter and the matrix are to be viewed as guidance and may be modified and adapted as necessary to fit the needs of the specific CIDMP proponent when working with their Technical Advisory Team.

The assessment phase begins with the assembly of a Technical Advisory Team that will work with identified district representatives to agree upon the scope of the assessment. The assessment's scope will include the CIDMP's action area and the potentially affected species. The scope of the assessment may be determined by the resources available to the plan proponent and the Technical Advisory Team. Flexibility is allowed when determining the scope of the assessment but the extent of ESA and CWA coverage will be determined by the assessment's scope and resulting findings.

The biological assessment's findings will serve as clear direction for development of the district's CIDMP. It is at this point in the process that the CIDMP proponent should give serious consideration to the specific administrative pathway for compliance with the ESA. For example, the district may decide that specific actions already committed to and being developed under an ESA Section 7 consultation, as well as current activities to meet existing CWA Total Maximum Daily Load's (TMDLs) are sufficient for addressing both the ESA and CWA biological and water quality needs identified by the completed assessment. Alternatively, the proponent may determine that completing an ESA Section 10 Habitat Conservation Plan (HCP) is in the best interest of the district and may proceed with CIDMP development with that goal in mind.

The next phase of the CIDMP Planning will be for the district, in cooperation with the Technical Advisory Team, to develop a list of planned actions to address the issues identified by the biological assessment. This list should indicate a well considered responsiveness to the district's long-term water management goals as well as the identified aquatic habitat goals.

Once the planned actions are identified they should be listed and prioritized in an implementation plan. The CIDMP should also clearly identify methods for monitoring results and opportunities for adaptive management of the implementation to insure both water management and biological goals are being met.

The district should identify all sources of funding for items listed in the implementation plan. Project funding is an important factor in determining the likelihood of success of a CIDMP. All participants of the AFW Irrigation District process have committed to working to identify and develop funding opportunities in general. Funding sources may be created for exclusive access to those who complete the CIDMP process.

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This CIDMP process is likely to be an integral part of a negotiation with the USFWS and the NMFS and the Washington Department of Ecology regarding the district's preferred pathway for compliance with ESA and CWA and the time frame of coverage desired. The CIDMP must be approved through normal administrative means under ESA and CWA to achieve compliance under those laws.

An implementation agreement will be developed to document the specific commitments of all parties to achieve ESA and CWA compliance as well as the legal benefits to the district derived from compliance. The sample agreement included in this manual offers a glimpse into the form of the final agreement, but does not give full appreciation for the length and breadth of discussions which may lead up to that final agreement.

References and appendices are included in the back of this manual for use by the CIDMP participants.

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CHAPTER 1
Steps in Developing the CIDMP

Introduction

This chapter summarizes the steps suggested for developing a Comprehensive Irrigation District Management Plan (CIDMP). The individual steps are covered in greater detail in subsequent chapters of this document. This chapter also provides a suggested table of contents for a CIDMP.

The steps in CIDMP development can be considered in three stages:

- *Establish Framework for Planning:*
  - Step 1: Define Objectives, Assess Options and Determine Need for CIDMP
  - Step 2: Establish Technical Advisory Team
  - Step 3: Define Key Planning Parameters
- *Gather Information and Identify Actions:*
  - Step 4: Inventory District Facilities, Operations and Needs
  - Step 5: Assess District Impacts on Water Quality and Fish Habitat and Determine Needs
  - Step 6: Determine Comprehensive Action Plan for Meeting Needs
- *Define Implementation Program, Address SEPA Requirements, and Produce Plan Document:*
  - Step 7: Define Implementation Program
  - Step 8: Produce CIDMP Document
  - Step 9: Perform SEPA/NEPA Review
  - Step 10: Complete Agreements with Regulatory Agencies

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Step 1: Define Objectives, Assess Options and Determine Need for CIDMP

<u>Define comprehensive objectives for district operations, clean water compliance and ESA</u>

A CIDMP will be most effective if planned actions to improve water quality and fish habitat are embedded in a comprehensive program of actions to meet the full range of district objectives. Therefore, it is suggested that the planning process begin with a statement of all major objectives. For example, objectives may include:

- Ensure reliable water supply to meet district purposes;
- Maintain the district's financial viability;
- Assure compliance with applicable state and/or federal water quality requirements;

- Meet requirements for threatened or endangered species, as related to district activities;
- Comply with local, state and federal requirements affecting the district; and
- Ensure district facilities and operations do not put public safety and health at risk.

Actions may be identified in the CIDMP to meet one, several, or all of the objectives listed. The value of considering district actions in a comprehensive framework is that linkages in terms of objectives, funding sources, scheduling and other characteristics will be more apparent.

Assess Risk and Determine Need for CIDMP

Once the objectives and ESA pathways have been identified, the district should assess its exposure to risk and determine whether the potential benefits offered by a CIDMP outweigh the costs of developing and implementing the plan. Factors that may be considered in choosing to develop a CIDMP include:

- Potential for the district's operations to be impacted by ESA and CWA;
- Potential improved certainty due to assurances from regulatory agencies;
- Degree of protection from potential liability (e.g., third-party litigation);
- Potential improved availability of funding for ESA compliance and water quality improvements;
- Cost of developing and implementing the CIDMP.

Assuming the district decides to develop a CIDMP, the following sections outline the steps in the planning process.

Review ESA pathways and relationship to water quality objectives, and identify one or more desired pathways

Chapter 3 of this document outlines four pathways for compliance with ESA. These pathways are:

- Section 4(D) Special Rules
- Section 7 Interagency Consultation
- Section 10 Habitat Conservation Plans
- Avoiding take

At the outset of the planning process, it is important to take stock of the merits of each pathway relative to ID needs, especially in view of CWA compliance needs. Discussion of these pathways should also involve agency representatives, through the Technical Advisory Team (see Step 2, below).

This review will depend on particular circumstances of the district. The level of assessment of district impacts, determination of district actions, and appropriate steps in implementation will all be affected by the pathway selected. In some cases, a district may choose to pursue more than one pathway simultaneously. This will provide multiple options for subsequent decisions.

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Step 2: Establish Technical Advisory Team

Chapter 4 of this document describes the Technical Advisory Team, consisting of state and federal agency representatives, tribal representatives, outside scientists, and/or others. It is appropriate to establish this team early in the planning process, so team members can provide input on the steps listed below, such as definition of the action area and determination of the appropriate scope of the plan. Chapter 4 outlines a process for establishing the Technical Advisory Team, and designating a Lead Coordinating Agency.

The role of the Technical Advisory Team is to provide technical advice and assistance to the district during the scoping and formulation of the plan. This advisory role is intended to engage the early involvement and partnership of the appropriate federal and state agencies, tribes, and others. It is also to insure an efficient and coordinated effort for development of the plan, so that upon completion, it is sufficient to meet Endangered Species Act (ESA) and Clean Water Act (CWA) requirements.

Step 3: Define Key Planning Parameters

In any planning process, it is important to establish key planning parameters to guide development of the plan and provide boundaries for the elements considered. With respect to the CIDMP, important planning parameters include the action area for consideration, the scope of the plan, and the time frame encompassed by planned actions. These parameters are described further, as follows.

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Action area

This document uses the term "action area" to refer to the geographic area, both inside and outside district boundaries, that is affected by district actions. At a minimum, the action area will include lands and waters within district boundaries. Depending on circumstances of a particular district, the action area may also include various segments of natural or artificial waterways diverted or used for return flows. For example, the action area may extend upstream of the district's point of diversion; cover the river reach between diversion and return flow; and extend for some distance below the point where return flows enter a natural waterway.

Definition of the action area is closely related to development of the plan scope (see below). It will also affect the complexity, cost, and degree of protection under each of the four ESA pathways.

Scope of CIDMP

The scope of the CIDMP is essentially a list of impacts and actions that will be considered in the planning process. Elements of the scope may include:

- Species involved (including current listings and/or potential future listings);
- Specific habitat conditions appropriate for consideration;
- Specific water quality parameters to be addressed;

- Surface and subsurface hydrology;
- Level of detail appropriate in describing different elements of district facilities and operations;
- Aspects to be considered concerning facilities owned by other entities but operated to support district operations;
- Level of detail necessary for reviewing potential actions that are outside district control, or require participation by other entities.
- Extent to which the plan will rely on existing information, compared with collection of new data;
- Whether modeling (flow modeling, water quality modeling, hydrogeologic modeling, etc.) is necessary and appropriate for plan development;
- How "data gaps" will be factored into plan development;
- Consideration of potential partnerships with other entities;
- Integration of District plans with watershed planning processes (i.e., 2514 and 2496).

This list is not all-inclusive. Particular districts may identify additional elements that need to be considered in developing the scope.

Time frame for Planning

It is important to consider the time frame involved in planning. The time frame can be determined based on the needs, priorities and resources of the district. For example, a district may choose to develop a plan covering its activities over a 10 to 15 year period; a 50-year period, or some other period.

It should be recognized that the agencies involved would likely be more willing to commit resources to development of a CIDMP if it were to address a longer time period. In addition, the assurances available under ESA and CWA are likely to be more substantial for plans that commit the district to actions affecting a longer time period, and that provide more of the conservation needs of listed species.

The determination of the time frame covered by the CIDMP will affect the types of actions that can be considered (e.g. replacement of specific structures); financing options for district actions; and relationship to actions by other entities.

Step 4: Inventory District Facilities, Operations and Needs

The steps outlined above set the stage for the development of the CIDMP. Once the district has defined objectives, assessed options, formed a Technical Advisory Team, and defined key planning parameters (see Steps 1-3 above), it is ready to begin gathering the necessary information for the plan itself.

The first step in gathering information is to perform an inventory of district facilities, operations and needs. Chapter 4 of this document provides guidance on the inventory of facilities and

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operations, covering elements such as land base and land use; water supply and water rights; facilities, operations and maintenance; and water uses.

The district's needs in terms of upgrading or replacing facilities, and any planned changes in operations or policies should also be described. Later in the planning process, actions designed to meet these needs will be considered in a comprehensive framework together with actions responding to water quality and ESA needs (see Step 6, below).

Step 5: Assess District Impacts on Water Quality and Fish Habitat and Determine Needs

Chapter 6 of this document describes a process for assessing district impacts on water quality and fish and wildlife needs. A matrix is provided to identify the impacts associated with district actions that may be covered in the assessment. The emphasis is on use of existing studies, but in some cases new data may be necessary to adequately address the scope defined for the CIDMP.

Once impacts have been adequately defined, the district should identify specific needs related to habitat and water quality that should be addressed in the CIDMP action plan (see below). These needs should be considered in sufficient detail to permit the district to define specific actions that could remedy each need. In addition, prioritization of needs can assist in supporting the action plan and implementation program described below.

As part of the assessment process, it is important to identify data gaps related to impacts on habitat and water quality. The relationship of these data gaps to the plan should be explained. It is not expected that all data gaps will be addressed during the assessment process. It may be appropriate for the action plan (see Step 6, below) to include actions over time designed to collect new information. In some cases, the type of information needed may be more appropriate for collection by another entity, or through a cooperative agreement among several entities.

Step 6: Develop Comprehensive Action Plan

After completion of the inventory of facilities and operations, the assessment of impacts on habitat and water quality, and a comprehensive identification of needs, an action plan can be developed. The purpose of the action plan is to identify specific actions the district can take, alone or through collaboration with other entities, to meet the defined needs. As stated previously, the action plan will be most effective and implementable if it adopts a comprehensive perspective. The actions defined should fit within a practical framework and should be related to the objectives defined in Step 1, above.

Elements of the Action plan may include:

- ***Facilities Improvements.*** Physical upgrades, replacement, removal or construction of new facilities such as diversion structures, canals, settling ponds, pressurized piping, etc.
- ***Operational Changes.*** Adjustments to operations, practices or schedules designed to meet specific identified needs.
- ***Policy changes.*** Adjustments to district policies.

- ***Monitoring Program*.** Activities designed to fill identified data gaps, and/or track the effectiveness of specific actions and to support mid-course corrections that may be necessary to enhance effectiveness over time. For example this may include water-quality monitoring, either within district facilities or in receiving waters.
- ***Cost estimate for each action identifie****d*.

The purpose of each action with respect to the identified needs should be clearly explained. Criteria for selecting actions should be documented. Actions should be characterized as designed for short-term or long-term effects. The action plan may include actions that were already planned, as well as those identified through the CIDMP process.

Step 7: Define Implementation Program

Once a set of specific actions has been defined, an implementation program should be determined. Elements of the implementation program will include an adaptive management strategy (see Chapter 7), funding sources (see Chapter 8), priorities and schedule of implementing specific actions, and implementing agreements that may be needed with regulatory agencies or other cooperating entities (e.g., other Irrigation Districts, conservation districts, WRIA planning groups, etc.).

Where actions will be contingent on other events (e.g., actions by other entities, availability of outside funding, etc.) this should be documented. However, agency assurances will normally require firm commitments to carry out the actions involved, including commitments of the necessary funding. Where funding has not been secured at the time of plan preparation, funding commitments may need to be incorporated later, before completion of implementing agreement(s) between the district and the agencies involved (see Step 10 below).

Action plans may be implemented in phases. Phasing may be based on priorities identified in the plan, on availability of funding, on completion of studies to address data gaps, or on actions to be taken by other entities. The implementation program should describe phases and how they will be triggered.

In addition, the implementation program should describe an adaptive management strategy. This strategy should describe how actions may be modified over time, in response to new information. If possible, specific indicators should be identified that would trigger either continuance of the recommended actions, or a modification of the action plan.

Step 8: Produce CIDMP Document

Once all of the steps above have been completed, the district should document its analysis, action plan, and implementation program in the CIDMP document. A representative outline for a CIDMP is shown at the end of this chapter.

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The CIDMP document may be used as a tool by the district to guide its activities over time, as a source of documented information to be used in securing funding for planned actions from outside sources, and as the basis for formal agreements with agencies, as described below (see Step 10). All of these potential uses should be considered in preparing the document.

Step 9: Perform SEPA/NEPA Review

The CIDMP and/or specific actions defined within the CIDMP may require review under the State Environmental Policy Act (SEPA) and/or National Environmental Policy Act (NEPA). The district should assess how these requirements may be triggered. For example, NEPA may be triggered through a federal action such as issuance of an incidental take permit for an HCP. Once it is determined how SEPA and NEPA apply, the district should coordinate with the involved agencies to ensure SEPA and/or NEPA requirements are met.

Step 10: Complete Agreements with Agencies

Upon completion, the CIDMP becomes the basis for negotiated agreements between the district and regulatory agencies. Chapter 9 contains further information on these agreements. The objective of completing final agreements should be kept in mind throughout the planning process.

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Suggested Elements of a Comprehensive Irrigation District Management Plan

Executive Summary

Introduction and Purpose

Description of Action Area

ESA Compliance Pathway Choice

- Rationale for option chosen

Inventory of Irrigation District Facilities and Operations

- District Organization
- Land Base and Land Use
- Facilities, Operation and Maintenance
- Related facilities owned or operated by other entities
- Water Supply, Use, and Rights
- Water conservation measures

Assessment of District Operations on Aquatic Resources and Water Quality

- Covered activities and species
- Covered waterbodies
- Water quality and habitat assessment
- Data gaps
- Estimate of CIDMP effects

Action Plan

- Changes to Existing Service Area
- New Facilities Construction
- Reconstruction/maintenance of Existing Facilities
- Additional Sources of Water and Water Rights
- Additional Water Conservation Measures
- Operational changes
- New or revised district policies

Implementation Plan for CIDMP

- Scheduling and priorities
- Funding Sources

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- Permitting Issues
- Phasing
- Monitoring program
- Adaptive management strategy
- Implementing agreements
- SEPA/NEPA strategy

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CHAPTER 2

The Endangered Species Act and Clean Water Act: Compliance and Certainty

Introduction

Irrigation District operations may affect a variety of resources protected by the Endangered Species (ESA) and Clean Water Acts (CWA). The potential that such effects can render Irrigation District operations non-compliant with those Federal laws creates uncertainty regarding those ongoing activities; uncertainty that can interfere with the efficient operation of an Irrigation District.

Certainty or protective coverage refers to the ability of landowners/IDs to predict the consequences of government or citizen actions for a particular approach to compliance with the law. In the case of the ESA, there is concern that Irrigation Districts and their members may be vulnerable to citizen law suits or agency enforcement for "take" of a threatened/endangered species. Certainty can also be expressed in terms of eligibility for specified government funding programs if certain practices are agreed to. The common use of the terms "assurances" or "certainty" under the ESA is "protection" of landowners from citizen suits or enforcement in exchange for performing certain habitat restoration or protection activities.

There is no comparable authority under the CWA for citizen suits against landowners for nonpoint sources. Under Section 504 of the CWA, EPA could take enforcement action in cases of "imminent and substantial endangerment," regardless of point or nonpoint pollutant sources. Under Washington State law Ecology may take enforcement action for exceedances of water quality standards.

Furthermore, that same uncertainty can interfere with adequate conservation of resources these laws are designed to protect. Accordingly, the Irrigation Districts, State and Federal Governments, and environmental and tribal representatives in Washington State met under the aegis of the Agriculture, Fish, and Water Forum to develop planning guidelines that would enable Irrigation Districts to receive protective coverage under ESA and CWA, if their operations comply with the Endangered Species and Clean Water Acts, while ensuring that those activities yield environmental conditions that meet the needs of the resources protected by those laws.

Because the goals of the CWA and ESA are very compatible, these CIDMP guidelines have been developed so that Irrigation Districts can meet the requirements of both laws. This approach is supported by the regulatory agencies and may provide greater certainty for Irrigation Districts.

Clean Water Act

The goal of the Clean Water Act (CWA) is to restore and maintain the chemical, physical, and biological integrity of the Nation's waters. To accomplish this, the CWA takes both a technology and a water quality based approach. The technology or best management practices

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approach has been emphasized for many years. More recently, there has been more emphasis on the water quality based approach.

The "best management practices" approach is very familiar to farmers and Irrigation Districts. The "water quality based" approach to the Clean Water Act requires that, every two years, states prepare a list of water bodies that fail to meet water quality standards. All water bodies on the list need to have Water Cleanup Plans, also called Total Maximum Daily Loads (TMDL). The purpose of these plans is to determine the amount of pollution a water body can receive and still remain healthy for its intended uses, such as agricultural, industrial, drinking water, recreation, and fish habitat. The EPA must approve the plan.

Water Quality standards for Washington are adopted in rules (Ch 173-201A) by the Department of Ecology and approved by the Environmental Protection Agency. Additional information on standards can be found in Chapter 4 of these Guidelines.

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How CWA Standards are Set

The federal Clean Water Act sets out broad goals such as "fishable/swimmable" waters. To meet the broad goals, the CWA requires that states (and tribes that receive "treatment as states") set water quality standards pursuant to law, regulation, and guidance. The key components of water quality standards include:

- Beneficial uses (what we are trying to protect);
- Numeric water quality criteria (e.g. 64 degrees F.);
- Narrative criteria (e.g. no toxics in toxic amounts); and
- Anti-degradation provisions (keep good water clean).

These four elements together are termed water quality standards, but common usage often refers to the numeric water quality criteria as the standards. EPA lays out minimum water quality criteria, but states/tribes may adopt more stringent water quality standards. Where local circumstances warrant, states/tribes may adopt site specific criteria that are different from the minimum criteria, subject to EPA approval. This provision is not commonly used, and the justification required is substantial.

The Department of Ecology is in the process of developing" use-based" water quality standards. If this approach is approved, the beneficial uses within an ID's action area could change, and thus change the numeric criteria.

Once water quality standards are in place, states are required to develop lists of waters that exceed the criteria, the so-called CWA 303(d) list. These lists of impaired waters are published and subject to public comment. The CWA requires that a Total Maximum Daily Load (TMDL) analysis be produced for the impaired waters. In very brief terms, the TMDL:

- Assesses the impairments;
- Determines the desired future condition (what standards apply where and when);
- Determines what reduction in pollutants is necessary to meet the criteria; and

- Allocates the reductions among the sources, both point and nonpoint.

Unlike the ESA, the CWA allows EPA to delegate certain regulatory functions to states and tribes. The State of Washington is delegated virtually all functions allowable by law. The Colville Confederated Tribes have their own water quality standards that have been approved by EPA. The Clean Water Act requires that EPA retain approval over water quality standards, 303(d) lists, and TMDLs.

Because the TMDL is a valuable analytical tool, the parties to this agreement have determined to use the TMDL where appropriate, regardless of whether the waters of interest are on the 303(d) list. While a TMDL is required for impaired waters, its use is suggested for all waters for the following reasons:

- While a water body may not be presently listed as impaired, it may be subject to future listings if data suggests that need.
- The CIDMP's are designed to meet ESA and CWA in *one* process. It seems prudent to meet the requirement concurrently with the ESA requirements to avoid sequential processes.
- Even if the water body may not be listed at this time, a TMDL is a useful tool to prevent future exceedances by calculating the trends and degree of threat of exceeding the criteria; i.e., meeting anti-degradation criteria.

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Endangered Species Act

The National Marine Fisheries Service (NMFS) and the U.S. Fish and Wildlife Service (USFWS) (known collectively as the Services) are the federal agencies charged with implementing the federal Endangered Species Act (ESA). The ESA was enacted by Congress to respond to the nation's concerns regarding potential extinction of fish, wildlife and plant species. The ESA provides a means to conserve the ecosystems upon which endangered and threatened species depend, a program for the conservation of such species, and takes steps to achieve the purposes of existing treaties and conventions affecting wildlife, fish and plants.

The ESA requires that all Federal departments and agencies shall conserve endangered species and threatened species and shall utilize their authorities in furtherance of the Act, and that Federal agencies shall cooperate with State and local agencies to resolve water resource issues in concert with conservation of endangered species.

Sources of Uncertainty under the Endangered Species Act

Under the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531 *et seq*), the National Marine Fisheries Service (NMFS) and the U.S. Fish and Wildlife Service (USFWS, together the Services) seek to conserve the ecosystems on which threatened and endangered species depend by prohibiting the unauthorized "take" of species, among other things. Species "take" is conceptually simple. Under the ESA, take means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or to attempt to engage is any such conduct.[1] Take becomes

1 16 U.S.C. 1532(19)

more complex when these terms are further defined. "Harm," for example, is variously defined and application of the definition is contextual and changes depending on the species, the nature of the species habitat, and the effects of operations on those habitats. Regulations promulgated by the USFWS define harm in the definition of take in the ESA as an act which actually kills or injures wildlife, [including] significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering.[2] Recently, NMFS promulgated a definition of harm specifically for species under its jurisdiction. According to NMFS, harm in the definition of ''take'' in the Act means an act that actually kills or injures fish or wildlife. Such an act may include significant habitat modification or degradation, which actually kills or injures fish or wildlife by significantly impairing essential behavioral patterns, including, breeding, spawning, rearing, migrating, feeding or sheltering.[3] Yet, short of instances of clear take, *i.e.* those where an operator's action and the linkage of that action to a dead individual of a listed species are clearly identifiable, defining take remains difficult for the Services. In large part, the difficulty emanates from the diversity and large number of listed species, the variables in the functional habitat needs of those species, the myriad ways in which human development and other activities modify habitat. Accordingly, assessing whether one's business and other activities result in take is potentially complex. As a result, the regulatory prohibition against take can cause uncertainty as to whether activities that adversely affect listed species can occur in "compliance" with the ESA.

To address uncertainty regarding compliance with the ESA, the Services can provide protective coverage to entities that their activities comply with the ESA; even where those activities might adversely affect listed species. This protective coverage is authorized in the ESA and can be acquired through three distinct administrative vehicles or "pathways." Each of these vehicles is identified in a separate section of the ESA, provides different levels of assurance, and is available in certain circumstances. This chapter introduces the options for protective coverage under the ESA, each of which is discussed in more detail in Appendix C of this document. Appendix C was written to help applicants understand these pathways and choose the appropriate administrative vehicle to acquire protective coverage under the ESA. Such understanding should enable an Irrigation District engaged in ESA conservation planning to choose the pathway that best addresses their situation and needs. Appendix C also explains the situations and factors that influence the availability of these compliance options. Each pathway offers a unique combination of relative advantages and disadvantages. Again, the relative characteristics of the compliance options are also described in Appendix C, including a comparative description of tradeoffs associated with each, and a preliminary set of questions to help applicants select a preferred pathway.

2 50 C.F.R. 17.3
3 50 C.F.R. 222.102

CWA Compliance Assurances

Assurances under the Clean Water Act result from meeting water quality standards or developing a plan to meet water quality standards by some predictable date. Unlike the ESA, the CWA does not specifically provide additional pathways for assurances. However, if an Irrigation District decides to address water quality in their CIDMP, their efforts can be recognized and supported in several ways. First, this guidance has been written to include all the elements of a total maximum daily load. If the action area of one or several districts encompasses a watershed then the plan can be submitted through Ecology for approval by EPA as a TMDL. This satisfies CWA requirements for waterbodies listed as impaired and can also be considered as a preventative TMDL for those waters not on the 303(d) list but may be impaired or are predicted to exceed water quality criteria at some time in the future absent some preventive action by the Irrigation District. The water quality improvement plan submitted in the CIDMP can be adopted as part of the implementation plan, which is part of the TMDL.

In CWA terminology, the preferred way to obtain CWA assurances is to avoid exceedances of water quality criteria, but if criteria are exceeded, prepare a TMDL and implement it. Regulations promulgated by EPA in July 2000 may require an implementation plan to be submitted as part of the TMDL. The implementation plan would require documentation of authorities and steps, both voluntary and regulatory, which would provide reasonable assurance that the water quality criteria would be met in a designated time frame. The effective date and status of these regulations is in flux, and Irrigation Districts are encouraged to check with the CWA agencies to obtain the latest information. This requirement would not confer any new regulatory authority to EPA. In practice, implementation plans are already being prepared by the Washington Department of Ecology (Ecology), and include mechanisms such as National Pollution Discharge Elimination System (NPDES) permits, state law and regulations, local laws and regulations, voluntary activities (privately and publicly funded), and other implementation tools. Habitat Conservation Plans (HCPs) approved under Section 10 and rules issued pursuant to Section 4(d) of the Endangered Species Act may also be considered as part of an implementation plan.

Washington's water quality standards also endorse a Best Management Practice (BMP) approach (WAC 173-201A-160). In general, the rule says if BMPs are being applied and a violation of water quality standards still occurs, then additional BMPs may be required. The rule goes on to say, if BMPs are not being applied then formal enforcement actions may be pursued. Ecology and EPA are committed to a philosophy of working cooperatively with districts. Their enforcement efforts will be targeted toward activities that are contributing to problems, not those that are working to implement solutions.

Other Watershed Processes

Irrigation Districts who choose to follow these guidelines need to be aware of other water quality, water quantity, and species related assessments and activities in the watershed. Irrigation Districts may be only one element of an existing TMDL. Or, a future TMDL may be conducted at a scale far larger than the area of influence of the Irrigation District. Irrigation Districts are encouraged to play an active role with those ongoing watershed groups, share data, and provide input and support. For example, if an irrigation return flow is one of the limiting

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factors in the watershed assessment, then the CIDMP would fit into the watershed TMDL and implementation plan. If the TMDL is scheduled for the future, a CIDMP prepared in advance of the TMDL that meets the water quality criteria will be incorporated into the watershed or sub-basin scale TMDL in the future.

Additional materials on TMDLs and TMDL assessments are included in the Reference and Website sections of this document.

Endangered Species Act Compliance Options

As mentioned above, Irrigation Districts can assure that their operations comply with the general prohibition of take or other entities can currently comply with the ESA under Section 4(d), Section 7(a)(2), Section 10(a)(1)(B), and by conducting operations in ways that avoid take (Table 1).

Section 4(d) Rules

Section 4(d) of the Endangered Species Act states:

> "Whenever any species is listed as a threatened species...the Secretary shall issue such regulations as he deems necessary and advisable to provide for the conservation of such species."

As explained in more detail in Appendix C, this section of the ESA provides considerable latitude for promulgation of so-called "special rules" which apply only to threatened species. NMFS and USFWS use these special rules in different ways. One of the most significant differences is that when the USFWS lists a species as threatened, the species is automatically granted the same protections against take as a species listed as endangered. In any case, the effect of a 4(d) rule is to specify the general prohibition against taking a threatened species.

For example, NMFS has listed certain Evolutionary Significant Units (ESUs) of steelhead as threatened. For these ESUs, a 4(d) rule was recently finalized, applying the general prohibition against take. Included in the final rule were 13 limitations on the application of that general prohibition. Each of the limitations was based on the commitment to adopt and implement certain conservation programs that NMFS had already reviewed and determined would meet the needs of the steelhead. Irrigation Districts that have endangered species present will need to use another pathway to achieve complete ESA compliance (see Table 1). Appendix C provides further detail on how section 4(d) might apply in the context of an approved CIDMP.

Interagency Consultation Under Section 7

ESA section 7(a)(2) requires federal agencies to consult with the Services to ensure that they are not undertaking, funding, permitting, or authorizing actions likely to jeopardize the continued existence of listed species or to destroy or adversely modify designated critical habitat. Irrigation Districts with a federal nexus have the opportunity to use this pathway. The consultation process provides an opportunity to identify potential project effects, explore modifications that reduce or remove effects, and determine how to proceed when the underlying

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action is likely to adversely affect listed species or their designated critical habitat. The interagency consultation process and the underlying policies and procedures in use in Washington State are described in further detail in Appendix C.

Habitat Conservation Plans Under Section 10

Non-federal entities whose activities do not have the "federal nexus" required to participate in interagency consultation under ESA Section 7, can acquire a permit to engage in incidental take under section 10(a)(1)(B). ESA Section 10 sets out the process for preparing a Habitat Conservation Plan (HCP) as part of an application for an incidental take permit that authorizes the take of listed species. The HCP process and the criteria for issuing an incidental take permit are described in detail in Appendix C, as is the manner in which the CIDMP process and the HCP process integrate. Finally, Appendix C compares the relative merits and disadvantages of each of these sections as a means of garnering ESA compliance assurances (see Table 1 for a summary).

Avoiding Take

Each of the preceding sections describe an administrative pathway through which individuals and entities can assure that their activities that result in incidental take of listed species are compliant with ESA regulations. Not previously mentioned are those situations in which Irrigation District operations do not adversely affect listed species. For districts in that situation the need for protective coverage under CWA and ESA are probably diminished if not non-existent. The availability of this approach is highly context-dependent and may only be possible in locations in which there are no species that are listed or proposed for listing, or designated critical habitat present. Avoiding take is not an administrative option, expressly addressed in the ESA. Accordingly, Appendix C does not provide any detail on take avoidance as an approach to assuring ESA compliance.

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Table 1. Comparison of alternative ESA compliance pathways

Evaluation Criteria	Section 4(d) special rules	Section 7 interagency consultation	Section 10 habitat conservation plans		No effect actions
			Individual	Programmatic certificate of inclusion	
Availability	All applicants	Federal nexus required	All applicants	Anyone	Context dependent
Species covered	Threatened only	All listed	All	All	All
Cost					
Development	Moderate	Lowest	Highest (typically)	Variable*	Low
Implementation	Mod. to High	Low	Variable	Variable*	Low - high
Development time-line	Moderate	Short	Longest (typically)	Short to moderate*	Shortest
Applicant flexibility	Low	Moderate	Higher	Lower	Low
"Permit" duration	Variable	Short	Longest		N/A
"Long term certainty of protective coverage to landowner/ID	Moderate certainty	Low certainty	High certainty		Most certain
NEPA/SEPA requirements	Required	Required, 30 day min., comment period	60 day min., comment period		Required categorical exclusion possible

* *Depends on extent of up-front efforts to include specificity.*

Note: Rankings are comparative across rows, with different scales for each criterion. Entries represent the preliminary professional judgements of Irrigation District Workgroup members who have experience with various pathways. Criteria included here are not exhaustive, but those presented highlight the most substantive differences among pathways.

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Characteristics Shared by all Pathways

The sequence of steps in the Irrigation District management plan development process will be the same, regardless of the compliance pathway chosen. The steps are described in Chapter 1.

Choice of a compliance pathway will only affect the Irrigation District's distribution of effort among the steps and the level of involvement of federal action and regulatory agencies in plan development. All pathways presume that the activities proposed in Irrigation District management plans are legal and within the jurisdiction and authority of the applicant to conduct.

All compliance pathways will require Irrigation Districts to make decisions about which listed species (e.g., aquatics only or aquatic and terrestrial) and which district activities will be covered by their plan. The pathways that offer higher levels of applicant flexibility will provide districts greater opportunities to tailor coverage to their specific needs. However, some up-front decisions about scope of coverage will need to be made. Scope of coverage decisions have ramifications for the cost, development time, and regulatory certainty components of all pathways. In general, more inclusive approaches are more costly and prolonged, but also provide greater regulatory certainty.

Levels of regulatory certainty are proportional to the certainty of protection for listed species that a management plan provides. For example, providing a generous margin of safety in view of uncertain effects and securing funding adequate to ensure implementation of effective conservation or restoration measures, will enable regulatory agencies to provide more comprehensive and longer duration protective coverage under CWA and ESA.

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Preliminary Questions for Irrigation Districts

In addition to consideration of the previous text and tables, responding to the following questions may help Irrigation Districts reach well-informed decisions about which compliance pathway best meets their needs.

1. Which ESA compliance pathways are available?

    a. Are listed species, habitats or designated critical habitats present? (If "yes," continue with subsequent questions. If "no," then "no effect" pathway is the easy choice).

    b. Are only threatened species present? (If "yes," then "Section 4(d) special rule" pathway is available. If "no," then exclude the 4(d) pathway).

    c. Is there a federal agency that authorizes, funds, permits, or contributes to carrying out the Irrigation District's actions? (If "yes," then "Section 7 interagency consultation" pathway is available. If "no," exclude the Section 7 pathway).

    d. What are the Irrigation District's priorities regarding ESA compliance? Cost? Flexibility? Certainty?

e. Which pathways are feasible, given the Irrigation District's constraints?

f. Are other Irrigation Districts in the area amenable to developing a joint comprehensive management plan, and can joint planning make compliance pathways available that would not be feasible as a solo applicant?

Integrating CWA and ESA Compliance Options

An ID needs to determine a course of action relative to the ESA and CWA early in the planning process. Options range from doing nothing to preparing a Habitat Conservation Plan (HCP). As a first step, the Irrigation District needs to understand its legal vulnerabilities and environmental objectives. As part of that analysis, the Irrigation District should not only consider the ESA and CWA individually, but the two Acts together.

Integration of the ESA and CWA are prompted by several factors. First, the federal and state agencies do not wish to see landowners making good faith efforts to comply with one act become vulnerable under another act. Second, lack of certainty for the landowner/Irrigation District can be a disincentive for environmental progress; conversely, certainty can be an incentive. Third, the two Acts can and should be complementary in their goals and approaches. Finally, it is just good government to assist the public and avoid duplication or contradictions where the law allows.

The State of Washington has a process for approval of Best Management Practices (BMPs) for water quality that involves working with local conservation districts, Washington State University Cooperative Extension, and the public. Formal approval comes through Ecology and the state Conservation Commission. The BMP approach is also supported in water quality standard rules. If BMPs are in place and the standards are still not met, then Ecology will work with the landowners on practices to meet standards, and use that information to update the BMPs if necessary.

Where water quality standards are being exceeded, the expected government response is to prepare a TMDL, which will allocate the pollutant reduction load among the landowners/IDs. The term assurances in the CWA context has come to mean an understanding between landowners and EPA/Ecology regarding when and how TMDLs will be prepared, the relative degree of uncertainty in the data and assumptions leading to projections of when water quality standards will be met, and the adaptive management and monitoring program.

Earlier in this chapter is a discussion of the various sections of the ESA and the relative certainty provided by Sections 4, 7, and 10. The CWA has no specific provision for long-term certainty or incidental take permits such as is contained in Section 10 of the ESA. In part, this is due to the reality that water quality standards can change over time with new information or changes in beneficial uses or approaches to standard setting. For those waters on the 303(d) list, preparation, approval, and implementation of a TMDL offers a good degree of certainty. TMDLs can change as adaptive management informs the need for different allocations or implementation strategies.

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EPA is required by law to consult with the Services on the adequacy of state water quality standards to protect threatened and endangered species pursuant to Section 7 of the ESA. The federal nexus is the legal mandate that EPA approves all state water quality criteria and standards. Once EPA has completed that consultation, and the standards are approved, an affected landowner or Irrigation District can have reasonable assurance~~s~~ that if the water quality standards are met, there is little risk from the CWA for non-point sources. EPA sometimes approves the standards and consults after the fact.

Not all water quality criteria in the State of Washington have yet been subject to a Section 7 consultation. EPA and the Services are discussing a process that would accelerate the review and consultation of previously approved criteria that have not been through consultation. The authors of this guidance wish to acknowledge that water quality criteria are not set in concrete, as the CWA mandates periodic review of the ability of criteria to meet beneficial uses. And, any future listing of species under ESA could require modification of criteria. However, if the existing criteria are exceeded, it is highly likely that future criteria will be exceeded to an even greater extent. Putting best management practices in place as soon as possible will begin the trajectory toward achieving criteria and beneficial uses. We acknowledge that it may take years to achieve criteria even as new management practices come on line.

While meeting the water quality standards may not in itself provide full coverage under ESA, meeting standards for typical agricultural pollutants such as sediment, temperature, pesticides, fecal coliform, and nutrients usually involves some well-established Best Management Practices such as provision for shade (a buffer strip), sediment controls or treatment, fencing, etc. These practices typically complement or are identical to those practices sought for protection of threatened/endangered species. A jointly prepared Habitat Conservation Plan and TMDL may offer the highest degree of certainty for Irrigation Districts.

Those Irrigation Districts seeking the fullest measure of certainty may wish to cooperate in the production of a concurrent TMDL and Habitat Conservation Plan such as that prepared for the Simpson Timber Company's forest lands on the Olympic Peninsula. A jointly prepared HCP/TMDL links the ESA and CWA by using the water quality standards as a measure of success in the HCP, and may offer the highest degree of certainty. The prescriptions agreed to in the HCP (and the incidental take permit) provide much of the implementation assurance sought by EPA and Ecology. A citation for the Simpson HCP/TMDL is contained in the reference materials.

For example, an Irrigation District that wishes to prepare a HCP and concurrently deal with water quality impairments resulting from an irrigation return flow may find that a TMDL analysis will help quantify the reductions in pollutants necessary to meet water quality criteria at some designated point. This information could then inform the district as to the effectiveness of various options (on-farm practices, treatment, or a combination) available to meet the criteria. The HCP and TMDL would be two separate but related documents. There are also other options to achieve varying degrees of protection and certainty.

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If the Field Office Technical Guide (FOTG) process results in applicable ESA/CWA agreed-upon protective practices for on-farm activities, those FOTG practices could be the default practices for ESA and CWA purposes assuming that on-farm action is part of the chosen option. Adaptive management and monitoring will advise the Irrigation District and the agencies if the measures are meeting the objectives, and adjust as necessary.

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CHAPTER 3
Technical Advisory Team

Purpose

When an Irrigation District notifies the appropriate agencies that it intends to develop a comprehensive management plan, the agencies will help the district to form a Technical Advisory Team (TAT) to assist with plan development. The purpose of the Technical Advisory Team is to provide technical advice and assistance to the district during the scoping and formulation of the plan. The agencies will consult with the district and with other parties to determine which federal and state agencies' representatives, tribal representatives, outside scientists, and others may need to be involved in the plan's development.

The TAT's advisory role is intended to engage the early involvement and partnership of the appropriate federal and state agencies, tribes, and others. It is also to insure an efficient and coordinated effort for development of the plan, so that upon completion, it is sufficient to meet Endangered Species Act (ESA) and Clean Water Act (CWA) requirements (see Figure 3).

Participants are encouraged to invite and consult with the affected Tribe(s) involved in the management decisions that affect the aquatic resources upon which their treaty rights depend. The Tribes have a vested interest in the management of culturally significant resources and can provide important scientific and cultural reference to the success of the CIDMP. Tribal consultation and participation early within the process will aid in addressing Tribal issues and concerns up-front and help save considerable time in the development of the CIDMP.

The principal responsibilities and tasks for the Technical Advisory Team are:

- Provide consistency in technical advice and interpretations regarding procedural, regulatory, and statutory requirements.
- Assist with the collection of existing technical and scientific information necessary for preparation of the plan and environmental documents.
- Participate in conducting the evaluation and assessment components in the plan.
- Review and provide formal comment on the final draft plan and implement agreement documents.
- Prepare evaluations and recommendations, as appropriate, for agency policy officials.
- Participate in oversight activities and adaptive management as part of the plan implementation.

The Technical Advisory Team will utilize a core group of technical representatives and scientists, and provide a continuity of support, and consistency of assistance and interpretations to the district (and other parties participating in the process) during the plan's development, review, approval and implementation.

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The Technical Advisory Team may establish ad hoc workgroups as needed to address specific issues or elements of plan development. The team or workgroups may bring in additional technical or scientific staff as necessary to address specific plan developmental needs.

With the Technical Advisory Team, the district will establish the work plan and schedule for plan development. The district will also chair Technical Advisory Team meetings and provide administrative support.

The parties should recognize that disagreements, differences of interpretation and disputes concerning the drafting and formulation of the plan might occur from time to time. If such issues arise, the Technical Advisory Team members will work together to resolve the issues informally within the team process. If the situation involves agency policy issues, the matter may be elevated to the agencies' policy representatives for discussion and resolution.

Technical Advisory Team Core Agencies

Representatives from the following state and federal agencies (and possibly other agencies) which are most closely tied to the ESA and CWA implementation, will form the core of the TAT's:

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State Agencies

Washington State Department of Agriculture
PO Box 42560
Olympia, WA 98504-2560

Washington State Department of Ecology
PO Box 47600
Olympia, WA 98504-7600

Washington State Department of Fish and Wildlife
PO Box 43200
Olympia, WA 98504-3200

Federal Agencies

National Marine Fisheries Service
510 Desmond Drive SE, Suite 103
Lacey, WA 98503

US Fish and Wildlife Service
510 Desmond Drive SE, Suite 102
Olympia, WA 98503

US Environmental Protection Agency
15 W. Yakima Ave., Suite 200
Yakima, WA 98902

US Bureau of Reclamation
P.O. Box 815
32 C Street NW
Ephrata, WA 98823

Lead Coordinating Agency

The Lead Coordinating Agency will act as a single point of contact for the district to coordinate with Technical Advisory Team members. The agencies, working with the district, will determine and select an agency to serve as the Lead Coordinating Agency for the Technical Advisory Team**.** This assignment will reflect the variable extent of the agency involvement needed for plan development, and the agency's availability to assume this responsibility.

Technical Advisory Team Membership

The core agencies will determine additional members of the Technical Advisory Team as needed. The purpose will be to insure the necessary coordination, appropriate mix of technical and scientific expertise, knowledge of plan development needs, and a broad representation of interests.

Approvals

The Technical Advisory Team does not make final determinations on districts' CIDMP compliance with the Clean Water Act and the Endangered Species Act. The approval of plan documents is addressed in Chapter 9, Implementing Agreements.

