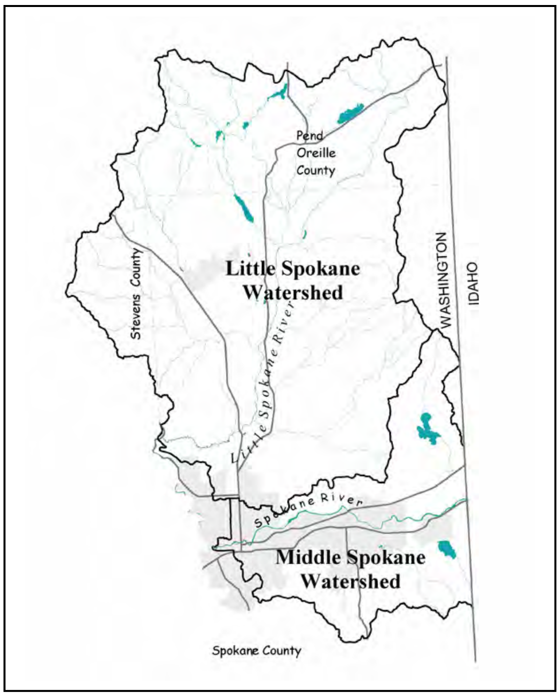
Watershed Management Plan

Water Resource Inventory Area 55 - Little Spokane River

&

Water Resource Inventory Area 57 - Middle Spokane River



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Little Spokane River and Middle Spokane River Planning Unit

Lead Agency

Spokane County

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City of Spokane
Spokane County
Pend Oreille County
Stevens County
Vera Water and Power
Whitworth Water District

Planning Unit Members and Staff
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CHAPTER 1 INTRODUCTION AND BACKGROUND

In 1998, the Washington State Legislature established the Washington State Watershed Planning Act (WPA) to address water quantity, quality and habitat issues for individual surface water basins in the state. Codified under Chapter 90.82 RCW, the WPA was designed to allow people that live, work and recreate within a watershed to collaborate on how they want water within their watershed to be managed for the future. The WPA signifies the state's commitment to provide for both a growing population and economy, and for the integrity of the natural watershed system.

Watershed planning in the Little Spokane River and Middle Spokane River basins was started by a group of Initiating Governments including the City of Spokane, Spokane County, Stevens County, Pend Oreille County, Whitworth Water District, and Vera Water and Power. The Spokane Tribe was invited but elected to not participate. The Initiating Governments formed one Planning Unit that voluntarily led the watershed planning effort. The objectives of this watershed planning effort were to:

Gather Information

While a great deal of water resource information existed for the watersheds, the information was unconsolidated and uncoordinated. This planning effort made it possible to consolidate substantial amounts of the data, identify data gaps and, in some cases, generate new data or approaches.

Address Water Resource Issues

Through the planning process, water resource issues were identified and prioritized. This allowed the Planning Unit of represented agencies, organizations, and entities to develop solutions and make recommendations for issues of the highest priority.

Provide Local Management of Water Resources in WRIAs 55/57

A critical component of this process was the fact that the Planning Unit was able to identify, address and make recommendations from a *local* perspective, thereby creating a plan that truly represents WRIA 55/57 interests, concerns and solutions.

Coordinate and Consolidate Water Management Practices

The recommendations include several action items that will result in better WRIA 55/57 Watershed planning and restoration efforts. The Planning Unit focused on the organizational and management practices that will best implement the ideas put forth in this plan.

Elements of Watershed Planning

The WPA identifies four planning elements that may be addressed in a watershed plan: water quantity, water quality, habitat, and instream flows.

The water quantity component is required, while the other elements are optional. The water quantity component of a watershed plan addresses water supply and use in a watershed, and how to develop strategies for future use, including an evaluation of storage options (Chapter 90.82.070 RCW). Watershed plans must address the water quantity component with strategies that will supply adequate instream water for fish and out-of-stream water for future uses and/or population growth. The WPA specifies what types of information must be gathered and what strategies must be employed.

The water quality component addresses water quality in a watershed by synthesizing current available data. Local and watershed-wide approaches are then developed for monitoring and Total Maximum Daily Load (TMDL) implementation, where necessary.

The habitat component provides that the watershed plan is developed in a way that fish habitat is protected and enhanced. This component "must rely on existing laws, rules, or ordinances created for the purpose of protecting, restoring, or enhancing fish habitat" (Chapter 90.82.100 RCW).

The instream flow component of a watershed plan is designed to recommend minimum instream flows for streams within a watershed. Instream flows are defined as scientifically based, surface water flows set by administrative rule to ensure adequate water for fish and other instream values.

The Watershed Planning Plan for WRIA 55/57 addresses the water quantity and instream flow components.

Phases of Watershed Planning

Watershed planning conducted under the WPA may be initiated for a WRIA or group of WRIAs only with the unanimous consent of the Initiating Governments within the watershed. The Initiating Governments include all counties within the watershed, the largest city or town, and the largest water utility. All tribes with reservation lands within the watershed should be invited to participate as initiating governments.

<u>Phase 1: Organization and Development of a Phase II Scope of Work</u>

During this phase, the Initiating Governments appoint a lead agency for the planning process, decide upon the elements to be covered in the planning process, and organize a Planning Unit, comprised of stakeholders within the watershed. Spokane County was designated the Lead Agency for the combined WRIAs 55 and 57.

<u>Phase 2: Technical Assessment</u>

A Technical Assessment is conducted on the watershed to assess its current physical state. The Technical Assessment must include the following minimum requirements:

- Estimate of surface and groundwater present and available given seasonal fluctuations and other variations.

- Estimate of water represented by the water rights claims registry, water use permits, certificated rights, existing minimum instream flow rules, federally-reserved rights and any other rights to water.

- Estimate of surface and groundwater use and predicted future needs.

- Identification of aquifers that recharge surface water and surface areas that recharge aquifers.

- Estimate of the surface and groundwater available for future appropriation, taking into account adopted minimum instream flows, including the data needed to evaluate flows necessary for fish.

Phase 3: Watershed Management Plan Development

Phase 3 consists of writing the Watershed Management Plan. This is accomplished by a review of Phase 2 technical information, research of additional necessary data, and development of recommendations by the Planning Unit for short-term and long-term actions and strategies to address current and future water needs within the watershed.

Phase 4: Implementation

After completion of the planning process, implementation of the plan begins. Funding from the Washington State Department of Ecology (Ecology) is available over a period of five years to assist with the implementation of a plan.

Watershed Management Plan Approval Process

The Planning Unit must approve the Watershed Management Plan either by consensus of all its members or by consensus among members representing units of government with a majority vote of the nongovernmental members. The approved Watershed Management Plan is then submitted to the county/counties in the watershed. The legislative authority of each county in the watershed is required to hold at least one public hearing on the plan. Following the individual county public hearings, the counties are then required to convene in a joint session to consider the plan. At the joint session (or in the case of only one county, at the county public hearing), the county legislative authorities can either approve or reject the plan, but may not amend it. However, they may reject and recommend revisions to the Planning Unit for consideration. In such a case, the county review process would begin again following Planning Unit revision of the Watershed Plan. The process ends if the county legislative authorities reject the plan twice.

Obligations and Expectations

When the Planning Unit and participating state agencies approve the Watershed Management Plan, the Department of Ecology is obligated to adopt by rule, or through an agreement, the Watershed Management Plan strategies. Ecology is also required to track and give priority to making water rights decisions when there is sufficient information available, per the recommendations agreed to in the Watershed Management Plan. The following sections from the 2003 update of Chapter 90.82 RCW provide details and directives to agencies and organizations about plan obligations and expectations:

- *RCW 90.82.130(3)(a) For agencies of state government, the agencies shall adopt by rule the obligations of both state and county governments and rules implementing the state obligations, or with the consent of the Planning Unit, may adopt policies, procedures, or agreements related to the obligations or implementation of the obligations in addition to or in lieu of rules. The obligations on state agencies are binding upon adoption of the obligations, and the agencies shall take other actions to fulfill their obligations as soon as possible, and should annually review implementation needs with respect to budget and staffing;*

- RCW 90.82.130(3)*(b) For the counties, the obligations are binding on the counties and the counties shall adopt any necessary implementing ordinances and take other actions to fulfill their obligations as soon as possible, and should annually review implementation needs with respect to budget and staffing; .*

- *RCW 90.82.130(3)(c) For an organization voluntarily accepting an obligation, the organization must adopt policies, procedures, agreements, and rules of ordinances to implement the plan, and should annually review implementation needs with respect to budget and staffing*

- *RCW 90.82.130(4) After a plan is adopted, the Department (Ecology) will use the plan as a framework for making future water resource decisions for the planned watershed. Additionally, Ecology will rely upon the plan as a primary consideration in determining the public interest related to such decisions.*

WRIA 55/57 Approach and Organization

In WRIA 55/57, Spokane County, Pend Oreille County, Stevens County, City of Spokane, Vera Water and Power, and Whitworth Water District assumed the role of Initiating Governments. Although no tribal reservation land is in the watershed, the Spokane Tribe was invited, but did not participate. Spokane County agreed to serve as the lead agency for the project.

On behalf of the Initiating Governments, Spokane County applied for and received a planning grant from Ecology in June 1998. The grant application stated that the planning Unit "is designed to have equal representation, to the maximum extent possible, for all major interested parties in the watershed." Once the grant was received, the Little Spokane and Middle Spokane River Watershed Management Plan project began in 1999.

To guide the planning process, the Initiating Governments developed a Memorandum of Agreement (MOA). The MOA (Appendix A) identified the goal and scope of the plan, possible interests to include on the WRIA 55/57 Planning Unit, the project objectives and an outline of the planning process. For WRIA 55/57, the Initiating Governments decided to address water quantity and the optional instream flow components.

The WPA envisions broad public, private and government involvement in the planning process. To accomplish this, requests were circulated to agencies, groups and individuals to serve on the Planning Unit. Representation varied slightly over the course of the project, but generally included twenty or more interests (Appendix B).

The Planning Unit met on a monthly basis for over four years, with more frequent meetings held during the final six months of the project. Announcements and notes for each meeting were distributed to Planning Unit members and other interested parties and posted on the Spokane County Watershed website (spokanewatershed.org). Initial work conducted by the Planning Unit included the adoption of a MOA, the preparation of policies and issues for the Technical Assessment and Watershed Management Plan. The Planning Unit used a consensus process to arrive at most decisions. (Please see Appendix C for a complete list of Planning Unit Operating Procedures.)

The preliminary draft (Draft 01) of the Watershed Management Plan for WRIA 55 and 57 was completed in early September 2004. Notification was made to the Planning Unit and other stakeholders, and the preliminary draft Plan was posted on the watershed planning website (www.spokanewatershed.org). Public meetings were held on September 14 and 15 in Spokane and Colbert, respectively, to present the preliminary draft Plan and receive comments from the general public. Comments on the preliminary draft Plan were received until October 14 2004. The complete comments are included as Appendix D.

In order to respond to the specific comments received, the Planning Unit prepared a Responsiveness Summary, which is attached as Appendix E. For organizational purposes, and to assist the WRIA 55/57

Planning Unit in developing a uniform set of comprehensive, non-repetitive responses, the comments were sorted by issue.

The primary issues addressed in the Responsiveness Summary include: Conservation; Conservation, Reclamation and Reuse; Growth; Water Quality; Logging and Reforestation; Instream Flows on Spokane River, including reference locations, Water Quality, and Aesthetics; Recharge and Base Flow Augmentation; Eloika Lake issues; and other issues related to decision making process, coordination with other regional water resource issues, and public process.

The second draft of the WRIA 55/57 Watershed Management Plan (Draft 02, February 2005) was prepared to address specific public comments. These comments and the Planning Unit's responses to them are in Appendix D and E, respectively.

This final draft (Draft 03, June 2005) is based on a final review and revisions by the Planning Unit members. Comments received from Planning Unit members are included in Appendix F. The WRIA 55/57 Watershed Management Plan is intended to be a consensus-based living document, which, when adopted, will be reviewed and amended on a regular basis. Also, as the WRIA 54 Watershed Plan is developed and adopted, then this plan may be revised accordingly.

WRIA 55/57 Planning Unit Policy Statements

To guide the development of the Watershed Management Plan, the WRIA 55/57 Planning Unit created twenty-five Policy Statements for the following eight (8) major water resource areas: Water Conservation, Reclamation and Reuse, Instream Flow Needs for the Middle Spokane Watershed, Instream Flow Needs for the Little Spokane River, Domestic Exempt Wells, Water Rights and Claims, Strategies for Base Flow Augmentation, Strategies for Ground Water Recharge Enhancement, and Approaches to Plan Implementation.

The WRIA 55/57 Planning Unit developed ninety-seven recommendations to implement the twenty-five Policy Statements. The Policy Statements are listed below in the order they appear in Chapter 4 of this document.

1) Support actions to reduce per capita water consumption.
2) Support education programs which foster public acceptance of water conservation, reuse and reclamation.
3) Support actions that result in the increased use of reclaimed and reused water.
4) Assure that instream flows for the Middle Spokane River meet the needs of rainbow trout and other associated aquatic biota.
5) Manage flow in the Middle Spokane River to provide for aesthetic and recreational use.
6) Manage flow in the Middle Spokane River to maintain water quality adequate for identified beneficial uses.
7) Manage flow in the Middle Spokane River to provide adequate flow during spring runoff so river water can be diverted for groundwater recharge augmentation while protecting spawning and incubation of fish.
8) Integrate flow recommendations for aquatic biota, recreation, aesthetics, and water quality into an overall recommendation for flow management in the WRIA 57 watershed.
9) Assure that instream flows for the Little Spokane River (173-555 WAC) meet the needs of rainbow trout and mountain whitefish and other representative aquatic biota.
10) Manage water resources in the Little Spokane River Basin to maintain beneficial uses other than aquatic biota.

11) Integrate flow recommendations for aquatic biota, recreation, aesthetics, water quality, and other uses into an overall recommendation for a minimum instream flow regime. (WRIA 55)
12) Develop approaches to land use management that limits the impacts of withdrawals from domestic exempt wells at or below current levels.
13) Collect additional data to better define the impact of exempt wells on water use and model calibration.
14) Develop a clear, consistent policy for assigning water rights quantities for water systems taking over domestic exempt wells.
15) Water management is needed for WRIAs 55 and 57 to insure water in the future for all beneficial uses.
16) Reduce summertime water use to help increase river flow during low flow years.
17) Support water resources management approaches that augment water supply in the Little Spokane River basin during the summer high water use period.
18) Support water resources management approaches that augment water supply in the Middle Spokane River basin during the summer high water use period.
19) Support water resources management approaches that augment stream flow in the Middle Spokane River during summer low flow season.
20) Support storm water management approaches that foster the maintenance or enhancement of natural groundwater recharge rates due to direct precipitation.
21) Support the use of reclaimed /reused water for aquifer storage and recovery practices, taking wellhead protection areas into account, to provide mitigation for municipal water supply pumping and to support Spokane River base flow.
22) Support the practice of groundwater recharge using Spokane River water diversions during high flow periods, where the injection does not cause a supply well to become groundwater under the influence of surface water, to provide mitigation for municipal water supply pumping and to support Spokane River base flow.
23) Support continuing data collection and evaluation to fill data gaps that limit the scope and implemetability of the WRIA 55 & 57 Watershed Plan.
24) Utilize established systems for forecasting water availability in the Spokane and Little Spokane Watersheds.
25) Promote funding of projects included in Watershed Plans.

WRIA 55/57 Watershed Management Plan Organization

The WRIA 55/57 Watershed Plan is organized into five chapters:

1. Introduction
2. Technical Summary
3. Water Availability
4. Recommendations
5. Implementation.

Chapter 1 provides background on the Watershed Planning Act (Chapter 90.82 RCW) and the Policy Statements (goals) that the WRIA 55/57 Planning Unit created for the two watersheds.

Chapter 2 is a detailed summation of all the data existing before the formation of the WRIA 55 and 57 Planning Unit and the data collected during Phase II of this project. Section 2 information is a compilation of four reports; “Little Spokane (WRIA 55) and Middle Spokane (WRIA 57) Watershed Planning Phase II – Level 1 Assessment, Data Compilation and Preliminary Analysis” (Golder, 2003), “Little and Middle Spokane Watershed WRIA 55 and 57 Planning Unit Level 2 Technical Assessment:

Watershed Simulation Model" (Golder, 2003), "Little Spokane River Basin (WRIA 55) Instream Flow Assessment" (Golder, 2003), and "Instream flow and Fish Habitat Assessment"(NHC, 2004).

Chapter 3 is a discussion of water availability in WRIAs 55 and 57. The factors that determine water availability are presented and discussed. Chapter 3 also presents two future scenarios concerning water availability. The first scenario presents water consumption twenty years into the future to the year 2020, and the second presents water consumption further into the future by artificially pumping the full municipal inchoate water rights. These scenarios provide a general view of water availability, what the short and long-term increased demand for water would be due to population growth, and the impact that withdrawals have on the overall hydraulic conditions in the basin.

Chapter 4 is a compilation of twenty-five Policy Statements covering the eight key water resource action areas. To implement the twenty-five Policy Statements, the WRIA 55/57 Planning Unit generated approximately 100 recommendations. Recommendations presented herein do not necessarily represent obligations by the participating governments and organizations, unless specifically stated.

Chapter 5 is a presentation of the Implementation Matrix. The Implementation Matrix presents the list of the recommendations developed in Chapter 4 and identifies the preliminary commitments of the Implementing Governments and organizations. The Implementation Matrix is intended to provide the initial thinking of the "who" and "when" with respect to implementation of the recommendations, and includes information regarding proposed timing and the anticipated level of effort. The Implementation Matrix is a tool the Planning Unit will utilize to refine the roles and responsibilities of the Implementing Governments and organizations as the specific implementation measures are developed in Phase IV, which will commence following adoption of this Plan.

Chapter 6 is a description of the Washington State Environmental Policy Act (SEPA), and includes a review of probable impacts due to proposed actions, alternatives to proposed actions, and mitigation measures. For the purposes of this planning effort, the WRIA 55/57 Planning Unit and Spokane County have elected to issue a determination of significance and to adopt the Final Environmental Impact Statement (EIS) for Watershed Planning under Chapter 90.82 (Ecology, 2003) for proposed actions in the Plan.

Due to the complexities of the multiple political subdivisions within WRIAs 55 and 57, as noted in Chapter 2, page 16, the recommendations and obligations in both Chapters 4 and 5 developed for each watershed do not necessarily represent the full support or priority order of implementation by all participating governments. For example, in WRIA 55, recommendations or obligations that were defined as top priorities for Spokane County may in fact be a low priority or no priority for Pend Oreille and/or Stevens Counties due to varied priorities and issues dealing with the economical, cultural, and population differences within each county.

CHAPTER 2 TECHNICAL INFORMATION SUMMARY

Watershed Planning accommodates two types of information: existing data and newly developed data. Existing data compiled and assessed for its value in answering the basic questions of Watershed Planning forms the basis of plan preparation. When data gaps in the existing data prevent answering the basic questions, new or additional data is collected to fill those gaps. This summary is broken into two sections based on the division of existing and new data.

Generally, the information described and conclusions drawn below in Level 1 Technical Assessment are from the executive summary of the Golder Associates Inc. (Golder) document titled *WRIA 55/57 Watershed Planning Phase II - Level 1 Data Compilation and Preliminary Assessment, (*Golder, 2003). To provide a more complete technical picture, specific data from the document not in Golder's summary has been moved into this section. In addition, some of the information is recast to present a concise picture of the issues involved.

The information in Level II Technical Assessment is drawn from four primary sources: *Little Spokane River Basin (WRIA 55) Instream Flow Needs Assessment, (*Golder, 2003)*; Level 2 Technical Assessment: Watershed Simulation Model,* (Golder, 2003); *Middle Spokane River (WRIA 57) Instream Flow Needs Assessment* (Hardin Davis, 2004); *and Storage Assessment: Little and Middle Spokane Watersheds* (Golder, 2004). Again, some of the data presented in the original reports is recast to present a concise picture and to better answer questions developed during Planning Unit sessions where Watershed Planning issues were discussed.

I. Level 1 Technical Assessment: Data Compilation and Preliminary Assessment

The *Phase II - Level 1 Data Compilation and Preliminary Assessment, (*Golder, 2003) represents the first integrated basin-scale study of WRIA 57. In 1978 the United States Environmental Protection Agency (EPA) designated the Spokane Valley Rathdrum Prairie (SVRP) Aquifer a "Sole Source Aquifer". Currently, the SVRP Aquifer is the drinking water source for more than 400,000 people living in Spokane County, Washington and Kootenai County, Idaho. Due to the unique characteristics of the SVRP Aquifer, most of the previous work within WRIA 57 has focused on this aquifer.

Previous studies include:

> Research level studies and papers on the formation of the SVRP aquifer (Bretz, 1930; Bretz, 1959; Purves, 1969; Baker, 1973; Kiver and Stradling, 1985; Jensen and Eckart, 1987; Molenaar, 1988);
>
> A series of sequential groundwater flow modeling studies (Pluhowski and Thomas, 1968; Drost and Seitz, 1978; Bolke and Vaccaro, 1979; Bolke and Vaccaro, 1981; Bolke and Vaccaro, 1983; Molenaar, 1988; Buchanan and Olness, 1994; CH2M Hill, 1998; CH2M Hill, 2000);
>
> Aquifer sensitivity and wellhead protection studies (IDEQ, 2000; CH2M Hill, 1998; CH2M Hill, 2000); and,
>
> Hydraulic continuity studies (McDonald and Broom, 1951; Broom, 1951; Miller, 1996; Gearhart and Buchanan, 2000).

To date, an instream flow rule has not been set for the Spokane River in WRIA 57. However, a recommended minimum flow target for the Spokane River was set by Ecology at 2,000 cfs in 1999 at the United States Geologic Survey (USGS) gage 12422500 (Spokane River at Spokane). The 2,000 cfs target recommended by the Washington Department of Fish and Wildlife (WDFW) represents the 50% exceedence flow for the period of record pre-installation of the Post Falls Dam (i.e. 1891 to 1906).

Although Ecology has not completed a basin-scale study of WRIA 57, the WRIA 55/57 Planning Unit has identified a number of issues based on its understanding of the area:

1. The 2,000 cfs Spokane River target flow is met only 86% of the time and only 55% of the time in the summer;
2. Interactions between the SVRP Aquifer and the Spokane River are important seasonally and spatially to maintain flows and good water quality in the Spokane River; and,
3. A better understanding of how Spokane River flows are impacted by human activities (e.g., land use changes and pumping wells) is required to chart the future development in WRIA 57.

Summary of Existing Data

Watershed planning under Chapter RCW 90.82 was conducted jointly in WRIA 55, the Little Spokane and WRIA 57, the Middle Spokane River basins. Though there are two surface water basins in the study area, the drainages are linked by significant movement of the SVRP Aquifer water from WRIA 57 to WRIA 55. The reach of the Spokane River below the confluence of the Spokane and Little Spokane is referred to as WRIA 54, the Lower Spokane River. These basins comprise the Spokane River / Aquifer System that is tributary to the Columbia River.

WRIA 55 is comprised of the drainage basin of the Little Spokane River (Figure 2.I.A). WRIA 57 is comprised of the portion of the drainage basin of the Spokane River from the Washington-Idaho border to its confluence with Hangman (Latah) Creek (Figure 2.I.A) and is called the Middle Spokane Watershed. For modeling purposes the USGS gage near Post Falls serves as the study area boundary due to the hydraulic control provided by the gage.

For this summary of existing data, Spokane County acted as a clearinghouse for the transfer of information from the watershed Planning Unit members to Golder. The information was compiled in one of four formats: hardcopy; bibliography; GIS data layers; or other electronic data (e.g., spreadsheets, databases, etc.).

Regional Setting

Figure 2.I.A outlines the boundaries of WRIA 55 (the Little Spokane River Basin) and WRIA 57 (the Middle Spokane River Basin) relative to surrounding basins and political jurisdictions. The basins are located on the eastern boundary of Washington State in the rain shadow of the Cascade Range. The two basins are located on the eastern edge of the Columbia River Basalt Plateau, in the foothills of the Rocky Mountain Range. The Little and Middle Spokane Watersheds are located in Northeastern Washington on the border with Idaho. The natural drainage of the Little Spokane River is almost entirely within the WRIA 55 boundary; only a small portion of the drainage laps over into Idaho. WRIA 57 contains less than 10% of the contributing natural drainage of the Spokane Basin. Most of the Spokane watershed lies in Idaho.

Geology

The subsurface geology is comprised of crystalline basement rocks of granite and gneiss, which outcrop on the uplands surrounding the basins. Columbia River Basalt rocks cover parts of the lower elevations of the basins. Rivers eroded valleys in these deposits, and filled them with unconsolidated sediments. These sediments form the primary aquifers, but the basalts are also tapped as productive aquifers.

Climate and Topography

Precipitation is a key climatic component of the hydrologic system of a watershed. Annual precipitation in WRIAs 55 & 57 ranges from about 15 inches per year in the lower elevations of the basins to over 45 inches in the mountainous parts of the basins. About 70% of the precipitation occurs during the months of October through March. Approximately 25-40% of the precipitation falls as snow, depending on elevation. Accumulations of snow range from a few inches to several feet at the Spokane National Weather Service Station.

Climatic records for stations around Spokane, Deer Park, Coeur d'Alene, Newport, Cheney and Colville were collected for use in the study. Summaries of some of the climatic characteristics in the area are shown in Table 2.I.A.

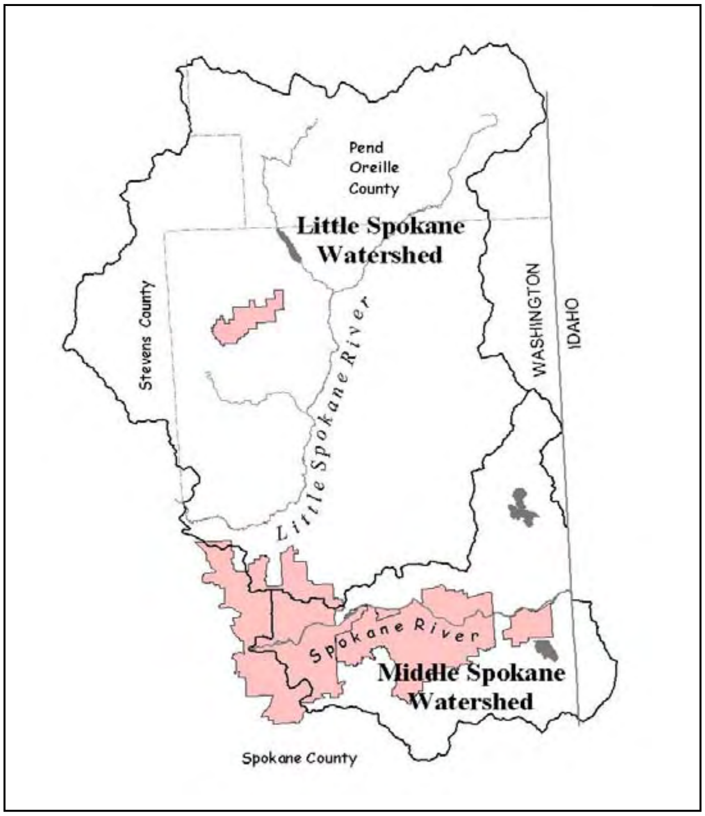


Figure 2.I.A. Middle and Little Spokane Watersheds.

Table 2.I.A WRIA 55 & 57 Climate Characteristics				
	Station Elevation (ft msl)	Average Annual Temperature (°F)	Average Annual Precipitation (in.)	Average Annual Snowfall (in.)
Spokane International Airport	2,355	48.0	16.2	41.7
Coeur d'Alene	2,135	47.9	26.5	47.4
Mt. Spokane Summit	5,280	36.6	46.2	162.5
Deer Park	2,201	45.3	21.8	N/A

A second key climatic component of a water balance for a hydrologic system is evapotranspiration, the removal of water from the system by evaporation from surface water and the removal of water from the system by plants, transpiration. In the model used to evaluate the hydrology of the Middle Spokane and Little Spokane basins this element is calculated from a variety of factors including precipitation, temperature, wind, soil moisture and vegetation type. Evaluations of evapotranspiration for the area have been made for a variety of purposes including earlier modeling efforts. The several models used produce potential evapotranspiration rates ranging from 2 to 4 inches per year for Spokane. Actual evapotranspiration is limited by precipitation and is usually about half the potential evapotranspiration unless irrigation is applied. Potential evapotranspiration may reach ½ inch per day during a hot summer.

Land Use

Land use and land cover vary in the two basins. In WRIA 55, the dominant land uses are forest (70%), agriculture (25%) and urban development (5%). In WRIA 57, the dominant land uses are forest (60%), urban development (23%), and agriculture (16%). Land use changes in the future are expected to result in the conversion of agricultural land to urban land use in both WRIAs.

Political Subdivisions

WRIAs 55 & 57 contain a number of political subdivisions. The Little Spokane (WRIA 55) basin lies primarily within Spokane County but portions lie in Stevens and Pend Oreille Counties. The City of Deer Park is the largest municipality that lies completely in the watershed. The incorporated town of Clayton and unincorporated communities of Elk Milan, Riverside, Chattaroy, Colbert, and Mead also fall within the watershed boundaries. The entire Middle Spokane basin (WRIA 57) within Washington State lies in Spokane County; there are four additional municipal governments with jurisdiction in the basin. The City of Spokane is the largest both in terms of land area and population. The Town of Millwood is the smallest. The City of Liberty Lake and the City of Spokane Valley, incorporated in 1998 and 2003 respectively have been created since the inception of watershed planning. The populations and population projections of the areas within Spokane County are listed in Table 2.I.B.

Table 2.I.B. Population Forecasts for Municipalities in WRIA 55 & 57
Spokane County Comprehensive Plan and Capital Facilities Plan

System Name	1990 Population	2000 Population	2020 Projected Population
Deer Park	2,278	3,017	5,767
Liberty Lake[3]	600	3,265	10,511
Millwood	1,559	1,649	1,821
Spokane, City of[1]		195,629	249,629
Spokane Valley, City of[2]		82,005	101,000

1 – Spokane County Comprehensive Plan population of incorporated area
2 – City of Spokane Valley Incorporated in 2003
3 – Liberty Lake 2020 population based on 11/30/2004 Spokane County findings, 2004-1009.
Spokane County Comprehensive Plan resolution 1-1059, Nov 2001

Unlike many communities where public water is provided by the municipal government, a large portion of the water delivered to both the incorporated and unincorporated urban area is provided by special purpose water and irrigation districts. Of the approximately 275,000 people in the Planning Area, 40 % are served by water systems operated by cities, 50 % by special purpose water districts, and 10% by individual wells. Table 2.I.C lists the major water systems with their 2000 populations and projected 2020 populations. Almost half of the customers served by the City of Spokane live outside of the WRIA 55 & 57 boundaries; however, almost all of the water for the City of Spokane's service area is pumped from WRIA 55 or 57.

Table 2.I.C Water System Population Forecasts From the Spokane County Comprehensive Plan and Capital Facilities Plan		
System Name	2000 population	Projected 2020 population
Carnhope Irrigation District #7	1,200	1,690
Consolidated irrigation District #19	16,388	27,086
Deer Park	3,017	5,767
East Spokane Water District #1	4,063	4,681
Hutchinson Irrigation District #16	1,950	2,063
Irvin Water District #6	2,531	4,564
Liberty Lake Sewer & Water District	4,125	9,833
Millwood	1,649	1,821
Model Irrigation District #18	5,708	6,353
Modern Electric Water Company	16,677	20,997
North Spokane Irrigation District #8	2,000	2,503
Orchard Avenue Irrigation District #6	3,178	3,301
Pasadena Park Irrigation District #6	4,168	6,921
Spokane, City of[1]	200,416	259,000
Spokane County Water District #3	22,140	28,563
Trentwood Irrigation District #3	4,048	5,508
Vera Water and Power	19,801	28,136
Whitworth Water District #2	16,890	25,448
Total (City of Spokane water service area)	329,949	444,235

1 –Water System Plan population of water service area and projected population. City of Spokane incorporated area 2000 population 195,629. Projected incorporated area 2020 population 249,629.
Spokane County Comprehensive Plan resolution 1-1059, Nov 2001
Spokane County Capital Facilities Plan, Dec 2001.

Surface Water

The major stream in WRIA 55 is the Little Spokane River and the major stream in WRIA 57 is a portion of the Spokane River. Graphs of annual discharge over the period of record for gages on both the Little Spokane and Middle Spokane show highly variable flows (Figure 2.I.B). Mean annual discharge for the Little Spokane at Dartford is 220,000 acre-feet; for the Spokane River at Spokane it is 4.8 million acre-feet.

On both streams, the maximum recorded discharge is approximately 4 times the minimum discharge. Although annual variations and long-term streamflow trends are affected by water diversions and withdrawals, large-scale weather patterns (e.g., decadal patterns affected by the Pacific Decadal Oscillation [PDO]) are believed to be the dominant influence affecting streamflows. This effect is clearest in the more than 100 years of data for the Spokane River at Spokane gage.

Table 2.I.D. Annual Discharge for the Little Spokane and Middle Spokane Rivers for the period of record in acre-feet.			
	Mean Annual Discharge	Maximum Annual Discharge	Minimum Annual Discharge
Little Spokane River at Dartford April 1929 – September 1932; December 1947 – September 2003	219,856	453,203 (1997)	92,668 (1931)
Spokane River at Spokane April 1891 - September 2003	4,867,894	8,912,033 (1974)	1,815,709 (1977)

Little Spokane River

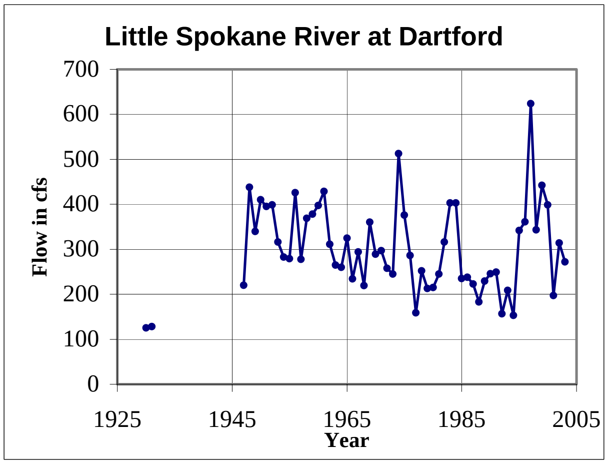
The headwaters of the Little Spokane River are split approximately evenly between the West Branch of the Little Spokane River and the mainstem. The mainstem heads in a large wetland area west of Newport, WA. Some studies suggest the mainstem may receive baseflow from the Pend Oreille River system in the form of inter-basin underflow. The West Branch of the Little Spokane River heads in the Diamond Lake drainage and flows through several large shallow lakes, Diamond, Sacheen and Eloika, before merging with the main stem at River Mile 28.

