

PREPARED FOR THE
Nisqually Indian Tribe
and WRIA 11 Planning Unit

Final
NISQUALLY WATERSHED MANAGEMENT PLAN



FINAL

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WATERSHED MANAGEMENT PLAN

*Funded Under Grant No. G9800293, provided by the Washington State Department of Ecology
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and
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Submitted by:

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The Nisqually Watershed Plan was developed through the participation and input of numerous stakeholders from the Nisqually Watershed over the past four years; many of whom spent countless hours providing information, reviewing and formulating plan actions, and attending meetings to represent their constituencies. These individuals are listed below:

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The Nisqually Watershed Planning Unit has opted to address Watershed Planning at two scales, a watershed-wide scale and a sub-basin scale. High priority issues affecting the entire watershed were defined by the Planning Unit. The Watershed Plan first prescribes recommended actions in the form of policy statements, management strategies, and projects at a watershed scale for these high priority issues. In three sub-basins, Yelm, McAllister, and Mashel/Ohop, pending water issues require specific and immediate action. Three sub-basin action plans that address local, near-term actions are also included as part of this plan. Issues in other sub-basins, Toboton/Powell/Lackamas, Muck/Murray, and the Upper Basin, are addressed through the watershed scale actions in the Plan.

The Nisqually Planning Unit acknowledges that Watershed Planning under House Bill 2514 is the avenue by which to address water resource related rule codified under State law. The Planning Unit has determined that their approach to rule change is to provide sub-basin specific solutions rather than proposed ‘watershed-wide’ rule change. This approach to rule change particularly relates to water right and instream flow recommendations as outlined in Chapters 5 and 6 of this plan.

TABLE OF CONTENTS

SECTION 1 – INTRODUCTION AND EXISTING CONDITIONS

1.0 INTRODUCTION AND BACKGROUND..... 1

1.1 Mission and Objective..... 1

1.2 Watershed Planning in Washington State 2

1.2.1 Watershed Management Act 2

1.2.2 Planning Focuses..... 3

1.2.3 Obligations and Expectations..... 5

1.3 Planning Process in the Nisqually Watershed 6

1.3.1 Expanded Initiating Governments..... 6

1.3.2 Memorandum of Agreement and Decision-Making Structure 6

1.3.3 Planning Unit..... 7

1.3.4 Technical Subcommittees 7

1.3.5 Planning History and Schedule 7

1.3.6 Plan Approval and Obligations 8

1.4 Plan Scope, Focus and Scale 8

1.4.1 Plan Scope 8

1.4.1.1 Supplemental Water Quality Assessment 9

1.4.1.2 Supplemental Instream Flow Assessment 9

1.4.1.3 Supplemental Storage Assessment..... 10

1.4.1.4 Fisheries Habitat..... 10

1.4.2 Nisqually Plan Focus..... 10

1.4.3 Plan Scale 11

1.5 Public Outreach..... 13

1.6 Other Plans and Processes..... 13

1.7 Current and future opportunities for collaboration..... 13

2.0 AREA CHARACTERIZATION 14

2.1 Background Technical Information..... 15

SECTION 2 - WATERSHED-WIDE ISSUES AND RECOMMENDED ACTIONS

3.0 GROWTH AND LAND USE..... 18

3.1 Problem Statement 18

3.2 Background 18

3.2.1 Water System Plans..... 19

3.2.2 Coordinated Water System Plans (CWSPs)..... 19

3.2.3 Growth Management Act and Comprehensive Land Use Planning..... 21

3.2.4 Water Conservancy Boards..... 22

3.3 Recommended Actions..... 22

4.0 GROUNDWATER RESOURCES AND SUPPLY 25

4.1 Problem Statement 25

4.2 Background 25

4.2.1 Watershed Hydrogeology..... 25

4.2.2	Regional Water Supply – Nisqually Aquifer	28
4.2.3	Hydraulic Continuity	33
4.2.4	WRIA Boundaries versus Groundwater Boundaries	33
4.2.5	Critical Recharge Areas and Wellhead Protection Areas as Components of Critical Areas Ordinances	34
4.2.6	Water Supply Systems and Exempt Wells	36
4.2.6.1	Group A and B Water Systems	36
4.2.6.2	Exempt Wells	37
4.3	Recommended Actions	40
4.3.1	Regional Supply Actions	40
4.3.2	Policy statements and action items regarding differences in WRIA boundaries and groundwater divides	40
4.3.3	Actions Pertaining to Aquifer Recharge Areas	41
4.3.4	Actions Pertaining to Exempt Wells	42
5.0	WATER RIGHTS (GENERAL AND PROCESSING IN CLOSED SUB-BASINS) ..	44
5.1	Problem Statement	44
5.2	Background	44
5.2.1	Water Rights	44
5.2.2	Tributary Closures and Their Effects on Future Water Allocation	48
5.2.3	Minimum Instream Flows and Their Effects on Water Allocation	48
5.2.4	Hydraulic Continuity	49
5.3	Recommended Actions	49
6.0	INSTREAM FLOWS AND SURFACE WATER/GROUNDWATER CONTINUITY ISSUES	57
6.1	Problem Statement	57
6.2	Background	57
6.2.1	Instream Flow in the Nisqually Watershed	57
6.2.2	Administrative Status of Instream Flows	57
6.2.3	Nisqually Watershed Instream Resource Protection Program (IRPP)	58
6.2.4	Technical Basis for Existing Instream Flow Levels and Sub-basin Closures	60
6.2.5	Current and Future Instream Flow Assessments	61
6.2.6	Process for Establishing New Minimum Instream Flows	62
6.2.7	Hydraulic Continuity	62
6.2.8	Data Gaps Identified in the Phase II, Level 1 Technical Watershed Assessment	62
6.3	Recommended Actions	64
6.3.1	Policy/Process	64
6.3.2	Projects	65
7.0	WATER QUALITY	66
7.1	Problem Statement	66
7.2	Background	66
7.2.1	Groundwater Quality	67
7.2.2	Surface Water Quality	67
7.2.3	Current Water Quality Plans and Programs	68
7.3	Recommended Actions	71

SECTION 3 - SUB-BASIN ACTION PLANS

8.0 MCALLISTER SUB-BASIN ACTION PLAN 75

8.1 Problem Statement 75

8.2 Background 75

8.3 McAllister Sub-basin Goals 77

8.4 Action Plan 78

8.4.1 Short-Term Actions 78

8.4.2 Long-Term Actions 81

9.0 YELM SUB-BASIN ACTION PLAN 83

9.1 Problem Statement 83

9.2 Background 83

9.3 Action Plan 85

9.3.1 Short-term Actions 85

9.3.2 Long-term Actions 86

10.0 MASHEL-OHOP SUB-BASIN ACTION PLAN 88

10.1 Problem Statement 88

10.2 Background 89

10.2.1 Water Demand..... 89

10.2.2 Existing Water Rights 90

10.2.3 Water Supply Quality..... 91

10.2.4 Wastewater Treatment Facility 91

10.2.5 Land Use 91

10.2.6 Stream Habitat and Instream Flows 92

10.2.7 Instream Flows 93

10.2.8 Water Quality 94

10.3 Action Plans 95

10.3.1 Short-term Action Plan..... 96

10.3.2 Long-Term Action Plan 97

SECTION 4 - RECOMMENDED ACTIONS, IMPLEMENTATION, SEPA, AND RELATED PROCESSES

11.0 WATER RELATED PROGRAMS, PLANS AND PROCESSES 101

11.1 Issues Affecting Neighboring WRIAs..... 101

11.2 Other Watershed-wide Watershed Plans 102

11.2.1 Nisqually River Management Plan..... 102

11.2.2 Nisqually Chinook Recovery Plan/Nisqually Multi-Species Recovery Plan 102

11.3 Other smaller-scale planning occurring in WRIA 11 103

11.3.1 2003 Muck Creek Basin Plan, Pierce County Public Works and Utilities, Environmental Services, Water Programs..... 103

11.3.2 Fort Lewis 104

11.3.3 Community planning 105

11.4 Supplemental Assessments..... 105

11.5 Hydroelectric Projects 105

11.5.1 Tacoma Power – Nisqually River Hydroelectric Project 105

11.5.2 City of Centralia – Yelm Hydroelectric Project 105

11.6	Planning Processes Related to Key Plan Issues	106
11.6.1	Growth and Land Use	106
11.6.2	Groundwater Resources	106
11.6.3	Water Rights.....	107
11.6.4	Instream Flows	107
11.6.5	Water Quality	107
11.7	Related and Concurrent Processes	107
12.0	NISQUALLY WATERSHED MANAGEMENT PLAN – SUMMARY OF RECOMMENDED ACTIONS.....	109
12.1	Growth and Land Use Actions	114
12.2	Groundwater Resources and Supply	116
12.3	Water Rights (General and Processing in Closed Sub-basins)	120
12.4	Instream Flows and Surface Water/Groundwater Continuity	126
12.5	Water Quality Recommended Actions.....	128
12.6	McAllister Sub-Basin Recommended Actions.....	129
12.7	Yelm Sub-Basin Recommended Actions	134
12.8	Mashel-Ohop Sub-Basin Recommended Actions.....	136
12.9	Implementation Actions	138
13.0	STATE ENVIRONMENTAL POLICY ACT	140
13.1	NEPA compliance	141
13.2	SEPA compliance for the Nisqually Watershed Management Plan.....	141
13.3	Application of Watershed Planning EIS Alternatives to WRIA 11 Watershed Management Plan.....	143
14.0	IMPLEMENTATION	150
14.1	Governance.....	150
14.2	Project Selection.....	151
14.3	Funding Options.....	151
14.4	Planning Area.....	152
14.5	Intent to Support Development and Implementation	152
14.6	Plan Obligations	153
14.6.1	Planning Unit Recommendation for State, Local and Federal Obligations	154
14.6.2	Actions and Obligations Tables	154
15.0	REFERENCES.....	162
16.0	SUMMARY OF APPENDICES	164