Implementation Oversight

Upon completion, the Comprehensive Irrigation District Management Plan will re-establish the Technical Advisory Team as a Technical Advisory Oversight Committee, which will serve to advise and assist the district during the plan's implementation. The committee will be authorized to form subcommittees or groups, as needed, from within the overall committee.

The function of the Technical Advisory Oversight Committee is:

- Periodic review and evaluation of progress on Irrigation District management plan implementation;
- Periodic review and evaluation of progress on Irrigation District management plan implementation and effectiveness monitoring;
- Identification and resolution of issues and adaptive management needs that require discussion and decision; and
- Communication regarding management plan implementation.

The Technical Advisory Oversight Committee will be representative of the signatories to the agreement, and will have additional members appointed to effect broad representation during the implementation process. Included will be federal and state agencies, tribes, water users within the district, outside scientists, and interest groups, including environmental organizations and fish advocacy groups. Letters of appointment from the district will recognize the committee designees.

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The district will chair the Technical Advisory Oversight Committee, all subcommittees or work groups, and will provide administrative support. Annual Irrigation District management plan monitoring and evaluation reports will be prepared by the district for the committee.

The Technical Advisory Oversight Committee tasks and responsibilities will be consistent with the scope of duties and authorizations specified in the Implementation Agreement.

Implementation Activities/ Project Approvals and Authorizations

Certain local, state and federal laws and regulations may be applicable to specific implementation activities and projects identified in the district's management plan. The district should work with the core group of agencies represented on the Technical Advisory Oversight Committee to initiate coordinated permitting processes for these projects, to assure efficient and expedited permitting. Federal and state agencies and local governments should use their flexibility to coordinate requirements for management plan projects and synchronize their permitting processes (such as Shorelines, COE and HPA permits).

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CHAPTER 4
Inventory of Irrigation District Facilities and Operations

Introduction

The Irrigation District inventory items described below are suggested for each Irrigation District to include in their individual Comprehensive Irrigation District Management Plan (CIDMP). The goal is to survey district facilities, operations, and maintenance in a manner that will be helpful to the Technical Advisory Team and to those who will approve the final CIDMP. This list uses Referendum 38 (see Appendix B) as a model and is not a mandatory list.

The CIDMP program is designed to address both conservation and water quality issues. Districts should organize their inventory in a manner that best addresses their specific conservation and water quality goals.

A review of various completed Referendum 38 Comprehensive Conservation Plans may help to guide districts in completing this chapter. Review of other conservation and water quality plans may also be useful and acceptable for the purpose of completing the inventory. A district's inventory should include all necessary information about district facilities, operations and maintenance for which Endangered Species Act (ESA) and Clean Water Act (CWA) compliance will be sought.

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General Information

The CIDMP should include general background information that would be helpful in understanding the district's origin and its basic facilities, maintenance and operations. This subchapter should include a section specifically describing the district's organizational basis and structure, (e.g., organized under Title 87 RCW), number of acres served, operation and maintenance budgets and water user assessments.

Land Base and Land Use

Describe the district's legal boundaries and existing service area. Include any links to land use planning in the district or as it relates to other land use plans. Describe land use trends in the district such as urbanization or continued development of agricultural lands. Describe the agricultural cropping patterns and related water uses within the district's boundaries.

Water Supply, Use, and Rights

Explain the history of the district's water supply and the rights for the use of that supply, including water rights and contractual rights. Include information on the hydrology of the water supply source.

Present Facilities, Operation and Maintenance

Describe the district-operated facilities including diversions, fish screens, canals, laterals, reservoirs, hydro-power facilities, drains and wasteways, settling ponds, rights-of-way, water measurement devices or systems, natural watercourses used by the district for water delivery or drainage purposes, etc.

Also include a description of facilities not operated by the district but which play an important role in the district's overall operation (e.g., storage reservoir operations and hydroelectric facilities operated by the U.S. Bureau of Reclamation). It may also be necessary to list entities such as drainage districts whose operations are integral to the Irrigation District's operations.

The district should list and briefly describe maintenance activities that could potentially relate to ESA and CWA issues. For example, this section should list such maintenance activities as right-of-way maintenance, construction activities, ditch bank maintenance, weed control activities, application of aquatic herbicides, etc.

Water Use

The inventory should explain the district's water use efficiencies as related to its water delivery systems. It is not meant to require the district to evaluate on-farm water use efficiencies. However, the district could describe trends in on-farm conservation as a tool for better managing its water delivery system. These calculations will form the foundation for evaluating water conservation projects to be proposed by the district.

Future Water Use

Describe the relationship of predicted land use trends to the use of district water. This could include prediction of future cropping patterns, developments in on-farm irrigation techniques, and further development of agricultural lands within district boundaries.

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CHAPTER 5

Assessment of Effects of District Operations on Aquatic Resources and Water Quality

Introduction

The primary objectives of the assessment process are:

- To describe current environmental conditions, especially the effects of Irrigation District operations on water quality and the biological needs of species to be covered in their CIDMP, and
- To enable estimation of the changes in effects resulting from implementation of the completed CIDMP.

The scope of the assessment incorporates all areas affected directly or indirectly by Irrigation District operations (the action area). After current conditions are described, the assessment can then be used to develop an Action Plan (Chapter 6) that addresses impacts and ultimately results in achieving desired future conditions for the aquatic habitat.

Assessment of an Irrigation District's effects on aquatic resources and water quality builds on the Inventory of Irrigation District Facilities and Operations (Chapter 4). After deciding which facilities and operations need CWA and ESA coverage, the assessment can proceed as a series of steps:

1. Define the geographic scope of the action area.
2. Determine the waterbodies, species, and designated critical habitat to be covered.
3. Define the relevant CWA/ESA water quality parameters and ESA Habitat Pathways.
4. Compile and analyze existing water quality data and aquatic habitat data, and describe existing conditions.
5. Identify data gaps.
6. After completion of the Action Plan (Chapter 6), estimate changes in water quality and aquatic habitat condition that are likely to result from plan implementation.

Use of these assessment steps will promote incorporation of all information necessary to meet ESA and CWA statutory requirements.

Although certain district operations may not impact water quality or aquatic species habitat, the district should consider assessing these operations to ensure that those operations gain ESA and CWA coverage through the CIDMP. The proponent district should be aware that CWA and ESA coverage would only be for those operations addressed by the CIDMP. For example, the district may choose to assess only fish species or it may opt to include an assessment of its operations effects on other aquatic species. The district may choose to assess such pollutants as temperature, sediments (turbidity or total suspended solids), fecal coliforms, or chemical contaminants

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(nutrients, dissolved oxygen, pesticides, or aquatic herbicides) but may also decide to assess other potential pollutants.

An Irrigation District will determine the content of its assessment by selecting the aquatic species and pollutants for which it seeks coverage, and confirming with its Technical Advisory Team that the environmental parameters it intends to evaluate are sufficient. The district may choose to assess their operations in light of projected species listings and anticipated CWA 303(d) listings.

An Irrigation District's assessment process will benefit from using the information and tools presented in this chapter. In particular, Table 6, which associates typical Irrigation District operations with the effects of these operations on water quality and aquatic habitats, can help to guide information-gathering efforts. Furthermore, Appendix B provides summaries about various sources of information that may be useful during assessment preparation, and Appendix D presents the Services' approach to evaluating effects of actions on listed species.

Although an Irrigation District should seek out all available information related to the district's action area, districts are not required to conduct comprehensive biological and water quality studies in order to complete the assessment phase of CIDMP. Instead, the district can rely on existing data to complete the assessment. The district may also identify important data gaps and include data gathering as part of its CIDMP implementation plan.

Districts should access information from several sources, such as the local watershed planning process; the Conservation Commission's "limiting habitat factors" analyses; existing Irrigation District documents, such as Comprehensive Water Conservation Plans; existing Biological Assessments prepared by federal agencies under ESA Section 7 consultations; TMDL studies completed in the action area; USGS or USBR hydrological data; Public Utility District studies; studies conducted under the Power Planning Council's Ecosystem Diagnosis and Treatment program; or any other relevant study. A thorough search for relevant data is warranted because the completed assessment will form the foundation for the Action Plan (Chapter 6).

Assessment Requirements

To achieve simultaneous compliance with both the Clean Water Act (CWA) and the Endangered Species Act (ESA), Irrigation Districts will first need to assess the effects of their ongoing activities on water quality, listed species, and designated critical habitat. This assessment of baseline conditions will guide development of strategies for operational changes, habitat restoration, or construction of new infrastructure to achieve water quality objectives and avoid or minimize impacts to listed species.

If an Irrigation District develops a CIDMP that includes changes in operations, habitat quantity or quality, or infrastructure, the Irrigation District will also need to assess the anticipated effects of these changes. This chapter describes the necessary components of assessments that will enable regulatory agencies to determine the effects of ongoing Irrigation District operations and CIDMPs on aquatic resources.

In simple terms, the first objective of conducting the assessment of existing infrastructure and ongoing operations is to answer the question:

What is the existing condition or environmental baseline?

The answer to this question will set the stage for defining objectives for the desired future condition and for devising a specific strategy for reaching these objectives (see Chapter 6).

Assessments of this sort have traditionally been referred to as "snapshots." This analogy, however, does not adequately represent the scope of information that should be contained in the assessment. Rather than a "snapshot," the assessment of existing conditions may be better thought of as a "movie." A movie depicts a progression of actions through time. Likewise, the assessment should include information that describes the historic range of natural variation in environmental conditions (hydrology -- for example), as well as the range of variation in an Irrigation District's ongoing operations and maintenance that are possible within the constraints of current infrastructure and responsibilities. This retrospective analysis will set the stage for CIDMP development and the analysis of projected future CIDMP effects.

Answering the "baseline" question is best approached as a series of steps:

1. *Define the watershed(s) or geographic scope of the action area affected by the CIDMP*.

   The "watershed" is the assessment scale recommended for compliance with both the CWA and ESA. A watershed is typically defined as any area of land that drains to a common point; i.e., a hydrologically meaningful unit. This definition can apply to many spatial scales, but for the purpose of this assessment, a watershed is smaller than a river sub-basin, but larger than a drainage or site. This scale roughly corresponds to Water Resource Inventory Areas (WRIAs) or independent drainages within WRIAs, and typically covers areas from 50,000 to 500,000 acres.

   The action area refers to the area affected by, or in support of, district operations. The action area includes all lands and waterways within the district's boundaries, as well as off-site waterways affected by district discharges or by the manipulation of flows to deliver water to the district. The two objectives of the assessment phase of the CIDMP process can be summarized as an attempt to determine a district's potential contribution to achieving ESA and CWA goals. Thus, an Irrigation District's analysis should include an assessment of available information for the action area related to water quality, quantity, flow fluctuation, and other fish habitat conditions. The assessment should also include an analysis of the extent to which the district's operations contribute to known problems related to these physical habitat parameters.

   TMDLs are typically based on watersheds or water body segments. Irrigation Districts should strive to integrate their assessment of water quality into existing or anticipated watershed-scale evaluations. If a single Irrigation District does not encompass a hydrologically meaningful unit, then it may be necessary to use an adaptive management approach to incorporate its assessment into a subsequent TMDL analysis done at a watershed scale (Rea 1999). If Irrigation Districts cooperate to develop joint CIDMPs that conform to the traditional scale of TMDL

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development, this will promote watershed-scale assessment and overall streamlining of the compliance process.

Although ESA compliance is typically based on land ownership boundaries, description of the environmental baseline and determination of the effects of proposed actions are based on watershed-scale assessments. ESA compliance pathways can accommodate multiple joint applicants (e.g., the Snohomish-King-Pierce county HCP), but close coordination among the applicants is necessary.

Pursuing a grouped, versus an independent, CIDMP may provide both advantages and disadvantages. Potential advantages of a grouped CIDMP include increased regulatory certainty associated with covering a hydrologically meaningful unit, more diverse opportunities for avoiding, minimizing, or mitigating effects on listed species while maintaining operational efficiency, and cost sharing for CIDMP development. Disadvantages of a grouped CIDMP include reduced flexibility associated with trying to reach consensus among parties, and excessive complexity associated with attempting to integrate district operations. Each Irrigation District will need to evaluate these tradeoffs early in the process of developing a CIDMP.

A single Irrigation District or a group of Irrigation Districts generally will not have jurisdiction over entire WRIAs or drainages within WRIAs. Nonetheless, the assessment of baseline conditions should be conducted at this scale to determine how a resulting CIDMP could most effectively contribute to achieving properly functioning condition within an entire watershed.

2. *Determine applicable 303(d) listings (what water bodies are not meeting standards and for which parameters), determine which listed species or designated critical habitats are present, and decide which of these species and habitats will be covered by the CIDMP*.

   If no 303(d) listed water bodies, listed species, or designated critical habitat is found within or downstream of an Irrigation District's area of jurisdiction, then the assessment described in this chapter is unnecessary. An Irrigation District in this enviable situation would simply need to continue operating in a way that did not degrade current water quality.

   Water bodies included on the Washington 303(d) list are found on the Washington Department of Ecology (Ecology) website (http://www.wa.gov/ecology/wq/). This information may also be obtained as hard copy from Alison Beckett, (360) 407-6456, e-mail: abec461@ecy.wa.gov

   The Services' final rules for listed species contain descriptions of suitable habitat and lists of watersheds that contain populations. More site-specific information can be obtained from the Washington Department of Fish and Wildlife (WDFW) Salmonid Stock Inventory, or by contacting local WDFW, Tribal, or U. S. Forest Service biologists. Listed species and designated critical habitats for a particular location can also be determined by requesting a species list from the local field offices of the

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NMFS and USFWS. This request for a species list can also serve as a notification for the regulatory agencies that an Irrigation District or group of Irrigation Districts is beginning work on a CIDMP. Early notification will help ensure early participation in the Technical Advisory Team (see Chapter 3).

Irrigation Districts should consider including all federally listed wildlife species likely to be incidentally taken through the duration of their CIDMP. If an Irrigation District does not include a species that the Services later determine likely to be taken during CIDMP implementation, then implementation could be stopped or delayed after the plan has been completed and a permit has been issued for "covered" species.

Likewise, Irrigation Districts should consider including unlisted species that are likely to be listed during the life of the CIDMP. Doing so can protect Irrigation Districts from delays associated with amending their CIDMP, and may also provide assurances associated with the "No Surprises" rule for HCPs. In particular, Irrigation Districts within the range of Southwestern Washington/Columbia River coastal cutthroat trout (*Oncorhynchus clarki clarki*) should consider including this species, which is proposed for listing, and is currently subject to an extension of the interim period before publication of a final listing rule (65 FR 20123). A final rule is expected in the spring of 2001. Irrigation Districts in eastern Washington should consider including assessment of effects on westslope cutthroat trout (*Oncorhynchus clarki lewisi*). Adding species adds complexity, and Irrigation Districts may need to balance regulatory certainty with manageability and cost considerations.

3. *Define the relevant CWA/ESA water quality parameters and ESA Habitat Pathways*.

The following water quality parameters are also essential determinants of aquatic habitat quality, and are therefore likely to be components of all Irrigation District assessments:

- Temperature
- Flow/hydrology
- Sediment (turbidity/total suspended solids)
- Chemical and biological contaminants (e.g., nutrients that affect dissolved oxygen, pesticides, aquatic herbicides, fecal coliform).

The need to assess additional water quality parameters may be determined through discussions in the Technical Advisory Team.

Temperature: Current temperature criteria for waters in Washington vary depending on water-body classification (Chapter 173-201 WAC). These standards are currently under review and may be replaced with use-based standards (see Table 4). In this step, Irrigation Districts should determine which current water quality standards (i.e., Class AA, A, B, or Lake) apply to water bodies in their assessment area. In anticipation of the proposed transition to use-based standards, Irrigation Districts

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should also compile information on the beneficial uses of water bodies in the assessment area.

Water temperature criteria also vary among listed species, with criteria for bull trout being the coldest (see Table 4). If no listed species are present, an Irrigation District will need only to meet CWA temperature standards. If listed species are present, an Irrigation District should seek to achieve the temperature criteria for the species with the most stringent requirements. Ongoing negotiations among regulatory agencies may ultimately result in consolidated temperature criteria. In the interim, the temperature criteria incorporated into CIDMPs may vary depending on which species are covered.

Temperature regime is one of the most important factors affecting the distribution and status of listed salmonids, particularly bull trout (Rieman and McIntyre 1995, McCullough 1999). Increases in the thermal regime of a water body can have a variety of deleterious effects on salmonids including reducing the distribution of spawning and rearing habitat, increasing egg infertility and mortality rates of eggs and juvenile fish, reducing growth rates, and increasing the susceptibility of all life stages to infectious diseases (reviewed in McCullough 1999). The temperature regime of streams is also closely associated with the flow regime. In general, temperatures tend to be cooler at higher rates of flow.

Flow/hydrology: Flow is also closely interrelated with other water quality parameters. High flows often contribute to maintaining lower water temperature, diluting chemical and biological contaminants to benign concentrations, and flushing fine sediments from the stream substrate.

The relationship between flow/hydrology and salmonid status is often expressed as "fish need water." While this expression is true, it does not capture the numerous ways in which the volume and temporal aspects of flow interact with different life stages of salmonids, nor the critical role flow plays in shaping aquatic habitats. In order to thrive, fish need water of a particular quality, for a certain period of time, in locations where other critical habitat features are also present. The importance of the natural flow regime on the health of salmonid populations is difficult to overstate.

The Washington Department of Ecology's Water Resources program establishes minimum instream flows using the Instream Flow Incremental Methodology (IFIM), toe-width, or Tennant Methods. Descriptions of these methods and a list of water bodies for which the Ecology has set instream flows can be obtained at: www.ecy.wa.gov/programs/wr/sw/swtr. Ecology is developing a white paper, which summarizes flow-related issues for use by planning groups (Rushton 2000, draft; www.ecy.wa.gov.programs/wr/sw/if-v12cl).

If instream flows have not been set for the water bodies affected by an Irrigation District, determining these flows will be a critical information need. The IFIM is the preferred approach. Use of alternative methods, including new instream flow approaches currently under development, would require explicit approval from the

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Technical Advisory Team that is assisting with CIDMP development. Instream flow studies are complex, time consuming, and expensive, however, and Irrigation Districts are encouraged to coordinate with local planning units and Ecology to complete these studies.

Sediment: Undisturbed streams typically maintain equilibrium between sediment input and sediment transport (Everest et al. 1987, Waters 1995). Anthropogenic disturbance of this equilibrium generally results in a reduction in the complexity or "roughness" of stream channels, and concomitant acceleration of fine sediment transport. Upslope activities typically increase rates of fine sediment delivery to stream channels. In agricultural landscapes, sheet and rill, gully, and ephemeral gully erosion from hillslopes introduce most sediment into streams (Castro and Reckendorf 1995).

Impacts of sediment on fish habitat are influenced by both the amount of sediment delivered to streams and subsequent transport or deposition of these sediments.

Fine sediments are transported as suspended sediment (silt- and clay-sized particles) or as bedload (coarse sands or larger particles). Both transport mechanisms are strongly influenced by flow rate and channel complexity. The most adverse affects of fine sediments on fish occur when high rates of sediment input are coupled with stabilized low flows and decreased channel complexity, resulting in relatively heavy and spatially homogeneous deposition of sediments.

Adverse impacts of fine sediment on salmonids typically result from reduction in the permeability of spawning gravels, reducing intragravel water flow and oxygen availability to developing embryos (reviewed in Everest et al. 1987). Reduced oxygen supplies can result in mortality or stunted growth. Fine sediments can also physically interfere with the emergence of salmonid fry from the gravel. The inverse relationship between amount of fine sediment and fry survival is well established (reviewed in Everest et al. 1987). Increased fine sediments can also reduce the availability of macroinvertebrates, a primary food source for rearing salmonids (Waters 1995). Perhaps the most pervasive adverse effects of fine sediments on salmonids is in terms of changes in habitat structure and stream morphology that reduce the area of suitable freshwater habitat available for salmonid populations. The role of sediments as a limiting factor in salmonid production, however, is not well understood.

Unlike many chemical pollutants, sediment is a vital natural component of waterbodies and the uses they support. However, sediments can impair beneficial uses other than fish habitat. Sediments can cause taste and odor problems, block water supply intakes, foul treatment systems, and fill reservoirs. High levels of sediment can impair swimming and boating by altering channel form, creating hazards due to reductions in water clarity, and adversely affecting aesthetics (USEPA 1999a).

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Because erosion is a natural process and some sedimentation is needed to maintain healthy stream systems, it is often necessary to evaluate the degree to which sediment discharge in a particular watershed exceeds natural rates or patterns. This analysis can be complicated because sedimentation processes in any systems are highly variable from year to year. This type of analysis is particularly important in most areas of Washington, which are vulnerable to high natural sediment production rates and are particularly sensitive to land disturbance. Erosion rates under natural and disturbed conditions can be compared through several approaches, including comparative analysis with reference streams and literature values for similar settings (USEPA 1999a).

Sediment water quality analysis is less straightforward than analysis of many other pollutants. Adverse sediment discharges usually occur as a result of changes in processes that influence erosion and the capacity of watersheds to store sediment and transport it through the system. To evaluate potential impacts of land management activities on designated uses, the analyses must assess the influence of land management activities on factors such as changes in erosion processes, water discharge amounts and timing, and channel form. This assessment requires evaluation of the extent to which existing conditions diverge from natural conditions and how existing conditions will respond to planned land management activities (USEPA 1999a).

A source assessment is needed to evaluate the type, magnitude, timing, and location of loading of sediment to a waterbody. A number of factors can be considered in conducting the source assessment. These factors include:

- Identifying the various types of sources (e.g., point, non-point, background),
- The relative location and magnitude of loads from the sources,
- The transport mechanisms of concern (e.g., runoff vs. mass wasting),
- The routing of the sediment through the waterbody, and
- The time scale of loading to the waterbody (i.e., duration and frequency of sediment loading to receiving waters) (USEPA 1999a).

Chemical and biological contaminants: Chemical contaminants, especially pesticides and heavy metals, can affect fish and other aquatic organisms in both apparent and subtle ways that decrease reproductive success and survival. Acute toxicity of contaminants to fish is well described. Subtle effects of contaminants include increased stress, diminished swimming performance, developmental anomalies, and behavioral disruptions, especially of migratory behaviors. Subtle effects, however, are difficult to detect for many reasons, including poorly understood effects of breakdown products. Likewise, synergistic adverse interactions among contaminants, host immune response, and pathogens also occur (Arkoosh et al. 1998). Indirect effects of contaminants on the invertebrate food supply of fish can also reduce growth rates and probability of survival.

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Excess nutrients can also have adverse effects on fish and aquatic life (as well as other beneficial uses). For example, nitrites have adverse effects on both freshwater fish (Eddy and Williams 1994) and amphibians (Marco et al. 1999). Indirect effects of excessive nutrient enrichment (eutrophication) occur primarily through oxygen depletion resulting from microbial decomposition of dead plant matter. Eventually, extreme oxygen depletion can stress or eliminate desirable aquatic life and nutrients, and toxins may also be released from sediments when dissolved oxygen and pH are lowered (Brick and Moore 1996). Breakdown of dead organic matter in water also can produce un-ionized ammonia, which can reduce hatching success, reduce growth rate and morphological development, and injure gill tissue, liver, and kidneys (USEPA 1999b). At extreme ammonia levels, fish may experience convulsions, coma, and death (USEPA, 1986; revised 1998).

Source assessments for chemical and biological contaminants need to consider most of the same factors as sediment source assessments. The objectives of the source assessment are:

- To develop a comprehensive list of the potential and actual sources of contaminant or nutrient delivery to the waterbody of concern;
- To account for the load originating from the identified sources in the watershed;
- To document the location or spatial extent and distribution of sources and the processes important for delivery to the waterbody, using GIS or maps; and
- To group sources into some appropriate management unit (e.g., by delivery mechanism or common characteristics) for evaluation and analysis.

In some cases, for example when no numeric water quality standard is set and only a narrative standard is available, source assessment may be accomplished by measuring indicators rather than by direct measurement of the contaminant or nutrient (USEPA 1999b).

After relevant water quality parameters have been defined, Irrigation Districts should also identify relatively pristine portions of their defined action area (e.g., tributaries crossing Irrigation District canals). The baseline condition of these pristine areas will also need to be assessed in order to comply with the non-degradation provisions of the CWA. Final CIDMPs will be expected to include clear provisions that ensure water quality and habitat in pristine areas are not degraded (Rea 1999; see Chapter 5 of this document).

In addition to water quality effects, Irrigation District activities can affect aquatic habitats through a variety of habitat pathways (see Glossary and Table 6). The Services define habitat conditions necessary to ensure the continued existence of listed salmonid species in terms of a concept called properly functioning condition (NMFS 1996, 1999; USFWS 1998). Properly functioning condition (PFC) is the sustained presence of natural habitat-forming processes in a watershed that are necessary for the long-term survival of the species through the full range of environmental variation.

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Habitat condition is evaluated in terms of diagnostics or pathways (e.g., channel condition and dynamics), and specific "indicators" within these pathways (e.g., the ratio of average wetted width to maximum depth in scour pools in a reach). These pathways and indicators have been collected into matrices used by the Services to evaluate the effects of activities on habitat condition; referred to as Matrices of Pathways and Indicators (MPI – see Appendix C for a full explanation of the design and use of these matrices). The information gathered for each indicator is evaluated as indicating that the habitat is "properly functioning," "at risk," or "not properly functioning." Actions that degrade habitat condition, maintain "at risk" or "not properly functioning" conditions, or retard attainment of PFC are considered to have adverse effects on listed salmonids using that habitat.

Irrigation Districts should use Table 6 to identify district activities that have the potential to affect fish populations and habitat. Table 6 depicts the most likely effects of Irrigation District activities, but others may occur and these should also be discussed in the assessment. In addition to Table 6, which simply helps assessment teams identify which Irrigation District activities affect which habitat pathways, the documents describing the matrices of pathways and indicators for salmon and steelhead (NMFS 1996) and for bull trout (USFWS 1998) will be essential tools for completing assessments. These documents contain specific measurable indicators of habitat characteristics and numeric and descriptive criteria for evaluating habitat condition (see Appendix D).

The habitat pathways and indicators to be assessed by an Irrigation District will be selected from the following list (see Glossary and the Services' matrices of pathways and indicators, Appendix D):

- Habitat access;
- Substrate embeddedness;
- Large woody debris;
- Pool frequency, quality and size;
- Off-channel habitat;
- Width to depth ratio;
- Bank condition;
- Floodplain connectivity;
- Road density and location;
- Disturbance regime;
- Riparian areas, and
- Subpopulation characteristics.

Cooperation between Irrigation District staff and agency biologists may be needed to refine the scope of the assessment of aquatic habitats. Irrigation District staff members have the most in-depth knowledge and data regarding the operations and

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maintenance of their facilities. Agency biologists understand the habitat needs of listed species. Combined effort may be necessary to select appropriate pathways and indicators and to describe and assess the ongoing environmental effects of Irrigation District activities on habitat elements.

4. Compile and analyze existing ambient water quality data and aquatic habitat data.

The objective of this step is to gather all the data that will be necessary for Ecology to complete a TMDL, and for the Services to evaluate fully the effects of ongoing Irrigation District activities. Some general types of data that may be collected include:

- Hydrology of the system;
- Channel types;
- Lithotopo classification (e.g., see Cleland et al. 1999);
- Land use;
- BMPs in place;
- Water quality ambient and pollutant loading data;
- Surrogate measures for water quality parameters (e.g., percent effective shade as a surrogate for temperature; Cleland et al.1999);
- Bioindicators (e.g., the benthic Index of Biotic Integrity (B-IBI; Karr and Chu 1999), and
- Data for each habitat pathway relevant for the CIDMP being prepared.

Compilation and analysis of existing data will be the most substantive part of the assessment. Ideally, Irrigation Districts will not need to generate much new data in order to complete their assessments, instead relying on existing information. The Services' accepted standard for inclusion of information in biological assessments is "the best scientific and commercial data available," and includes published literature as well as professional opinions of recognized experts.

Existing information, however, may be either very limited or overwhelmingly voluminous, and contradictory information is likely to be encountered. Synthesizing this information into a useful assessment within tight time frames will undoubtedly be challenging. During the process of sorting information to include in an assessment, teams should be guided by the primary objectives of this effort:

- To describe baseline environmental conditions, especially the effects of ongoing Irrigation District operations on water quality, species, and critical habitats to be covered in the CIDMP, and
- To enable estimation of the changes in effects resulting from implementation of the Irrigation District's Action Plan.

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Keeping these objectives in mind will help assessment teams make appropriate decisions about the most informative ways to present existing information. The benefit of producing a clear, concise, and comprehensive assessment will be expedited compliance.

To aid in the processes of collecting and evaluating appropriate data, Appendix B outlines several existing assessment frameworks, which may prove to be useful sources of information for Irrigation Districts. Habitat limiting factors reports developed by the Conservation Commission, the information system and reports developed by the Salmon and Steelhead Habitat Inventory and Assessment Program's (SSHIAP), and planning documents prepared by HB2514 and HB2496 lead entities will be particularly useful.

From the Services' perspective, the assessment completed by Irrigation Districts will serve a function analogous to that of a Biological Assessment provided to initiate formal section 7 consultation (see 50 CFR §402.12(f) and the Services' Endangered Species Consultation Handbook, pages 3-10 to 3-11) or the Identification of Project Impacts segment of an HCP application (see HCP Handbook, pages 3-10 to 3-18). Analysis of the compiled data should reveal:

- The effects of ongoing actions on species and their habitats, including indirect effects,
- The cumulative effects of future non-federal activities reasonably certain to occur within the action area during the period of CIDMP implementation, and
- Estimated changes in effects to aquatic resources resulting from implementation of the Irrigation District's action plan.

Irrigation districts should strive to make quantitative estimates of take of individuals and habitat elements (using appropriate units) whenever possible. Maps that overlay habitat use with activities proposed in the Action Plan can be useful analytical tools. Copies of exemplary assessments for aquatic species, previously prepared by other federal agencies or HCP applicants, can be obtained from Technical Advisory Team members or directly from the Services (see Appendix A).

The assessment approach described in this document differs from others described in Appendix B in that it is:

- Sector-specific; i.e., tailored to the activities of water purveyors.
- Intended to accommodate both CWA and ESA information needs.
- Structured around the Services' matrices of pathways and indicators.

Although all of these factors increase the specificity of the types of information to be included in these assessments, these data elements are included under general headings found in most other watershed assessment and analysis protocols used in Washington. Because of this overlap, and because Irrigation Districts will largely be relying on information generated by these ongoing assessment programs, Irrigation

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Districts are expected to produce assessments that are consistent with these other programs.

The state of Washington is in the process of developing statewide watershed assessment guidance. This effort aims to build on existing assessments and to achieve greater standardization of both the conceptual foundations and technical approaches used across the state. Increased standardization is expected to allow for aggregation of results across spatial scales and comparison of watersheds based on similar measures.

The draft statewide guidance focuses on describing physical and ecological processes underlying watershed function, and identifying ways in which degradation of these processes have contributed to diminished habitat quantity and quality for salmonids. The guidance uses a checklist approach to ensure that all of the key components of watershed structure and function are fully evaluated. Elements of the checklist include:

- General watershed description;
- Stock status and trends;
- Habitat-forming processes;
- Salmonid life history – habitat relationships, and
- Synthesis of assessment results.

The content of each element is further elaborated with specific key components that should be completed in a full assessment. Approaches for data compilation and analysis for each key component are also provided.

The draft statewide guidance provides a promising framework for conducting watershed assessments. If this guidance is adopted as part of the Statewide Strategy to Recover Salmon, then watershed-planning entities that use this approach are likely to develop process-based assessments of watershed environmental baselines. The Services' matrices of pathways and indicators, however, tend to focus on measures of structural aspects of watershed condition, which are typically easier to measure than watershed process rates. How process-based watershed assessments will be integrated in practice with assessments of Irrigation District effects is unclear at this time. Because changes in watershed structural features are caused by changes in process rates, assessments using the statewide guidance could provide the process context for understanding observed patterns of change in structural conditions. The combination of assessment tools may yield a more comprehensive understanding of which factors are causing problems for salmonids in a watershed than either approach used alone. This improved understanding could help Irrigation Districts determine which types of actions would most effectively address problems in their watersheds.

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5. *Identify data gaps* (for all variables listed in step 4, above).

Irrigation District assessment teams may find that they lack, and cannot readily obtain, essential information about conditions in their watershed. These data needs should be explicitly described in the assessment. Furthermore, the implications of data deficiencies and the risks of proceeding given the quality and extent of currently available data should be discussed. If assumptions were made in the absence of information, these assumptions also should be explicitly stated. Finally, the assessment should include recommendations for prioritizing data collection (USDA and USDI 1995).

Options for circumventing data gaps such as using data from a larger spatial scale, extrapolating from representative sub-areas, or collecting the needed information should be discussed with the Technical Advisory Team.

Identification of existing data gaps regarding current environmental conditions is the last step in gathering and analyzing information to answer the "baseline" question. Once the watershed's range of natural variation has been described, and effects of ongoing operations on water quality, species, and critical habitat have been evaluated, an Irrigation District has the background information necessary to develop its Action Plan. After the Action Plan has been developed, the final step in the overall assessment process is to estimate changes in effects resulting from implementation of the Action Plan.

6. *Estimation of CIDMP effects*.

The second objective of the assessment process is to enable estimation of the changes in effects resulting from implementation of the completed CIDMP. This step in the assessment process must necessarily follow development of the Irrigation District's Action Plan of action (see Chapter 6). The assessment of baseline conditions, however, is likely to provide clear recommendations regarding types of actions that should be considered for inclusion in the CIDMP; i.e., those actions that would most effectively avoid or minimize adverse effects to water quality or covered species.

Estimates of changes in effects need to be completed for all relevant water quality parameters and habitat pathways included in the baseline assessment, as well as any additional parameters or pathways that will be affected by the planned changes in operations. For example, if a CIDMP includes planned expansion of the service area of an Irrigation District, new effects or changes in levels of effect associated with this expansion will need to be estimated and described (Table 6 may be useful for determining estimation needs for new effects).

From the perspective of the regulatory agencies, the estimation of future effects is a critical component for determining if water quality standards and the conservation needs of covered species will be met. This determination in turn plays an important role in determining the quality and duration of assurances the regulatory agencies are able to grant to an Irrigation District proposing a plan. Consequently, assessment

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teams should provide thorough documentation to support that their estimates of CIDMP benefits and impacts are based on the best scientific and commercial data available.

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Table 4. Comparison of NMFS, USFWS, and Ecology water quality criteria.

	NMFS **Properly functioning condition**	**USFWS** **Functioning appropriately**	**Ecology** **Existing standards**	**Ecology** **Proposed use-based standards (DRAFT)**
Temperature	10 – 14 °C (50 to 57 °F)	7 – day **maximums** by life stage: Incubation 2 – 5 °C Rearing 4 –12 °C Spawning 4 – 9 °C Migration (adult) < 15 °C	Not to exceed: Class AA 16 °C Class A 18 °C Class B 21 °C Lake class – no measurable change from natural conditions. If natural conditions below standard, natural conditions become the standard.	7-day avg. of daily max (°C) / **Single** day max. (°C) Bull trout and Dolly Varden Sep 1 to Sep 15 8 10 Sep 16 to Apr 14 6 8 Apr 15 to Aug 31 11 13 Cutthroat trout 11 13 Salmon and steelhead May 8 to Jul 31 13 21 Aug 1 to Sep 22 13 18 Sep 23 to May 7 11 13 Rainbow trout Jun 1 to Aug 31 18 22 Sep 1 to May 31 13 18 Limited aquatic life Jun 1 to Aug 31 20 25 Sep 1 to May 31 15 19 Human-created waterworks Temperatures must be maintained such that water quality criteria of downstream waters are fully protected.

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Table 4. Comparison of NMFS, USFWS, and Ecology water quality criteria.

	NMFS Properly functioning condition	USFWS Functioning appropriately	Ecology Existing standards	Ecology Proposed use-based standards (DRAFT)
Sediment and turbidity	< 12% fines (< 0.85 mm) in gravel, turbidity low	< 12% fines (< 0.85 mm) in gravel, and < 20% surface fines < 6 mm	Turbidity shall not exceed: Class AA and A: 5 NTU over background when background NTU is 50 NTU or less; otherwise have more than 10% increases. Class B: 10 NTU over background when background NTU is 50 NTU or less; otherwise have more than 20% increase. Lake Class: 5 NTU over background	No changes proposed
Chemical contamination and nutrients	Low levels of chemical contamination from agricultural, industrial and other sources, no excess nutrients, no CWA 303(d) designated reaches.	Low levels of chemical contamination from agricultural, industrial and other sources, no excess nutrients, no CWA 303(d) designated reaches.	Varies by parameter (see Ch. 173-201A WAC)	

Note: Water quality standards derived from the NMFS and USFWS Matrices of Pathways and Indicators will likely be used where listed species are present. The water quality analyses associated with TMDLs, however, are likely to be adopted by the NMFS and the USFWS as the analytical bases for effectiveness monitoring of prescriptions in CIDMPs (Cleland et al. 1999).

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Table 5
Habitat limiting factors (HLF) analyses
and other assessment information sources by WRIA.

WRIA Name	WRIA No.	HLF CD No.*	Instream flows or closure set by regulation	Basin Plan (BP) or Instream Resource Protection Plan (IRPP)	SSHIAP In Progress
Nooksack	1	IP**	Yes	IRPP	Yes
Stillaguamish	5	1			Yes
Island County	6	4			Yes
Cedar-Sammamish	8	IP	Yes	IRPP	Yes
Duwamish-Green	9	IP	Yes	IRPP	Yes
Puyallup	10	1	Yes	IRPP	Yes
Nisqually	11	3	Yes	IRPP	Yes
Chambers-Clover	12	IP	Yes	IRPP	Yes
Deschutes	13	2	Yes	IRPP	Yes
Kennedy-Goldsborough	14	IP	Yes	IRPP	Yes
Dungeness/Elwha	18	3			Yes
Western Strait of Juan de Fuca	19	2			Yes
North Coast	20	4			Yes
Lower Chehalis	22	IP	Yes	BP	Yes
Upper Chehalis	23	IP	Yes	BP	Yes
Willapa	24	2			No
Grays-Elochoman	25	IP			No
Cowlitz	26				No
Lewis/Kalama	27	3			No
Salmon-Washougal	28	IP			No
Wind River	29	2			No
Klickitat	30	2			No
Rock-Glade	31	4		BP	No
Walla Walla	32	IP		BP	No
Lower Yakima	37	IP		BP	No
Naches	38	IP			No
Upper Yakima	39	IP			No
Wenatchee	45	IP	Yes	IRPP	No
Entiat	46	2			No
Methow	48	4	Yes	BP	No

* Number assigned to the compact disk produced by the Conservation Commission that contains the limiting habitat factors report for each WRIA.

** IP -- Work on a habitat limiting factors report is in progress.

Unlisted WRIAs – status of work on habitat limiting factors reports unknown.

More information on habitat limiting factors reports is available at: www.conserver.org/salmon/reports.

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Table 6.
Possible effects of district activities on salmonid habitat pathways and indicators

Irrigation District Activities Operations and Maintenance	**Habitat functions and subpopulation characteristics**										
	Water quality			**Habitat access**	**Habitat elements**				**Channel condition and dynamics**		
	Temp	Sediment	Contamin-ants and nutrients	Barriers to migration	Substrate embed-dedness	Large woody debris	Pool fre-quency, quality, and size	Off-channel habitat	Width: depth	Bank condition	Flood-plain connec-tivity
Diversion											
Volume	H	M		H	H	H	H	H	H	H	H
Duration	H			H		H	H	H		H	H
Timing	H	M		H	M	L	L	L			H
Rate of change	H		L	H			L	H	H	H	H
Methods											
ROR dam	H			H	H	H	H	H	H		
Parallel or off channel						M		H	H	H	
Wells	H		M								
Measurement (gauges)											
Headworks/ intake canal		H			M	H		M		M	
Screens				M							
Screen bypass				L							
Ladders				H		M					
New construction		M		M							

Legend:
- H High or important effects – should be assessed quantitatively whenever possible.
- M Moderate effect or mechanism – quantitative assessment preferred by qualitative assessment is sufficient.
- L Uncertain or small effects – qualitative assessment likely to be only available option.

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Table 6 (continued)
Possible effects of district activities on salmonid habitat pathways and indicators

Irrigation District Activities Operations and Maintenance	Habitat functions and subpopulation characteristics								
	Flow		Watershed condition			Subpopulation characteristics			
	Change in peak and base flows	Drainage network increase	Road density and location	Disturbance regime	Riparian areas	Size	Growth and survival	Life history diversity and isolation	Persistence and genetic integrity
Diversion									
Volume	H				H	H	L	L	L
Duration	H			H	H	M	H	L	
Timing	H			H	H	M	H	L	
Rate of change					H	L	H	L	L
Methods									
ROR dam				H	M	H	H	H	H
Parallel or off channel					M	M	M		
Wells	H	H	M			M	M		
Measurement (gauges)									
Headworks/ intake canal			H	H	H		M		
Screens								M	
Screen bypass						H	H		H
Ladders						H	H	H	H
New construction			L		M			L	

Legend:
- H High or important effects –should be assessed quantitatively whenever possible.
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Table 6 (continued)
Possible effects of district activities on salmonid habitat pathways and indicators

Irrigation District Activities Operations and Maintenance	**Habitat functions and subpopulation characteristics**										
	Water quality			**Habitat access**	**Habitat elements**				**Channel condition and dynamics**		
	Temp	Sediment	Contamin-ants and nutrients	Barriers to migration	Substrate embed-dedness	Large woody debris	Pool fre-quency, quality, and size	Off-channel habitat	Width: depth	Bank condition	Flood-plain connec-tivity
Delivery system, drains, and wasteways											
Measurement											
Discharge (return flow)	H	H	H	M	H		H	H			
Return "gate"				M							
Sediment and debris removal		H	M		M	H			M	H	M
Aquatic weed control	L		H	L				L		L	
Terrestrial weed control	L	L	M	L						L	
Roads (ROW)		H	M	H	M	H	M		H	H	M
New construction	L	M	M								
Drainage ditches	M	M	M	M	M		H	H	H	H	H
Dikes	M	M	M	M	M	H	H	H	H	H	H
Other											
Hydro ops	L			H	H	M	M	H	M	H	H
Soil stabilizers			M		?		M				
Storage ops	M	M		H	M	M	M	H	M	H	H
Fishing & rec.			L					L		M	
Storm water	L	L	L		M	M	M	M	M	M	M
???											

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Legend:
- H High or important effects –should be assessed quantitatively whenever possible.
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- L Uncertain or small effects – qualitative assessment likely to be only available option.