Flow in the upper reaches of the Little Spokane River increases primarily through the contribution of tributaries such as Deadman and Dragoon Creeks. In the lower reach, defined here as the reach between the Dartford gage and the mouth, flow increases significantly as a result of groundwater discharge from WRIA 57 via the SVRP Aquifer. The river is dominantly gaining throughout its length. The Little Spokane River has few artificial controls on its flow and the hydrograph shows sharp responses to seasonal effects such as snow pack melt.

Minimum instream flows were established in 1976 at four points on the Little Spokane River (Ch. 173-555 WAC). The minimum flows were set at the 80% exceedence level based on the historical record. Chapter 173-555 WAC established flows for the gages at Elk, Chattaroy, Dartford and Near Dartford (Rutter Parkway Bridge). More information on Little Spokane River minimum flows is included Section 2 of this chapter.

Spokane River

In WRIA 57, there are no permanent streams tributary to the Spokane River; the porous soil of the aquifer



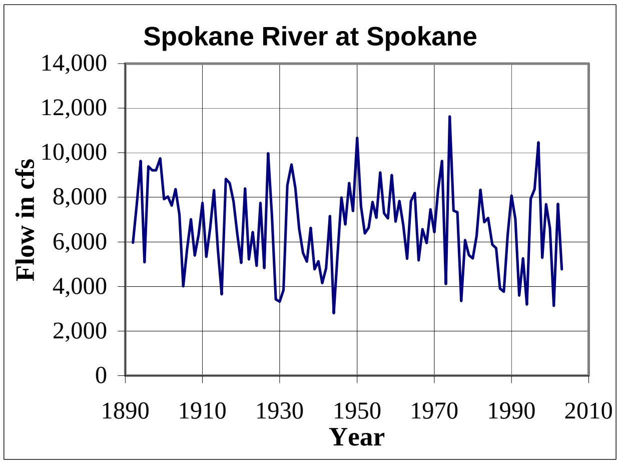


Figure 2.I.B. Mean annual discharges in the Little and Spokane Rivers.

host material, over which the river flows, absorbs flow from lakes and streams before they reach the river. Peak flows are not as sharp as for the Little Spokane River and are attenuated as a result of the larger drainage basin size, tempering of flow surges by storage in Lake Coeur d'Alene and buffering of changes in flow by losses to and gains from the SVRP Aquifer.

A number of dams are located on the mainstem Spokane River (Table 2.I.E). Of these, the Post Falls Dam located downstream from the outlet of Lake Coeur d'Alene has the greatest effect on the river hydrograph. Flow through the dam regulates Spokane River flow for four to six months a year during the low flow period. The dam regulates flow to maintain the level of Lake Coeur d'Alene at the agreed upon ordinary high water mark of 2128 ft mean sea level (msl). Storing water that would have naturally drained from the lake during the summer modifies the flow characteristics of the river. The current hydrograph shows minimum flows occurring in late August or early September compared to the pre dam hydrograph where minima occurred in late September of early October. Long Lake Dam, located downstream of the study area also has a storage reservoir adequate to allow minor effects on flow.

Table 2.I.E. Characteristics of Spokane River Dams and Impoundments

Site	Owner	Location River Mile	Installation Date	Pool Elevation (ft msl)/ Storage Capacity (acre – ft)	Maximum Power Production (MW/hr)	Flow at Max Power (cfs)
Post Falls [1]	Avista Utilities	100	1906	2,128 / 225,000	14.75	5,400
Upriver	City of Spokane	80.2	1894	1,910 / 3,000	14	7,500
Division Street / Upper Falls	Avista Utilities	74.5	1922	1,870.5 / 800	10	2,500
Monroe Street	Avista Utilities	73.9	1890	1,806 / 30	14.82	2,900
Nine Mile[1]	Avista Utilities	58.1	1908	1,606.6 / 3,130	26.4	6,500
Long Lake [1]	Avista Utilities	33.9	1915	1,536 / 105,000	71	
Little Falls [1]	Avista Utilities	29.3	1910	1,362 / 2,220	32	

[1] These dams are outside of the WRIA 55 and 57 watersheds.

There are several run-of-the-river dams along the mainstem of the Spokane River. These include Upriver Dam, Upper Falls Dam, Monroe Street Dam, Nine Mile Falls Dam and Little Falls Dam. With the exception of Upriver Dam, which is operated by the City of Spokane, these facilities are operated by Avista Utilities. While these dams have little effect on the hydrograph; they do change the character of the river in their impoundment areas.

There is a high degree of hydraulic continuity between the Spokane River and groundwater of the SVRP Aquifer that strongly affects seasonal and annual flows. Between the Idaho-Washington border and the river's confluence with Hangman Creek, there are several well-defined gaining or losing reaches. Water flowing through the Spokane River Valley flows out of the WRIA 57 study area through the Spokane River and as groundwater through the Hillyard and Trinity Troughs (Figure 2.I.A).

An instream flow target of 2,000 cfs at the Spokane River at Spokane gage was agreed to by Ecology and the Washington Department of Fish and Wildlife in 1999. This target was based on 50% of natural flows using flow data from before the installation of the Post Falls Dam (1891-1906). The lowest seven-day average flow fails to meet instream flow target almost every year. The frequency and duration of non-attainment of these target flows correlates to wet and dry Pacific Decadal Oscillations (PDO) periods. Recent studies suggest that the 1891-1906 period may have been within a wet PDO period. If so, the instream flow target may not be representative of 50% of natural flows on average over different climatic periods.

Groundwater

Important groundwater resource aquifers occur primarily within the unconsolidated sediments that include glacial flood deposits and recent alluvium. Important local sources of domestic water supply are also found within glacial lake deposits, fractured and weathered basalt, and crystalline basement rocks. Dense and unweathered crystalline basement rocks as well as glacial lake clays act as important local aquitards, restricting vertical and lateral groundwater movement. The crystalline basement aquitard represents the lower hydrogeologic boundary of the region.

Eight aquifer areas have been delineated in WRIAs 55 and 57. Three of these areas (Five Mile Prairie, Orchard Prairie and Green Bluff) contain basalt aquifers. Four of these areas (the SVRP Aquifer, the Little Spokane River aquifer area, Peone Prairie, and the Diamond Lake aquifer area) are unconsolidated sediment aquifers. The Deer Park Basin is comprised of an upper unconsolidated sediment aquifer and a lower basalt aquifer. The SVRP Aquifer, which occurs within the central portion of WRIA 57 and the southern portion of WRIA 55, as well as extending into Idaho, is one of the most productive aquifers in the United States and serves as the primary water source for more than 400,000 people in Washington and Idaho. The SVRP Aquifer acts as a conduit for flow from the Spokane River through the Hillyard Trough to the Little Spokane River, and to a lesser extent through the Trinity Trough to lower reaches of the Spokane River.

The majority of the groundwater level data collected over the years in WRIAs 55 and 57 are from the various SVRP Aquifer monitoring programs. Some data were also available for the Deer Park Basin and the Little Spokane Aquifer area.

Three types of groundwater level fluctuations were observed in hydrograph data from WRIA 55 and WRIA 57:

1. Groundwater levels in close hydraulic continuity with surface water exhibit quick response (e.g., hours or days) to river stage fluctuations, with the response becoming more muted and the time lag becoming longer with increasing distance from surface water bodies;
2. Seasonal fluctuations in response to rainy and dry seasons; and,
3. Long-term (decadal) fluctuations as a result of extended periods of below or above average precipitation.

These variations of response may be important for developing water resource management options. For instance, the lag time between surface water and groundwater fluctuations may allow for development of groundwater extractions in areas of the aquifer system so that impacts to surface water occur during times of the year with higher flows.

A series of groundwater flow models for the SVRP Aquifer have been constructed over the last 30 years. The purpose for developing models range from aquifer flow and contaminant transport (USGS models from the 1980's) to support of land development (i.e. groundwater supply) and to designate wellhead capture zones for the water purveyors Wellhead Protection Plans (CH2M-Hill 1998, 2000). Studies conducted to develop data for model development have resulted in improved understanding of the SVRP Aquifer.

Water Quality

WRIA 55 - Several reaches of the Little Spokane River are listed as impaired under Section 303(d) of the Clean Water Act, including the area around the confluence with Deadman Creek (temperature, pH, and coliform) and near the confluence with the Spokane River (polychlorinated biphenyls (PCBs) and coliform). The Dragoon Creek sub-basin, where the City of Deer Park is located, has several reaches that are water quality impaired (dissolved oxygen [DO] and coliform) and listed under Section 303(d) of the Clean Water Act. The water quality problems in the Little Spokane system are probably related to agricultural activities (DO and coliform), maintenance of residential lawns (DO and temperature), loss of riparian vegetation, temperature, and industrial activities (PCBs), among other potential factors.

Groundwater quality is generally good to excellent throughout WRIA 55. However, localized areas with elevated nitrate concentrations exist and are likely related primarily to agricultural activities with on-site wastewater discharges a possibility in some cases. Groundwater discharge to Dragoon Creek during low flow periods is believed to contribute nitrate to surface water. Significant groundwater discharge from the SVRP aquifer in the Little Spokane River below Dartford is important in providing summer base flow and maintaining good surface water quality which in turn support aquatic habitat and recreational uses.

WRIA 57 - Surface water quality issues in WRIA 57 include heavy metals, DO, pH, temperature, PCBs and sediment. Heavy metal concentrations, primarily cadmium, lead and zinc, are related to the influx from mining activities in Idaho's Coeur d'Alene River Basin. Metal concentrations in the river are generally a function of flow; during high flow, experienced during spring runoff, metals laden sediment from the Coeur d'Alene basin is transported through Lake Coeur d'Alene to the Spokane River. The remaining water quality issues may be related to wastewater treatment plant effluents (DO), industrial activities (PCBs), land use activities, and possibly other factors. PCBs are not very soluble in water and tend to attach to organic matter and sediments so the PCBs have accumulated in the bottom of the Upriver Dam reservoir as well as other places in the Spokane River.

Current data show that water quality in the SVRP Aquifer is good to excellent. Although there are few examples of actual contamination, the high potential for contamination to the sole source aquifer is perhaps the most critical groundwater quality issue in the basin. Water quality trends from the 1970s and 1980s showed a gradual increase in contaminants, particularly nitrate- N, within the aquifer. The increase was attributed to the rapid residential development dependent on septic tank – drainfield waste disposal. With the aggressive sewer construction effort launched in both northern Idaho and Spokane County in the mid 1980's, aquifer degradation has slowed or stopped. The SVRP aquifer is highly susceptible to contamination because it is unconfined and the aquifer materials overlying sediments are very permeable.

In spite of the susceptibility of the aquifer to contaminants seeping from the surface, water lost from the river to the aquifer, even during high flow / high metals concentration periods does not appear to significantly impact groundwater quality in the SVRP aquifer (Caldwell and Bowers, 2003). With the River carrying total lead concentration on the order of 1 part per million, groundwater 30 to 50 feet below the river carried lead just at or below the level of detection.

Water Use and Allocation

Water Rights

A concise version of Ecology's Water Rights Application Tracking System (WRATS) database was queried to provide a synoptic assessment of the current status of water allocation. The results of this assessment are summarized in the tables below. The WRATS database was incomplete with respect to the quantities associated with all permits and certificates and no quantities were given for claims. Therefore, a number of assumptions were made to quantify all rights. Water rights where the purposes of use are listed as fish propagation, fire suppression and power were tallied separately and excluded from Table 2.IF because they are generally non-consumptive, or, in the case of fire suppression, rarely used.

Table 2.I.F. Estimated Allocation of Water Rights by Type (Acre-feet/year)
(Excluding rights for fish propagation, fire suppression and power purposes of use)

		WRIA 55	WRIA 57	Total
Certificates & Permits				
	Groundwater	128,000	278,000	406,000
	Surface Water	15,000	16,000	31,000
	Subtotal:	143,000	294,000	437,000
Claims				
	Groundwater	21,000	14,000	35,000
	Surface Water	23,000	11,000	34,000
	Subtotal:	44,000	25,000	69,000
	TOTAL:	187,000	319,000	506,000

1 Acre-foot = 325,900 gallons

It is likely that some of the rights registered in the WRATS database are not valid and may be subject to relinquishment due to non-use. There have been three periods since the water code was implemented for users of surface water (1917) and groundwater (1945) to register claims to water rights. The methodology used to quantify water rights and claims indicates that claims may constitute approximately 15% of the total amount. A review of the claim records reveals apparent duplicate and triplicate records for similar claims. These apparent replications are probably due to individuals registering the same claim during each claim registry period and likely do not actually represent unique claims. Therefore, the number of claims may be significantly less than indicated.

The distribution of water rights among various purposes of use is shown in Table 2.I.G. The amount allocated to exempt wells is estimated based on per capita use in the City of Spokane and several rural area purveyors and census population outside of purveyor service areas. On the average the per capita use determined for the purveyors assessed is consistent with the Department of Health standard assumption of 800 gallons per household.

Table 2.I.G. Estimated Allocation of Water Rights by Purpose of Use (Acre-feet/year)			
	WRIA 55	**WRIA 57**	**Total**
Municipal & Domestic			
Permits & Certificates	81,000	210,000	291,000
Claims	8,000	2,000	10,000
Subtotal:	89,000	212,000	301,000
Irrigation			
Permits & Certificates	39,000	28,000	67,000
Claims	34,000	23,000	57,000
Subtotal:	73,000	51,000	124,000
Commercial/Industrial			
Permits & Certificates	21,000	51,000	72,000
Other	4,000	5,000	9,000
Exempt Wells			~10,000
Total:	187,000	513,000	700,000
1 Acre-foot = 325,900 gallons			

There are 23 applications in WRIA 55 for new water rights, 16 of these are for new groundwater allocations and 7 for new surface water right allocations, and 16 change applications. In WRIA 57, there are 37 applications for new water rights, 27 of these are for new groundwater allocations and 10 for new surface water right allocations, and 46 change applications. The average size of application for new water rights is approximately 1,300 gallons per minute (gpm) for groundwater, and 54 gpm (0.12 cfs) for surface water.

Spokane County recently established a Water Conservancy Board as an additional avenue for expediting the processing of change applications. The board can consider change applications to valid water rights. Changes may not result in an enlargement of the water right or impairment of other water rights including minimum instream flows. Therefore these proposed changes are not anticipated to have a significant impact on water resource management.

Water Use

Actual water use estimated for the categories of agricultural irrigation, water systems, commercial/industrial use, and exempt wells is presented in Table 2.I.H. The largest uses of water for the combined WRIAs 55 and 57 are: municipal/domestic (~129,000 AF/yr); commercial/industrial (~38,000 AF/yr); exempt wells (~16,600 AF/yr); and, agricultural irrigation (~7,700 AF/yr).

Municipal and domestic use and commercial/industrial use data was compiled by Spokane County and includes the major water distribution systems. Exempt well use is estimated based on water system data provided by Spokane County, 2000 census data, and per capita use provided by Spokane County and the City of Spokane. The estimate of agricultural irrigation use is based on United States Department of Agriculture land use census Natural Resource Conservation Service data and USGS land use mapping. The estimate of actual use incorporates only the crop irrigation requirement.

Table 2.I.H. Summary Comparison of Estimated Allocated Water and Actual Use. (excluding fire, fish and power uses; all quantities in AF/yr)				
Purpose of Use	**Allocated**	**Actual Withdrawal**	**Unused Allocation**	**Percent of Allocation Used**
WRIA 55				
Agricultural Irrigation [a]	73,337	6,398	66,939	9%
Municipal/Domestic	88,996	24,553	64,443	28%
Commercial/ Industrial	21,428	3,929	17,499	18%
Exempt Wells	-	11,000	-	
Subtotal	183,761	34,880 [b]	148,881	19%
WRIA 57				
Agricultural Irrigation [a]	51,151	1,278	49,873	2%
Municipal/Domestic	211,634	103,962	107,672	49%
Commercial/Industrial	50,996	34,254	16,742	67%
Exempt Wells	-	5,600	-	
Subtotal	313,781	139,494 [b]	174,287	44%
Total	**497,542**	**174,374** [b]	**323,168**	**35%**

[a] Allocated quantities based on a duty of 3-4 feet/acre/year. Actual withdrawal based on a duty of 1.6 feet/acre/year. Application efficiencies, conveyance losses, and stock watering are not included and may result in higher actual withdrawal estimates.
[b] Excludes exempt well use.
1 Acre-foot = 325,900 gallons

Based on these estimates about 6% of water allocated for agricultural irrigation is actually being used. However, this estimate does not account for conveyance losses or irrigation application efficiencies. The distribution of irrigation rights being exercised likely varies widely and it is expected that many irrigation rights are not being used to the full extent of quantities specified on the written documents. Approximately 43% of water allocated to municipal and domestic use is being used. However, the availability of allocated water rights is not evenly distributed among purveyors. In fact, growth within some water districts is limited by their available water rights quantities. The estimate of municipal and domestic actual use does not include small domestic systems with six or less connections. About 67% of the water in WRIA 57 allocated for commercial and industrial applications is being used, while approximately 18% of the water allocated in WRIA 55 for this purpose is being used.

Comparison of water use should also take into account the consumptive portion of water use. This is the portion of water that is evaporated through various processes and transpired by plants as opposed to the portion of water that is returned to groundwater or streams. The largest consumptive water use in the two basins is outdoor use for irrigation of landscaping. Comparing winter and summer water use from purveyors showed that 50% to 67% of the water pumped is used for landscape irrigation. Table 2.I.I summarizes the estimated irrigation uses of the categories of use by WRIA. A large portion of all irrigation use is consumptive.

Table 2.I.I: Summary of Estimated Irrigation Use			
Purpose of Use	Actual Withdrawal (AF/yr)	Irrigation Use (%)	Irrigation Use[3] (AF/yr)
WRIA 55			
Agricultural Irrigation[1]	6,398	100%	6,398
Municipal/Domestic[2]	24,553	50% to 67%	12,276 to 16,369
Commercial/Industrial	3,929	Unknown	-
Exempt Wells[2]	11,000	50% to 67%	5,500 to 7,333
Subtotal	45,880		24,174 to 30,100
WRIA 57			
Agricultural Irrigation[1]	1,278	100%	1,278
Municipal/Domestic[2]	103,962	50% to 67%	51,981 to 69,310
Commercial/Industrial	34,254	Unknown	-
Exempt Wells[2]	5,600	50% to67%	2,800 to 3,733
Subtotal	145,094		56,059 to 74,321
Total	190,974		80,233 to 104,421

[1] Based on Crop Irrigation Requirement. Application efficiencies may result in higher consumptive use. Actual application schedules may result in lower consumptive use.

[2] Based on exterior use of residential demand patterns for the City of Spokane. Over watering may result in a significant amount of return flow and reduced consumptive use.

1 Acre-foot = 325,900 gallons

Table 2.I.J is a water balance using the actual water withdrawal and use. There is a discrepancy of approximately 1.8% between the estimated quantity of water pumped (actual withdrawal) and the quantity of actual use. There are many potential explanations for this discrepancy. Actual use estimates shown above considered wastewater discharge, septic system recharge, and irrigation (assuming half of purveyor and exempt well water is used for landscape irrigation). Actual use estimates are about 2% greater than actual withdrawals if it is assumed that two thirds of purveyor and exempt well use is for landscape irrigation. Some water purveyors calculate "unaccounted water" (water that is pumped but is not metered). Water that is not metered includes that consumed by fire suppression, hydrant testing, main breaks, reservoir rehabilitation, street cleaning or other permitted hydrant use. The volume of unaccounted water can be more than 10% of the total water pumped by a purveyor.

Table 2.I.J. Actual withdrawal and use. (acre-feet/year)	
Actual withdrawal:	179,974
Irrigation use:	92,327
Waste water discharge:	78,818
Septic system recharge:	12,000
Actual use accounted:	183,146
Actual difference:	(3,172)

II. Level 2 Technical Assessment: Additional Data Collection and Assessment

After reviewing the Draft Phase II – Level I Assessment Data Compilation and Preliminary Assessment (Golder, 2003), the Planning Unit opted to collect additional information in several areas. Primary needs were for:

- Refinement of data to calibrate the MIKE SHE groundwater model (selected as the preferred tool for analyzing water availability);
- Assessing the suitability of Little Spokane River minimum flows as protection for aquatic biota;
- Developing data for an instream flow recommendation for the Middle Spokane; and
- Evaluating storage alternatives to enhance streamflow and increase water supply.

As with the existing information provided above in Section 1: Level 1 Technical Assessment, the summaries presented below are drawn primarily from the executive summaries of the parent documents; supplemental data and data interpretations are expanded with additional material from the individual project reports.

Watershed Simulation Model

Early in the program, the WRIA 55 and57 Watershed Planning Unit decided to use a numerical model to assess water availability in the Middle Spokane and Little Spokane basins. The approach was selected because the large body of existing data for the planning area provides a sound technical base for an accurate model and public acceptability of decisions based on well calibrated models. The Planning Unit opted to use the MIKE suite of software packages developed by the Danish Hydrologic Institute.

The basic MIKE SHE model includes six modular components, each describing a major flow process of the hydrologic cycle. These include interception/evapotranspiration, overland flow, channel flow, unsaturated zone flow, saturated zone flow and snow pack. Additionally, in the Little Spokane and Middle Spokane Watersheds, simulations of lawn watering and agricultural irrigation were included. A primary benefit of the MIKE SHE modeling environment is its ability to simulate groundwater and surface water interactions.

Model Calibration and Sensitivity Analysis

The MIKE SHE model was calibrated over the hydrologic years 1994 through 1999 that includes representative dry (1994), wet (1997) and average years (1999). Calibration data included continuous and snapshot river discharge, groundwater elevation, and snow water equivalent measurements.

Calibrations of heads in the central SVRP Aquifer in WRIA 57 are shown to be accurate at both high and low water table elevations. Calibration in the Hillyard Trough area shows variable agreement between simulated and actual water levels due to the existence of silt/clay lens in the central portion of the Hillyard Trough. This is in part due to the models method of solving a lens setup that restricts accurate calibration to heads from wells screened above, in and below the lens. Calibration near the model boundary indicates a need for additional data in this area to simulate aquifer response to the high degree of river to aquifer recharge and the distribution of this water in the aquifer.

Geology, hydrogeology and calibration data in the aquifers of WRIA 55 are sparser than in WRIA 57 and only general groundwater elevations are simulated in WRIA 55. Annual calibration of these points shows good overall correlation, with the sands and gravels matching measured values better than the basalt layer.

Calibration of discharge data on the Spokane River shows excellent calibration to measured data. Major losing and gaining reaches of the Spokane River are captured both in river discharges and in baseflow simulations. Calibration of the Little Spokane River data is not as good, with simulated flows higher than actual flows on several tributaries and reaches of the Little Spokane River; particularly the early winter peak flows. Simulated peak flows matched observed flows better during wet years than dry years at all gages where peak data exists in WRIA 55 (primarily the Little Spokane River). Interaction between surface water and groundwater appears to be well simulated by the model over the full domain. Annual discharge model results for WRIA 55 indicate that either the total amount of water input to the model (primarily as precipitation) is too high or the total amount of sinks in the watershed is too low (primarily as evapotranspiration).

Sensitivity analysis show the model is most sensitive to precipitation and temperature inputs, boundary conditions, aquifer hydraulic conductivity, unsaturated zone hydraulic parameters and drainage parameters.

Results of Model Scenario Analysis

The Planning Unit developed a list of 17 scenarios they considered useful for developing a Watershed Plan. This list was prioritized and the top six scenarios were assigned to Golder Associates for evaluation (Table 2. II.A). Five scenarios were actually run, and the findings are presented below. The remaining scenarios, and any new scenarios developed during deliberations will be analyzed after the model is transferred to the lead agency.

As part of model calibration and sensitivity analysis one model scenario was developed. This scenario was meant to answer the question: what effect has pumping groundwater from the SVRP Aquifer for human use had on flows of the Spokane and Little Spokane Rivers.

Table 2.II.A. WRIA 55 & 57 Planning Unit model scenario priorities 6/16/2003

Priority	**Model Scenario**	**WRIA**	**Issue**
0	Turn off all pumping and artificial recharge. (Pre-development conditions)	55 & 57	What are the affects of purveyor and domestic pumping on rivers and aquifers?
1	Pump water with 20-year population growth added using current water use levels.	55 & 57	What happens to river and aquifer levels with 20 years of growth?
2	Pump water out of the Spokane River during high flows and inject it into groundwater. May want to try several locations.	57	Will the recharged water affect river flows? Will it reach the river at an appropriate time?
3	Turn off all wells near (within ½ mile) the river (in reaches where the aquifer is recharging the river).	57	Does the location of aquifer pumping affect river recharge (particularly in the summer)?
4	Replace domestic exempt wells within an appropriate distance of a public water supply system with water pumped from the Hillyard Trough.	55 (and some in 57)	How do decreased pumping and recharge from imported water affect aquifer levels and flow in the LSR? Will recharge with less pumping stabilize aquifer levels in the LSR basin? Does this negatively impact the SVRP aquifer?
5	Pump all water rights and domestic exempt wells to their maximum.	55 & 57	What are the affects of a maximum case scenario on the rivers and aquifers?
	Raise the water level behind Upriver Dam.	57	What happens to river flow and aquifer

			levels? Do gaining and losing reaches of the river change? Do flows in the river change?
	Change river and aquifer flows coming into model from Idaho. (Most likely in a negative direction.)	57 (& 55)	What affect does more water use in Idaho have on the river and aquifer?
	Turn off domestic exempt wells in Little Spokane Basin.	55	Are domestic exempt wells having a large detrimental affect on LSR flows?
	Change Spokane River flow to reflect holding Lake Coeur d'Alene at 2128' longer into the fall.	57	How does this affect river and aquifer levels?
	Pump water with 20-year population growth added. Include water conservation.	55 & 57	What happens to river and aquifer levels with 20 years of growth and conservation?
	Turn off pumping at Colbert Landfill cleanup wells. (Maybe this can be run with a scenario that affects only WRIA 57.)	55	How will the cessations of pumping from aquifers and discharge to the LSR effect flow in the LSR? How long will it take to reach equilibrium?
	Use current conditions with pumping (and recharge) to reflect conservation. May want several scenarios with different levels of conservation.	55 & 57	What affect will conservation alone have on river and aquifer levels?
	Augment Spokane River flow during the summer from Lake Coeur d'Alene	57	Is there sufficient water in Lake Coeur d'Alene to keep SR flows at a higher level all summer? Does this just recharge the aquifer?
	Run the model with the pumping associated with new applications for water rights added.	55 & 57	Would pumping current applications for water rights affect the river or aquifer?
	Run model including pumping from likely growth in Idaho.	57	What affect does more water use in Idaho have on the river and aquifer?
	Remove Upriver Dam (Probably not possible)	57	What happens to river flow and aquifer levels without this dam? Do gaining and losing reaches of the river change? Do flows in the river change?

Scenario 0 - Predevelopment Conditions

Predevelopment conditions were simulated in the model by "turning off" the following processes:

- Groundwater pumping (there are no surface water diversions in the model);
- Agricultural and lawn irrigation;
- Wastewater discharge to surface water and land surface; and
- Drywell recharge.

These components entail all the watershed processes representative of development within the model domain, except for the hydroelectric dams, land use (e.g. changes in paved areas or deforestation), and changes to aquifer inflow across the Idaho-Washington state line. Hydroelectric dams on the Spokane River in the watershed are not used to regulate flows but are run-of-the-river and therefore have little affect on downstream flows. By limiting 'predevelopment' almost entirely to removing the watershed mechanisms distributing water, the impacts to streamflow and groundwater elevation resulting from changes in water withdrawal are clearer.

The largest area of groundwater level changes were seen in the central SVRP Aquifer and the Hillyard Trough where predevelopment conditions raise aquifer levels by between 4 and 32 inches. Pronounced groundwater level increases occurred north of Liberty Lake. Throughout the simulation the natural seasonal hydrograph fluctuations of rising water levels in response to recharge during the winter and dropping water levels in response to regional drainage during the summer are maintained. Due to the river / aquifer interchanges, the most important effects of turning off pumping are on flow in the rivers.

The response of change in streamflow of the Spokane River at Spokane correlates well to pumping of groundwater. Peak groundwater pumping under current conditions is around 320 cfs, while the maximum difference in streamflow under predevelopment conditions compared to current conditions was around 215 cfs. July, August, and September flows were between 177 cfs and 247 cfs higher under predevelopment conditions. The total discharge of the Spokane River at the Spokane gage over the complete period of time simulated (1993 to 1999) was 2% higher with predevelopment conditions. This additional flow equates to 82% of the total groundwater pumped over the period of time. The remaining 18% of groundwater withdrawals is probably accounted for with raised groundwater levels, more flow through the Trinity and Hillyard troughs, and/or other effects.

The Little Spokane River streamflow At Dartford, which is primarily upstream of major influences by the SVRP Aquifer, shows small differences in flow under predevelopment conditions. This may be due in part to:

- Most water withdrawal occurs downstream of this monitoring point; and
- Return flows of upstream uses reenter the Little Spokane River before this point and no bypass reach is created around the At Dartford monitoring point.

Peak annual change in streamflow At Dartford is around 10 cfs. Streamflow at the Near Dartford gage on the Little Spokane River shows a greater response to groundwater pumping. The peak change in streamflow is around 57 cfs. There does not appear to be any impact from pumping on streamflow Near Dartford during the winter months. The total reduction in volume of stream flow due to development during the entire time period of simulation (April 1995 to September 1999) is 1.6%.

Scenario 1 – 20-year Growth

This scenario models the projected changes in municipal and domestic water use, wastewater discharge, and lawn irrigation for the year 2020. Changes were not made to water use for agriculture, commercial and industrial, or exempt well use. The groundwater withdrawals are modeled as monthly pumping rates. Table 2. II.B shows the annual projected demand increase for areas within the model. The increase in groundwater extraction in WRIA 57 is 86 cfs (56 mgd) during peak summer pumping and approximately 20 cfs (13 mgd) during minimum pumping periods (winter). The average increase in pumping in WRIA 55 equates to 15 cfs (10.4 mgd) in the summer and 1.5 cfs (1 mgd) in the winter months.

Table 2.II.B. Increases in groundwater abstraction with growth projected for 2020.

	Original Model Pumping (Million gallons)	20-year growth Pumping (Million gallons)	Increase (million gallons)	Increase (mgd)	Increase (cfs)
WRIA 55	10,951	12,914	1,963	5.4	8.3
WRIA 57	41,696	51,117	9,421	25.8	40.0
Total	52,648	64,032	11,384	31.2	48.3

In this model scenario, the Spokane River at Spokane discharge decreases by approximately 50 cfs in the summer and 25 cfs in the winter. Between 7 and 13 cfs of the lost flow is returned downstream by the Waste Water Treatment Plant. The change in discharge of the Spokane River correlates well to pumping of groundwater. There is no significant lag time between when peak pumping occurs and when the greatest decrease in flows occurs. This suggests that impacts of pumping groundwater from the SVRP Aquifer in WRIA 57 to the river emerge quickly.

The Little Spokane River streamflow at the At Dartford gage has a peak change in streamflow of approximately 22 cfs between November and December and a minimum change in streamflow of approximately 13 cfs during July and August time period. Flow at the Near Dartford gage shows a very similar response with an additional reduction of about 1 cfs during the whole year. This additional reduction is most likely due to pumping in the Hillyard Trough. There is a significant lag time between peak pumping and peak reduction in streamflow in the Little Spokane River. This suggests a buffering effect due to the distance between the pumping and the river and/or the natural groundwater storage capacity.

Groundwater elevations decreased between 0.25 and 1 foot throughout the modeled area. The decreases in groundwater elevations are not great, but lead to the reduction of groundwater discharge to surface water. The largest decreases in groundwater discharge to the Spokane River occur in the gaining reaches around Sullivan Road and just upstream of Greene Street. The largest decreases in groundwater discharge to the Little Spokane River occur in the gaining reach between Dragoon and Deadman Creek as well as the reach downstream of Dartford Creek.

Scenario 2 – Spokane River Diversion and Aquifer Injection During High Flows

During the high flow period from April 1 to June 1, 100 cfs was diverted from the Spokane River near Post Falls and used to recharge the SVRP Aquifer by having the water percolate into the ground in a shallow excavation near Barker Road and Trent Road.

Groundwater elevations increase around the injection point during the injection period. After injection has ended, the groundwater mound spreads and dissipates from the model eastern boundary to Upriver Dam, with some effects downstream. There is no change in groundwater elevations in the Hillyard Trough. In August, the groundwater mound has almost fully dissipated.

Flow in the Spokane River at Greene Street decreases immediately upon diversion of river water but the effects of water returning to the river from the injection site to the river appears within 7 days – the output time step for results. Once diversion and injection stops, there is a sharp increase in streamflow above natural conditions. The increase is not sustained and is far less than the total injected volume. The river flow response at Greene Street ends by August and adds, on average, 20 cfs in June and 5 cfs in July. No additional water from the diversion enters the Spokane River downstream of Greene Street. There is also no impact on the Little Spokane River.

This scenario shows the truly dynamic nature of the SVRP Aquifer with the rapid dissipation of water away from the injection point toward the river. Injecting water at the specified location and time will insignificantly increase the flows in the Spokane River during low flow periods.

Scenario 3 – Redistribution of Pumping Away from the Spokane River

An annual total of 12,000 million gallons of water from 7 wells was redistributed to existing wells located further from the river. Two of the largest decreases in groundwater pumping, peaking at a combined rate of almost 40,000 gpm (8.8 cfs) occur upstream of Greene Street at the City-Parkwater and City-Well Electric wells. The majority of the pumping has been transferred to the City-Nevada and City-Ray wells with additional pumping at the City-Central and City-Hoffman wells. Downstream of Sullivan Road to just upstream of Greene Street there is an increase in the average groundwater elevations. Below Greene Street and through the Hillyard Trough there is an average decrease in groundwater elevations. At Greene Street, discharge to the Spokane River increases the flows by as much as 35 cfs during the late summer (August). The flow in the Spokane River at the Spokane gage is higher during the summer months by as much as 14 cfs but there is either no effect or a slight decrease in flow during the late winter and spring. Flow in the Little Spokane River near Dartford shows a decrease in discharge, between 1 and 2.5 cfs throughout the model run. This is likely due to decreases in groundwater elevations in the Hillyard Trough.

Scenario 4. – Inchoate Water Rights

Washington State House Bill 1338, passed after the identification of model scenarios, requires Watershed Planning Units to take all municipal water rights into account – including the unused portions of the water right known as inchoate water rights. This scenario was added and run as a means to meet that requirement.