LIST OF TABLES

Table 1	Water Issue Prioritization
Table 2	Water Right Applicants
Table 3	Closures pursuant to WAC 173-511-040, Effective February 1981
Table 4	Closures pursuant to RCW 75.20.050
Table 5	McAllister Applications
Table 6	Yelm Applications
Table 7	Eatonville Pending
Table 8	Eatonville Water Rights
Table 9	Eatonville Supply Capacity by Source
Table 10	Stream Closures in the Mashel Sub-basin
Table 11	Growth and Land Use – Action Code and Title
Table 12	Groundwater Resources – Action Code and Title
Table 13	Instream Flows – Action Code and Title
Table 14	Water Rights (General and Processing in Closed Sub-basins) – Action Code and Title
Table 15	Water Quality – Action Code and Title
Table 16	McAllister Sub-basin Action Plan – Action Code and Title
Table 17	Yelm Sub-basin Action Plan – Action Code and Title
Table 18	Mashel/Ohop Sub-basin Action Plan – Action Code and Title
Table 19	Implementation – Action Code and Title
Table 20	Growth and Land Use – Action Code and Title
Table 21	Groundwater Resources and Supply – Action Code and Title
Table 22	Water Rights (General and Processing in Closed Sub-basins) – Action Code and Title
Table 23	Instream Flows and SW/GW Continuity Issues – Action Code and Title
Table 24	Water Quality – Action Code and Title
Table 25	McAllister Sub-basin Action Plan – Action Code and Title
Table 26	Yelm Sub-basin Action Plan - Action Code and Title
Table 27	Mashel/Ohop Sub-basin Action Plan – Action Code and Title
Table 28	Implementation – Action Code and Title
Table 29	Growth and Land Use – Action Code and Title
Table 30	Groundwater Resources and Supply – Action Code and Title
Table 31	Water Rights (General and Processing in Closed Sub-basins) – Action Code and Title
Table 32	Instream Flows and SW/GW Continuity Issues – Action Code and Title
Table 33	Water Quality – Action Code and Title
Table 34	McAllister Sub-basin Action Plan – Action Code and Title
Table 35	Yelm Sub-basin Action Plan - Action Code and Title
Table 36	Mashel/Ohop Sub-basin Action Plan – Action Code and Title
Table 37	Implementation – Action Code and Title

LIST OF FIGURES

Figure ES1	Nisqually Watershed Overview
Figure 1	Nisqually Watershed Overview
Figure 2	Watershed Planning Approach and Schedule
Figure 3	WRIA 11 Land Cover
Figure 4	CWSP Areas and Water Service Areas
Figure 5	Urban Growth Area Boundaries
Figure 6	Agricultural Lands
Figure 7	Distribution of Specific Capacity
Figure 8	Geohydraulic Cross Section: Lake St. Clair to Nisqually Reach

Figure 9	Groundwater Vulnerability
Figure 10	Pending Water Right Applications
Figure 11	Nisqually River Reaches and Instream Flow Control Points
Figure 12	WRIA 11 USGS Streamflow Gauging Stations
Figure 13	Surface Water Quality - 1998 303(d) List
Figure 14	Groundwater Monitoring Stations
Figure 15	Surface Water Monitoring Sites
Figure 16	McAllister Sub-basin
Figure 17	Yelm Sub-basin
Figure 18	Mashel/Ohop Sub-basin
Figure 19	Related Plans and Processes Diagram
Figure 20	Related Plans and Processes Spreadsheet

LIST OF ACRONYMS

ASR	Aquifer Storage and Recovery
AWC	Association of Washington Cities
BMP	Best Management Practice
CARA	Critical Aquifer Recharge Area
CWRP	Comprehensive Water Reuse Plan
CWSP	Coordinated Water System Plan
DOH	Department of Health
EPA	Environmental Protection Agency
FERC	Federal Energy Regulatory Commission
GMA	Growth Management Act
GIS	Geographic Information System
GPM	Gallons per Minute
GW	Groundwater
IRPP	Instream Resource Protection Program
MGD	Million Gallons per Day
MGSA	McAllister Geologically Sensitive Area
MOA	Memorandum of Understanding
NEPA	National Environmental Policy Act
NTNC	Non-Transient/Non-Community (Water System)
NTU	Normalized Turbidity Units
PALS	Pierce County Planning and Land Services
PCD	Pierce Conservation District
PU	Planning Unit
PUD	Public Utilities District
RCW	Revised Code of Washington
RM	River Mile
SBR	Sequencing Batch Reactor
SEPA	State Environmental Policy Act
SHB	State House Bill
SRFB	Salmon Recovery Funding Board
SW	Surface Water
SWSMP	Small Water System Management Program
TG	Technical Group
TMDL	Total Maximum Daily Load
TNC	Transient Non-Community (Water System)
UGA	Urban Growth Area

USGS	United States Geological Service
WAC	Washington Administrative Code
WMA	Watershed Management Act
WRATs	Water Rights Allocation and Tracking System
WRIA	Water Resource Inventory Area
WSP	Water System Plan
WUCC	Water Utilities Coordinating Committee

LIST OF APPENDICES

Appendix A	Executive Summary, Level 1 Technical Assessment
Appendix B	Plan Framework and Workshop Outcomes
Appendix C	Water Quality Monitoring Report
Appendix D	Instream Flow Step A Report
Appendix E	Storage Assessment Step A Report
Appendix F	Outreach Plan and Implementation Record
Appendix G	Memorandum of Agreement
Appendix H	Record of Planning Unit Meetings and Communications

Section 1
Introduction and Existing Conditions

Section 1

Section 1 of this Watershed Management Plan provides an overview of the watershed planning process and physical characteristics of the watershed, with an emphasis on water resources. This section contains two chapters. Chapter 1, Introduction and Background, describes the watershed planning process in the state of Washington, and its execution in the Nisqually watershed. Chapter 2, Area Characterization, summarizes physical conditions in the watershed, providing context for the issues and planning actions addressed in this Plan. Much of the physical characterization referred to in Chapter 2 is contained in the Executive Summary of the Phase II, Level 1 Technical Assessment (WPN, 2002), Appendix A.

1.0 INTRODUCTION AND BACKGROUND

In 1998, the Washington State Legislature passed the Watershed Management Act, which provided for locally-based watershed planning with the goal of giving local interests a voice and a forum for collaboration. The intent of this legislation was to allow citizens, governments, and tribes to develop solutions to water issues in their own watershed, thus providing a more complete picture of the status of water resource availability and environmental integrity in each watershed. The Nisqually Watershed Management Plan has been created under those guidelines, and with attention to the spirit and intent of the act.

This plan is the product of four years of collaboration, through which the Planning Unit has reached a common ground in creating management strategies and recommending actions. The Watershed Management Plan is intended to serve as a locally-supported, long-term plan focusing on water availability, and also addressing water quality, habitat, and instream flows in the Nisqually Watershed (WRIA 11). It has been created with the understanding that without the commitment and involvement of stakeholders in a collaborative and comprehensive planning effort, current and future water needs in the Nisqually Watershed could not be met.

Watershed planning within Watershed Resource Inventory Areas (WRIAs) recognizes the large scale and complexity of water resources and the wide variety of factors that influence the amount of water available for use. Although the geographic area contained in a WRIA rarely corresponds with political or other jurisdictional boundaries, water resource issues such as water supply, water quality, and habitat for fish and wildlife are closely linked within watersheds. The Nisqually Watershed, its sub-basins, and the cities, towns, counties, tribal and federal lands within it are shown in Figure 1.

This chapter provides background on watershed planning in the State of Washington, and specifics of the planning process occurring in the Nisqually Watershed.

1.1 Mission and Objective

The intent of the Watershed Management Act is, “meeting the needs of a growing population and a healthy economy statewide; meeting the needs of fish and healthy watersheds statewide; and advancing these two principles together, in increments over time.” The Watershed Management Act goes on to state that, “The legislature finds that improved management of the State’s water resources, clarifying the authorities, requirements, and timelines for establishing instream flows, providing timely decisions on water transfers, clarifying the authority of water conservancy boards, and enhancing the flexibility of our water management system to meet both environmental and economic goals are important steps to providing a better future for our State” (RCW 90.82 notes 2001 c 237).

The Mission of the Nisqually Planning Unit, as approved at the April 12, 2000 Planning Unit meeting, is:

“To maximize the ability of the Nisqually Watershed to produce high quality ground and surface water, while protecting and managing the related resources to support environmental, social, economic, and cultural values.”

The Planning Unit’s main objective for the plan is to develop a comprehensive strategy for balancing competing demands for water, while at the same time preserving and enhancing the future integrity of the watershed.