Table 6 (continued)
Possible effects of district activities on salmonid habitat pathways and indicators

Irrigation District Activities Operations and Maintenance	**Habitat functions and subpopulation characteristics**								
	Flow		**Watershed condition**			**Subpopulation characteristics**			
	Change in peak and base flows	Drainage network increase	Road density and location	Disturbance regime	Riparian areas	Size	Growth and survival	Life history diversity and isolation	Persistence and genetic integrity
Delivery system, drains, and wasteways									
Measurement									
Discharge (return flow)	M				L			L	L
Return "gate"						M	M		M
Sediment and debris removal				H	M		M		
Aquatic weed control					L	L	L	L	L
Terrestrial weed control						L	L	L	L
Roads (ROW)		M			M				
New construction	L	M	H		M				
Drainage ditches	H	H	H	M	H	L	L	L	L
Dikes	H		M	M	H	L	L	L	L
Other									
Hydro ops	H		L		M	M	M		M
Soil stabilizers	M	M							
Storage ops	H		L		M	M	M		M
Fishing & rec.			M		H	M			
Storm water	H	H		H	M	L	L	L	L
???									

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Legend:
- H High or important effects –should be assessed quantitatively whenever possible.
- M Moderate effect or mechanism – quantitative assessment preferred by qualitative assessment is sufficient.
- L Uncertain or small effects – qualitative assessment likely to be only available option.

Table 6 Explanatory Notes

The primary function of Table 6 is to provide guidance to CIDMP assessment teams about what elements to include and emphasize in their assessments.

- All Irrigation Districts divert surface flow, or pump groundwater, or both. Assessment of the effects of water withdrawals on several aspects of the natural flow regime (Poff et al. 1997) clarifies ecological consequences of these changes and suggests ways in which the pattern of water withdrawals could be changed to minimize effects. Diversion operations have therefore been partitioned into volume, duration, timing, and rate-of-change components.

    1. Volume is the amount of water diverted from surface flow or pumped from groundwater. Volume of withdrawal is inversely proportional to instream flow.
    2. Duration is the seasonal period of withdrawal.
    3. Timing is the regularity or consistency of withdrawal rate during the irrigation season.
    4. Rate of change is the ramping rate at which withdrawals are increased or decreased.

- All Irrigation Districts are required to have screens on their diversions. The degree to which these screens are functioning to current specifications will need to be assessed. Subpopulation effects of screens depicted in the matrix indicate that a poorly performing screen can result in fish mortality and injury from entrainment and impingement. Likewise, the functional performance of ladders should be assessed; ladders that unduly delay upstream migrants or that disorient downstream migrants can have adverse effects on subpopulations.

- The third and fourth pages of the table apply only to Irrigation Districts that have return flows.

- Irrigation District operations and maintenance headings in the left column have not been explicitly defined, assuming these terms are commonly understood in the irrigation community. Habitat functions and subpopulation characteristic headings are defined in the Glossary.

- Matrix entries from various sources, especially FISRWG 1998, Table 3-27. The scope of a given Irrigation District's effects on ecosystem processes will depend on a variety of factors. Although Table 6 portrays effects of Irrigation District activities in terms of habitat function and population response, most districts are relatively small and the impacts of changes in their operations on habitat or population variables will be difficult to detect on the background of natural variation. Measurement of variables associated with district operations may provide higher-resolution information on the degree to which a given district can minimize adverse effects. Performance measures, therefore, should be based on a combination of biological function and Irrigation District operational criteria, not either one in isolation.

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CHAPTER 6
Preparing the Action Plan

Introduction

The data review and analysis performed as part of the inventory and assessment steps should lead to development of the district's Action Plan. In the Action Plan, the district should identify specific improvements, operational changes, or policies that will be enacted to meet the district's objectives for irrigation, species enhancement, and water quality.

It is important that the linkages between the assessment and the action plan be clearly documented within the CIDMP. From the assessment, a list of needs can be identified. The actions recommended by the district should directly address these needs. Actions may include both substantive actions that directly remedy species or water quality issues, and/or information-gathering actions that remedy important data gaps.

Implementation requirements should be considered together with the list of proposed actions. For example, the costs of implementation should be estimated, and a funding program proposed (see Chapter 8).

The Action plan will be a critical element in negotiating implementing agreements with state and federal agencies. In some cases, a district may produce a comprehensive action plan addressing all district needs together with needs directly involving species and water quality. Negotiation of implementing agreements will normally focus on only those elements that are directly related to species and water quality.

This chapter outlines a process for developing the action plan. The exact contents of the action plan will likely vary considerably from one district to another, depending on the objectives, results of the assessment, and other factors.

Relationship of the Action Plan to Inventory and Assessment

The first step in developing the action plan is a definition of needs to be addressed by district actions. Defining these needs provides the linkage between the action plan, the inventory of district facilities and operations (Chapter 4), and the assessment of baseline conditions and impacts (Chapter 5).

As described in Chapter 2 of this document, a CIDMP will be most effective if planned actions to improve water quality and species are embedded in a comprehensive program of actions to meet the full range of district objectives. Therefore, the needs analysis should also be comprehensive in scope. For example, it should identify all needed capital improvements; not only those directly intended to improve water quality and species habitat. The value of considering all needs in a comprehensive framework is that relationships in terms of objectives, funding sources, phasing and other aspects will be more apparent.

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The following list provides illustrative examples of needs that may be identified following the inventory and assessment steps:

- Improve stream flow during all or parts of the year;
- Minimize ramping rates associated with both increases and decreases of flow;
- Reduce water losses in district operations;
- Reduce loading of sediments or other substances to natural waterways;
- Reduce thermal impacts to natural waterways receiving return flows;
- Improve fish passage around diversion works, thermal barriers, etc.;
- Improve channel structure to facilitate fish passage, rearing, etc.
- Increase channel complexity/roughness;
- Improve riparian zone conditions, wetland functions, etc.
- Improve connectivity of floodplain elements to stream channels;
- Decommission and rehabilitate unneeded roads;
- Reduce mortality of specific fish life stages in the action area;
- Improve incentives for increasing efficiency of water-use;
- Upgrade or replace aging district facilities to improve operations, public safety, etc.;
- Provide for technological improvements (e.g., automation) to reduce costs, improve operational efficiency, etc.;
- Extend lifetime of district facilities; and
- Improve predictability of water supply.

The identification of needs will be more useful if each need is clearly linked to the objectives identified for the CIDMP, the inventory of district facilities and operations, and the assessment of baseline conditions and district impacts on aquatic resources. With these linkages documented, agencies and potential funding sources will be more likely to recognize how recommended actions (see below) contribute to overall objectives.

Identifying, Selecting and Defining Actions

Following determination of needs, a preliminary list of actions can be developed. This preliminary list may contain actions that will not be part of the final action plan. However, it is useful to begin with a broad list of potential actions, and narrow them down to a final list. Each action should indicate which need or needs it addresses. Actions may fall into the following categories:

- *Facilities improvements*. Physical upgrades, construction, replacement, or removal of facilities such as diversion structures, screens, canals, settling ponds, pressurized piping, etc.
- *Operational Changes*. Adjustments to operations, practices or schedules designed to meet specific identified needs.

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- *Policy changes*. Adjustments to district policies.
- *Habitat restoration within the action area.*
- *Collection of new information to fill identified data gaps*;
- *Offsite mitigation*. Actions outside the district that improve water quality or habitat. For example, purchase of water rights for instream flows; improvement of riparian conditions or stream channel configuration, etc.

Together with the list of potential actions, the district may find it useful to establish criteria for selecting actions. Criteria may include effectiveness in resolving water-resource issues from the assessment; effectiveness in improving district operations or infrastructure; cost-effectiveness, etc. These criteria should be clearly linked to the objectives established for the CIDMP.

Based on the needs and criteria discussed above, the final list of actions can be determined for the CIDMP's Action Plan. At this stage, the actions identified need to be fully defined. For example, if improvements to canals and laterals are proposed, they should specify which facilities will be improved, and the nature of the improvements. In most cases, a map of district lands should be included, showing the facilities involved. If sediment loading is to be reduced, the specific location and type of improvements to accomplish this should be described. In addition, the district should establish priorities among the actions selected. These priorities will be used in establishing an implementation schedule and funding program.

Once the specific actions have been selected, the district can prepare the Action Plan. The Action Plan is envisioned as a chapter of the CIDMP, which identifies specific actions, describes which needs they address, estimates capital and operating costs, and provides a phased schedule of implementation. The changes in effects to aquatic resources resulting from implementation of the action plan need to be estimated. If implementation is phased the changes in effects associated with each phase should be described. The monitoring plan to CIDMP should be designed to validate these estimates of plan effects.

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Estimating Capital and Operating Costs

The Action Plan should include estimates of the capital and operating costs associated with each action. In addition, the planned schedule of expenditures should be provided (e.g. year one, year two, year three, etc.). A table listing each action, the estimated costs, and the year the cost will be incurred provides a convenient way to organize this information.

A financing program to address these estimated costs will be another element of the CIDMP. For further discussion, see Chapter 8.

Relationship of Action Plan to Monitoring and Adaptive Management

At the time the action plan is developed, consideration should be given to monitoring and adaptive management. For some actions, it may be appropriate to develop a monitoring program (e.g. water quality monitoring; species monitoring, etc.) to assist in evaluating the action's effectiveness over time. In addition, where an adaptive management strategy is included in the

CIDMP, the action plan should reflect that strategy. For example, monitoring results, as defined in the adaptive management strategy may trigger additional actions. This topic is addressed further in Chapter 8.

If a monitoring program is included in the action plan, costs of monitoring should also be estimated.

Relationship of Action Plan to Implementing Agreements

Chapter 9 of this document describes implementing agreements that can be used to document commitments by the district and resource agencies, particularly in regard to ESA issues. If implementing agreements are developed, the district should consider whether all elements of the Action plan are appropriate for inclusion in the agreements. For example, those elements that directly address habitat improvements may be appropriate for inclusion, while other improvements designed mainly to improve operations may require a different treatment.

One consideration, as noted in Chapter 9, is that it may be desirable to include all district actions in the implementing agreements, so as to gain assurances from agencies regarding regulatory actions and third-party litigation.

Another consideration is that for those actions not directly impacting listed species; the district may not want to make a commitment to natural resource agencies which will reduce flexibility of capital spending and operations.

It is likely these objectives can be reconciled through creative development of provisions in implementing agreements between the district and the resource agencies.

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CHAPTER 7
Monitoring, Adaptive Management, and Oversight

Introduction

Adaptive Management and the ESA

Monitoring is an essential portion of the ESA and is required by the policies and regulations of both U.S. Fish and Wildlife Service and the National Marine Fisheries Service (collectively, the "Services"). Monitoring is the measurement of environmental characteristics over an extended period of time to determine status or trends in some aspect of environmental quality. While adaptive management, the continual process of planning, monitoring and research, and evaluation, is not required under either Services' policy or regulations - in the context of planned operations, adaptive management is one method of maintaining the ability to make changes to an existing plan.

Monitoring serves not only to measure compliance with identified management strategies, but also has the ability to gauge the effect and effectiveness of management plans and their proposals. In addition, it assists in redefining biological goals (if sufficiently rigorous sampling is completed), identifies choices under adaptive management and provides the Services with information used to conduct range-wide assessments of species status and baseline conditions.

The most commonly referred to types of monitoring include:

(1) Compliance monitoring, which monitors the permittee's implementation of the requirements of the management plan, permit, and/or implementation agreement, and

(2) Effectiveness monitoring, which investigates the impact of the proposed management plan, and authorized take, and verifies if progress is being made towards the biological goals and objectives.

Effectiveness monitoring involves testing specific hypotheses, and is very focused (tightly controlled in space). This is necessary to reliably establish cause/effect relationships between implementation of CIDMP commitments (management actions), changes in watershed/riparian processes, resultant shifts in stream channel morphology and fish habitat, and local habitat utilization by fish. A complete monitoring program, which provides thorough information to aid in refining adaptive management, includes both compliance and effectiveness monitoring. If an adaptive management strategy is incorporated in the CIDMP, then the monitoring program must include the feedback loops of that strategy (Figure 4).

Monitoring measures should be based on the scope and duration of the Irrigation District proposed actions and the biological significance of its effects. The monitoring program should be flexible so that it can be modified if necessary, based on the need for additional information. Meaningful information is only obtained when the methods and standards from one reporting area to another are comparable and that monitoring protocol "responds to the question asked."

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The monitoring program must be based on sound science and standard survey or other established protocols should be used.

In addition to CIDMP or action plan level monitoring, a monitoring/adaptive management program for the entire Irrigation Process should be developed. This could be the responsibility of the Technical Oversight Advisory committee and facilitated through their involvement. Completion of this level of a adaptive management program meets the third goal and objective of the AFW-Irrigation District Process: to establish an adaptive management program to ensure that the guidelines and CIDMPs are meeting the objectives of ESA and CWA, as well as the needs of participating Irrigation Districts.

An example of the type of program that could be established is the effectiveness monitoring program developed under the Northwest Forest Plan for Riparian and Aquatic Systems: AREMP - Aquatic and Riparian Evaluation and Monitoring Plan (Hohler et al, August 2000). The AREMP is intended to characterize the ecological condition of watersheds and their aquatic ecosystems. It intends to determine present watershed condition; track trends in watershed condition over time, and report on the effectiveness of the Northwest Forest Plan across the Northwest.

See the following list for steps to consider in development of monitoring programs.

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Steps to Consider in Developing Monitoring Programs

- Develop objectives for the monitoring program. Any monitoring program should answer specific questions or lead to specific conclusions. Well-developed objectives shape a complete monitoring program.
- Describe the subject of the monitoring program, e.g., effects on habitat of affected species.
- Describe variables to be measured and how the data will be collected. These should be consistent with the objectives of the monitoring program.
- Detail frequency, timing and duration of sampling for variables. Determine how frequently and how long to collect information. Inadequate frequency of data collection may skew results.
- Describe how data will be analyzed and who will conduct analyses. Sample size, frequency, duration and timing all may affect the completeness of analysis.
- Monitoring should be sufficient to detect trends in species populations in the plan area.
- For consistency, a mutually identified party other than the permittee should carry out monitoring. This party should be specified in the CIDMP and funding should be provided.

Adaptive Management and the CWA

Adaptive management is well established in the TMDL program. EPA and Ecology agree that the concepts of adaptive management are compatible with the needs of certain TMDL analyses. In particular, where there is lack of data or uncertainty in the interpretation of that data, the landowner may develop additional monitoring and adaptive mechanisms to compensate for those

gaps. For example, if there is reasonable uncertainty as to the effectiveness of a particular management practice to meet water quality standards, the agencies would generally support implementation of that management practice and add monitoring and adaptive mechanisms, rather than delay environmental improvement waiting for a higher and perhaps elusive reduction of uncertainty.

Over reliance on adaptive management is an obvious concern, as the agencies cannot agree to highly speculative or clearly sub-standard practices. Proper design of the monitoring system is key to ensuring that the questions being asked will be answered. That is, a set of practices are agreed upon despite some degree of uncertainty. A monitoring scheme is proposed, which may or may not provide the necessary data to justify a revision of the practice. Or, institutional barriers exist which tend to prevent new information from changing practices.

EPA and Ecology are willing to engage with Irrigation Districts to minimize uncertainty regarding water quality and the fish resources. When some degree of uncertainty remains, the agencies are prepared to consider adaptive management plans as part of a CIDMP.

Adaptive Management

The need for adaptive management is framed by the plan's ability to meet desired results through planned Irrigation District operations. Where the plan's ability to meet desired objectives is limited by information availability or disagreement between proponent and agency representatives, adaptive management can provide a structured response to gathering new information during implementation of a CIDMP (Figure 4). This mechanism is appropriate for information gathering regarding either the propriety of the desired results or the planned operations necessary to arrive at those results. Thus, adaptive management is a tool of systematic flexibility that enables changes to planned operations in response to structured inquiries.

Adaptive management enables responsive changes to a plan that recognizes a threshold insufficiency of certain types of information. Adaptive management is essential for action plans and CIDMPs that would otherwise pose a significant risk to the species due to significant data or information gaps. Adaptive management has also proved to be a suitable device for addressing disagreements between a plan preparer and the Services; the agencies responsible for providing protective coverage of listed species under ESA. Such instances can include the inability of these parties to agree to a set of rigid prescriptions because they disagree on their view of what is needed. Where the parties agree on the desired outcome but disagree on the management route to that outcome, adaptive management is a useful way to test the applicant's (and the Services') hypotheses without sacrificing the value of the plan during its duration.

Although Adaptive management is not needed in areas where there is no risk and is not a mandatory part of any action plan or CIDMP, monitoring is a required component. Monitoring evaluates whether the assumptions made in an action plan or CIDMP are valid.

In Habitat Conservation Plans (HCPs) developed under Section 10 of the Endangered Species Act of 1972 as amended, adaptive management has been covered in terms of an agreement regarding planned changes in response to new information or circumstances.

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Basic Components - An Adaptive Management Mechanism

1. **Base Strategy:** The base strategy comprises the operations as planned and agreed to by the Services and the Applicant at the time the plan is initially approved and implemented. The base strategy, at its most narrow, can refer to something as small as a single management measure. The base strategy can also comprise a suite of management measures. However, the broader the base strategy, the more complicated adaptive management becomes to integrate and implement. The strategy or prescriptions, which are initially implemented, must be sufficiently robust so that the Services have a fair amount of confidence that they will be successful.

   Adaptive management, in addition to enabling plan flexibility, is also a method of managing risk. The Services' decisions approving or disapproving conservation plans receive a high level of internal and external scrutiny by expert and other interested parties. Therefore, base strategies with a high confidence of success are more likely to meet approval.

2. **Feedback (Monitoring) Loop:** The second essential component of adaptive management integrates learning into planned operations. The value of adaptive management is to enable change to the base strategy as a plan is implemented over time. Feedback is the mechanism that tells whether or not the need for change has been triggered (Figure 4).

   Typically, feedback involves comparing the results observed through monitoring, with results expected from the base strategy. The parties must agree to measurable criteria as a threshold matter.

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Example Objectives of a Monitoring Plan for Individual CIDMPs within the AFW-Irrigation District Process (from USFWS, November 2000)

Objective 1. Contribute to biologically based flows sufficient to provide properly functioning habitat conditions for salmonids native to Washington systems. These flows will be sufficient to provide for passage for salmon and native fish at all times of the year and for all life stages.

Objective 2. Provide water in sufficient amounts to maintain viability of the Irrigation Districts.

Table 8

Effectiveness monitoring to be initiated within the project area, and the information that will be reported at five-year plan reviews

	Effectiveness Monitoring	**Information Reported at 5-Yr Review**
Effectiveness for Flows (Obj.1)	• Measure river, watershed, and/or basin-scale effects and changes in habitat utilization by fish.	• Before Irrigation turn-on and after shutoff. • Reach scale changes in temperature (surrogate) due to irrigation activity.
	• Measure trends in riparian conditions, stream channel characteristics, and habitat utilization by fish through time for a variety of irrigation strategies.	• Analysis of differences in riparian condition trends between areas with irrigation withdrawals and those without.
Effectiveness for Viability of IDs (Obj. .2)	• Measure whether the amount of delivery throughout ID is equal to or below that necessary for irrigation requirements	• After Irrigation turn-on and after shutoff throughout ID system. • Changes in crop/land use health based on level of flows.

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Table 9
Use of monitoring results in adaptive management

Adaptive Management Process Step	Use of Monitoring results in the Adaptive Management Pathway
Trigger (Obj.1)	**Trigger A: Are impacts to stream flows minimized?** The trigger is a statistically significant (alpha=0.1) increase of flows as measured by change to habitat (passage, cover etc…) Note: Potential here for use of an additional Trigger (- B) to measure net impact over the entire project area using temperature (potentially) as a surrogate for the provision of instream flow protection.
1.1 Biological Relevance	In the event that the trigger is pulled for a particular stream/watershed/basin, available scientific data will be used by applicants and the Services to evaluate the biological relevance of non-attainment for permit species in the Project Area. At a minimum, the factors that must be evaluated to determine biological significance are as follows: 1) The magnitude of the observed change 2) The range in which the change is observed 3) Fish species affected and what is known about their physiological requirements 4) The extent of the downstream persistence of the change 5) Research data from other sources Fish habitat utilization in response to the observed change, derived from measured habit use of control vs. treatment reaches
Document/Determine Source of Change	• *Analyze* study data to isolate the most direct cause of non-attainment • *Isolate the* situations where management practices fail to meet objectives. *Identify* why existing commitments are not working.
1.2 Management Response	If Biological Relevance is positive and trigger can be attributed to Plan inadequacy, implement the following steps: 1) Utilize study data to describe specific streams, watersheds, basins that require improved riparian measures. 2) Utilize study data to describe as specifically as possible the causal factors identified as they relate to management actions. 3) Revise or create enhanced prescriptions to address shortfalls in meeting Objective: – Revisions or additions will be directly related to causal factors identified; – Revisions or additions should be applied to streams, watersheds, basins demonstrated to be at risk. 4) In the event that over-performance is demonstrated, describe management changes that would allow resources to be reallocated to other parts of the plan that are under-performing.

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Ensuring Certainty while Integrating Flexibility

Conservation planning under the Endangered Species Act provides certainty to both applicants and the Services regarding regulatory expectations, operational commitments, and contributions to species conservation. Such assurances are important enough to have lead to the development of the "No Surprises" policy for habitat conservation planning under ESA Section 10 (DOI, DOC 1994) which was subsequently codified at 50 C.F.R. 17.22 and 50 C.F.R. 222.22. Under the "No Surprises" rule, regulatory certainty is addressed by creating limits to the circumstances in which planned operations can be changed.

At the same time, adaptive management introduces flexibility and the possibility of change into previously agreed commitments regarding planned operations and management measures. Regulatory certainty and concomitant assurances regarding species and habitat conservation can be reconciled with plan flexibility as long as the parties recognize and incorporate the following elements into their agreement:

1. **Implementation:** The parties must agree that change will occur when triggered, as a threshold matter. In an agreement purporting to provide certainty of commitments, an effective adaptive management process will provide the parties mutual expectations about results of planned activities and measurable criteria used to gauge when change will be required or enabled. This can be accomplished in either of two ways. First, since the assurances of the "No Surprises" rule incorporate circumstantial limits to changing conservation commitments, the parties can agree to waive those assurances as to the covered subject matter (such as a species or suite of species, or a management activity or suite of activities covered by an ESA Section 10 Permit). Second, the conservation commitments can be framed as environmental goals or outcomes rather than prescriptive commitments. The latter scenario is preferred.

   If the mitigation is defined as achieving biological objectives (e.g., achieving target flows as agreed), then a change from a base strategy to an alternative strategy of, say, water conservation measures would not be increasing mitigation and would not "violate" the assurances policy. However, under the assurances policy, the Services would not unilaterally be able to change the initial target flows to a more conservative objective unless this change was agreed to before completion of the Plan and was an identified "management response" to a "trigger."

   It is important to have the implementation language in the action plan and CIDMP and/or Implementing Agreement crafted in a manner that matches the biological considerations, so that increases in conservation measures *can and will* occur when needed, in spite of other assurances which may be made.

2. **Limits to Adjustment:** Another way to ensure regulatory and conservation certainty is to agree to limit the extent of any adjustments that might occur under an adaptive management agreement. In developing an action plan and CIDMP, the parties can agree to establish an upper limit on the extent of conservation commitments, beyond which the assurances policy would apply.

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Under this scenario, an applicant would not be required to provide additional relief, absent "unforeseen circumstances" as they are defined in the "No Surprises" rule. Limits on conservation commitments can be expressed according to any number of different variables (flows, ratios, number of sites, etc.). Whatever measure is used for establishing caps, the Services must be able to justify that the cap is appropriate and will allow sufficient adjustment to meet underlying conservation goals. For some aspects of these plans, applicants may be able to make an unlimited commitment and such caps will be unnecessary. Importantly, the use of limitations on adjustments is subject to the agreement, and therefore negotiation between the parties.

3. **Adjustment Increments:** Where possible and practical, a mechanism for determining the extent of change under adaptive management agreements should be developed in advance so all parties are clear in this regard and can react swiftly at the appropriate time. The timing of the change and how the parties work together to notify one another are important considerations. Such change could be related to the results of the monitoring and the level of deviation from the desired condition. Adaptive management at its most efficient would enable management's changes to occur rapidly in response to new information or circumstances without the need for renewed, protracted negotiations between parties. Adaptive management in response to such deviations is termed "management response."

4. **External Factors:** It is possible for the Services to commit to having to differentiate between cause and effect, but they need to ensure that they will be able to distinguish between increased instream flows resulting from planned conservation and that available during good water years. This would enable the Services to avoid relaxing conservation requirements in an existing plan on the mistaken basis that surplus flows resulted from overly conservative initial plan requirements (an internal factor) as opposed to an unexpectedly good supply (an external factor).

5. **Direction of Change:** Change under adaptive management agreements should be a "two-way street."

Contrasting Plan-level Flexibility and Structured Adaptive Management

Adaptive management is a structured means of inducing flexibility into an otherwise rigidly planned conservation agreement. Although ESA-driven conservation plans must contain firm conservation commitments to garner the assurances embedded in Incidental Take Permits and the "No Surprises" rule, the plans themselves are flexible in the absence of adaptive management provisions. Indeed, because conservation plans such as CIDMPs are agreements between applicants and the Services, the parties can negotiate flexibility in planned operations so that operational level changes can ensure efficient plan operations. However, plan level flexibility such as the location and timing of definite projects or elements of projects should be changeable as long as the agreement can account for such changes and they do not alter the balance of the plan's conservation.

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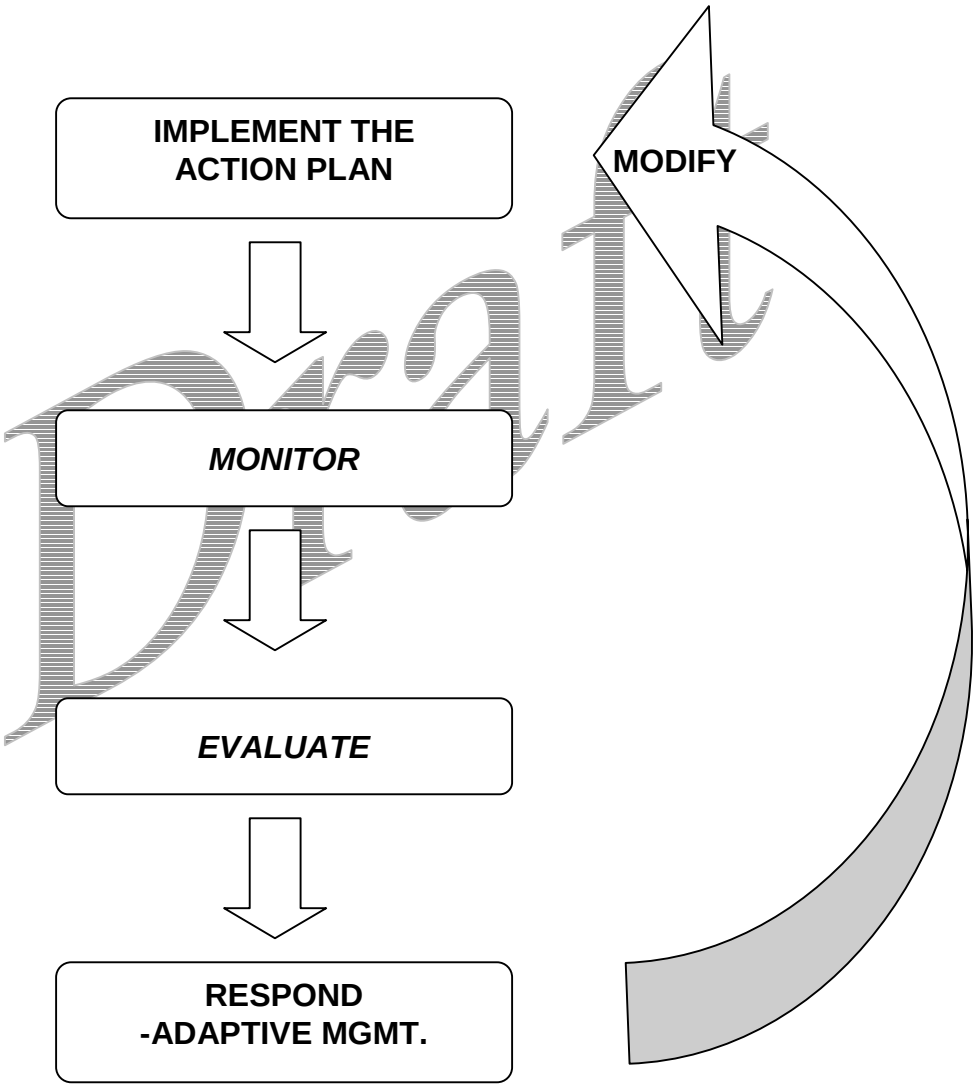
One step more complex than plan-level flexibility would be planned modifications or amendments to the plan. Such modifications could include changes to conservation targets themselves, depending on the circumstances. The agreement should capture the appropriate circumstances for such modifications, as well as the appropriate protocols and process responses to the need for such modifications.

FIGURE 1.
Adaptive Management Feedback Loop



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CHAPTER 8
Financing and Funding Implementation

Implementing the Plan

The purpose of this planning process is to address the changes in performance identified in Chapter 6 – Preparing the Action Plan. These actions are necessary to comply with the ESA and CWA and provide regulatory protection for the district and its operations. As part of the planning process, the Irrigation District needs to develop a financial/funding strategy that outlines how the district expects to fund and/or finance elements of the plan. This funding plan may build upon an existing district conservation plan or other resource conservation or protection effort. The district is encouraged to utilize a combination of cost share programs, grants, loans and district funds to implement the plan. State and federal governments will provide technical and, as they are able, financial assistance to implement the plan activities and projects.

Financing/Funding Strategy

The district needs to identify in detail which elements of the plan will require financial resources to implement and how they have decided to address these financial needs. The district may be able to fund all of the plan activities and projects without the assistance of state or federal funds. However, in many instances, the district will need additional financial assistance in the form of cost share, grants and/or loans in order to complete the activities or projects.

To complete the funding strategy section, the district needs to clearly identify how the activities or projects are to be funded, the source(s) of the funds available or sought, length of time expected to acquire funding (when necessary), and expected timeline for initiating and completing the activities or projects. This information will be important to the Technical Assistance Team as it works with the district to review and approve the final district plan. Without a thorough and complete funding strategy the Services may be unable to approve the districts plan.

Resource/Financial Assistance Information

Many of the current funding resources available to Irrigation Districts to complete conservation and habitat restoration and/or protection activities and projects are listed in Appendix A. New resources may become available to districts as both state and federal governments allocate additional monies to implement salmon recovery efforts. The Technical Advisory Team will be able to provide guidance to the districts in the development of the financial/funding strategy, as well as inform the district of new resources, as they become available.

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CHAPTER 9
Implementing Agreements

Introduction

Whether or not an implementing agreement (IA) should be prepared for a given CIDMP will depend on the size and scope of the underlying conservation plan and the wishes of either the Services or the Irrigation District. Implementing agreements are not required for low-effect Habitat Conservation Plans (HCPs). Such agreements are usually not required to cover the applicant's commitments in the reasonable and prudent measures in a biological opinion. However, IAs can be useful in each of these contexts, and should be done when requested by the permit applicant. In other HCPs, the development of the Implementation Agreement is left to the discretion of the Services. Implementing agreements are recommended for regional or other large-scale conservation plans, such as those embodied in HCPs that address significant portions of a species range or involve numerous activities or landowners, for HCPs with long-term mitigation and monitoring programs, or where habitat protection programs are complicated or have other special features.

Section 10(a)(2)(B) of the ESA--which describes issuance criteria for incidental take permits--authorizes the Services to obtain "such other assurances as [they] may require that the plan will be implemented." This provision allows the Services broad latitude to require measures as necessary to accommodate the wide variety of circumstances often encountered in HCPs.

While the example above is particular to the Habitat Conservation Planning process, the discussion may provide useful information regarding any compliance pathway that the Irrigation District chooses.

Benefits to Developing an Implementation Agreement

Implementing agreements can help assure the government that the applicant will implement the mitigation program and other conditions of the conservation plan, while assuring the applicant that agreed-upon procedures will be followed for any changes in the conditions of the permit or the conservation measures for species addressed in the conservation plan. As such, they are especially useful in the HCP context. Although the Services and permit applicant possess these rights and responsibilities under the permit, both sides may prefer the additional specificity of an Implementing Agreement because the Agreement is tailored for the HCP in question, can be more detailed than the permit conditions, and is signed by all parties, thus providing the explicit consent of each party to abide by the terms of the HCP.

Implementing agreements can also strengthen a Finding of No Significant Impact (FONSI) under NEPA by ensuring implementation of the mitigation program. This can be especially important for conservation plans that provide sufficient mitigation to enable FONSI under NEPA. They can also extend responsibilities under an HCP beyond the life of the permit itself (e.g., by requiring perpetual protection of mitigation lands) and can set out a process for implementing the assurances under the "No Surprises" rule.

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In the HCP context, an Implementation Agreement typically includes one or more of the following elements:

1. Dfines the obligations, benefits, rights, authorities, liabilities, and privileges of all signatories and other parties to the HCP;

2. Asigns responsibility for planning, approving and implementing specific HCP measures;

3. Secifies the responsibilities of the USFWS, NMFS, or other state and federal agencies in implementing or monitoring the HCP's conservation program;

4. Provides for specific measures when habitat acquisition, transfer, or other protections are part of the HCP's mitigation program;

5. Establishes a process for amendment of the HCP, where necessary; and

6. Provides for enforcement of HCP measures and remedies should any party fail to perform on its obligations under the HCP.

Agreements capturing the commitments of the Services and an Irrigation District in a CIDMP should contain these elements in some mutually acceptable format, regardless of the compliance pathway used, if the parties agree to use an IA.

The Services' Handbook for HCP and Incidental Take Permit (ITP) Processing (NMFS and USFWS, 1996, as amended) delegates to the Regional Directors (or, where appropriate, the NMFS Director, Office of Protected Resources in Washington, D.C.) the discretion to decide if HCP implementing agreements are beneficial on a case-by-case basis. IAs are not done for low-effect HCPs unless requested by the applicant. Each Regional Director or the NMFS Office of Protected Resources Director shall determine the circumstances under which implementing agreements may be required for HCPs under his or her respective jurisdiction.

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Sample Implementation Agreement

To assist applicants in the HCP process, the Services developed a sample implementing agreement template (see Appendix F) consisting of standard clauses. The December 1998 draft of the standard clause Implementation Agreementis reproduced in Appendix F for the benefit of Irrigation Districts in the CIDMP process. The template is intended to expedite development of implementing agreements for HCPs, because it identifies the basics needed for developing Agreements. The template has all necessary legal elements for Agreements for HCPs except project-specific information, which can be filled in as indicated. While these clauses were developed when the focus of the HCP Program was on forested landscapes, these clauses were developed to improve the HCP program and provide a predictable format for implementing agreements. While HCPs by nature must be site specific and customized for each applicant, IAs generally do not. The Services are striving for consistency amongst IAs so as not to revisit standard policy decisions for each new applicant. Deviations from the standard clauses must be well justified, based on site-specific conditions.

CHAPTER 10
Public Involvement

Introduction

In the process of developing their management plans, Irrigation Districts may wish to include a program for involving and informing the public. Recognizing that districts currently have and already use various kinds of citizen involvement programs, this guidance emphasizes flexibility and using the elements that are most suitable to the district's needs.

The district should prepare educational and informational materials to distribute to interested persons and the general public to assist in their understanding of the CIDMP process. The objective to provide these outreach materials so that citizens, interest groups, water users within the district, and others may more effectively participate in the process.

Management plan development may involve the participation of the public and interested parties. The process may include a public education and outreach component, which may include newsletters, informational materials and public announcements. Public involvement may include a number of workshops at the initial planning stage, during formulation of the plan, and at the review and approval of the final document. A public notice may be published in local newspapers. Then, a public hearing may be held where the final draft is presented to the public for formal comment, before the district adopts it and submits it to the appropriate agencies for required approvals. A district's public involvement program may include some, or all, of the following element examples.

Public Involvement Elements

Workshops - The district may, during development of the CIDMP, encourage the active participation by all persons, water users within the district, interest groups and other parties which have an interest in the district operations through a series of evening public workshops. The workshops should be designed to inform the participants of the purpose and need for the CIDMP and seek their input into its drafting and development. If workshops are held, the district would schedule, arrange and conduct the workshops. Technical Advisory Team members should also be available at the workshops to help explain and answer questions related to the CIDMP development and their involvement in the effort.

Public Hearings - Prior to adoption by the district of the final CIDMP the district may hold at least one public hearing for the purpose of obtaining the views and comments of the public on the plan. A notice of public hearing may precede the public hearing. The district may schedule, arrange, and conduct the public hearing(s). Members of the Technical Advisory Team may be invited by the district to assist with presentations to the public at the hearing or to help in answering any questions.

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Advertising/Public Notices - The district should advertise, in advance, the opportunity for diverse public involvement in the CIDMP workshops/hearings. Additional special workshops could also be arranged specifically for water users served by the district. Notice can be made through district newsletters, local papers, radio and television announcements, mailings to interested persons requesting notification, and by any other venues that may assist in communicating the workshop opportunities for the public to be involved in the development of the CIDMP.

The district should advertise the intent to adopt the CIDMP, including the publication of a formal legal notice or display ad. The notice may advise of the scheduled public hearing for purpose of receiving formal comment on the plan. The notice should indicate that persons may submit their comments in writing or in person at the hearing. It should include the date, time and location of the public hearing. A contact name, phone number, mailing address, and website address (if available) should be provided in the notice as to where additional information can be obtained. The notice must be made a minimum of once in each of two weeks immediately preceding the hearing in one or more newspapers of general circulation serving the area in which the district is located.

Documentation

Attached to the adopted CIDMP should be a record of the education and outreach activities, public workshops, hearings and citizen involvement.

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ACRONYMS

BMP	Best Management Practice(s)
CIDMP	Comprehensive Irrigation District Management Plan
CRI	Cumulative Risk Initiative
CWA	Clean Water Act
DPS	Distinct Population Segments
EA	Environmental Assessment
ECOLOGY	Washington Department of Ecology
EDT	Ecosystem Diagnosis and Treatment
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
ESA	Endangered Species Act
ESU	Evolutionarily Significant Unit
FONSI	Finding of No Significant Impact
FOTG	Field Office Technical Guide
GMA	Growth Management Act
HCP	Habitat Conservation Plan (Endangered Species Act)
HPA	Habitat Protection Area
HUC	Hydrologic Unit Code
IA	Implementing Agreement
ID	Irrigation District(s)
IFIM	Instream Flow Incremental Methodology
ITP	Incidental Take Permit
ITS	Incidental Take Statement
MOU	Memorandum of Understanding
MPI	Matrix of Pathways and Indicators
MRCI	Municipal, Residential, Commercial, and Industrial
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NRCS	Natural Resources Conservation Service
NWIFC	Northwest Indian Fisheries Commission
NWPPC	Northwest Power Planning Council

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PATH	Plan for Analyzing and Testing Hypotheses
PFC	Properly Functioning Condition
PUD	Public Utility District
RPA	Reasonable and Prudent Alternatives
RPM	Reasonable and Prudent Measure
RU	Recovery Unit(s)
SASI	Salmon and Steelhead Stock Inventory
SEPA	State Environmental Protection Act
SMA	Shorelines Management Act
SRFB	Salmon Recovery Funding Board
SSHIAP	Salmon and Steelhead Habitat Inventory and Assessment Project
TAT	Technical Advisory Team
TMDL	Total Maximum Daily Load (for water pollutants)
USBR	U.S. Bureau of Reclamation
USCOE	U. S. Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WDFW	Washington Department of Fish & Wildlife
WRCS	Natural Resources Conservation Service
WRIA	Water Resource Inventory Area
WQS	Water Quality Standards

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GLOSSARY OF TERMS

Action area refers to the area affected by, or in support of, district operations. The Action Area includes all lands and waterways within the district's boundaries as well as off-site waterways affected by district discharges, or by the manipulation of flows to deliver water to the district.

Bank condition refers to the proportion of a streams bank that has greater than 90% stability as defined by Overton et al. (1995). High bank stability is positively related to under-bank habitat for juvenile and adult salmonids and reduced sediment input.

Bioindicators are organisms or groups or organisms that display predictable and readily detectable responses to changes in habitat quality. For example, benthic macroinvertebrates are used as bioindicators of stream habitat quality because they show rapid and sensitive responses to a range of pollutants and other degradations of aquatic habitats such as increased temperature and sedimentation. Compared to chemical or physical analyses, bioindicators provide the advantages of direct determination of biological effects, determination of synergistic and antagonistic effects of multiple degradation factors, early detection of degradation, and relatively low cost.

Disturbance regime refers to the relative frequency, duration, and intensity of disturbance events such as scour and debris torrents. An increase in any of these aspects of disturbance tends to simplify aquatic environments and exacerbate future disturbance events, leading to a cycle of degradation. Intact habitats exposed to typical disturbance regimes generally retain refuges for all life-history stages, and do not show significant changes in habitat complexity in response to disturbance events.

Federal Nexus refers to an action that is undertaken, permitted or funded by a federal agency.

Floodplain connectivity refers to the frequency and extent to which off-channel habitats and adjacent wetlands and riparian areas are hydrologically linked to the main channel. Floodplain inundation maintains wetland functions and sustains ecological succession of riparian vegetation. Numeric thresholds have not been established. Evaluation depends on local topography, geomorphology, and hydrology.

Flow/hydrology includes several components of the natural flow regime of streams and rivers (Poff et al. 1997):

- ***Volume*** is the amount of surface flow (cfs).
- ***Frequency*** is how often a flow above a given magnitude recurs.
- ***Duration*** is the period of time a specific flow condition persists.
- ***Timing*** is the regularity or consistency of specific flow conditions.
- ***Rate of change*** is how quickly amount of flow increases or decreases.

All of these components are important to the ecological integrity of rivers, streams, adjacent floodplains, and estuaries.

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Habitat access means providing for the volitional upstream and downstream movement of fish. This includes providing for passage of all life stages in both directions, a particularly important factor for bull trout and steelhead. Common impediments or obstructions to fish passage associated with IDs are diversions and flow control structures, inadequate fish ladders, and water-crossing structures (roads and canals/ditches/wasteways).

Instream flows means the conditioning of regulatory flows established for a stream. This term is commonly used in fisheries and water resources literature and has been used by the Department of Ecology for many years to encompass the terms "base flow" and "minimum flow" that are used in two separate laws.

Instream flow methodologies: 1) Instream Flow Incremental Methodology (IFIM) is a process for evaluating instream flows in the context of the entire ecology of the watershed, including hydrology, geography, and biology; 2) Physical Habitat Simulation (PHABSIM) is a modeling approach and tool for use within (or separate from) IFIM; 3) Toe Width- the distance between the toe of one stream bank to the other which then run through an equation to derive flow levels needed for spawning and rearing; and 4) Tennant Methods-also know an the Montana Method predicts flows based on average flows. IFIM generally is selected as the best method for predicting how the quantity of available fish habitat changes in response to incremental changes in streamflow.

Large woody debris (LWD) is typically defined as any piece of woody material that intrudes into a stream channel, whose smallest diameter is greater than 10 cm, and whose length is greater than 1 m. LWD functions to form pools, regulate sediments, disperse stream energy, create channel complexity, stabilize channels, and provide instream organic matter (Bisson et al. 1987, Bilby and Ward 1989, Pearsons et al. 1992). All of these factors contribute to higher salmonid productivity with increasing LWD (Hicks et al. 1991, Cederholm et al. 1997).