Current pumping of municipal/domestic water rights is about 145,000 acre-feet per year. With the inchoate water rights, pumping would increase to around 300,000 acre-feet per year. The SVRP Aquifer contains the most municipal inchoate water rights in WRIA 55 and WRIA 57. Due to inchoate water rights in shallow portions of aquifers in the model, the model withdrew only 91% of the groundwater demand specified in the model input files. This may be as a result of model limitations or actual conditions.

The model shows three primary impacts from pumping 91% of all municipal inchoate water rights. The average reduction in Spokane River discharge at Spokane is 150 cfs with a maximum during the mid to late summer of about 250 cfs. Some of this water is returned to the river via wastewater discharge downstream. The most pronounced reductions in groundwater levels in the SVRP Aquifer of 2 to 5 feet occur during the summer from near Pines Road into the Hillyard Trough. The flow in the Little Spokane River downstream of Dartford is reduced an average of 18 cfs. The majority of this reduction (13 cfs) occurs above Dartford with the remaining 5 cfs due to diminishing the flow of groundwater through the Hillyard Trough and the associated discharge to the Little Spokane River. The relative change in streamflows is approximately the same in both watersheds (e.g., 10%-15% reduction).

Due to the high hydraulic conductivity of the SVRP Aquifer, the impacts of groundwater pumping were immediately visible in WRIA 57 with quick, though not complete, rebounds during the winter months. There is a significant time lag between the seasonal period of peak groundwater withdrawals (July-August) and impact to the Little Spokane River (December-January). The cause of the time lag between withdrawals and streamflow impacts is interpreted to be a result of the dispersion of wells through the watershed, the indirect hydraulic continuity between the pumped aquifers and streams, and buffering of impacts by groundwater storage.

Instream Flow Needs

Early in its deliberations the Planning Unit realized that lacking a good technical basis for instream flow, creating a technically defensible and publicly acceptable water balance would be difficult. Without a good water balance, determining available water could not be done. To that end special studies to better quantify the instream flow needs were recommended for both the Little Spokane and Middle Spokane Rivers.

The primary focus of the studies was to assess the needs for aquatic biota. Flows for aquatic biota are often considered the most critical for watershed planning as many watersheds contain species that must be protected by law.

Other areas of instream flow needs identified by the Planning Unit may call for more water than biota. The four instream-flow needs identified are: aquatic biota, recreation and aesthetics, water quality and hydropower. The information available for assessing flow for these needs ranges from qualitative, anecdotal statements from river users to somewhat quantitative data collected by Avista Utilities as part of their work for relicensing the Spokane River hydroelectric project.

Little Spokane River Instream Flow Needs Assessment (Aquatic Biota)

Spokane County contracted with Golder to conduct a detailed study of the Little Spokane River to determine if the flows set by rule would protect aquatic biota. Table 2. II.C summarizes the minimum flows set in Chapter 173-555 WAC for the four control points on the Little Spokane River. The table also includes the mean annual flow for the stream based on USGS records.

Table 2.II.C. Instream Flows established in 173-555-WAC.

	Mean Annual	July – August Minimum	Range of Instream Flow
Little Spokane River @ Elk	57	38	38 – 54
Little Spokane River @ Chattaroy	N/A	57	57 – 165
Little Spokane River At Dartford	304	115	115 – 250
Little Spokane River Confluence	604	375	375 - 490

The key purpose of the Little Spokane River instream flow needs assessment is to re-evaluate the existing minimum instream flows in the context of habitat needs for selected fish species (i.e. Redband/rainbow trout and mountain whitefish). This assessment focuses on established minimum instream flow control points on the Little Spokane River and locations on tributary streams (Otter, Dragoon and Deadman Creeks). The assessment of existing instream flows was based on the results of a Wetted Perimeter evaluation as well as a fish habitat evaluation using a single transect Physical Habitat Simulation (PHABSIM) analysis.

Both the wetted perimeter and the PHABSIM methods require selection of study sites to collect the necessary field data. Study site selection occurred under the guidance of the WRIA 55 and 57 Planning Unit Instream Flow Work Group, with input from representatives of the Washington Department of Fish and Wildlife (WDFW), Ecology and technical experts from Golder. Decision-making was also based on field visits to potential study sites. Homogeneous reaches were determined from longitudinal profiles of the stream and site visits. Study sites were selected on the basis of existing minimum instream flow control points, fish habitat, fish distribution and use, hydrology, existing data, site accessibility and the cost-per-site relative to the chosen instream flow methodology. Study sites on the Little Spokane River were located at Pine River Park, Chattaroy and Elk. Sites were also established on Otter Creek, Dragoon and Deadman Creeks. The site transects were selected to take advantage of the best locally available conditions for stage and discharge measurements. Transects were located in the riffle habitat to facilitate the wetted perimeter approach.

Wetted Perimeter Analysis

As the discharge in a river increases the amount of streambed that is covered by water, i.e. the wetted perimeter also increases. The rational behind the wetted perimeter method is that there is a point where the rate of increase in the wetted perimeter decreases as the discharge rate increases resulting in a distinct inflection point in the wetted perimeter versus discharge relationship. If such an inflection point can be easily identified, the corresponding discharge is identified as a potential minimum instream flow recommendation using this methodology.

To develop this relationship, field data were collected to measure the bed profile and water surface elevations at each transect for six different discharges to calculate the wetted perimeter. A stage discharge regression model was used to determine discharge at unmeasured discharges. The wetted perimeter results and general streamflow characteristics for the Little Spokane River and tributaries are included in Table 2. II.D.

Table 2.II.D. Little Spokane River wetted perimeter results and general streamflow characteristic.

	Mean Annual flow (cfs)	Wetted Perimeter results (cfs)	Bank Full Flow (cfs)
LSR @ Elk	56	32	120
LSR @ Chattaroy	150	50	375
LSR @ Pine River Park	310	160	1100
Otter Creek	N/A	13	50
Dragoon Creek	N/A	40	400
Deadman Creek	N/A	13	320

The application of the wetted perimeter method typically includes a degree of subjectivity in selecting the inflection point in the plot of wetted perimeter versus discharge. The Little Spokane River at Elk and Deadman Creek exhibited fairly noticeable inflection points (and several in some cases) while the sites at Pine River Park, Chattaroy and Dragoon Creek were much more subtle, exhibiting steady changes in slope rather than a distinct breakpoint. The Otter Creek site showed a break in the slope; however, the pattern of changing slope then reversed itself. This artifact of the transect location highlights the limitations of using a single transect per site. The clear breakpoint on Otter Creek occurs over a range of flows associated with a small terrace on one bank that appears to be higher than the typical base flows in the creek.

The wetted perimeter method provides a single instream flow number that is generally applied throughout the year. This approach does not take into account the variability of the natural stream hydrograph or the variability of fish habitat needs at different life stages. In this discussion the wetted perimeter flow values are therefore evaluated using the results of the fish habitat analysis to determine if the wetter perimeter recommendation provided suitable habitat protection.

PHABSIM Habitat Flow Relationships

Habitat versus flow relationships were developed to evaluate the biological relevance of the existing minimum instream flows as well as an independent check of recommendations based on the Wetted Perimeter method. A PHABSIM approach was used to develop the habitat versus discharge relationship. Within PHABSIM modeling, habitat is typically defined in terms of depth, velocity, substrate and cover. The measured data were used to calibrate the model. The model then produces simulated distributions of depths and velocities at unmeasured discharges across each transect.

Each simulated discharge is evaluated to determine the amount of suitable habitat available across the transect based on habitat suitability criteria. The Washington State-wide suitability criteria were used for rainbow trout while suitability criteria developed at expert workshops in Alberta were used for mountain whitefish. The habitat at any discharge can be compared to the maximum available habitat can be defined as a proportion of the maximum available habitat. The weighted useable width curves were used to define the amount of habitat available for each life stage of interest at the existing minimum flows, as well as the flows recommended by the Wetted Perimeter analysis.

Evaluation of Existing Minimum Instream Flows

The existing minimum instream flows on the Little Spokane River provide a variable flow regime that reflects the seasonal variability of water in the region. This is a desired feature of an instream flow rule and it is recommended that any adjustment to the current minimum instream flow values should retain seasonal variability. In general, based on the evaluation of the weighted useable width curves for each life stage of rainbow trout and mountain whitefish, the current minimum instream flows for the three control sites on the upper Little Spokane River provide relatively good habitat protection for most of the year.

Table 2.II.E provides a summary of the information collected at Pine River Park, the sampling site nearest the Dartford gage. The Dartford gage is used to enforce closures on junior water rights in the Little Spokane Basin and is thus a key to water right management. Based on the PHABSIM analysis, increasing the regulatory minimum instream flow at Pine River Park site on the Little Spokane River from the existing 115 cfs to the 160 recommended by the wetted perimeter method during July – September would provide a habitat gain for adult and juvenile life stages of rainbow trout and mountain whitefish but a decrease in habitat for fry. Spawning does not occur during the summer period.

Table 2.II.E. Comparison of life stage needs with flows measured at Pine River Park

Fish Species and Life Stage	**% Optimal Habitat Condition** (per PHABSIM)				PHABSIM Flows	
	WAC 173-555			Wetted Perimeter Flow (160 cfs)	≥ 80 % Optimal Habitat Condition	≥ 95 % Optimal Habitat Condition
	July-Sept (115 cfs)	Mar-Apr (190-250 cfs)	Dec-Jan (150 cfs)			
Rainbow trout						
Adult/juvenile	82	98-100	95	97	120-300	150-260
Spawning[1]	n/a	26-36	n/a	43	50-100	60-90
Fry	37	21- 26	32	31	57	50
Mountain whitefish						
Adult	60	93-100	n/a	80	180-350	200-300
Juvenile	80	97-99	92	95	130-500	160-400
Spawning[2]	n/a	n/a	86	90	140-525	180-400
Fry	89	62-71	79	77	50-140	60-90

[1] Rainbow trout spawn in March and April.
[2] Mountain whitefish spawn in December and January.

Table 2.II.F summarizes the wetted perimeter results for the three sites studied with an established minimum instream flow (MSF) and the habitat implications for rainbow trout and mountain whitefish. Table 2.II.G summarizes the established minimum instream flows and their habitat implications for the same fish species. The wetted perimeter flow of 50 cfs at the Chattaroy site on the Little Spokane River could be used to justify recommending minimum instream flow lower than the current 57 cfs for June and July. However, based on the PHABSIM evaluation, the 50 cfs from the wetted perimeter method provides only poor habitat conditions for most life stages of the target species during this time period. It is not recommended that the existing minimum be adjusted based on the wetted perimeter method. At the Elk Park site on the Little Spokane River, the existing minimum instream flows provide good habitat conditions throughout the year for most life stages. The wetted perimeter flow recommendation of 32 cfs also provides good habitat conditions for most life stages as determined from the PHABSIM evaluation. Adjustments to the current regulated flow to improve fish habitat are not warranted.

Table 2.II.F. LSR Wetted Perimeter flows and habitat implications for Rainbow Trout and Mountain Whitefish.

Site	Wetted Perimeter (WP) flow cfs	Normalized Habitat @ WP flow for adult / juvenile % of optimum	Normalized Habitat @ WP flow for fry % of optimum	Normalized Habitat @ WP flow for spawning [1] % of optimum
Rainbow Trout				
Elk Park	32	94	77	not evaluated [2]
Chattaroy	50	30	49	94
Pine River Park	160	43	31	97
Mountain Whitefish				
Elk Park	32	74	96	83
Chattaroy	50	35	99	40
Pine River Park	160	80	77	90

[1] Percentages for Spawning flows are based on the regulated flow during the spawning season for the species identified.
[2] The large cobble substrate at the study site near Elk Park is not suitable for rainbow trout spawning.

Table 2.II.G. LSR WAC 173-555 flows and habitat implications for Rainbow Trout and Mountain Whitefish

Site	Current MSF Flow (cfs)	Normalized Habitat @ Regulated flow for adult / juvenile (% of optimum)	Normalized Habitat @ Regulated flow for fry (% of optimum)	Normalized Habitat @ Regulated flow for spawning [1] (% of optimum)
Rainbow Trout				
Elk Park	38 - 54	84	61	not evaluated [2]
Chattaroy	57 - 165	66	27	15
Pine River Park	115 - 250	93	31	31
Mountain Whitefish				
Elk Park	38 - 54	85	84	92
Chattaroy	57 - 165	63	88	70
Pine River Park	115 - 250	70	79	86

[1] Percentages for Spawning flows are based on the regulated flow during the spawning season for the species identified.
[2] The large cobble substrate at the study site near Elk Park is not suitable for rainbow trout spawning.

The use of habitat simulation modeling for rainbow trout and mountain whitefish in the Little Spokane River shows that typical spring flows exceed the optimum flow for Rainbow Trout spawning at Dartford and are in the optimum range at Chattaroy and Elk. Flows at all three sites are in the optimum range for winter spawning of Mountain Whitefish

Establishing a single regulatory minimum instream values for the full year, as suggested by the wetted perimeter method, does not reflect the seasonal variability of flow and is not recommended for application throughout the year. During August through October the wetted perimeter flows are seasonally appropriate and the minimum flow at Elk Park could be lowered to 32 cfs if desired. Using 32 cfs would result in a small gain in habitat for juvenile / adult rainbow and slight habitat loss for mountain whitefish juvenile / adult populations. Due to the conflicting consequences on fish habitat of changing the minimum summer flow, changing the minimum is not warranted based on existing information.

Tributary Instream Flows

No minimum instream flows have been set for the tributaries of the Little Spokane River. A detailed evaluation to determine the biological relevance of the existing instream flow for Dragoon, Deadman and Otter creeks is not possible at this time due to the lack of suitable long term hydrologic information. Habitat evaluation was conducted using the wetted perimeter method described previously.

Tables 2.II.H and 2.II.I summarize minimum flows that would be set using the wetted perimeter approach for the three LSR tributaries studied. These results show that the wetted perimeter approach provides good habitat protection for rainbow trout adults and juveniles and mountain whitefish fry. For the other life stage / species combinations the habitat conditions at wetted perimeter flows are poor to moderate.

Table 2.II.H. LSR Tributary Wetted Perimeter flows and habitat implications for Rainbow Trout

Site	Wetted Perimeter (WP) Flow (cfs)	Normalized Habitat @ WP flow Rainbow adult / juvenile % Optimum	Normalized Habitat @ WP flow Rainbow fry % Optimum	Normalized Habitat @ WP flow Rainbow spawning % Optimum
Dragoon Creek	40	100	43	67
Deadman Creek	13	86	41	38
Otter Creek	13	90	46	N/A

Table 2.II.I. LSR Tributary Wetted Perimeter flows and habitat implications for Mountain Whitefish

Site	Wetted Perimeter (WP) Flow cfs	Normalized Habitat @ WP flow Mountain Whitefish adult / juvenile % optimum	Normalized Habitat @ WP flow Mountain Whitefish fry % optimum	Normalized Habitat @ WP flow Mountain Whitefish spawning % optimum
Dragoon Creek	40	60 - 78	95	63
Deadman Creek	13 / 6	33 - 44	100	18
Otter Creek	13	79 - 81	91	N / A

Using the wetted perimeter approach to establish instream flow minima for the LSR tributaries will not provide good habitat. As there are no current minimum instream flows, or even long term flow averages, with the existing information conclusions regarding the benefits to be derived from setting minima can not be evaluated either.

Use of Multiple Control Points for Managing Water Rights on the Little Spokane River

Chapter 173-555 WAC set control points on the Little Spokane River at Elk, Chattaroy, Dartford and Rutter Parkway. Currently the gage at Dartford is used to "manage" all junior water rights in the Little Spokane; when flow at Dartford drops below the minimum set for Dartford, all junior water rights holders in the basin receive notice to stop withdrawals.

Based on an assessment of water rights and certificates on file with the Department of Ecology the following numbers of rights and certificates would be managed using flows at the indicated control point if flow monitoring were being conducted at each control point: near Dartford -- 8, at Dartford -- 47, Chattaroy -- 74, and Elk -- 15.

Comparison of Minimum Flow Requirement Among LSR Sites

Table 2.II.J is based on a comparison of USGS gage data for 1947 – 1971 at Elk Park and At Dartford and October 1975 to September 1999 at Chattaroy and At Dartford with the variable instream flow minima set in Chapter 173-555 WAC (See Table 2.II.C).

Table 2.II.J. Little Spokane flows below the Minimum Instream Flow (MISF).

	Number of days below MISF	Number of Events below MISF	Potential number of irrigation season closures	Days closed
Elk 1947-1971	579	11	4	392
At Dartford 1947-1971	172	6	3	204
Chattaroy 10/75-9/99	2156	25	14	1,339
At Dartford 10/75-9/99	1713	17	13	1,054

Events in this table are defined as seven or more consecutive days below the minimum. Irrigation closures are events that occur between April 1 and October 1 of the year. After the first event during irrigation season it is assumed any action to restrict water use will remain in effect during the remainder of the season. Under these guidelines restrictions would have been put in place for the whole irrigation season three years (1977, 1992, and 1994) based on the Chattaroy gage and two years (1977 and 1992) based on the At Dartford gage.

Little Spokane River Instream Flow Needs for Uses other than Aquatic Biota

In addition to supporting aquatic biota the Little Spokane River provides for several other instream beneficial uses.

Aesthetics and Recreation

The current recreational and aesthetic uses in public areas of the Little Spokane River are canoeing, kayaking, swimming, fishing, picnicking, and holding ceremonies. These same activities occur to a lesser extent on private portions of river, which are not open to the general public due to a 1900 ruling by the

Washington State Supreme court. The public areas along the Little Spokane River are Elk Park, Pine River Park, and the Little Spokane Natural Area.

In Elk Park, swimming is somewhat limited near the end of the season when the flows are lower because the rocks are more dangerous for kids floating down the river. The main flow related use at Pine River Park is swimming. Low flows make swimming less fun, but the main complaint from users is the small beach. The parks' employees did not mention receiving complaints about swimming in the river making people sick.

Paddling or floating the river in canoes, kayaks, and inner tubes are the main flow related uses of the Little Spokane River in the Natural Area. Swimming is not allowed in this reach. People paddle the river at almost every level; however, the 2003 summer's flow of 90 cfs may be the lowest some groups can use. Lowering minimum instream flows may also harm cultural and educational values.

Little Spokane River Water Quality

Four stream segments in the Little Spokane Watershed are listed on Washington State's 303d list. A segment of the Little Spokane in the Natural Area is listed for PCBs. A segment of the Little Spokane just downstream of Highway 395 is listed for turbidity. A segment of Deadman Creek near the mouth is listed for fecal coliform, as is a segment of Dragoon Creek near its mouth.

The only permitted point source discharges into the Little Spokane River and its tributaries are the Colbert Landfill volatile organic compound stripping facility and Kaiser Aluminum – Mead. The Colbert Landfill facility discharges clean groundwater and does not limit beneficial uses. The Kaiser Aluminum – Mead plant is no longer operating and is not discharging any water.

The Spokane County Conservation District is currently working on a Water Quality Plan for the Little Spokane Watershed. The process will identify the non-point sources of contamination in the watershed and develop a plan to clean up or prevent non-point source pollutants from entering the river.

Hydropower

There is very little potential for low-head hydropower development in the Little Spokane Watershed. Lowering the flows in the Little Spokane River and its tributaries would limit the potential for any future low-head hydropower development.

Middle Spokane River Instream Flow Needs Assessment

Unlike the Little Spokane River where hydropower is not a factor in assessing instream flow, the Middle Spokane has three hydroelectric development (HED) projects within its boundaries. Upper Falls HED and Monroe Street HED are Avista Utilities projects in downtown Spokane and Upriver Dam is a City of Spokane facility at the east city limits. All these facilities are "run of the river" with impoundments serving only to provide a constant head for the turbines. The Post Falls HED in Idaho, four miles upstream of the Middle Spokane WRIA boundary at the State Line, regulates flow in the Spokane River during four to six months of the year.

Middle Spokane River Aquatic Biota

Under a cooperative agreement with Spokane County and Avista Utilities, Hardin-Davis conducted a study of the Middle Spokane to determine flows needed to support the various life stages of rainbow trout, the key indicator species in the Middle Spokane. Hardin-Davis' work was performed to support both watershed planning and Avista's FERC relicensing effort.

On September 3, 2003, Hardin - Davis, Avista, Spokane County, Washington Department of Fish and Wildlife, Idaho Department of Fish and Game and Washington Department of Ecology staff toured the Spokane River to establish study reaches. The study area was divided into two large "reaches." The Post Falls Reach (RM 101) extends downstream from the Post Falls Dam to slackwater behind Upriver Dam (RM 84). The Monroe Street Reach extends downstream from Spokane Falls (RM 74) to River Mile 71.

Seven transect locations were established in the Post Falls Reach. These include McGuire Park (RM 100.7) and Corbin Park (RM 99.8) in Idaho and Starr Road Bar (RM 94.7), Harvard Road (RM 92.7), Barker Road (RM 90.8) and Sullivan Road (glide @ 87.5 and cascade @ RM 87.0) in Washington. Two transect locations were established in the Monroe Reach, the Peaceful Valley area located at River Mile 73.4 and the Evergreen Street site was located at River Mile 72.5.

Depth, velocity, flow and substrate measurements at each of the transects were made while Post Falls HED flow released approximately 500, 1500, and 2500 cfs. Altering the discharge through the Post Falls HED created these flows. The river did not have time to equilibrate with the SVRP Aquifer between flow regimes.

Some of the sites were examined to determine flow needs for spawning and incubation (Starr Road Bar, Harvard Road, Peaceful Valley and Evergreen Street) and some were examined for rearing needs (McGuire Park, Corbin Park, Barker Road, Sullivan glide and Sullivan cascade).

General conclusions for rainbow trout spawning and incubation:

- Based on PHABSIM modeling, spawning (March to April) area at Starr Road Bar peaks between 7,5000 and 11,000 cfs and Harvard Road spawning area peaks between 7,000 and 8,500 cfs.
- Useable spawning area drops rapidly at flows below ~5,000 cfs at Harvard Road.
- Useable spawning area drops most rapidly between 6,000 and 5,000 cfs at Starr Road Bar.
- Incubation (approximately April 1 – May 31) is most effective if flow remains near spawning flow, thus preventing dewatering of redds.
- Available incubation area at Harvard plateaus at about 6,000 cfs and drops sharply below 4,500 cfs.
- Available incubation area at Starr Road Bar declines steeply as flow falls below 7,000 cfs.
- The Washington State Department of Fish and Wildlife and others generally believe the incubation flow is acceptable if either it (a) is 2/3 of spawning flow or (b) can be demonstrated to keep the spawning area wet.
- Almost no spawning habitat is available at Peaceful Valley with flow below 6000 cfs.
- About half the potential spawning area at Evergreen Road is available at 5000 cfs.
- Avista and the Fisheries resources agencies should continue to collaborate on managing the power generation and spillway operations to maintain a near constant flow in the Middle Spokane River between the end of spawning and the end of incubation.

General conclusions for juvenile and adult rainbow trout rearing:

- Little loss of rearing habit is seen with decreasing flow at the McGuire and Corbin Park sites. The current flow releases at Post Falls HED are probably adequate for trout rearing
- The Barker site provides better habitat for juveniles than adults.
- At the studied transect at Barker, wetted usable area for juveniles drops steeply below 200 cfs.
- At the studied transect at Barker, wetted usable area for adults drops steeply below 500 cfs.

- The Sullivan sites provide summer temperature refuge for trout during low flow periods.
- At the Sullivan sites, 150 to 200 cfs provides optimum habitat for both adult and juvenile trout.
- The Post Falls HED should be managed to achieve about 200 cfs at the Sullivan sites during the summer low flow period, taking into account the potential temperature effect of using lake water for flow augmentation.

The Hardin-Davis study developed flow relationships between the Post Falls HED and the Post Falls reach sites for this study. Because the river and the aquifer did not have time to equilibrate, using longer term data would create more accurate flow relationships. The USGS has data available for daily average flow at the Post Falls, Otis Orchards, and Greenacres gages for the 1999 – 2003 water years. These data sets can be used to better define the flow relationships between the operations at the Post Falls HED and at the habitat study sites.

Middle Spokane River Instream Flow Needs for Resource Uses and Values other than Aquatic Biota

In addition to supporting aquatic biota the Spokane River provides water for several other instream and out of stream resource uses and values. These include Aesthetics and Recreation, Water Quality and Hydropower Production. As part of their relicensing effort for the Spokane River Project, Avista has generated information on some aspects of all of these issues.

Aesthetics and Recreation

For aesthetic purposes the criteria for the Spokane River is to have total flow adequate to provide water to wet the majority of the north channel through Riverfront Park. The total flow should also provide for maintaining the current daytime flow of 200 cfs over the Monroe Street spillway.

The Louis Berger Group, Inc. provided a report to the Avista Relicensing Recreation, Land Use and Aesthetics work group on whitewater recreation in the Spokane River (2004). The Spokane River provides excellent whitewater boating opportunities with both river runs and park-and-play areas. Access to most play areas or river reaches is relatively easy and, in most cases, just minutes from downtown Spokane. In addition, paddlers can enjoy the whitewater resources for the vast majority of the year. Additional whitewater opportunities would be increases by providing Post Falls flow data online, by improving access at some sites, by adjusting releases within the 2,000 to 5,000 cfs range to meet the preferred flows, or by providing additional recreational releases during summer months. The relative benefits of additional summer time releases must be weighed against the effects on water levels, water quality, and water availability.

Protect Water Quality

The water quality criteria for Class A rivers like the Spokane River include dissolved oxygen, temperature, pH and turbidity. The primary manner flow affects water quality in the Spokane River is in wastewater discharge management. Water quality requirements in wastewater discharge permits are generally based on the dilution capacity of the receiving water at a prescribed minimum flow. The higher the minimum flows, generally, the less difficult it is to meet water quality requirements. The overall goal for this component of the instream flow recommendation is to minimize wastewater treatment costs while maintaining desired stream quality.

Hydropower

The goal for hydropower flows is to provide enough water to fully operate the smallest power plant on the Spokane River in WRIA 57 throughout the year.

Multi-Purpose Storage Assessment

A supplemental storage assessment was conducted in WRIAs 55 and 57 to investigate storage alternatives in order to enhance existing streamflow, prevent future decreases in low summer flows that may occur due to increased water use, increase water supply reliability, and meet future demand. The assessment was completed in two phases, the first being an initial broad assessment of potential storage options in the WRIAs, and the second being a more focused assessment of three specific storage options.

Analysis for the first phase included estimating the quantities of in-stream water that may be needed in the future, characterizing the hydrology of the watershed from a perspective of water available for storage, and identifying a broad range of storage related options and concepts that may be considered for inclusion in a watershed plan.

Many storage concepts were considered for application in the first phase, these included:

- Wetland and riparian storage enhancement,
- Surface water reservoirs,
- Infiltration ponds,
- Capture and infiltration of run-off,
- Natural groundwater storage/management,
- Aquifer Storage and Recovery,
- Surface recharge, injection and wetland discharge of reclaimed water for streamflow augmentation, and
- Direct discharge of groundwater for streamflow augmentation.

These concepts, and specific options where these concepts could be implemented, were presented to the WRIA 55 and 57 Planning Unit. From this information the Planning Unit provided guidance on concepts, or specific options that were considered feasible and beneficial for further study in the second step. The Planning Unit focused resources for the second step on three specific options.

1. Aquifer storage and recovery (ASR) in the lower Little Spokane Watershed, WRIA 55, using the Spokane Valley Rathdrum Prairie Aquifer (SVRP) as a source of water and the Lower Sand and Gravel Aquifer in the vicinity of the confluence of Deadman Creek with the Little Spokane River as the receiving water body.
2. Evaluation of surface storage potential on Beaver and Buck Creeks in northwestern WRIA 55.
3. Saltese Flats restoration for storage potential with additional focus on its potential as a discharge site for reclaimed water in WRIA 57.

These three options address or are applicable to the topics of environmental restoration, habitat improvement, providing for future water demand, and water reclamation.

Aquifer Storage and Recovery (ASR) in the Lower Little Spokane Watershed (WRIA 55)

Aquifer Storage and Recovery (ASR) is a water management method in which water is recharged into an aquifer during times of surplus, and stored for a period of time (from months to years). The water is then withdrawn during periods of high demand or for emergency use. This water resource management tool has the potential of providing additional water for out of stream uses with minimal impacts on streamflow. The Lower Sand and Gravel Aquifer in the region of the confluence of Deadman Creek with the Little Spokane River was identified as a candidate aquifer for storage. The source water being considered is groundwater from the Hillyard Trough area of the Spokane Valley Rathdrum Prairie (SVRP) Aquifer. Existing wells and transmission facilities would be used to withdraw the source water, transport it through existing municipal distribution facilities, and recharge it into the target aquifer. The stored water is intended for meeting existing and/or future domestic summer peak demand, and/or minimizing impacts to streamflow from peak summer withdrawals. Any leakage of stored water would result in the augmentation of streamflow.

The Whitworth Water District #2 overlies both the source aquifer (Hillyard Trough) and the recharge aquifer and might need additional instantaneous water right capacity in the next five to ten years, but has sufficient annual water right capacity for the next 20 years. Obtaining additional instantaneous water right capacity through the issuance of new water rights is uncertain. An ASR program may more easily provide the needed mitigation to allow allocating additional instantaneous capacity.

The assessment indicates that:

1 Hydrogeologically, the Lower Sand and Gravel Aquifer in the vicinity of the confluence of Deadman Creek with the Little Spokane River remains a candidate for receiving water in an ASR program. The aquifer is confined and well bounded. The primary variable of least confidence is the degree of hydraulic continuity between this portion of the aquifer and the rest of the SVRP Aquifer along State Route 2 in the vicinity of Mead.

2 The source aquifer (i.e., the Hillyard Trough portion of the SVRP Aquifer) is a sustainable seasonal (winter-spring) source of water for ASR.

3 The quality of the source and receiving waters appear compatible.

4 Existing infrastructure is well configured for ASR. High capacity groundwater wells are operated by the Whitworth WD#2 in both the source and recharge areas. Transmission capacity (i.e., intertie) between the proposed source and recharge wells exists, and may be sufficient to conduct a pilot test. Expansion of the transmission capacity in the next two years is planned and will improve the ability of the system to maintain an ASR program.

5 There may be a need for additional instantaneous water right capacity.

6 There is sufficient annual water right capacity under which to operate an ASR program that may allow the exercise of additional instantaneous water right capacity.

Based on the findings of this study, ASR appears to be a viable concept for increasing the instantaneous water right capacity needed to provide for projected increase in municipal water demand.

Potential New Surface Water Reservoir on Beaver or Buck Creek (WRIA 55)

Surface storage reservoirs were considered in WRIA 55 to retain peak flows to release later for summer stream flow augmentation. Streamflow augmentation objectives developed by the Planning Unit included augmentation of existing flows as well as prevention of further detriment due to exercise of junior, future or inchoate water rights.

A number of surface storage locations were evaluated in the First Step storage assessment based on available published literature regarding the geologic, soil, and hydrologic conditions of areas as well as the length of stream flow benefit, potential habitat (aquatic and terrestrial) impact, and water quality impacts.

To facilitate a comparative analysis of site potential, a target annual reservoir storage of 4,750 AF was used, which is approximately the projected impact resulting from full exercise of existing inchoate water rights. This volume is capable of augmenting streamflows with approximately 25 cfs for three months.

Further planning for this option would be expected to result in changes to this target volume based on the balance of streamflow augmentation and habitat benefits versus drawbacks of the reservoir. In order to determine if the site hydrology could meet the target volume, it was assumed that ideally, not more than 50% of flows would be retained between November and April.

Two alternative locations for a new dam in the northwestern corner of WRIA 55 considered were:

1. Beaver Creek in Stevens County, just upstream of Baker Lake Dam; and,
2. Buck Creek in Pend Oreille County, north of Beaver Creek, approximately 1.75 miles upstream of Horseshoe Lake.

From an environmental perspective, little site-specific data was available from which to characterize current conditions at either site. Therefore further study would be required to clarify site-specific conditions and potential impacts. From a technical perspective, available data on geology, hydrogeology, and hydrology indicate that either site could support a zoned earthen embankment dam.

Beaver Creek

In Beaver Creek, eastern brook and rainbow trout have been recorded, and three natural and one human-made barriers (Baker Lake Dam) are recorded downstream of the site. National Wetlands Inventory data (US Fish and Wildlife, 1987) indicate that the proposed Beaver Creek site would cause approximately 9.0 acres of wetlands to become inundated, although new seasonal wetlands would also be created.

The studied reservoir site on Beaver Creek was estimated to have insufficient inflow to support the target volume of 4,750 AF. Existing inflows could support a reservoir of between approximately 930 AF, assuming 50% of wet season inflow is retained, and 1,850 AF, if 100% of wet season inflow is retained. Reservoir sizing to support this range would require an embankment height of 25 to 40 feet, respectively. In terms of streamflow augmentation, 930 AF of storage is equivalent to approximately 8 cfs delivered continuously over a two-month period.

Buck Creek

In Buck Creek, eastern brook and rainbow trout, sculpin, and kokanee have been recorded. Two natural and one human-made barriers exist downstream of the site. Wetland survey data from the National Wetlands Inventory indicate that the proposed Buck Creek site would potentially inundate approximately 16.4 acres of wetlands, although new seasonal wetlands would also be created.

The studied reservoir site on Buck Creek was estimated to have sufficient inflows to meet the target volume of 4,750 AF. Assuming retention of 50% of wet season flows, an average of 4,560 AF of water would be stored. A reservoir of this size, on this site, would result in an embankment height of 85 feet. In terms of streamflow augmentation, 4,750 AF of storage is equivalent to approximately 38 cfs delivered continuously over a two-month period.

These options were evaluated with the objective of improving instream flows in WRIA 55 with the potential additional benefits to junior water right and/or inchoate water right holders. The balance between these objectives would likely be primary factors in the regulatory feasibility of permitting either project. Early engagement of regulatory agencies and development of a communication and permitting strategy to address environmental issues to ensure that all procedural requirements are met will be critical for these options, if pursued.

Saltese Flats Restoration

Saltese Flats (Flats) is evaluated in this report for multiple purposes of: wetland restoration, enhanced groundwater recharge for streamflow augmentation from seasonal storage, and as a potential site for reclaimed water discharge. The Flats is located in the southwestern portion of WRIA 57, in a rapidly developing area just south of the City of Spokane Valley and west of Liberty Lake. It was once a seasonal shallow lake, wetland system that was drained in the early 1900's for agricultural purposes, and is now used for agriculture, stock and some recreation. Residential development is encroaching upon the historical wetland area. Both the National Wetlands Inventory and the Spokane County Critical Areas Ordinance designate it as wetlands.