1.2 Watershed Planning in Washington State

Details of legislation providing the guidelines for watershed planning are described below.

1.2.1 Watershed Management Act

The 1998 Watershed Management Act provided a framework for a voluntary, comprehensive watershed planning process that included a strong local involvement component. State funding is available for watersheds that elect to complete watershed plans. The Act allows local citizens to provide significant input to the creation of these plans, with technical assistance from State agencies available upon request. The Act signified the State's commitment to provide for both a growing population and economy and for the integrity of the watershed system, now and in the future.

Watershed planning involves complex water resource issues that play out over a large area. Under RCW 90.82, the Planning Unit is required to gather certain types of watershed information (such as current water availability and allocation and future water needs) and develop potential strategies for managing the water resources within a WRIA. The law restricts the Planning Unit from changing existing laws, altering water rights or treaty rights, or requiring any party to take an action unless that party agrees.

Twelve State agencies signed a Memorandum of Understanding identifying roles and responsibilities for coordination under the Watershed Planning Act. This memorandum commits these agencies to work through issues in order to speak with one governmental voice when sitting at local planning unit tables. The following agencies signed this document:

- The Department of Agriculture
- The Conservation Commission
- The Department of Community, Trade and Economic Development
- The Department of Ecology
- The Department of Fish and Wildlife
- The Department of Health
- The Department of Natural Resources
- The Department of Transportation
- The Interagency Committee for Outdoor Recreation
- The Puget Sound Water Quality Action Team
- The Salmon Recovery Office, within the Governor's Office
- The State Parks and Recreation Commission

The Watershed Management Act was updated by the State legislature in 2003. This update provided direction for Watershed Management Plan implementation and continued funding for watershed planning in the state. House Bill 1336 amended RCW 90.82.040 to include Phase IV, Implementation, and annual funding for implementation activities. The amendment provides \$100,000 per year for three years to fund Phase IV activities. At the end of the three-year period, a two-year extension may be available for up to \$50,000 each year. A ten percent match is required to apply for implementation funding. Matching can take the form of financial contributions or in-kind goods and services directly related to coordination and oversight functions. The match can be

provided by the Planning Unit or combined commitments from federal agencies. Senate Bill 5073 also impacts Watershed Planning by authorizing special district entities to expend up to 10 percent of their existing water-related revenues and water-related funds on implementation of watershed plan projects.

Amendments addressing implementation activities also:

- require the development of an implementation plan that specifies strategies and interim milestones to provide sufficient water for agricultural, municipal needs, and instream flows;
- allow counties that constitute less than five percent of the watershed to opt out of the planning process; and,
- allow state agency obligations to be adopted by policy, procedures or agreements.

1.2.2 Planning Focuses

The Watershed Management Act identifies four planning focuses that may be addressed through each Watershed Plan: water quantity, water quality, habitat, and setting of instream flows.

- The *water quantity* component of the plan addresses water quantity by assessing water supply and use in the watershed and developing strategies for future use (RCW 90.82.070). Watershed plans must address quantity with strategies that would supply adequate instream water for fish and out-of-stream water for future uses and/or development. The law specifies that certain types of information must be gathered and that certain strategies must be addressed.
- The *water quality* component addresses water quality in the watershed by synthesizing current available data, and gathering metadata on current and historical water quality programs and studies. It then develops WRIA-wide and local approaches for monitoring and Total Maximum Daily Load (TMDL) implementation.
- 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, including the Shoreline Management Act (90.58 RCW), the Growth Management Act (36.70A RCW), and the Forest Practices Act (76.09 RCW)” (90.82.100 RCW).
- *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 *instream flows* component of the plan is designed to set minimum instream flows for streams within the watershed. Administrative rules regarding instream flows in the Nisqually Watershed have been established by the Washington State Department of Ecology in accordance with Chapter 173-500 of the WAC.

The water quantity component is mandatory if grant funds are received. The other components are optional, and additional funding is available for Planning Units who choose to address the optional components. Instream flows must be set in each watershed. This can be accomplished either through the comprehensive watershed planning process, or the WRIA may choose to exclude instream flow planning from the watershed plan and pass the responsibility of setting an instream flow to Ecology.

The watershed planning process is typically begun by a group of governments called “initiating governments,” which must include all the counties within the watershed, the largest city, and the largest water purveyor. Indian tribes must be invited to participate, but their participation is not mandatory. This group appoints a lead agency to oversee the planning process. The group also appoints a Planning Unit made up of local stakeholders, to collaborate in the creation of the watershed plan.

The watershed planning process consists of four phases:

Phase 1: Organization and Scoping

To initiate Phase 1, the initiating governments appoint a lead agency for the planning process and identify and appoint Planning Unit members. *State funding for Phase 1 is \$50,000.*

Phase 2: Technical Assessment

In Phase Two 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 its availability 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 ground water actually being used, and predicted future needs.
- Identification of aquifers which recharge surface water, and surface areas which recharge aquifers.
- Estimate of the surface and ground water available for future appropriation, taking into account adopted minimum instream flows, including the data needed to evaluate flows necessary for fish.

State funding for Phase 2 is \$200,000.

Phase 2 may also include the following optional assessments:

- *Multipurpose Storage.* To conduct a detailed assessment of multipurpose water storage opportunities or for studies of specific multipurpose storage projects which opportunities or projects are consistent with and support the other elements of the Planning Unit’s watershed plan developed under RCW 90.82.
- *Instream Flow Assessment.* To establish new minimum instream flow regulations or amend existing regulations.
- *Water Quality Assessment.* To conduct water quality assessment in fulfillment of RCW 90.82.090 and support the development of the watershed plan.

State funding for each optional assessment is \$100,000.

Phase 3: Watershed Management Plan Development

Phase 3 consists of consensus based meetings, review of Phase 2 information collected, research of additional necessary data, and creation of goals, policies, programs, and planning statements by the Planning Unit. Phase 3 culminates in the completion of the Watershed Plan for the WRIA.

State funding for Phase 3 is \$300,000.

Phase 4 - Implementation

Plan implementation is an important component of the watershed planning process. Planning Units are encouraged to develop a detailed implementation plan within one year of the Watershed Plan's adoption. Effective implementation, including coordination and oversight, is critical to the success of the watershed planning process. The 2003 legislative update of the Watershed Management Act (WMA) provided funding and direction for the implementation phase. The updated RCW 90.82 states, "within one year of accepting funding under RCW 90.82.040(2)(e), the planning unit must complete a detailed implementation plan. Submittal of a detailed implementation... (2) each implementation plan must contain strategies to provide sufficient water for: (a) production agriculture; (b) commercial, industrial, and residential use; and, (c) instream flows."

State funding for Implementation is \$400,000, which is distributed over five years, and requires 10% matching funds, which may consist of in-kind goods and services.

1.2.3 Obligations and Expectations

In general, the Watershed Management Plan is the preferred tool for future watershed management in each WRIA. The Department of Ecology and the Planning Unit expect to use recommendations in this Watershed Management Plan to aid in decisions about water rights permitting.

When the Watershed Management Plan is approved by the Planning Unit and participating State agencies, the Department of Ecology will be obligated to adopt comprehensive watershed roles that will fold in Watershed Management Plan strategies. Ecology will also be required to track its work obligations under the local Watershed Management Plans and give priority to making water rights decisions in watersheds that have developed sufficient information to make decisions. The following sections from the 2003 update of RCW 90.82 provide details and directives to agencies and organizations about Plan obligations and expectations:

"All agencies and organizations voluntarily accepting a Plan obligation will need to adopt policies, procedures, agreements, and rules of ordinances to implement the Plan. These organizations should annually review implementation needs with respect to budget and staffing.

After a Plan is adopted...the department shall use the Plan as a framework for making future water resource decisions for the planned watershed. Additionally, the department shall rely upon the Plan as a primary consideration in determining the public interest related to such decisions."

1.3 Planning Process in the Nisqually Watershed

The Nisqually Watershed Management Plan is the culmination of four years of planning work by numerous stakeholders from throughout the watershed. The following describes watershed planning processes specific to the Nisqually watershed.

1.3.1 Expanded Initiating Governments

Typically, watershed planning begins when a group of “initiating governments,” (which includes all counties, the largest city, and the largest water purveyor in the watershed) determine they will begin the process. This group of “initiating governments” was defined by the Watershed Planning Act. As there was a demonstrated interest in initiating the watershed planning process by a larger group of governments and agencies in WRIA 11 than mandated by the Watershed Planning Act, agencies in WRIA 11 chose to form an expanded group of initiating governments. In 1998, the Nisqually watershed planning process was initiated by the “Expanded Initiating Governments.” The Nisqually Indian Tribe serves as the lead agency, and is the only Tribe designated as a 2514 lead agency in the State. Expanded Initiating Governments for WRIA 11 Watershed Planning are listed below.

- Nisqually Indian Tribe
- Thurston County
- Lewis County
- Pierce County
- Town of Eatonville
- City of Lacey
- City of Yelm
- City of Olympia
- Ashford Water District
- Elbe Water District
- Department of Ecology (representing Washington State interests)

1.3.2 Memorandum of Agreement and Decision-Making Structure

A Memorandum of Agreement (MOA) between the Expanded Initiating Governments, dated September 7, 1999, established the Nisqually Planning Unit and defined the roles and responsibilities of the Expanded Initiating Governments in creating the Watershed Plan. The Governments agreed to form a balanced Planning Unit that would represent a wide range of water resource interests in the Nisqually Watershed. “The Planning Unit is the committee formed by the Expanded Initiating Governments to gather and analyze water data and to develop and present water resource management policies to the Expanded Initiating Governments” (‘Expanded Initiating Governments’ MOA, 1999).