Limiting factor is defined in the context of the HB 2496 program as "conditions that limit the ability of habitat to fully sustain populations of salmon."

Nonpoint source pollution is pollution that enters a water body from water-based or land-use activities, including atmospheric deposition; surface water runoff from agricultural lands, urban areas, and forest lands; subsurface or underground sources; and discharges from boats and other water craft. Nonpoint pollutants are introduced into water through runoff. Rainfall, snow melt and irrigation wash pollutants from the land into rivers, streams, lakes, oceans, and underground aquifers. Land use is strongly correlated to nonpoint pollution.

Off-channel habitat refers to the relative abundance of ponds, oxbows, sloughs, and other backwater areas with cover that provide high-quality rearing habitat for juvenile salmonids. No threshold values have been determined; relative abundance is evaluated in light of local topography, geomorphology, and hydrology.

Riparian areas are located between a stream or other water body and the adjacent upland, including wet areas of floodplains and valley bottoms. Riparian areas are characterized by having distinctive soils and vegetation that can tolerate soils that are saturated during some portion of the growing season (Meehan 1991).

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Road density, expressed as miles of road per square mile of habitat (mi./mi.^{2}), has proven to be a good indicator of the health of aquatic ecosystems; increasing road density has pervasive negative impacts. In the interior Columbia Basin, bull trout were absent at geometric mean road densities at or above 1.31, depressed at or above mean road densities of 0.67, and strongest at or below mean road densities of 0.18 (Lee et al. 1997). In forested ecosystems, road densities less than 1.00 and the absence of valley bottom roads are necessary for properly functioning condition.

Substrate embeddedness is the degree to which boulders, rubble, and gravel in a streambed are surrounded or covered by fine sediment, which is usually measured in classes according to percent coverage. Impoundment's and diversions alter natural sediment transport processes, causing deposition of fine sediments in slackwater areas, reducing flushing of sediments by moderating extreme flows, and decreasing recruitment of coarse material downstream of obstructions (Spence et al. 1996). Intensive ground-disturbing activity (e.g., agriculture, road building and maintenance) tends to increase delivery of fine sediments to streams. Increasing embeddedness reduces spawning habitat quality, and diminishes egg and juvenile survival, particularly for bull trout, which show a strong association with the substrate throughout their life history (Goetz 1989).

Total suspended solids refer to particles suspended in the water column. The relative size of particles will vary with the flow characteristics (e.g., velocity, bed forms, turbulence, gradient) and the characteristics of the material being carried by the water body (e.g., density, shape).

Turbidity refers to the amount of light that is scattered or absorbed by a fluid. Hence turbidity is an optical property of the fluid and not necessarily associated with the amount of suspended matter in the fluid.

Water Resource Inventory Areas (WRIAs) Washington State is divided into 62 geographic areas based on the location of its major watersheds.

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APPENDICES

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APPENDIX A

Websites/Contacts for Information and Assistance

Websites

Listed below are websites that offer information on water, fish, and wildlife preservation, the Endangered Species and Clean Water Acts, environmental permitting, and watershed planning. Information within these sites is apt to change from time to time, so it is a good idea to check them regularly.

Website	Web Address
National Marine Fisheries Service (NMFS)	www.nmfs.us.gov
Office of the Governor, Salmon Recovery Office	www.governor.wa.gov/esa/
"Yakima River Basin Water Enhancement Program," U.S. Bureau of Reclamation	pn.usbr.gov/reg/was/yrbwep.html
"Habitat Conservation Planning Handbook," November 1996, U.S. Fish & Wildlife Service and National Marine Fisheries Service	www.fws.gov
Washington State Water Resources Association	www.wswra.org
"Water Facts"	wswra.org/waterfacts.htm
"About the Columbia Basin Project"	wswra.org/cbpabout.htm
Washington State Conservation Commission	www.conserver.org
"The Endangered Species Act - A Short, Short Course"	www.conserver.org/afw/more/ESAShortCourse.phtml
Washington State Department of Ecology	www.ecology.wa.gov
Washington State Department of Fish and Wildlife	www.dfw.wa.gov
Washington State Association of Counties	www.wacounties.org
Association of Washington Cities	www.mrsc.org/AWCFILES/awc.htm
Bull Trout Foundation Homepage,	www.bulltrout.org/index.html
Washington State Department of Health	www.doh.wa.gov

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Statutes and Regulations Influencing Irrigation District Management Plans

Clean Water Act Federal Agencies – U.S. Environmental Protection Agency State Agencies – Ecology	www.epa.gov/epahome/laws.htm
Endangered Species Act Federal Agencies: U.S. Fish and Wildlife Service [est. in the Act] State Agencies- Agriculture, Ecology, Governor's Office, Fish & Wildlife.	www.endangered.fws.gov www/governor.wa.gov/esa
Endangered Species Act - 4(D) Rules (*See above and additional material at the end of this section) The Salmon Information Network NMFS Northwest Region Protected Resources Division West Coast Salmon And The Endangered Species Act, Proposed 4(D) Rules - References	www.nwr.noaa.gov/salmon/ www.salmoninfo.org www.nwr.noaa.gov/1salmon/salmesa/pubs/4d-refs.html www.nwr.noaa.gov
Growth Management Act State Agencies - Department of Community, Trade, and Economic Development	www.ocd.wa.gov/info/lgd/index.html
Hydraulic Project Approval (HPA)	www.drw.wa.gov/habitat.htm#habprot
Shorelines Management Act State Agencies – State Environmental Hearings Office	www.eho.wa.gov/selected _statutes and_regulation.htm
State Environmental Policy Act (SEPA) State Agencies: Washington State Department of Ecology Department of Community, Trade, and Economic Development	www.wa.gov/ecology/ www.cted.wa.gov/
National Environmental Policy Act (NEPA) Federal Agencies - US Environmental Protection Agency only State Agencies – Department of Ecology	www.epa.gov/epahome/laws.htm www.wa.gov/ecology/
State Water Quality Laws and Regulations The Washington State Water Resources Association State Environmental Hearings Office	wswra.org www.eho.wa.gov/selected _statutes and_regulation.htm
Watershed Planning Laws Washington State Department of Ecology "Guide to Watershed Planning"	www.wa.gov/ecology/watershed/guideinfo.html

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Below are links to various documents referenced in the December 1999 proposed 4(d) rules for steelhead, chinook, chum, sockeye, coho, and Tribal programs. These documents can also be obtained by requesting copies from:

National Marine Fisheries Service
Protected Resources Division
525 NE Oregon Street, Suite 500
Portland, OR 97232-2737

or by sending an e-mail to: rosemary.furfey@noaa.gov

Oregon Aquatic Habitat Restoration and Enhancement Guide, 1999
Location: http://www.oregon-plan.org/hab_guide

Washington Fish Passage Design at Road Culverts, March 3, 1999
http://www.wa.gov/wdfw/hab/engineer/cm/toc.htm

Viable Salmonid Populations NMFS, 2000
http://www.nwfsc.noaa.gov/pubs/tm/tm42/tm42.pdf (1.6 MB)

NMFS Fish Screening for Anadromous Salmonids, January 1997
http://www.nwr.noaa.gov/1salmon/salmesa/pubs/swrscrng.pdf

Oregon Road/Stream Crossing Restoration Guide, Spring 1999
Oregon Department of Forestry
http://www.nwr.noaa.gov/1salmon/salmesa/4ddocs/orfishps.htm

Washington's Integrated Streambank Protection Guidelines June 1998
Contact NMFS at the addresses above for a copy of the document.

A Guide to Placing Large Wood in Streams, Oregon
Department of Forestry and Department of Fish and Wildlife (May 1995)
http://www.nwr.noaa.gov/1salmon/salmesa/4ddocs/lrgwood.pdf

NMFS' Juvenile Fish Screening Criteria, NWR, Revised Feb. 1995 with addendum May 1996
http://www.nwr.noaa.gov/1salmon/salmesa/pubs/nmfscrit.pdf

Oregon Department of Transportation's Routine Road Maintenance Water Quality and Habitat Guide, June 1999
http://www.odot.state.or.us/eshtm/images/4dman.pdf

City of Portland, Parks and Recreation Department's Pest Management Program, March 1997
http://www.portlandparks.org/hort/

Title 3 of Metro's Urban Growth Management Functional Plan, June 1998
http://www.metro-region.org/growth/tfplan/funcplan/title3.pdf

Washington Forests and Fish Report, April 1999
http://www.wa.gov/dnr/htdocs/fp/fpb/forests&fish.html

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Handbook for Forest and Ranch Roads, Weaver et al., June 1994
Contact NMFS at the addresses above for a copy of the document.

California Salmonid Stream Habitat Restoration Manual; California Department of Fish and Game, Inland Fisheries Division, 1994
Contact NMFS at the addresses above for a copy of the document.

Guidelines for Electrofishing Waters Containing Salmonids Listed under the Endangered Species Act

(Backpack Electrofishing Guidelines, NMFS, Letter to Investigators, January 11, 1999).
http://www.nwr.noaa/gov/1salmon/salmesa/pubs/electrol.pdf
(Backpack Electrofishing Guidelines, NMFS, December 1998)
http://www.nwr.noaa.gov/1salmon/salmesa/pubs/electrog.pdf

Stream Corridor Restoration: Principles, Processes and Practices, USDA, 1998
To download: http://www.usda.gov:80/stream_restoration/newgra.html.
For a copy of the report on paper or CD-ROM, write to:

USDA
Natural Resources Conservation Service
P.O. Box 2890
Washington, DC 20013

or order from the US Dept of Commerce Website at: http://www.ntis.gov/yellowbk/1nty821.htm

Contacts for Information and Assistance

Irrigation Districts requiring technical assistance during the assessment phase of their management plan preparations, may - in addition to consultation with the Technical Advisory Committee – also wish to contact the following specific sources for additional information.

Inquiry/Assistance	State Agency	Phone, E-Mail, or Website
Critical Pathways Methodology	State of Washington Office of the Governor Salmon Recovery Office Salmon Team	PO Box 43135, Olympia, WA 98504-3135 Phone: (360) 902-2216 http://www.governor.wa.gov/esa/endofyear.htm (See Section 8-Critical Pathways Methodology)
Funding Sources	Washington State Conservation Commission—CREP Program Washington State Department of Ecology ▪ Washington Conservation Corps ▪ Centennial and State Revolving Fund (both must be linked to water quality) Washington State Department of Fish & Wildlife-Early Action Salmon Grants Washington State Department of Transportation Wide range of misc. sites of funding sources for Washington State	www.conserver.org/crep/factsheet.html Kirk Thomas, 360/407-7600 www.ecy.wa.gov/programs/wq/funding/2002 www.wa.gov/wdfw/grants/ www.wsdoat.wa.gov/eesc/environmental/FSDatabase.htm www.tib.wa.gov/grants

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Inquiry/Assistance	State Agency	Phone, E-Mail, or Website
Growth Management	Department of Trade and Economic Development	
Habitat Restoration	State Department of Ecology Water Quality Financial Assistance Interagency Committee for Outdoor Recreation Salmon Recovery Funding Board Habitat Restoration Information Center (for research and background) Municipal Research & Services Center, Seattle Washington State Department of Fish & Wildlife	Tim Hilliard, (360) 407-6429 1111 S.E. Washington St. Olympia, WA 98504 (360) 902-2636 http://www.habitat-restoration.com/laws.htm Lynne DeMerritt, Senior Research Consultant, (206) 625-1300 Habitat Program 360-902-2534, E-Mail: habitatprogram@dfw.wa.gov http://www.wa.go/wdfw/ habitat.htm
Instream Flows	Washington State Department of Ecology	Doug Rushton P.O. Box 47600 Olympia, WA (360) 407-6513 drus461@ecy.wa.gov http://www.ecy.wa.gov/ programs/wr/instreamflows/ index.html
Limiting Factors Analysis	Washington State Conservation Commission	Ed Manary, Statewide Salmon Recovery Coordinator, (360) 407-6236 eman461@ecy.wa.gov
Salmon, Steelhead, and Trout Recovery Efforts	Washington State Independent Science Panel	PO Box 43135 Olympia, WA 98504-3135 (360) 902-2216
Salmonids Screening	Washington State Department of Fish & Wildlife	Eric Egbers (primary) 3705 W. Washington Ave. Yakima, WA 98903-1137 (509) 575-2734, e-mail egberebe@dfw.wa.gov Ken Bates (secondary) 600 Capitol Way North Olympia, WA 98501-1091 (360) 902-2545, e-mail: bateskmb@dfw.wa.gov http://www.wa.gov/wdfw/hab/ engineers/fishscrn.htm http://www.wa.gov/wdfw/hab/engineer/habeng.htm#dwnstrm
	Columbia River Inter-Tribal Fish Commission Technical Reports	http://www.critfc.org/text/tech_rep.htm

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Inquiry/Assistance	State Agency	Phone, E-Mail, or Website
Stream Passage	Stream Systems Technology Center	Larry J. Schmidt, Prog. Mgr. USDA, Forest Service Fort Collins, CO 80526 (970) 295-5983 www.stream.fs.fed.us
	Upper Salmon Model Watershed Project	206 Van Dreff, Suite A Salmon, Idaho 83467 Phone (208) 756-6322 E-mail: mws@dmi.net www.modelwatershed.org
	State Department of Fish & Wildlife; Habitat Engineering Fish Streams Information	http://www.wa.gov/wdfw/hab/engineer/habeng.htm
Stream Flow Monitoring	Chehalis River Council	www.crcwater.org/wqmanual.html
	Environmental Stream Monitoring Example; Dexter Fortson Associates, Inc.	http://www.dfa-inc.com/environ2.htm
Total Maximum Daily Loads (TMDLs)	Washington State Department of Ecology Water Quality Program	http://www.wa.gov/ecology/wq/links/watershed.html
Funding Opportunities	Natural Resource Conservation Service ▪ Environmental Quality Incentive Program (EQIP) ▪ Wildlife Habitat Incentive Program (WHIP)	www.nrcs.usda.gov/NRCSProg.html
	U.S. Department of Agriculture-Western Regional Sustainable Agriculture Research and Education Programs	wsare.usu.edu
	U.S. Environmental Protection Agency-Catalog of Federal Funding Sources for Watershed Protection	www.epa.gov/OWOW/watershed/wacademy/ or 1-800-490-9198
Instream Flow Incremental Methodology (IFIM)	"Instream Flow Incremental Methodology (IFIM)" U.S. Department of the Interior U.S. Geological Survey	http://www.mesc.nbs.gov/rsm/IFIM.html
Watershed Characterization Assessment	U.S. Geological Survey	http://water.usgs.gov//wsc/wsc_dswa.htm
Bull Trout Guidance	USFWS	fws.gov
Ecosystem Diagnosis and Treatment (EDT)	Northwest Power Planning Commission	nwppc.org
Matrix of Pathways and Indicators (MPI)	National Marine Fisheries Service	http://www.psmfc.org/efh/Jan99-sec3-22.html
Soil and Site Information	NRCS?	
Total Maximum Daily Loads (TMDLs)	Total Maximum Daily Loads – What's New? USEPA-TMDL Program	www.epa.gov/owow/tmdl/index.htm Laurie Mann, @206) 553-1583, e-mail: mann.laurie@epa.gov
Water Quality Standards/Monitoring	USEPA-Monitoring Water Quality	www.epa.gov/owow/monitoring

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Inquiry/Assistance	Tribal Governments	Phone, E-Mail, or Website
Environmental Programs	Contact the local tribe(s) in your geographical area.	
Natural Resources Programs		
Fisheries Programs		
	Northwest Indian Fisheries Commission	www.nwifc.wa.gov (360) 438-1180
	Columbia River Intertribal Fisheries Commission	www.critfc.org (503) 238-0667
	United Columbia River Tribes	
Inquiry/Assistance	**Local Governments**	**Phone, E-Mail, or Website**
Growth Management/Land Use/Critical Areas	Contact your local county commissioners	
Shorelines Inventory	Contact your local county planning department.	
Watershed Planning	Municipal Research & Services Center, Seattle	Lynne DeMerritt, Senior Research Consultant, (206) 625-1300
Inquiry/Assistance	**Other Contacts**	**Phone, E-Mail, or Website**
	Northwest Power Planning Council	Brian Walsh 600 N. Capitol Way; Olympia, WA 98504 360-902-2302
Fish facts and other links	Sponsored by PSMFC	www.streamnet.org
Funding sources-misc.	Appropriate Technology Transfer for Rural Areas	www.attra.org
	Conservation Assistance Tools (CAT)	www.sonoran.org
	The Brainerd Foundation-Funding Resources	www.grainerd.org/comm/funding.htm
	Northwest Power Planning Council	Brian Walsh 600 N. Capitol Way; Olympia, WA 98504 360-902-2302
	Infrastructure Assistance Coordinating Council-Assistance Directory	Janice Roderick Department of Ecology PO Box 47600 Olympia, WA 98504-7600 (360) 407-6541
HCP/TMDL	Simpson Timber Company HCP	www.nwr.noaa.gov/1habweb/hcp.htm
	Simpson Timber Company TMDL	www.ecy.wa.gov/biblio/0010047.html

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Contact Information: State of Washington

Governor's Office

Curt Smitch
Governor's Salmon Advisor
PO Box 43113
Olympia, WA 98504-3113
(360) 902-0634

Office of Tribal Affairs
531 15th Avenue SE
PO Box 40909
Olympia, WA 985-4-0909
(360) 753-2411

Watershed Planning

Planning units wishing to invite state agency participation in the Watershed Planning Process should send a written request to:

Robert Nichols
Office of Financial Management
P.O. Box 43113
Olympia, WA 98504

Joseph Williams
Department of Ecology
P.O. Box 40117
Olympia, WA 98504

Washington State Department of Fish and Wildlife

Greg Hueckel
600 Capitol Way North
Olympia, WA 98501-1090

State Department of Health

Statewide Lead
Ginny Stern
Department of Health
Division of Drinking Water
Airdustrial Center, Bldg. 3
P.O. Box 47822
Olympia, WA 98504-7822
(360) 236-3134
FAX (360) 236-2252

Watershed Planning Coordinator
Jim Rioux
Department of Health
Division of Drinking Water
Airdustrial Center, Bldg. 3
P.O. Box 47822
Olympia, WA 98504-7822
(360) 236-3153
FAX (360) 236-2252

You can also contact the Department of Health at their website, www.doh.wa.gov

Limiting Factors Analysis (HB 2496):

Washington Conservation Commission
PO Box 47721
Olympia, WA 98504-7721
(360) 407-6200

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Statewide Salmon Recovery Coordinator
Ed Manary 360-407-6236 eman461@ecy.wa.gov

Region 1 (Whatcom, Skagit, Island, and San Juan counties and the Stillaguamish River)
Vacant

Region 2 (Snohomish, Pierce, and King counties, and the Nisqually River)
John Kerwin 253-761-8843 jkerwin@mindspring.com

Region 3 (Northwest Thurston, Kitsap, East Jefferson, East Clallam, and North Mason counties)
Don Haring 360-754-3588 dharing@thurstoncd.com

Region 4 (West Clallam, Grays Harbor, Pacific, South Mason, and West Jefferson counties)
Carol Smith 360-357-6986 4salmon@netscape.net

Region 5 (Cowlitz, Lewis, Clark, Wahkiakum, and Skamania counties)
Bryan Cowan 360-696-7631, ext. 112 cowankbc@dfw.wa.gov

Region 6 (Benton, Yakima, Kittitas, and Klickitat counties)
Don Haring 360-754-3588 dharing@thurstoncd.com

Region 7 (Chelan, Douglas, and Okanogan counties)
Carmen Andonaegui 509-682-2896 carmen@electrikdreams.com

Region 8 (Asotin, Columbia, Franklin, Pomeroy, and Walla Walla counties)
Mike Kuttle 509-382-1518 mkuttel@hscis.net

Tribal Liaison
Randy McIntosh 438-1181 Randy @McIntosh.com

Watershed Management:

Washington State Department of Ecology Leads

Nooksack
Dick Grout 360-738-6255 rgro461@ecy.wa.gov
Jim Bucknell 360-738-6244 jbuc461@ecy.wa.gov

San Juan/Lower & Upper Skagit
Rod Sackrison 425-649-4447 rsak461@ecy.wa.gov

Island/Kitsap/Snohomish
Geoff Tallent 425-649-4318 gtal461@ecy.wa.gov

Green/Duwamish
Janet Thompson 425-649-7128 jtho461@ecy.wa.gov

Chambers-Clover/Lyre-Hoko/Soleduck-Hoh
Bob Duffy 360-407-0239 bduf461@ecy.wa.gov

Nisqually/Deschutes
Steve Craig 360-407-6784 scra461@ecy.wa.gov

Skokomish-Dosewallips/Kennedy-Goldsborough/Quilcene-Snow
Phil Wiatrak 360-407-6652 pwia461@ecy.wa.gov

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Elwha-Dungeness
Cynthia Nelson 360-407-0276 cyne461@ecy.wa.gov

Lower/Upper Chehalis
Kahle Jennings 360-407-6310 kjen461@ecy.wa.gov

Grays-Elokiman/Cowlitz/Lewis/Salmon-Washougal/Wind-White Salmon
Tom Loranger 360-407-6058 tlor461@ecy.wa.gov

Klickitat/Lower Yakima/Naches/Upper Yakima
Greg Schuler 509-454-3619 grsc461@ecy.wa.gov

Entiat/Wenatchee
John Mohahan 509-457-7112 jmon461@ecy.wa.gov

Moses Coulee/Foster Creek/Methow
John Stormon 509-454-7832 jsto461@ecy.wa.gov

Little & Middle Spokane/Hangman
Doug Allen 509-625-5344 doua461@ecy.wa.gov

Colville/Pend Oreille
Keith Holliday 509-456-2750 khol461@ecy.wa.gov

Technical Assistance

Washington State Department of Fish & Wildlife

Habitat Program
PO Box 43200
Olympia, WA 98504-3200

Contact Information: Federal Agencies

National Marine Fisheries Service
Steve Landino, Chief
Washington State Habitat Branch
510 Desmond Drive SE, Suite 103
Olympia, WA 98503

U.S. Fish and Wildlife
Manager, Western Washington Office
510 Desmond Drive SE, Suite 102
Olympia, WA 98503

Environmental Protection Agency
Dan Robison
Central Regional Office
15 West Yakima Avenue, Suite 200
Yakima, WA 98902-3401

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APPENDIX B

Compendium of Existing Assessment and Research Programs and Protocols

The objective of outlining these information resources is to assist Irrigation Districts in finding and using information relevant to their assessments. Acknowledgement of these information resources, however, does not imply endorsement of the validity or sufficiency of the information they provide for the purposes of TMDL development or determination of effects under the ESA.

- **Referendum 38** (Chapter 43.99E RCW, Chapter 173-170 WAC). The purpose of this referendum is to provide financial assistance to public bodies engaged in furnishing an adequate and efficient irrigation water supply. In order to qualify for this financial assistance, an applicant needs to complete a Comprehensive Water Conservation Plan. Guidelines for completing this plan specify that the plan must contain segments on:
    - Land use, including soil classification and cropping patterns,
    - Water supply, use, and rights,
    - Future water needs and adequacy of water supply, and
    - Opportunities for improvement in water supply and distribution system efficiencies (WA DOE 1990).

  Completed Comprehensive Water Conservation Plans can provide much of the information necessary for the flow/hydrology and sediment loading components of the assessment. Copies of the Referendum 38 Supplemental Guidelines for preparing Comprehensive Water Conservation Plans are available from the WADOE.

- **HB 2496** established the Salmon Recovery Funding Board (SRFB or "surf-board") in 1999. The SRFB administers grants of state and federal funds to support a broad range of salmon habitat restoration, protection, and related activities. HB2496 (later revised by Senate Bill 5595) also established geographically defined "lead entities" with designated administrative and technical functions (see RCW 75.46.060- 090). Among these lead entity functions is completion of habitat limiting factors analysis and reports that could be used to identify and prioritize projects to benefit salmonid habitat within a defined geographic area (typically one or more Watershed Resource Inventory Areas; WRIAs). As of October 2000, habitat limiting factors analyses have been published for 16 WRIAs (Table 5) and several more are in progress. Information in these reports is organized at the watershed and sub-watershed scales. These analyses are available on CD ROM from the Washington State Conservation Commission and at: www.conserver.org/salmon/reports.

  The habitat limiting factors reports, where available, can be valuable to Irrigation District assessments because they contain relatively current compilations of information about:
    - Watershed and sub-watershed characteristics,
    - The distribution and condition of salmonid stocks (including bull trout and cutthroat trout in many cases),

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- Analyses of habitat limiting factors for each sub-watershed, and
- Identification of data gaps.

The types of habitat limiting factors assessed in these reports are very similar to the habitat pathways found in the MPIs used by the Services and include consideration of water quality parameters. These reports also provide suggestions about habitat restoration priorities in each sub-watershed. Irrigation Districts may find these suggestions useful in the development of their CIDMPs.

- **ESHB 2514**, also known as the Watershed Management Act, established a process and funding for local watershed planning. In comparison to the HB 2496 program, the State's ESHB 2514 watershed planning program emphasizes water supply, and balancing completing demands for water within WRIAs. Assessment of water quantity is required under the ESHB 2514 program, while assessments of water quality, habitat, and instream flow are optional. The objectives of completing the water supply assessment are to satisfy the minimum instream flows for fish and provide water for future development in the WRIA. Consequently, planning units established under ESHB 2514 are likely sources of watershed-scale information about water supply.

  The *Guide to Watershed Planning and Management* developed for the ESHB 2514 program (available at www.ecy.wa.gov/watershed/index or from the WA DOE) is an excellent aid for the entire assessment and planning process. In particular, the chapter on Technical Assessments describes a process for collecting and evaluating technical information, which will help Irrigation Districts meet the information needs for their CIDMPs.

  A Memorandum of Understanding (MOU) has been developed to coordinate implementation of ESHB 2514 and ESHB 2496 (www.ecy.wa.gov/watershed/MOU.html). The clarification of roles and responsibilities and increased cooperation expected to result from this MOU should make local planning units increasingly valuable sources of information for Irrigation Districts.

- **Salmon and Steelhead Habitat Inventory and Assessment Project (SSHIAP)** is an initiative begun in 1995 by the Northwest Indian Fisheries Commission (NWIFC) and the WDFW. The primary purposes of the SSHIAP habitat information system are to provide:
  - Information about habitat quantity and quality to complement stock identification and status information contained in SASI.
  - A means for prioritizing and coordinating basin-specific protection and restoration strategies.

  The SSHIAP characterizes freshwater and estuary habitat conditions at the 1:24,000 scale, and delineates streams into segments based on physical characteristics and habitat types.

  SSHIAP assessments are in progress for WRIAs 1 through 23 (the most complete analysis is for WRIA 8). WRIAs 24 through 62 will be included pending future funding of this program. The core elements of the information system are:

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- Delineation of streams into segments based on gradient, confinement, and habitat type, thus providing a consistent spatial framework for integrating information.
- Identification and mapping of both natural and anthropogenic barriers to fish migration with respect to species and hydrology.
- Identification and mapping of hydromodifications, including dikes, revetments, bank hardening, ditching, stream-adjacent roads, stream crossings, and gravel removal.
- Incorporation of information from the DNR Nearshore Habitat Program, which contains information about the status and trends of nearshore habitats and biotic communities (e.g., shoreline modification, surveys of exotic species, location of canopy-forming kelp, and surveys of submerged vegetation; see www.wa.gov/dnr/thdocs/aqr/nshr).
- Documentation of riparian habitat condition by stream segment.
- Documentation, by stream segment, of stream width/cross section and habitat type. In combination, these data elements will allow for the quantification of suitable space within streams for salmonid rearing and spawning.
- Quantification of historical habitat conditions; protocols currently under development.

The SSHIAP is also developing a directory of salmon-related monitoring protocols (potentially useful in developing the monitoring and adaptive management plan for CIDMPs – see Chapter 7 of this guidance).

The SSHIAP database (Microsoft ACCESS) can be queried by basin, watershed, individual tributary, species, or SASI stock. GIS linkages are in progress. Further information about the SSHIAP can be obtained from www.wa.gov/wdfw.hab/sshiap/ and http://bulltrout.nwifc.wa.gov/sshiap0.

- The Northwest Power Planning Council's (NWPPC) **Subbasin Assessment Template** is an approach currently being considered as a primary tool for guiding restoration planning in the Columbia River Basin (see the NWPPC web page at www.nwppc.org). The template is an outline that suggests the types, spatial and temporal scales, and sources of information most useful for subbasin and regional fish and wildlife planning. The template also recommends analytical procedures and protocols appropriate for interpreting assessment data. Resulting subbasin assessments are considered precursors for subbasin planning. Use of the template is expected to increase consistency over a wide geographic area, leading to better regional coordination, shared priority setting, and improved capability for measuring progress. This template is also one of the central documents guiding development of statewide assessment guidelines being developed by the Governors Salmon Recovery Office.

  The Council plans to develop assessments of subbasin over the next six months, then ask for recommendations for specific subbasin objectives and action measures that would be adopted into the program in the form of integrated subbasin plans. The Council hopes to develop those plans on an expedited schedule, by the fall of 2001.

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The template provides a recipe for completing:

- A general description of environmental conditions and processes,
- A compilation of biological information such as abundance and life-history diversity for species of interest,
- Spatial evaluation of habitat distribution, connectivity, and productivity for species of interest, and
- Validation and monitoring of the assessment.

This template may be useful to Irrigation Districts as both a model that describes the relationships among the essential elements of an assessment, and where subbasin assessments have been completed, as a guide to locations where actions to benefit species of interest are likely to have the greatest effect.

- **Ecosystem Diagnosis and Treatment (EDT)** is a quantitative tool for developing and evaluating actions to maintain or improve the sustainability of natural resources, like salmonids (Lichatowich et al. 1995; Mobrand et al. 1997). EDT provides a systematic and comprehensive diagnosis of problems and prioritizes alternative enhancement actions. The Northwest Power Planning Council (NWPPC) has chosen EDT as its assessment method for guiding salmon restoration in the Columbia River Basin. EDT is typically applied at the scale of subbasins by the NWPPC. The NWPPC anticipates having preliminary EDT analyses completed for all fifty-three Columbia River subbasins by the end of 2001. Apart from the NWPPC efforts, in-depth EDT analyses have been completed or are ongoing in the Yakima, Klickitat, Cowlitz, and Nisqually watersheds in Washington.

  Information about the EDT modeling approach for analyzing assessment data, including the EDT book of rules that explains how the EDT model translates environmental attributes into biometrics, is available at www.mobrand.com . The NWPPC Framework site (http://www.nwframework.org/ecol_work.html) provides both background information about EDT and draft results of analyses.

- The **Interior Columbia Basin Ecosystem Management Project (ICBEMP,** www.icbemp.gov) is charged with developing a scientifically sound and ecosystem based strategy for forest and rangelands administered by the Forest Service and Bureau of Land Management in the interior Columbia River basin and portions of the Klamath and Great Basins. The results of this effort have been some of the most comprehensive and sophisticated assessments of existing environmental conditions ever conducted for an area of this size. Irrigation Districts within this planning area may find the *Assessment of Ecosystem Components in the Interior Columbia Basin and Portions of the Klamath and Great Basins,* Volume III, Chapter 4, Broadscale assessment of aquatic species and habitats, to be a valuable resource for describing current conditions.

  This planning effort is also pioneering the use of new analytical tools, such as using Bayesian belief networks to assess population and habitat viability and to guide decisions about alternative courses of action in view of uncertainty about underlying ecological dynamics.

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These new tools may provide Irrigation Districts with options for interpreting assessment data and crafting their CIDMPs.

- **U.S. Forest Service Watershed Analyses** can provide considerable relevant information for Irrigation Districts that are adjacent to or near to Forest Service land. A primary focus of watershed analysis, particularly on lands managed under the Northwest Forest Plan, is implementation of the Aquatic Conservation Strategy found in that Plan (FEMAT 1993;USFS and USBLM 1994). The fundamental objective of the Aquatic Conservation Strategy is to restore and maintain properly functioning condition of aquatic ecosystems on public lands.

  Forest Service watershed analyses use a systematic procedure consisting of several modules to characterize the aquatic, riparian, and terrestrial features in a watershed. Results from these modules are integrated into a description of current conditions, including the location and abundance of key species, and maps of location, frequency, and magnitude of key processes.

  Although watershed analysis can be conducted at any spatial scale, the typical scale of Forest Service analyses is 5th field watersheds (as defined by the U.S. Geological Survey). Types of information typically used in the Forest Service's watershed analyses include:

  - Maps of topography, stream networks, soils, vegetation, and geology,
    - Sequential aerial photographs,
    - Field inventories and surveys including landslide, channel, aquatic habitat, and riparian condition inventories,
    - Census data on species presence and abundance,
  - Water quality data,
    - Disturbance and land-use history, and
    - Stream flow records.

  In addition to containing information on current watershed conditions and relevant ecosystem processes, Forest Service watershed analyses also evaluate likely future conditions, restoration needs, and monitoring programs. These elements of the analysis may also prove useful to Irrigation Districts during development of their CIDMPs.

  Copies of watershed analyses conducted by the Forest Service can be obtained from either the office of the local National Forest Ranger District, or the Supervisor's Office of the National Forest of interest.

- **Plan for Analyzing and Testing Hypotheses (PATH).** Originally formed to resolve differences in modeling outcomes regarding the effects of Columbia River hydroelectric dams on salmon survival during migration, PATH continues to strive to build an integrated body of scientific information about Columbia River Basin salmon. The objectives of PATH are to:

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- Determine the overall level of support for key alternative hypotheses from existing information, and propose other hypotheses and/or model improvements that are more consistent with these data (retrospective analyses);
- Assess the ability to distinguish among competing hypotheses from future information, and advise institutions on research, monitoring and adaptive management experiments that would maximize learning; and
- Advise regulatory agencies on management actions to restore endangered salmon stocks to self-sustaining levels of abundance (prospective and decision analyses).

Although PATH research efforts are targeted primarily at resource management and regulatory agencies, these efforts have required compilation of extensive data regarding population dynamics of Columbia River salmonids. These data, and recommendations resulting from PATH analyses and modeling efforts, may be useful resources for Irrigation Districts in the Columbia Basin. Reports resulting from PATH efforts are available from www.efw.bpa.gov/PATH.

- The **Cumulative Risk Initiative (CRI)** is an effort by the NMFS's Northwest Fisheries Science Center to assess salmonid population trends and the impacts of various actions on those trends. The CRI was developed largely in response to concerns that PATH research was too focused on effects of hydroelectric dams on salmonids (Mann and Plummer 2000). CRI seeks to assess salmon status from a more holistic perspective.

  The CRI team uses survivorship information to construct population models, which can be used to identify critical life stages (those that have the most pervasive impacts on population dynamics and the risk of extinction). The analytical framework used in the CRI integrates across life stages and different possible actions, providing a basis for evaluating the relative benefits or risks associated with alternative actions. The CRI effort has compiled and organized a large body of salmonid population data, particularly for Columbia Basin populations. Much of this information and resulting population models and reports are available at www.nwfsc.noaa.gov/cri. These reports include draft general risk analyses for 11 of the 12 listed Columbia Basin ESUs.

  Most of the CRI population trend analyses are conducted at larger spatial scales than the assessment described here. Nonetheless, ESU-wide analyses from the CRI can assist Irrigation Districts in describing the likely effects of their operations on local salmonid populations, and in identifying opportunities for minimizing effects on life stages that have the greatest probability of contributing to positive demographic responses.

  Another component of the CRI is the Viable Salmonid Population paper that identifies central principles relevant to assessing both population- and ESU-level viability (McElhany et al., 2000). This effort is expected to lead to identification of measurable population attributes and "rules of thumb" that can be used to assess the status of ESUs and to set recovery goals (see the following section). Because population viability analysis is a difficult and contentious aspect of population biology, progress on developing these methods will likely be slow. Nonetheless, as CRI continues to develop these approaches, they will provide an important source of support for local management plans such as CIDMPs.

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Another aspect of the CRI is quantitative evaluation of the relationships among land use, habitat condition, and salmonid production. These analyses are being conducted at the watershed and sub-watershed scales, appropriate for Irrigation District assessments. The only watersheds in Washington for which preliminary analyses of this sort have been completed are in the Snohomish River basin (Bilby et al. draft report).

- **Recovery Planning under the ESA**. Section 4(f) of the ESA specifies that the services shall develop and implement recovery plans for the conservation and survival of endangered and threatened species. These plans often incorporate:
  - A description of site-specific management actions necessary to achieve the plan's goal for the conservation and survival of the species;
  - Objective, measurable criteria which, when met, would result in delisting the species, and;
  - Estimates of the time required and the cost to carry out those measures needed to achieve the plan's goal and to achieve intermediate steps toward that goal.

  Range-wide recovery planning is underway for bull trout and for most salmon and steelhead ESUs in Washington.

  The National Marine Fisheries Service (NMFS, http://research.nwfsc.noaa.gov/cbd/trt/index.html) is responsible for developing recovery plans for anadromous salmon. Recovery plans will address all salmonid species within a series of discrete geographic areas, or domains. In Washington these domains include:
  - Puget Sound and the Olympic Peninsula: Puget Sound Chinook, Hood Canal Summer Chum, and Ozette Lake Sockeye.
  - Willamette and Lower Columbia River Basins and Southwest Washington Coast: Lower Columbia River Chinook, Upper Willamette River Chinook, Columbia River Chum, Lower Columbia River Steelhead, Upper Willamette River Steelhead.
  - Mid and Upper Columbia River Basins: Upper Columbia River Spring Chinook, Upper Columbia River Steelhead, Mid Columbia River Steelhead.
  - Snake River Basin: Snake River Fall Chinook, Snake River Spring/Summer Chinook, Snake River Sockeye, Snake River Steelhead.

  The NMFS will appoint Technical Recovery Teams (TRTs) for each of these domains. These teams will be asked to (1) identify population and ESU de-listing goals; (2) characterize habitat/fish abundance relationships; (3) identify the factors for decline and limiting factors for each ESU; identify the early actions that are important for recovery; (4) identify research, evaluation, and monitoring needs; and (5) serve as science advisors to groups charged with developing measures to achieve recovery. Recovery goals must, at a minimum, restore listed ESUs to levels at which they are no longer threatened and can therefore be de-listed under the ESA. Although the TRTs will not identify formal recovery goals for candidate species, they will identify factors of concern and measures to ensure the long-term conservation of such species.

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The planning component of the ESA recovery planning process will focus on identifying the measures and actions necessary to achieve the recovery goals identified by the TRTs. Important steps in this process will include:

(1) Inventorying all ongoing state, tribal, local, and Federal conservation plans and planning efforts, as well as all existing Habitat Conservation Plans and 4(d) rule components in each planning area;

(2) Evaluating these existing conservation plans and efforts to assess how well they address identified factors for decline and limiting factors, and the extent to which they collectively achieve the identified recovery goals;

(3) Identifying and evaluating any additional or alternative measures necessary for achieving the identified recovery goals; and

(4) Prioritizing the required recovery measures and identifying the entity or entities responsible for implementing them; and (5) estimating the costs and time needed to carry out the identified recovery measures.

An overview of the USFWS recovery program, including reclassification and delisting activities, is available at http://endangered.fws.gov/recovery. For bull trout, two Distinct Population Segments (DPS) occur in Washington: the Columbia River DPS and the Coastal-Puget Sound DPS. The Columbia River DPS has been subdivided into 22 recovery units (RU), and recovery unit designations for the Coastal-Puget Sound DPS are being developed. RUs are delineated using biological and genetic factors, while considering political boundaries (e.g., occurrence or potential for gene flow among populations; the Upper Columbia River RU encompasses the Entiat, Wenatchee, and Methow river basins). RUs are the focal units for recovery planning and managing recovery effort, but delisting can only occur at the DPS level. Recovery Unit Teams consisting of fishery biologists from federal and state agencies and academia are producing reports that include:

- The historic and current distribution and abundance of bull trout in each RU,
- Factors for decline,
- Recovery goals and objectives,
- Recovery criteria,
- General conservation measures,
- Specific actions needed, and
- Implementation schedule.

These RU-specific reports will be combined to produce DPS-scale recovery plans and delisting criteria.

Although the scale of geographic domains and RUs are typically larger than 5th field watersheds, recovery plans will often contain information collected at the watershed or stream reach level. This information will be useful for addressing subpopulation pathways in

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the assessment matrix. Likewise, the conservation measures and lists of specific actions that are needed can be useful to Irrigation Districts in terms of developing their plan of action.

- {under construction} The **Tri-county Watershed Assessment Framework** is an effort by Pierce, King, and Snohomish counties to develop guidance that will ensure WRIA planning efforts are consistent with ESA requirements, and that relevant technical work is fully incorporated into watershed assessment programs. The Framework is intended to function as a "checklist" of watershed management perspectives, core questions, and technical components that represent critical elements of WRIA-based studies focused on salmonid conservation and recovery. Use of this checklist is expected to result in coherent development and implementation of technical programs in the Tri-county region (see www.salmoninfo.org).

  The conceptual basis of the Framework derives from three perspectives that guide the task of watershed assessment:

  - Habitat/ecosystem perspective
  - Fish life-history perspective
  - Human use perspective

  The Framework identifies three technical issues that require particular attention during watershed assessment:

  - Geographic scale
  - Temporal scale
  - Causal relationships

  Goals of the assessment:

  - Identify the critical biological, physical, and chemical conditions in the watershed which most strongly influence the freshwater and nearshore sustainability of salmonids.
  - Characterize current and historic conditions throughout the watershed, with respect to their ability to support salmonid production during the freshwater and nearshore life history stages.
  - Enhance understanding of the causal relationships between landscape-scale watershed conditions, specific habitat factors, and salmon sustainability.
  - Build understanding of the causal relationships among human uses of the watershed and habitat qualities of the watershed to refine current and future land uses to support salmonid protection and restoration.
  - Establish the technical basis for the definition of measurable recovery objectives, priority actions and monitoring efforts.
  - Identify, prioritize, and recommend both short- and long-term opportunities for conservation and recovery action.

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The Framework outlines a two-phase approach to assessments. Both phases are guided by a set of core questions that shape information gathering and analysis efforts, especially regarding appropriate levels of detail.

- Phase 1: Reconnaissance assessment
- Phase 2: Strategic assessment

Minimum components align well with the Services' matrices of pathways and indicators.

- **NRCS assessment protocol**. The NRCS publication, *Riparian Area Management* (TR 1737-15 1998): A user guide to assessing proper functioning condition and the supporting science for lotic areas, presents this agency's approach to assessment of proper functioning condition. This checklist-based approach focuses on how well the physical processes of streams are functioning. Many of the measurement parameters included in this assessment approach are the same as those in the Services' matrices of pathways and indicators. The excellent figures, illustrations, and photographs in the NRCS user guide make this a valuable reference for developing both a sound grasp of riparian processes and an intuitive sense of how properly functioning condition looks. Sections in the guide regarding quantification of the checklist items provide easily understood explanations of quantitative methods and reviews of scientific literature supporting these methods. Copies of the user guide are available from: Bureau of Land Management, National Business Center, BC-650B, P.O. Box 25047, Denver, CO, 80225-0047.