The Flats presents a unique opportunity for a multi-faceted project with benefits including: storage/streamflow augmentation, water quality improvement, wetlands restoration, reclaimed water polishing, open space preservation, habitat enhancement and educational benefits. Currently, undisturbed portions of the flats are used by migratory water fowl, raptors, mammals and amphibians including state-listed endangered, threatened and candidate species. Restoration is expected to provide a significant increase in habitat available to such species.

The predicted natural inflow hydrograph to the Flats from Saltese and Quinamose Creeks peaks in the winter and/or early spring. Currently, this water is directed to ditches and, primarily, passed through the Flats to Shelley Lake for infiltration, with some diversions for irrigation and small storage projects. Restoration of the Flats to a seasonal lake will result in a shift in the hydrograph of water flowing out of the Flats from the majority of discharge occurring in the winter and early spring during peak flows to discharge and infiltration from the Flats occurring in a more distributed manner throughout the year and with greater discharges during the late spring and possibly into the summer.

The historic state of the Flats as a seasonal lake indicates it has inherent potential for seasonal storage. Available site data indicate that the system is restorable; however development and zoning may limit the fulfillment of restoration for specific purposes. Streamflow augmentation to the Spokane River would occur through increased groundwater levels and recharge in the area surrounding the Flats and Shelley Lake, which receives the outflow from the Flats. Shelley Lake is located directly over the SVRP Aquifer. The Flats, however, appear to be located over a low permeability layer which prevents rapid infiltration and therefore results in storage of inflows.

Existing data is insufficient to confidently define the rate of recharge through the Flats, and the extent of hydraulic connectivity with the SVRP Aquifer. The rate of recharge in the Flats will ultimately determine the ratio of water stored and released as surface discharge to Shelley Lake versus the quantity which infiltrates directly through the Flats. This rate will also influence the storage size necessary to retain inflows in the Flats. However, in terms of streamflow augmentation surface water which recharges at either Saltese Flats or Shelley Lake is expected to have benefits to Spokane River flows through increased discharge to the river in gaining reaches, such as downstream of Sullivan Road, and potentially decreased losses in losing river reaches.

Saltese Flats restoration was evaluated in two steps, first for habitat using existing natural inflows, and second using the addition of reclaimed water. Taking into account potential restrictions to restoration, physical conditions, and goals, three configuration options were developed to bracket the system's potential:

1. Restoration of the seasonal shallow lake system (seasonal lacustrine system) using topography to contain seasonal water. This would involve the purchase of some areas zoned for future urban development. This option is estimated to have storage potential of approximately 11,400 AF, and a surface area of approximately 1,200 acres.

2. Restoration of the seasonal shallow lake system (seasonal lacustrine system) using dikes to prevent flooding outside of the Spokane County wetland critical area boundary. This option is estimated to have storage potential on the order of approximately 8,600 AF and a surface area of 895 acres.
3. Restoration of a seasonal marsh/wetland system (palustrine/emergent) within the Spokane County wetland critical area, with little manageable storage. This option is estimated to have storage potential on the order of approximately 2,000 AF, and surface area of approximately 895 acres.

Total annual natural inflow to the Flats is estimated to range from 8,800 AF to 15,700 AF. A water balance for the Flats indicates that, after taking into account losses to evaporation and recharge to the SVRP Aquifer, these volumes can be almost fully contained under the first two configurations. This would result in an estimated monthly average recharge to the SVRP Aquifer, between July and October, of between 11 to 35 cfs depending on the configuration and the climatic year. The third configuration is intended primarily for habitat enhancement and preservation, not as a manageable storage system, and most of the inflow would be immediately discharged. Evaporation and plant transpiration in the third option would likely result in little surface discharge during the summer months.

Management of the above configurations can accommodate the addition of reclaimed water. Regulatory guidelines for the discharge of reclaimed water to wetlands define criteria designed to protect the wetlands, groundwater quality and human health and are determined on a site-specific basis. These guidelines define the allowable loading and variation of discharge through average annual loading and average monthly water level criteria that are directly correlated to the total wetted area and based on pre-augmentation conditions. Hydraulic loading criteria for the described configurations results in limits which range from approximately 44 cfs to 61 cfs of inflow. Additionally inflow management must ensure that water levels do not increase over pre-augmentation conditions by more than 10 cm. Because the Flats is degraded, pre-augmentation conditions are not readily measurable and therefore would need to be based on an agreed upon definition of the desired wetland structure and function and collaboration with the departments of Ecology and Health.

Restoring the Flats to a seasonal, shallow lake/wetlands system is an option that has been of interest to several agencies and therefore could be expected to receive wide support. The site has the potential to provide seasonal storage, wetland habitat, reclaimed water polishing and public benefit in terms of open space, environmental educational opportunities, decreased flooding potential in winter and increased discharge to Shelley Lake in the summer.

The Flats appears to have a wide range of restoration options, in terms of size and configuration. To maximize the available opportunities this site presents, it will be necessary to coordinate many different agencies and objectives in order to achieve the maximum benefit.

CHAPTER 3 WATER AVAILABILITY

Introduction

There are many ways to consider water availability. One way is to determine if enough water exists in the watershed to supply the needs of the population in the area. Most of the water used in WRIAs 55 and 57 comes from groundwater and the majority of the people in the WRIAs receive water from aquifers in sand and gravel. Currently, these aquifers do not appear to be in danger of running out of water. Water levels may drop seasonally and/or during drought years, but rebound when precipitation increases. In the largest of these aquifers, the Spokane Valley – Rathdrum Prairie (SVRP) Aquifer, there is no current indication of an overall reduction in water levels over time. There are, however, limited areas within WRIAs 55 and 57 where groundwater levels have dropped, areas where water has to be imported to sustain the population, and areas where water is not reasonably available. Typically, wells located in these areas are drilled into rock or fine-grained sediments, or some other factor limits groundwater availability.

Another way to consider if water is available is to determine if water is likely to exist in excess of the quantities currently allocated to existing beneficial uses, including the minimum instream flow for fish. One of the three primary tasks outlined for watershed planning under Chapter 90.82 RCW is evaluation of the amount of unappropriated or available water in the watershed. Where minimum instream flows have been set, those flows need to be maintained and protected. Any water above the minimum instream flow requirement is considered excess water in the hydrologic system that may be allocated as new water rights without conditions. Even if it has been determined that water is not available, Ecology may allocate new water rights if mitigation is done to offset the impacts of the new water rights. One task of Watershed Planning is to develop such strategies for mitigation. The feasibility of implementing mitigation measures depends largely on the acceptability of the costs to the water rights applicant.

A water right specifically defines where water can be pumped and used, as well as the maximum pumping rate and total allowable annual volume. Historically, water right applications were processed on an individual basis and did not account for the total volume of water allocated within in the watershed. The current status of these water rights is unknown because some of the water allocated is no longer used. According to Chapter 90.14.160 RCW, 'any person entitled to the use of water …who abandons or voluntarily fails, without sufficient cause, to beneficially use all or any part of said water right to divert or withdraw for any period of five consecutive years after July 1, 1967, shall relinquish such right or portion thereof, and said right or portion thereof shall revert to the state…and be available for further appropriation. However, this "use it or lose it" policy does not apply to municipal water rights. Because they have an obligation to serve urban growth (Chapter 43.20.260 RCW), municipal water rights holders are allowed to keep their full water right regardless of whether they used the total volume in any five-year period. Currently, less than half of the 97,740 million gallons per year (300,000 acre-feet/year) of municipal water rights in WRIAs 55 and 57 are actually being pumped.

Attaining minimum instream flows both in the Little and Spokane Rivers is a criteria for allocating new water rights from the SVRP Aquifer because the SVRP Aquifer spans both watersheds and the Little and Spokane Rivers are interconnected with the SVRP Aquifer. In the lower Little Spokane River, and in gaining reaches of the Spokane River between the Greenacres gage and the Spokane gage, the SVRP Aquifer affects the river flows. A minimum instream flow was set for four sites on the Little Spokane River in 1976 (Chapter 173-555 WAC). No minimum instream flows exist for the Spokane River however this plan recommends the establishment of a minimum instream flow for the gage at Greenacres. Meeting the minimum instream flow during the summer at the Greenacres gage is primarily dependent on the flow through the Post Falls HED and is not affected by water use in Washington. Taking these factors into consideration, this section of the Watershed Plan assesses whether water is available for allocation in either WRIA 55 or 57.

Water Availability Information

Historical river flow data for the Spokane and Little Spokane Rivers are used to assess whether water is available for new water rights by looking at flow trends over time and comparing flows to the minimum instream flows set by rule. Information derived from the MIKE SHE Model (MIKE) scenarios that simulate present, past and future water resources provides a method for assessing the impacts of water use on flows in the rivers. The original computer model was based on and calibrated to water resource conditions (such as climate and water use) as recorded in the years 1994 to 1999. The first scenario represents pre-development conditions, the second scenario presents potential water consumption in the year 2020, and the third scenario presents potential water consumption further into the future by pumping all of the municipal inchoate water rights. These scenarios provide a general view of the impact that withdrawals may have on the overall hydraulic conditions in these watersheds.

Spokane River (WRIA 57)

Ecology in collaboration with the Washington Department of Fish and Wildlife (WDFW) recommended a minimum instream flow of 2000 cfs for the Spokane River at the Spokane gage in 1999. This flow was meant to protect rainbow trout rearing habitat in the lower Spokane River during the low flow summer months. In 2004, Hardin-Davis performed a needs analysis for rainbow trout spawning below the Spokane gage. Regrettably, the 2004 study did not address rainbow trout rearing below the Spokane gage. As a result, the evaluation of instream flow needs is not complete. Therefore, this Planning Unit stresses that further data and deliberations will be necessary before summer minimum instream flow recommendations can be made. Watershed planning in the lower Spokane River watershed (WRIA 54), more information from the Avista Dam Relicensing process, the Spokane River Dissolved Oxygen Total Maximum Daily Load, and the Bi-State Aquifer study may help in making minimum instream flow recommendations in the future.

The WRIA 55/57 Watershed Planning Unit recognizes the importance of staying actively involved in all future instream flow studies for the entire Spokane River watershed, including tributaries, due to the direct correlation of the resulting reports. In order to address the complex future water use needs for WRIA 55 and WRIA 57, it will be critical for the WRIA 55/57 Watershed Planning Unit to be represented during future water resource studies, to ensure that a collaborative process is upheld that will balance both the instream and out-of-stream needs within all of these watersheds.

Table 3.A shows monthly Spokane River flows calculated as a monthly average and the lowest daily flow for the whole period of record from U.S.G.S. Spokane gage data. Low flows can be caused, among other things, by climate or changes in Post Falls HED operation. Historical data show that the lowest daily flow for some months has not occurred in the last 20 years. The lowest daily flows for October, December, July, and August occurred over 20 years ago. The lowest daily flows for November, January, and April occurred before 1960. The lowest daily flows for February, March, and May occurred before 1940. However, the lowest flows of the year tend to be lower in recent years than in years past.

Table 3.A. Flows for the Spokane River at Spokane Gage		
	1891-2003 USGS Gage	
Month	Average Monthly Flow (cfs)	Lowest daily flow (cfs)
October	1,799	633
November	2,197	940
December	5,444	937
January	5,292	1,000
February	6,242	1,230
March	9,354	1,480
April	9,277	1,850
May	12,211	2,340
June	10,181	1,190
July	3,316	549
August	1,286	466
September	1,252	487

Table 3.B shows the minimum flow and the precipitation for the water years 1981 to 2003. Maximum snowpack at Lookout Pass located high in the Spokane River drainage, for the water years 1986 to 2002 is also presented. The snowpack data show why river flows stay higher some years than others and more accurately reflects the effect of weather patterns than precipitation at the Spokane Airport. Snowpack is defined as the equivalent depth of water in inches because of the variable moisture content of snow.

Table 3.B. 7-day average low flow for the Spokane River at Spokane Gage and precipitation at Spokane, 1981 to 2003. Maximum annual snowpack at Lookout Pass, 1986 to 2002.			
Water Year	7-day average low flow (cfs)	Annual precipitation at Spokane Airport (inches)	Lookout Pass maximum snow water equivalent (inches)
1981	983	16.78	
1982	1124	16.12	
1983	1333	20.26	
1984	1276	19.22	
1985	1140	14.17	
1986	752	16.15	26.8
1987	743	15.09	25.3
1988	550	16.64	26.6
1989	845	16.73	32.4
1990	1114	18.22	34.2
1991	858	15.38	31.2
1992	545	13.18	26
1993	1120	16.72	31.8
1994	502	10.11	21.8
1995	869	22.76	26
1996	1023	19.33	25.8
1997	1594	24.2	52
1998	845	15.1	25.5
1999	947	16.91	45.6
2000	730	17.18	32
2001	578	9.67	20.9
2002	993	15.47	46
2003	507	15.29	

Figure 3.A shows the mean annual flow of the Spokane River at the Spokane gage, which has the longest historical record in Washington. All of these data show the varying, often cyclic, nature of precipitation and river flow in our area. As with the SVRP Aquifer, there is little indication of a long-term downward trend in the total amount of water flowing in the Spokane River. Figure 3.B shows the 7-day average low flow for the same period. The 7-day average low flow is the lowest 7 consecutive day average in a year. Unlike the annual mean flow, the 7-day low flow is noticeably lower now than at the beginning of the record. These lower flows in recent years have many causes, but show a trend that may indicate less water is available.

Figure 3.A. Spokane River at Spokane mean annual streamflow.

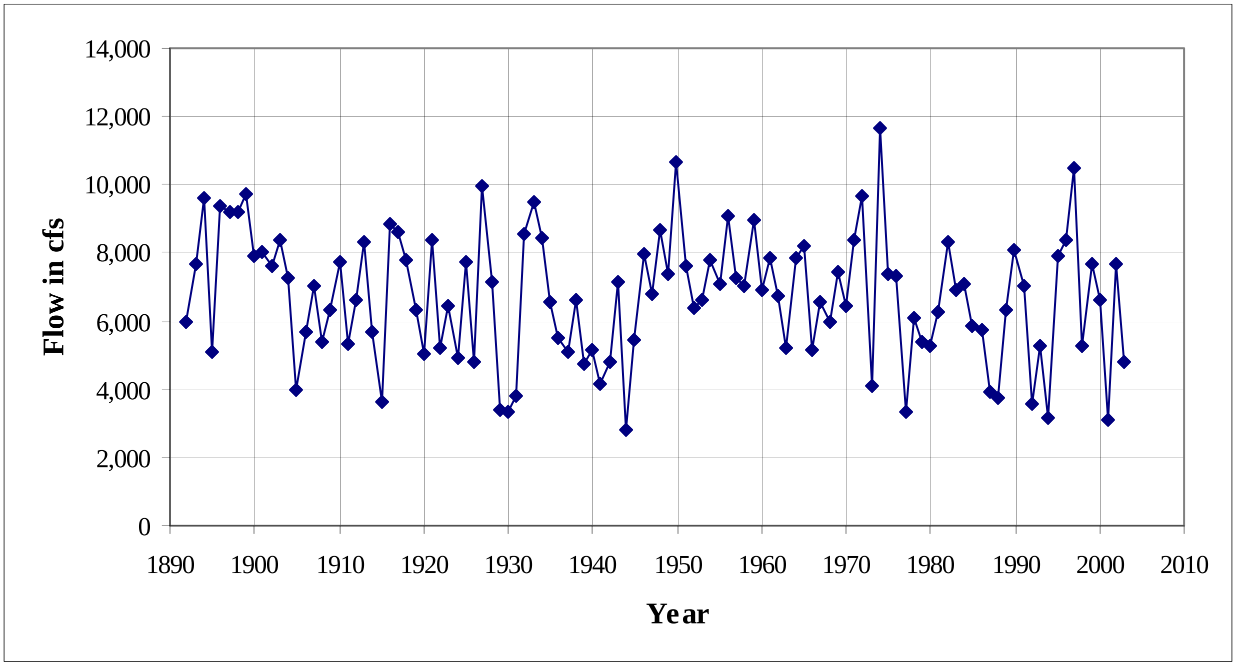
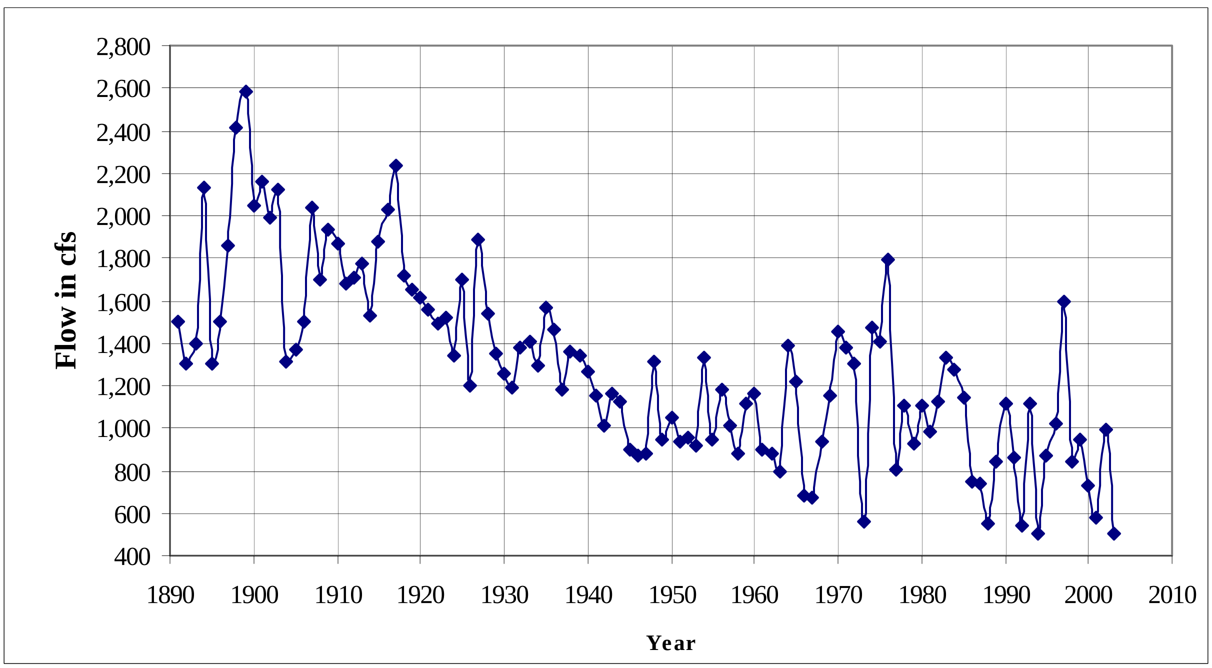


Figure 3.B. Spokane River at Spokane 7-day average low flow.

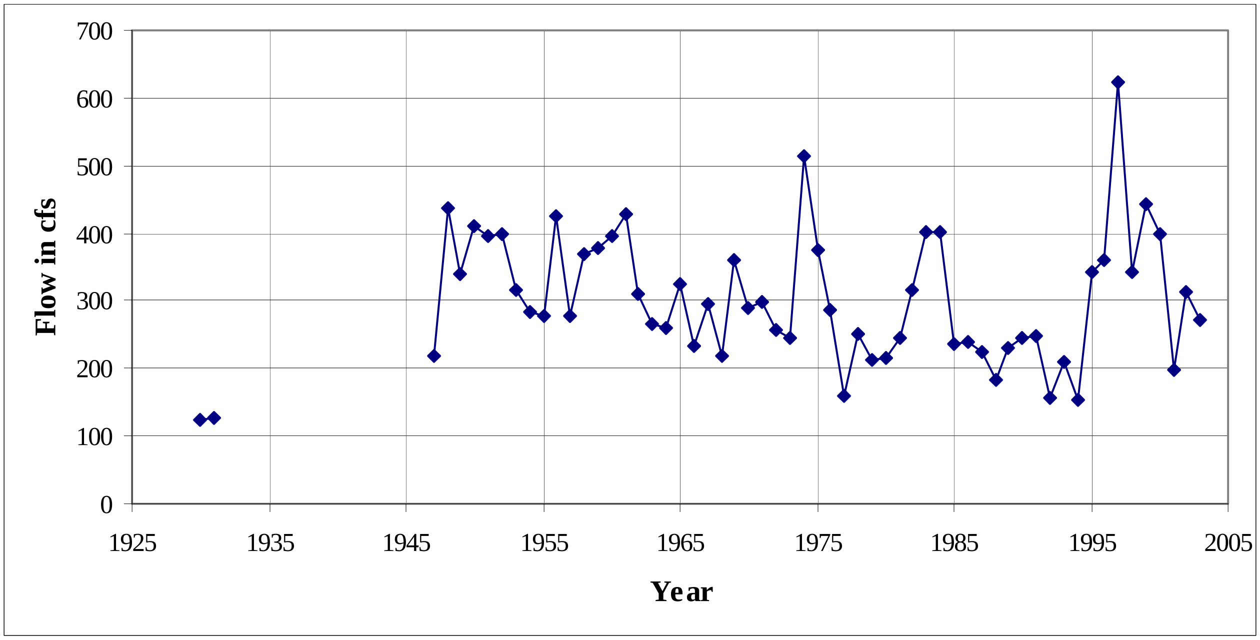


Little Spokane River (WRIA 55)

Comparisons of current flows with the minimum instream flows set by rule are used to assess water available for new water rights in the Little Spokane River. A minimum instream flow was set for the Little Spokane River in 1976 (Chapter 173-555 WAC). Studies conducted by Golder Associates in 2003 at Elk, Chattaroy, and near the At Dartford gage confirmed the ability of the minimum instream flows to protect the needs of rainbow trout and mountain whitefish at these three of the four sites listed in the rule. The water availability below the At Dartford gage cannot be determined at this time because the needs for fish were not studied downstream of this gage. Reevaluation of water availability based on minimum instream flows at Elk and Chattaroy was not done at this time because of the limited flow data available at these two sites.

Figure 3.C shows the mean annual flow of the Little Spokane River at the At Dartford gage. Again, these data show the varying, often cyclic, nature of precipitation and river flow in our area. As with the SVRP Aquifer and the Spokane River, there is little indication of a long-term downward trend in the total amount of water flowing in the Little Spokane River.

Figure 3.C. Little Spokane River at the At Dartford gage mean annual streamflow.



Comparing the minimum daily flow data from the gage At Dartford with the minimum instream flows set by rule shows that flows have been below the instream flow levels in all months of the year (Table 3.C). Ecology interrupts junior water rights during the irrigation season when the flow At Dartford falls below the minimum instream flow for 7 consecutive days. Table 3.D shows the 7-day average low flow for the years 1981 to 2003 along with the precipitation and snowfall at Newport for the years 1981 to 1999. Figure 3.D shows the 7-day average low flow compared to the summer time minimum instream flow of 115 cfs.

Applications for new rights typically request year-round municipal/domestic use or seasonal, summertime irrigation use. Water use demand is often highest at precisely the same time when the supply is most limited. Because of the frequency of water rights interruptions in recent years, Ecology is not currently issuing water rights in WRIA 55 that would need to use water during the dry, summer months. New summer uses would impair existing senior water rights (including instream flow rights). New rights for off-season use and/or summer uses that provide mitigation water may be available. Table 3.C shows that though minimum daily flows have not always been met, the average monthly flows do meet or exceed minimum instream flows. Proper planning, conservation and mitigation may help improve the periodic minimum flow deficit. Funding is needed to pursue, plan and develop watershed management measures in the upper watershed that would improve the minimum daily flow numbers. Additionally, to clarify the uncertainties of water availability above the At Dartford gage, the Planning Unit recommends reinstating the gage at Chattaroy and/or Elk as part of this plan.

Table 3.C. Minimum and average flows for Little Spokane River at the At Dartford Gage

Month	1947-2003 USGS Gage Minimum flow for the month (cfs)	Average Monthly Flow (cfs)	Mike She Model Results For LSR flow 1994-1999 Mean (cfs)	Minimum instream flows from Chapter 173-555 WAC (cfs)
October	81	157	153	130-140
November	85	191	194	150
December	80	239	238	150
January	90	288	311	150
February	120	412	352	150-170
March	134	588	412	190-218
April	150	633	484	218-250
May	117	421	325	192-170
June	100	264	252	148-130
July	72	167	158	115
August	66	134	159	115
September	69	138	160	115

Figure 3.D. Little Spokane River at the At Dartford gage 7-day average low flow.

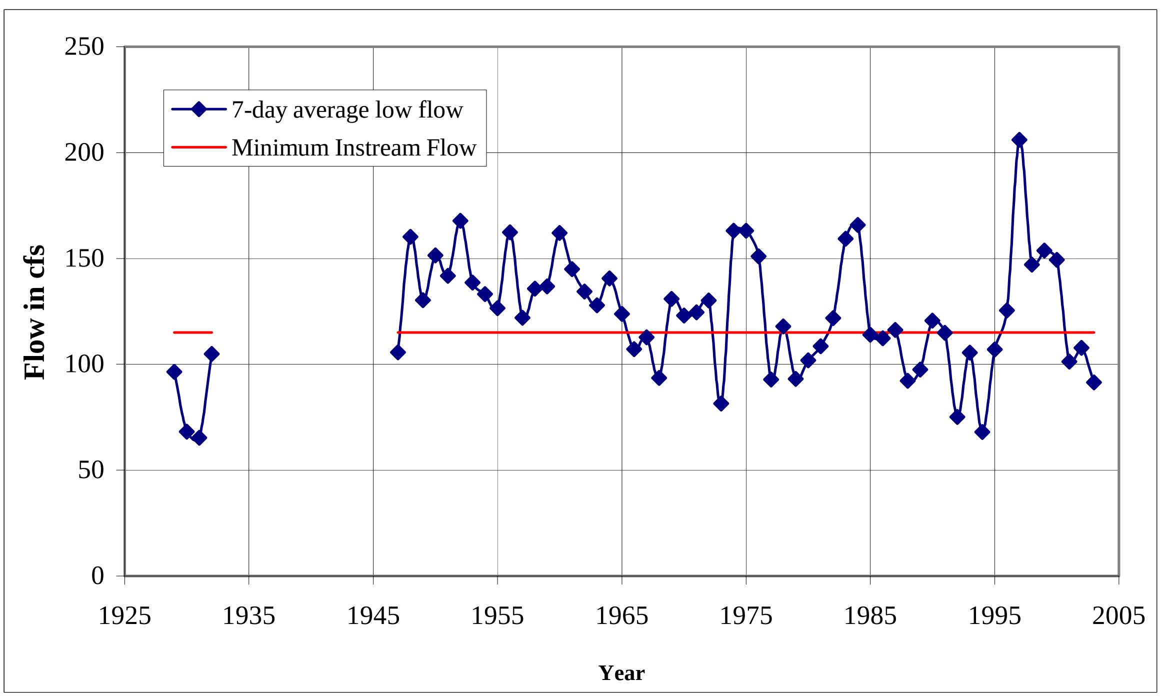


Table 3.D. 7-day average low flow for the Little Spokane River at Spokane Gage and precipitation at Newport, 1981 to 1999. Newport annual snowfall, 1981 to 1999.			
Water Year	7-day average low flow (cfs)	Annual precipitation at Newport (inches)	Newport annual total snowfall (inches)
1981	108.6	28.6	30.7
1982	121.9	34.1	72.9
1983	159.3	36.1	55.1
1984	165.9	31.7	40
1985	114.0	22.5	120.4
1986	112.3	26.0	71.9
1987	116.3	22.9	35.5
1988	92.1	20.5	47.7
1989	97.4	25.9	82
1990	120.6	27.2	56.1
1991	114.9	27.2	64.3
1992	75.1	20.6	28
1993	105.6	27.8	72.7
1994	68.0	14.3	33.8
1995	107.0	29.8	51
1996	125.4	25.1	23.3
1997	206.0	28.5	72.1
1998	147.0	29.6	14.4
1999	153.7	27.6	36.3
2000	149.3	26.3	20.1
2001	101.3	16.8	39.1
2002	107.7	28.4	57.3
2003	91.4	23.8	18.5

Modeled water use impacts.

Pumping water within WRIAs 55 and 57 can reduce the amount of water in the Spokane and Little Spokane Rivers. Results from the MIKE SHE model simulations predict past and future conditions and remove the climate variable from the analysis by using 1994 to 1999 climate conditions for all scenarios. Water use is not evenly spread throughout the year. Peak pumping occurs during the summer months and can be 3 times higher than during the winter. Unfortunately, this is also when stream flow is the lowest.

Pre-development scenario

Removing the water use impacts such as pumping, irrigation, and wastewater discharge simulates conditions before humans settled in the watersheds (pre-development conditions). This computer simulation was run to compare how the watershed system behaves without human impacts to current and potential future conditions. Table 3.D compares the results of this model simulation to the peak impact results of the three other model simulations described below. Effects for the Little Spokane Watershed are shown at the gage At Dartford because numerical instabilities downstream of this gage limit the confidence in the simulated flows.

Modeled current WRIA 55 and WRIA 57 water use (1994 to 1999)

The largest uses of water for the combined WRIAs 55 and 57 are municipal/domestic (41,700 million gallons per year or 128,000 acre-feet per year); commercial/industrial (12,700 million gallons per year or 39,000 acre-feet per year); exempt wells (3,100 million gallons per year or 9,600 acre-feet per year); and agricultural irrigation (2,400 million gallons per year or 7,500 acre-feet per year). Peak pumping in the model for WRIA 57 occurs in July and August at about 360 cfs (232 million gallons per day (mgd)). The peak streamflow change in the Spokane River at the Spokane gage is 206 cfs (133 mgd) in August, indicating a very quick impact of groundwater pumping on streamflow at the Spokane gage. Minimum (winter time) pumping equates to about 100 cfs (65 mgd) with approximately the same amount of change in the flow at the Spokane gage. Peak pumping for WRIA 55 is about 28 cfs (18.1 mgd) and minimum pumping is about 13 cfs (8.4 mgd). The peak monthly decrease in streamflow is about 13 cfs (8.4 mgd) in January, five months after peak pumping. The minimum decrease in streamflow of about 6 cfs (4 mgd) occurs in June and July. This represents a significant lag time between pumping and its effects on streamflow.

Year 2020 Projection (20 Year Growth Scenario)

Table 2.II.B shows the annual projected demand increase for the year 2020 scenario. The projected increase in groundwater pumping from the 1994 to 1999 baseline in WRIA 57 is 86 cfs or 56 mgd during peak summer pumping and approximately 20 cfs (13 mgd) during minimum pumping periods (winter). The projected average increase in pumping in WRIA 55 equates to 15 cfs (9.7mgd) in the summer and 1.5 cfs (1 mgd) in the winter months.

The 2020 scenario suggests the Spokane River flow at the Spokane gage decreases approximately an additional 50 cfs (32.3 mgd) in the summer and 25 cfs (16.1 mgd) in the winter. Between 7 and 13 cfs (4.5 to 8.4 mgd) of the additional lost flow is returned downstream by the City of Spokane's Advanced Wastewater Treatment Plant. There is no significant lag time between when peak pumping occurs and when the greatest decrease in flows occurs.

Full Municipal Water Rights (Inchoate Scenario)

The inchoate scenario simulates groundwater withdrawals that may occur under the full exercise of all allocated municipal water rights. Inchoate rights are the portion of municipal water rights not currently in use and reserved for future use. Current pumping of municipal/domestic water rights is about 47,200 million gallons per year (145,000 acre-feet per year). With the inchoate water rights, pumping would increase to around 97,740 million gallons per year (300,000 acre-feet per year). The average reduction in Spokane River flow at the Spokane gauge is 150 cfs (96.9 mgd) with a maximum reduction during the mid-to-late summer of about 250 cfs (161.5 mgd) and a minimum reduction of about 100 cfs (64.6 mgd) during the winter.

The SVRP Aquifer has the most municipal inchoate water rights in both WRIA 55 and WRIA 57. The interconnection between the SVRP Aquifer and the Spokane River in WRIA 57 is so strong that there is an immediate response in river flows after pumping of the SVRP Aquifer begins. The lack of a lag time and impacts on river flow are a result of the high hydraulic conductivity of the SVRP Aquifer and interconnection with the Spokane River.

The interconnection between the Little Spokane River and underlying aquifer(s) is not as strong as evidenced by a time lag of three-to-four months after pumping of the aquifer begins. The lag time between peak withdrawals and associated peak reduction of stream flows suggests the causes are the diffuse distribution of the points of withdrawal (wells) and the buffering effects of groundwater storage. Full exercise of inchoate water rights is predicted to reduce the average annual flow of the Little Spokane River At Dartford by approximately 13 cfs. Maximum changes in river discharge occur during the months of December/January, reducing river flow by about 15-16 cfs.

Table 3.E. Possible peak impacts of groundwater pumping on flows in the Middle and Little Spokane Rivers as simulated by the MIKE SHE computer model.

	Peak (summer) Pumping in WRIA 57	Peak (summer) Pumping in WRIA 55	Peak Impact on Spokane River at Spokane	Peak Impact on Spokane River below WWTP	Peak Impact on Little Spokane River at Dartford
Pre-development	0	0	0	0	0
Base (1994 to 1999)	361 cfs (238 mgd)	90 cfs (59 mgd)	206 cfs (133 mgd)	150 cfs (97 mgd)	13 cfs (8.4 mgd) in January
2020	446 cfs (288 mgd)	105 cfs (69 mgd)	260 cfs (168 mgd)	192 cfs (124 mgd)	31 cfs (20 mgd) in November through January
Inchoate	614 cfs (404 mgd)	107 cfs (70 mgd)	421 cfs (272 mgd)	303 cfs (196 mgd)	31 cfs in January, 11 cfs in August

Conclusion

The Planning Unit views the watershed planning and implementation process as an <u>on-going, adaptive, local consensus process</u>, to identify regional water needs, identify potential water available, identify reasonable solutions to timing, quantity, and in some cases water quality issues, and finally do this while keeping water costs appropriate.

It is recognized that there are federal, state, and local regulations governing water issues and it is recognized that these requirements often have some flexibility. For example, the State of Washington requires its water resource agencies to protect and enhance fish habitat, but there can be a great deal of discretion in enhancement. This Planning Unit has not fully investigated the needs of fish throughout the watersheds, although we have done investigations in areas that resource agencies have identified as most critical. Further work will be necessary, as described in the recommendations section, both below Sullivan Road on the Spokane and below Dartford on the Little Spokane with regard to identifying the water needs for fish.

Before questions on water availability and cost can be better answered, continued research will be necessary to provide the practical technical solutions to the significant issues identified that remain outstanding in regard to determining water availability, especially with the uncertainties that are rooted in demand (both here and in Idaho), climate change, future local decision making, and legal rights. Water supply will, in all probability, come at a higher cost in the future than it does now. In addition, finding technical solutions to the problems identified, and having public acceptance of the same is not guaranteed.

In addition, public priorities need to be further clarified with regard to conservation, instream flows, utility costs, water quality goals for surface water and groundwater, land use priorities, acceptability of potential technical solutions, validity of water rights, etc. The intent of the recommendations in this plan is to guide and further us all along toward answers for these difficult questions.