Since watershed planning is a consensus-based process, the MOA also dictated a decision-making structure for the Nisqually Planning Unit. “The Planning Unit will strive to make decisions by consensus of all members of the Planning Unit” (from the Expanded Initiating Governments’ MOA, 1999). If the Planning Unit cannot reach consensus among all members, then a decision may be decided by consensus among governmental members (interpreted as the expanded initiating governments) and a 2/3 majority vote by non-governmental members. Government participants provide written approval of all Watershed Management Plan elements that would create an obligation to the government entity.

1.3.3 Planning Unit

The Nisqually Planning Unit is made up of the individuals representing stakeholder agencies as listed in the Acknowledgements section at the beginning of this document. The Nisqually Indian Tribe is the lead agency in watershed planning under the Watershed Planning Process in the Nisqually Watershed and is responsible for facilitating the Planning Unit.

1.3.4 Technical Subcommittees

The MOA that established the expanded initiating governments also provided for the creation of technical and sub-basin committees. A smaller group, a subset of the Planning Unit, serves as the Technical Group. This group includes representation from each of the expanded initiating governments. The Technical Group meets more frequently than the Planning Unit and is charged with making technical decisions for the Watershed Plan. All Planning Unit members are invited to attend Technical Group meetings. Sub-basin committees were also formed to work through sub-basin specific issues, and create sub-basin action plans when greater specificity was needed to address local issues. Technical Group and Sub-basin committee members are listed in the acknowledgements section at the beginning of this document.

1.3.5 Planning History and Schedule

In 1998, the Nisqually Indian Tribe acting on a request from the Nisqually River Council initiated Phase I of the Watershed Planning Process. During Phase I, the Expanded Initiating Governments were convened, the Memorandum of Agreement was developed and signed in September of 1999, public workshops were held, and a scope of work was developed to address the Technical Assessment phase of the planning process (Phase II).

In 2000, a Phase II, Level 1 Technical Assessment was completed for the upper Nisqually Watershed (David Evans and Associates, 2000). Planning in the upper basin was completed prior to, and separate from the lower basin due to a pending development in the Upper Basin and the need to secure water rights in a timely manner for the development to move forward. In March 2002, a Phase II, Level 1 Technical Assessment of the lower Nisqually Watershed was completed by Watershed Professionals Network. The Executive summary of this report is attached as Appendix A. The entire document is available online at: <http://www.ecy.wa.gov/programs/eap/wrias/11.html>.

Phase III, the development of the actual Watershed Management Plan, began in October 2002. Individual members of the Planning Unit were interviewed to determine their primary issues pertaining to water resources in the watershed, and to brainstorm potential solutions. Two Planning Unit workshops were convened in late 2002 to identify stakeholder issues, define problem statements and begin to develop recommended actions to address the problems identified. The outcomes of these workshops were incorporated into a Watershed Plan Framework for the Nisqually Watershed. The Framework is contained in Appendix B of this document. The schedule for Phase III of the Watershed Planning process in the Nisqually Watershed is presented in Figure 2.

Development of the Watershed Management Plan has been ongoing since the workshops in late 2002. Public outreach efforts began in March 2003 and will continue until the Plan is adopted by each of the County legislative authorities. The first draft of the Watershed Plan was reviewed by State agencies in July 2003. The second draft of the plan was completed in September 2003. After public comment and Planning Unit review, and acceptance, the final plan will be submitted to counties for public hearing in October 2003.

1.3.6 Plan Approval and Obligations

Under the Memorandum of Agreement signed by the WRIA 11 Expanded Initiating Governments, the Planning Unit shall report its plan and recommendations to the Expanded Initiating Governments in order to seek formal support for the watershed plan and management policies developed prior to submittal of the plan to the counties for approval. Obtaining specific written approval from the government participants for watershed plan elements that would create an obligation by those government entities, as specified in Section 6.6 of the Memorandum of Agreement, will be included as a component of this review. All Planning Unit members need a clear understanding of the obligations in the Plan for Planning Unit approval.

The Planning Unit may approve the plan by consensus of all the members of the Planning Unit (PU), or, if full consensus cannot be reached, the PU may approve the plan by consensus among the members of the PU appointed to represent units of government and a majority vote of the nongovernmental members of the PU.

Despite the rigorous schedule required to produce a plan by October a draft Plan will be provided for review and written approval of the Expanded Initiating Governments by the October deadline. Per the WRIA 11 Memorandum of Agreement, written approval of all watershed plan elements that would create an obligation is necessary prior to finalizing the management plan for submittal to the Counties for adoption.

Under the Watershed Management Act, once key management actions are defined and the Planning Unit approves the plan, it must be submitted to each county with territory in the management area: Pierce, Thurston and Lewis Counties. The County legislative authority for each county is then required to:

- Provide public notice of, and conduct at least one public hearing on, the plan; and;
- Hold a joint legislative session to either approve the plan or return it to the Planning Unit with suggested revisions.

The obligations and expectations of entities identified in this Watershed Management Plan for the Nisqually Watershed are presented in detail in Chapter 15, Implementation.

1.4 Plan Scope, Focus and Scale

1.4.1 Plan Scope

The scope of the Nisqually Watershed Plan was outlined in the MOA between the Expanded Initiating Governments. This scope “is comprehensive, to include water quantity, water quality, instream flows, and fish and shellfish habitat. Existing data, studies and plans will be fully utilized in this watershed planning process” (1999). Although the Planning Unit has chosen to address all four elements of watershed planning (water quantity, instream flow, water quality and habitat), the primary focus of the plan is on water quantity and related instream flow issues. Water quality and instream flows are addressed in Watershed Management Plan actions in Chapter 6 (Instream Flows) and Chapter 7 (Water Quality). The Planning Unit has received funding under the Watershed Management Act for supplemental technical assessments for water quality, storage, and instream flow. The scope of these assessments goes beyond what is discussed in the Watershed Management Plan. These are discussed below.

1.4.1.1 Supplemental Water Quality Assessment

Funding was received for both the first and second phases of the Water Quality component. The overall purpose of the water quality component in WRIA 11 is to provide guidance and consistency for long-term monitoring of surface and groundwater quality in WRIA 11. The first step of the water quality technical assessment consisted of completion of a draft Water Quality Monitoring Plan that served the purpose of compiling program and sampling location information for water quality monitoring programs in the watershed into a metadata catalog, as well as creating and compiling water quality recommendations from past studies and shortfalls that became apparent through the water quality metadata compilation project. Water quality issues are also addressed in this Watershed Management Plan in Chapter 7.

The goal of the second phase of the supplemental water quality project is to achieve consistency and provide data accessibility and efficiency of that access for all involved parties. The GIS/web-enabled database produced in this phase of the water quality project will serve to coordinate data collection efforts throughout WRIA 11, where applicable; help ensure that data of the appropriate quantity and quality are being collected; optimize sampling locations; improve consistency in the data collected; improve coordination of sampling efforts; and be cost-effective for future studies. Educational workshops on the database are scheduled for both data collectors and the technical database user (responsible for database upkeep and maintenance). A technical memorandum (Appendix C) details data protocol and instructions on using the GIS/web-enabled water quality data system. The final Water Quality Monitoring Plan (Appendix C) was also produced as part of the supplemental water quality work.

1.4.1.2 Supplemental Instream Flow Assessment

Funding was received for Step A of the instream flow study for the Mashel River (Appendix D) in the Nisqually watershed. The Step A instream flow study presents streamflow exceedance curves, estimates of allocated water and actual water use, a summary of habitat conditions, a summary of potential instream flow assessment methods with recommendations for implementation, and scopes of work with costs for an instream flow study and an assessment of Hydraulic Continuity for the Mashel Sub-basin of WRIA 11.

The WRIA 11 Watershed Planning Unit opted to address instream flows only in the Mashel Sub-basin in the Step A instream flow study. This decision was based on the following:

- Some sub-basins in WRIA 11 are closed year-round under Chapter 173-511 WAC. The Planning Unit is uncomfortable initiating a process that could lead to a potential instream flow rule change that would be less protective to the natural resources in those sub-basins.
- The Mashel River is the only tributary to the Nisqually Watershed with instream flows set by rule.
- The need to establish healthy baseline conditions.

Thus far, the supplemental project has only been funded for the Step A scoping assessment.

1.4.1.3 *Supplemental Storage Assessment*

A Level 1 Storage Assessment was conducted for WRIA 11. This assessment was conducted with the purpose of determining the feasibility of storing water during periods of “excess” capacity for use during periods of limited capacity. The Level 1 Storage Assessment is attached as Appendix E and includes:

- A general overview of potential storage options;
- A range of storage alternatives including off-channel storage, underground storage, enlargement or enhancement of existing storage and on-channel storage;
- An inventory of existing storage facilities, available infrastructure, and storage volumes; and
- An overview of potential storage projects in WRIA 11.