- **Timber, Fish, and Wildlife (TFW) Watershed Analysis**. This approach to watershed assessment was developed through the Washington State Forest Practices Board to address cumulative effects of forest practices on private lands on public resources. The spatial scale for these assessments was the Watershed Administrative Unit, discrete hydrologic units ranging in size from 10,000 to 50,000 acres. This scale corresponds well with the action area of many irrigation districts. Although most irrigation districts do not include large acreage of forested lands, the erosion, hydrologic change, and riparian function elements of these assessment guidelines are relevant to irrigation district assessments. TFW watershed analysis guidance is available from the Forest Practices Board section of the Washington Department of Natural Resources website: www.wa.gov/dnr.htdocs/fp/fpb/rules. Status and results of TFW watershed analysis and monitoring are available at http://nwifc.wa.gov/TFW.

- **Basin Plans and Instream Resources Protection Programs** (still needs to be written)

- **Tri-county Water Resource Agency—Yakima River Watershed**. This agency is developing a comprehensive water plan for the Yakima River Basin. An important component of this process was recent completion of a draft watershed assessment. This draft assessment (available at: www.co.yakima.wa.us/tricnty), which includes sub-basin assessments, contains most of the information needed for irrigation district baseline assessments in the Yakima basin.

- The Washington Departments of Fish and Wildlife, Ecology, and Transportation, as a component of the *Statewide Strategy to Recover Salmon: Extinction is Not an Option*, are

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developing **guidelines for salmonid habitat protection and restoration**. Guidelines are currently proposed for the following activities:

- Stream bank protection
- Fish passage and screens
- Fish passage at road culverts (www.wa.gov/wdfw/hab/engineer/cm/toc)
- Stream channel design
- Gravel removal and freshwater dredging
- Marine dredging
- Over-water structures
- Water crossings
- Conduit crossings
- Floodplain development
- Aqua-culture
- Aquatic plant control

These statewide guidelines are intended to inform citizens of their options and responsibilities by clearly describing the adverse impacts on aquatic resources that can result from their activities, and by explaining how these impacts can be avoided, minimized, or mitigated.

Another component of this effort is the development of statewide guidelines for watershed assessment. Currently in the form of a preliminary draft, these assessment guidelines rely on the assessment formats outlined in the draft Tri-county Watershed Assessment Framework and the Sub-basin Assessment Template developed for the NWPPC. Ongoing coordination will be necessary to ensure consistency between these developing statewide assessment guidelines and the assessment guidance provided in this document.

To support the statewide guidelines, a series of white papers that will summarize the existing state of knowledge regarding various aspects of aquatic ecology and stream restoration, are also being developed. Specific white paper topics include:

- Over-water structures (marine, freshwater, and treated-wood issues)
- Water crossings
- Channel design
- Floodplain and riparian corridor issues
- Dredging and gravel removal (marine and freshwater)

Most of these white papers should be completed in early 2001. Because these papers will form the scientific basis for statewide habitat protection and restoration guidelines, they will be important reference resources for Irrigation Districts as they develop both the specific

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components of their assessment and their CIDMPs. Upon completion, copies of these white papers will be available at: www.wa.gov/wdfw/hab/salguide/salguide.htm.

General information concerning the guidelines project is available at www.wa.gov/wdfw/hab/salguide.

- The U.S. EPA has produced a Compendium of Tools for Watershed Assessment and TMDL Development (Shoemaker et al. 1997). This compendium provides summaries of a variety of assessment techniques and modeling approaches that have been used in TMDL development. This reference provides useful insights into how EPA or the WA DOE uses information provided in assessments to develop a TMDL. Copies can be obtained from the EPA's National Service Center for Environmental Publications at www.epa.gov/ncepihom.

- *Stream Corridor Restoration: Principles, Processes, and Practices* (FISRWG 1998) provides comprehensive coverage of all physical and biological aspects of stream ecosystems. Chapter 3 describes the effects of human-induced disturbances on stream corridor processes, and Chapters 4 and 7 cover the collection and analysis of relevant data. Furthermore, Chapter 6 provides an excellent treatment of monitoring, evaluation, and adaptive management. This excellent reference document is available from www.usda.gov/stream_restoration.

Additional useful web sites

- *EMAP* (www.epa.gov/emap): The Environmental Monitoring and Assessment Program (EMAP) is a research program to develop the tools necessary to monitor and assess the status and trends of national ecological resources (see EMAP Research Strategy). EMAP's goal is to develop the scientific understanding for translating environmental monitoring data from multiple spatial and temporal scales into assessments of ecological condition and forecasts of the future risks to the sustainability of our natural resources.

  EMAP objectives are to advance the science of ecological monitoring and ecological risk assessment, guide national monitoring with improved scientific understanding of ecosystem integrity and dynamics. EMAP will also develop and demonstrate indicators to monitor the condition of ecological resources.

- *NAWQA* (www.water.usgs.gov/NAWQA): The National Water-Quality Assessment (NAWQA) Program is designed to describe the status and trends in the quality of the Nation's ground- and surface-water resources and to provide a sound understanding of the natural and human factors that affect the quality of these resources. Study units in Washington include the Puget Sound Basin, the Yakima River Basin, the Central Columbia Plateau, and the Northern Rockies Intermontane Basins (including the Pend Oreille basin in Washington).

- *Surf Your Watershed* (www.epa.gov/surf3): This site is an all-purpose clearinghouse for watershed information, especially regarding water quality. It links to multiple national databases and allows the user to access information about their watershed of interest using several simple locators, including zip code and Hydrologic Unit Code.

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- *The Riparian Bibliography* (http://wwwdev.cfr.washington.edu/ris/html/intro.htm) assembled by the University of Washington, College of Forest Resources is a trove of information about aquatic and riparian habitats with a focus on the Pacific Northwest.

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APPENDIX C
Pathways to ESA Compliance

A. Introduction

In Chapter 4, this manual describes the need to prepare an inventory of Irrigation District activities that may affect resources that are protected under the Endangered Species Act and the Clean Water Act. In Chapter 6, this manual describes processes for assessing the extent of those effects and suggests a strategic approach to conservation planning for those activities identified through the inventory process described in Chapter 4. In Chapter 2, this manual describes the types of compliance assurances that are available in the Endangered Species Act and the Clean Water Act, and the statutory and regulatory requirements for acquiring such assurances.

The National Marine Fisheries Service (NMFS) and the U.S. Fish and Wildlife Service (the Services) administer the federal Endangered Species Act (ESA). The Endangered Species Act seeks to conserve the ecosystems on which threatened and endangered species depend by prohibiting the unauthorized "take" of species. Species "take" is conceptually simple. Nevertheless, assessing whether one's business and other activities result in take is potentially complex. As a result, the regulatory prohibition against take can cause uncertainty as to whether activities that adversely affect listed can occur in "compliance" with the ESA.

The Services can provide assurances to entities that their activities comply with the ESA; even where those activities may adversely affect listed species. These assurances are authorized in the ESA and can be acquired through three distinct administrative vehicles or "pathways." The purpose of this chapter is to help applicants understand these pathways and choose the appropriate administrative vehicle to acquire compliance assurances under the ESA. Such understanding should enable an Irrigation District engaged in ESA conservation planning to choose the pathway that best addresses their situation and needs. Availability of the administrative vehicles through which compliance assurances can be packaged depends on a variety of factors. These factors are described below. Each pathway offers a unique combination of relative advantages and disadvantages. These considerations are also described below, including a comparative description of tradeoffs associated with each, and a preliminary set of questions to help applicants select a preferred pathway.

Generally, the Endangered Species Act (ESA) of 1973 as amended (16 U.S.C. 1531 *et seq.*) prohibits the "take" of species listed as threatened and endangered. "Take" is variously defined under the ESA. Take defined as "harm" is the form of take most in-play for purposes of Comprehensive Irrigation District Management Planning. "Harm" is habitat modification that kills or injures species by impeding certain natural behavioral patterns including breeding, feeding, and sheltering (for terrestrial species) and spawning, rearing, feeding, sheltering, and migrating (for aquatic species, including anadromous fish). The ESA recognizes that take can and does occur during the course of otherwise lawful activities. Lawful Irrigation District activities can lead to take of listed species creating uncertainty regarding continuing those operations.

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B. ESA Compliance Assurances

For entities whose otherwise lawful activities result in the incidental take of ESA-listed species, the Services can provide compliance assurances under three separate provisions. These provisions include:

- ESA Section 4(d) Rules
- ESA Section 7(a)(2) Interagency Consultation
- ESA Section 10(a)(1)(B) Habitat Conservation Planning

Each of these pathways has advantages and disadvantages relative to the others (Table 1). Furthermore, the availability of each of the pathways is limited by certain factors to that might limit the choice of any Irrigation District. Early in the CIDMP development process, each Irrigation District will need to decide which pathway is appropriate for that District. Factors that will influence the choice of pathway include the extent and duration of assurances sought, the extent of control the Irrigation District seeks to exert over the conservation planning process, the species for which the Irrigation District seeks assurances, and the certainty that assurances will remain in tact in the event of changed circumstances.

C. Characteristics Shared by all Pathways

Developing a Comprehensive Irrigation District Management Plan under this guidelines document will generally be the same, regardless of the compliance pathway. The planning steps include taking an inventory of operations that may affect ESA or CWA resources (or both), assessment of the extent of effects, and planning minimization or mitigation measures (or both) as appropriate. The product of these steps will include a conservation plan with a monitoring program and (where desired) an adaptive management strategy. The commitments of the CIDMP will likely involve development of a formal agreement to be signed by the Irrigation District and jurisdictional agencies after plan approval.

Irrigation Districts will have to decide the species their plan will cover and for which they will receive assurances under the ESA. The pathways vary in the flexibility accorded to the choice of covered specie. At a minimum, covered species will include all listed species potentially exposed to take by Irrigation District activities. Decisions about scope of coverage have ramifications for the cost, development time, and regulatory certainty components of all pathways. In general, broader coverage requires more threshold effort and is more time intensive, but also provides greater regulatory certainty.

Levels of regulatory certainty are proportional to the certainty of protection for listed species provided by a management plan. For example, providing a generous margin of safety in view of uncertain effects and securing funding adequate to ensure implementation of conservation or restoration measures that have been demonstrated to be effective will enable regulatory agencies to provide more comprehensive and longer duration assurances.

CIDMP conservation plans, regardless of pathway, must be contain actions that are legal and within the jurisdiction and authority of the applicant to conduct. This requirement ensures that an Irrigation District plan consists of activities it can actually carry out.

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D. Characteristics of Each Pathway

1. 4(d) Rule

The first of the ESA compliance pathways that might accommodate the CIDMP process and provide assurances to Irrigation Districts with approved plans is provided in Section 4(d) of the ESA. Section 4(d) directs the Services to issue regulations that are "necessary and advisable to provide for the conservation of the species." In the past, the Services have used this provision differently. Typically, NMFS simply adopted 4(d) rules to prohibit the take of species listed as "threatened" under the ESA (that prohibition being automatically applied upon the listed of a species as "endangered"). For the 4(d) rules signed in June 2000 covering 14 salmon and steelhead ESUs, a somewhat different approach was announced. While the prominent action of the June 2000 4(d) rule is to prohibit the take of those ESUs of salmon and steelhead, the rule also promulgated limitations on the coverage of the take prohibition. Specifically, the rule does not apply to certain actions carried out under approved state, local, or tribal programs. During the development and promulgation of the June 2000 4(d) rule, NMFS approved those programs as adequate to conserve the listed species. At the same time, the June 2000 rule does not prohibit all other actions; it just generally prohibits take. As a result, actions carried out under the regulations comprising those approved programs, in addition to those that do not take the listed species, are compliant with the ESA.

The June 2000 4(d) rule limited the take prohibition for 13 programs of state and local actions, plus one for tribal governments (the "limits"). None of these approved limits on the take prohibition is appropriate to accommodate the CIDMP process described in this handbook. However, the rule is flexible and NMFS can amend the take prohibition to add further limits where new or additional programs that adequately conserve the listed species are submitted and approved. To illustrate the criteria by which such a program could be approved as a future limit on the take prohibition, this section briefly describes the habitat-related limits one the June 2000 4(d) rule and the process NMFS has set out for consideration of further programs under those limits.

Whether take prohibitions or other protective regulations are necessary and advisable depends upon the biological status of the species and the potential impacts of various activities on the listed species' biological status. If programs contribute to conserving the species or adequately limit the impacts on the species, NMFS can find it is not necessary or advisable to impose the take prohibition. In assessing the impacts of an action or program on the listed species' habitat, NMFS considers 1) whether the action will degrade existing habitat processes and functions, and 2) whether the action helps restore degraded habitat processes and functions. The 14 limits in the June 2000 4(d) rule provide examples of how activities that may harm salmon and steelhead can be adequately controlled to minimize impacts and contribute to the conservation of the listed species.

Programs covering development activities need adequate funding and legal mechanisms for implementing, monitoring, maintenance and reporting to ensure that they comply with approved policies, ordinances, and permitting procedures. This requirement could include approved conservation plans such as those proposed under the CIDMP process covered by these guidelines. NMFS expects that programs proposed for a limit will be

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sufficiently described, guided, or governed by an applicable authority (other than the ESA itself). These authorities could include state laws, county regulations, metropolitan master plans, local ordinances, official operating manuals, or other regulating mechanisms. Conceivable, an individual CIDMP could serve as such an authority for one or multiple Irrigation Districts willing to commit to the provisions of the CIDMP. To qualify for a limit, these mechanisms and the entities implementing them must provide absolute assurance that covered activities are conducted in compliance with the specifications NMFS has analyzed and approved.

To approve a limit from ESA take prohibitions, a program must conserve salmon by proposing measures that enable conditions that meet the listed species biological requirements. This criterion is the same for any program, throughout the range of the listed species, and across the West Coast. However, the manner in which programs meet biological requirements will differ according to geographic and operational facts specific to individual programs. The scope of any given program is important to the NMFS analysis. The scope of the program may be such that only a portion of the habitat forming processes in a watershed are affected by it. For NMFS to find that a program is consistent with the conservation of the listed salmonids, only the effects on habitat functions that are within the scope of that program will be evaluated. For example, an integrated pest management program may affect habitat-forming processes related to clean water, but have no effect on physical barriers preventing access by fish to a stream. The June 2000 4(d) rule provides further guidance on the protection and conservation of listed fish (65 Fed. Reg. 42422, July 10, 2000).

To determine that the 13 state and local limits and one tribal limit conserve the listed species habitat, NMFS evaluated whether the activities would allow properly functioning habitat condition to be attained persist. There is no single, scientifically credible analytical framework for determining effect of an activity, and NMFS will accept any scientifically credible analysis of effects. However, NMFS has developed a default analytic methodology (*Making Endangered Species Act Determinations of Effect for Individual or Grouped Actions at the Watershed Scale*, NMFS, 1996) that applicants may want to consider when looking for an analytical model. It is often referred to as the "Matrix" (of Pathways and Indicators, or "MPI"). In the MPI framework, the pathways for determining the effect of an action are represented as six conceptual groupings (*e.g.*, water quality, channel condition) of 18 habitat condition indicators (*e.g.*, temperature, width/depth ratio). Indicator criteria (mostly numeric, though some are narrative) are provided for three levels of environmental baseline condition: properly functioning, at risk, and not properly functioning. The effect of the action upon each indicator is classified by whether it will restore, maintain, or degrade the indicator.

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Although the indicators used to assess functioning condition may entail instantaneous measurements, they are chosen, using the best available science, to detect the health of underlying processes, not static characteristics. "Best available science" advances through time. This advance allows PFC indicators to be refined, new threats to be assessed and species status and trends to be better understood. Salmonid habitats are inherently dynamic, and the PFC concept includes recognition that natural patterns of habitat disturbance will continue to occur. Floods, landslides, windstorms, and fires will result in spatial and temporal variability in habitat characteristics; as will anthropogenic perturbations. Indicators of PFC may vary between different landscapes based on unique physiographic and geologic features. For example, aquatic habitats on timberlands in glacial mountain valleys are controlled by natural processes operating at different scales and rates than are habitats on low-elevation coastal rivers. The MPI provides a consistent, but geographically adaptable, framework for effect determinations. The pathways and indicators, as well as the ranges of their associated criteria, are amenable to alteration through the process of watershed analysis.

Regardless of the analytical method used, if a proposed action is likely to impair properly functioning habitat, appreciably reduce the functioning of already impaired habitat, or retard the long-term progress of impaired habitat toward PFC, it cannot be found consistent with the conservation of the species. If a program preserves existing habitat function levels, and allows natural progression towards PFC where habitat is impaired, it may be determined by NMFS to qualify under one of the habitat limits in the June 2000 4(d) rule or as an amendment (new limit) to that 4(d) rule. The NMFS has added language to the limits for road maintenance, pesticide management, municipal, residential, commercial, and industrial (MRCI) development, and forestry that defines PFC and identifies how NMFS will evaluate programs with regard to meeting this biological standard. Specific criteria for applying this conservation standard are listed in each habitat-related limit (65 Fed. Reg. 42422, July 10, 2000).

The USFWS Western Washington Office is currently developing a special rule for bull trout that may be used in a way similar to the NMFS special rules; to provide limited incidental take allowances at some time after this species was listed as threatened for activities and programs that meet Conservation Enhancement Plan criteria (Table 2). In the AFW Irrigation District context, if the guidelines developed by the workgroup meet Conservation Enhancement Plan criteria, then Irrigation Districts that adhere to this template could get incidental take allowances for bull trout through a special rule. Note that this option may only be available in the near future for bull trout, and not for other species listed as threatened by the USFWS.

Some proposed criteria for USFWS Conservation Enhancement Plans for bull trout include:

- Plan proponents must have jurisdiction over proposed activities and the authority and means to carry them out. The proponent's regulations will be the mechanisms that enable the USFWS to authorize limited incidental take.
- The plan must "contribute to the long-term conservation" of covered species. This means providing improved conditions, not simply maintaining the status quo.

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- Allowances for short-term adverse effects are possible if:
    1. These impacts are later eliminated or their probability of recurrence reduced, and
    2. The likelihood of recovery is not diminished or the time to recovery prolonged.
- Implementation and effectiveness monitoring will be required and reports assessing the results of this monitoring will need to be provided to the USFWS.
- Proponents will be required to provide assurances of funding adequate to implement the program, and enforcement capabilities sufficient to ensure compliance.

a. Comparison of 4(d) rule to other Pathways

From the applicant's perspective, special rules generally occupy the middle ground in terms of both advantages and disadvantages for most functional aspects. The level of assurance afforded to a limit proponent is limited compared to assurance afforded by a Section 10 Incidental Take Permit (ITP). The scope and duration of coverage is also potentially less than the Habitat Conservation Plan (HCP) process, but potentially greater than under Section 7 Interagency Consultation.

Section 4(d) rules are fundamentally different from the pathways provided through Section 7 Interagency Consultation and HCPs. Specifically, limitations of the take prohibition can be extended only to species listed as "threatened." Incidental take of endangered species can be addressed and covered in either of the other pathways. Irrigation Districts whose activities may affect endangered species will achieve ESA compliance by avoiding take of those species, or by acquiring incidental take coverage through the Section 7 or 10 pathways. Coverage of unlisted species is beyond the scope of any 4(d) rule.

The certainty of the assurances provided by adherence to programs covered in a take limitation extends only as far as the limitation itself. Since 4(d) rules are the product of Federal rulemaking, and Federal agencies can unilaterally engage in rulemaking, a limit proponent could have to adjust it's conservation program over time. In contrast, qualifying HCPs can integrate the assurances of the No Surprises Rule (50 C.F.R. 17.22(b)(5), 17.32(b)(5) and 222.307(g); 63 Fed. Reg. 8859, February 23, 1998), which states that the proponent of an approved, operating habitat conservation plan will not be required to provide further mitigation than that already in the HCP, except in certain, very narrow (and clearly defined) circumstances. Even then, the Services can impose further mitigation responsibilities only by working closely with the ITP permittee.

The Services have typically approved limits for programs based on prescriptive actions. Local permitting and master planning programs are examples of such limits that have already been approved in the June 2000 4(d) rule. Recent efforts by NMFS to encourage greater local involvement in special rule development may increase the flexibility of this pathway. Because the USFWS is currently developing the legal and logistical details of how Conservation Enhancement Plans will be used to allow

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limited take of bull trout, the ultimate flexibility of this pathway remains uncertain. Likewise, the NEPA requirements associated with this pathway are currently unclear.

2. Interagency Consultation

Section 7 of the ESA outlines procedures for interagency cooperation to conserve federally listed species and designated critical habitats. Section 7(a)(1) requires federal agencies to use their authorities to further the conservation of listed species. Section 7(a)(2) requires federal agencies to consult with the Services to ensure that they are not undertaking, funding, permitting, or authorizing actions likely to jeopardize the continued existence of listed species or to destroy or adversely modify designated critical habitat.

The interagency consultation process ensures against jeopardy and adverse modification by screening out projects that are "likely to adversely affect" listed species and assessing the expected effects of those projects against the existing environmental baseline. For projects that will result in habitat based take, the interagency consultation process requires the development of measures ("RPMs") that minimize take to the extent that survival of the species is not impeded. Projects that would impede the survival of covered species, regardless of the RPMs, are said to jeopardize them. If the mechanism impeding survival is traceable to a specific element of habitat that caused that habitat to be designated as critical habitat, then the project is said to adversely modify or destroy critical habitat. The NMFS and USFWS are required to develop reasonable and prudent alternatives ("RPAs") to proposed actions that jeopardize species or adversely modify or destroy their critical habitat. Typically, the Services implement the interagency consultation process in collaboration with the Federal action agency to help those agencies ensure their activities do not jeopardize listed species.

Formal consultation is often preceded by a period of informal consultation that provides an opportunity to identify potential project effects, explore modifications that reduce or remove effects, and determine if a formal consultation is necessary (i.e., adverse effects are likely to occur). Formal consultation begins with delivery to the Services of a complete "biological assessment," which is prepared by the action agency and describes their proposed action and its effects on listed and proposed species and designated critical habitat. The typical product of formal interagency consultation is a "biological opinion" issued by one or both Services. Four major components of biological opinions are:

(1) The Services' determination as to whether or not a proposed action is likely to jeopardize the continued existence of listed species or to destroy or adversely modify designated critical habitat,

(2) Detailed discussions of the environmental baseline and the effects of the proposed action on listed species and designated critical habitat,

(3) An incidental take statement that authorizes a specified amount of take associated with implementing the proposed action, and

(4) Reasonable and prudent measures for avoiding or minimizing incidental take.

In conducting analyses of habitat-altering actions under § 7 of the ESA, The Services use the following steps: (1) consider the status and biological requirements of the affected species; (2) evaluate the relevance of the environmental baseline in the action area to the species' current status; (3) determine the effects of the proposed or continuing action on the species; (4) consider cumulative effects; (5) determine whether the proposed action, in light of the above factors, is likely to appreciably reduce the likelihood of species survival in the wild or adversely modify its critical habitat. If jeopardy or adverse modification is found, The Services must identify reasonable and prudent alternatives to the action if they exist. The analytical framework described above is consistent with the Services' joint ESA § 7 Consultation Handbook and builds upon the Handbook framework to better reflect the scientific and practical realities of salmon conservation and management on the West Coast. This analytical framework is described further, below.

a. Status of Affected Species and Species Biological Requirements

The first step in conducting this analysis is to identify listed species, and when known, populations of listed species, that might be affected by the proposed action. Under the ESA, a taxonomic species can be defined as a "distinct population segment."[1] NMFS policy describes "distinct population segments" as Evolutionarily Significant Units (ESUs).[2] An ESU is the listing unit for salmon under NMFS jurisdiction. Therefore, for purposes of jeopardy determinations, NMFS considers whether a proposed action will jeopardize the continued existence of the affected ESU or adversely modify its critical habitat. The USFWS retains the distinct population segment (DPS) as the listing unit for fish under its jurisdiction.

When affected species and populations have been identified, the Services consider the relative status of the listed species, as well as the status of populations in the action area. This can include parameters of abundance, distribution, and trends in both. Various sources of information exist to define species and population status. The final rule listing the species or designating its critical habitat is a good example of this type of information. Species' status reviews and factors for decline reports can also provide relevant information for this section. When completed, recovery plans and associated reports will provide a basis for determining species status in the action area.

The listed species' biological requirements can be described in a number of different ways. For example, biological requirements for salmon can be expressed in terms of population viability using such variables as a ratio of recruits to spawners, a survival rate for a given life stage (or set of life stages), a positive population trend, or a threshold population size. Under the habitat-based analytic approach used by NMFS in the Northwest Region, biological

[1] 16 U.S.C. § 1532 (16) (1988).

[2] 56 Fed. Reg. 58618 (1991)

requirements are described as the habitat conditions necessary to ensure the species' continued existence *(i.e.*, functional habitats). These conditions are expressed in terms of the physical, chemical, and biological parameters that define the pathways and indicators described in Chapter 5 of these guidelines. The description of these requirements varies according to the nature of the action under consultation and its likely effects on the species.

Importantly, there is a strong causal connection between population variables and the function of habitat components. Actions that affect habitat have the potential to affect population abundance, productivity, and diversity; these effects are particularly noticeable when populations are at low levels—as they are now in every listed DPS or ESU. The importance of this relationship is highlighted by the fact that freshwater habitat degradation is identified as a factor of decline in every salmon listing on the West Coast.[3]

Quantifying the effects of a given habitat action in terms of its impact on biological requirements for individual salmon (whether in the action area or outside of it) is difficult. Thus it follows that while it is often possible to draw an accurate picture of a species' range-wide status, determining how that status can be affected by a given habitat-altering action is complex. Therefore, the Services usually must rely on the best scientifically and commercial information available and determine the effects an action has on a given habitat component. The direct relationship between habitat condition and population viability, enables the Services to extrapolate to the impacts on the species as a whole. By examining the effects a given action has on the habitat portion of a species' biological requirements, the Services have a gauge of how that action will affect the population variables that constitute the rest of a species' biological requirements and, ultimately, how the action will affect the species' current and future health.

In the absence of reliable scientific information on a species' biological requirements at both the population and the DPS or ESU levels, the Services analyses must rely on generally applicable scientific research that one can reasonably extrapolate to the action area and to the population(s) in question. NMFS usually defines the biological requirements in terms of a concept called properly functioning condition (PFC). For bull trout, the USFWS uses a similar concept (habitat "functioning appropriately").[4] Properly functioning condition is the sustained presence of natural[5] habitat-forming processes in a watershed *(e.g.*,

[3] *See e.g.*, 57 Fed. Reg. 14653 (April 22, 1992) (Snake River spring/ summer and fall chinook); 64 Fed. Reg. 14308 (March 24, 1999) (West Coast Chinook)

[4] To simplify the terminology used in these Guidelines, PFC will be used to refer to both properly functioning habitat and habitat appropriately functioning.

[5] The word "natural" in this definition is not intended to imply "pristine," nor does the best available science lead us to believe that only pristine wilderness will support salmon. The best available science does lead us to believe that the level of habitat function necessary for the long-term survival of salmon (PFC) is most reliably and efficiently recovered and maintained by simply eliminating anthropogenic impairments, and does not usually require

riparian community succession, bedload transport, precipitation runoff pattern, channel migration) that are necessary for the long-term survival of the species through the full range of environmental variation. PFC, then, constitutes the habitat component of a species' biological requirements. The indicators of PFC vary between different landscapes based on unique physiographic and geologic features. For example, aquatic habitats on timberlands in glacial mountain valleys are controlled by natural processes operating at different scales and rates than are habitats on low-elevation coastal rivers.

In the PFC framework, baseline environmental conditions are described as "properly functioning," "at risk," or "not properly functioning." When reviewing actions under the ESA for their effects on listed species, the Services add the effects of the action (both beneficial and adverse) to the environmental baseline[6] and determine whether the action changes the baseline condition. If a proposed action would be likely to impair[7] properly functioning habitat, appreciably reduce the functioning of already impaired habitat, or retard the long-term progress of impaired habitat toward PFC, it will usually be found likely to jeopardize the continued existence of the species or adversely modify its critical habitat or both, depending upon the specific considerations of the analysis. These findings form the core of the analysis NMFS performs when reviewing actions under the ESA.

b. Environmental Baseline in the Action Area

The species' current status is described in relation to the risks presented by the continuing effects of all previous actions and resource commitments that are not subject to further exercise of Federal discretion. For a new project, the environmental baseline consists of the conditions in the action area that exist before the proposed action begins. For an ongoing Federal action, those effects of the action resulting from past unalterable resource commitments are included in the baseline, and those effects that would be caused by the continuance of the proposed action are then analyzed for determination of effects. The reason for determining the species' status under the environmental baseline (without the effects of the proposed or continuing action) is to better understand the relative

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artificial restoration. *See* Rhodes et. al., *A Coarse Screening Process for Potential Application in* [5] *ESA Consultations.* Columbia River Inter-Tribal Fish Commission, Portland, Oregon, pp. 59-61, (1994); National Research Council, *Upstream: Salmon and Society in the Pacific Northwest. National Research Counci*l, National Academy Press, Washington, D.C., p. 201 (1996).

[6] The environmental baseline consists of the current conditions to which the effects of the proposed or continuing action would be added. It "includes the past and present impacts of all Federal, State, or private activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early § 7 consultation, and the impact of State or private actions which are contemporaneous with the consultation in process." *See* 50 CFR § 402.02 (1999) (definition of the effects of the action).

[7] In this document, to "impair" habitat means to reduce habitat condition to the extent that it does not fully support long-term salmon survival and therefore "impaired habitat" is that which does not perform that full support function. Note that "impair" and "impaired" are not intended to signify any and all reduction in habitat condition.

significance of the effects of the action upon the species' likelihood of survival and chances for recovery. Thus if the species' status is poor and the baseline is degraded at the time of consultation, it is more likely that any additional adverse effects caused by the proposed or continuing action will be significant.

c. Effect Determination

In this step of the analysis, the Services examine the likely effects of the proposed action on the species and its habitat within the context of the its current status and existing environmental baseline. The analysis also includes an analysis of both direct and indirect effects of the action. "Indirect effects" are those that are caused by the action and are later in time but are still reasonably certain to occur. They include effects on species or critical habitat of future activities that are induced by the action subject to consultation and that occur after the action is completed. The analysis also takes into account direct and indirect effects of actions that are interrelated or interdependent with the proposed action. "Interrelated actions" are those that are part of a larger action and depend on the larger action for their justification. "Interdependent actions" are those that have no independent utility apart from the action under consideration.

The Services can use either or both of two independent techniques in assessing the impact of a proposed action. First, the Services can consider the impact in terms of how many individuals of a listed species will be killed or injured ("take") during a particular life stage and gauge the effects of that take's effects on population size and viability. Alternatively, The Services can consider the impact on the species' freshwater habitat requirements, such as water temperature, substrate composition, dissolved gas levels, structural elements, etc. This second technique is especially useful for habitat-related analyses because, while many cause and effect relationships between habitat quality and population viability are well known[8], they do not lend themselves to meaningful quantification in terms of fish numbers. Consequently, while this second technique does not directly assess the effects of actions on population condition, it indirectly considers this issue by evaluating existing habitat conditions in light of habitat conditions known to be conducive to salmon conservation.

Though there is more than one valid analytical framework for determining effects, The Services usually use different (albeit almost identical) versions of a matrix of pathways and indicators to determine whether proposed actions would further damage impaired habitat or retard the progress of impaired habitat toward properly functioning condition. For the purpose of guiding Federal action agencies in making effects determinations, the Services have developed and

[8] *See* Spence et al., *An Ecosystem Approach to Salmonid Conservatio*n, ManTech Environmental Research Services Corporation, Corvallis, Oregon (1996).

distributed papers detailing this method.[9] The matrices are discussed in more detail in Chapter 5.

Compared to other compliance pathways, Section 7 offers both noteworthy advantages and disadvantages. Advantages include reduced costs, because CIDMP development and implementation would be done in cooperation with a federal action agency that also will take a lead position in NEPA/SEPA compliance. Furthermore, formal Section 7 consultations are bound by statutory timelines, ensuring relatively rapid attainment of ESA compliance. Aspects of Section 7 consultation that may be perceived as disadvantageous by Irrigation Districts are (1) limitations on flexibility imposed by collaborating with a federal action agency, and (2) relatively standardized criteria for re-initiation of consultation that tend to reduce both the duration of the "permit" (the incidental take statement) and diminish the perceived level of regulatory certainty relative to other pathways.

3. Habitat Conservation Plans

This section of the guidelines describes the ESA compliance pathway provided in Section 10(a)(1)(B). Under that section of the ESA, any non-federal entity, such as state or local governments, businesses, associations and individuals can apply for a permit that authorizes the incidental take of listed species (Incidental Take Permit). The process for applying for the Incidental Take Permit (ITP), including the requirements for the preparation of an HCP is summarized below. In addition, the permit issuance criteria and the Services methods for processing permit applications is described. Finally, the benefits of this pathway are compared to the benefits and disadvantages afforded by Section 4(d) Special Rules and Section 7(a)(2) Interagency Consultations.

Congress intended the Section 10 process to be used to reduce conflicts between the needs of federally listed species and development activities of non-federal entities. In codifying this process, Congress intended that the Services work creatively with non-federal entities in developing conservation plans that address species' needs in the context of the planner's development activities. These plans, now referred to as HCPs, were intended to be long term agreements providing certainty that listed species would be conserved and that development activities could proceed without interruption.[10]

The immediate and notable characteristics of the HCP pathway include a high degree of applicant control over the coverage and duration of the assurances, the high level of certainty provided by an ITP, and a potentially high level of effort and length of time to

[9] *See* NMFS, *Making Endangered Species Act Determinations of Effect for Individual or Grouped Actions at the Watershed Scale* (MPI) (1996). *Also USFWS, A Framework to Assist in Making Endangered Species Act Determinations of Effect for Individual or Grouped Actions at the Bull Trout Subpopulation Watershed Scale (see Appendix D).*

[10] H.R. Rep. No. 97-835, 97th Congress, Second Session.

develop and gain approval of an HCP. Further discussion of the relative advantages of the HCP process follows the description of the HCP process, below.

a. Developing an HCP

The first step is to determine who the applicant is who ultimately will hold the permit. In many cases this is relatively straightforward--the applicant is the land or other natural resource owner who proposes the project or activity and is responsible for implementing the HCP. In regional HCPs, the plan often relies upon local or regional authorities to implement the plan and regulate the taking of listed species addressed in the plan. The permittee must therefore be capable of overseeing HCP implementation and have the authority to regulate the activities covered by the permit. For large-scale planning efforts involving only one or two landowners or types of activities, the landowners themselves are usually the appropriate permittee. For planning efforts involving numerous property owners and activities, the permittee is usually a local public agency--e.g., a city or county government or several local agencies acting jointly. In other cases, a state agency may obtain and hold a Section 10 permit for certain types of state-regulated private activities (e.g., forestry activities).

When no government agency is available or interested in assuming the responsibility for an HCP, private groups wishing to obtain a permit for large-scale or multi-faceted projects may initiate an HCP without government involvement. They may, for example, form a consortium to develop the HCP, in which case the consortium would be the permittee. Or, they may jointly fund development of the HCP but maintain their individual identities by applying for separate permits, using the same HCP or individual HCPs modified from a jointly developed "template." Either approach is acceptable so long as the permittees have the authority to regulate or control all or applicable parts of the HCP program and the conditions of the HCP are enforceable.

During the HCP development phase, the Services typically advise and consult with applicants on the following (regardless of whether there is a steering committee):

- Preparing the species list and identifying project scope and impacts;
- Biological studies and data needed to assess project impacts;
- NEPA requirements and the applicant's potential role in developing the NEPA analysis;
- Applicability of state endangered species law and requirements, and any other Federal laws that may be applicable, if any;
- Project modifications that would minimize take and reduce impacts to the affected species;
- Design of mitigation, habitat enhancement, or mitigation programs;

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- Reserve design criteria and assistance in population viability assessments, if desired;
- Methods for monitoring HCP progress and project impacts on affected species;
- Biologically acceptable take limits and how to define them;
- Criteria to track or determine success of the HCP; and,
- Procedural and other HCP issues as requested by the committee.

b. Covered Species

In many HCPs, there are one or two primary species that "trigger" the need for an incidental take permit (e.g., the northern spotted owl or salmon in the Pacific Northwest, desert tortoise in southwestern deserts, or red-cockaded woodpecker in the southeast), though other listed species may occur in the same planning areas. After the decision has been made to obtain a permit, one of the first decisions an HCP applicant must make is what species to address in the plan. Generally, permit applicants should be advised to include all federally listed wildlife species likely to be incidentally taken during the life of the project or permit. If the applicant does not address such species, it may not be possible to issue the permit (if the issuance of a more limited permit would violate Section 7(a)(2) for the listed species not covered) or the project activities could be stopped or delayed after the permit has been issued if a listed species that was not addressed in the HCP is likely to be taken during project activities.

There are also advantages in addressing unlisted species in the HCP (proposed and candidate species as a minimum), particularly those that are likely to be listed within the foreseeable future or within the life of the permit. Doing so can protect the permittee from further delays--e.g., having to revise the HCP and amend the permit--should species that were not listed at the time the original HCP was approved subsequently become listed. In addition, the "No Surprises" rule, applies to listed as well as unlisted species if they are adequately addressed in the HCP. The more species addressed in the HCP, the more potentially complicated the HCP may become. For example, in most state systems, primary jurisdiction over candidate species rests with the affected State fish and wildlife agency, thereby increasing the advisability of that agency's participation in the HCP process. Thus, selecting the species list can become an exercise in balancing the need to obtain maximum regulatory certainty, with practical considerations such as manageability, availability of biological information, and cost. The Services should be prepared to advise the applicant about which listed species should be highest priority in the HCP, which unlisted species are most likely to be listed in the future, and which species, listed or unlisted, can otherwise be advantageously addressed in the HCP.

Ultimately, the decision about what species to address in the HCP lies with the applicant. In any case, the species list should be developed and agreed upon early

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in the HCP process, since it forms much of the basis for future plan development. When preparing the species list the applicant should be informed that the ESA generally does not prohibit the incidental take of federally listed plants. Nevertheless, the Services should encourage the applicants to consider including listed plants in HCPs because, although incidental take of plants may not be prohibited by Section 9, the Section 7(a)(2) prohibition against jeopardy does apply to plants. If the Section 7 consultation on a Section 10 permit application concludes that issuance of the HCP permit for wildlife species would jeopardize the existence of a listed plant species, the permit could not be issued. To avoid this outcome, the applicant should ensure that actions proposed in the HCP are not likely to jeopardize any federally listed plant species. In addition, not all species under the jurisdiction of NMFS listed as threatened are subject to the Section 9 take prohibitions. Such prohibitions are applied through regulation, on a case-by-case basis. Therefore, an incidental take permit may not be required for these species. Specific regulations are provided at 50 C.F.R. Part 227.

c. Treaty Rights and Federal Trust Responsibility

A unique and distinctive relationship exists between the United States and Native American Tribes, as defined by treaties, executive orders, statutes, court decisions, and the United States Constitution. This relationship differentiates tribes from other entities that deal with, or are affected by, the Federal government. Indian tribes are recognized under Federal law as separate sovereigns with governmental rights over their lands and people. These governmental rights and authorities extend to natural resources that are reserved by or protected in treaties, executive orders, and Federal statutes. Such reserved rights may include off-reservation rights to hunt, fish, or gather trust resources.

The United States has a federal trust obligation towards Indian tribes to preserve and protect these rights and authorities. The federal Indian trust responsibility is a legal enforceable fiduciary obligation, on the part of the United States, to protect tribal lands, assets, resources, and treaty rights, as well as a duty to carry out the mandates of Federal law with respect to American Indian tribes and Alaskan Natives.

During habitat conservation planning negotiations with non-federal landowners, the Services must consider whether proposed plans might affect tribal rights to trust resources. Whenever the Services have a reasonable basis for concluding that such effects might occur, they must notify the affected tribes and consult government-to-government in a meaningful way. Consultation with the affected tribe shall be completed within a timely manner. After careful consideration of the tribe's concerns, the Services must clearly state the rationale for the recommended final decision and explain how the decision relates to the government's trust responsibilities. In light of this obligation, it is important that the Services identify and evaluate during the planning process, any anticipated effects of a proposed HCP upon Indian trust resources.

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Identifying Project Impacts. Four subtasks must be completed to determine the likely effects of a project or activity on federally listed or candidate species:

- Delineation of the HCP boundaries or plan area;
- Collection and synthesis of biological data for species to be covered by the HCP;
- (Identifying activities proposed in the plan area that are likely to result in incidental take; and
- Quantifying anticipated take levels.

To help expedite the Section 7 process, the HCP should also assist the Services in:

(a) satisfying the requirements of Section 7 of the ESA;

(b) addressing significant indirect effects of the project on federally listed species, if any;

(c) addressing jeopardy to federally listed plants, if anticipated; and

(d) addressing effects on critical habitat, if any. Section 7 should be addressed as early as is practicable in the HCP development process.

d. Contents of an HCP

Under ESA Section 10(a)(2(A) and the implementing regulations[11], an HCP submitted in support of an ITP application must provide the following information.

- Impacts likely to result from the proposed taking of the species for which the ITP is requested;
- Measures the applicant will undertake to monitor, minimize, and mitigate those impacts; the funding that will be made available to undertake such measures;
- Any alternatives to the proposed incidental take that the HCP proponent considered and why such alternatives are not being utilized; and
- Such other measures that the Secretar[ies] may require as being necessary or appropriate for the plan.

[11] 50 C.F.R. 17.22(b)(1), 17.32(b)(1), and 222.22

e. Incidental Take Permit Issuance Criteria

Section 10(a)(2)(B) of the ESA requires the following criteria to be met before the USFWS or NMFS may issue an incidental take permit. If these criteria are met and the HCP and supporting information are statutorily complete, the permit must be issued.

1. The taking will be incidental.

Under the ESA, all taking of federally listed fish and wildlife species as detailed in the HCP must be incidental to otherwise lawful activities and not the purpose of such activities. For example, deliberate shooting or wounding a listed species ordinarily would not be considered incidental take and would not qualify for an incidental take permit. Conversely, the destruction of an endangered species or its habitat by heavy equipment during home construction or other land use activities generally would be construed as incidental and could be authorized by an incidental take permit.

Mitigation and monitoring programs sometimes require actions that, strictly speaking, may be construed as a deliberate take. A good example is trapping endangered or threatened animals at a project site to re-locate or protect them in some fashion or to monitor their presence or activities. Generally, actions that result in deliberate take can be conducted under an incidental take permit, if: (1) the take results from mitigation measures (e.g., capture/relocation) specifically intended to minimize more serious forms of take (e.g., killing or injury) or are part of a monitoring program specifically described in the HCP; and (2) such activities are directly associated in time or place with activities authorized under the permit. Examples include capture of endangered animals from a project site and removal to adjacent or nearby habitat, capture and release of animals accidentally entrapped at the site (e.g., in a pipeline trench), capture/release studies for monitoring purposes, even permanent capture for purposes of donation to a captive breeding or research facility. However, where such activities require special qualifications, the HCP should require written USFWS or NMFS authorization before any individual is permitted to conduct the work.