Regarding the need to set minimum instream flows for WRIA 55 and 57, along with the adjoining WRIA 54, the Planning Unit understands the necessity to continue working with the Departments of Ecology and Fish and Wildlife, and the WRIA 54 Watershed Planning Unit to ensure that a collaborative process is upheld to help set minimum flows. The primary goal for setting the minimum instream flows is to balance both the instream and out-of-stream needs, in accordance with Chapter 90.82 RCW for these watersheds.

As additional technical information becomes available, collaborative solutions are developed, and minimum instream flows are agreed upon and set, the Planning Unit will need to incorporate the results into the WRIA 55/57 Implementation Plan and future updates of the WRIA 55/57 Watershed Plan.

CHAPTER 4 RECOMMENDED ACTIONS

The heart of the Little Spokane River (WRIA 55) and Middle Spokane River (WRIA 57) Watershed Plan is the Recommended Actions section. This section presents the policies, issues and recommendations the Planning Unit deems necessary or desirable for future water needs in the Spokane watersheds. Each watershed has its own issues and therefore these recommendations are specific to these watersheds.

The WRIA 55 Watershed has three counties within the boundaries of that watershed (Spokane, Stevens and Pend Oreille Counties), which represent varied priorities and issues dealing with the wide-ranging differences of population growth and demands, geographies, economics and resources available within each county. In addition, these three counties have specific land use and water resource regulations, which must be administered according to the Critical Areas Ordinances, Comprehensive Plans, and statues written specific for each county. Chapter 4 includes recommended actions that may be a different priority for each county or watershed.

Preceding sections of this document have outlined the general goals of watershed planning, the technical basis for decision-making and a summary of the current status of the resource. One of the tools used to support decision-making was the MIKE SHE computer model of the surface and ground water of both watersheds. This model, which is mentioned in this chapter, is described in Chapter 2.

In the course of developing this section, eight key action areas were identified; the recommended actions are organized under these action areas. While the eight key action areas are listed in a general order of priority, the policies, issues and recommendations within them are not. The Policy, Issue and Recommended Action elements are generally listed in the order they were brought up by the Planning Unit or Work Groups.

Recommended actions presented herein do not necessarily represent obligations on the part of the participating agencies. Obligations and recommendations are specifically defined in the Implementation Matrix as presented in Chapter 5: Implementation. For recommended actions that are identified as obligations, no entity can be required to implement the recommended action without their specific, written consent.

The Implementation Matrix is intended to represent the initial thinking of the "who" and "when" with respect to the recommended actions, as approved by the Planning Unit. The Implementation Matrix presented in Chapter 5 includes the proposed timing of the recommended actions and a preliminary estimate of the anticipated level of effort by the participating governments and agencies. It is understood that the specific details of the implementation of the recommendations and obligations will be developed in greater detail the initial year of Phase IV, Implementation, following approval of this Plan.

Implementation of many of the recommended actions not directly obligating State resources will need participation of the Ecology-appointed watershed lead for planning and coordination. The initial thoughts of all of the potential participating state agencies are included after the Implementation Matrix.

I. Water Conservation, Reclamation and Reuse

Background

Conservation, reclamation and reuse are the easiest ways of extending the availability of water. Implementing measures to accomplish one or more of these allows the user to do more with the same amount of water. The terms conservation, reclamation and reuse all have legal and / or quasi-legal definitions that are too limiting for the purpose of this discussion. For the purpose here, the following definitions apply:

Conservation: Applying measures that reduce the amount of water consumed to perform a defined task.

Reclamation: Adequately and reliably treating wastewater so that as a result of that treatment it is suitable for a beneficial use or a controlled use that would not otherwise occur and is no longer considered wastewater.

Reuse: Applying water that has been used, with or without treatment, to a second beneficial use. The water quality requirements of the follow up use are generally lower than that for the initial use.

Water purveyors, industrial and commercial well owners, and public and private entities that irrigate substantial areas from on-site wells (parks, schools, cemeteries, golf courses etc.) provided total amounts of water pumped (Table 4.I.A). Water use amounts for several categories of use were divided by the 2000 U.S. census data for the service area of the users to obtain a daily per capita water use figure. The water use data are presented in units of acre feet/year, million gallons/day, and cubic feet per second for comparison. The total amount of water pumped for all uses indicate a year around average production of water of approximately 327 gallons per person per day. During the winter municipal water production is about 157 gallons per person per day. During the peak water use months of July and August, the water production increases to approximately 700 gallons per person per day. These data indicate there is a significant increase in water use during the summer above the year round base water use for indoor use. The increase in water use is most likely caused by irrigation of lawns and gardens.

Table 4.I.A. Spokane Metro Area Public Supply Groundwater Pumping (1994 to 1999)

Use	Annual			July and August		
	Residential	Metered M& I	Total Production	Residential	Metered M&I	Total Production
	gallons/ person/ day	gallons/ person/ day	gallons/ person/ day	gallons/ person/ day	gallons/ person/ day	gallons/ person/ day
Municipal Non-irrigation Use [1]	76.2	118.1	156.7	76.2	118.1	156.7
Municipal Irrigation	108.1	150.8	171.4	314.2	451.3	547.5
Municipal Subtotal	**184.3**	**268.9**	**328.1**	**390.4**	**569.4**	**704.2**
Commercial / Industrial [2]			105			107
Commercial Irrigation [3]			4			12
Total			**437.1**			**823.2**

[1] average of November - March pumping represents "indoor" (Non-irrigation) use
[2] not supplied by municipal sources
[3] parks, schools, golf courses etc. not supplied by municipal sources

Table 4.I.B summarizes daily per capita water use for Spokane County and other locations in the Western United States to provide a comparison with Spokane area water use.

Table 4.I.B. Public Supply Daily Per Capita Water Use.					
	Use Period	Per Capita Use gal/day	Use Type	Population Served	Source
Ada County, ID (Boise)	1995	181	Residential	165,700	USGS Website
Ada County, ID (Boise)	1995	212	Total Production	165,700	USGS Website
Ada County, ID (Boise)	2000	223	Total Production	258,770	USGS Website
United Water Idaho (Boise area)	2001	230	M & I	190,000	United Water ID Website
Billings, MT	1997	214	M & I	92,000	City Utility Website
Kootenai County	1995	170	Residential	79,770	USGS Website
Kootenai County	1995	229	Total Production	79,770	USGS Website
Kootenai County	2000	280	Total Production	86,950	USGS Website
King County, WA	1995	129	Residential	1,506,760	USGS Website
King County, WA	1995	177	Total Production	1,506,760	USGS Website
King County, WA	2000	208	Total Production	1,593,060	USGS Website
Pend Oreille County, WA	2000	134	Total Production	5,390	USGS Website
Spokane County	1995	124	Residential	342,350	USGS Website
Spokane County	1995	271	Total Production	342,350	USGS Website
Spokane County	2000	214	Residential	368,690	USGS Report
Spokane County	2000	298	Total Production	368,690	USGS Website
Stevens County	2000	209	Total Production	23,400	USGS Website
USGS Report: SIR 2004-5015 USGS Website: http://water.usgs.gov/watuse/ Accessed 7/13/2004.					

Policy

I.A. Support actions to reduce per capita water consumption. (Confirmed 6/9/2004)

Issue

I.A.01. What steps can be taken to reduce indoor water use? (Approved 10/22/03; Confirmed 11/19/03)

Recommendations

I.A.01 a. Determine indoor conservation issues (approaches) on which the public needs to be educated (i.e. in-door low flow devices such as showerhead, facets, toilets and appliances and habits). (Approved 10/22/03; Confirmed 11/19/03)

I.A.01 b. Local authorities / wastewater utilities should evaluate customer indoor water saving incentives as a means to save on new facility costs. If cost effective, incentives should be included in facility and comprehensive planning processes and implemented through local regulation. (Updated 11/19/03; Confirmed 11/19/03)

I.A.01c. City and County governments will develop and implement a regional education and awareness program to promote wise and efficient use of the water supply with voluntary participation by water suppliers. (Work Group 12/04/03; Approved 1/21/04, Confirmed 3/24/04)

I.A.01.d. Municipal water suppliers will develop water conservation programs independently and cooperatively in accordance with Washington State Department of Health regulations and other water suppliers are encouraged to develop their own water conservation programs. (Work Group 12/04/03; Approved 1/21/04, Confirmed 3/24/04)

Issue

I.A.02. What steps can be taken to reduce domestic, municipal and public outdoor water use? (Approved 10/22/03; Confirmed 11/19/03)

Recommendations

I.A.02 a. Determine the outdoor conservation issues (approaches) on which the public needs to be educated (i.e., soil development, plant root development, native/drought resistant vegetation, xeriscaping). (Approved 10/22/03; Confirmed 11/19/03)

I.A.02 b. Counties/Cities consider developing incentives for xeriscaping and use of native and/or drought resistant vegetation through existing and future planning processes. *(Updated 11/19/03; Confirmed 11/19/03)*

I.A.02 c. Include options for xeriscaping in landscape requirements for commercial and industrial developments. (Work Group 12/04/03; Approved 1/21/04, Confirmed 3/24/04)

I.A.02 d. Encourage the xeriscaping option for urban open space in planned developments. (Work Group 12/04/03; Approved 1/21/04, Confirmed 3/24/04)

I.A.02 e. County/Cities/Water Purveyors encourage implementation of water conservation in watering of public properties such as parks, school lawn areas, athletic fields, boulevards, and highway green areas. (Approved 10/22/03; Confirmed 11/19/03)

I.A.02.f. Evaluate the benefits of retrofitting irrigation systems with automatic controllers and other high efficiency components for schools, golf courses, parks, cemeteries, and other large scale public irrigation projects (Planning Unit request rewrite 01/21/04; Work Group 1/27/04, Approved 3/24/04, Confirmed 6/9/2004)

I.A.02.g.Encourage and evaluate incentives for irrigators (e.g. agricultural and golf course) to implement all feasible irrigation efficiencies. (Staff & WG 01/27/2004, reworded and approved 6/9/2004, confirmed 6/29/2004, reworded 11/17/2004)

Policy

I.B Support education programs which foster public acceptance of water conservation, reuse and reclamation. (Confirmed 6/9/2004)

Issue

I.B.01. What steps should be taken to educate the public on water conservation and use? (Approved 10/22/03; Confirmed 11/19/03)

Recommendations

I.B.01a Encourage the use of several educational methods to reach all segments of the population, those in schools, government, and businesses. (Approved 10/22/03; Confirmed 11/19/03)

Policy

I.C. Support actions that result in the increased use of reclaimed and reused water. (Confirmed 6/9/2004)

Issue

I.C.01. What economic, political, legal and resource incentives can be implemented to encourage municipalities, utilities and businesses to reclaim and reuse water? (Approved 10/22/03; Confirmed 11/19/03, reworded and confirmed 6/9/2004)

Recommendations

I.C.01 a. Evaluate the public perception of water reclamation and reuse and determine how to educate the public to increase their understanding of the benefits and risks. (Approved 10/22/03; Confirmed 11/19/03, reworded and confirmed 6/9/2004)

I.C.01 b. Evaluate the potential for tax incentives, permitting and/or regulatory credits that can be used by corporations that want to implement water reuse strategies. (Staff & work group 01/27/04, Approved 3/24/04, reworded and confirmed 6/9/2004)

I.C.01.c. Evaluate development of cost-effective options for reclamation arid reuse in small scale and decentralized settings. (Approved 10/22/2003, confirmed 11/19/2003, reworded and confirmed 6/9/2004)

I.C.01.d. Research possible water reuse and reclamation opportunities. (Added from public comment. Approved 10/26/2004, confirmed 11/8/2004)

II. Instream Flow Needs for the WRIA 57, the Middle Spokane Watershed

Background

Under a cooperative agreement with Spokane County and Avista Utilities, Hardin - Davis conducted analysis of spawning and incubation habitat for rainbow trout in the Spokane River between Post Falls and the confluence with Latah (Hangman) Creek. The instream flow studies were coordinated with the Avista relicensing stakeholders fisheries group. Members of the Planning Unit gave input to the Avista FERC relicensing process that will affect minimum instream flows and spawning and emergence flow management.

Rearing habitat for rainbow trout was analyzed between Post Falls and just downstream of Sullivan Road in the Spokane Valley. Physical Habitat Simulation (PHABSIM) of the Instream Flow Incremental Methodology (IFIM) was used to model how habitat changed through different flows.

Resident trout in the Spokane River maintain a self-sustaining population between Spokane Falls and the Post Falls Dam. These two endpoints limit immigration into this section of the river. Instream flows to protect spawning, incubation, and rearing habitat are needed to perpetuate the population. All life stages are essential, but flow is most likely to limit these populations. Because of the need to protect more than one life stage, a variable flow regime that reflects the seasonal variability of water in the region is a desired feature of an instream flow rule. The instream flow proposals for spawning and incubation cover the Spokane River from Post Falls to the confluence with Latah (Hangman) Creek. The rearing instream proposals cover the portion of the Spokane River from Post Falls HED to Barker Road.

Rainbow trout spawning occurs in the spring, primarily in April, during spring runoff. These flows are largely unregulated. They determine where spawning will occur. In a high runoff year spawning will be higher on the gravel bars and in a low runoff year spawning will be lower on the gravel bars. Once fish spawn, eggs are at the location where spawning occurred and production from those eggs depends on incubation conditions through the remainder of the spring incubation season, through the end of the first week in June, as the spring runoff recedes. To the extent possible, the rate of decline of spring runoff should be minimized within the incubation period (Beecher and others, 2004).

The rest of summer and into the fall Avista controls the flow in the Spokane River with the Post Falls HED. Flow in the river is needed for fry (newly emerged fish that occupy shallow edge habitat), young-of-the year juveniles that behave more like older juveniles (juvenile I), juvenile IIs (at least 1 year old), and adults who coexist and contribute to production and recreational value. Older fish (juvenile IIs and adults) require the most territory and have already survived through critical life history stages. Providing habitat for older juvenile and adult trout will also maintain considerable habitat for fry and young-of-the-year. At the same time, emphasis on the older life stages will facilitate segregation of the different life stages, thereby minimizing habitat overlap and potential cannibalism. Barker Road provides the highest WUA per 1000 ft of stream for both juvenile 2 and adult rainbow trout. Table 4.II.A shows the flows at Barker Road and the percent of maximum rearing habitat in the area for juvenile 2 and adult trout. Temperature effects, due to warm lake water releases, limit useable habitat at higher flows.

Table 4.II. A. Flows and rearing habitat based on the Barker site studied by Hardin-Davis (2004).		
Flow at Barker (cfs)	Percent of maximum rearing habitat for juvenile 2 rainbow trout	Percent of maximum rearing habitat for adult rainbow trout
200	91%	37.3%
250	98%	48.9%
300	100%	59.4%
350	99%	68.7%
400	97%	77.2%
450	94%	84.6%
500	92%	90.0%
550	90%	94.3%
600	87%	96.9%
650	84%	98.8%
700	81%	100.0%
750	78%	99.5%
800	75%	99.0%
850	72%	98.5%
900	68%	97.7%
950	65%	97.0%

Policy

II.A Assure that instream flows for the Middle Spokane River meet the needs of rainbow trout and other associated aquatic biota. (Work Group 12/4/03, Approved 3/24/04; Confirmed 4/21/04)

Issue

II.A.01. Does the information on rainbow trout from the Hardin Davis Instream Flow and Habitat Study establish the basis for setting instream flows on the Middle Spokane River? (Work Group 12/4/03, Approved 4/1/04; confirmed 4/21/04)

Recommendations

II.A.01.a Establish a minimum instream flow for the Spokane River at the Barker Road transect (USGS Gage 12420500) of 500 cfs to provide significant weighted useable area for juvenile and adult rainbow trout. (Staff 2/27/04; Re-worded and Approved 4/1/04; confirmed 4/21/04, reworded and confirmed 6/29/2004, Changed 10/21/2004, confirmed 10/26/2004)

II.A.01.b Avista's 2007 operating license for the Spokane River Hydroelectric Development should require a minimum discharge to provide habitat for juvenile and adult rainbow trout that would be protected through a minimum instream flow for the Spokane River at the Barker Road transect (USGS gage 12420500) of 500 cfs. (Staff 2/27/04, re-worded and Approved 4/1/04; Confirmed 4/21/04, reworded and confirmed 10/26/2004)

II.A.01.c Flow in the Middle Spokane River should be managed to optimize spring spawning, incubation and emergence for rainbow trout. A protocol should be established between the WDFW, IDF&G and

Avista to accomplish this task. Specific flow levels and timing would be established as early as possible each year and based on snow pack and expected runoff conditions for that year. (Staff 2/27/04, Re-worded and Approved 04/01/04; Confirmed 4/21/04)

II.A.01.d. Continue operation of the Greenacres gage and study the correlation between the Barker Road and Post Falls flows. (Approved 6-2-04, confirmed 6/29/2004)

Issue

II.A.02 Would using Post Falls gage (USGS gage 12419000) and/or the Greenacres gage (12420500) provide better protection for aquatic biota in the Spokane River between the Post Falls HED and Sullivan Road than using the Spokane at Spokane gage (USGS Gage 12422500) below the Maple Street Bridge? (Staff 2/27/04; Re-worded and Approved 4/1/04, confirmed 6/2/2004)

Recommendations

II.A.02.a The flow regime in critical habitat areas for aquatic biota identified in the Spokane River between the Post Falls HED and Sullivan Road are more closely related to flow at the Spokane River near Post Falls gage (USGS 12419000) *and/or the Greenacres gage (12420500)* than at the Spokane River at Spokane gage (USGS 12422500). To improve flow management in this reach, take steps to upgrade the Post Falls gage to that of a "real time" gage. (Staff, 3/26/04, re-worded and Approved 04/01/04; Confirmed 4/21/04)

II.A.02.b. Instream flow for the Lower Spokane River could be managed using USGS Gage 12422500, the Spokane River at Spokane. Conduct fish habitat studies focusing on juvenile and adult rearing on at least 3 sites in the Lower Spokane River between the Monroe Street HED and the Nine-Mile HED pool. This work could be conducted as part of the WRIA 54, Lower Spokane River Watershed Plan and/or as an Avista relicensing PM&E. (Staff, 2/27/04, re-worded and Approved 04/01/04; Confirmed 4/21/04)

Policy

II.B. Manage flow in the Middle Spokane River to provide for aesthetic and recreational use. (re-worded and Approved 04/01/04; Confirmed 4/21/04)

Issue

II.B.01. What flow provides an aesthetic experience in the "north channel" of the Spokane River in Riverfront Park? (Staff 3/26/04, re-worded and Approved 04/01/04; Confirmed 4/21/04)

Recommendations

II.B.01.a <u>Support a consensus based agreement within the Avista Recreation, Land Use, and Aesthetics Work Group of at least 300 cfs in the north channel of the Spokane River through Riverfront Park as the basis for aesthetic flows</u>. (Staff 3/26/04, re-worded and Approved 04/01/04, confirmed 6/2/2004, re-worded and approved 11/8/2004, confirmed 11/17/2004)

Issue

II.B.02. What flow conditions are needed to provide recreation experiences on the Middle Spokane River during the low flow period? (Staff 3/26/04, re-worded and Approved 04/01/04; Confirmed 4/21/04)

Recommendations

II.B.02.a Use the Avista Recreation, Land Use, and Aesthetics Work Group findings as the basis for recreation flows in the Middle Spokane River. (Staff 3/26/04; Approved 4/21/04, confirmed 6/2/2004)

II.B.02.b Evaluate the use of periodic increases in flow during low flow periods for recreational use in the Middle Spokane River while taking into account effects on aquatic biota, water quality, and safety. (Staff 3/26/04, Workgroup 5/26/2004, approved 6/2/2004, confirmed 6/29/2004)

II.B.02.c Evaluate the impact on aquatic biota, water quality, and safety of managing the declining spring runoff and fall drawdown with releases from the Post Falls HED to optimize recreational use of the Spokane River according to the Avista Recreation, Land Use, and Aesthetics Work Group. (Staff 3/26/04, Workgroup 5/26/2004, approved 6/2/2004, confirmed 6/29/2004)

Policy

II.C Manage flow in the Middle Spokane River to maintain water quality adequate for identified beneficial uses. (Staff, 04/09/04; Approved 4/21/04b, confirmed 6/2/2004, confirmed 6/29/2004)

Issue

II.C.01 How do different flow regimes in the Spokane River affect temperature and Dissolved Oxygen and what are their consequences for aquatic biota? (Staff and workgroup, 5/26/2004, approved 6/2/2004, confirmed 6/29/2004)

Recommendations

II.C.01.a. Encourage the Department of Ecology to use the CEQUALW2 model (with necessary changes) to consider different flow regimes as part of the Spokane River / Lake Spokane TMDL process. (Staff and workgroup, 5/26/2004, approved 6/2/2004, confirmed 6/29/2004)

Policy

II.D. Manage flow in the Middle Spokane River to provide adequate flow during spring runoff so river water can be diverted for groundwater recharge augmentation while protecting spawning and incubation of fish. (Staff and workgroup, 5/26/2004, approved 6/2/2004, confirmed 6/29/2004)

Issue

II.D.01. How can spring high flows be managed to meet the needs of fish spawning and incubation and still allow for the diversion of flow for groundwater recharge? (Staff and Workgroup, 5/26/2004, approved 6/2/2004, **confirmed 6/29/2004***)*

Recommendations

II.D.01.a. Evaluate how river diversions can be accomplished without impairing spawning and incubation of rainbow trout. (Workgroup, 5/26/2004, approved 6/2/2004, confirmed 6/29/2004)

Policy

II.E. Integrate flow recommendations for aquatic biota, recreation, aesthetics, and water quality into an overall recommendation for flow management in the WRIA 57 watershed. (Planning Unit Discussion, Staff 04/01/04; re-worded and Approved 4/21/04, confirmed 6/2/2004)

Issue

II.E.01 What flows are needed to meet different seasonal uses? (Staff, 04/09/04; Re-worded and Approved 4/21/04, confirmed 6/2/2004)

Recommendations

II.E.01.a. After the Avista HED license application is filed, the Spokane River / Lake Spokane Dissolved Oxygen TMDL data gathering phase, and instream studies on rearing below Monroe Street HED are completed, integrate all of the recommended instream flows into one regime for the whole watershed. The flow regime will be submitted to the Department of Ecology for instream flow rule making. Ecology obligation. (Workgroup, 5/26/2004, approved 6/2/2004, confirmed 6/29/2004, reworded from 10/21/2004 meeting, approved 10/26/2004)

III. Instream Flow Needs for the Little Spokane River

Background

Recommendations for instream flow for aquatic biota in the Little Spokane River are based on the Instream Flow evaluation performed by Golder (2003). The guiding principle behind the study was to determine if the current minimum instream flows established on the river provide protection for target species – Rainbow Trout and Mountain Whitefish. Table 4.III.A shows the Chapter 173-555 WAC minimum instream flows for the Little Spokane River. Two approaches were used. First, measurements were taken to develop wetted perimeter curves for the River and tributaries at selected sites. These curves were used to produce a "wetted perimeter" flow. Second, additional measurements were taken to allow the use of a physical habitat simulation model to produce a total useable habitat for the site and the fraction of that habitat made available at specified flows.

Table 4.III.A. Little Spokane River Minimum Instream Flows, Chapter 173-555 WAC

		all flows are in cubic feet per second (cfs)			
Month	Day	Elk	Chattaroy	Dartford	Confluence
January	1	40	86	150	400
	15	40	86	150	400
February	1	40	86	150	400
	15	43	104	170	420
March	1	46	122	190	435
	15	50	143	218	460
April	1	54	165	250	490
	15	52	143	218	460
May	1	49	124	192	440
	15	47	104	170	420
June	1	45	83	148	395
	15	43	69	130	385
July	1	41.5	57	115	375
	15	39.5	57	115	375
August	1	38	57	115	375
	15	38	57	115	375
September	1	38	57	115	375
	15	38	63	123	380
October	1	38	70	130	385
	15	39	77	140	390
November	1	40	86	150	400
	15	40	86	150	400
December	1	40	86	150	400
	15	40	86	150	400

Study sites on the Little Spokane River mainstem were located at Pine River Park, at Chattaroy and at Elk Park. All three of these sites are near the gages where a minimum instream flow (MISF) was set in Chapter 173-555 WAC. Table 4.III.B below provides a summary of the results obtained by comparing the useable habitat available with total habitat available at the site.

Table 4.III.B. LSR WAC 173-555 MISF and habitat implications for Rainbow Trout and Mountain Whitefish				
Site	MISF Flow (cfs)	Normalized Habitat @ MISF for adult / juvenile (%Total)	Normalized Habitat @ MISF for fry (%Total)	Normalized Habitat @ MISF for spawning [1] (%Total)
Rainbow Trout				
Elk Park	38 - 54	84	61	not evaluated [2]
Chattaroy	57 - 165	66	27	15
Pine River Park	115 - 250	93	31	31
Mountain Whitefish				
Elk Park	38 - 54	85	84	92
Chattaroy	57 - 165	63	88	70
Pine River Park	115 - 250	70	79	86
[1] Percentages for Spawning flows are based on the regulated flow during the spawning season for the species identified. December and January for Mountain Whitefish, March and April for Rainbow Trout. [2] The large cobble substrate at the study site near Elk Park is not suitable for rainbow trout spawning.				

In general, the existing minimum instream flows in the Little Spokane River mainstem appear to be reasonable for protecting habitat of the Rainbow Trout and Mountain Whitefish. Channel maintenance and riparian flows are also provided on a regular basis because higher flows in the Little Spokane River have not been reduced by human activity.

In addition to the three main stem reaches, flow / habitat conditions were evaluated for sites on three tributaries - Otter Creek, Dragoon and Deadman Creeks. These results show that the wetted perimeter approach provides good habitat protection for rainbow trout adults and juveniles and mountain whitefish fry. For the other life stage / species combinations the habitat conditions at wetted perimeter flows are poor to moderate. Using the wetted perimeter approach to establish instream flow minima for the LSR tributaries will not provide good habitat.

The current minimum instream flows appear to also protect some other existing beneficial uses such as aesthetics and recreation. A separate process being led by the Spokane County Conservation District addresses water quality issues and will develop a Water Quality Management Plan. Some of the water quality problems that may be affected by flow are: dissolved oxygen, temperature, nutrients, turbidity and suspended sediments. The Department of Ecology is allocating waste loads through the Total Maximum Daily Load (TMDL) process.

Management practices used currently in the Little Spokane River Watershed due to the failure to meet the minimum instream flow many years are (1) closing the basin to any new water rights and (2) interrupting junior water rights when the flow at Dartford falls below the minimum instream flow for seven consecutive days. Asking all water rights holders in the basin to conserve water may help increase low flows and reduce the need for these management practices. Any new management practices will need to consider cost of implementation versus cost to the public, and consider priorities relating to minimum flows (e.g., human, fish, recreation) and the law.

Policy

III.A. Assure that instream flows for the Little Spokane River (173-555 WAC) meet the needs of rainbow trout and mountain whitefish and other representative aquatic biota. (Confirmed 6/2/2004)

Issue

III.A.01. Does the information on rainbow trout and mountain whitefish from the Golder study support changing the minimum instream flows on the Little Spokane River? (Approved 10/22/03; Confirmed 11/19/03)

Recommendations

III.A.01.a. Recommend no changes in the minimum instream flows for the reaches controlled by the "At Dartford" gage, the Chattaroy gage, and the Elk Park gage in WAC 173-555 at this time. As new data become available the minimum instream flows should be evaluated. (Approved 10/22/03; Put on hold by city of Spokane 11/19/03, workgroup addition 5/26/2004, confirmed with additions 6/2/2004)

III.A.01.b. Additional studies on instream flow needs for the mainstem and tributaries should be conducted if problems arise with the existing conditions. (Updated 11/19/03; Confirmed 11/19/03)

III.A.01 c. Studies should be conducted on the major tributaries to determine the extent of and areas where spawning occurs. When this information becomes available, flow studies on the tributaries should be conducted to determine flow needs for the tributaries. (Updated 11/19/03; Confirmed 11/19/03)

III.A.01 d. Recommend a study on the Little Spokane River tributaries on optimizing habitat for the target species and linking the preferred flows on the tributaries to flows at the control points. (Approved 10/22/03; Confirmed 11/19/03)

III.A.01 e. Expanded study on the mainstem would require reapplication of PHABSIM using site-specific preference curves and multiple transect measurements. (Updated 11/19/03; Confirmed 11/19/03)

III.A.01.f. Recommend a study of the fish habitat instream flow needs for the reach of the Little Spokane River below the "At Dartford" gage to better determine the water available for future withdrawals. (Workgroup, 5/26/2004, approved 6/2/2004, confirmed 6/29/2004)

Policy

III.B. Manage water resources in the Little Spokane Basin to maintain beneficial uses other than aquatic biota. (Updated 11/19/03; Confirmed 11/19/03)

Issue

III.B.01. How will pumping from the SVRP Aquifer Watershed to provide water service in the Little Spokane Watershed north of the Little Spokane River / Deadman Creek affect flows in the Little Spokane River? (Updated 11/19/03; Confirmed 11/19/03)

Recommendations

III.B.01.a. Monitor the effects of exporting water from the SVRP Aquifer into the Little Spokane Watershed on the flow of the Little Spokane River. (Approved 10/22/03, Confirmed 11/19/03)

Issue

III.B.02. What action should be taken toward domestic exempt wells when flows at the designated control point fall below the minimum instream flow? (Updated 11/19/03; confirmed 11/19/03)

Recommendations

> *The following recommendation is being evaluated and considered by the Watershed Planning Unit for inclusion in the Plan:*
>
> **III.B.02.a. The Department of Ecology should enforce the minimum instream flow shutoff of water rights junior to WAC 173-555 on irrigation from exempt wells in the Little Spokane Watershed where it does not cause additional fire danger. (Workgroup 5/26/2004, approved 6/2/2004; confirmed for inclusion in the first draft Watershed Plan June 6-29-04)**

See also IV.A.02.a

Issue

III.B.03. What effect will reactivating the gage at Chattaroy and/or Elk have on water rights interruptions for upper basin water users? (Updated 11/19/03; Confirmed 11/19/03)

Recommendations

III.B.03 a. Using existing data, study the effects of reactivating the gage at Chattaroy and/or Elk for regulation of the upstream water users. (Updated 11/19/03; Confirmed 11/19/03)

III.B.03 b. If further study is desired, the Planning Unit should work with Pend Oreille County, the Department of Ecology, Spokane Community College and others to continue flow measurements as needed. (Updated 11/19/03; Confirmed 11/19/03)

III.B.03 c. If the benefits are sufficient to offset costs and legal constraints do not exist, beneficiaries of the operation of a Chattaroy control point, in cooperation with the Department of Ecology, should reactivate and fund the gage at Chattaroy and/or Elk with real time capabilities as needed for regulation. (Updated 11/19/03; Confirmed 11/19/03)

Issue

III.B.04. What actions are needed to maintain or improve recreational opportunities on the Little Spokane River? (Work Group 12/04/03, approved 1/21/2004, confirmed 6/2/2004)

Recommendations

III.B.04 a. Promote management practices, when feasible, that maintain minimum flows of at least 90 cfs at the "At Dartford" gage in the Lower Little Spokane River (Little Spokane River

Natural Area) to support current and future recreational activities. (Work Group 12/04/03 & 5/26/2004, approved 6/2/2004, confirmed 6/29/2004)

III.B.04 b. Promote management practices, when feasible, that maintain minimum flows of at least 90 cfs at the "At Dartford" gage for Pine River Park and 32 cfs at Elk Park to support existing and future recreational activities. (Work Group 12/04/03, approved 1/21/2004, confirmed 6/2/2004)

III.B.04 c. Investigate and/or determine if future parks or access points are needed for recreational use of the Little Spokane River. (Work Group 12/04/03, approved 1/21/2004, confirmed 6/2/2004)

Issue

III.B.05. Would a better understanding of flow in the West Branch of the Little Spokane River help water resource management in the watershed? (From public comment, approved 11/8/2004, confirmed 11/17/2004)

Recommendation

III.B.05.a. Determine the feasibility of installing a gage(s) on the West Branch of the Little Spokane River. (From public comment, approved 11/8/2004, confirmed 11/17/2004)

Policy

III.C. Integrate flow recommendations for aquatic biota, recreation, aesthetics, water quality, and other uses into an overall recommendation for a minimum instream flow regime. (PU conceptually approved 6/2/04, staff 6/3/2004, confirmed 6/29/2004)

Issue

***III.C.01. What flows are needed in the Little Spokane River for different seasonal uses?* (PU conceptually approved 6/2/04, staff 6/3/2004, confirmed 6/29/2004)**

Recommendations

III.C.01 a. When the lower Little Spokane River aquatic biota study and the Water Quality Management Plan/TMDL process are completed, integrate all of the recommended instream flows into one regime to evaluate the need for revisiting the instream flow rule for the whole watershed taking wildlife habitat and other uses into account. (PU conceptually approved 6/2/2004, staff 6/3/2004*;* confirmed 6-29-2004)

III.C.01.b. Develop strategies for achieving the integrated flow regime. (PU conceptually approved 6/2/2004, staff 6/3/2004*;* confirmed 6-29-2004)

Technical Support Needs

Additional study of fish spawning, migration and rearing habitat for resident species in tributaries led by WDFW.

IV. Domestic Exempt Wells

Background
Based on current land uses in the Little Spokane River basin there are approximately 7,000 households supplied by domestic exempt wells. These homes are estimated to use an average of 5.66 million gallons per day. In terms of water use, domestic exempt and agricultural irrigation wells pump about equal amounts of water in the basin. Unlike agricultural irrigation use, which is closed to further appropriation, there is no limit imposed by water rights on domestic exempt wells. With many vacant parcels where exempt wells can be drilled in Spokane County alone, the potential for continued, impact on groundwater is substantial.

In some areas the density of exempt wells is high enough that in low recharge years, wells go dry. This has led to the demand for the extension of public water supply to homes on the fringe of the urban area. Often the cost of these extensions exceeds the income they can generate. With the Growth Management Act restricting new development outside the UGA, there is little incentive for water suppliers to extend water to these areas.