1.4.1.4 *Fisheries Habitat*

To avoid overlap in planning efforts, the Nisqually Planning Unit is looking to the Salmon Recovery Planning process lead by the Nisqually Tribe for guidance on habitat-related issues. The Salmon Recovery Planning Process is a statewide effort to develop adopted and ready-to-implement Salmon Recovery Plans at the local and regional scale. The Salmon Recovery Planning process in the Nisqually watershed is further discussed in Chapter 11. Revisions to the Critical Areas Ordinances specific to buffers and wetland protection also address aquatic habitat-related issues in the Watershed.

1.4.2 Nisqually Plan Focus

At the 2002 workshops, the Planning Unit unanimously agreed on a focused plan wherein a limited number of key issues are addressed in detail (versus a more general plan that would have briefly addressed a large number of issues). This Plan is focused in the interest of improving the ability of agencies and others responsible for plan implementation to take specific recommended actions and carry out the intent of the plan. Although many issues were raised in Planning Unit and Technical Group meetings, only those agreed to be the most urgent and important are discussed in detail in the Plan. A thorough list of issues that were raised at the workshops is included in the Plan Framework in Appendix B.

The key issue categories are:

- Growth and Land Use;
- Groundwater Resources and Supply;
- Water Rights;
- Instream Flows and Surface/Groundwater Continuity; and
- Water Quality.

For each category above, the Planning Unit identified specific issue(s), problem statement(s), and potential planning strategies or projects to address the problem. Table 1 indicates the results of the Planning Unit’s ranking of key water-related issues in the watershed and provides the basis for the issues addressed in this plan. Note that the prioritization applies to the watershed as a whole. Priorities for individual sub-basins may vary, and are being addressed separately by specific sub-basin committees. Details describing the formulation of this ranking are included in the Plan Framework in Appendix B.

Planning Unit members requested that the Watershed Plan take the form of a flexible, working plan, wherein identified projects and programs would be implemented over time. It is anticipated that the Planning Unit or future implementing organization will identify criteria to be used to prioritize work items as part of Phase IV implementation and subsequently use these criteria to prioritize projects and programs. The projects or planning actions that are of highest priority will be funded first; however, funding of these projects will also be balanced against such factors as availability of cost-sharing agreements and the likelihood of success. Additional projects will be addressed as funding for implementation becomes available.

1.4.3 Plan Scale

The Nisqually Watershed is presented in Figure 1. Sub-basins are the drainage areas of significant tributaries to the Nisqually River, and are delineated on the watershed map. Sub-basins in the Nisqually watershed have been grouped as follows:

- Mashel;
- McAllister;
- Muck/Murray;
- Tanwax/Kreger/Ohop;
- Toboton/Powell/Lackamas;
- Yelm; and
- Upper Basin.

The plan addresses both watershed-wide and sub-basin specific issues. A sub-basin approach was selected in order to highlight issues specific to local areas. Planning Unit representatives from each sub-basin had the option to complete sub-basin action plans. Sub-basin action plans were written for the Yelm, Mashel, and McAllister sub-basins by committees of the Technical Group. Sub-basin action plans were not written for the other sub-basins because representatives from these areas on the Technical Group and Planning Unit felt that issues facing them were sufficiently covered in the watershed-wide section of the WRIA 11 Watershed Management Plan

TABLE 1**Basin-Wide Issue Ranking Results**

ISSUE	TOTAL POINTS(a)	RANK (1-Highest, 14 -Lowest)
Issue WQ1 - Growth and Land Use	50	1
Issue WQ2 - Prioritization of Sub-basins	41	5
Issue WQ3 - Exempt Wells	34	10
Issue WQ4 - Groundwater Resources and Supply (Includes Stormwater Recharge)	49	2
Issue WQ5 - Surface Water Resources and Supply (See ISF-1 and ISF-2)	32	13
Issue WQ6 - Water Rights - General	45	3
Issue WQ7 - Processing Water Rights in Closed Basins	44	4
Issue WQ 8 - Relationship between WRIAs - Place of diversion/Place of Use	36	8 (tie)
Issue WQ9 - WQ12 - Strategies for Improved Efficiency	30	14
Issue IF1 - Instream Flow - Lack of Data, Lack of Support for Closures	33	11 (tie)
Issue IF2 - Instream Flow Resource Concerns	37	7
Issue WQual -1 - Surface Water Quality	36	8 (tie)
Issue WQual-2 - Groundwater Quality	40	6
Issue H1 - Habitat Protection, Restoration, Enhancement	33	11 (tie)

1.5 Public Outreach

Public outreach and participation are important components of Watershed Planning. A Public Outreach Plan was developed as part of Phase III Watershed Planning in the Nisqually Watershed. The Outreach Plan and documentation of outreach related activities are provided in Appendix F.

Planning Unit members undertook responsibility for briefing their constituencies about the Plan as it was developed. Table C1 in Appendix F provides a list of all of the entities that were informed by briefing and public meetings throughout the watershed during the planning process.

In June 2003, a newsletter describing the planning process and requesting public comment was distributed as an insert in major newspapers in the watershed. The newsletter is included in Appendix F. The newsletter was distributed throughout the watershed via insertion in the *Eatonville Dispatch* and the *Nisqually Valley News*. The content of the newsletter was also distributed as a press release in six papers, and was published in *The Source* and the *Stream Team* newsletters. In August 2003, letters describing watershed management planning activities in WRIA 11 and a copy of the newsletter were sent to all water right applicants in WRIA 11 to inform them of recommendations pertaining to water right processing in the plan.

The newsletter includes a comment form and instructions for submitting comments. Comments received from this and other public participation processes were compiled and are included as part of the public outreach record.

1.6 Other Plans and Processes

Numerous water related plans, programs and processes are ongoing in the Nisqually watershed. Furthermore, watershed boundaries do not follow political boundaries, so watershed planning may be a component of or be affected by water-related activities in other WRIAs, including the Watershed Management Plans developed for adjacent WRIAs 12 and 13. It is the intent of the Planning Unit that this Watershed Management Plan complements ongoing plans, policies and processes. Where applicable, implementation of the Watershed Management Plan is intended to facilitate the goals of related plans, policies, and processes.

A detailed discussion of concurrent and contingent, water-related plans and policies in this watershed is provided in Chapter 11.

1.7 Current and future opportunities for collaboration

Specific sub-basin actions and issue prioritization may change over time with changing land use, population growth, and environmental pressures. Though this plan is a working document, it is intended that the integrity and intent of the plan remain consistent through future changes.

Considerable attention to plan feasibility and implementation has been given with the firm understanding that without implementation, this document will be nothing more than good intentions. Although specific programs and projects recommended in this plan are flexible based on available funding and agency support during the implementation phase, this plan is intended to become the directive for water quantity, water quality, habitat and instream flow concerns throughout the watershed.

2.0 AREA CHARACTERIZATION

The Nisqually Watershed has been the home to the Nisqually Indian Tribe for thousands of years and was the first area in the Puget Sound to be settled by Europeans. Though it was settled early, rapid development did not follow in the watershed. A significant portion of the watershed is currently protected, including the Nisqually Indian Reservation, Ft. Lewis Military Reservation, Mt. Rainier National Park, and the Nisqually National Wildlife Refuge. The Nisqually River Basin Land Trust is also actively working to protect critical habitat in the watershed. Compared with other WRAs in the Puget Sound region, the watershed remains in relatively good condition from a natural resource perspective.

Land cover in the 720 square mile Nisqually Watershed has changed throughout the last several hundred years. Figure 3 illustrates 1992 land cover in the watershed. These landcover data were obtained from the USGS National Land Cover Database, and were classified from LANDSAT Thematic Mapper satellite images with 30-meter resolution. The figure divides land cover in the watershed into twelve classes:

- Barren;
- transitional (disturbed);
- commercial/industrial/transportation;
- high intensity residential;
- urban/recreational grasses;
- wetlands;
- herbaceous/planted/cultivated;
- natural/light agricultural/forest upland;
- open water;
- woody agricultural (including orchards and vineyards); and
- shrub land.

Historically, the Nisqually Watershed was comprised of diverse vegetation patterns, ranging from heavily forested mountain slopes covered with cedar, fir, and hemlock to shrubs in the lowlands, and grasses in the prairie lands and meadows. Before European settlement, much of the prairie land was burned by the Nisqually people each fall. This burning inhibited the encroachment of trees into these areas. Today, the burning has ceased, and most of these former prairie areas and oak forests have been replaced with fir-dominated land cover (Carpenter, personal conversation 2003). These woody vegetation types withdraw more water than the prairie grasses. This change in vegetation type and evapotranspiration rate can affect streamflow quantity and timing. Thus, characteristics of the waterbodies' hydrographs, as well as the landscape, have changed through time.

In times since European settlement, despite its proximity to the high density urban land uses in nearby Olympia and Tacoma, the Nisqually watershed's environment has remained intact and healthy. Prior efforts in the watershed have helped to maintain this quality. It boasts a number of native salmon runs, a large protected estuary, and a wide range of habitat values generally characteristic of areas more distant from development. However, the watershed is currently poised to experience significant pressure on its natural resources. It is anticipated that growth, as defined by 20-year population forecasts and slated by the Growth Management Act, will result in water supply shortfalls in the

Cities of Yelm and Lacey and the Town of Eatonville in the next decade if new sources are not found and/or water is not allocated by the State.