2. The applicant will, to the maximum extent practicable, minimize and mitigate the impacts of such taking.

The applicant decides during the HCP development phase what measures to include in the HCP (though, obviously, the applicant does so in light of discussions with and recommendations from USFWS or NMFS). However, the Services ultimately decide, at the conclusion of the permit application processing phase, whether the mitigation program proposed by the applicant has satisfied this statutory issuance criterion. This finding typically requires consideration of two factors: adequacy of the minimization and mitigation program, and whether it is the maximum that can be practically implemented by the applicant. To the extent

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maximum that the minimization and mitigation program can be demonstrated to provide substantial benefits to the species, less emphasis can be placed on the second factor. However, particularly where the adequacy of the mitigation is a close call, the record must contain some basis to conclude that the proposed program is the maximum that can be reasonably required by that applicant. This may require weighing the costs of implementing additional mitigation, benefits and costs of implementing additional mitigation, the amount of mitigation provided by other applicants in similar situations, and the abilities of that particular applicant. Analysis of the alternatives that would require additional mitigation in the HCP and NEPA analysis, including the costs to the applicant is often essential in helping the Services make the required finding.

3. *The applicant will ensure that adequate funding for the HCP and procedures to deal with unforeseen circumstances will be provided.*

These issuance criteria are identical to HCP requirements discussed in Chapter 3. The Services must ensure that funding sources and levels proposed by the applicant are reliable and will meet the purposes of the HCP, and that measures to deal with unforeseen circumstances are adequately addressed. Without such findings, the Section 10 permit cannot be issued. The HCP should be consistent with the joint Department of Interior/Department of Commerce "No Surprises" rule (*Id.)* and should impose no higher standard on the permit applicant with respect to unforeseen circumstances than that described under that rule.

4. *The taking will not appreciably reduce the likelihood of survival and recovery of the species in the wild.*

This is a critically important criterion for incidental take permits because it establishes a fundamental "threshold" standard for any listed species affected by an HCP. Furthermore, the wording of this criterion is identical to the "jeopardy" definition under the Section 7 regulations (50 C.F.R. Part 402.02), which defines the term "jeopardize the continued existence of" as "to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species." Congress was explicit about this link, stating in the Conference Report on the 1982 ESA amendments that the Services will determine whether or not to grant a permit, "in part, by using the same standard as found in Section 7(a)(2) of the ESA, as defined by the [Services'] regulations." Congress also directed the Services to "consider the extent to which the conservation plan is likely to enhance the habitat of the listed species or increase the long-term survivability of the species or its ecosystem." (H.R. Report No. 97-835, 97th Congress, Second Session). Thus, since the issuance of a Section 10 permit is a Federal action subject to Section 7 of the ESA, the law prohibits any non-Federal activity under an HCP from "jeopardizing" a species under two standards: (1) the Section 7 jeopardy standard; and (2) the incidental take permit issuance criteria. There is one difference

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between these two standards--the Section 10 issuance criteria apply only to listed fish and wildlife species (because listed plants typically are not protected against take on non-Federal lands), while the jeopardy standard under Section 7(a)(2) applies to plants as well as animals. However, the practical effect is the same--the ESA requires a "no-jeopardy" finding for all affected federally listed species as a precondition for issuance of an incidental take permit. The basis for this finding is the Service's biological opinion.

5. *The applicant will ensure that other measures that the Services may require as being necessary or appropriate will be provided.*

This criterion is equivalent to the requirement that HCPs include other measures as necessary or appropriate for purposes of the plan. Because the HCP process deals with numerous kinds of proposals and species, this criterion authorizes the Services to impose additional measures to protect listed species where deemed necessary. Although these types of measures should have been discussed during the HCP development phase and incorporated into the HCP, USFWS or NMFS must ensure that the applicant has included all those measures the Services consider necessary "for purposes of the plan" before issuing the permit. The principal additional measure that the Services may require at this time is the Implementing Agreement. Other measures the Services might recommend during HCP negotiations could include those necessary to guarantee funding for the mitigation program and monitoring and reporting requirements to ensure permit compliance. Also, any incidental take permit issued will be subject to the general permit conditions described at 50 C.F.R. Part 13, Subpart D (USFWS) or 50 C.F.R. Part 220 (NMFS) regarding the display of permits, maintenance of records, filing of reports, etc.

6. *The Services have received such other assurances as may be required that the HCP will be implemented.*

The applicant must ensure that the HCP will be carried out as specified. Since compliance with the HCP is a condition of the permit. The authority of the permit is a primary instrument for ensuring that the HCP will be implemented. When developed, Implementing Agreements also provide assurances that the HCP will be properly implemented. Where a local government agency is the applicant, the Agreement should detail the manner in which local agencies will exercise their existing authorities to effect land or water use as set forth in the HCP. Under an HCP, government entities continue to exercise their duly constituted planning, zoning, and permitting powers. However, actions that modify the agreements upon which the permit is based (e.g., rezoning an area contrary to land uses specified in the HCP) could invalidate the permit. In addition, failure to abide by the terms of the HCP and Implementing Agreement (if required) is likely to result in suspension or revocation of the permit.

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Some HCPs may involve interests other than the applicant or permittee. In these cases, the applicant must have specific authority over the other parties affected by the HCP and be willing to exercise that authority, or must secure commitments from them that the terms of the HCP will be upheld. In the latter case, agreements between the agencies and the other groups, or legally binding contracts between the applicant and such individuals or interests, may be necessary to bind all parties to the terms of the HCP. For example, a programmatic HCP can be developed which sets the negotiation sideboards within which individual or subsidiary plans are developed. The potential advantages of this approach depend on the specificity of the programmatic framework. The obvious trade-off is that greater specificity in the programmatic will increase development time, but will expedite inclusion of individual plans. Specificity in the programmatic HCP, particularly in the form of "biological benchmarks," may also be perceived as limiting the flexibility of individual Irrigation Districts. Programmatic HCPs typically identify which activities may be covered and reduce the likelihood that applicants will be "surprised" by agency requests during the HCP-development process.

f. Processing Applications for Incidental Take Permits

After completing the draft HCP, the applicant submits the ITP application package to the Services. The package typically contains the draft environmental review document (EA or EIS), the HCP, the Implementation Agreement (IA), the permit application and application fee. The ESA requires that the HCP be available for a minimum 30-day review. That review is usually built into the public review process mandated by NEPA. Public review enables the Services to gather written and aural comment on the proposed issuance of the requested ITP. The Services' NEPA regulations require the Service respond in writing to all comments received. For comments requesting further information or clarification, the Services can respond by making changes in the NEPA documents or by working out changes in the proposed HCP with the applicant. Where commentors raise new information, the Service might prepare and publish a supplemental NEPA document, or explain, in writing, why no further review is necessary.

After taking and appropriately addressing public comment, the Services begin processing the application. To complete permit processing the Services must make findings for each of the permit issuance criteria described above. These include making a determination of effect under ESA Section 7(a)(2) and writing a Biological Opinion. Additionally, the Services must make findings appropriate to the environmental review of the HCP alternatives. Finally, the Services must prepare signature packages appropriate to the internal procedures of each agency, and prepare the agencies' responsible officials for approving the application and issuing the ITP. As already mentioned, the process for reviewing, publishing, and approving an HCP and ITP application can be very effort intensive and time consuming for the agencies. Potential HCP proponents should factor in the time and effort likely to be required to develop and gain approval of an HCP before jumping into the process.

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g. Comparison of HCP Characteristics to the Other Pathways

The primary advantages of HCPs for Irrigation Districts are customized fit and long-term regulatory certainty. The corresponding disadvantages are high cost and protracted development time. In the AFW Irrigation District context, two types of HCPs are possible: individual and programmatic. Individually customized HCPs provide applicants with operational flexibility, but also require considerable involvement by regulatory agency staff to learn about applicant activities and to develop ways to avoid and minimize the impacts of these activities on listed species. As is the case with all custom work, the costs tend to be high, and timelines long. The long duration of resulting incidental take permits and the "no surprises" rule provide applicants with a high level of regulatory certainty. At the same time, these features encourage a cautious approach that contributes to increasing the cost and development time of individual HCPs. Use of the CIDMP Guidelines to develop biological assessments of Irrigation District effects on listed species will undoubtedly expedite the HCP pathway.

HCPs result in the issuance of an incidental take permit to the applicant. Permit issuance is considered a federal action, and as such requires completion of an internal Section 7 consultation to assess the potential effects of the federal action (i.e., an independent Service biologist determines if issuance of the incidental take permit is likely to jeopardize the continued existence of listed species or to destroy or adversely modify designated critical habitat). Participants in the development of HCPs should keep this consultation step in mind because it includes requirements such as completion of jeopardy analysis and cumulative effects analysis. An important benefit of the CIDMP guidelines is that they will incorporate the information needs for the Section-7 consultation component of HCP development and will help to avoid delays associated with failing to anticipate and prepare for this step.

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APPENDIX D

A Framework to Assist in Making Endangered Species Act Determinations of Effect for Individual or Grouped Actions at the Bull Trout Subpopulation Watershed Scale

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Prepared by
U.S. Fish and Wildlife Service
(adapted from the National Marine Fisheries Service)

February 1998

Note: The equivalent document for anadromous fish, produced by the National Marine Fisheries Service, can be found at the following website: www.nwr.noaa.gov/1habcon/habweb/habpub.htm

A Framework to Assist in Making Endangered Species Act Determinations of Effect for Individual or Grouped Actions at the Bull Trout Subpopulation Watershed Scale

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Overview

The following framework was designed to facilitate and standardize determinations of effect for Endangered Species Act (ESA) conferences, consultations and permits focusing on bull trout (*Salvelinus confluentus)*. We recommend that this framework be applied to individual actions or grouped similar activities at the 5th or 6th field Hydrologic Unit Code (HUC) watershed scale. Subsequent Conference Reports or Biological Opinions that you will receive from the U.S. Fish and Wildlife Service (USFWS) will address the effects of your actions at the bull trout subpopulation level. Maps of bull trout subpopulation watersheds will be provided to you for your area and generally are similar to the 4th field Hydologic Unit Code (HUC). It will be necessary for you to aggregate your 5th or 6th field HUC framework determinations to the subpopulation watershed level in any Biological Assessment that you submit.

When USFWS conducts an analysis of a proposed activity or grouped activities, it involves the following steps: (1) define the biological requirements of the listed species; (2) evaluate the relevance of the environmental baseline to the species' current status; (3) determine the effects of the proposed or continuing action(s) on listed and proposed species; and (4) determine whether all the life stages and forms of the species can be expected to survive, with an adequate potential for recovery, to be self-sustaining and self-regulating under the effects of the proposed or continuing action(s), the environmental baseline, and any cumulative effects. The last item (item 4) addresses considerations given during a jeopardy analysis. Please recognize, however, that this framework document does not address jeopardy or identify the level of take or adverse effects which would constitute jeopardy. Jeopardy is determined on a case by case basis involving the specific information on habitat conditions and the health and status of the fish population. USFWS is currently preparing a set of guidelines, to be used in conjunction with this document, to help in the determination of jeopardy.

This framework document provides a consistent, logical line of reasoning to aid in determining when and where adverse effects occur and why they occur. It is a framework or template to stimulate discussion among Level 1 and Interdisciplinary teams regarding the influence of important habitat variables or indicators on bull trout populations. It is not an aquatic conservation strategy. This framework does not replace watershed analysis nor attempt to define data standards. Using available data, results from watershed analyses, and team discussions, the framework will help the teams arrive at an ecologically defendable and trackable determination of the effects of proposed actions on the species and its habitat.

This framework document contains definitions of ESA effects and examples of effects determinations, a recommended reading list to help in understanding the importance of an indicator on bull trout, a matrix of diagnostics/pathways of effects and indicators of those effects, a checklist for documenting the environmental baseline and effects of the proposed action(s) on the relevant indicators, and a dichotomous key for making determinations of effect and documenting expected incidental take. None of the tools identified in this document are new inventions. The matrix, check list, and dichotomous key format have been adapted from the matrix, check list, and dichotomous key developed by the National Marine Fisheries Service (NMFS) to determine the effects of actions on listed anadromous fish species. Although some identifying words and values in this framework have been changed from those in the NMFS document, the format is very similar. The matrix developed here reflects the information

needed to evaluate effects of proposed and on-going land management actions of the U.S. Forest Service and U.S. Bureau of Land Management on the persistence and potential recovery of proposed/listed bull trout subpopulations. The similarity between the NMFS's document and this framework should facilitate a blending of the matrices by Level 1 teams during combined consultation/conference efforts with the two regulatory agencies, as well as formal integration of the matrices by the two agencies in the future.

Using these tools, the Federal agencies and Non-Federal Parties (both will be referred to as evaluators in the remainder of this document) can make determinations of effect for proposed projects (i.e. "no effect"/"may affect" and "may affect, not likely to adversely affect"/"may affect, likely to adversely affect") on listed and proposed species. As explained below, these determinations of effect will depend on whether a proposed action (or group of actions) hinders the attainment of relevant environmental conditions (identified in the matrix as pathways and indicators) and further impacts the status of a bull trout subpopulation (also identified in the matrix as diagnostics and indicators), and/or results in "take" of a proposed or listed species, as defined in the ESA.

Finally, this framework is a **draft** document designed to be applied to a wide range of environmental conditions. This means it must be flexible and will be refined. It also means that a certain degree of professional judgement will be required in its application. There will be circumstances where the numeric values or descriptions in the matrix simply do not apply to a specific watershed, are unavailable, or exist in a different format. In each case, the evaluator will need to provide more ecologically appropriate values using local data when available, including data sources and techniques used, as well as provide adequate documentation and rationale (see amendment to Streamlining direction) that justify changes or deletions of a diagnostic/pathway indicator(s). All documentation must be presented in each associated biological assessment, habitat conservation plan, or other appropriate document. This documentation will be used by USFWS in preparation of a Section 7 consultation, habitat conservation plan, or other appropriate biologically based document.

Before You Begin

To facilitate effective use of the framework, it will be necessary to gather and familiarize yourself with several documents and reports ranging in scope from general bull trout life history information to specific stream reach survey information. It would be difficult to even begin to list all the important information sources that can help you better understand the biology of bull trout and its interrelationship with its environment. To begin your information search, any watershed analysis and previous biological assessments pertaining to the watershed under consideration, as well as all the maps, data findings and results, and historical accounts you can gather, will be essential information in assessing your integrated environmental and population baseline and arriving at a biologically sound effects determination.

Below are listed a few sources that may be helpful to you in your information search. Many of those recommended are referred to or cited in the framework.

Behnke, R.J. 1992. Native trout of western North America. Monograph No. 6, American Fishereis Society. 275 p.

Biological Opinion on Implementation of Interim Strategies for Managing Anadromous Fish producing

Watersheds in Eastern Oregon and Washington, Idaho, and Portions of California (PACFISH). National

Marine Fisheries Service, Northwest Region, January 23, 1995.

Buchanan, D.V.; Gregory, S.V., 1997. Development of water temperature standards to protect and restore habitat for bull trout and other cold water species in Oregon. *In* W.C. Mackay, M.K. Brewin, and M. Monita, eds. Friends of the Bull Trout Conference Proceedings. P8.

Frissell, C.A.; Liss, W.J.; Bayles, D. 1993. An Integrated Biophysical Strategy for Ecological Restoration of Large Watersheds. *In* Potts, D., ed. Proceedings from the Symposium on Changing Roles in Water Resources Management and Policy, June 27-30, 1993. Herndon, VA: American Water Resources Association: p. 449-456.

Interior Columbia Basin Ecosystem Management Project Draft Environmental Impact Statement and Appendices.

Lee, D.C.; Sedell, J.R.; Rieman, B.E.; Thurow, R.F.; Williams, J.E. and others. 1997. Chapter 4: Broadscale Assessment of Aquatic Species and Habitats. *In* T.M. Quigley and S. J. Arbelbide eds "An Assessment of Ecosystem Components in the Interior Columbia Basin and Portions of the Klamath and Great Basins Volume III". U.S. Department of Agriculture, Forest Service, and U.S. Department of Interior, Bureau of Land Management, Gen Tech Rep PNW-GTR-405.

Leopold, L.B.; Maddock, T., J. 1953. The hydraulic geometry of stream channels and some physiographic implications. Professional Paper 252. U.S. Department of the Interior, Geological Survey. 56p.

Leopold, L.B.; Wolman, M.G.; Miller, J.P. 1964. Fluvial processes in geomorphology. San Francisco: W.H. Freeman and Co. 522p.

Menning, K.M.; Erman, K.; Johnson, N.; Sessions, J. 1996. Modeling aquatic and riparian systems, assessing cumulative watershed effects, and limiting watershed disturbance. Davis, CA: University of California-Davis, Sierra Nevada Ecosystem Project.

Montgomery, D.R.; Buffington, J.M.; Smith, R.D.; Schmidt, K.M.; Press, G. 1995. Pool spacing in forest channels. Water Resources Research Vol. 31, No. 4. April 1995: p. 1097-1105.

Montgomery, D.R.; Buffington, J.M. 1993. Channel classification, prediction of channel response and assessment of channel condition. Report TFW-SH10-93-002. June 24, 1993. 84p.

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Northwest Forest Plan, 1994. Standards and Guidelines for Management of Habitat for Late-Successional and Old-Growth Forest Related Species Within the Range of the Northern Spotted Owl. USDA Forest Service and USDI Bureau of Land Management.

Overton, C.K.; McIntyre, J.D.; Armstrong, R. ; Whitewell, S.L.; Duncan, K.A.. 1995. User's guide to fish habitat: descriptions that represent natural conditions in the Salmon River Basin, Idaho. U.S. Department of Agriculture, Forest Service, Intermountain Research Station, Gen Tech. Rep. INT-GTR-322.

Overton, C.K.; Wollrab, S.P.; Roberts, B.C.; Radko, M.A.. 1997. R1/R4 (Northern/Intermoutain Regions) Fish and Fish Habitat Standard Inventory Procedures Handbook. U.S. Department of Agriculture, Forest Service, Intermountain Research Station, Gen Tech. Rep. INT-GTR-346.

Reid, L.M. 1993. Research and cumulative watershed effects. U.S. Department of Agriculture, forest Service, Pacific Southwest Research Station, Gen Tech. Rep. PSW-GTR-141.

Rieman, B.E.; McIntyre, J.D.. 1993. Demographic and habitat requirements for conservation of bull trout. U.S.D.A. Forest Service, Intermountain Research Station, Boise, ID.

Rieman, B.E.; Meyers, D.L. . 1997. Use of redd counts to detect trends in bull trout (*Salvelinus confluentus)* populations. Conservation Biology 11(4): 1015-1018.

Rosgen, D.L. 1994. A classification of natural rivers. Catena. Vol. 22, No. 3, June 1994: 169-199.

Shepard, B.B.; Pratt, K.L.; Graham, P.J. 1984. Life histories of westslope cutthroat and bull trout in the Upper Flathead River Basin, MT. Environmental Protection Agency Rep. Contract No. R008224-01-5.

Washington Timber/Fish Wildlife Cooperative Monitoring Evaluation and Research Committee, 1993. Watershed Analysis Manual (Version 2.0). Washington Department of Natural Resources.

Winward, A.H., 1989 Ecological Status of Vegetation as a base for Multiple Product Management. Abstracts 42nd annual meeting, Society for Range Management, Billings MT, Denver CO: Society For Range Management: p277.

Description of the Matrix

The objective of the "Matrix of Diagnostics/Pathways and Indicators" (Table A, within this appendix) is to integrate the biological and habitat conditions to arrive at a determination of the potential affect of land management activities on a proposed or listed species. This matrix is divided into seven overall diagnostics/pathways (major rows in the matrix) and a summary integration diagnostic:

Species Diagnostics

-- Subpopulation Characteristics

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Habitat Pathways

-- Water Quality

-- Habitat Access

-- Habitat Elements

-- Channel Condition and Dynamics

-- Flow/Hydrology

-- Watershed Conditions

Habitat and Species

–Integration of Species and Habitat Condition

The above were designed to simplify arriving at an effects determination with a firm understanding of the status of the bull trout subpopulation in the watershed being considered for management activities, the environmental baseline (current condition) of the habitat, and how that subpopulation might be affected (beneficially or not) by changes in its habitat as a result of the proposed action(s). It is essential that each diagnostic/pathway be addressed. The species diagnostic "Subpopulation Characteristics" is designed to help you evaluate the status of the bull trout subpopulation in the area of the proposed action(s) under current habitat conditions. Each of the above listed diagnostic tools relating to habitat represents a pathway by which actions can have potential effects on bull trout. It is essential to have an understanding of both the condition of the habitat and the status of the subpopulation when proposing activities that will change the environmental baseline and potential risk to the species. Integration of these diagnostics and pathways is needed to make an appropriate effects determination.

The diagnostics and pathways are further broken down into "indicators." Within the habitat pathways, indicators are generally arranged from a finer to a broader scale. For example, under the pathway "Habitat Elements", the indicators ask you to consider information from the reach level, (substrate embeddedness), to the grouped reach level (large woody debris, pool frequency and quality, large pools), to the entire stream length (off-channel habitat), and finally the complete subpopulation watershed (refugia). Indicators are generally of two types: (1) Metrics that have associated numeric values (e.g. "4 - 9 degrees C."); and/or (2) descriptions (e.g. "adequate habitat refugia do not exist"). The purpose of having both types of indicators in the matrix is that numeric data are not always readily available for making determinations or there may be no reliable numeric indicator for a specific environmental or population attribute. In this case, a description of overall condition may be the only appropriate method available. When a numeric value and a description are combined in the same cell in the matrix, it is because accurate assessment of the indicator requires attention to both. Values and descriptions are presented to stimulate discussion within Level 1 and interdisciplinary teams. They provide a diagnostic tool that should be evaluated for reliability in describing environmental functional relationships specific to the watershed you are considering for management activity. <u>The numeric values are not presented as absolutes nor to define data standards</u>**.** They are presented as diagnostic tools to promote discussion of differences between local data or findings and values suggested in the matrix. If local data relating to a specific indicator is not available for comparison and verification, then proposed management activities should be designed to

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minimize impacts to that indicator. If a numeric indicator suggested in the matrix is not functionally attainable given the inherent characteristics of the watershed being considered or if an equivalent value is available using a different field technique, Level 1 and Interdisciplinary teams should replace the numeric value with local data and professional judgement. When this occurs, changes must be accompanied by rigorous discussion within the team, which is integrated into adequate documentation complete with supportive local data and the technique used to compile the data, and/or scientifically supported reasoning, logic, or professional judgement for the change. Likewise, if a team decides not to use all indicators in a diagnostic or pathway, the team must provide defendable and trackable documentation on why an indicator was not considered.

Diagnostics, pathways, and indicators may overlap in their scope and data components. This is to provide a cross-check that ensures potential effects are viewed from more than one perspective. Likewise, it provides an avenue for integration among habitat variables and between the condition of a bull trout subpopulation and its habitat.

The columns in the matrix correspond to levels of condition of the indicator. There are three condition levels: "functioning appropriately," "functioning at risk," and "functioning at unacceptable risk." These three categories of function are defined for each indicator in the "Matrix of Diagnostics/Pathways and Indicators". In concept, indicators in a watershed are "functioning appropriately" when they maintain strong and significant populations that are interconnected and promote recovery of a proposed or listed species or its critical habitat to a status that will provide self-sustaining and self-regulating populations. When the indicators are "functioning at risk", they provide for persistence of the species but in more isolated populations and may not promote recovery of a proposed or listed species or its habitat without active or passive restoration efforts. "Functioning at unacceptable risk" suggests the proposed or listed species continues to be absent from historical habitat, or is rare or being maintained at a low population level; although the habitat may maintain the species at this low persistence level, active restoration is needed to begin recovery of the species.

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Description of the Checklist

The "Checklist for Documenting Environmental Baseline and Effects of Proposed Action(s) on Relevant Indicators" (Table B, within this appendix) is designed to be used in conjunction with the matrix. The checklist has six columns. The first three describe the condition of each indicator (which when taken together encompass the environmental baseline and condition of the bull trout subpopulation), and the second three describe the effects of the proposed action(s) on each indicator. As with the matrix, rigorous discussion among Level 1 or Interdisciplinary teams should occur when making checklist selections. Likewise, documentation and rationale supporting each checklist selection must be made available.

Description of the Dichotomous Key for Making ESA Determinations of Effect and Documentation of Expected Incidental Take:

The "Dichotomous Key for Making ESA Determinations of Effect" (Table C, within this appendix) is designed to aid in determinations of effect for proposed actions that require a Section 7 consultation/conference or permit under Section 10 of the ESA. Once the matrix has

been modified with watershed specific local data (if necessary) to meet the needs of the evaluators, and the checklist has been discussed and filled out, the evaluators should use the key to help make their ESA determinations of effect. If it is determined that the proposed actions will result in a “take”, identify the expected “take” on the “Documentation of Expected Incidental Take” form that accompanies the Dichotomous Key.

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How to Use the Matrix, Checklist, and Dichotomous Key

1) Group similar projects when possible that are proposed within a 5th or 6th field HUC watershed.

2) Using the Matrix provided (or a version modified and documented by the evaluator) **evaluate environmental and subpopulation baseline conditions** (mark on checklist), use all 7 pathways (identified in the matrix). Summarize the matrix in the "Habitat and Species: Integration of Habitat and Species Conditions" indicator.

3) **Evaluate effects of the proposed action** at both the 5th or 6th and watershed levels using the matrix. Do they restore, maintain or degrade existing baseline conditions? Mark on checklist, and provide written logic and rationale.

Matrix of Diagnostics/Pathways and Indicators

Use to describe the Environmental and Sub-population Baseline Conditions

Subpopulation Characteristics, Water Quality, Habitat Access, Habitat Elements, Channel Condition and Dynamics, Flow/Hydrology, Watershed Condition, Integration of Species and Habitat Conditions

and

Then use the same Diagnostics/ Pathways and Indicators to evaluate the Effects of Proposed Projects on Species and its Habitat

↓

Mark Results on Checklist

↓

4) Take the checklist you marked and the dichotomous key and answer the questions in the key, substantiated by a written rationale and logic, **to reach a determination of effects.**

Environmental Baseline			Effects of the Action		
Funct. Appro-priately	Funct At Risk	Funct at Unaccept-able Risk	Maintain	Restore	Degrade

↓

Use Professional Judgement, Level 1 Team Discussions, written documentation and rationale, and the Checklist to Work through the Dichotomous Key

↓

(Note: Actual Matrix, Checklist, and Dichotomous Key appear later in this appendix.)

Yes/No

No Effect
May Effect
Not Likely to Adversely Affect
Likely to Adversely Affect

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Definitions of ESA Effects Thresholds and Examples

Following are definitions of ESA effects (sources in *italics*):

"No effect:"

This determination is only appropriate "if the proposed action will literally have no effect whatsoever on the species and/or critical habitat, not a small effect or an effect that is unlikely to occur." (From "*Common flaws in developing an effects determination*", Olympia Field Office, U.S. Fish and Wildlife Service). Furthermore, actions that result in a "beneficial effect" do not qualify as a no effect determination. If a "no effect" determination is derived, conference/consultation does not need to proceed, but it is recommended that these determinations be shared within the Level 1 team. Documentation to substantiate this determination must be filed in evaluator's records.

"May affect, not likely to adversely affect:"

"The appropriate conclusion when effects on the species or critical habitat are expected to be beneficial, discountable, or insignificant. Beneficial effects have contemporaneous positive effects without any adverse effects to the species or habitat. Insignificant effects relate to the size of the impact and should never reach the scale where take occurs. Discountable effects are those extremely unlikely to occur. Based on best judgement, a person would not: (1) be able to meaningfully measure, detect, or evaluate insignificant effects; or (2) expect discountable effects to occur." (From "*Draft Endangered Species Consultation Handbook; Procedures for Conducting Section 7 Consultations and Conferences*," USFWS/NMFS, 1994). The term "negligible" has been used in many ESA consultations involving anadromous fish in the Snake River basin. The definition of this term is the same as "insignificant." Consultation/conference is required for this effect determination, but can proceed as informal.

"May affect, likely to adversely affect"

Unfortunately, there is no definition of adverse effects in the ESA or its implementing regulations. The draft Endangered Species Consultation Handbook (NMFS/USFWS, November 1994) provides this definition for "Is likely to adversely affect" - the appropriate conclusion if any adverse effect to listed species or critical habitat may occur as a direct or indirect result of the proposed action or its interrelated or interdependent actions. In the event the overall effect of the proposed action is beneficial to the listed species or critical habitat, but is also likely to cause some adverse effects, then the proposed action 'is likely to adversely affect' the listed species or critical habitat. An "is likely to adversely affect" determination requires formal Section 7 consultation.

The following is a definition specific to anadromous salmonids developed by NMFS, the FS, and the BLM during the PACFISH consultation and is given as example: "Adverse effects include short or long-term, direct or indirect management-related, impacts of an individual or cumulative nature such as mortality, reduced growth or other adverse physiological changes, harassment of fish, physical disturbance of redds, reduced

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reproductive success, delayed or premature migration, or other adverse behavioral changes to listed anadromous salmonids at any life stage. Adverse effects to designated critical habitat include effects to any of the essential features of critical habitat that would diminish the value of the habitat for the survival and recovery of listed anadromous salmonids" (From *NMFS' Pacfish Biological Opinion, 1/23/95*). Interpretation of part of the preceding quotation has been problematic. The statement "...impacts of an individual or cumulative nature..." has often been applied only to actions and impacts, not organisms. NMFS' concern with this definition is that it does not clearly state that the described impacts include those to individual eggs or fish. However, this definition is useful if it is applied on the individual level as well as on the subpopulation and population levels.

For the purposes of Section 7, any action which has more than a negligible potential to result in "take" (see definition at bottom of Dichotomous Key) is likely to adversely affect a proposed/listed species. It is not possible for NMFS or USFWS to concur on a "not likely to adversely affect" determination if the proposed action will cause take of the listed species. Take can be authorized in the Incidental Take Statement of a Biological Opinion after the anticipated extent and amount of take has been described, and the effects of the take are analyzed with respect to jeopardizing the species or adversely modifying critical habitat. Take, as defined in the ESA, clearly applies to the individual level, thus actions that have more than a negligible potential to cause take of individual eggs and/or fish are "likely to adversely affect."

"Likely to jeopardize the continued existence of"

The regulations define jeopardy as "to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species" (*50 CFR §402.02*).

"**Take**"

The ESA (Section 3) defines take as "to harass, harm, pursue, hunt, shoot, wound, trap, capture, collect or attempt to engage in any such conduct". The USFWS further defines "harm" to include "significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns such as breeding, feeding, or sheltering", and "harass" as "actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering".

Examples of Effects Determinations

"No effect"

USFWS is encouraging evaluators to conference/consult at the subpopulation or watershed scale (i.e., on all proposed actions in a particular watershed or within the range of a bull trout subpopulation) rather than on individual projects. Due to the strict

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definition of "no effect" (above), the interrelated nature of in-stream conditions and watershed conditions, and the watershed scale of these conferences, consultations, and activities, "no effect" determinations for all actions in a watershed will be unusual when proposed/listed species are present in or downstream from a given watershed. This is reflected in the dichotomous key, however the evaluator may identify some legitimate exceptions to this general rule.

Example:

The proposed project is in a watershed where available monitoring information indicates that in-stream habitat is functioning appropriately and riparian vegetation is at or near potential. The proposed activity will take place on stable soils and will not result in increased sediment production. No activity will take place in the riparian zone and no listed/proposed species or designated critical habitat exist in the watershed or immediately downstream of the watershed where the activity will take place.

"May affect, not likely to adversely affect"

Example:

The proposed action is in a watershed where bull trout exists. Available monitoring information indicates that in-stream habitat is functioning appropriately and riparian vegetation is at or near potential. Past monitoring indicates that this type of action has led to the present condition (i.e., timely recovery has been achieved with the kind of management proposed in the action). No activity will take place in the riparian zone. Given available information, the potential for take to occur is negligible.

"May affect, likely to adversely affect"

Example:

The proposed action is in a watershed that has a remnant resident population of bull trout in very low numbers and the migratory form is no longer present. The watershed is in relatively good condition, however a few in-stream indicators show degradation, such as excess fine sediment, moderate cobble embeddedness, and poor pool frequency/quality. If the action will further degrade any of these indicators, the determination is clearly "likely to adversely affect".

A less obvious example would be a proposed action in the same watershed that is designed to improve baseline conditions, such as road obliteration or culvert repair. Even though the intent is to improve the degraded conditions over the long-term, if any short-term impacts (such as temporary sedimentation) will cause take (adverse effects), then the determination is "likely to adversely affect."

Sample Species Narrative

(*Should be modified to address the specific bull trout population in the watershed where an action is proposed to occur*)

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Bull Trout (*Salvelinus confluentus)*

Endangered Species Act Status: Proposed threatened Columbia River population segment and endangered Klamath River population segment, June 10, 1997. All life forms are included in this proposal.

Description. For years, the bull trout and Dolly Varden (*Salvelinus malma* Girard) were combined under one name, the Dolly Varden (*Salvelinus malma* Walbaum). In 1991, with the support of the American Fisheries Society, they became two distinct species. A couple of the most useful characteristics in separating the two species are the shape and size of the head (Cavender 1978). The head of a bull trout is more broad and flat on top, being hard to the touch, unlike Dolly Varden. Bull trout have an elongated body, somewhat rounded and slightly compressed laterally, and covered with cycloid scales numbering 190-240 along the lateral line. The mouth is large with the maxilla extending beyond the eye and with well developed teeth on both jaws and head of the vomer (none on the shaft). Bull trout have 11 dorsal fin rays, 9 anal fins, and the caudal fin is slightly forked. Although they are often olive green to brown with paler sides, color is variable with locality and habitat. Their spotting pattern is easily recognizable showing pale yellow spots on the back, and pale yellow and orange or red spots on the sides. Bull trout fins are tinged with yellow or orange, while the pelvic, pectoral, and anal fins have white margins. There should be no black or dark markings on the fins.

Historical and Current Distribution. The historical range of bull trout was restricted to North America (Cavender 1978; Haas and McPhail 1991). Bull trout have been recorded from the McCloud River in northern California, the Klamath River basin in Oregon and throughout much of interior Oregon, Washington, Idaho, western Montana, and British Columbia, and extended into Hudson Bay and the St. Mary's River Saskatchiwan.

Bull trout are believed to be a glacial relict (McPhail and Lindsey 1986), and their broad distribution has probably contracted and expanded periodically with natural climate change (Williams and others, in press). Genetic variation suggests an extended and evolutionarily important isolation between populations in the Klamath and Malheur Basins and those in the Columbia River basin (Leary and others 1993). Populations within the Columbia River basin are more closely allied and are thought to have expanded from common glacial refugia or to have maintained higher levels of gene flow among populations in recent geologic time (Williams and others, in press).

It is unlikely that bull trout occupied all of the accessible streams at any one time. Distribution of existing populations is often patchy even where numbers are still strong and habitat is in good condition (Rieman and McIntyre 1993; Rieman and McIntyre 1995). Habitat preferences or selection is likely important (Dambacher and others, in press; Goetz 1994; Rieman and McIntyre 1995); but more stochastic extirpation and colonization processes may influence distribution even within suitable habitats (Rieman and McIntyre 1995).

Even though bull trout may move throughout whole river basins seasonally, spawning and juvenile rearing appear to be limited to the coldest streams or stream reaches. The lower limits of habitat used by bull trout are strongly associated with gradients in elevation, longitude, and latitude, that likely approximate a gradient in climate across the Basin (Goetz 1994). The

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patterns indicate that spatial and temporal variation in climate may strongly influence habitat available to bull trout (see Meisner 1990 for an example with brook trout). While temperatures are probably suitable throughout much of the northern portion of the range, predicted spawning and rearing habitat are restricted to increasingly isolated high elevation or headwater "islands" toward the south (Goetz 1994; Rieman and McIntyre 1995).

Bull trout are now extinct in California and only remnant populations are found in much of Oregon (Ratliff and Howell 1992). A small population still exists in the headwaters of the Jarbidge River, Nevada which represents the present southern limit of the species range. Bull trout are known or predicted to occur in 45 percent of watersheds in the historical range and to be absent in 55 percent.

Migratory life histories have been lost or limited throughout the range (for example, Goetz 1994; Jakober 1995; Montana Bull Trout Scientific Committee, in preparation; Pratt and Huston 1993; Ratliff and Howell 1992; Rieman and McIntyre 1993, 1995). There is evidence of declining trends in some populations (Mauser and others 1988; Pratt and Huston 1993; Schill 1992; Weaver 1992) and extirpations of local populations are reportedly widespread.

Life History Characteristics. Bull trout spawn from August through November (McPhail and Murray 1979; Pratt 1992). Hatching may occur in winter or early spring, but alevins may stay in the gravel for an extended period after yolk absorption (McPhail and Murray 1979). Growth, maturation, and longevity vary with environment, first spawning is often noted after age four, with individuals living 10 or more years (Rieman and McIntyre 1993).

Two distinct life-history forms, migratory and resident, occur throughout the range of bull trout (Pratt 1992; Rieman and McIntyre 1993). Migratory forms rear in natal tributaries before moving to larger rivers (fluvial form) or lakes (adfluvial form) or the ocean (anadromous) to mature. Migratory bull trout may use a wide range of habitats ranging from 2nd to 6th order streams and varying by season and life stage. Seasonal movements may range up to 300 km as migratory fish move from spawning and rearing areas into overwinter habitat in downstream reaches of large basins (Bjornn and Mallet 1964; Elle and others 1994). The resident form may be restricted to headwater streams throughout life. Both forms are believed to exist together in some areas, but migratory fish may dominate populations where corridors and subadult rearing areas are in good condition (Rieman and McIntyre 1993).

Habitat Relationships. Bull trout appear to have more specific habitat requirements than other salmonids (Rieman and McIntyre 1993). Habitat characteristics including water temperature, stream size, substrate composition, cover and hydraulic complexity have been associated with the distribution and abundance (Dambacher and other, in press; Jakober 1995; Rieman and McIntyre 1993).

Stream temperatures and substrate composition may be particularly important characteristics of suitable habitats. Bull trout have repeatedly been associated with the coldest stream reaches within basins. Goetz (1994) did not find juvenile bull trout in water temperatures above 12.0 C. The best bull trout habitat in several other Oregon streams was where water temperature seldom exceeded 15 degrees C (Buckman et al. 1992; Ratliff 1992; Ziller 1992). Temperature also appears to be a critical factor in the spawning and early life history of bull trout. Bull trout in

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Montana spawned when temperatures dropped below 9 to 10 C (Fraley and Shepard 1989). McPhail and Murray (1979) reported 9 degrees C as the threshold temperature to initiate spawning for British Columbia bull trout. Temperatures fell below 9 degrees C before spawning began in the Metolius River, Oregon (Riehle 1993). Survival of bull trout eggs varies with water temperature (McPhail and Murray 1979). They reported that 0-20%, 60-90%, and 80-95% of the bull trout eggs from British Columbia survived to hatching in water temperatures of 8-10 degrees C, 6 degrees C, and 2-4 degrees C, respectively. Weaver and White (1985) found that 4-6 degrees C was needed for egg development for Montana bull trout. Temperature may be strongly influenced by land management (Henjum and others 1994) and climate change; both effects may play an important role in the persistence of bull trout.

Bull trout are more strongly tied to the stream bottom and substrate than other salmonids (Pratt 1992). Substrate composition has repeatedly been correlated with the occurrence and abundance of juvenile bull trout (Dambacher and others in press; Rieman and McIntyre 1993) and spawning site selection by adults (Graham and others 1981; McPhail and Murray 1979). Fine sediments can influence incubation survival and emergence success (Weaver and White 1985), but might also limit access to substrate interstices that are important cover during rearing and overwintering (Goetz 1994; Jakober 1995).

Key Factors. Angling is a factor influencing the current status of bull trout. Bull trout may be vulnerable to over-harvest (Ratliff and Howell 1992; Rieman and Lukens 1979). Poaching is viewed as an important cause of mortality, especially in accessible streams that support large migratory fish (N. Horner, Idaho Department of Fish and Game and J. Vasho, Montana Department of Fish, Wildlife and Parks, pers. comm.).

Watershed disruption is a second factor that has played a role in the decline of bull trout. Changes in or disruptions of watershed processes likely to influence characteristics of stream channels are also likely to influence the dynamics and persistence of bull trout populations. Bull trout have been more strongly associated with pristine of only lightly disturbed basins (Brown 1992; Clancy 1993; Cross and Everest 1995; Dambacher and others, in press; Huntington 1995; Ratliff and Howell 1992).

Patterns of stream flow and the frequency of extreme flow events that influence substrates are anticipated to be important factors in population dynamics (Rieman and McIntyre 1993). With overwinter incubation and a close tie to the substrate, embryos and juveniles may be particularly vulnerable to flooding and channel scour associated with the rain-on-snow events common in some parts of the range within the belt geography of northern Idaho and northwestern Montana (Rieman and McIntyre 1993). Channel dewatering tied to low flows and bed aggradation has also blocked access for spawning fish resulting in year class failures (Weaver 1992).

Changes in sediment delivery, aggradation and scour, wood loading, riparian canopy and shading or other factors influencing stream temperatures, and the hydrologic regime (winter flooding and summer low flow) are all likely to affect some, if not most, populations. Significant long-term changes in any of these characteristics or processes represent important risks for many remaining bull trout populations. Populations are likely to be most sensitive to changes that occur in headwater areas encompassing critical spawning and rearing habitat and remnant resident populations.

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Introduced species are a third factor influencing bull trout. More than 30 introduced species occur within the present distribution of bull trout. Some introductions like kokanee may benefit bull trout by providing forage (Bowles and others 1991). Others such as brown, brook, and lake trout are thought to have depressed or replaced bull trout populations (Dambacher and others, in press; Donald and Alger 1992; Howell and Buchanan 1992; Kanda and others, in press; Leary and others 1993; Ratliff and Howell 1992). Brook trout are seen as an especially important problem (Kanda and others, in press; Leary and others 1993) and may progressively displace bull trout through hybridization and higher reproductive potential (Leary and others 1993). Brook trout now occur in the majority of the watersheds representing the current range of bull trout. Introduced species may pose greater risks to native species where habitat disturbance has occurred (Hobbs and Huenneke 1992).

Isolation and fragmentation are the fourth factor likely to influence the status of bull trout. Historically bull trout populations were well connected throughout the Basin. Habitat available to bull trout has been fragmented, and in may cases populations have been isolated entirely. Dams have isolated whole subbasins throughout the Basin (see for example, Brown 1992; Kanda and other, in press; Pratt and Huston 1993; Rieman and McIntyre 1995). Irrigation diversions, culverts, and degraded mainstem habitats have eliminated or seriously depressed migratory life histories effectively isolating resident populations in headwater tributaries (Brown 1992; Montana Bull Trout Scientific Committee, in preparation; Ratliff and Howell 1992; Rieman and McIntyre 1993). Introduced species like brook trout may displace bull trout in lower stream reaches further reducing the habitat available in many remaining headwater areas (Adams 1994; Leary and others 1993). Loss of suitable habitat through watershed disturbance may also increase the distance between good or refuge habitats and strong populations thus reducing the likelihood of effective dispersal (Frissell and others 1993).