Policy

IV.A. Develop approaches to land use management that limits the impacts of withdrawals from domestic exempt wells at or below current levels. (Confirmed 6/9/2004)

Issue

IV.A.01. Should the counties adopt policies to manage the proliferation of domestic exempt wells? (Approved 10/22/03; Confirmed 11/19/03)

Recommendations

IV.A.01 a. Support low residential densities in areas of the counties designated as rural in order to protect water supplies. *(Approved 12/17/03; Confirmed 2/18/04)*

IV.A.01 b. The counties should implement a policy or procedure requiring a person who is developing property within a water service area to consult with the water purveyor about the potential for public water service before creating a development or single-family residence dependent on domestic exempt wells. *(Approved 12/17/03; DE workgroup added "single-family residence" 1/12/2004; Confirmed 2/18/04)*

IV.A.01 c. Request counties, cities, and/or the Regional Health Districts to evaluate the quantity of water necessary (currently 1 gallon per minute) from a domestic exempt well before a building permit is issued. (Instream WG 5/26/2004; approved 6/9/04; confirmed 6-29-04)

IV.A.01.d. Local land use regulations should contain specific criteria by which applicants for land development such as subdivisions, short subdivisions, binding site plans, or certificates of exemption for the purpose of creating additional building sites must demonstrate sufficient water availability. (6/8/2004; approved 6/9/04; confirmed 6-29-04)

IV.A.01.e. Water purveyors are encouraged to participate with land use regulators and the Department of Health in identifying and addressing areas of water availability concern. (6/8/2004; approved 6/9/04; confirmed 6-29-04)

IV.A.01.f. Land use regulators are encouraged to consider available ground water resources when establishing minimum parcel sizes in areas where exempt wells will be the main source of domestic water in an effort to avoid future water shortages. (6/8/04; approved 6/9/04; confirmed 6-29-04)

Issue

IV.A.02. Should the counties adopt policies which limit the maximum daily withdrawals from individual domestic exempt wells where detrimental impacts are identified? (Staff and WRIA 56, 5/27/2004, approved 6/9/2004, confirmed 6/29/2004, wording added 12/15/2004)

Recommendations

IV.A.02 a. Evaluate policies that will limit the maximum daily withdrawals to less than 5000 gallons per day where detrimental impacts are identified. (approved 6/9/04; confirmed 6-29-04, wording added 12/15/2004)

Issue

IV.A.03. What are the methods for reducing summertime water use from domestic exempt wells during low flow years? (Approved 10/22/03; Confirmed 11/19/03)

Recommendations

IV.A.03.a. At a minimum, when flows in the Little Spokane River are expected to fall below minimum instream flows, caution letters should be sent to all domestic exempt well owners in the Little Spokane Watershed asking them to voluntarily conserve water. Methods for saving water and directions to a website with more information will be included with the letter. (Approved 12/17/03; Confirmed 2/18/04)

Policy

IV.B. Collect additional data to better define the impact of exempt wells on water use and model calibration. (confirmed 6/9/2004)

Issue

IV.B.01. Would more accurate water use quantities and locations for domestic exempt wells make a significant difference in the accuracy of the watershed model? (Approved 10/22/03; Confirmed 11/19/03)

Recommendations

IV.B.01.a. Run a sensitivity analysis on water use from exempt wells with the watershed model. If the model is recalibrated with different data in the future, another sensitivity analysis may need to be done. *(Approved 12/17/2003; Confirmed 2/18/04 with "will" need to be done to "may")*

Issue

IV.B.02. Would more accurate water pumping quantities and locations for Group B and small Group A wells make a significant difference in the accuracy of the watershed model? (Approved 10/22/03; Confirmed 11/19/03)

Recommendations

IV.B.02.a. Run a sensitivity analysis on unmetered Group A and Group B water use with the watershed model. If the model is recalibrated with different data in the future, another sensitivity analysis may need to be done. (Approved 12/17/2003; *Confirmed 2/18/04 with "will" need to be done to "may")*

Policy

IV.C. Develop a clear, consistent policy for assigning water rights quantities for water systems taking over domestic exempt wells. (Confirmed 6/9/2004)

Issue

IV.C.01. Could the Department of Ecology be clearer and more consistent when assigning water rights quantities for water systems taking over domestic exempt wells that have no record of previous water usage? ? (Approved 12/17/03; Confirmed 2/18/04)

Recommendations

IV.C.01.a Recommend that the Department of Ecology clarify policy 1230 (Consolidation of Rights for Exempt Ground Water Withdrawals (1/11/1999)) to ensure it is consistently implemented. (DE workgroup reworded 1/12/2004; *Approved 2/18/04, Confirmed 6/9/2004)*

Technical Support Needs

MIKE SHE Model runs incorporating the above recommendations on sub basins to determine the magnitude of natural recharge.

V. Water Rights and Claims

Background

Current water rights and claims are evaluated by the Department of Ecology when making decisions on whether to grant new water rights. Since only a small portion of the Little Spokane Watershed and none of the Middle Spokane Watershed has been adjudicated to determine the actual quantities of valid water rights, the quantity of potentially valid water rights and claims on file is significantly higher than the current water use.

Instream flows adopted by rule are similar to water rights in that they are protected from impairment from those rights junior in priority date to the instream flows. These junior water rights are interruptible when flow in the stream falls below the minimum instream flow. An interruptible water right is not acceptable for domestic suppliers who need a long-term reliable and predictable supply of water. At the same time the State of Washington discourages the development of exempt wells for multiple domestic uses where water supplies are available from public water systems. When flows are set by rule, watershed groups and other stakeholders frequently seek to have certain amounts of water reserved for future uses that would not be subject to interruption to protect regulatory flows. A municipal reserve would set aside for future municipal water rights. If a reservation would conflict with protection and preservation of fish and wildlife, then it may not be allowed unless there is a clear showing of overriding consideration of public interest (OCPI).

Policy

V.A. Water management is needed for WRIAs 55 & 57 to insure water in the future for all beneficial uses. (Staff 5/27/2004, Confirmed 6/9/2004)

Issue

V.A.01. Would a better understanding of water rights in the WRIAs help in making water management decisions for WRIA 55 & 57? (Approved 10/22/03; Confirmed 11/19/03)

Recommendation

V.A.01.a. Request the Department of Ecology to monitor and enforce existing water rights holders to meet conditions of their water rights and comply with state law. (Staff revision 5/28/2004; reworded and approved 6/9/04; confirmed 6-29-04)

V.A.01.b. Evaluate how to inventory water use within the watersheds to assist in making future water management decisions. (Approved 6/9/2004, confirmed 6/29/2004)

V.A.01.c. Evaluate the creation of a Municipal Reserve for future water rights for municipal water supplies. (LSR ISF Work Group 12/4/2003, approved 6/9/2004, confirmed 6/29/2004)

V.A.01.d. Develop strategies to address compliance, enforcement, and validity of water rights and claims within WRIAs 55 and 57. (Written and approved 1/14/2005, confirmed 1/26/2005)

Issue

V.A.02. How can water rights be acquired to increase instream flow? (From public comment, Approved 10/26/2004, reworded and confirmed 11/8/2004)

Recommendation

V.A.02.a. Encourage the use of the State Trust Water Rights Program to secure water rights for instream flow. (From public comment, Approved 10/26/2004, reworded and confirmed 11/8/2004)

Policy

V.B. Reduce summertime water use to help increase river flow during low flow years. (Staff 5/27/2004, confirmed 6/9/2004))

Issue

V.B.01. What are the approaches for reducing summertime water use by those with water rights during low flow years? (DE workgroup 1/12/04; Approved 2/18/04; Confirmed 3/24/2004)

Recommendation

V.B.01.a. When flows in the Little Spokane River and/or Middle Spokane River are expected to fall below the minimum instream flow during the summer, all water rights holders should be contacted asking them to voluntarily conserve water. (Confirmed 3/24/2004)

V.B.01.b. When flows in the Little Spokane River and/or Middle Spokane River are expected to fall below the minimum instream flow during the summer, a media campaign should be launched to encourage additional water conservation measures. (recommended and approved 3/24/2004, Confirmed 6/9/2004)

VI. Strategies for Base Flow Augmentation

Background

In the Middle Spokane and Little Spokane River Watersheds over 70% of the precipitation occurs as snow and rain during the winter. As this stored water melts in the spring much of it runs off and causes a rapid increase in stream flow, usually in the months of April through June. In both watersheds, high water use coincides with normal low flow. If more of this water could be held high in the watershed and released slowly, spring runoff peaks would be lowered and summer low flows would be raised and more water would be available for use by existing wells. Natural forest, grassland and wetland ecosystems and groundwater reservoirs all provide significant storage that might enhance summer stream flow. Enhancing storage can be accomplished through natural means or human intervention. Beaver dams, one natural method, can have both positive and negative impacts, such as at Sacheen Lake along the West Branch of the Little Spokane River.

Pumping water from wells near gaining reaches of the river during low flow periods reduces baseflow at the critical time. Moving the pumping away from the river during critical times may help increase recharge to the river from the aquifer.

Policy

VI.A. Support water resources management approaches that augment water supply in the Little Spokane River basin during the summer high water use period. (approved 5/13/2004, confirmed 6/2/2004)

Issue

VI.A.01. What land management methods can be employed to slow the release of winter snowmelt and runoff into streams thus augmenting baseflow in the watershed? (Public Workshop 7/1/03 – Staff; approved 5/13/2004, confirmed 6/2/2004)

Recommendations

VI.A.01 a. Support the restoration, where feasible, of wetlands in areas where these features existed historically but have been drained. (Public Workshop 7/1/03; concept approved 5/13/2004, confirmed 6/2/2004)

VI.A.01 b. Encourage the creation of new wetlands, where feasible, in upland areas and along stream corridors. (Public Workshop 7/1/03; approved 5/13/2004, confirmed 6/2/2004)

VI.A.01 c. Encourage forest management and harvest practices that preserve vegetative ground cover to reduce runoff and increase infiltration in keeping with the forest practices act . (Public Workshop 7/1/03; approved 5/13/2004, confirmed 6/2/2004, “management” added 10/26/2004 in response to public comment.)

VI.A.01 d. Discourage the destruction of existing wetlands. (PU 5/13/2004; approved 5/13/2004, confirmed 6/2/2004)

VI.A.01 e. Encourage agricultural practices that reduce runoff and increase infiltration. (PU 5/13/2004; approved 5/13/2004, confirmed 6/2/2004)

Combined with VI.A.01.c.

VI.A.01.f. Consider land use policies that preserve vegetation in natural drainages and other areas in new subdivisions, short subdivisions, or binding site plans. (From planning unit comment. 11/8/2004, reworded and confirmed 11/17/2004)

Issue

VI.A.02. What types of storage can be employed to slow the release of winter snowmelt and runoff into streams in the Little Spokane River basin to augment baseflow in the watershed? (Staff, Multi-Use Storage WG, 3/16/04;* approved 5/13/2004, confirmed 6/2/2004*)

Recommendations

VI.A.02.a. Continue site identification and feasibility analysis for use of surface runoff storage in existing lakes as means of augmenting base flow in the Little Spokane Watershed. (Staff, Multi-Use Storage WG, 3/16/04; approved 5/13/2004, confirmed 6/2/2004, reworded and confirmed 12/15/2004)

VI.A.02.b. Continue site identification and feasibility analysis for use of surface runoff storage in new artificial lakes or ponds as means of augmenting base flow in the Little Spokane Watershed. (Staff, Multi-Use Storage WG, 3/16/04; approved 5/13/2004, confirmed 6/2/2004, reworded and confirmed 12/15/2004)

VI.A.02.c. Continue site identification and feasibility analysis for use of recharge and storage in aquifers as means of augmenting base flow in the Little Spokane Watershed. (Staff, Multi-Use Storage WG, 3/16/04; approved 5/13/2004, confirmed 6/2/2004, reworded and confirmed 12/15/2004)

VI.A.02.d Consider a public education program on the benefits and problems of beaver dams. (From public comment, concept approved 11/8/2004, reworded and approved 11/17/2004)

Policy

VI.B. Support water resources management approaches that augment water supply in the Middle Spokane River basin during the summer high water use period. (Staff, Multi-Use Storage WG, 3/16/04; approved 5/13/2004, confirmed 6/2/2004)

Issue

VI.B.01. What types water storage can be employed to slow the release of winter snowmelt and runoff into streams in the Middle Spokane Watershed to augment baseflow in the watershed? (Staff, Multi-Use Storage WG, 3/16/04; approved 5/13/2004, confirmed 6/2/2004)

Recommendations

VI.B.01.a. Continue site identification and feasibility analysis for use of surface runoff storage in existing lakes as means of augmenting base flow in the Middle Spokane Watershed. (Staff, Multi-Use Storage WG, 3/16/04; approved 5/13/2004, confirmed 6/2/2004, reworded and confirmed 12/15/2004)

VI.B.01.b. Continue site identification and feasibility analysis for use of surface runoff storage in new reservoirs or manmade ponds as means of augmenting base flow in the Middle Spokane Watershed.

(Staff, Multi-Use Storage WG, 3/16/04; approved 5/13/2004, confirmed 6/2/2004, reworded and confirmed 12/15/2004)

VI.B.01.c. Continue site identification and feasibility analysis for use of recharge and storage in aquifers as means of augmenting base flow in the Middle Spokane Watershed. (Staff, Multi-Use Storage WG, 3/16/04; approved 5/13/2004, confirmed 6/2/2004, reworded and confirmed 12/15/2004)

VI.B.01.d. Continue site identification and feasibility analysis for use of recharge and storage in aquifers for recovery as a water supply source in the Middle Spokane Watershed. (Staff, Multi-Use Storage WG, 3/16/04; approved 5/13/2004, confirmed 6/2/2004, reworded and confirmed 12/15/2004)

Policy

VI.C. Support water resources management approaches that augment stream flow in the Middle Spokane River during summer low flow season. (Approved 6-2-04, confirmed 6/29/2004)

Issue

VI.C.01. Will moving water supply well pumping away from the Spokane River increase river flow during summer low flow season? (Staff& Instream WG 5/27/2004; Approved 6-2-04; confirmed 6-29-04)

Recommendations

VI.C.01.a. Assess the impact and feasibility of moving pumping away from existing wells near the river during the summer low flow season.. *(Staff& Instream WG 5/27/2004, reworded and approved 6/2/04;* confirmed 6-29-04*)*

Technical Support Needs

MIKE SHE Model runs may be a way of supporting the above recommendations to determine the magnitude of the impact of implementing the practices described, when funding and needs are identified.

VII. Strategies for Ground Water Recharge Enhancement

Background

Additional recharge to the aquifers of WRIAs 55 and 57 may increase streamflow during the low flow, summer season or increase the amount of groundwater available for water supply. There are several methods that enhance recharge above natural conditions.

Stormwater infiltration results in approximately four times the recharge to aquifers as natural conditions. Managing stormwater so that most of it infiltrates rather than evaporating or running to surface water will take advantage of this extra recharge.

Both the Spokane and Little Spokane Rivers often have spring runoff conditions where flow is greater than instream flow needs. Flow could be diverted to appropriate locations away from the rivers during these periods to enhance groundwater recharge
Reclaimed or reused water could also be used to recharge aquifers. This water which usually go directly to the rivers could enhance the groundwater for additional uses.

Policy

VII.A. Support stormwater management approaches that foster the maintenance or enhancement of natural groundwater recharge rates due to direct precipitation. (Staff; approved 5/13/2004; confirmed 6/29/2004)

Issue

VII.A.01. How can stormwater runoff generated by development be used to enhance recharge? (Staff*; approved 5/13/2004*;* confirmed 6/29/2004*)

Recommendations

VII.A.01.a. Support regulations that favor treatment and infiltration of stormwater as an alternative to collection, treatment and discharge to surface water. (Staff; approved 5/13/2004; confirmed 6/29/2004)

VII.A.01.b. Promote the diversion of stormwater from low permeability areas to areas with permeability conducive to infiltration. (Staff; approved 5/13/2004; confirmed 6/29/2004)

VII.A.01 c. Support the infiltration of stormwater through natural sumps into shallow aquifers. . (Staff; approved 5/13/2004; confirmed 6/29/2004)

Policy

VII.B. Support the use of reclaimed /reused water for aquifer storage and recovery practices, taking wellhead protection areas into account, to provide mitigation for municipal water supply pumping and to support Spokane River base flow. (Work Group, 12/04/03; approved 5/13/2004; confirmed 6/29/2004)

Issue

VII.B.01. To what extent can reclaimed wastewater be used for aquifer recharge to support water supply and/or river base flow needs? (Work Group, 12/04/03*; approved 5/13/2004*;* confirmed 6/29/2004*)

Recommendations

VII.B.01.a. Support use of reclaimed water from municipal wastewater treatment facilities for aquifer recharge. (Work Group, 12/04/03; approved 5/13/2004; confirmed 6/29/2004)

VII.B.01.b. Upon completion of reclaimed water use acceptability evaluations (I.A.01) including wellhead protection concerns, perform recharge site investigations, preliminary design studies and feasibility studies for a reclaimed water recharge program. (Work Group, 12/04/03; approved 5/13/2004; confirmed 6/29/2004)

VII.B.01.c. If aquifer storage of reclaimed water is politically acceptable and economically feasible, implement an aquifer storage program for reclaimed water. (Work Group, 12/04/03; approved 5/13/2004; confirmed 6/29/2004)

Policy

VII.C. Support the practice of groundwater recharge using Spokane River water diversions during high flow periods, where the injection does not cause a supply well to become groundwater under the influence of surface water, to provide mitigation for municipal water supply pumping and to support Spokane River base flow. (Work Group 1/19/04; concept approved 5/13/2004; confirmed 6/29/2004)

Issue

VII.C.01. To what extent can Spokane River diversions support Spokane River base flow needs during seasonal low flow periods? (Work Group 1/19/04*; approved 5/13/2004*;* confirmed 6/29/2004*)

Recommendations

VII.C.01a. Apply for supplemental funding under multi-use storage to investigate the technical feasibility of increasing summer river flow using non-natural recharge. (Work Group 1/19/04; approved 5/13/2004*;* confirmed 6/29/2004)

VII.C.01.b Identify potential infiltration areas that could be used to augment summer baseflow in gaining reaches of the Spokane River. (Work Group 1/19/04 & 2/13/04; concept approved 5/13/2004*;* confirmed 6/29/2004)

VII.C.01.c. Incorporate findings of VII.C.01.b into the Implementation Phase for WRIA 55 & 57 watershed planning and include specific recommendations in the first Plan Update. (Work Group 2/13/04; approved 5/13/2004*;* confirmed 6/29/2004)

VII.C.01.d. During the implementation phase, support development of criteria, in collaboration with the Department of Ecology, under which credit for mitigation will be determined. (Work Group 2/13/04; approved 5/13/2004*;* confirmed 6-29-04)

Issue

VII.C.02. To what extent can Spokane River diversions support artificial aquifer recharge to support future public water supply needs? (Work Group 1/19/04, approved 6/2/2004;* confirmed 6/29/2004*)

Recommendations

VII.C.02.a. Apply for supplemental funding under multi-use storage to investigate the technical feasibility of mitigating public water supply pumping using artificial recharge. (Work Group 1/19/04, approved 6/2/2004*;* confirmed 6/29/2004)

VII.C.02.b. Identify locations where infiltration or injection might benefit supply wells and the amount of water that might be beneficially stored based on current and projected pumping. (Work Group 2/13/04, approved 6/2/2004*;* confirmed 6/29/2004)

VII.C.02.c. Incorporate findings of this evaluation into the Implementation Phase for WRIA 55 & 57 watershed planning and include specific recommendations. (Work Group 2/13/04, approved 6/2/2004*;* confirmed 6/29/2004)

VII.C.01.d. During the Implementation Phase develop criteria, in collaboration with the Department of Ecology, under which credit for mitigation for new water appropriations will be determined. (Work Group 2/13/04, approved 6/2/2004*;* confirmed 6/29/2004)

Issue

VII.C.03*. What is the net effect on the aquifer; resulting from changes to Post Falls HED operations, during summer low flow operations? (Approved 6-2-04), approved 6/2/2004*;* confirmed 6/29/2004*)

Recommendations

VII.C.03.a. Perform a MIKE SHE Model evaluation of the net effect on the aquifer; resulting from changes to Post Falls HED operations, during summer low flow operations. (Work Group 1/19/04, approved 6/2/04: re-worded and confirmed 6/29/2004)

VIII. Approaches to Plan Implementation

Background

To ensure the success of this plan it is necessary for some entity to be responsible for the coordination and oversight of the implementation process. The activities of the group will fall under three general categories:

1. Carrying out actions defined in the watershed plan. These actions may include construction of infrastructure, restoration of physical characteristics of the watershed, and programmatic activities to improve watershed conditions or extend water supplies.
2. Coordination and oversight of the implementation process. This may include a number of interrelated activities, such as seeking funding; making adjustments to respond to new information and changing conditions; coordinating the many implementation actions being performed by different organizations in the watershed; and responding to local needs and concerns as expressed by elected officials, stakeholders and the public.
3. Supporting activities. These may include public outreach and education; long-term monitoring activities and associated research; data management; and program evaluation.

Policy

VIII.A. The WRIA 55 & 57 Planning Unit will continue to function as the main vehicle for Plan implementation after plan approval. (Staff, approved 6/2/2004, confirmed 6/29/2004)

Issue

VIII.A.01. What should the structure and membership of the Planning Unit be as it assumes the implementation role?(Staff, **approved 6/2/2004, confirmed 6/29/2004)**

Recommendations

VIII.A.01.a Identify key stakeholder groups needed for plan implementation and secure commitment for continued involvement. (approved 6/2/2004, confirmed 6/29/2004)

VIII.A.01.b. Entities that will be involved with implementation and included in the implementation matrix should be represented on the implementation Planning Unit. (Approved 6-2-04, confirmed 6/29/2004)

VIII.A.01.c. Develop procedures for Planning Unit participation in Plan implementation. (approved 6/2/2004, confirmed 6/29/2004)

Policy

VIII.B. Support continuing data collection and evaluation to fill data gaps that limit the scope and implemetability of the WRIA 55 & 57 Watershed Plan. (approved 6/2/04; confirmed 6-29-04)

Issue

VIII.B.01. What additional information is needed to fully implement Watershed Plan?(approved 6/2/2004*, **confirmed 6/29/2004*)

Recommendations

VIII.B.01.a. Evaluate studies recommended in the Watershed Plan for data gaps. (Conceptually approved 6/2/2004, confirmed 6/29/2004)

VIII.B.01.b. Evaluate the success of implemented Watershed Plan recommendations. (Conceptually approved 6/2/2004, confirmed 6/29/2004)

VIII.B.01.c. Use adaptive management to fill data gaps and improve the outcomes of implemented recommendations. (Conceptually approved 6/2/2004, confirmed 6/29/2004)

Policy

VIII.C. Utilize established systems for forecasting water availability in the Spokane and Little Spokane Watersheds. (Approved 6/2/2004, confirmed 6/29/2004)

Issue

VIII.C.01. Can established systems be used to forecast the general nature of streamflow in these rivers? **(Approved 6-2-04, confirmed 6/29/2004)**

Recommendations

VIII.C.01.a Evaluate existing forecasting systems, and support improvements determined valuable by the Planning Unit. (Approved 6-2-04, confirmed 6/29/2004)

VIII.C.01.b Develop a procedure for presenting flow forecast information that will be used to trigger water resources management procedures. (Approved 6-2-04, confirmed 6/29/2004)

Policy

VIII.D. Promote funding of projects included in Watershed Plans. (approved 6/2/2004, confirmed 6/29/2004)

Issue

VIII.D.01. How can watershed plan projects compete for limited funds? (Approved 6/2/2004, confirmed 6/29/2004)

Recommendations

VIII.D.01.a State agencies should give priority to projects included in Watershed Plans when reviewing projects for funding. (Approved 6/2/2004, confirmed 6/29/2004)

VIII.D.01.b. Identify and pursue additional funding sources for watershed plan projects. (Approved 6-2-04, confirmed 6/29/2004)

CHAPTER 5 IMPLEMENTATION

Introduction

The recommended actions as presented in Chapter 4: Recommendations, are tabulated into the following Implementation Matrix. The Implementation Matrix is intended to represent the initial thinking of the "who" and "when" with respect to the implementation of the recommended actions, as approved by Planning Unit consensus. The WRIA 55/57 Implementation Matrix includes the proposed timing of the recommended actions and a preliminary estimate of the anticipated level of effort by the participating governments and agencies.

Obligations and recommendations are specifically defined in the Implementation Matrix. Recommendations specifically denoted as such do not represent obligations on the part of the participating governments and agencies. Further, for recommended actions that are specifically identified as obligations, no entity can be required to implement the recommended action without their specific, written consent. "Obligation", as defined in Chapter 90.82, Revised Code of Washington, Watershed Planning, means any action that imposes upon a tribal government, county government, state government, or an organization voluntarily accepting such action, either: a fiscal impact; a redeployment of resources; or a change of existing policy.

Implementation Matrix

The Implementation Matrix presented below, provides the preliminary outline for implementing the recommended actions as presented in Chapter 4. The Implementation Matrix identifies the participating agencies and governments, proposed timing, and a preliminary estimate of the level of effort needed to implement an action.

The Implementation Matrix includes three types of criteria. First, implementation actions are specifically identified as recommendations or obligations, as agreed upon by consensus of the Planning Unit and the implementing agencies. Second, the proposed timing of the implementation actions, as envisioned by the participating governments and agencies, are identified. Third, the preliminary estimate of the level of effort required by the participating governments and agencies to implement the actions, are identified.

Table 5.A defines the codes as presented in the Implementation Matrix to identify the proposed timing and estimated level of effort:

Table 5.A. Definitions of abbreviations for use in the Implementation Matrix

Timing / When Implementation Should Begin

0 Action which is effectively implemented by Plan approval.
1 1 to 2 years after adoption
2 3 to 6 years after adoption
3 7+ years after adoption

Estimated Level of Effort for Participating governments and agencies

A Can be done with existing staff
B Needs additional staff or funding
C Will provide staff or funding for other agency to implement
D No staff or funding (beyond planning / implementing unit participation)

It is understood that the specific details of the implementation of the recommendations and obligations will be developed in greater detail during the initial year of Phase IV, Implementation, following approval of this Plan.

In accordance with the recommendations presented in Section VIII, Chapter 4, the WRIA 55 and 57 Planning Unit will continue to function as the main vehicle for implementation after plan approval. The Planning Unit will identify key stakeholder groups needed for implementation and secure commitments for their continued involvement. Entities that will be involved with implementation and included in the Implementation Matrix will be encouraged to continue to participate as members of the Planning Unit.

Implementation of many of the recommended actions not directly obligating State resources will need participation of the Ecology-appointed watershed lead for planning and coordination. The initial thoughts of all of the potential participating state agencies are included after the Implementation Matrix.

Table 5.B. WRIA 55 & 57 Watershed Plan Implementation Matrix

			Washington State agencies[vi]		Spokane County		Pend Oreille County		Stevens County		City of Spokane[i]		City of Deer Park		City of Liberty Lake		City of Spokane Valley		City of Millwood		Spokane Aquifer Joint Board		Whitworth Water District		Vera Water District		Stevens County PUD		The Lands Council		Spokane County Cons. Dist.	
		Obligation / Recommendation	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)
I. Water Conservation, Reclamation and Reuse																																
Policy I.A	Support actions to reduce per capita water consumption.																								1	d						
Issue I.A.01	*What steps can be taken to reduce indoor water use?*																								1	a						
I.A.01.a	Determine indoor conservation issues (approaches) on which the public needs to be educated (i.e. in-door low flow devices such as showerhead, facets, toilets and appliances and habits).	O			1	a					1	a,b,c 8k	1	A	1	A	1	D			2	a	1	a	1	a			1	d		
I.A.01.b	Local authorities / wastewater utilities should evaluate customer indoor water saving incentives as a means to save on new facility costs. If cost effective, incentives should be included in facility and comprehensive planning processes and implemented through local regulation.	R			1	a					1	a 2k	1	A	1	A	2	D	1	d			1	a	1	b						
I.A.01.c	City and County governments will develop and implement a regional education and awareness program to promote wise and efficient use of the water supply with voluntary participation by water suppliers.	O			2	a			2[xiii]	B	1	a,b,c 30k	1	C	1	B	1	D	2	a			1	c					1	d		
I.A.01.d	Municipal water suppliers will develop water conservation programs independently and cooperatively in accordance with Washington State Department of Health regulations and other water suppliers are encouraged to develop their own water conservation programs.	O (R state)	1	a DOH							2	a,b,c 250k	2	A	2	N/A							1	a			2	a				
Issue I.A.02	*What steps can be taken to reduce domestic, municipal and public outdoor water use?*																		1	a					1	a						
I.A.02.a	Determine the outdoor conservation issues (approaches) on which the public needs to be educated (i.e., soil development, plant root development, native/drought resistant vegetation, xeriscaping).	O			1	a					1	a,b,c 35k	2	D	1	A	1	D	3	a	2	b[iii]	1	a			2	a	1	d	2	b

			Washington State agencies [vi]		Spokane County		Pend Oreille County		Stevens County		City of Spokane[i]		City of Deer Park		City of Liberty Lake		City of Spokane Valley		City of Millwood		Spokane Aquifer Joint Board		Whitworth Water District		Vera Water District		Stevens County PUD		The Lands Council		Spokane County Cons. Dist.	
		Obligation / Recommendation	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)
I.A.02.b	Counties/Cities consider developing incentives for xeriscaping and use of native and/or drought resistant vegetation through existing and future planning processes.	R			1	a					0	a 0k	2	A	1	A	1	D	3	a	1	a	1	a	1	a			1	d		
I.A.02.c	Include options for xeriscaping in landscape requirements for commercial and industrial developments.	O			1	a					0	a 0k	1	A	1	A	1	D	3	a	1	a	1	a	1	a				*ii*		
I.A.02.d	Encourage the xeriscaping option for urban open space in planned developments.	R			1	a					0	a 0k	1	A	1	A	1	D	3	d	1	a	1	a	1	a				*ii*		
I.A.02.e	County/Cities/Water Purveyors encourage implementation of water conservation in watering of public properties such as parks, school lawn areas, athletic fields, boulevards, and highway green areas.	R			1	a,b					1	a,b 40k	1	A	1	B	2	D	3	d	2	a	1	a	1	a			1	d[ii]		
I.A.02.f	Evaluate the benefits of retrofitting irrigation systems with automatic controllers and other high efficiency components for schools, golf courses, parks, cemeteries, and other large scale public irrigation projects	O			2	a,b					2	a 40k			2	B	2	D	2	a	1	a	1	d					2	d[ii]		
I.A.02.g	Encourage and evaluate incentives for irrigators (e.g. agricultural and golf course) to implement all feasible irrigation efficiencies.	O/R (R state)	0	a DOE	2	a,b					2	a,b,c 10k	2	A	2	A	2	D							1	a					2	c
Policy I.B	Support education programs which foster public acceptance of water conservation, reuse and reclamation.																								1	a						
Issue I.B.01	*What steps should be taken to educate the public on water conservation and use?*																		2	d	**2**	**a**	1	a	1	a						
I.B.01.a	Encourage the use of several educational methods to reach all segments of the population, those in schools, government, and businesses.	R			1	a					2	a,b,c 30k	2	D	1	A	1	D	2	a	2	a	1	a			2	a		d	1	b

			Washington State agencies [vi]		Spokane County		Pend Oreille County		Stevens County		City of Spokane[i]		City of Deer Park		City of Liberty Lake		City of Spokane Valley		City of Millwood		Spokane Aquifer Joint Board		Whitworth Water District		Vera Water District		Stevens County PUD		The Lands Council		Spokane County Cons. Dist.	
		Obligation / Recommendation	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)
Policy I.C	Support actions that result in the increased use of reclaimed and reused water.																		2	d	2	a			1	a				a	1	a
Issue I.C.01	*What economic, political, legal and resource incentives can be implemented to encourage municipalities, utilities and businesses to reclaim and reuse water?*																		3	d	2	a			**1**	**a**						
I.C.01.a	Evaluate the public perception of water reclamation and reuse and determine how to educate the public to increase their understanding of the benefits and risks.	O			1	a					2	a,b,c 15k	3	D	1	B,C	2	D	3	d	2	b[iii]	1	a,d	1	b						
I.C.01.b	Evaluate the potential for tax incentives, permitting and/or regulatory credits that can be used by corporations that want to implement water reuse strategies.	O			2	a,b					2	a 0k	3	D	2	A,C	2	D	3	d	1	d	1	d	2	b						
I.C.01.c	Evaluate development of cost-effective options for reclamation and reuse in small scale and decentralized settings.	O (R state)	1	a	2	a,b					2	a,b,c 10k	3	D	2	B,C	2	D			1	d	1	d	2	b	2	a				
I.C.01.d	Research possible water reuse and reclamation opportunities.	O			2	a,b						a,b,c 5k	3	D	1	B,C									2	b						
II. Instream Flow Needs for the Middle Spokane River																																
Policy II.A	Assure that instream flows for the Middle Spokane River meet the needs of rainbow trout and other associated aquatic biota.																				2	a			1	a			1	a		d
Issue II.A.01	*Does the information on rainbow trout from the Hardin Davis Instream Flow and Habitat Study establish the basis for setting instream flows on the Middle Spokane River?*																								1	a						
II.A.01.a	Establish a minimum instream flow for the Spokane River at the Barker Road transect (USGS Gage 12420500) of 500 cfs to provide significant weighted useable area for juvenile and adult rainbow trout.	O	2	a DOE (WDFW support)	0						0	d			2	D	2	D			2	a			1	a						

			Washington State agencies [vi]		Spokane County		Pend Oreille County		Stevens County		City of Spokane[i]		City of Deer Park		City of Liberty Lake		City of Spokane Valley		City of Millwood		Spokane Aquifer Joint Board		Whitworth Water District		Vera Water District		Stevens County PUD		The Lands Council		Spokane County Cons. Dist.	
		Obligation / Recommendation	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)
II.A.01.b	Avista's 2007 operating license for the Spokane River Hydroelectric Development should require a minimum discharge to provide habitat for juvenile and adult rainbow trout that would be protected through a minimum instream flow for the Spokane River at the Barker Road transect (USGS gage 12420500) of 500 cfs.	R	0	a	0						1	d			2	D	2	D			2	a			1	a			1	a		d
II.A.01.c	Flow in the Middle Spokane River should be managed to optimize spring spawning, incubation and emergence for rainbow trout. A protocol should be established between the WDFW, IDF&G and Avista to accomplish this task. Specific flow levels and timing would be established as early as possible each year and based on snow pack and expected runoff conditions for that year.	R	1	a							1	d			2	D	2	D			2	a			1	a			1	a		d
II.A.01.d	Continue operation of the Barker Road gage and study the correlation between the Barker Road and Post Falls flows.	O			2	b					1	c 10k			0	D	2	D			0	c			1	a			1	a		d
Issue II.A.02	***Would using Post Falls gage (USGS gage 12419000) and/or the Greenacres gage (12420500) provide better protection for aquatic biota in the Spokane River between the Post Falls HED and Sullivan Road than using the Spokane at Spokane gage (USGS Gage 12422500) below the Maple Street Bridge?***																								**2**	**a**						
II.A.02.a	The flow regime in critical habitat areas for aquatic biota identified in the Spokane River between the Post Falls HED and Sullivan Road are more closely related to flow at the Spokane River near Post Falls gage (USGS 12419000) *and/or the Greenacres gage (12420500)* than at the Spokane River at Spokane gage (USGS 12422500). To improve flow management in this reach, take steps to upgrade the Post Falls gage to that of a "real time" gage.	O			1	b					2	a,b,c 10k			1	C	2	D							1	b						