2.1 Background Technical Information

Background technical information specific to each issue addressed in this Plan is provided within the chapter specific to that issue. This specific background technical information is presented to provide context for the recommended actions addressing growth and land use, groundwater resources, water rights, instream flows and water quality in Chapters 3 through 7, respectively.

In some cases, background information is extensive and has been addressed in the Phase II, Level 1 Technical Assessment for WRIA 11, completed for the Planning Unit by the Watershed Professionals Network in March 2002 (WPN, 2002). The Executive Summary of the Phase II, Level 1 Technical Assessment is included as Appendix A of this plan. The reader is directed to the full Level 1 Technical Assessment if additional background information is desired, which is available on the internet at: <http://www.ecy.wa.gov/programs/eap/wrias/assessments/wria11/>. As the Watershed Planning process was completed separately in the Upper Basin portion of WRIA 11, that area is covered in a separate Phase 2, Level 1 document. (David Evans and Associates, Inc., 2000).

This Level 1 Technical Assessment is intended to serve as the technical basis for planning and policy recommendations made by the Planning Unit in Phase III of watershed planning. It was produced based on existing information, and in many cases, complete data sets or information were not available at the time the report was completed. As the watershed planning process has moved forward in the Nisqually Watershed, issues have surfaced that were not sufficiently addressed in the Level 1 either because of a lack of sufficient background data or because it was not realized that these results were needed at the time the Level 1 document was produced. It is important to emphasize that watershed planning is a collaborative, learning process. Thus, many of the recommendations of the Planning Unit set forth in this plan are to fill data gaps and complete assessments that were not answered by analyses presented in the Level 1 document, but are necessary to move forward with the watershed planning process.

The Executive Summary of the Level 1 Technical Assessment, as included in Appendix A, was excerpted directly from the original document, and is to be used for qualitative purposes only. It is provided to describe the watershed's physical, environmental, cultural, and economic characteristics. This summary is intended to serve the reader as a basis for understanding the context of this Watershed Plan. Readers are cautioned that it may not reflect the true condition of the watershed until the identified data gaps are filled and new analyses are conducted. The Level 1 Technical Assessment was not produced by Golder Associates, and its accuracy is not endorsed by Golder.

Section 2
Watershed-wide Issues and Recommended Actions

Section 2

The Nisqually Watershed Planning Unit identified a number of water related issues that could be addressed under Watershed Planning (RCW 90.82) during two scoping workshops in 2002. Section 2 of this Watershed Plan presents these watershed-wide issues along with recommended actions. The Planning Unit also indicated a preference for a narrowly focused plan that addressed priority issues over a broad plan encompassing all issues. As such, the Planning Unit prioritized issues and chose to formulate recommended actions that address the following high priority issues:

Growth and Land Use – Chapter 3

Groundwater Resources and Supply – Chapter 4

Water Rights (General and Processing in Closed Watersheds) - Chapter 5

Instream Flow and Surface Water/Groundwater Continuity –Chapter 6

Water Quality – Chapter 7

Each chapter in Section 2 addresses one high priority, watershed-wide issue, and contains a problem statement, background information and a list of recommended actions that take the form of policy statements, management strategies and recommendations, and proposed projects.

3.0 GROWTH AND LAND USE

Growth requires the availability of infrastructure and natural resources. Many facilities, such as roads or schools can be built or expanded based on need and the availability of funds. However, as water resource availability is finite, it may not always be possible to "build the water" needed for growth due to regulatory and environmental constraints. Simply planning over a 20-year time horizon does not guarantee that there will be a supply of water for current land use designations and urban growth areas in the future.

Municipalities and water systems make financial and infrastructure decisions based on land use plans. In situations where systems are currently nearing their water rights limitations, the inability to secure additional water rights can severely impact the ability to implement both land use and capital facility plans.

Currently, there is a general lack of coordination between local planning processes in the Nisqually Watershed such as Water System Plans, Coordinated Water System Plans, Comprehensive Land Use Plans and the Growth Management Act, especially with respect to the relationship between growth and land use as dictated by Comprehensive Plans. This can result in the inability to serve projected growth with water. It is the hope of the Nisqually Watershed Planning Unit that this Watershed Management Plan can help bridge the gap between these planning mechanisms. The framework for coordination is already in place, through the DOH, Ecology, County Health and Planning Departments, and adjacent Water Systems.

It is not the intention of the Nisqually Watershed Planning Unit to recommend that local jurisdictions revise current Comprehensive Land Use Plans. Instead, this Plan provides background information on water resource availability and establishes a coordination mechanism that will more closely link water supply planning and water availability with revisions to land use designations, as requested by individual property owners, cities or towns in proposed amendments for UGA expansions, or through regularly scheduled revisions to Comprehensive Plans.

3.1 Problem Statement

There is uncertainty in the ability to provide a sufficient supply of water for current land use designations and for projected growth in urban and rural areas. This is because water availability was not considered in determining original land use designations, and because current land use designations are not based on available supply.

- In many cases, local jurisdictions have invested in infrastructure for water and other utilities in hopes of securing water rights needed to support growth that will rely on this infrastructure, only to face uncertainty in the processing of these water rights.
- It is difficult to coordinate infrastructure capacity and water supply in urban areas because, in many cases, purveyors do not know when their water right applications will be processed or whether they will be approved.
- Concurrency requirements under GMA do not include integration of water supply (including actual water right allocation information) into town, city and county planning processes.

3.2 Background

There are three different planning umbrellas that affect the way water supply is developed in the Nisqually Watershed; each of these planning umbrellas operates at a different scale.

- The State of Washington requires that **Water System Plans** be prepared by each individual water purveyor serving one thousand households or more. These plans demonstrate how each individual water system needs to provide water based on land use, zoning and local growth projections.
- **Coordinated Water System Plans (CWSPs)** are implemented to coordinate groups of public water systems (and therefore groups of Water System Plans) within a defined area. Three separate Coordinated Water System Plans are currently being implemented in the Nisqually Watershed; two in Thurston County and one that encompasses the entirety of Pierce County. There is no CWSP for Lewis County. Each CWSP is overseen by a committee of water purveyors that form a Water Utilities Coordinating Committee (WUCC). Currently, each CWSP in the Nisqually Watershed is implemented differently. The current CWSP boundaries in Pierce and Thurston County and the water service areas within them are shown in Figure 4.
- Finally, the State's **Growth Management Act (GMA)** requires **Comprehensive Land Use Plans** to address State projected growth, however, the growth rates projected under GMA do not consider available water supply. The boundaries of the Urban Growth Areas in the Nisqually Watershed, as drawn under the GMA, are shown in Figure 5.

3.2.1 Water System Plans

Water System Plans (WSPs) are required under WAC 246-290 and are overseen by the Washington State Department of Health (DOH). The purpose of a Water System Plan is to provide a uniform process for water purveyors to demonstrate the system's operational, technical, managerial and financial capability, demonstrate how the system will address present and future needs, and establish eligibility for funding pursuant to the State drinking water revolving fund. There is coordination between Ecology, DOH, and County and health planning departments with regard to WSPs. When a new WSP is submitted to DOH, Ecology is notified and is given 60 days to respond with comments, as documented in a Memorandum of Understanding between Ecology and DOH. Ecology staff reviewed the draft Water System Plans, with particular attention paid to the sections pertaining to water rights. The Water System is responsible for sending a copy of the WSP to the County Health and Planning Departments and adjacent water systems. Any DOH correspondence in regard to individual WSPs is also sent to the County Health and the County Planning departments.

Per WAC 246-290-100, a Water System Plan is required of most water purveyors, including those with more than one thousand connections, those that are expanding, those that are new, and those experiencing planning, operational, and/or management problems. It is through a Water System Plan that water systems demonstrate the system's operational, technical, managerial, and financial capability to comply with relevant local, State, and federal plans and with both current and future regulations. Water System Plans are approved by the Department of Health; an update is required every six years. Pierce County does have a requirement that all expanding water systems update their Water System Plans. Per WAC 246-290-105, smaller systems that are not expanding, and are not experiencing planning, operational, or management problems are allowed to prepare a Small Water System Management Program (SWSMP), which is a one-time document that does not have to be updated. Transient, Non-Community systems (TNC) and Non-Transient/Non-Community (NTNC) systems do not have to prepare a full WSP, but are required to fulfill the SWSMP requirement.

3.2.2 Coordinated Water System Plans (CWSPs)

The Water System Coordination Act (Coordination Act) (WAC 246-293) was developed in accordance with the authority granted in the Public Water System Coordination Act of 1977

(Chapter 70.116 RCW) with the purpose of developing a program to coordinate public water systems within the State of Washington. Specifically, it was developed to identify areas that are critical water supply service areas and to provide a framework for coordinated water system planning in those areas. A critical water supply service area is defined as an area having problems related to inadequate water quality, unreliable service, or lack of coordinated planning. Only water purveyors within a critical water supply service area are required to participate in a CWSP process. DOH provides oversight for CWSPs.

A CWSP is either a compilation of all of the Water System Plans within its geographic boundary, along with supplemental provisions addressing water purveyors concerns, or a single plan covering all affected public water systems. A Water System Plan is required for each water purveyor within a CWSP area that meets the requirements described in WAC 246-290, and as described above.