References: Much of the narrative was taken from Lee, D.C., J.R. Sedell, B.E. Rieman, R.F. Thurow, J.E. Williams and others. 1997. Chapter 4: Broadscale Assessment of Aquatic Species and Habitats. *In* T.M. Quigley and S. J. Arbelbide eds "An Assessment of Ecosystem Components in the Interior Columbia Basin and Portions of the Klamath and Great Basins Volume III". U.S. Department of Agriculture, Forest Service, and U.S. Department of Interior, Bureau of Land Management, Gen Tech Rep PNW-GTR-405). For complete citations, refer to that document.

Other references used but not contained in Lee and others 1997:

Brown, C. J. D. 1971. Fishes of Montana. The Endowment and Research Foundation, Montana State University, Bozeman, MT.

Cavender, T.M. 1978. Taxonomy and Distribution of the Bull Trout, *Salvelinus confluentus* (Suckley), from the American Northwest. California Fish and Game 64(3): 139-174.

Simpson, J. C. and R. L White 1982. Fishes of Idaho. University Press of Idaho, Moscow, ID.

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Table A. Matrix of diagnostics / pathways and indicators

(Remember, the values of criteria presented here are <u>NOT absolute</u>, they may be adjusted for local watersheds given supportive documentation. See p. 7)

DIAGNOSTIC OR PATHWAY	INDICATORS	FUNCTIONING APPROPRIATELY	FUNCTIONING AT RISK	FUNCTIONING AT UNACCEPTABLE RISK
SPECIES:				
Subpopulation Characteristics within subpopulation watersheds	Subpopulation Size	Mean total subpopulation size or local habitat capacity more than several thousand individuals. All life stages evenly represented in the subpopulation.[1]	Adults in subpopulation are less than 500 but >50.[1]	Adults in subpopulation has less than 50.[1]
	Growth and Survival	Subpopulation has the resilience to recover from short term disturbances (e.g. catastrophic events, etc) or subpopulation declines within one to two generations (5 to 10 years).[1] The subpopulation is characterized as increasing or stable. At least 10+ years of data support this estimate.[2]	When disturbed, the subpopulation will not recover to predisturbance conditions within one generation (5 years). Survival or growth rates have been reduced from those in the best habitats. The subpopulation is reduced in size, but the reduction does not represent a long-term trend.[1]. At least 10+ years of data support this characterization.[2] If less data is available and a trend can not be confirmed, a subpopulation will be considered at risk until enough data is available to accurately determine its trend.	The subpopulation is characterized as in rapid decline or is maintaining at alarmingly low numbers. Under current management, the subpopulation condition will not improve within two generations (5 to 10 years).[1] This is supported by a minimum of 5+ years of data.
	Life History Diversity and Isolation	The migratory form is present and the subpopulation exists in close proximity to other spawning and rearing groups. Migratory corridors and rearing habitat (lake or larger river) are in good to excellent condition for the species. Neighboring subpopulations are large with high likelihood of producing surplus individuals or straying adults that will mix with other subpopulation groups.[1]	The migratory form is present but the subpopulation is not close to other subpopulations or habitat disruption has produced a strong correlation among subpopulations that do exist in proximity to each other.[1]	The migratory form is absent and the subpopulation is isolated to the local stream or a small watershed not likely to support more than 2,000 fish.[1]

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	Persistence and Genetic Integrity	Connectivity is high among multiple (5 or more) subpopulations with at least several thousand fish each. Each of the relevant subpopulations has a low risk of extinction.[1] The probability of hybridization or displacement by competitive species is low to nonexistent.	Connectivity among multiple subpopulations does occur, but habitats are more fragmented. Only one or two of the subpopulations represent most of the fish production.[1] The probability of hybridization or displacement by competitive species is imminent, although few documented cases have occurred.	Little or no connectivity remains for refounding subpopulations in low numbers, in decline, or nearing extinction. Only a single subpopulation or several local populations that are very small or that otherwise are at high risk remain.[1] Competitive species readily displace bull trout. The probability of hybridization is high and documented cases have occurred.
HABITAT:				
Water Quality:	Temperature	7 day average maximum temperature in a reach during the following life history stages: [1, 3] incubation 2 - 5°C rearing 4 - 12°C spawning 4 - 9°C also temperatures do not exceed 15°C in areas used by adults during migration (no thermal barriers)	7 day average maximum temperature in a reach during the following life history stages:[1, 3] incubation <2°C or 6°C rearing <4°C or 13 - 15°C spawning <4°C or 10°C also temperatures in areas used by adults during migration sometimes exceeds 15°C	7 day average maximum temperature in a reach during the following life history stages:[1, 3] incubation <1°C or >6°C rearing >15°C spawning <4°C or > 10°C also temperatures in areas used by adults during migration regularly exceed 15°C (thermal barriers present)
	Sediment (in areas of spawning and incubation; rearing areas will be addressed under "substrate embeddedness")	Similar to chinook salmon [1]: for example (e.g.): < 12% fines (<0.85mm) in gravel4; e.g. <20% surface fines of <6mm[5, 6]	Similar to chinook salmon[1]: e.g. 12-17% fines (<0.85mm) in gravel[4]; e.g. 12-20% surface fines [7]	Similar to chinook salmon 1: e.g. >17% fines (<0.85mm) in gravel[4]; e.g. >20% fines at surface or depth in spawning habitat[7]
	Chemical Contamination/ Nutrients	low levels of chemical contamination from agricultural, industrial and other sources, no excess nutrients, no CWA 303d designated reaches[8]	moderate levels of chemical contamination from agricultural, industrial and other sources, some excess nutrients, one CWA 303d designated reach[8]	high levels of chemical contamination from agricultural, industrial and other sources, high levels of excess nutrients, more than one CWA 303d designated reach[8]
Habitat Access:	Physical Barriers (address subsurface flows impeding fish passage under the pathway "flow/hydrology")	man-made barriers present in watershed allow upstream and downstream fish passage at all flows	man-made barriers present in watershed do not allow upstream and/or downstream fish passage at base/low flows	man-made barriers present in watershed do not allow upstream and/or downstream fish passage at a range of flows

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Habitat Elements:	Substrate Embeddedness in rearing areas (spawning and incubation areas were addressed under the indicator "sediment")	reach embeddedness <20%[9, 10]	reach embeddedness 20-30% [9,10]	reach embeddedness >30%[4,10]
	Large Woody Debris	current values are being maintained at greater than 80 pieces/mile that are >24"diameter and >50 ft length on the Coast [9], or >20 pieces/ mile >12"diameter >35 ft length on the Eastside[11]; also adequate sources of woody debris are available for both long and short-term recruitment	current levels are being maintained at minimum levels desired for "functioning appropriately", but potential sources for long term woody debris recruitment are lacking to maintain these minimum values	current levels are not at those desired values for "functioning appropriately", and potential sources of woody debris for short and/or long term recruitment are lacking
	Pool Frequency and Quality	pool frequency in a reach closely approximates [5]: Wetted width (ft) #pools/mile 0-5 39 5-10 60 10-15 48 15-20 39 20-30 23 30-35 18 35-40 10 40-65 9 65-100 4 (can use formula: pools/mi = 5,280/wetted channel width #channel widths per pool); also, pools have good cover and cool water[4], and only minor reduction of pool volume by fine sediment	pool frequency is similar to values in "functioning appropriately", but pools have inadequate cover/temperature[4], and/or there has been a moderate reduction of pool volume by fine sediment	pool frequency is considerably lower than values desired for "functioning appropriately"; also cover/temperature is inadequate[4], and there has been a major reduction of pool volume by fine sediment
	Large Pools (in adult holding, juvenile rearing, and overwintering reaches where streams are >3m in wetted width at baseflow)	each reach has many large pools >1 meter deep[4]	reaches have few large pools (>1 meter) present[4]	reaches have no deep pools (>1 meter)[4]

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	Off-channel Habitat (see reference 18 for identification of these characteristics)	watershed has many ponds, oxbows, backwaters, and other off-channel areas with cover; and side-channels are low energy areas[4]	watershed has some ponds, oxbows, backwaters, and other off-channel areas with cover; but side-channels are generally high energy areas[4]	watershed has few or no ponds, oxbows, backwaters, or other off-channel areas[4]
	Refugia (see Checklist footnotes for definition of this indicator)	habitats capable of supporting strong and significant populations are protected and are well distributed and connected for all life stages and forms of the species[12, 13]	habitats capable of supporting strong and significant populations are insufficient in size, number and connectivity to maintain all life stages and forms of the species[12, 13]	adequate habitat refugia do not exist[12]
Channel Condition & Dynamics:	Average Wetted Width/ Maximum Depth Ratio in scour pools in a reach	<10[7, 5]	11 - 20[5]	>20[5]
	Streambank Condition	>80% of any stream reach has >90% stability[5]	50 - 80% of any stream reach has >90% stability[5]	<50% of any stream reach has >90% stability[5]
	Floodplain Connectivity	off-channel areas are frequently hydrologically linked to main channel; overbank flows occur and maintain wetland functions, riparian vegetation and succession	reduced linkage of wetland, floodplains and riparian areas to main channel; overbank flows are reduced relative to historic frequency, as evidenced by moderate degradation of wetland function, riparian vegetation/succession	severe reduction in hydrologic connectivity between off-channel, wetland, floodplain and riparian areas; wetland extent drastically reduced and riparian vegetation/succession altered significantly
Flow/Hydrology:	Change in Peak/ Base Flows	watershed hydrograph indicates peak flow, base flow and flow timing characteristics comparable to an undisturbed watershed of similar size, geology and geography	some evidence of altered peak flow, baseflow and/or flow timing relative to an undisturbed watershed of similar size, geology and geography	pronounced changes in peak flow, baseflow and/or flow timing relative to an undisturbed watershed of similar size, geology and geography
	Increase in Drainage Network	zero or minimum increases in active channel length correlated with human caused disturbance	low to moderate increase in active channel length correlated with human caused disturbance	greater than moderate increase in active channel length correlated with human caused disturbance
Watershed Conditions:	Road Density & Location	<1mi/mi² [13]; no valley bottom roads	1 - 2.4 mi/mi² [13]; some valley bottom roads	>2.4 mi/mi² [13]; many valley bottom roads
	Disturbance History	<15% ECA of entire watershed with no concentration of disturbance in unstable or potentially unstable areas, and/or refugia, and/or riparian area; and for NWFP area there is an additional criteria of ≥15% LSOG in watersheds[14]	<15% ECA of entire watershed but disturbance concentrated in unstable or potentially unstable areas, and/or refugia, and/or riparian area; and for NWFP area there is an additional criteria of ≥15% LSOG in watersheds[14]	>15% ECA of entire watershed and disturbance concentrated in unstable or potentially unstable areas, and/or refugia, and/or riparian area; does not meet NWFP standard for LSOG

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	Riparian Conservation Areas (RHCA - PACFISH and INFISH) (Riparian Reserves - Northwest Forest Plan)	the riparian conservation areas provide adequate shade, large woody debris recruitment, and habitat protection and connectivity in subwatersheds, and buffers or includes known refugia for sensitive aquatic species (>80% intact), and adequately buffer impacts on rangelands: percent similarity of riparian vegetation to the potential natural community/ composition >50%[15]	moderate loss of connectivity or function (shade, LWD recruitment, etc.) of riparian conservation areas, or incomplete protection of habitats and refugia for sensitive aquatic species (≈70-80% intact), and adequately buffer impacts on rangelands : percent similarity of riparian vegetation to the potential natural community/composition 25-50% or better[15]	riparian conservation areas are fragmented, poorly connected, or provides inadequate protection of habitats for sensitive aquatic species (<70% intact, refugia does not occur), and adequately buffer impacts on rangelands : percent similarity of riparian vegetation to the potential natural community/composition <25%15
	Disturbance Regime	Environmental disturbance is short lived; predictable hydrograph, high quality habitat and watershed complexity providing refuge and rearing space for all life stages or multiple life-history forms.[1] Natural processes are stable.	Scour events, debris torrents, or catastrophic fire are localized events that occur in several minor parts of the watershed. Resiliency of habitat to recover from environmental disturbances is moderate.	Frequent flood or drought producing highly variable and unpredictable flows, scour events, debris torrents, or high probability of catastrophic fire exists throughout a major part of the watershed. The channel is simplified, providing little hydraulic complexity in the form of pools or side channels.[1] Natural processes are unstable.
SPECIES AND HABITAT:				
Integration of Species and Habitat Conditions		Habitat quality and connectivity among subpopulations is high. The migratory form is present. Disturbance has not altered channel equilibrium. Fine sediments and other habitat characteristics influencing survival or growth are consistent with pristine habitat. The subpopulation has the resilience to recover from short-term disturbance within one to two generations (5 to 10 years). The subpopulation is fluctuating around an equilibrium or is growing.[1]	Fine sediments, stream temperatures, or the availability of suitable habitats have been altered and will not recover to predisturbance conditions within one generation (5 years). Survival or growth rates have been reduced from those in the best habitats. The subpopulation is reduced in size, but the reduction does not represent a long-term trend. The subpopulation is stable or fluctuating in a downward trend. Connectivity among subpopulations occurs but habitats are more fragmented.[1]	Cumulative disruption of habitat has resulted in a clear declining trend in the subpopulation size. Under current management, habitat conditions will not improve within two generations (5 to 10 years). Little or no connectivity remains among subpopulations. The subpopulation survival and recruitment responds sharply to normal environmental events.[1]

[1] Rieman, B.E. and J.D. McIntyre. 1993. Demographic and habitat requirements for conservation of bull trout. U.S.D.A. Forest Service, Intermountain Research Station, Boise, ID.

[2] Rieman, B.E. and D.L. Meyers. 1997. Use of redd counts to detect trends in bull trout (*Salvelinus confluentus)* populations. Conservation Biology 11(4): 1015-1018.

[3] Buchanan, D.V. and S.V. Gregory. 1997. Development of water temperature standards to protect and restore habitat for bull trout and other cold water species in Oregon. *In* W.C. Mackay, M.K. Brewin, and M. Monita, eds. Friends of the Bull Trout Conference Proceedings. P8.

[4] Washington Timber/Fish Wildlife Cooperative Monitoring Evaluation and Research Committee, 1993. Watershed Analysis Manual (Version 2.0). Washington Department of Natural Resources.

[5] Overton, C.K., J.D. McIntyre, R. Armstrong, S.L. Whitewell, and K.A. Duncan. 1995. User's guide to fish habitat: descriptions that represent natural conditions in the Salmon River Basin, Idaho. U.S. Department of Agriculture, Forest Service, Intermountain Research Station, Gen Tech. Rep. INT-GTR-322.

[6] Overton, C.K., S.P. Wollrab, B.C. Roberts, and M.A. Radko. 1997. R1/R4 (Northern/Intermoutain Regions) Fish and Fish Habitat Standard Inventory Procedures Handbook. U.S. Department of Agriculture, Forest Service, Intermountain Research Station, Gen Tech. Rep. INT-GTR-346.

[7] Biological Opinion on Land and Resource Management Plans for the: Boise, Challis, Nez Perce, Payette, Salmon, Sawtooth, Umatilla, and Wallowa-Whitman National Forests. March 1, 1995.

[8] A Federal Agency Guide for Pilot Watershed Analysis (Version 1.2), 1994.

[9] Biological Opinion on Implementation of Interim Strategies for Managing Anadromous Fish-producing Watersheds in Eastern Oregon and Washington, Idaho, and Portions of Calfornia (PACFISH). National Marine Fisheries Service, Northwest Region, January 23, 1995.

[10] Shepard, B.B., K.L. Pratt, and P.J. Graham. 1984. Life histories of westslope cutthroat and bull trout in the Upper Flathead River Basin, MT. Environmental Protection Agency Rep. Contract No. R008224-01-5.

[11] Interior Columbia Basin Ecosystem Management Project Draft Environmental Impact Statement and Appendices.

[12] Frissell, C.A., Liss, W.J., and David Bayles, 1993. An Integrated Biophysical Strategy for Ecological Restoration of Large Watersheds. Proceedings from the Symposium on Changing Roles in Water Resources Management and Policy, June 27-30, 1993 (American Water Resources Association), p. 449-456.

[13] Lee, D.C., J.R. Sedell, B.E. Rieman, R.F. Thurow, J.E. Williams and others. 1997. Chapter 4: Broadscale Assessment of Aquatic Species and Habitats. *In* T.M. Quigley and S. J. Arbelbide eds "An Assessment of Ecosystem Components in the Interior Columbia Basin and Portions of the Klamath and Great Basins Volume III". U.S. Department of Agriculture, Forest Service, and U.S. Department of Interior, Bureau of Land Management, Gen Tech Rep PNW-GTR-405.

[14] Northwest Forest Plan, 1994. Standards and Guidelines for Management of Habitat for Late-Successional and Old-Growth Forest Related Species Within the Range of the Northern Spotted Owl. USDA Forest Service and USDI Bureau of Land Management.

[16] Winward, A.H., 1989 Ecological Status of Vegetation as a base for Multiple Product Management. Abstracts 42nd annual meeting, Society for Range Management, Billings MT, Denver CO: Society For Range Management: p277.

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Table B.
Checklist for documenting environmental baseline and effects of proposed action(s) on relevant indicators

DIAGNOSTICS/ PATHWAYS:	POPULATION AND ENVIRONMENTAL BASELINE (list values or criterion and supporting documentation)			EFFECTS OF THE ACTION(S)			
INDICATORS	Functioning Appropriately	Functioning At Risk	Functioning at Unaccept-able Risk	Restore[1]	Maintain[2]	Degrade3	Compliance with ACS
Subpopulation Characteristics: Subpopulation Size							
Growth and Survival							
Life History Diversity and Isolation							
Persistence and Genetic Integrity							
Water Quality: Temperature							
Sediment							
Chem. Contam./Nutrients							
Habitat Access: Physical Barriers							
Habitat Elements: Substrate Embeddedness							
Large Woody Debris							
Pool Frequency and Quality							
Large Pools							
Off-channel Habitat							
Refugia[4]							
Channel Cond. & Dynamics: Wetted Width/Max.Depth Ratio							
Streambank Condition							
Floodplain Connectivity							
Flow/Hydrology: Change in Peak/Base Flows							
Drainage Network Increase							

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DIAGNOSTICS/ PATHWAYS:	POPULATION AND ENVIRONMENTAL BASELINE (list values or criterion and supporting documentation)			EFFECTS OF THE ACTION(S)			
INDICATORS	Functioning Appropriately	Functioning At Risk	Functioning at Unaccept-able Risk	Restore[1]	Maintain[2]	Degrade3	Compliance with ACS
Watershed Conditions: Road Density & Location							
Disturbance History							
Riparian Conservation Areas							
Disturbance Regime							
Integration of Species and Habitat Conditions							

Watershed Name: Location:

1 For the purposes of this checklist, "restore" means to change the function of a "functioning at risk" indicator to "functioning appropriately", or to change the function of a "functioning at unacceptable risk" indicator to "functioning at risk" or "functioning appropriately" (i.e., it does not apply to "functioning appropriately" indicators). Restoration from a worse to a better condition does not negate the need to consult/confer if take will occur.

2 For the purposes of this checklist, "maintain" means that the function of an indicator does not change (i.e., it applies to all indicators regardless of functional level).

3 For the purposes of this checklist, "degrade" means to change the function of an indicator for the worse (i.e., it applies to all indicators regardless of functional level). In some cases, a "functioning at unacceptable risk" indicator may be further worsened, and this should be noted.

4 Refugia = watersheds or large areas with minimal human disturbance having relatively high quality water and fish habitat, or having the potential of providing high quality water and fish habitat with the implementation of restoration efforts. These high quality water and fish habitats are well distributed and connected within the watershed or large area to provide for both biodiversity and stable populations.
(adapted from discussions on “Stronghold Watersheds and Unroaded Areas” in Lee, D.C., J.R. Sedell, B.E. Rieman, R.F. Thurow, J.E. Williams and others. 1997. Chapter 4: Broadscale Assessment of Aquatic Species and Habitats. *In* T.M. Quigley and S. J. Arbelbide eds “An Assessment of Ecosystem Components in the Interior Columbia Basin and Portions of the Klamath and Great Basins Volume III”. U.S. Department of Agriculture, Forest Service, and U.S. Department of Interior, Bureau of Land Management, Gen Tech Rep PNW-GTR-405).

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Dichotomous key for making ESA determination of effects
(Circle the conclusion at which you arrive)

1. Are there any proposed/listed fish species and/or proposed/designated critical habitat in the watershed or downstream from the watershed?

   NO ..... No effect
   YES (or unknown) ..... Go to 2

2. Will the proposed action(s) have any effect whatsoever [1] on the species; designated or proposed critical habitat; seasonally or permanently occupied habitat; or unoccupied habitat necessary for the species' survival?

   NO ..... No effect
   YES ..... (May Affect) Go to 3

3. Does the proposed action(s) have potential to: result in "take"[2] of any proposed/listed fish species?

   A. NO ..... Go to 4
   B. YES..... Likely to adversely affect

4. Does the proposed action(s) have potential to or cause an adverse effect to any proposed/ listed fish species habitat, such as: adverse effects to critical habitat constituent elements or segments; impairing the suitability of seasonally or permanently occupied habitat [3]; or impairing or degrading unoccupied habitat necessary for the survival [4] of the species locally?

   A. NO .....Not likely to adversely affect
   B. YES..... Likely to adversely affect (including adverse effects to critical habitat)

- "Any effect whatsoever" includes small effects, effects that are unlikely to occur, and beneficial effects (all of which are recognized as "may effect" determinations). A "no effect" determination is only appropriate if the proposed action will literally have no effect whatsoever on the species and/or critical habitat, not a small effect, an effect that is unlikely to occur, or a beneficial effect.

- "Take" - The ESA (Section 3) defines take as "to harass, harm, pursue, hunt, shoot, wound, trap, capture, collect or attempt to engage in any such conduct". The USFWS (USFWS, 1994) further defines "harm" as "significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns such as breeding, feeding, or sheltering", and "harass" as "actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering".

- Action(s) with potential to hinder attainment of relevant "functioning appropriately indicators" (from table 2) may result in an adverse affect determination due to negative effects on habitat. This may indicate harm or harassment take of the species or adverse effects to habitat necessary for survival of the species locally (i.e. potential for adverse affect w/o take, or adversely affecting critical habitat).

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- Survival - The species persistence, as listed or as a recovery unit, beyond the conditions leading to its endangerment, with sufficient resilience to allow recovery from endangerment. This condition is characterized by a species with a sufficiently large population, represented by all necessary age classes, genetic heterogeneity, and number of sexually mature individuals producing viable offspring, which exists in an environment providing all requirements for completion of the species' entire life cycle, including reproduction, sustenance, and shelter (USDI and USDC 1998).

- Document expected incidental take on next page of this key.

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Documentation of expected incidental take

Name and location of action(s):_____ Species:_____

1. The proposed action may result in incidental take through which of the following mechanisms (circle as appropriate)?

   Harm: Significant impairment of behavioral patterns such as breeding, feeding, sheltering, and others (identify).

   Harass: Significant disruption of normal behavior patterns which include, but are not limited to, breeding, feeding, sheltering, or others (identify).

   Pursue, Hunt, Shoot, Wound, Capture, Trap, Collect.

2. What is the approximate duration of the effects of the proposed action(s) resulting in incidental take?

3. Which of the following life stages will be subject to incidental take (circle as appropriate)?

   Fertilization to emergence (incubation)

   Juvenile rearing to adulthood

   Adult holding and over-wintering

   Adults spawning

   Adults migrating

4. Which life forms and subpopulation status are present in the watershed or downstream of the watershed where the activities will take place (circle as appropriate)?

Life Form:	Subpopulation status:
Resident	Stronghold population
Adfluvia	Depressed population
Fluvial	
Anadromous	

5. What is the location of the expected incidental take due to the proposed action(s)?

   Basin and watershed:

   Stream reach and habitat units:

6. Quantify your expected incidental take:

   Length stream affected (miles):

   Individuals (if known):

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Examples of Some of the Influences of Human Activities on Aquatic Ecosystems

The following, except the section on water temperature, are excerpts generally from two sources: 1. "An Assessment of Ecosystem Components in the Interior Columbia Basin and Portions of the Klamath and Great Basins, Volume III, Chapter 4, 1997, (referred to as Lee and others 1997), and 2) Rieman and McIntyre 1993. These descriptions are generated to stimulate biologist's thought and Level 1 team discussion on evaluation of all the diagnostics/pathways through which habitat degradation could occur and aquatic populations can be altered. These examples are not all inclusive. We recommend that biologists review all the recommended reports and papers suggested below the matrix and use them to gain a more complete insight into each indicator listed in the matrix. The Interior Columbia Basin Assessment can be acquired from the U.S. Forest Service, Pacific Northwest Research Station, 3200 SW Jefferson Way, Corvallis, OR 97331.

Channel Stability (excerpts from Rieman and McIntyre 1993)

"Young bull trout are closely associated with stream channel substrates. Incubation occurs over a prolonged period through the winter. Juvenile fish are found in close association with the bottom of the channel, often using substrate for cover (Fraley and Shepard 1989; Oliver 1979; Pratt 1984; Shepard and others 1984b). The association with substrate appears more important for bull trout than for other species (Nakano and others 1992; Pratt 1984).

The extended tie to substrate and the presence of embryos and alevins in substrate during winter and spring suggests that highly variable stream flows, bed load movements, and channel instability will influence the survival of young bull trout (Goetz 1989; Weaver 1985). The embryos and young of fish that spawn in the fall are particularly vulnerable to flooding and scouring during winter and early spring (Elwood and Waters 1969; Seegrist and Gard 1972; Wickett 1958) and to low winter flows or freezing within the substrate." "Low habitat complexity, the frequency of bed load scour and the frequency of low flows may be aggravated by watershed disruption and problems of channel instability in many bull trout streams."

Channel Substrate (excerpts from Rieman and McIntyre 1993)

"Increased sediments reduce pool depth, alter substrate composition, reduce interstitial space, and cause channels to braid (Beschta and Platts 1986; Clifton 1989; Everest and others 1987; Lisle 1982; Megahan and others 1980). Initial work on the influence of fine sediments (Shepard and others 1984a; Weaver and White 1985) suggested that incubating bull trout embryos tolerated fine sediments (less than 6.35 millimeters) better than cutthroat trout, steelhead trout, and brook trout. Their tolerance appeared similar to that of chinook salmon (Hausle and Coble 1976; Irving and Bjornn 1984; Tappel and Bjornn 1983). More recent work (Weaver and Fraley 1991), however, indicated that any increase in fine sediments reduces survival. Others have found that when the percent of fine sediments in the substrate was higher, rearing bull trout were also less abundant (Leathe and Enk 1985; McPhail and Murray 1979; Shepard and others 1984a; Weaver and Fraley 1991)." "Spawners may also "select" sites where substrate is not highly compacted (Graham and others 1981; McPhail and Murray 1979).

It is difficult to predict how much a particular change in substrate composition will affect survival for any salmonid (Chapman 1988; Everest and others 1987; Weaver and Fraley 1991).

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Some substrates are more likely to accumulate fines than others, and some populations probably are more sensitive than others. In the absence of detailed local information on population habitat dynamics, any increase in the proportion of fines in substrates should be considered a risk to productivity of an environment and to the persistence of associated bull trout populations."

Cover (excerpts from Rieman and McIntyre 1993)

"Bull trout usually associate with complex forms of cover and with pools. Juveniles live close to in-channel wood, substrate, or undercut banks (Goetz 1991; Pratt 1984, 1992). Young-of-the-year bull trout use side channels, stream margins, and other areas of low velocity. Older fish use pools (Hoelscher and Bjornn 1989; Pratt 1984) and areas with large or complex woody debris and undercut banks (Graham and others 1981; Oliver 1979; Pratt 1985; Shepard and others 1984b). Woody debris correlated significantly with densities of bull trout sampled in streams in the Bitterroot National Fores (Clancy 1992)." "Cover is important in winter and is thought to limit many fish populations (Chapman 1966; Cunjak and Power 1986). Cover clearly influences population density and overwinter survival of brook trout (Boussu 1954; Hunt 1976; Saunders and Smith 1962)."

Water Temperature

Researchers recognize temperature more consistently than any other factor influencing bull trout distribution, based mostly on correlative evidence (Reiman and McIntyre 1993). Water temperatures in excess of about 15 degrees C are thought to limit bull trout distribution (Rieman and McIntyre 1993). McPhail and Murray (1979) reported that the survival of bull trout eggs to hatching varied with water temperature: 0-20% survival in 8-10 degrees C, 60-90% in 6 degrees C, and 80-95% in 2-4 degrees C. Temperatures between 4-6 C were needed for egg development in Montana streams (Weaver and White 1985). Water temperature also appears to be a critical factor in the spawning and early life history of bull trout. Spawning has been observed to occur in British Columbia, Oregon, and Montana at or below 9 degrees C (Fraley and Shepard 1989, McPhail and Murray 1979, Riehle 1993).

Water Quality (excerpts from Lee et al. 1997)

"The extent and intensity of land development and land-use activities have increased during the past century." "Aquatic ecosystem perturbations related to these activities include: 1) thermal pollution; 2) toxicity due to the presence of organic compounds (synthetic and natural) and heavy metal ions; 3) introduction of pathogenic organisms; 4) organic wastes that result in potentially catastrophic changes in dissolved oxygen levels; 5) acidification; 6) elevated sedimentation rates; and 7) increased eutrophication (Ellis 1989).

Eutrophication is indicative of deteriorating water quality associated with a buildup of nutrients, especially nitrogen and phosphorus. Increased rates of nutrient loading can be related to changes an/or disturbances within a watershed (Brugam and Vallarino 1989; Dojlido and Best 1993; Stauffer 1991). Development activities that contribute to increased nutrient levels include point sources such as industrial effluents and water-borne sewage systems and nonpoint sources such as agricultural operations, residential development and septic systems, road construction, and forest practices (Dojlido and Best 1993; Spencer 1991; Thralls 1991).

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Nonpoint source pollution may be the most problematic cause of water quality deterioration because the origin of perturbation is often difficult to identify and control." "Development can result in increases of nitrogen and phosphorus in surface waters resulting from: septic system effluents (Scott 1991; Sorrie 1994; Stauffer 1991), runoff from fertilized lawns and agricultural lands (Lewis and others 1984; Power and Schepers 1989), and runoff from highways and road (Ehrenfeld and Schneider 1991; Lewis and others 1984)."

Some Major Activities and their Effects

(All of the following are excerpts from Lee and others 1997)

Water diversions and dams

"Trends in the number of dams constructed over time and impounded water volumes indicate that many streams and rivers have experienced a rapid and massive change in their hydrology. Even though the rate of increase in storage volume has leveled since the mid-1970s, the total number of dams continues to increase, suggesting that new construction is focused on smaller dams (National Research Council 1995)."

"Reservoir operation has resulted in long-term changes in downstream water temperatures and the annual discharge of water and sediments. The pattern and timing of the annual hydrograph have been altered in most basins on scales ranging from hours to months and even years. In many instances dams have changed large river systems to isolated fluvial fragments between lakes. In arid areas of the Basin, stream diversions have reduced flows to a trickle."

"Water withdrawals for off-stream uses include rural domestic use, stock watering, irrigation, public water supply, commercial and industrial supply, and thermoelectric cooling." "Agricultural irrigation is by far the dominant off-stream use in the Basin."

"Most irrigation diversions on Forest Service and BLM-administered lands are operated by private individuals, but a few water rights are held by federal agencies."

"Irrigation has contributed to the extirpation of salmon and steelhead from many small streams in the Salmon National Forest (Keifenhiem 1992). Many streams in the Sawtooth National Recreation Area have inadequate instream flow as a result of irrigation." "The cumulative loss of spawning and rearing habitat in these tributaries is significant."

Grazing and Farming

"The proportion of land in the Pacific Northwest dedicated to agriculture is relatively small (approximately 16%). However, agricultural practices can have considerable effects on aquatic resources because the lands are often located on historic flood plains and valley bottoms. The effects of farming on aquatic systems include loss of native vegetation, bank instability, loss of floodplain function, removal of large woody debris sources, changes in sediment supply, changes in hydrology, increases in water temperature, changes in nutrient supply, chemical pollution, channel modification, and habitat simplification (Spence and others 1995)."

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"The effects of livestock grazing on aquatic systems are related, in part, to the biophysical attributes of the site (Archer and Smeins 1991)." "Unstable stream conditions often exist as part of the natural conditions of streams; however, grazing can amplify these unstable conditions. In some cases, livestock use may initiate additional instability within a stream system.

Overgrazing by livestock can lead to a reduction of soil structure, soil compaction, and damage or loss of vegetative cover. All of these processes contribute to an increase in the rate and erosive force of surface runoff (Meehan and Platts 1978; Thurow 1991). Resulting increases in soil erosion lead to a loss of stored nutrients in the soil and a decrease in the level of vegetative productivity (Thurow 1991). The degree of soil erosion associated with livestock grazing is related to slope gradient and aspect of the site being grazed, the condition of the soil, type and density of vegetation, and the accessibility of the site to livestock (Meehan and Platts 1978).

Riparian areas maintain stream structure and function through processes such as water filtration, bank stabilization, water storage, groundwater recharge, nutrient retention, regulation of light and temperature, channel shape and pattern (morphology and micro-topography), and dispersal of plants and animals (Cummins and others 1984; Gregory and others 1991; Minshall 1967, 1994; Sullivan and others 1987)." "Livestock grazing can alter the species composition of stream-side vegetation (Archer and Smeins 1991; Platts 1978; Stebbins 1981; Thurow 1991; Vollmer and Kozel 1993) and diminish vegetative productivity (Archer and Smeins 1991; Horning 1994; Meehan and Platts 1978; Platts 1978; Thurow 1991; Vollmer and Kozel 1993). Grazing alters riparian vegetation by removing deep rooting plant species and decreasing canopy cover and riparian vegetation height (Platts 1991). Grazing has been implicated in the alteration of species composition of vegetative communities and associated fire regimes (Agee 1993; Leopold 1924).

Grazing is a major nonpoint source of channel sedimentation (Dunne and Leopold 1978; MacDonald and others 1991; Meehan 1991; Platts 1991). Grazed watersheds typically have higher stream sediment levels than ungrazed watersheds (Lusby 1970; Platts 1991; Rich and others 1992; Scully and Petrosky 1991). Increased sedimentation is the result of grazing effects on soils (compaction), vegetation (elimination), hydrology (channel incision, overland flow), and bank erosion (sloughing) (Kauffman and others 1983; MacDonald and others 1991; Parsons 1965; Platts 1981a, 1981b; Rhodes and others 1994). Sediment loads that exceed natural background levels can fill pools, silt spawning gravels, decrease channel stability, modify channel morphology, and reduce survival of emerging salmon fry (Burton and others 1993; Everest and others 1987; MacDonald and others 1991; Meehan 1991; Rhodes and others 1994). In addition, runoff contaminated by livestock wastes can cause an increase in potentially harmful bacteria (for example, *Pseudomonas aeruginosa* and *Aeromonas hydrophila*) (Taylor and others 1989; Hall and Amy 1990; Thurow 1991). Compared to ungrazed sites, aquatic insect communities in stream reaches associated with grazing activities often are composed of organisms more tolerant of increased silt levels, increased levels of total alkalinity and mean conductivity, and elevated water temperatures (Rinne 1988)."

Timber harvest

"Anderson (1988), citing a 1986 report of the Montana State Water Quality Bureau, suggested that the single greatest threat to watersheds and aquatic life is timber harvest and associated road building within forests. This threat is due, in part, to the increased level of harvesting timber

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from steeper, more environmentally sensitive terrain (Anderson 1998; Platts and Megahan 1975). Accelerated surface erosion and increased levels of sedimentation can decrease after initial disturbance but may remain above natural levels for many years (Platts and Megahan 1975; Spencer 1991; Swanson 1981)." "Vulnerable watersheds generally have high slope gradients, high levels of potential soil erodibility, soils having moderate to very poor drainage, or soil moisture contents in excess of field capacity for long periods of the year (van Kesteren 1986).

Soil and site disturbance that inevitably occur during timber harvest activities are often responsible for increased rates of erosion and sedimentation (Chamberlain and others 1991; FEMAT 1993; MacDonald and others 1991; Meehan 1991; Reid 1993; Rhodes and others 1994); modification and destruction of terrestrial and aquatic habitats (FEMAT 1993; van Kesteren 1986); changes in water quality and quantity (Bjornn and Reiser 1991; Brooks and others 1992; Chamberlain and others 1991; Rhodes and others 1994); and perturbation of nutrient cycles within aquatic ecosystems (Rowe and others 1992). Physical changes affect runoff events, bank stability, sediment supply, large woody debris retention, and energy relationships involving temperature (Li and Gregory 1995). All of these changes can eventually culminate in the loss of biodiversity within a watershed (FEMAT 1993; Rowe and others 1992).

Increased delivery of sediments, especially fine sediments, is usually associated with timber harvesting and road construction (Eaglin and Hubert 1993; Frissell and Liss 1986; Havis and others 1993; Platts and Megahan 1975). As the deposition of fine sediments in salmonid spawning habitat increase, mortality of embryos, alevins, and fry rises. Erosion potential is greatly increased by reduction in vegetation, compaction of soils and disruption of natural surface and subsurface drainage patterns (Chamberlain and others 1991; Rhodes and others 1994). Generally, logged slopes contribute sediment to streams based on the amount of bare compacted soils that are exposed to rainfall and runoff. Slope steepness and proximity to channels determine the rate of sediment delivery.

Water quality (for example, water temperature, dissolved oxygen, and nutrients) can be altered by timber harvest activities (Chamberlain and others 1991). Stream temperature is affected by eliminating stream-side shading, disrupted subsurface flows, reduced stream flows, elevated sediments, and morphological shifts toward wider and shallower channels with fewer deep pools (Beschta and others 1987; Chamberlain and others 1991; Reid 1993; Rhodes and others 1994). Dissolved oxygen can be reduced by low stream flows, elevated temperatures, increased fine inorganic and organic materials that have infiltrated into stream gravels retarding intergravel flows (Bustard 1986; Chamberlain and others 1991). Nutrient concentrations may increase following logging but generally return quickly to normal levels (Chamberlain and others 1991).

Because the supply of large woody debris to stream channels is typically a function of the size and number of trees in riparian areas, it can be profoundly altered by timber harvest (Bisson and others 1987; Sedell and others 1988; Robison and Beschta 1990). Shifts in the composition and size of trees within the riparian area affect the recruitment potential and longevity of large woody debris within the stream channel. Large woody debris influences channel morphology, especially in forming pools and instream cover, retention of nutrients, and storage and buffering of sediment. Any reduction in the amount of large woody debris within streams, or within the distance equal to one site-potential tree height from the stream, can reduce instream complexity (Rainville and others 1985; Robison and Beschta 1990). Large woody debris increases the

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quality of pools, provides hiding cover, slow water refuges, shade, and deep-water areas (Rhodes and others 1994). Ralph and others (1994) found instream wood to be significantly smaller and pool depths significantly shallower in intensively logged watersheds. The size of woody debris in a logged watershed in Idaho was smaller than that found in a relatively undisturbed watershed (Overton and others 1993).

Because water is often delivered to lakes via stream channels, we can infer that effects to streams related to timber harvest and road construction may eventually be manifested within lakes." "Birch and others (1980) reported that timber harvest activities caused increases in lake sedimentation rate and lake productivity in three of four lakes studied in western Washington, accelerating the rate of change in the trophic status of each lake. Timber harvest activities and road construction, including railroad construction, increased sedimentation rates above natural levels in three lades of the Flathead Basin (Spencer 1991). Road construction appeared to be the greatest cause of disturbance resulting n enhanced fine sediment deposition in lakes downstream from the construction areas."

Roads

"Roads contribute more sediment to streams than any other land management activity (Gibbons and Salo 1973; Meehan 1991), but most of the land management activities, such as mining, timber harvest, grazing, recreation, and water diversions are dependent on roads. The majority of sediment from timber harvest activities are related to roads and road construction (Chamberlain and others 1991; Dunne and Leopold 1978; Furniss and others 1991; Megahan and others 1978; MacDonald and Ritland 1989) and associated increased erosion rates (Beschta 1978; Gardner 1979; Meehan 1991; Reid 1993; Reid and Dunne 1984; Rhodes and others 1994; Swanson and Dyrness 1975; Swanston and Swanson 1976)." "Roads can also affect water quality through applied road chemicals and toxic spills (Furniss and others 1991; Rhodes and others 1994)."

"Roads directly affect natural sediment and hydrologic regimes by altering streamflow, sediment loading, sediment transport and deposition, channel morphology, channel stability, substrate composition, stream temperatures, water quality, riparian conditions within a watershed. For example, interruption of hill-slope drainage patterns alters the timing and magnitude of peak flows and changes base stream discharge (Furniss and others 1991; Harr and others 1975) and sub-surface flows (Furniss and others 1991; Megahan 1972). Road-related mass soil movements can continue for decades after the roads have been constructed (Furniss and others 1991). Such habitat alterations can adversely affect all life-stages of fishes, including migration, spawning, incubation, emergence, and rearing (Furniss and others 1991; Henjum and others 1994; MacDonald and others 1991; Rhodes and others 1994)."

"Road/stream crossings can also be a major source of sediment to streams resulting from channel fill around culverts and subsequent road crossing failures (Furniss and others 1991). Plugged culverts and fill slope failures are frequent and often lead to catastrophic increases in stream channel sediment, especially on old abandoned or unmaintained roads (Weaver and others 1987). Unnatural channel widths, slope, and stream bed form occur upstream and downstream of stream crossings (Heede 1980), and these alterations in channel morphology may persist for long periods of time. Channelized stream sections resulting from riprapping of roads adjacent to stream channels are directly affected by sediment from side casting, snow removal, and road

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grading; such activities can trigger fill slope erosion and failures. Because improper culverts can reduce or eliminate fish passage (Belfore and Gould 1989), road crossings are a common migration barrier to fishes (Evans and Johnston 1980; Furniss and others 1991; Clancy and Reichmuth 1990)."

Mining

"Although any mining activity may have negative effects on aquatic ecosystems (according to the Pacific States Marine Fisheries Commission 1994, 14,400 kilometers of rivers and streams in the western United States have been polluted by mining), the largest impacts are generally associated with surface mining."

"Mining activities can affect aquatic systems in a number of ways: through the addition of large quantities of sediments, the addition of solutions contaminated with metals or acids, the acceleration of erosion, increased bank and streambed instability, and changes in channel formation and stability. Sediments enter streams through erosion of mine tailings (Besser and Rabeni 1987), by direct discharge of mining wastes to aquatic systems, and through movement of groundwater (Davies-Colley and others 1992). Coarse particles that enter watersheds are likely to settle relatively rapidly (Davies-Colley and others 1992), and therefore, effects on aquatic systems are greatest near mining activities. Fine inorganic particles (like clays) settle slowly and may travel great distances from the point of their introduction and therefore may have a greater effect on water bodies such as lakes further from mining activities. Fine suspended material reduces the amount of light available for benthic algae and plants, and thereby, biomass and primary production are diminished. Fine suspended materials may also reduce the quantity and quality of epilithon (substrate surface biofilm) that serves as food for benthic invertebrates. If suspended sediments damage respiratory structures of benthic invertebrates, their abundance may decline (Davies-Colley and others 1992)."