			Washington State agencies [vi]		Spokane County		Pend Oreille County		Stevens County		City of Spokane[i]		City of Deer Park		City of Liberty Lake		City of Spokane Valley		City of Millwood		Spokane Aquifer Joint Board		Whitworth Water District		Vera Water District		Stevens County PUD		The Lands Council		Spokane County Cons. Dist.	
		Obligation / Recommendation	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)
II.A.02.b	Instream flow for the Lower Spokane River could be managed using USGS Gage 12422500, the Spokane River at Spokane. Conduct fish habitat studies focusing on juvenile and adult rearing on at least 3 sites in the Lower Spokane River between the Monroe Street HED and the Nine-Mile HED pool. This work could be conducted as part of the WRIA 54, Lower Spokane River Watershed Plan and/or as an Avista relicensing PM&E.	O (R state)	1	a	2	a,b					2	d			1	C	2	D							1	b			1	d		
Policy II.B	Manage flow in the Middle Spokane River to provide for aesthetic and recreational use.																								2	a						
Issue II.B. 01	*What flow provides an aesthetic experience in the "north channel" of the Spokane River in Riverfront Park?*																								**2**	**a**						
II.B.01.a	Support a consensus based agreement within the Avista Recreation, Land Use, and Aesthetics Work Group of at least 300 cfs in the north channel of the Spokane River through Riverfront Park as the basis for aesthetic flows.	R			0						1	d			0	D	2	D					0	d	2	a						
Issue II.B. 02	*What flow conditions are needed to provide recreation experiences on the Middle Spokane River during the low flow period?*																								2	**b**						
II.B.02.a	Use the Avista Recreation, Land Use, and Aesthetics Work Group findings as the basis for recreation flows in the Middle Spokane River.	R	0	a							1	d			0	D	2	D							2	b						
II.B.02.b	Evaluate the use of periodic increases in flow during low flow periods for recreational use in the Middle Spokane River while taking into account effects on aquatic biota, water quality, and safety.	R	1	a [vii]							1	d			1	C,D	2	D							2	b			1	d		
II.B.02.c	Evaluate the impact on aquatic biota, water quality, and safety of managing the declining spring runoff and fall drawdown with releases from the Post Falls HED to optimize recreational use of the Spokane River according to the Avista Recreation, Land Use, and Aesthetics Work Group.	R	1	a (WDFW supprt)							2	d			1	C,D	2	D					0	d	2	b			2	d		

			Washington State agencies [vi]		Spokane County		Pend Oreille County		Stevens County		City of Spokane[i]		City of Deer Park		City of Liberty Lake		City of Spokane Valley		City of Millwood		Spokane Aquifer Joint Board		Whitworth Water District		Vera Water District		Stevens County PUD		The Lands Council		Spokane County Cons. Dist.	
		Obligation / Recommendation	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)
Policy II.C	Manage flow in the Middle Spokane River to maintain water quality adequate for identified beneficial uses.																								1	a						d
Issue II.C. 01	*How do different flow regimes in the Spokane River affect temperature and Dissolved Oxygen and what are their consequences for aquatic biota?*																								**1**	**b**						
II.C.01.a	Encourage the Department of Ecology to use the CEQUALW2 model (with necessary changes) to consider different flow regimes as part of the Spokane River / Lake Spokane TMDL process.	R	0	a	0	d					2	d			0	D	2	D					0	d	2	b			1	a		
Policy II.D	Manage flow in the Middle Spokane River to provide adequate flow during spring runoff so river water can be diverted for groundwater recharge augmentation while protecting spawning and incubation.																				2	a										
Issue II.D. 01	*How can spring high flows be managed to meet the needs of fish spawning and incubation and still allow for the diversion of flow for groundwater recharge?*																								**2**	**b**						
II.D.01.a	Evaluate how river diversions can be accomplished without impairing spawning and incubation of rainbow trout.	O (R state)	1	d	2	b					1	a,b,c 15k			1	C,D	2	D			2	c			1	b						
Policy II.E	Integrate flow recommendations for aquatic biota, recreation, aesthetics, and water quality into an overall recommendation for flow management in the WRIA 57 watershed.																								1	b			2	a		d
Issue II.E. 01	*What flows are needed to meet different seasonal uses?*																								**1**	**b**						
II.E.01.a	After the Avista HED license application is filed, the Spokane River / Lake Spokane Dissolved Oxygen TMDL data gathering phase, and instream studies on rearing below Monroe Street HED are completed, integrate all of the recommended instream flows into one regime for the whole watershed. The flow regime will be submitted to the Department of Ecology for instream flow rule making. Ecology obligation.	O	1	a DOE	2	a,b					2	a,b,c 5k			1	D							2	d	2	b			2	b		

			Washington State agencies [vi]		Spokane County		Pend Oreille County		Stevens County		City of Spokane [i]		City of Deer Park		City of Liberty Lake		City of Spokane Valley		City of Millwood		Spokane Aquifer Joint Board		Whitworth Water District		Vera Water District		Stevens County PUD		The Lands Council		Spokane County Cons. Dist.	
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III. Instream Flow Needs for the Little Spokane River																																
Policy III.A	Assure that instream flows for the Little Spokane River (173-555 WAC) meet the needs of rainbow trout and mountain whitefish and other representative aquatic biota.																															
Issue III.A.01	*Does the information on rainbow trout and mountain whitefish from the Golder study support changing the minimum instream flows on the Little Spokane River?*																															
III.A.01.a	Recommend no changes in the minimum instream flows for the reaches controlled by the "At Dartford" gage, the Chattaroy gage, and the Elk Park gage in WAC 173-555 at this time. As new data become available the minimum instream flows should be evaluated.	R	2	a	0	a					0	d	O	D	0	D							0	d								
III.A.01.b	Additional studies on instream flow needs for the mainstem and tributaries should be conducted if problems arise with the existing conditions.	R	2	a	2	d					2	d	3	D	2	C,D							2	d					2	d [ii]		
III.A.01.c	Studies should be conducted on the major tributaries to determine the extent of and areas where spawning occurs. When this information becomes available, flow studies on the tributaries should be conducted to determine flow needs for the tributaries.	R	2	a	3	d					3	d	3	D	1	C,D							2	d					2	d		
III.A.01.d	Recommend a study on the Little Spokane River tributaries on optimizing habitat for the target species and linking the preferred flows on the tributaries to flows at the control points.	R	2	a	3	d					3	d	3	D	2	D							2	d						*ii*		
III.A.01.e	Expanded study on the mainstem would require reapplication of PHABSIM using site-specific preference curves and multiple transect measurements.	R	2	a	3	d					3	d	3	D	2	D							2	d								
III.A.01.f	Recommend a study of the fish habitat instream flow needs for the reach of the Little Spokane River below the "At Dartford" gage to better determine the water available for future withdrawals.	R	2	a	2	d					3	c 12k	3	D	1	D							2	d						*ii*		

			Washington State agencies [vi]		Spokane County		Pend Oreille County		Stevens County		City of Spokane[i]		City of Deer Park		City of Liberty Lake		City of Spokane Valley		City of Millwood		Spokane Aquifer Joint Board		Whitworth Water District		Vera Water District		Stevens County PUD		The Lands Council		Spokane County Cons. Dist.	
		Obligation / Recommendation	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)
Policy III.B	Manage water resources in the Little Spokane Basin to maintain beneficial uses other than aquatic biota.																				2	a										
Issue III.B.01	*How will pumping from the SVRP Aquifer Watershed to provide water service in the Little Spokane Watershed north of the Little Spokane River / Deadman Creek affect flows in the Little Spokane River?*																				2	a										
III.B.01.a	Monitor the effects of exporting water from the SVRP Aquifer into the Little Spokane Watershed on the flow of the Little Spokane River.	O			2	b					2	a,b,c 25k	3	D	1	D	2	D			2	a	2	a	2	b				[ii]		
Issue III.B.02	*What action should be taken toward domestic exempt wells when flows at the designated control point fall below the minimum instream flow?*																															
III.B.02.a	The Department of Ecology should enforce the minimum instream flow shutoff of water rights junior to WAC 173-555 on irrigation from exempt wells in the Little Spokane Watershed where it does not cause additional fire danger.	R	1	a DOE							0	d	0	D	0	D							0	d					1	d		
Issue III.B.03	*What effect will reactivating the gage at Chattaroy and/or Elk have on water rights interruptions for upper basin water users?*						1	D																								
III.B.03.a	Using existing data, study the effects of reactivating the gage at Chattaroy and/or Elk for regulation of the upstream water users.	O			1	a	1	D			2	d	2	D		D							2	d					2	d		
III.B.03.b	If further study is desired, the Planning Unit should work with Pend Oreille County, the Department of Ecology, Spokane Community College and others to continue flow measurements as needed.	R	1	a DOE	2	a,b					3	d	3	D	0	D							2	d					2	d	3	a[iv]
III.B.03.c	If the benefits are sufficient to offset costs and legal constraints do not exist, beneficiaries of the operation of a Chattaroy and/or Elk control point, in cooperation with the Department of Ecology, should reactivate and fund the gage at Chattaroy and/or Elk with real time capabilities as needed for regulation.	R	1	a DOE	3	d					3	d	3	D	2	D							2	d						[ii]		

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Issue III.B.04	*What actions are needed to maintain or improve recreational opportunities on the Little Spokane River?*																															
III.B.04.a	Promote management practices, when feasible, that maintain minimum flows of at least 90 cfs at the "At Dartford" gage in the Lower Little Spokane River (Little Spokane River Natural Area) to support current and future recreational activities.	R			0	d					1	a 0k	2	D	0	D							2	d					2	d		
III.B.04.b	Promote management practices, when feasible, that maintain minimum flows of at least 90 cfs at the "At Dartford" gage for Pine River Park and 32 cfs at Elk Park to support existing and future recreational activities.	R			0	d					1	a 0k	2	D	0	D							2	d					2	d		
III.B.04.c	Investigate and/or determine if future parks or access points are needed for recreational use of the Little Spokane River.	O			2	a,b					2	d	2	D	1	D													3	d	1	B
Issue III.B.05	*Would a better understanding of flow in the West Branch of the Little Spokane River help water resource management in the watershed?*						2	D																								
III.B.05.a	Determine the feasibility of installing a gage(s) on the West Branch of the Little Spokane River.	O / R			3	d					2	d	2	D	1	D							2	d					2	d		
Policy III.C	Integrate flow recommendations for aquatic biota, recreation, aesthetics, water quality, and other uses into an overall recommendation for a minimum instream flow regime.																															
Issue III.C.01	*What flows are needed in the Little Spokane River for different seasonal uses?*																															
III.C.01.a	When the lower Little Spokane River aquatic biota study and the Water Quality Management Plan/TMDL process are completed, integrate all of the recommended instream flows into one regime to evaluate the need for revisiting the instream flow rule for the whole watershed taking wildlife habitat and other uses into account.	O (R state)	2	a (DOE WDFW [viii])	3	d					3	a,b,c 5k	2	D	2	D							2	a,d					2			*v*
III.C.01.b	Develop strategies for achieving the integrated flow regime.	O (R State)	1	a DOE & WDFW	3	d					3	a,b,c 5k	3	D	2	D							2	a,d							2	b

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IV. Domestic Exempt Wells																																
Policy IV.A	Develop approaches to land use management that limits the impacts of withdrawals from domestic exempt wells at or below current levels.												1	D							1	a			2	b			1	b		
Issue IV.A.01	*Should the counties adopt policies to manage the proliferation of domestic exempt wells?*						2	D					**1**	**D**											**1**	**a**						
IV.A.01.a	Support low residential densities in areas of the counties designated as rural in order to protect water supplies.	R			2	a,b					0	d	1	D	0	D	1	D			1	a	0	d	2	a			1	b[ii]	2	b
IV.A.01.b	The counties should implement a policy or procedure requiring a person who is developing property within a water service area to consult with the water purveyor about the potential for public water service before creating a development or single-family residence dependent on domestic exempt wells.	R			2	a,b			2[xiii]	B	0	d	1	A	1	D	1	D			1	a	0	d	1	a			1	d[ii]		
IV.A.01.c	Request counties, cities, and/or the Regional Health Districts to evaluate the quantity of water necessary (currently 1 gallon per minute) from a domestic exempt well before a building permit is issued.	R			2	a,b					0	a 0k	0	D	1	D	1	D			1	a	0	d	1	a			1	b[ii]		
IV.A.01.d	Local land use regulations should contain specific criteria by which applicants for land development such as subdivisions, short subdivisions, binding site plans, or certificates of exemption for the purpose of creating additional building sites must demonstrate sufficient water availability.	R			2	a,b			2[xiv]	A	2	a 1k	0	D	1	A	1	D[ix]			1	a	0	d	1	a			1	d		
IV.A.01.e	Water purveyors are encouraged to participate with land use regulators and the Department of Health in identifying and addressing areas of water availability concern.	R	1	a	2	a,b					1	a 1k	1	A	0	B	1	D[x]			1	a	1	a	1	a						
IV.A.01.f	Land use regulators are encouraged to consider available ground water resources when establishing minimum parcel sizes in areas where exempt wells will be the main source of domestic water in an effort to avoid future water shortages.	R			2	a,b					1	a 0k	1	A	0	D	1	D[x]			1	a	1	a	2	b			1	d[ii]		

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Issue IV.A.02	*Should the counties adopt policies which limit the maximum daily withdrawals from individual domestic exempt wells where detrimental impacts are identified?*						2	D					**1**	**D**											2	b						
IV.A.02.a	Evaluate policies that will limit the maximum daily withdrawals to less than 5000 gallons per day where detrimental impacts are identified.	R	1	a DOE	2	a,b							1	D	1	D	1	D			1	a	0	d	2	b			1	d		
Issue IV.A.03	*What are the methods for reducing summertime water use from domestic exempt wells during low flow years?*																								2	b						
IV.A.03.a	At a minimum, when flows in the Little Spokane River are expected to fall below minimum instream flows, caution letters should be sent to all domestic exempt well owners in the Little Spokane Watershed asking them to voluntarily conserve water. Methods for saving water and directions to a website with more information will be included with the letter.	R			2	a,b					1	d	1	D	1	D					1	a	0	d	1	a			1	d		
Policy IV.B	Collect additional data to better define the impact of exempt wells on water use and model calibration.																				1	a			2	b			1	d		
Issue IV.B.01	*Would more accurate water use quantities and locations for domestic exempt wells make a significant difference in the accuracy of the watershed model?*																								**2**	b						
IV.B.01.a	Run a sensitivity analysis on water use from exempt wells with the watershed model. If the model is recalibrated with different data in the future, another sensitivity analysis may need to be done.	R			2	a,b					1	a,c,d 1k	1	D	1	D	2	D			1	a	0	d	1	b			1	d		

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Issue IV.B.02	*Would more accurate water pumping quantities and locations for Group B and small Group A wells make a significant difference in the accuracy of the watershed model?*																								**2**	b						
IV.B.02.a	Run a sensitivity analysis on unmetered Group A and Group B water use with the watershed model. If the model is recalibrated with different data in the future, another sensitivity analysis may need to be done.	R			2	a,b					2	c 1k	1	D	1	D	2	D			2	a	0	d	2	b						
Policy IV.C	Develop a clear, consistent policy for assigning water rights quantities for water systems taking over domestic exempt wells.												1	A							1	a	1	a	2	b	1	a				
Issue IV.C.01	*Could the Department of Ecology be clearer and more consistent when assigning water rights quantities for water systems taking over domestic exempt wells that have no record of previous water usage?*												**1**	**A**							**1**	**a**	1	a	**1**	**b**	**1**	**a**				
IV.C.01.a	Recommend that the Department of Ecology clarify policy 1230 (Consolidation of Rights for Exempt Ground Water Withdrawals (1/11/1999)) to ensure it is consistently implemented.	R	1	a DOE							0	d	1	A	0	D	2	D			1	a	0	a	1	a	1	a	2	b[ii]		

			Washington State agencies [vi]		Spokane County		Pend Oreille County		Stevens County		City of Spokane[i]		City of Deer Park		City of Liberty Lake		City of Spokane Valley		City of Millwood		Spokane Aquifer Joint Board		Whitworth Water District		Vera Water District		Stevens County PUD		The Lands Council		Spokane County Cons. Dist.	
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V. Water Rights and Claims																																		
Policy V.A	Water management is needed for WRIAs 55 & 57 to insure water in the future for all beneficial uses.																																	
Issue V.A.01	*Would a better understanding of water rights in the WRIAs help in making water management decisions for WRIA 55 & 57?*																				**2**	**a**			1	a						
V.A.01.a	Request the Department of Ecology to monitor and enforce existing water rights holders to meet conditions of their water rights and comply with state law.	R	0	a							0	d	0	D	0	D	1	D			2	a	0	d	1	a	1	d	1	b[ii]		
V.A.01.b	Evaluate how to inventory water use within the watersheds to assist in making future water management decisions.	O			2	a,b					2	a,c 3k	0	D	1	B	2	D			2	a	0	d	1	a						
V.A.01.c	Evaluate the creation of a Municipal Reserve for future water rights for municipal water supplies.	O (R state)	1	a DOE	3	d					2	a 3k	2	D		B	2	D			2	a	2	a	1	a						
V.A.01.d	Develop strategies to address compliance, enforcement, and validity of water rights and claims within WRIAs 55 and 57.	O	1	a							2	d											1	d								
Issue V.A.02	*How can water rights be acquired to increase instream flow?*																								1	a			2	d		
V.A.02.a	Encourage the use of the State Trust Water Rights Program to secure water rights for instream flow.	R	1	a	2	d					2	d	1	D	0	D							1	d	1	a			2	d		
Policy V.B	Reduce summertime water use to help increase river flow during low flow years.																												1	b		
Issue V.B.01	*What are the approaches for reducing summertime water use by those with water rights during low flow years?*																				**1**	**a**			**1**	**a**						
V.B.01.a	When flows in the Little Spokane River and/or Middle Spokane River are expected to fall below the minimum instream flow during the summer, all water rights holders should be contacted asking them to voluntarily conserve water.	R			2	d					1	c 5k	0	D	1	B	1	D			1	a	0	d					2	*ii*		

			Washington State agencies [vi]		Spokane County		Pend Oreille County		Stevens County		City of Spokane[i]		City of Deer Park		City of Liberty Lake		City of Spokane Valley		City of Millwood		Spokane Aquifer Joint Board		Whitworth Water District		Vera Water District		Stevens County PUD		The Lands Council		Spokane County Cons. Dist.	
		Obligation / Recommendation	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)
V.B.01.b	When flows in the Little Spokane River and/or Middle Spokane River are expected to fall below the minimum instream flow during the summer, a media campaign should be launched to encourage additional water conservation measures	R			1	a,b					1	c 5k	0	D	1	B	1	D			1	a	0	d					1	d	3	a
VI. Strategies for Base Flow Augmentation																																
Policy VI.A	Support water resources management approaches that augment water supply in the Little Spokane River basin during the summer high water use period.																				1	a							1			
Issue VI.A.01	*What land management methods can be employed to slow the release of winter snowmelt and runoff into streams thus augmenting baseflow in the watershed?*																								1	b						
VI.A.01.a	Support the restoration, where feasible, of wetlands in areas where these features existed historically but have been drained.	R			2	a,b					2	a,b,c 10k	0	D	0	B					1	a	0	d	**2**	b			1	d	3	b
VI.A.01.b	Encourage the creation of new wetlands, where feasible, in upland areas and along stream corridors.	R			2	a,b			2[xiv]	A	2	a,b,c 10k	1	D	0	B					1	a	1	d	2	b			1	d	2	b
VI.A.01.c	Encourage forest management and harvest practices that preserve vegetative ground cover to reduce runoff and increase infiltration in keeping with the forest practices act.	R			2	a,b			2[xiv]	B	1	a,d 0k	1	D	0	A					1	a	0	d	2	b			1	d	2	b
VI.A.01.d	Discourage the destruction of existing wetlands.	R	0	a DOE	1	a,b			1[xiv]	A	1	a 0k	0	D	0	A					1	a	0	d					1	d	3	a
VI.A.01.e	Encourage agricultural practices that reduce runoff and increase infiltration.	R			2	a,b					1	a 0k	0	D	0	A					1	a	0	d	1	a			1	d	3	A
VI.A.01.f	Consider land use policies that preserve vegetation in natural drainages and other areas in new subdivisions, short subdivisions, or binding site plans.	R			3	a,b			2[xiv]	A	2	a,b 0k	0	D	1	A									1	a			1	b		

			Washington State agencies [vi]		Spokane County		Pend Oreille County		Stevens County		City of Spokane[i]		City of Deer Park		City of Liberty Lake		City of Spokane Valley		City of Millwood		Spokane Aquifer Joint Board		Whitworth Water District		Vera Water District		Stevens County PUD		The Lands Council		Spokane County Cons. Dist.	
		Obligation / Recommendation	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)	Priority (0 - 3)	Level of effort (A - D)
Issue VI.A.02	*What types of storage can be employed to slow the release of winter snowmelt and runoff into streams in the Little Spokane River basin to augment baseflow in the watershed?*						2	D																								
VI.A.02.a	Continue site identification and feasibility analysis for use of surface runoff storage in existing lakes as means of augmenting base flow in the Little Spokane Watershed.	R									2	a,b,c 3k			2	D																
VI.A.02.b	Continue site identification and feasibility analysis for use of surface runoff storage in new artificial lakes or ponds as means of augmenting base flow in the Little Spokane Watershed.	R									2	c 3k			2	D																
VI.A.02.c	Continue site identification and feasibility analysis for use of recharge and storage in aquifers as means of augmenting base flow in the Little Spokane Watershed.	R									2	c 3k			2	D																
VI.A.02.d	Consider a public education program on the benefits and problems of beaver dams.	R					2	D			2	d			1	D													1	d		
Policy VI.B	Support water resources management approaches that augment water supply in the Middle Spokane River basin during the summer high water use period.																				1	a							1	d		
Issue VI.B.01	*What types water storage can be employed to slow the release of winter snowmelt and runoff into streams in the Middle Spokane Watershed to augment baseflow in the watershed?*																								**2**	**b**			1	d		
VI.B.01.a	Continue site identification and feasibility analysis for use of surface runoff storage in existing lakes as means of augmenting base flow in the Middle Spokane Watershed.	R									2	a,b,c 4k			2	B	2	D			2	d			1	b			1	d		
VI.B.01.b	Continue site identification and feasibility analysis for use of surface runoff storage in new reservoirs or manmade ponds as means of augmenting base flow in the Middle Spokane Watershed.	R									2	a,b,c 4k			2	B	2	D			2	d			1	b						

			Washington State agencies [vi]		Spokane County		Pend Oreille County		Stevens County		City of Spokane [i]		City of Deer Park		City of Liberty Lake		City of Spokane Valley		City of Millwood		Spokane Aquifer Joint Board		Whitworth Water District		Vera Water District		Stevens County PUD		The Lands Council		Spokane County Cons. Dist.	
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VI.B.01.c	Continue site identification and feasibility analysis for use of recharge and storage in aquifers as means of augmenting base flow in the Middle Spokane Watershed.	R									2	a,b,c 4k			2	B	2	D			2	d			1	b						
VI.B.01.d	Continue site identification and feasibility analysis for use of recharge and storage in aquifers for recovery as a water supply source in the Middle Spokane Watershed.	R									2	a,b,c 4k			2	B	2	D			2	d			1	b						
Policy VI.C	Support water resources management approaches that augment stream flow in the Middle Spokane River during summer low flow season.																								1	b						
Issue VI.C.01	*Will moving water supply well pumping away from the Spokane River increase river flow during summer low flow season?*																								1	b						
VI.C.01.a	Assess the impact and feasibility of moving pumping away from existing wells near the river during the summer low flow season..	O			2	d					2	a,b,c 30k	2	D	2	B	2	D			2	a			1	a						
	VII. Strategies for Ground Water Recharge Augmentation																															
Policy VII.A	Support stormwater management approaches that foster the maintenance or enhancement of natural groundwater recharge rates due to direct precipitation.																								**1**	**a**			**1**	d		
Issue VII.A.01	*How can stormwater runoff generated by development be used to enhance recharge?*																															
VII.A.01.a	Support regulations that favor treatment and infiltration of stormwater as an alternative to collection, treatment and discharge to surface water.	R	1	a DOE	2	a,b					1	a 2k			1	A	2	D							1	a			1	d		
VII.A.01.b	Promote the diversion of stormwater from low permeability areas to areas with permeability conducive to infiltration	R	1	a DOE	2	a,b					1	d 0k			1	A	2	D							1	a						
VII.A.01.c	Support the infiltration of stormwater through natural sumps into shallow aquifers.	R	1	a DOE	2	a,b					1	d 0k			1	A	2	D							1	a			1	d		

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Policy VII.B	Support the use of reclaimed /reused water for aquifer storage and recovery practices, taking wellhead protection areas into account, to provide mitigation for municipal water supply pumping and to support Spokane River base flow.																				2	a							1	d		
Issue VII.B.01	*To what extent can reclaimed wastewater be used for aquifer recharge to support water supply and/or river base flow needs?*																								**1**	**a**			**1**	**d**		
VII.B.01.a	Support use of reclaimed water from municipal wastewater treatment facilities for aquifer recharge.	R	1	a DOE	1	a,b					1	a,b 1k	1	A	1	A	3	D			2	a			1	a			1	d		
VII.B.01.b	Upon completion of reclaimed water use acceptability evaluations (I.A.01) including wellhead protection concerns, perform recharge site investigations, preliminary design studies and feasibility studies for a reclaimed water recharge program.	O / R ? (R State)	1	a DOE	2	a,b					2	a,b,c 3k	2	D	1	B	3	D			2	a			2	b			1	d		
VII.B.01.c	If aquifer storage of reclaimed water is politically acceptable and economically feasible, implement an aquifer storage program for reclaimed water.	R	1	a DOE	3	a,b					2	a,b,c 3k	3	D	2	B	3	D			2	a			2	b			1	d		
Policy VII.C	Support the practice of groundwater recharge using Spokane River water diversions during high flow periods, where the injection does not cause a supply well to become groundwater under the influence of surface water, to provide mitigation for municipal water supply pumping and to support Spokane River base flow.																				2	a										
Issue VII.C.01	*To what extent can Spokane River diversions support Spokane River base flow needs during seasonal low flow periods?*																															
VII.C.01.a	Apply for funding supplemental funding under multi-use storage to investigate the technical feasibility of increasing summer river flow using non-natural recharge.	O (Done) (R State)	1	a DOE	0	a,b					0	d 0k			2	B	2	D			2	d			0	b						
VII.C.01.b	Identify potential infiltration areas that could be used to augment summer baseflow in gaining reaches of the Spokane River.	O (R State)	1	a DOE	0	a,b					1	a,b,c 3k	2	D	2	B	2	D			2	d			1	b						

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VII.C.01.c	Incorporate findings of VII.C.01.b into the Implementation Phase for WRIA 55 & 57 watershed planning and include specific recommendations in the first Plan Update.	O (R State)	1	a DOE	1	d					1	d 0k	2	D	2	D	2	D			2	d			1	b						
VII.C.01.d	During the implementation phase, support development of criteria, in collaboration with the Department of Ecology, under which credit for mitigation will be determined.	O / R (R State)	1	a DOE	1	d					1	d 0k	2	D	2	D	2	D			2	d			2	b			2	d		
Issue VII.C.02	*To what extent can Spokane River diversions support artificial aquifer recharge to support future public water supply needs*																															
VII.C.02.a	Apply for supplemental funding under multi-use storage to investigate the technical feasibility of mitigating public water supply pumping using artificial recharge.	O (Done) (R State)	1	a DOE	0	a,b					0	d 0k			2	B	2	D			2	d			2	b						
VII.C.02.b	Identify locations where infiltration or injection might benefit supply wells and the amount of water that might be beneficially stored based on current and projected pumping.	O (R State)	1	a DOE	2	a,b					1	a,b,c 3k	2	D	2	B	2	D			2	a			2	b						
VII.C.02.c	Incorporate findings of this evaluation into the Implementation Phase for WRIA 55 & 57 watershed planning and include specific recommendations.	O (R State)	1	a DOE	2	a,b					1	d 0k	2	D	2	D	2	D			2	a			2	b						
VII.C.02.d	During the Implementation Phase develop criteria, in collaboration with the Department of Ecology, under which credit for mitigation for new water appropriations will be determined.	O (R State)	1	a DOE	1	a,b					1	d 0k	2	D	2	D	2	D			2	a			1	b			2	d[ii]		
Issue VII.C.03	*What is the net effect on the aquifer; resulting from changes to Post Falls HED operations, during summer low flow operations?*																								**1**	b			**1**	**d**		
VII.C.03.a	Perform a MIKE SHE Model evaluation of the net effect on the aquifer; resulting from changes to Post Falls HED operations, during summer low flow operations.	R	1	a DOE	2	b					1	c 5k			2	D	2	D			2	a			1	b						

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VIII. Approaches to Plan Implementation																																
Policy VIII.A	The WRIA 55 & 57 Planning Unit will continue to function as the main vehicle for Plan implementation after plan approval.																								1	a			1	d		
Issue VIII.A.01	*What should the structure and membership of the Planning Unit be as it assumes the implementation role?*																								**1**	**a**						
VIII.A.01.a	Identify key stakeholder groups needed for plan implementation and secure commitment for continued involvement.	O (R state)	0	a DOE	1	a,b					1	d 0k	0	D	1	D	1	D					0	d	1	a	1	a			2	b
VIII.A.01.b	Entities that will be involved with implementation and included in the implementation matrix should be represented on the implementation Planning Unit.	R	0	a DOE	1	a					1	d 0k	0	D	1	D	1	D					0	d	1	a	1	a			3	a
VIII.A.01.c	Develop procedures for Planning Unit participation in Plan implementation.	O			1	a,b					1	a 1k	0	D	1	D	1	D					0	d	1	a	1	a				
Policy VIII.B	Support continuing data collection and evaluation to fill data gaps that limit the scope and implemetability of the WRIA 55 & 57 Watershed Plan.																								1	a			1	d		
Issue VIII.B.01	*What additional information is needed to fully implement Watershed Plan?*																								1	a						
VIII.B.01.a	Evaluate studies recommended in the Watershed Plan for data gaps.	O			1	a,b			1	D	1	d 0k	0	D	continuous	D	2	D					0	d	1	a					2	A
VIII.B.01.b	Evaluate the success of implemented Watershed Plan recommendations.	O			2	a,b			1	D	2	a,b,c 2k	0	D	continuous	D	2	D					0	d	2	a					2	B
VIII.B.01.c	Use adaptive management to fill data gaps and improve the outcomes of implemented recommendations.	O			0	a,b					2	d 0k	0	D	continuous	D	2	D					0	d	2	a						
Policy VIII.C	Utilize established systems for forecasting water availability in the Spokane and Little Spokane Watersheds.																								2	a						
Issue VIII.C.01	*Can established systems be used to forecast the general nature of streamflow in these rivers?*																								**1**	a						
VIII.C.01.a	Evaluate existing forecasting systems, and support improvements determined valuable by the Planning Unit.	O			2	a,b					2	a,b,c 2k	2	D	continuous	D	2	D							1	a						

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VIII.C.01.b	Develop a procedure for presenting flow forecast information that will be used to trigger water resources management procedures.	O (R state)	2	a	2	a,b					2	d 0k	3	D	2		2	D							1	a						
Policy VIII.D	Promote funding of projects included in Watershed Plans.																								1	a			1	d		
Issue VIII.D.01	*How can watershed plan projects compete for limited funds?*																								1	a						
VIII.D.01.a	State agencies should give priority to projects included in Watershed Plans when reviewing projects for funding.	R	0	a DOE							0	d 0k	2	D	1	D	1	D							1	a						
VIII.D.01.b	Identify and pursue additional funding sources for watershed plan projects.	O			1	a			1	D	2	a,b,c 2k	2	D	1	D	1	D							1	a					2	a

NOTES

Priority: 0 - Action effectively implemented by Plan approval; 1 -1 to 2 years after adoption; 2 - 3 to 6 years after adoption; 3 - 7+ years after adoption

Level of Effort: a - Can be done with existing staff; b - Needs additional staff or funding; c - Will provide staff or funding for other agency to implement; d - No staff or funding (beyond planning/implementing unit participation)

Obligation means, Recommendation means.

[i] As best as can be determined at this time, the City of Spokane is attempting to indicate the level of effort it can commit to for these tasks. The numbers followed by a "k" indicate a 5-year-sum, dollar commitment including both staff and funds, where "k" equals a thousand dollars. These sums in most cases are expected to be supplemented by other members to accomplish the goal. Any grant funds would be expected to proportionally reduce the City's costs. As the implementing unit has not discussed implementation, it is not possible to know at this time what staff needs will be and who will be doing the work. A "C" by itself indicates that the City expects that the work will be done by others with City support. An "A" by itself indicates that the City expects to do the work with City staff. The City of Spokane contributes to other entities such as SAJB. The dollar commitments listed are intended to include such routed funds.

[ii] The Lands Council will lobby the appropriate agency.

[iii] A survey costs ~$20,000

[iv] the SCCD currently has 5 gaging stations and lots of data on the Little Spokane River streamflow, so should be included here.

[v] What aquatic biota study is it referring to?

[vi] contingent upon available funding and staff

[vii] WDFW is concerned that recreational flows could conflict with fish protection flows.

[viii] Ecology and WDFW will support if "to evaluate the need for revising the instream flow rule" is added between "regime" and "for".

[ix] Will review as part of development regulations.

[x] Provide information in permit center.

[xi] Not sure how this would work.

[xii] City of Spokane Valley Parks Department

[xiii] If the available funding and/or resources are available to Stevens County

[xiv] Effectively implemented by Plan approval, and/or by other current regulations adopted by Stevens County.

CHAPTER 6 STATE ENVIRONMENTAL POLICY ACT

The Washington State Environmental Policy Act (SEPA) (Chapter 43.21C RCW) was enacted by the Washington State Legislature to ensure that state and local agencies consider potential environmental consequences of proposed actions during decision-making processes concerning such activities. This consideration occurs during the SEPA review process. Under SEPA rules, non-project actions are defined as governmental actions involving changes to policies, plans, and programs (Chapter 197-11 WAC). Such actions can include the adoption or amendment of policies, programs, and plans, such as Watershed Plans, under Chapter 90.82 RCW. Any non-project action must be reviewed under SEPA unless specifically exempted. This review process consists of identification and evaluation of probable impacts of a proposed action, reasonable alternatives to the proposed action, and mitigation measures, before committing to a particular course of action.