Planning under the Coordination Act is optional; however, if an area is declared as a Critical Water Resource Area by the Washington State Department of Health or the local legislative authority, planning under the Coordination Act is a requirement. Prior to the mid-90s CWSPs were required to be updated every five years. The Coordination Act was then revised such that a local legislative authority may update a CWSP at any time, with DOH able to initiate an update no more frequently than once every five years. (Even though the RCW requirement has changed, Pierce County has a policy that commits them to updating every five years). If DOH initiates an update, the State shall pay for the cost.

The CWSP can provide important umbrella policies to guide individual water system plans. The CWSP is also the procedure that provides authority for DOH and the County to give priority to a water system for future service within their approved service area.

A CWSP must do the following:

- Assess related, adopted plans;
- Identify future service areas;
- Designate minimum area-wide water system design standards;
- Include utility service review procedures;
- Include satellite management requirements;
- Include policies and procedures to address failing water systems; and
- Contain compilation of existing plans.

In the context of watershed planning, the CWSP program provides an opportunity to address exempt wells, long-term water supply and other issues identified in this Plan. Legislation adopted in 2003 (HB 1338 known as the "Muni Bill") increases the importance of including non-UGA public water systems in the CWSP. This new statute is intended to harmonize water system planning, use of existing water rights and vigorous implementation of conservation.

Pierce County

The entirety of Pierce County is contained in one CWSP. Officially, every public water system operating within Pierce County "plans" under the CWSP process. CWSPs are organized by a committee of water purveyors - a Water Utilities Coordinating Committee (WUCC) - per the Coordination Act. In the case of Pierce County, water purveyors with more than 50 connections were invited to serve on the WUCC.

Pierce County, in particular Pierce County Public Works and Utilities, Water Programs, is the lead agency in the implementation of the Pierce County CWSP. Other County departments and the

Tacoma-Pierce County Health Department have roles as well. Pierce County has committed to updating their CWSP every five years.

Currently, Pierce County has the following policies in their CWSP:

- Each affected purveyor should be contacted by Pierce County Planning and Land Services (PALS) and allowed to comment on applications which propose land use changes within their service area prior to approval of that change.
- The Public Works and Utilities Department shall review all water system planning documents for conformance and consistency with the Pierce County Comprehensive Plan as amended.

Thurston County

Thurston County has two CWSPs: North Thurston County and South Thurston County. The North Thurston County CWSP was a precursor to the Growth Management Act. The boundary established for the CWSP was eventually superceded by the adopted urban growth area boundaries as described by the Growth Management Act. These are illustrated in Figure 4. The North Thurston CWSP includes the urban growth areas of Lacey, Olympia, and Tumwater. The South Thurston CWSP includes the urban growth areas of Yelm, Rainier, Tenino, and a County growth area at Grand Mound.

Adding non-UGA water service to the CWSP program is an important measure to address exempt wells, long-term water supply and other issues identified in this Plan. The Thurston County Public Utility District Number 1 is exploring initiating a County-wide CWSP process. This County-wide CWSP would include the entire County, not only urban growth areas. The PUD will be soliciting interest for participation from cities and counties. However, Thurston County will not initiate or fund this CWSP update.

Lewis County

Lewis County does not have a CWSP or CWSP process.

3.2.3 Growth Management Act and Comprehensive Land Use Planning

In 1990, Washington State's Growth Management Act (GMA) (RCW 36.70A) provided for comprehensive planning with local control, with the intent of encouraging conservation, responsible use of lands and resources, and sustainable economic development. The GMA required the adoption of comprehensive land use plans to designate urban growth areas for concentrated development and growth, designate resource lands to preserve and plan for long term resource use (mining, forestry, and agriculture), and retain the integrity, character, and sustainability of these lands. This concentrated growth also provides a structure such that increasing populations in urban areas are served by a regulated water source rather than an exempt (from water right requirements) Group B system or individual well.

Although there are many benefits to be gained from the concentration of development and growth in confined areas, this concentrated demand on resources requires adequate water availability to meet the growing demand. Without proper planning or available resources, unbalanced pressures for water supply and growth can be felt in localities that have been slated for residential, business, or industrial development. In addition, competition for water resources from urban and rural residential areas puts pressure on agricultural areas, which must have adequate water to remain viable.

When urban growth areas, rural lands, and resource lands were designated through plans created under the GMA and other land use planning processes, water supply, availability, and appropriation of future water rights were not always factors in land use designations. There is currently a great deal of uncertainty as to whether water supply will be available for growth as mandated by the GMA. In

the Nisqually Watershed, this challenge is made greater by the physical and economic difficulties associated with moving water from one area (where it is available) to another (where it is needed). Achieving consistency between water supply availability and comprehensive planning efforts in both urban and rural lands is critical to the success of the GMA, continued urban development, and retention of viable resource lands.

The GMA does provide a structure under which urban, rural and resource land use assignment can be managed with accountability and forethought. Through the comprehensive planning process, there is opportunity to ensure that policies and controls are in place to retain adequate water rights on designated agricultural lands. Zoned agricultural lands for Thurston and Pierce Counties are shown in Figure 6. These areas are defined through comprehensive plans and codified in zoning ordinances. In Thurston County, designated agricultural lands include areas zoned “agriculture” or “Nisqually agriculture.” In Pierce County, Section 19A.30.070 defines agriculture resource lands as, “lands with long term commercial agriculture significance.” Pierce County has lands zoned “agriculture” and an agriculture overlay zoning district.

The GMA requires reassessment of land use if probable infrastructure funding falls short of meeting existing needs and to ensure that the land use element, capital facilities plan element, and financing plan within the capital facilities plan element are coordinated and consistent (RCW 36.70A.070(3)(e)). If this coordination effort is combined with watershed planning to address actual water availability, long-term decisions can be managed incrementally and locally to provide for the best use of water and land resources. By integrating watershed planning with other land use and resource use decision-making, entities in the watershed may adopt a combined conservation and management approach.

In addition, RCW 36.94.040 requires that the sewerage and/or water general plan must incorporate the provisions of existing comprehensive plans relating to sewerage and water systems of cities, towns, municipalities, and private utilities to the extent they have been implemented. This legislation helps coordinate the comprehensive planning process with water planning.

3.2.4 Water Conservancy Boards

In 1997, the State legislature authorized the creation of Water Conservancy Boards under RCW 90.80 to enable the process of water rights transfer and change applications at the local level. Water Conservancy Boards are established as independent units of local government through resolution of the county or counties with approval of Ecology. A Water Conservancy Board can serve a single watershed, multiple watersheds, a county, or multiple counties. All Water Conservancy Board decisions must be approved by Ecology. The Water Conservancy Board legislation was amended in 2001 (WAC 173-153) and 2002 to make the Water Conservancy Board legislation consistent with the law and to improve legislative guidance to Water Conservancy Boards and Ecology. There are county-wide Conservancy Boards in Thurston and Lewis Counties.

3.3 **Recommended Actions**

General Policy Statement and Associated Recommendation

GLU - 1 Water supply availability should be considered in city and county land use planning activities. As such, an integrated approach to planning for water for growth in WRIA 11 via the CWSP process should be developed.

Water suppliers, towns, cities, and counties should be involved in this integrated approach to water planning: municipalities via their Water System Plans; counties in their review of Water System

Plans, through the Coordinated Water System Plan process; and towns, cities, and counties in their comprehensive plans and capital facilities plans.

This Watershed Plan recommends strengthening county CWSP policies through either a county-wide planning policy in Pierce and Thurston Counties (Lewis County does not currently have a CWSP), or through revisions to the CWSP with the following options:

Actions Specific to CWSP Updates

GLU – 1a Look for opportunities to resolve inconsistencies between Pierce and Thurston CWSPs such that all CWSPs within the Nisqually Watershed are consistent in their review and coordination of Water System Plans and are also reviewed with respect to consistency with comprehensive plans.

As a part of this action, the Planning Unit expects the implementation body for watershed planning and the counties to work together to develop coordinated programs for CWSPs that are then approved by the counties.

GLU – 1b Recommend to DOH that each CWSP be required to include a supply element (and not just service area) from individual water supply plans. This recommendation does not require a revision to the Coordination Act.

GLU – 1c Recommend that a County-wide CWSP for Thurston County be developed as a means to implement recommendations identified in this section including ensuring adequate water supply and limiting the numbers of exempt wells where alternate supply is available. This CWSP will address any potential inconsistencies between South Thurston and North Thurston CWSPs and form an integrated North and South Thurston CWSP.

GLU – 1d Develop linkage between issuance of water availability certificates and exempt wells in areas encompassed by a CWSP (see Exempt Wells, Section 4.2.6)

GLU-1e Recommend that CWSPs address water rights associated with failed water systems. CWSPs should specify that when purveyors take over failed water systems that have their own source(s), the acquisition should also include the water rights for the water service area.

GLU-1f CWSPs should require purveyors to provide counties information about how much water is available for hook-ups through approval of Water System Plans. This would allow Counties a working number of connections remaining under the existing Water System Plan or Water Right approval, understanding that this number may be subject to change based on water usage and mitigation factors.

General Planning Policies

GLU – 2 Legislative amendments to comprehensive plan land use designations that intensify land use should demonstrate how infrastructure needs will be met at the time of development.