"Acidification of surface waters, a process associated with surface mining, mobilizes toxic metals naturally embedded in soils and streambeds." "Acidification of surface waters can affect organisms directly, such as salmonids which experience reduced egg viability, fry survival, growth rate, and other ills, or indirectly from toxic metals or substances which can affect growth, reproduction, behavior, and migration of salmonids and production of benthic algae (Spence and others 1995). Ecosystem responses to contaminants are dependant on the chemical, physical, biological, and geological processes at each site (Pascoe and others 1993). Depending on concentration, trace metal toxicity may reduce growth and reproduction or cause death of aquatic organisms (Leland and Kuwabara 1985). Adult stages of mollusks and fish can generally withstand higher concentrations of metals than other organisms (Leland and Kuwabara 1985), but embryonic and larval stages are quite sensitive to heavy metals (Leland and Kuwabara 1985). The combination of some metals may inhibit primary production more than any single metal alone (Wong and others 1978); therefore, when several metals are present, water quality criteria for single metals are insufficient for protecting aquatic life (Borgmann 1980)."

"Surface mining practices of dredging and placer mining have altered aquatic habitats by destroying riparian vegetation and reworking channels."

Common practice for extracting gold today involves heap leach mining, a form of open-pit mining used for low-grade ore deposits. Piles of crushed ore are sprayed with a solution of

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sodium-cyanide (NaCN) that bonds with gold particles and is deposited in pools from which the gold is recovered. Numerous, small help leach fields are located in the Basin, primarily in floodplains of rivers or streams which are susceptible to large floods, creating the potential for flood inundation of the toxic leach pools and consequent contamination of river or stream habitats."

Non-native Fish Species

"Most introductions have been made with the intent of creating or expanding fishing opportunities and were initiated in earnest as early as the late 1800's (Evermann 1893; Simpson and Wallace 1978). Stocking of mountain lakes with cultured stocks of cutthroat, brook, and rainbow trout has been extensive (Bahls 1992; Liss and others 1995; Reiman and Apperson 1989)." "A variety of species such as kokanee salmon, chinook salmon, lake trout, brown trout, Atlantic salmon, coho salmon, black bass and other centrarchids, and ictalurids were introduced in these systems to diversify angling opportunities, create trophy fisheries, and to provide forage for potential trophy species."

"Although introductions have provided increased fishing opportunities and socioeconomic benefits, they have also led to catastrophic failures in some fisheries and expanded costs to management of declining stocks (Bowles and others 1991; Gresswell 1991; Gresswell and Varley 1988; Wydoski and Bennett 1981)."

"Non-native fishes also threaten native species through hybridization and subsequent loss of the native genome through introgression." "Hybridization between brook trout and bull trout appears to be common where the species overlap (Adams 1994; Leary and others 1993; Reiman and McIntyre 1993), and elimination or displacement of bull trout can be a common outcome (Leary and others 1993).

Predation by non-native species may have an important influence on some native cyprinids and catostomids (Williams and others 1990), resident trout populations (Griffith 1988; Reiman and Apperson 1989), and on the survival of juvenile anadromous salmonids (Reiman and others 1991)." "Predation by introduced fishes is also commonly identified as a major factor in the isolation and decline of native amphibians (Bahls 1992; Bradford and others 1993; Liss and others 1995) and has important effects on local invertebrate faunas as well (Bahls 1992; Liss and others 1995)."

"Consequences of introducing non-native species are not limited to a few interacting species. Effects frequently cascade through entire ecosystems (Winter and Hughes 1995) and compromise structure and ecological function in ways that rarely can be anticipated (Li and Moyle 1981; Magnuson 1976; Moyle and others 1986)."

"There is growing recognition that biological integrity and not just species diversity (Angermeier 1994; Angermeier and Karr 1994) is an important characteristic of aquatic ecosystem health. The loss or restriction of native species and the dramatic expansion of non-native species leave few systems that are not compromised."

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Hatcheries

"Although the cultured stocks of salmonids have been frequently used to mitigate the effects of over-harvest and habitat degradation, there is substantial evidence that this practice has detrimental effects on native populations (Hindar and others 1991; Krueger and May 1991; Marnell 1986; Miller 1954). Offspring of hatchery fish spawning in the wild do not survive as will as the offspring of wild fish (Chilcote and others 1986; Leider and others 1990; Nickelson and others 1986), even if the hatchery stock was developed from wild adults (Reisenbichler and McIntyre 1977). There is unavoidable selection for traits favoring survival in the artificial conditions of egg trays, tanks, raceways, and holding ponds. Hatchery fish thus become genetically distinct from wild fish. If they stray and subsequently spawn with wild fish in natural areas, survival of the offspring is compromised (Chilcote and others 1986).

Despite lower survival, hatchery fish occupy habitat that would otherwise be used by wild fish (Miller 1954). In addition, artificially high densities of fish returning to hatcheries attract intensive fisheries that can over-harvest wild fish (Reisenbichler, in press; Wright 1981, 1993)."

"Many hatcheries located on tributaries of the Columbia River have water intakes upstream of structures designed to divert migrating fish into hatchery ponds. In order to reduce the risk of transmitting diseases to the hatchery via its water intake, adult fish are not passed upstream of the intake barrier at many sites. Protection of hatchery water supplies often prevents natural populations from accessing large tracts of historic spawning and nursery area."

Commercial and Recreational Harvest

"Angler harvest directly increases mortality and thereby influences total population abundance, size- and age-structure, and reproductive potential (Ricker 1975). Fishing may lead to substantial declines in abundance, especially in populations that are extremely vulnerable to certain types of gear." "Although high catchability may be desirable in sport fisheries, it may lead to substantial declines in abundance and changes in population structure without restrictions (Gresswell 1990; Gresswell and others 1994; Gresswell and Liss 1995).

Although management agencies have attempted to reduce or eliminate fishing as a source of mortality, incidental harvest of many sensitive native fish stocks is a problem in the Basin." "Anglers may also affect fish stocks by altering fish habitat through redd trampling and increased bank erosion. Roberts and White (1992) demonstrated that wading on trout redds can cause mortality to eggs and fry. For many years, stream reaches in some states have been closed to angling during salmon spawning season to reduce harassment of spawning fish."

"Within the past decade, many agencies have adopted new philosophies of management that prioritize restoration and management of native fish stocks and their habitats (Idaho Department of Fish and Game (IDFG) 1991) and recognize the non-consumptive values of fish (Botsford 1994; Gresswell 1994). Where habitat for native species remains suitable, fish populations have increased substantially following implementation of restrictive harvest regulations (Gresswell 1990; Varley and Gresswell 1988)." "Bull trout numbers and redds also increased in response to decreased harvest (Ratliff 1992). These examples suggest that where populations retain resilience, restoration efforts can be successful."

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Habitat Fragmentation and Simplification

"Aquatic habitat fragmentation (impassable obstructions, temperature increases, and water diversion) and simplification (channelization, removal of woody debris, channel bed sedimentation, removal of riparian vegetation, and water flow regulation) have resulted in a loss of diversity within and among native fish populations."

"Theories from population and conservation biology predict that smaller or more isolated populations have an increased risk of extirpation, and that smaller patches of habitat are likely to support less diverse communities (Boyce 1992; Gilpin and Soule 1986; MacArthur and Wilson 1967; Simberloff 1988). There is empirical evidence that these are important issues for many aquatic communities and species (Gilpin and Diamond 1981; Hanks 1991; Sjogren 1991) including fishes (Reiman and McIntyre 1995; Schlosser 1991; Sheldon 1988). At the same time species and communities that are spatially diverse face lower risks of regional extirpation in highly variable environments (den Boer 1968; Simberloff 1988). Core or source populations that are resistant to disturbance may support populations in other marginal or ephemeral habitats through dispersal (Bowers 1992; Simberloff 1988). The quality and distribution of even a few such key areas may ultimately dominate the dynamics of whole systems (Bowers 1992).

The heterogeneity of habitats for aquatic organisms, and particularly fishes, has been clearly recognized at multiple scales from microhabitat units to entire basins (Sedell and others 1990; Schlosser 1991). This spatial complexity is seen as an important factor influencing species diversity and ecosystem stability (Bowers 1992; Gresswell and others 1994; Schlosser 1991) and results in discontinuous distribution of life stages, populations, metapopulations, or subspecies and species as well. Important habitat types, such as pools or off-channel rearing areas, are discontinuous within stream reaches and influence the distributions and relative abundances of a species or life stages at that scale (Schlosser 1991). At larger watershed scales the distribution among reaches and among streams may be influenced by such things as local climate, stream temperature, stream gradients, the distribution of suitable spawning sites and gravels, and stream size (Fausch and others 1994; McIntyre and Rieman 1995; Rieman and McIntyre 1995). Spawning and rearing of bull trout and westslope and Yellowstone cutthroat trout, for example, may be restricted to smaller, headwater streams both by temperature and stream size even though subadults and adults may move widely throughout entire river basins (Gresswell 1995; McIntyre and Reiman 1995; Reiman and McIntyre 1995)."

"Fringe environments that do not support a large abundance of fishes may actually contribute much of the genetic variability to the population and may contribute in a critical way to the persistence of much larger systems (Northcote 1992; Scudder 1989). The connection among spatially diverse and temporally dynamic habitats and populations is likely to be a critical factor to persistence and integrity of aquatic communities.

Fishes, particularly salmonids, exhibit remarkable diversity of life-history strategies (Lichatowich and Mobrand 1995; Reiman and McIntyre 1993; Thorpe 1994) and important dispersal mechanisms for dealing with naturally fragmented and variable environments (Milner and Bailey 1989; Quinn 1993; Thorpe 1994). Migratory life-history forms may be a particularly important mechanism of dispersal and risk aversion in highly variable environments for species

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like bull and Yellowstone cutthroat trout (Gresswell and others 1994; Reiman and McIntyre 1993).

The loss or degradation of habitats resulting form anthropogenic activities has not occurred in a random or uniformly dispersed fashion. Often lower elevation lands are more accessible, have wider floodplain valleys, and are more easily developed, hence habitat degradation has been greater in lower watersheds or in the lower reaches of larger systems. Dams and water diversions often result in fragmented streams and rivers. As a result, watershed retaining the best remaining habitats are not well dispersed throughout the individual basins; they are often restricted to less productive headwater areas. Small streams in the headwater basins actually represent more extreme or sensitive environments with limited resilience to disturbance, increased synchrony among the populations, and relatively poor potential for dispersal throughout the entire Basin.

Because life-history stages and forms are also distributed in non-uniform or non-random patterns (Lichatowich and Mobrand 1994; Reiman and Apperson 1989; Schlosser 1991), some have been more likely to disappear than others. Within heavily managed areas, disturbance has often been dispersed among watersheds in an effort to minimize damage in any single area. If most watersheds are compromised, there are few local populations with the resilience to persist in the face of major storm or other catastrophic events that eventually test those populations. When high quality habitats are isolated in a system, the loss of migratory life histories, elimination of connecting corridors, or the poor quality of interspersed habitats that may act as "stepping stones" (Gilpin 1987) for dispersal may seriously limit the connectivity among populations. Eventually the ability of populations to rebound or support those that are lost is diminished."

"The loss of life history expression influences the connectivity and stability among populations, but it also has restricted the full potential for fish production (Lichatowich and Mobrand 1995). The challenge for aquatic ecosystem management will be the maintenance and restoration of spatially diverse, high quality habitats that minimize the risks of extinction (Frissell and others 1993; Reeves and Sedell 1992) and that provide for the full expression of potential life histories (Healey 1994; Lichatowich and Mobrand 1995)."

General Recreational Activities

"Mountain lakes, especially those in national parks and scenic forested areas, may be the most susceptible aquatic systems to the negative effects of recreation. The inherent sensitivity of a lake to pollutants influences its susceptibility to water-quality degradation (Gilliom and others 1980)." "Likelihood of pollutant-loading increases if soil, geologic, or hydrologic characteristics of a watershed favor the transport of pollutants to a lake (Gilliom and others 1980)."

"Where visitor use is high, trampling associated with foot traffic can affect vegetation along lakes and streams through direct mechanical action and indirectly through changes in soil (Liddle 1975). Resistance to trampling depends on plant life form; large and broad-leaved plants are most susceptible, and grasses generally are most resistant (Burden and Randerson 1972). Loss of vegetation from shorelines, wetlands, or steep slopes can cause erosion and pollution problems (Burden and Randerson 1972; Gilliom and others 1980)."

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"Power boats can have numerous negative effects on lake environments. Resuspension of bed sediments can occur with passage of a single boat (Garrad and Hey 1987)." "Concomitant high levels of turbidity and reduced light penetration may be a major factor in declining populations of submerged macrophytes." "Power boats are also associated with the spread of the exotic Eurasion watermilfoil (*Myriophyllum spicatum*). Because it reproduces from seeds, rhizomes, and fragmented stems, this non-native plan is easily transported between water bodies when plant matter becomes entangled on boat propellers or trailers (Reed 1977)."

"Outboard engines introduce hydrocarbon emissions to the aquatic environment, and emissions have a high phenol content that is quite toxic to aquatic organisms (Wachs and others 1992). Increased lead levels in reservoirs may be attributed to recreational boating and gasoline spills (Cairns and Palmer 1993)."

"Effects of off-road recreational vehicle use on aquatic resources are documented only for a few types of natural systems. On sand dunes and shorelines, off-road vehicles can result in significant reductions of vegetation (Anders and Leatherman 1987; Wisheu and Keddy 1991)." "Disturbance associated with off-road vehicle use can alter plant community composition or create openings in cover vegetation on shorelines (Wisheu and Keddy 1991). Partial loss of vegetation from shorelines can result in increased erosion that continues until those shorelines are devoid of vegetation (Wisheu and Keddy 1991). Because seeds tend not to be deeply buried in shoreline wetlands, they may be particularly sensitive to intense disturbance (Wisheu and Keddy 1991), and recovery of disturbed shorelines may be very slow. Use of off-road vehicles may be particularly detrimental in fragile soils or in areas where habitat for sensitive species is limited (Williams 1995). Additionally, off-road vehicle use in streams can result in destruction of redds, eggs, and young."

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Relating the ACS Objectives and Aquatic/Riparian Strategy Objectives with the Diagnostics/Pathways and Indicator

ACS Objectives of the Northwest Forest Plan

Forest Service and BLM-administered lands within the range of the northern spotted owl will be managed to:

1. Maintain and restore the distribution, diversity, and complexity of watershed and landscape-scale features to ensure protection of the aquatic systems to which species, populations and communities are uniquely adapted.

2. Maintain and restore spatial and temporal connectivity within and between watersheds. Lateral, longitudinal, and drainage network connections include floodplains, wetlands, up-slope areas, headwater tributaries, and intact refugia. These network connections must provide chemically and physically unobstructed routes to areas critical for fulfilling life history requirements of aquatic and riparian-dependant species.

3. Maintain and restore the physical integrity of the aquatic system, including shorelines, banks, and bottom configurations.

4. Maintain and restore water quality necessary to support healthy riparian, aquatic, wetland ecosystems. Water quality must remain within the range that maintains the biological, physical, and chemical integrity of the system and benefits survival, growth, reproduction, and migration of individuals composing aquatic and riparian communities.

5. Maintain and restore the sediment regime under which aquatic ecosystems evolved. Elements of the sediment regime include the timing, volume, rate, and character of sediment input, storage, and transport.

6. Maintain and restore in-stream flows sufficient to create and sustain riparian, aquatic and wetland habitats and to retain patterns of sediment, nutrient, and wood routing. The timing, magnitude, duration, and spatial distribution of peak, high, and low flows must be protected.

7. Maintain and restore the timing, variability, and duration of floodplain inundation and water table elevation in meadows and wetlands.

8. Maintain and restore the species composition and structural diversity of plant communities in riparian areas and wetlands to provide adequate summer and enter thermal regulation, nutrient filtering, appropriate rates of surface erosion, bank erosion, and channel migration and to supply amounts and distributions of coarse woody debris sufficient to sustain physical complexity and stability.

9. Maintain and restore habitat to support well-distributed populations of native plant, invertebrate, and vertebrate riparian-dependent species.

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Aquatic/Riparian Strategy Objectives in PACFISH and INFISH

The ACS for PACFISH and INFISH is written as "Riparian Goals" that describe expectations in establishing the characteristics of healthy, functioning watersheds, riparian areas, and associated fish habitats. These are interim directions. Until a long-term direction is finalized, these goals/objectives amend LRMPs and RMP in areas within the proposed bull trout listing areas but outside of that land covered by the Northwest Forest Plan.

Maintain or restore:

1. Water quality, to a degree that provides for stable and productive riparian and aquatic ecosystems;

2. Stream channel integrity, channel processes, and the sediment regime (including the elements of timing, volume, and character of sediment input and transport) under which the riparian and aquatic ecosystems developed;

3. Instream flows to support healthy riparian and aquatic habitats, the stability and effective function of stream channels, and the ability to route flood discharges;

4. Natural timing and variability of the water table elevation in meadows and wetlands;

5. Diversity and productivity of native and desired non-native plant communities in riparian zones;

6. Riparian vegetation, to:
   a. Provide an amount and distribution of large woody debris characteristic of natural aquatic and riparian ecosystems;
   b. Provide adequate summer and winter thermal regulation within the riparian and aquatic zones; and
   c. Help achieve rates of surface erosion, bank erosion, and channel migration characteristics of those under which the communities developed.

7. Riparian and aquatic habitats necessary to foster the unique genetic fish stocks that evolved within the specific geo-climatic region; and

8. Habitat to support populations of well-distributed native and desired non-native plant, vertebrate, and invertebrate populations that contribute to the viability of riparian-dependent communities.

A comparison between ACS Objectives of the Northwest Forest Plan and the diagnostics/ pathways and indicators used in the effects matrix.

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Relation of Indicators to ACS and Aquatic/Riparian Strategy Objectives

Aquatic Conservation Strategy Objectives - Northwest Forest Plan	Aquatic/Riparian Strategy Objectives - PACFISH/INFISH	Indicators
1,8,9	7,8	Subpop Char / Subpop Size
3,4,5,9	1,2,7,8	Subpop Char / Grow & Survl
1,2,4,6,7,9	1,2,3,6,7	Subpop Char / Life History Diversity & Isolation
2,6,9	3,6,7,8	Subpop Char / Persistence & Genetic Integrity
2,4,8,9	1,5,6,7	Water Quality / Temperature
4,5,6,8,9	1,2,3,4,5,6,7	Water Quality / Sediment
2,4,8,9	1,5,7,8	Water Quality / Chemical Concentration/Nutrients
2,6,9	3,7,8	Hab Access / Phys Barriers
3,5,8,9	2,6,7,8	Hab Elem / Substrate Embed
3,6,8,9	2,3,6,7	Hab Elem / L W D
3,8,9	2,6,7	Hab Elem / Pool Freq & Qual
3,5,6,9	2,3,7	Hab Elem / Large Pools
1,2,3,6,8,9	2,3,4,6,7	Hab Elem / Off-Channel Hab
1,2,9	7,8	Hab Elem / Refugia
3,8,9	3,7,8	Chan Cond & Dynamics / Wet Width/Max Depth Ratio
3,8,9	1,2,5,6,7	Chan Cond & Dynamics / Streambank Condition
1,2,3,6,7,8,9	3,4,5,6,7	Chan Cond & Dynamics / Floodplain Connectivity
5,6,7	2,3,6	Flow/Hydrology / Change in Peak/Base Flow
2,5,6,7	2,3	Flow/Hydrology / Increase in Drainage Network
1,3,5	2,4,8	Watershed Conditions / Road Density & Location
1,5	2,6,8	Watershed Conditions / Disturbance History
1,2,3,4,5,8,9	1,2,4,5,6,7,8	Watershed Conditions / RCA, RHCA, Riparian Reserves

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APPENDIX E

SAMPLE

IMPLEMENTING AGREEMENT

for the

[*APPLICANT*]

for

[*PROJECT OR SITE NAME*]

[*DATE*]

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1.0 Parties

The parties to this Implementing Agreement are [*permit applicant's name*]; the United States Fish and Wildlife Service (USFWS); and the National Marine Fisheries Service (NMFS). In this agreement, USFWS and NMFS are collectively referred to as the "Services."

2.0 Recitals and Purposes

2.1 Recitals. The parties have entered into this agreement in consideration of the following facts:

(a) [*Site name*] has been determined to provide, or potentially provide, habitat for the following listed species: *[name all federally-listed species];*

(b) *[Site name]* has also been determined to provide, or potentially provide, habitat for the following unlisted species: *[name all other species covered by the HCP, such as federal proposed or candidate species, state listed species, or other unlisted species]*; and

(c) Permittee has developed a series of measures, described in the habitat conservation plan (HCP), to minimize and mitigate to the maximum extent practicable the effects of take of covered species incidental to Permittee's covered activities.

2.2 Purposes. The purposes of this agreement are:

(a) To ensure implementation of each of the terms of the HCP;

(b) To describe remedies and recourse should any party fail to perform its obligations as set forth in this agreement; and,

(c) To provide assurances to Permittee that as long as the terms of the HCP, the permit, and this agreement are performed, no additional mitigation will be required of Permittee, with respect to covered species, except as provided for in this agreement or required by law.

3.0 Definitions

The following terms as used in this agreement will have the meanings set forth below:

3.1 Terms defined in Endangered Species Act. Terms used in this agreement and specifically defined in the Endangered Species Act (ESA) or in regulations adopted by the Services under the ESA have the same meaning as in the ESA and those implementing regulations, unless this agreement expressly provides otherwise.

3.2 "Changed circumstances" means changes in circumstances affecting a Covered Species or the geographic area covered by the HCP that can reasonably be

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anticipated by the permittee and that can reasonably be planned for in the HCP (e.g. the listing of a new species, or a fire or other natural catastrophic event in areas prone to such event.) Changed circumstances and the planned responses to those circumstances are described in Section XX of the HCP. Changed circumstances are not Unforeseen Circumstances.

3.3 **"Covered activities"** means certain activities carried out by Permittee on covered lands that may result in incidental take of covered species. Covered activities means the following activities related to timber management, provided that these activities are otherwise lawful: [*site preparation; tree planting; harvesting and yarding of timber; construction, maintenance and use of logging roads and landings on covered lands; and quarrying stone and gravel for use in those roads and landings*]. *[The foregoing are examples of covered activities. The actual list will depend on what activities have been adequately analyzed in the HCP.]*

3.4 **"Covered lands"** means the lands upon which the permit authorizes incidental take of covered species and the lands to which the HCP's conservation and mitigation measures apply. These lands are described in Appendix [X].

3.5 **"Covered species"** means the following species, each of which the HCP addresses in a manner sufficient to meet all of the criteria for issuing an incidental take permit under ESA § 10(a)(1)(B) [*identify all listed and unlisted species addressed here or in an Appendix to the IA*].

3.6 **"HCP"** means the habitat conservation plan prepared by Permittee for [*project name/site*].

3.7 **"Listed species"** means a species (including a subspecies, or a distinct population segment of a vertebrate species) that is listed as endangered or threatened under the ESA.

3.8 **"Permit"** means the incidental take permit issued by the Services to Permittee pursuant to Section 10(a)(1)(B) of the ESA for take incidental to covered activities on [*project name/site*], as it may be amended from time to time.

3.9 **"Permittee"** means [*applicant*].

3.10 **"Take"** means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect any listed or unlisted covered species. Harm means an act that actually kills or injures a member of a covered species, including an act that causes significant habitat modification or degradation where it actually kills or injures a member of a covered species by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering.

3.11 **"Unforeseen circumstances"** means changes in circumstances affecting a species or geographic area covered by a conservation plan that could not reasonably have been anticipated by plan developers and the Services at the time of the

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conservation plan's negotiation and development, and that result in a substantial and adverse change in the status of the covered species.

3.12 **"Unlisted species"** means a species (including a subspecies, or a distinct population segment of a vertebrate species) that is not listed as endangered or threatened under the ESA.

4.0 Obligations of the Parties

4.1 **Obligations of Permittee.** Permittee will fully and faithfully perform all obligations assigned to it under this agreement, the permit, and the HCP.

4.2 **Obligations of the Services.** Upon execution of this agreement by all parties, and satisfaction of all other applicable legal requirements, the Services will issue Permittee a permit under Section 10(a)(1)(B) of the ESA, authorizing incidental take by Permittee of each listed covered species resulting from covered activities on covered lands.

4.2.1 Permit coverage. The permit will identify all covered species. The permit will take effect for listed covered species at the time the permit is issued. Subject to compliance with all other terms of this agreement, the permit will take effect for an unlisted covered species upon the listing of such species.

4.2.2 "No surprises" assurances. Provided that Permittee has complied with its obligations under the HCP, this agreement, and the permit, the Services can require Permittee to provide mitigation beyond that provided for in the HCP only under unforeseen circumstances, and only in accordance with the "no surprises" regulations at 50 C.F.R. §§ 17.22(b)(5), 17.32(b)(5), 222.22(g).

Interim obligations upon a finding of unforeseen circumstances. If the Services make a finding of unforeseen circumstances, during the period necessary to determine the nature and location of additional or modified mitigation, Permittee will avoid contributing to appreciably reducing the likelihood of the survival and recovery of the affected species.

5.0 Incorporation of HCP

The HCP and each of its provisions are intended to be, and by this reference are, incorporated herein. In the event of any direct contradiction between the terms of this agreement and the HCP, the terms of this agreement will control. In all other cases, the terms of this agreement and the terms of the HCP will be interpreted to be supplementary to each other.

6.0 Term

6.1 **Initial Term.** This agreement and the HCP will become effective on the date that the Services issue the permit. This agreement, the HCP, and the permit will remain in effect for a period of [x] years from issuance of the original permit, except as provided below.

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6.2 Permit suspension or revocation. The Services may suspend or revoke the permit for cause in accordance with the laws and regulations in force at the time of such suspension or revocation. (See 5 U.S.C. § 558; 50 C.F.R. §§ 13.27 - 13.29, 222.27; 15 C.F.R. Part 904.) Such suspension or revocation may apply to the entire permit, or only to specified covered species, covered lands, or covered activities. In the event of suspension or revocation, Permittee's obligations under this agreement and the HCP will continue until the Services determine that all take of covered species that occurred under the permit has been fully mitigated in accordance with the HCP.

6.3 Relinquishment of the Permit

6.3.1 Generally. Permittee may relinquish the permit in accordance with the regulations of the Services in force on the date of such relinquishment. (These regulations are currently codified at 50 C.F.R. §§ 13.26, 220.31.) Notwithstanding relinquishment of the permit, Permittee will be required to provide post-relinquishment mitigation for any take of covered species that the Services determine will not have been fully mitigated under the HCP by the time of relinquishment. Permittee's obligations under the HCP and this agreement will continue until the Services notify Permittee that no post-relinquishment mitigation is required, or that all post-relinquishment mitigation required by the Services is completed. Unless the parties agree otherwise, the Services may not require more mitigation than would have been provided if Permittee had carried out the full term of the HCP.

6.3.2 Procedure for relinquishment. If Permittee elects to relinquish the permit before expiration of the full term of the HCP, Permittee will provide notice to the Services at least 120 days prior to the planned relinquishment. Such notice will include a status report detailing the nature and amount of take of all covered species, the mitigation provided for those species prior to relinquishment, and the status of Permittee's compliance with all other terms of the HCP. Within 120 days after receiving a notice and status report meeting the requirements of this paragraph, the Services will give notice to Permittee stating whether any post-relinquishment mitigation is required and, if so, the amount and terms of such mitigation, and the basis for the Services' conclusions. If the Services determine that no post-relinquishment mitigation is required, all obligations assumed by the parties under this agreement will terminate upon the Services' issuance of such notice. If Permittee disagrees with the Services' determination, the parties may choose to use the dispute resolution procedures described in Section 13 of this agreement. Permittee will continue to carry out its obligations under the HCP until any such dispute is resolved. If the parties are unable to agree, the Services will have the final authority to determine whether Permittee is required to provide post-relinquishment mitigation.

6.4 Treatment of unlisted species. For purposes of paragraph 6.2 and 6.3, unlisted covered species will be treated as though they were listed species in determining the amount of take and the mitigation required.

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6.5 Extension of the permit. Upon agreement of the parties and compliance with all applicable laws, the permit may be extended beyond its initial term under regulations of the Services in force on the date of such extension. If Permittee desires to extend the permit, it will so notify the Services at least 180 days before the then-current term is scheduled to expire. Extension of the permit constitutes extension of the HCP and this agreement for the same amount of time, subject to any modifications that the Services may require at the time of extension.

7.0 Funding

Permittee warrants that it has, and will expend, such funds as may be necessary to fulfill its obligations under the HCP. Permittee will promptly notify the Services of any material change in Permittee's financial ability to fulfill its obligations. In addition to providing any such notice, Permittee will provide the Services with a copy of its annual report each year of the permit, or with such other reasonably available financial information that the parties agree will provide adequate evidence of Permittee's ability to fulfill its obligations.

8.0 Monitoring and Reporting

8.1 Planned periodic reports. As described in the HCP, Permittee will submit periodic reports describing its activities and results of the monitoring program provided for in the HCP.

8.2 Other reports. Permittee will provide, within 30 days of being requested by the Services, any additional information in its possession or control related to implementation of the HCP that is requested by the Services for the purpose of assessing whether the terms and conditions of the permit and the HCP, including the HCP's adaptive management plan, are being fully implemented.

8.3 Certification of reports. All reports will include the following certification from a responsible company official who supervised or directed preparation of the report:

I certify that, to the best of my knowledge, after appropriate inquiries of all relevant persons involved in the preparation of this report, the information submitted is true, accurate, and complete.

8.4 Monitoring by Services. The Services may conduct inspections and monitoring in connection with the permit in accordance with their regulations. (See 50 C.F.R. §§ 13.47, 220.47.)

9.0 Changed Circumstances

[Note: HCPs should address all reasonably foreseeable changed circumstance, including natural catastrophes that normally occur in the area.]

9.1 Permittee-initiated response to changed circumstances. Permittee will give notice to the Services within seven days after learning that any of the changed

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circumstances listed in Section __ of the HCP has occurred. As soon as practicable thereafter, but no later than 30 days after learning of the changed circumstances, Permittee will modify its activities in the manner described in Section _ of the HCP, to the extent necessary to mitigate the effects of the changed circumstances on covered species, and will report to the Services on its actions. Permittee will make such modifications without awaiting notice from the Services.

9.2 Service-initiated response to changed circumstances. If the Services determine that changed circumstances have occurred and that Permittee has not responded in accordance with Section _ of the HCP, the Services will so notify Permittee and will direct Permittee to make the required changes. Within 30 days after receiving such notice, Permittee will make the required changes and report to the Services on its actions. Such changes are provided for in the HCP, and hence do not constitute unforeseen circumstances or require amendment of the permit or HCP.

9.3 Listing of species that are not covered species. In the event that a non-covered species that may be affected by covered activities becomes listed under the ESA, the Services will work with Permittee to identify those measures necessary to avoid take of, jeopardy to, or adverse modification of the critical habitat of, the species as a result of covered activities. Permittee will implement these measures until the permit is amended to include such species, or until the Services notify Permittee that such measures are no longer needed to avoid jeopardy to, take of, or adverse modification of the critical habitat of, the non-covered species.

10.0 Adaptive Management

[Note: HCPs should include adaptive management provisions whenever there are significant uncertainties or data gaps concerning the effectiveness of conservation strategies. The terms of this section will vary depending on the adaptive management provisions set forth in the HCP, and on whether the HCP has set specific biological objectives.]

10.1 Permittee-initiated adaptive management. Permittee will implement the adaptive management provisions in Section _ of the HCP, when changes in management practices are necessary to achieve the HCP's biological objectives, or to respond to monitoring results or new scientific information. Permittee will make such changes without awaiting notice from the Services, and will report to the Services on any actions taken pursuant to this section.

10.2 Service-initiated adaptive management. If the Services determine that one or more of the adaptive management provisions in the HCP have been triggered and that Permittee has not changed its management practices in accordance with Section _ of the HCP, the Services will so notify Permittee and will direct Permittee to make the required changes. Within 30 days after receiving such notice, Permittee will make the required changes and report to the Services on its actions. Such changes are provided for in the HCP, and hence do not constitute

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unforeseen circumstances or require amendment of the permit or HCP, except as provided in this section.

10.3 Reductions in mitigation. Permittee will not implement adaptive management changes that may result in less mitigation than provided for covered species under the original terms of the HCP, unless the Services first provide written approval. Permittee may propose any such adaptive management changes by notice to the Services, specifying the adaptive management modifications proposed, the basis for them, including supporting data, and the anticipated effects on covered species, and other environmental impacts. Within 120 days of receiving such a notice, the Services will either approve the proposed adaptive management changes, approve them as modified by the Services, or notify Permittee that the proposed changes constitute permit amendments that must be reviewed under Section 12.2 of this agreement.

10.4 No increase in take. This section does not authorize any modifications that would result in an increase in the amount and nature of take, or increase the impacts of take, of covered species beyond that analyzed under the original HCP and any amendments thereto. Any such modification must be reviewed as a permit amendment under Section 12.2 of this agreement.

11.0 Land Transactions

11.1 Acquisition of land by Permittee. Nothing in this agreement, the HCP, or the permit limits Permittee's right to acquire additional lands. Any lands that may be acquired will not be covered by the permit except upon amendment of the permit as provided in section 12.2 of this agreement.

11.2 Disposal of land by Permittee. Permittee's transfer of ownership or control of covered land will require prior approval by the Services and an amendment of the permit in accordance with section 12.2 of this agreement, except that transfers of covered lands may be processed as minor modifications in accordance with section 12.1 of this agreement if:

(a) The land will be transferred to an agency of the federal government and, prior to transfer, the Services have determined that transfer will not compromise the effectiveness of the HCP based on adequate commitments by that agency regarding management of such land;

(b) The land will be transferred to a non-federal entity that has entered into an agreement acceptable to the Services (e.g., an easement held by the state fish and wildlife agency with the Services as third-party beneficiaries) to ensure that the lands will be managed in such a manner and for such duration so as not to compromise the effectiveness of the HCP;

(c) The land will be transferred to a non-federal entity that, prior to completion of the land transaction, has agreed to be bound by the HCP as it applies to the transferred land and has obtained an incidental take permit following

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normal permit procedures covering all species then covered by the permittee's permit; or

(d) The Services determine that the amount of land to be transferred does not exceed ___ acres and will not have a material impact on the ability of the Permittee to comply with the requirements of the HCP and the terms and conditions of the Permit. [*Include other appropriate restrictions such as a cap on the cumulative amount of acres which may be sold or restrictions on location (e.g. non-core land)*.]

12.0 Modifications and Amendments

12.1 Minor modifications.

(a) Any party may propose minor modifications to the HCP or this agreement by providing notice to all other parties. Such notice shall include a statement of the reason for the proposed modification and an analysis of its environmental effects, including its effects on operations under the HCP and on covered species. The parties will use best efforts to respond to proposed modifications within 60 days of receipt of such notice. Proposed modifications will become effective upon all other parties' written approval. If, for any reason, a receiving party objects to a proposed modification, it must be processed as an amendment of the permit in accordance with subsection 12.2 of this section. The Services will not propose or approve minor modifications to the HCP or this agreement if the Services determine that such modifications would result in operations under the HCP that are significantly different from those analyzed in connection with the original HCP, adverse effects on the environment that are new or significantly different from those analyzed in connection with the original HCP, or additional take not analyzed in connection with the original HCP.

(b) Minor modifications to the HCP and IA processed pursuant to this subsection may include but are not limited to the following:

(1) corrections of typographic, grammatical, and similar editing errors that do not change the intended meaning;

(2) correction of any maps or exhibits to correct errors in mapping or to reflect previously approved changes in the permit or HCP;

(3) minor changes to survey, monitoring or reporting protocols; and

(4) [*Other types of modifications that are minor in relation to the HCP, that the Services have analyzed and agreed to, and on which the public has had an opportunity to comment.*]

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(c) Any other modifications to the HCP or IA will be processed as amendments of the permit in accordance with subsection 12.2 of this section.

12.2 Amendment of the Permit. The permit may be amended in accordance with all applicable legal requirements, including but not limited to the ESA, the National Environmental Policy Act, and the Services' permit regulations. The party proposing the amendment shall provide a statement of the **reasons** for the amendment and an analysis of its environmental effects, including its effects on operations under the HCP and on covered species.

13.0 Remedies, Enforcement, And Dispute Resolution

13.1 In general. Except as set forth below, each party shall have all remedies otherwise available to enforce the terms of this agreement, the permit, and the HCP.

13.2 No monetary damages. No party shall be liable in damages to any other party or other person for any breach of this agreement, any performance or failure to perform a mandatory or discretionary obligation imposed by this agreement or any other cause of action arising from this agreement.

13.3 Injunctive and temporary relief. The parties acknowledge that the covered species are unique and that their loss as species would result in irreparable damage to the environment, and that therefore injunctive and temporary relief may be appropriate to ensure compliance with the terms of this agreement.

13.4 Enforcement authority of the United States. Nothing contained in this agreement is intended to limit the authority of the United States government to seek civil or criminal penalties or otherwise fulfill its enforcement responsibilities under the ESA or other applicable law.

13.5 Dispute resolution. The parties recognize that disputes concerning implementation of, compliance with, or termination of this agreement, the HCP, and the permit may arise from time to time. The parties agree to work together in good faith to resolve such disputes, using the informal dispute resolution procedures set forth in this section, or such other procedures upon which the parties may later agree. However, if at any time any party determines that circumstances so warrant, it may seek any available remedy without waiting to complete informal dispute resolution.

13.5.1 Informal dispute resolution process. Unless the parties agree upon another dispute resolution process, or unless an aggrieved party has initiated administrative proceedings or suit in federal court as provided in this section, the parties may use the following process to attempt to resolve disputes:

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(a) The aggrieved party will notify the other parties of the provision that may have been violated, the basis for contending that a violation has occurred, and the remedies it proposes to correct the alleged violation.

(b) The party alleged to be in violation will have 30 days, or such other time as may be agreed, to respond. During this time it may seek clarification of the information provided in the initial notice. The aggrieved party will use its best efforts to provide any information then available to it that may be responsive to such inquiries.

(c) Within 30 days after such response was provided or was due, representatives of the parties having authority to resolve the dispute will meet and negotiate in good faith toward a solution satisfactory to all parties, or will establish a specific process and timetable to seek such a solution.

(d) If any issues cannot be resolved through such negotiations, the parties will consider non-binding mediation and other alternative dispute resolution processes and, if a dispute resolution process is agreed upon, will make good faith efforts to resolve all remaining issues through that process.

14.0 Miscellaneous Provisions

14.1 No partnership. Neither this agreement nor the HCP shall make or be deemed to make any party to this agreement the agent for or the partner of any other party.

14.2 Notices. Any notice permitted or required by this agreement shall be in writing, delivered personally to the persons listed below, or shall be deemed given five (5) days after deposit in the United States mail, certified and postage prepaid, return receipt requested and addressed as follows, or at such other address as any party may from time to time specify to the other parties in writing. Notices may be delivered by facsimile or other electronic means, provided that they are also delivered personally or by certified mail. Notices shall be transmitted so that they are received within the specified deadlines.

Assistant Regional Director
United States Fish and Wildlife Service
911 N.E. 11th Ave.
Portland, Oregon 97232-4181
Telephone: 503-231-6159
Telefax: 503-231-2019

Regional Administrator
National Marine Fisheries Service
7600 Sand Point Way N.E.
Seattle, Washington 98115-0070
Telephone: 206-526-6150
Telefax: 206-526-6426

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[Permittee Name]
[Permittee Address]
Telephone:
Telefax:

14.3 Entire agreement. This agreement, together with the HCP and the permit, constitutes the entire agreement among the parties. It supersedes any and all other agreements, either oral or in writing, among the parties with respect to the subject matter hereof and contains all of the covenants and agreements among them with respect to said matters, and each party acknowledges that no representation, inducement, promise or agreement, oral or otherwise, has been made by any other party or anyone acting on behalf of any other party that is not embodied herein.

14.4 Elected officials not to benefit. No member of or delegate to Congress shall be entitled to any share or part of this agreement, or to any benefit that may arise from it.

14.5 Availability of funds. Implementation of this agreement and the HCP by the Services is subject to the requirements of the Anti-Deficiency Act and the availability of appropriated funds. Nothing in this agreement will be construed by the parties to require the obligation, appropriation, or expenditure of any money from the U.S. Treasury. The parties acknowledge that the Services will not be required under this agreement to expend any federal agency's appropriated funds unless and until an authorized official of that agency affirmatively acts to commit to such expenditures as evidenced in writing.

14.6 Duplicate originals. This agreement may be executed in any number of duplicate originals. A complete original of this agreement shall be maintained in the official records of each of the parties hereto.

14.7 No third-party beneficiaries. Without limiting the applicability of rights granted to the public pursuant to the ESA or other federal law, this agreement shall not create any right or interest in the public, or any member thereof, as a third-party beneficiary hereof, nor shall it authorize anyone not a party to this agreement to maintain a suit for personal injuries or damages pursuant to the provisions of this agreement. The duties, obligations, and responsibilities of the parties to this agreement with respect to third parties shall remain as imposed under existing law.

14.8 Relationship to the ESA and other authorities. The terms of this agreement shall be governed by and construed in accordance with the ESA and applicable federal law. In particular, nothing in this agreement is intended to limit the authority of the Services to seek penalties or otherwise fulfill their responsibilities under the ESA. Moreover, nothing in this agreement is intended to limit or diminish the legal obligations and responsibilities of the Services as agencies of the federal government. Nothing in this agreement will limit the right or obligation of any federal agency to engage in consultation required under

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Section 7 of the ESA or other federal law; however, it is intended that the rights and obligations of Permittee under the HCP and this agreement will be considered in any consultation affecting Permittee's use of the covered lands.

14.9 References to regulations. Any reference in this agreement, the HCP, or the permit to any regulation or rule of the Services shall be deemed to be a reference to such regulation or rule in existence at the time an action is taken.

14.10 Applicable laws. All activities undertaken pursuant to this agreement, the HCP, or the permit must be in compliance with all applicable state and federal laws and regulations.

14.11 Successors and assigns. This agreement and each of its covenants and conditions shall be binding on and shall inure to the benefit of the parties and their respective successors and assigns. Assignment or other transfer of the permit shall be governed by the Services' regulations; under the regulations in force on the effective date of this agreement, a permit issued under ESA Section 10(a) may not be assigned or otherwise transferred.

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IN WITNESS WHEREOF, THE PARTIES HERETO have executed this Implementing Agreement to be in effect as of the date that the Services issue the permit.

BY _____ Date _____
Regional Director
United States Fish and Wildlife Service
Portland, Oregon

BY _____ Date _____
Regional Administrator
National Marine Fisheries Service
Seattle, Washington

BY _____ Date _____
[Name], President [Director, etc.]
[Company, Organization, Agency]

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