In July 2003, Ecology published *Final Environmental Impact Statement for Watershed Planning under Chapter 90.82* (Ecology, 2003). In accordance with the SEPA Rules, Ecology's Watershed Planning EIS (2003) provides Planning Teams with the following four options for SEPA compliance:

1. **ADOPTION OF THE PROGRAMMATIC WATERSHED PLANNING EIS and DETERMINATION OF SIGNIFICANCE (DS):** This is an option if the Watershed Planning EIS adequately addresses all probable adverse impacts.
2. **ADOPTION, DS and ADDENDUM:** This option is the same as #1; however, an addendum provides local decision makers with additional local information, such as land cover, environment, etc.
3. **ADOPTION and SUPPLEMENTAL EIS:** This option provides for additional independent analyses of environmental impacts, if the Final Watershed Planning EIS does not address all of the probable significant adverse environmental impacts.
4. **ADOPTION and DETERMINATION OF NON-SIGNIFICANCE (DNS):** This option could be used if it is determined that there are no probable significant adverse impacts associated with the recommended actions contained in the Watershed Plan.

There is already a SEPA review process in place for adoption or modification of some ordinances, rules, regulations, comprehensive plans, specific projects, etc. Many recommended actions in watershed management plans involve updates or changes to these plans, policies, or programs. If thorough environmental review occurs at the broad non-project level, focused project or non-project review for individual actions can be carried out at the time the individual action, such as the comprehensive plan update, is carried out.

Actions, also called alternatives in Ecology's Watershed Planning EIS (2003) are defined by the SEPA Rules as follows:

- New and continuing activities, including projects and programs, entirely or partly financed, assisted, conducted, regulated, licensed, or approved by agencies;
- New or revised agency rules, regulations, plans, policies, or procedures; and
- Legislative proposals (Chapter 197-11-704 WAC) (Ecology, 2003).

Conclusion Of Review Process And Selection Of EIS Option

The *Final Environmental Impact Statement for Watershed Planning under Chapter 90.82* (Ecology, 2003) presents a range of alternatives, including a no action alternative, which represents the types of recommended actions that Planning Units may include in their watershed plans to achieve the objectives of the Watershed Planning Act.

The WRIA 55/57 Planning Unit reviewed the four EIS options stated above and concluded that since the alternatives were discussed in Ecology's *Final Environmental Impact Statement for Watershed Planning under Chapter 90.82* (2003), it would be redundant to discuss alternatives to the actions identified in this Plan. Therefore, Option #1 has been selected and applied.

National Environmental Policy Act Compliance

The NEPA is triggered when action by or permit from a federal agency is required or if federal funding is involved. This Plan does not require a permit, action or funding by any federal agency. Spokane, Stevens, and Pend Oreille Counties reserve their rights to exercise powers granted to local governments under NEPA.

SEPA Compliance For The WRIAS 55 AND 57 Watershed Plan

Spokane County is the Lead Agency for SEPA and the Watershed Planning Act process in WRIAS 55 AND 57. Spokane County has opted to adopt the programmatic Watershed Planning EIS and to issue a DS for the WRIAS 55 AND 57 Watershed Plan. The *Final Environmental Impact Statement for Watershed Planning under Chapter 90.82* (Ecology, 2003) lists alternatives that are intended to represent the recommended actions that Planning Teams may include in their Watershed Plans. Recommended actions in this Plan that are consistent with alternatives in the programmatic watershed planning EIS do not require supplemental information for SEPA compliance, nor do they require enumeration of alternatives and potential impacts (i.e., action versus no action) in the standard SEPA format. In addition, the following qualifications also apply to the use of the programmatic watershed planning EIS and SEPA compliance for the watershed planning:

- Recommended actions for studies typically do not have the potential to cause an adverse environmental impact and will not trigger a determination of significance.

- Recommended actions for convening interest/stakeholder groups do not have an adverse environmental impact.

- Recommended actions that involve review or revision of existing ordinances, policies, or programs will go through a SEPA review process during adoption of the revised ordinance, policy, or program. The SEPA rules state that, "The fact that proposals may require future agency approvals or environmental review shall not preclude current consideration, as long as proposed future activities are specific enough to allow some evaluation of their probable impacts." Since a number of alternatives in the *Final Environmental Impact Statement for Watershed Planning under Chapter 90.82* (Ecology, 2003) address modifications to ordinances, plans, and policies, impacts and mitigation measures associated with these types of recommended actions have been addressed adequately for the level of environmental review required for the watershed planning process. These actions may also undergo individual environmental review at the time that each of the revisions is actually proposed.

- If it is determined that a recommended action will not result in probable significant adverse environmental impacts, such as formation of the Implementation Team, further environmental review of such an action under SEPA is not required.

Based upon alternatives listed in Ecology's Final Environmental Impact Statement for Watershed Planning under Chapter 90.82 (2003) and the factors listed above, this Plan does not require an addendum or additional EIS for its DS. The watershed planning EIS will be used for all actions in this Plan that requires SEPA review.

Pend Oreille County and Stevens County do not have additional requirements under SEPA; however, Spokane County does requires additional SEPA review. As such, a SEPA Checklist and Addendum for Non-project Actions has been prepared and is attached in Appendix G.

Water Quantity Component for WRIAS 55 AND 57

The Ecology *Final Environmental Impact Statement for Watershed Planning under Chapter 90.82* (2003) lists 25 alternatives for achieving the goals of the water quantity component of watershed planning, which fit into the following three general categories:

- Promote water use efficiency,
- Effectively manage allocation and use of water resources through legal mechanisms, and
- Develop or improve water resources storage infrastructure.

In Ecology's *Final Environmental Impact Statement for Watershed Planning under Chapter 90.82* (2003), alternative actions are listed as WP 1, WP 2, etc. WP stands for Watershed Planning Alternatives. Of those alternatives listed for the water quantity component in the EIS document, the following apply to this Plan:

WP 1: Develop and implement municipal conservation programs.

WP 2: Develop and implement agricultural water conservation and irrigation efficiency efforts.

WP 3: Develop and implement on-farm agricultural water conservation and irrigation efficiency efforts.

WP 4: Develop and improve industrial conservation measures.

WP 5: Request local governments or sewer utilities to construct and operate water reclamation and reuse facilities.

WP 8: Request Ecology to transfer existing water rights for out-of-stream beneficial uses acquired through purchase, lease, voluntary methods, or condemnation to instream beneficial uses through the state's Trust Water Right Program.

WP 9: Transfer water through inter-ties of public water systems or irrigation systems.

WP 10: Request Ecology to allocate additional groundwater or surface water on a short-term or long-term basis.

WP 12: Request Ecology to initiate an adjudication of a basin or sub-basin.

WP 13: Request Ecology to assign a water master to a basin, sub-basin, or other geographic area.

WP 14: Request Ecology to increase enforcement against illegal water use within a basin or sub-basin.

WP 15: Request Ecology to evaluate some set or subset of existing water rights within a basin or sub-basin to identify those water rights that are subject to relinquishment.

WP 16: Request local governments to adopt regulations or for Ecology to adopt rules to minimize use of exempt wells, to restrict the siting of wells in proximity to streams, and/or to restrict the finished depth of new wells to the second aquifer unit or lower.

WP 17: Where adequate public water supplies are available, extend public water system service into areas served by exempt wells and require any new development to connect to such public water supplies.

WP 19: Construct and operate new on-channel storage facilities.

WP 20: Raise and operate existing on-channel storage facilities.

WP 21: Construct and operate new off-channel storage facilities.

WP 22: Raise and operate existing off-channel storage facilities.

WP 23: Use existing storage facilities for additional beneficial uses.

WP 24: Construct and operate artificial recharge/aquifer storage projects.

Instream Flow Component for WRIAS 55 AND 57

The Ecology *Final Environmental Impact Statement for Watershed Planning under Chapter 90.82* (2003) lists two alternatives for achieving the goals of the instream flow component of watershed planning. Of the alternatives listed for the instream flow component in the watershed planning EIS (2003), the following one applies to this Plan:

WP 26: Request Ecology to set instream flows by administrative rule in Washington Administrative Code.

WP 27: Take no action regarding instream flows.

Water Quality and Habitat Components For WRIAS 55 AND 57

The Ecology *Final Environmental Impact Statement for Watershed Planning under Chapter 90.82* (2003) lists 30 alternatives for achieving the goals of the water quality component and/or habitat of watershed planning. Though the WRIA 55/57 Planning Unit chose not to address these optional elements, some of the alternatives listed under Water Quality and Habitat were recommended to address water quantity issues. Of the alternatives listed for the water quality and habitat components in Ecology's watershed planning EIS (2003), the following nine alternatives apply to this Plan:

WP 28: Request local governments or sewer utilities to construct and operate water reclamation and reuse facilities.

WP 36: Develop and implement a water quality public education program intended to prevent or reduce nonpoint pollution with focus on pollution sources associated with an urban setting, or with focus on pollution sources associated with a rural setting.

WP 44: Request local governments to route treated stormwater to water-limited streams to allow for channel maintenance.

WP 56: Support implementation of the recommendations of Washington's Forest and Fish Report.

Application Of Final Watershed Planning EIS Alternatives To WRIAs 55 AND 57 Watershed Plan

The following tables identify specific SEPA alternatives that apply to the recommendations in this Plan. Recommendations that do not require a SEPA alternative are noted by the following type:

- Actions that are studies (Study);
- Actions without a foreseeable adverse environmental impact (No impact); and
- Actions that are still in Early Planning Stages (EPS).

Each table presents the recommendation number, recommendation, and the application of SEPA Alternative for each planning component.

Table 6.A. WRIA 55 & 57 SEPA Matrix		
I. Water Conservation, Reclamation and Reuse		
Recommendation		
I.A.01.a	Determine indoor conservation issues (approaches) on which the public needs to be educated (i.e. in-door low flow devices such as showerhead, facets, toilets and appliances and habits).	Study
I.A.01.b	Local authorities / wastewater utilities should evaluate customer indoor water saving incentives as a means to save on new facility costs. If cost effective, incentives should be included in facility and comprehensive planning processes and implemented through local regulation.	WP 1
I.A.01.c	City and County governments will develop and implement a regional education and awareness program to promote wise and efficient use of the water supply with voluntary participation by water suppliers.	WP 1
I.A.01.d	Municipal water suppliers will develop water conservation programs independently and cooperatively in accordance with Washington State Department of Health regulations and other water suppliers are encouraged to develop their own water conservation programs.	WP 1
Issue I.A.02	*What steps can be taken to reduce domestic, municipal and public outdoor water use?*	
I.A.02.a	Determine the outdoor conservation issues (approaches) on which the public needs to be educated (i.e., soil development, plant root development, native/drought resistant vegetation, xeriscaping).	Study
I.A.02.b	Counties/Cities consider developing incentives for xeriscaping and use of native and/or drought resistant vegetation through existing and future planning processes.	WP 1
I.A.02.c	Include options for xeriscaping in landscape requirements for commercial and industrial developments.	WP 1
I.A.02.d	Encourage the xeriscaping option for urban open space in planned developments.	WP 1
I.A.02.e	County/Cities/Water Purveyors encourage implementation of water conservation in watering of public properties such as parks, school lawn areas, athletic fields, boulevards, and highway green areas.	WP 1
I.A.02.f	Evaluate the benefits of retrofitting irrigation systems with automatic controllers and other high efficiency components for schools, golf courses, parks, cemeteries, and other large scale public irrigation projects	Study
I.A.02.g	Encourage and evaluate incentives for irrigators (e.g. agricultural and golf course) to implement all feasible irrigation efficiencies.	WP 3
Policy I.B	Support education programs which foster public acceptance of water conservation, reuse and reclamation.	
Issue I.B.01	*What steps should be taken to educate the public on water conservation and use?*	
I.B.01.a	Encourage the use of several educational methods to reach all segments of the population, those in schools, government, and businesses.	WP 1
Policy I.C	Support actions that result in the increased use of reclaimed and reused water.	
Issue I.C.01	*What economic, political, legal and resource incentives can be implemented to encourage municipalities, utilities and businesses to reclaim and reuse water?*	
I.C.01.a	Evaluate the public perception of water reclamation and reuse and determine how to educate the public to increase their understanding of the benefits and risks.	Study

I.C.01.b	Evaluate the potential for tax incentives, permitting and/or regulatory credits that can be used by corporations that want to implement water reuse strategies.	Study
I.C.01.c	Evaluate development of cost-effective options for reclamation and reuse in small scale and decentralized settings.	Study
I.C.01.d	Research possible water reuse and reclamation opportunities.	Study
II. Instream Flow Needs for the Middle Spokane River		
Policy II.A	Assure that instream flows for the Middle Spokane River meet the needs of rainbow trout and other associated aquatic biota.	
Issue II.A.01	*Does the information on rainbow trout from the Hardin Davis Instream Flow and Habitat Study establish the basis for setting instream flows on the Middle Spokane River?*	
II.A.01.a	Establish a minimum instream flow for the Spokane River at the Barker Road transect (USGS Gage 12420500) of 500 cfs to provide significant weighted useable area for juvenile and adult rainbow trout.	WP 26
II.A.01.b	Avista's 2007 operating license for the Spokane River Hydroelectric Development should require a minimum discharge to provide habitat for juvenile and adult rainbow trout that would be protected through a minimum instream flow for the Spokane River at the Barker Road transect (USGS gage 12420500) of 500 cfs.	WP 23
II.A.01.c	Flow in the Middle Spokane River should be managed to optimize spring spawning, incubation and emergence for rainbow trout. A protocol should be established between the WDFW, IDF&G and Avista to accomplish this task. Specific flow levels and timing would be established as early as possible each year and based on snow pack and expected runoff conditions for that year.	WP 23
II.A.01.d	Continue operation of the Barker Road gage and study the correlation between the Barker Road and Post Falls flows.	No new Impact
Issue II.A.02	*Would using Post Falls gage (USGS gage 12419000) and/or the Greenacres gage (12420500) provide better protection for aquatic biota in the Spokane River between the Post Falls HED and Sullivan Road than using the Spokane at Spokane gage (USGS Gage 12422500) below the Maple Street Bridge?*	
II.A.02.a	The flow regime in critical habitat areas for aquatic biota identified in the Spokane River between the Post Falls HED and Sullivan Road are more closely related to flow at the Spokane River near Post Falls gage (USGS 12419000) *and/or the Greenacres gage (12420500)* than at the Spokane River at Spokane gage (USGS 12422500). To improve flow management in this reach, take steps to upgrade the Post Falls gage to that of a "real time" gage.	No new Impact; EPS
II.A.02.b	Instream flow for the Lower Spokane River could be managed using USGS Gage 12422500, the Spokane River at Spokane. Conduct fish habitat studies focusing on juvenile and adult rearing on at least 3 sites in the Lower Spokane River between the Monroe Street HED and the Nine-Mile HED pool. This work could be conducted as part of the WRIA 54, Lower Spokane River Watershed Plan and/or as an Avista relicensing PM&E.	Study
Policy II.B	Manage flow in the Middle Spokane River to provide for aesthetic and recreational use.	
Issue II.B. 01	*What flow provides an aesthetic experience in the "north channel" of the Spokane River in Riverfront Park?*	
II.B.01.a	Support a consensus based agreement within the Avista Recreation, Land Use, and Aesthetics Work Group of at least 300 cfs in the north channel of the Spokane River through Riverfront Park as the basis for aesthetic flows.	WP 23
Issue II.B. 02	*What flow conditions are needed to provide recreation experiences on the Middle Spokane River during the low flow period?*	
II.B.02.a	Use the Avista Recreation, Land Use, and Aesthetics Work Group findings as the basis for recreation flows in the Middle Spokane River.	WP 23

II.B.02.b	Evaluate the use of periodic increases in flow during low flow periods for recreational use in the Middle Spokane River while taking into account effects on aquatic biota, water quality, and safety.	Study
II.B.02.c	Evaluate the impact on aquatic biota, water quality, and safety of managing the declining spring runoff and fall drawdown with releases from the Post Falls HED to optimize recreational use of the Spokane River according to the Avista Recreation, Land Use, and Aesthetics Work Group.	Study
Policy II.C	Manage flow in the Middle Spokane River to maintain water quality adequate for identified beneficial uses.	
Issue II.C. 01	*How do different flow regimes in the Spokane River affect temperature and Dissolved Oxygen and what are their consequences for aquatic biota?*	
II.C.01.a	Encourage the Department of Ecology to use the CEQUALW2 model (with necessary changes) to consider different flow regimes as part of the Spokane River / Lake Spokane TMDL process.	Study
Policy II.D	Manage flow in the Middle Spokane River to provide adequate flow during spring runoff so river water can be diverted for groundwater recharge augmentation while protecting spawning and incubation.	
Issue II.D. 01	*How can spring high flows be managed to meet the needs of fish spawning and incubation and still allow for the diversion of flow for groundwater recharge?*	
II.D.01.a	Evaluate how river diversions can be accomplished without impairing spawning and incubation of rainbow trout.	Study
Policy II.E	Integrate flow recommendations for aquatic biota, recreation, aesthetics, and water quality into an overall recommendation for flow management in the WRIA 57 watershed.	
Issue II.E. 01	*What flows are needed to meet different seasonal uses?*	
II.E.01.a	After the Avista HED license application is filed, the Spokane River / Lake Spokane Dissolved Oxygen TMDL data gathering phase, and instream studies on rearing below Monroe Street HED are completed, integrate all of the recommended instream flows into one regime for the whole watershed. The flow regime will be submitted to the Department of Ecology for instream flow rule making. Ecology obligation.	EPS
III. Instream Flow Needs for the Little Spokane River		
Policy III.A	Assure that instream flows for the Little Spokane River (173-555 WAC) meet the needs of rainbow trout and mountain whitefish and other representative aquatic biota.	
Issue III.A.01	*Does the information on rainbow trout and mountain whitefish from the Golder study support changing the minimum instream flows on the Little Spokane River?*	
III.A.01.a	Recommend no changes in the minimum instream flows for the reaches controlled by the “At Dartford” gage, the Chattaroy gage, and the Elk Park gage in WAC 173-555 at this time. As new data become available the minimum instream flows should be evaluated.	WP 27
III.A.01.b	Additional studies on instream flow needs for the mainstem and tributaries should be conducted if problems arise with the existing conditions.	Study
III.A.01.c	Studies should be conducted on the major tributaries to determine the extent of and areas where spawning occurs. When this information becomes available, flow studies on the tributaries should be conducted to determine flow needs for the tributaries.	Study
III.A.01.d	Recommend a study on the Little Spokane River tributaries on optimizing habitat for the target species and linking the preferred flows on the tributaries to flows at the control points.	Study
III.A.01.e	Expanded study on the mainstem would require reapplication of PHABSIM using site-specific preference curves and multiple transect measurements.	Study
III.A.01.f	Recommend a study of the fish habitat instream flow needs for the reach of the Little Spokane River below the “At Dartford” gage to better determine the water available for	Study

	future withdrawals.	
Policy III.B	Manage water resources in the Little Spokane Basin to maintain beneficial uses other than aquatic biota.	
Issue III.B.01	*How will pumping from the SVRP Aquifer Watershed to provide water service in the Little Spokane Watershed north of the Little Spokane River / Deadman Creek affect flows in the Little Spokane River?*	
III.B.01.a	Monitor the effects of exporting water from the SVRP Aquifer into the Little Spokane Watershed on the flow of the Little Spokane River.	Study
Issue III.B.02	*What action should be taken toward domestic exempt wells when flows at the designated control point fall below the minimum instream flow?*	
III.B.02.a	The Department of Ecology should enforce the minimum instream flow shutoff of water rights junior to WAC 173-555 on irrigation from exempt wells in the Little Spokane Watershed where it does not cause additional fire danger.	WP 14
Issue III.B.03	*What effect will reactivating a gage at Chattaroy and / or Elk have on water rights interruptions for upper basin water users?*	
III.B.03.a	Using existing data, study the effects of reactivating a gage at Chattaroy and / or Elk for regulation of the upstream water users.	Study
III.B.03.b	If further study is desired, the Planning Unit should work with Pend Oreille County, the Department of Ecology, Spokane Community College and others to continue flow measurements as needed.	Study
III.B.03.c	If the benefits are sufficient to offset costs and legal constraints do not exist, beneficiaries of the operation of a Chattaroy and / or Elk control point, in cooperation with the Department of Ecology, should reactivate and fund a gage at Chattaroy and / or Elk with real time capabilities as needed for regulation.	EPS
Issue III.B.04	*What actions are needed to maintain or improve recreational opportunities on the Little Spokane River?*	
III.B.04.a	Promote management practices, when feasible, that maintain minimum flows of at least 90 cfs at the "At Dartford" gage in the Lower Little Spokane River (Little Spokane River Natural Area) to support current and future recreational activities.	EPS
III.B.04.b	Promote management practices, when feasible, that maintain minimum flows of at least 90 cfs at the "At Dartford" gage for Pine River Park and 32 cfs at Elk Park to support existing and future recreational activities.	EPS
III.B.04.c	Investigate and/or determine if future parks or access points are needed for recreational use of the Little Spokane River.	Study
Issue III.B.05	*Would a better understanding of flow in the West Branch of the Little Spokane River help water resource management in the watershed?*	
III.B.05.a	Determine the feasibility of installing a gage(s) on the West Branch of the Little Spokane River.	Study
Policy III.C	Integrate flow recommendations for aquatic biota, recreation, aesthetics, water quality, and other uses into an overall recommendation for a minimum instream flow regime.	
Issue III.C.01	*What flows are needed in the Little Spokane River for different seasonal uses?*	
III.C.01.a	When the lower Little Spokane River aquatic biota study and the Water Quality Management Plan/TMDL process are completed, integrate all of the recommended instream flows into one regime to evaluate the need for revisiting the instream flow rule for the whole watershed taking wildlife habitat and other uses into account.	Study
III.C.01.b	Develop strategies for achieving the integrated flow regime.	EPS
IV. Domestic Exempt Wells		
Policy IV.A	Develop approaches to land use management that limits the impacts of withdrawals from domestic exempt wells at or below current levels.	

Issue IV.A.01	*Should the counties adopt policies to manage the proliferation of domestic exempt wells?*	
IV.A.01.a	Support low residential densities in areas of the counties designated as rural in order to protect water supplies.	WP 16
IV.A.01.b	The counties should implement a policy or procedure requiring a person who is developing property within a water service area to consult with the water purveyor about the potential for public water service before creating a development or single-family residence dependent on domestic exempt wells.	WP 17
IV.A.01.c	Request counties, cities, and/or the Regional Health Districts to evaluate the quantity of water necessary (currently 1 gallon per minute) from a domestic exempt well before a building permit is issued.	Study
IV.A.01.d	Local land use regulations should contain specific criteria by which applicants for land development such as subdivisions, short subdivisions, binding site plans, or certificates of exemption for the purpose of creating additional building sites must demonstrate sufficient water availability.	WP 16
IV.A.01.e	Water purveyors are encouraged to participate with land use regulators and the Department of Health in identifying and addressing areas of water availability concern.	Study
IV.A.01.f	Land use regulators are encouraged to consider available ground water resources when establishing minimum parcel sizes in areas where exempt wells will be the main source of domestic water in an effort to avoid future water shortages.	WP 16
Issue IV.A.02	*Should the counties adopt policies which limit the maximum daily withdrawals from individual domestic exempt wells where detrimental impacts are identified?*	
IV.A.02.a	Evaluate policies that will limit the maximum daily withdrawals to less than 5000 gallons per day where detrimental impacts are identified.	Study
Issue IV.A.03	*What are the methods for reducing summertime water use from domestic exempt wells during low flow years?*	
IV.A.03.a	At a minimum, when flows in the Little Spokane River are expected to fall below minimum instream flows, caution letters should be sent to all domestic exempt well owners in the Little Spokane Watershed asking them to voluntarily conserve water. Methods for saving water and directions to a website with more information will be included with the letter.	WP 1
Policy IV.B	Collect additional data to better define the impact of exempt wells on water use and model calibration.	
Issue IV.B.01	*Would more accurate water use quantities and locations for domestic exempt wells make a significant difference in the accuracy of the watershed model?*	
IV.B.01.a	Run a sensitivity analysis on water use from exempt wells with the watershed model. If the model is recalibrated with different data in the future, another sensitivity analysis may need to be done.	Study
Issue IV.B.02	*Would more accurate water pumping quantities and locations for Group B and small Group A wells make a significant difference in the accuracy of the watershed model?*	
IV.B.02.a	Run a sensitivity analysis on unmetered Group A and Group B water use with the watershed model. If the model is recalibrated with different data in the future, another sensitivity analysis may need to be done.	Study
Policy IV.C	Develop a clear, consistent policy for assigning water rights quantities for water systems taking over domestic exempt wells.	
Issue IV.C.01	*Could the Department of Ecology be clearer and more consistent when assigning water rights quantities for water systems taking over domestic exempt wells that have no record of previous water usage?*	
IV.C.01.a	Recommend that the Department of Ecology clarify policy 1230 (Consolidation of Rights for Exempt Ground Water Withdrawals (1/11/1999)) to ensure it is consistently implemented.	WP 17

V. Water Rights and Claims		
Policy V.A	Water management is needed for WRIAs 55 & 57 to insure water in the future for all beneficial uses.	
Issue V.A.01	*Would a better understanding of water rights in the WRIAs help in making water management decisions for WRIA 55 & 57?*	
V.A.01.a	Request the Department of Ecology to monitor and enforce existing water rights holders to meet conditions of their water rights and comply with state law.	WP 14
V.A.01.b	Evaluate how to inventory water use within the watersheds to assist in making future water management decisions.	Study
V.A.01.c	Evaluate the creation of a Municipal Reserve for future water rights for municipal water supplies.	Study
V.A.01.d	Develop strategies to address compliance, enforcement, and validity of water rights and claims within WRIAs 55 and 57.	EPS
Issue V.A.02	*How can water rights be acquired to increase instream flow?*	
V.A.02.a	Encourage the use of the State Trust Water Rights Program to secure water rights for instream flow.	WP 8
Policy V.B	Reduce summertime water use to help increase river flow during low flow years.	
Issue V.B.01	*What are the approaches for reducing summertime water use by those with water rights during low flow years?*	
V.B.01.a	When flows in the Little Spokane River and/or Middle Spokane River are expected to fall below the minimum instream flow during the summer, all water rights holders should be contacted asking them to voluntarily conserve water.	WP 1
V.B.01.b	When flows in the Little Spokane River and/or Middle Spokane River are expected to fall below the minimum instream flow during the summer, a media campaign should be launched to encourage additional water conservation measures	WP 1
VI. Strategies for Base Flow Augmentation		
Policy VI.A	Support water resources management approaches that augment water supply in the Little Spokane River basin during the summer high water use period.	
Issue VI.A.01	*What land management methods can be employed to slow the release of winter snowmelt and runoff into streams thus augmenting baseflow in the watershed?*	
VI.A.01.a	Support the restoration, where feasible, of wetlands in areas where these features existed historically but have been drained.	EPS
VI.A.01.b	Encourage the creation of new wetlands, where feasible, in upland areas and along stream corridors.	EPS
VI.A.01.c	Encourage forest management and harvest practices that preserve vegetative ground cover to reduce runoff and increase infiltration in keeping with the forest practices act.	WP 56
VI.A.01.d	Discourage the destruction of existing wetlands.	EPS
VI.A.01.e	Encourage agricultural practices that reduce runoff and increase infiltration.	WP 36
VI.A.01.f	Consider land use policies that preserve vegetation in natural drainages and other areas in new subdivisions, short subdivisions, or binding site plans.	EPS
Issue VI.A.02	*What types of storage can be employed to slow the release of winter snowmelt and runoff into streams in the Little Spokane River basin to augment baseflow in the watershed?*	
VI.A.02.a	Continue site identification and feasibility analysis for use of surface runoff storage in existing lakes as means of augmenting base flow in the Little Spokane Watershed.	Study

VI.A.02.b	Continue site identification and feasibility analysis for use of surface runoff storage in new artificial lakes or ponds as means of augmenting base flow in the Little Spokane Watershed.	Study
VI.A.02.c	Continue site identification and feasibility analysis for use of recharge and storage in aquifers as means of augmenting base flow in the Little Spokane Watershed.	Study
VI.A.02.d	Consider a public education program on the benefits and problems of beaver dams.	Study
Policy VI.B	Support water resources management approaches that augment water supply in the Middle Spokane River basin during the summer high water use period.	
Issue VI.B.01	*What types water storage can be employed to slow the release of winter snowmelt and runoff into streams in the Middle Spokane Watershed to augment baseflow in the watershed?*	
VI.B.01.a	Continue site identification and feasibility analysis for use of surface runoff storage in existing lakes as means of augmenting base flow in the Middle Spokane Watershed.	Study
VI.B.01.b	Continue site identification and feasibility analysis for use of surface runoff storage in new reservoirs or manmade ponds as means of augmenting base flow in the Middle Spokane Watershed.	Study
VI.B.01.c	Continue site identification and feasibility analysis for use of recharge and storage in aquifers as means of augmenting base flow in the Middle Spokane Watershed.	Study
VI.B.01.d	Continue site identification and feasibility analysis for use of recharge and storage in aquifers for recovery as a water supply source in the Middle Spokane Watershed.	Study
Policy VI.C	Support water resources management approaches that augment stream flow in the Middle Spokane River during summer low flow season.	
Issue VI.C.01	*Will moving water supply well pumping away from the Spokane River increase river flow during summer low flow season?*	
VI.C.01.a	Assess the impact and feasibility of moving pumping away from existing wells near the river during the summer low flow season..	Study
VII. Strategies for Ground Water Recharge Augmentation		
Policy VII.A	Support stormwater management approaches that foster the maintenance or enhancement of natural groundwater recharge rates due to direct precipitation.	
Issue VII.A.01	*How can stormwater runoff generated by development be used to enhance recharge?*	
VII.A.01.a	Support regulations that favor treatment and infiltration of stormwater as an alternative to collection, treatment and discharge to surface water.	EPS
VII.A.01.b	Promote the diversion of stormwater from low permeability areas to areas with permeability conducive to infiltration	EPS
VII.A.01.c	Support the infiltration of stormwater through natural sumps into shallow aquifers.	EPS
Policy VII.B	Support the use of reclaimed /reused water for aquifer storage and recovery practices, taking wellhead protection areas into account, to provide mitigation for municipal water supply pumping and to support Spokane River base flow.	
Issue VII.B.01	*To what extent can reclaimed wastewater be used for aquifer recharge to support water supply and/or river base flow needs?*	
VII.B.01.a	Support use of reclaimed water from municipal wastewater treatment facilities for aquifer recharge.	WP 5
VII.B.01.b	Upon completion of reclaimed water use acceptability evaluations (I.A.01) including wellhead protection concerns, perform recharge site investigations, preliminary design studies and feasibility studies for a reclaimed water recharge program.	Study

VII.B.01.c	If aquifer storage of reclaimed water is politically acceptable and economically feasible, implement an aquifer storage program for reclaimed water.	WP 5
Policy VII.C	Support the practice of groundwater recharge using Spokane River water diversions during high flow periods, where the injection does not cause a supply well to become groundwater under the influence of surface water, to provide mitigation for municipal water supply pumping and to support Spokane River base flow.	
Issue VII.C.01	*To what extent can Spokane River diversions support Spokane River base flow needs during seasonal low flow periods?*	
VII.C.01.a	Apply for funding supplemental funding under multi-use storage to investigate the technical feasibility of increasing summer river flow using non-natural recharge.	Study
VII.C.01.b	Identify potential infiltration areas that could be used to augment summer baseflow in gaining reaches of the Spokane River.	Study
VII.C.01.c	Incorporate findings of VII.C.01.b into the Implementation Phase for WRIA 55 & 57 watershed planning and include specific recommendations in the first Plan Update.	EPS
VII.C.01.d	During the implementation phase, support development of criteria, in collaboration with the Department of Ecology, under which credit for mitigation will be determined.	EPS
Issue VII.C.02	*To what extent can Spokane River diversions support artificial aquifer recharge to support future public water supply needs*	
VII.C.02.a	Apply for supplemental funding under multi-use storage to investigate the technical feasibility of mitigating public water supply pumping using artificial recharge.	Study
VII.C.02.b	Identify locations where infiltration or injection might benefit supply wells and the amount of water that might be beneficially stored based on current and projected pumping.	Study
VII.C.02.c	Incorporate findings of this evaluation into the Implementation Phase for WRIA 55 & 57 watershed planning and include specific recommendations.	EPS
VII.C.02.d	During the Implementation Phase develop criteria, in collaboration with the Department of Ecology, under which credit for mitigation for new water appropriations will be determined.	EPS
Issue VII.C.03	*What is the net effect on the aquifer; resulting from changes to Post Falls HED operations, during summer low flow operations?*	
VII.C.03.a	Perform a MIKE SHE Model evaluation of the net effect on the aquifer; resulting from changes to Post Falls HED operations, during summer low flow operations.	Study
VIII. Approaches to Plan Implementation		
Policy VIII.A	The WRIA 55 & 57 Planning Unit will continue to function as the main vehicle for Plan implementation after plan approval.	
Issue VIII.A.01	*What should the structure and membership of the Planning Unit be as it assumes the implementation role?*	
VIII.A.01.a	Identify key stakeholder groups needed for plan implementation and secure commitment for continued involvement.	No impact
VIII.A.01.b	Entities that will be involved with implementation and included in the implementation matrix should be represented on the implementation Planning Unit.	No impact
VIII.A.01.c	Develop procedures for Planning Unit participation in Plan implementation.	No impact
Policy VIII.B	Support continuing data collection and evaluation to fill data gaps that limit the scope and implemetability of the WRIA 55 & 57 Watershed Plan.	
Issue VIII.B.01	*What additional information is needed to fully implement Watershed Plan?*	
VIII.B.01.a	Evaluate studies recommended in the Watershed Plan for data gaps.	No impact
VIII.B.01.b	Evaluate the success of implemented Watershed Plan recommendations.	No impact

VIII.B.01.c	Use adaptive management to fill data gaps and improve the outcomes of implemented recommendations.	No impact
Policy VIII.C	Utilize established systems for forecasting water availability in the Spokane and Little Spokane Watersheds.	
Issue VIII.C.01	*Can established systems be used to forecast the general nature of streamflow in these rivers?*	
VIII.C.01.a	Evaluate existing forecasting systems, and support improvements determined valuable by the Planning Unit.	No impact
VIII.C.01.b	Develop a procedure for presenting flow forecast information that will be used to trigger water resources management procedures.	No impact
Policy VIII.D	Promote funding of projects included in Watershed Plans.	
Issue VIII.D.01	*How can watershed plan projects compete for limited funds?*	
VIII.D.01.a	State agencies should give priority to projects included in Watershed Plans when reviewing projects for funding.	No impact
VIII.D.01.b	Identify and pursue additional funding sources for watershed plan projects.	No impact