GLU - 3 For proposed Urban Growth Boundary expansions that are outside the jurisdiction of a water service area, the proposal for expansion should include documentation of the city or town's intention to provide water, their ability to provide water, or the ability of the

development to provide water if it is to be self-served. Burden of proof is left to the applicant for the expansion

GLU-4 Adequate water supply should be retained on and provided to designated agricultural land of long-term commercial significance and other important agricultural areas. These areas are defined through comprehensive plans and codified in zoning ordinances. Zoned agricultural areas for Thurston and Pierce County are shown in Figure 6.

GLU -5 Ecology should not grant permits for transfers of existing water rights from designated agricultural lands, unless long-term arrangements are made for a suitable surrogate water supply to maintain agricultural use. (This action statement mirrors recent amendments proposed by the Thurston County Planning Commission for the County's Comprehensive Plan, and may require a rule change by Ecology).

4.0 GROUNDWATER RESOURCES AND SUPPLY

This section provides background information on the hydrogeology of each of the sub-basins within the Nisqually watershed and provides recommendations for a number of groundwater resource-related issues including: regional groundwater and potential regional water supply, the inconsistency between groundwater divides and WRIA divides, critical areas designation, codes and ordinances for aquifer recharge areas, and exempt well practices.

4.1 Problem Statement

- Yelm, Lacey, and Eatonville predict water supply shortfalls within the next 10 years and are having difficulty acquiring water rights to new groundwater supply.
- There is a general lack of information and lack of understanding regarding groundwater sources and hydraulic continuity (e.g., the interaction of surface water and groundwater) in the Nisqually Watershed. This makes it difficult to assess groundwater information required for water right decision-making, and to identify alternative supply options.
- Groundwater divides do not necessarily follow WRIA boundaries (surface water divides).
- All critical recharge areas need to be identified, and the Planning Unit and stakeholders must ensure that they are adequately protecting water quality and water quantity in these areas. Critical Area Ordinances have not been evaluated for consistency and adequacy regarding groundwater quality. Certain types of land uses in recharge areas could threaten groundwater quality.
- Scientific information regarding effects of exempt wells on surface water and instream flows is inconsistent. Exempt wells may cause a cumulative impact on surface water and instream flows. There is minimum regulatory oversight of individual exempt well use and of cumulative watershed-wide impacts of exempt well use.

4.2 Background

The following background material is included to provide a basis for the recommendations presented in this chapter. Background information includes discussion of watershed and sub-watershed scale geology and groundwater hydrology, hydraulic continuity, differences between WRIA boundaries and groundwater divides, critical aquifer recharge area designations and exempt wells.

4.2.1 Watershed Hydrogeology

The underlying geology of a watershed or sub-basin influences to a large extent the movement and availability of ground water in the area. It also has a large influence on the hydraulic continuity between streams and groundwater. Figure 1 illustrates the sub-basins described below.

The geologic units that comprise the watershed's geology were described as seven major geohydrology units by Drost, et. al. (1999). These units describe the lithologic and hydrologic characteristics of the geologic unit. The two geohydrological units referred to in this report are Qva, which has the hydrological characteristics of mostly confined groundwater, and Qc, where groundwater is more confined.

The Continental glaciers advanced into Pierce and Thurston County several times during the Pleistocene Epoch. The most recent glaciation, the Vashon Stage of the Fraser Glaciation, began about 15,000 years ago. The result of the repeated glacial advances and retreats is that most of the western portion of WRIA 11 is covered by as much as 2,000 feet of unconsolidated glacial and non-glacial deposits overlying bedrock. The drift consisted of predominantly gravels and sands with some local deposits of silt and clay. Alluvium is also found along the major rivers and tributaries in the western portion of the WRIA. These deposits differ dramatically in composition and thickness in each of the sub-basins, resulting in some areas with prolific supplies of groundwater, while others have minimal supply. It should be noted that many of the glacio-fluvial sediments and aquifers also extend beneath portions of WRIA 12 and 13, such that aquifer boundaries and groundwater divides do not always parallel WRIA boundaries. The following is a brief description of the each sub-basin's geology and associated hydrologic conditions.

The Upper Basin

The continental glacial ice did not cover the majority of the Upper Basin, and as a result the surficial geology in this area consists of Miocene to Eocene sedimentary and volcanic bedrock. The Upper Basin is essentially a closed system. The Nisqually River, its principal tributaries, and the Alder reservoir act to collect all surface and groundwater in the Upper Basins. There is no evidence of significant escapement via sub-flow into neighboring drainage sub-basins. There is an annual groundwater discharge of roughly 36,000 acre-feet per year from the Upper Basin. This would contribute about 50 cfs to the river flow.

Upstream from Ashford, the unconsolidated valley fill rapidly thins over shallow bedrock. Groundwater yield from this unit is generally low and water quality is usually poor. The groundwater reservoir here is essentially coincident with the modern river floodplain, which includes the Big Creek tributary area. Significant groundwater occurs in the alluvial materials flooring the lower valleys of Mineral, Roundup and East Creeks. In these areas, the principal groundwater reservoirs are shallow and minimally confined with most wells completed at depths less than 70 feet. The most plentiful groundwater resources in the Upper Basin are located in the Nisqually Valley from Ashford to Alder Lake. The aquifers are believed to occur in two principal units:

1. The upper fluvio-glacial unit, which extends from near the surface to the top of the middle confining zone.
2. The lower fluvio-glacial unit is separated from the upper unit by an 80-foot section of hard brittle clay.

The upland non-alluvial areas of this sub-basin are mainly underlain by bedrock. The aquifers in these areas are limited to small areas near fractures and joints in bedrock.

McAllister Sub-basin

The geology underlying the McAllister sub-basin is dominated by glacial deposits, glacial outwash, and alluvium that comprise a complex configuration of aquifers and aquitards. These sediments, and the aquifers within them extend beneath portions of the watershed to the north and south of the Nisqually Watershed. Groundwater passes easily through most of these deposits resulting in a highly productive aquifer. A significant quantity of groundwater flow in the Qva (Vashon advance outwash) and Qc (pre-Vashon glacial unit) aquifers appears to converge toward McAllister/Abbott Springs and McAllister Creek in the northern portion of the McAllister Sub-basin. For purposes of this Watershed Plan, this highly productive aquifer is referred to as the "Nisqually Aquifer".

Recharge to the groundwater system is primarily through infiltration of precipitation and secondarily as seepage from surface water (lakes, ponds, and streams), septic systems, and irrigation return flow. Annual groundwater recharge from precipitation is estimated to range between 26.6 and 29.3 inches per year (WPN, 2002). USGS data suggest that Lake St. Clair provides a significant amount of recharge to groundwater in the McAllister Sub-basin, estimated at 4,000 ac-ft/year (Drost et. al., 1999). A significant amount of water from the sub-basin likely originates as throughflow from other aquifers and from WRIA 13 (Deschutes Watershed).

Muck/Murray Sub-basin

The Muck-Murray Sub-basin consists almost exclusively of two soil associations: Kapowsin and Spanaway. Kapowsin soils formed in glacial till and are underlain at a depth ranging from two to five feet by an impermeable till layer. Perched groundwater and areas of standing water can form during the wetter months. Spanaway soils formed in glacial outwash. Approximately half of the Muck Creek stream system flows across these permeable deposits and loses large amounts of flow to the regional groundwater during most of the year. These soils drain rapidly, and are underlain by highly permeable gravel deposits. Therefore, these soils have very little surface runoff. Except during periods of high local groundwater levels, surface water in these areas will rapidly infiltrate. These two contrasting conditions have a marked effect upon hydrology in the Muck and Murray Sub-basins.

The sub-basin is generally underlain by glacial deposits of substantial thickness. One such hydrogeologic unit, Qc, is used extensively as a source of groundwater that is found primarily under confined conditions. The glacial sediments and associated aquifers in the Muck-Murray system may extend into adjacent watersheds.

There is a southwest to northeast trending groundwater divide located on Graham Hill. Groundwater to the north of that divide flows into the Muck-Murray drainage and potentially into the Clover Creek drainage. Groundwater to the south of the divide likely flows to the South Creek drainage, which is tributary to Muck Creek.

Yelm Sub-basin

The Yelm Sub-basin geology is dominated by glacial till, undifferentiated glacial drift, and Vashon advance outwash. The Qc unit (including water-bearing Salmon Springs Drift, penultimate deposits, and other coarse-grained deposits) is used extensively as a source of groundwater in the Yelm Sub-basin. Groundwater in this unit is found primarily under confined conditions. The soils in the Sub-basin have a mixture of slow and high infiltration rates.

Recharge to the groundwater system is primarily through infiltration of precipitation and secondarily as seepage from surface water (lakes, ponds, and streams); septic systems, reclaimed water infiltration and irrigation return flow. Groundwater has been observed to be in hydraulic continuity with Yelm Creek. Annual groundwater recharge from precipitation is estimated to range between 22.3 and 24.9 inches per year (WPN, 2002). In 2002, the City of Yelm, as part of their reclaimed water program, provided 75.8 acre-feet of additional groundwater recharge to the shallow aquifer system in the immediate vicinity of the City via reclaimed water recharge basins and a system of interconnected wetlands. The City also provided 23.3 acre-feet of reclaimed water for irrigation in 2002, part of which likely percolates to groundwater.

Tanwax/Kreger/Ohop Sub-basins

The upland, eastern areas of the sub-basin are mainly underlain by bedrock. The aquifers in these areas are limited to small areas near the fractures and joints in bedrock. The western end of the sub-

basin has areas of coarse-grained deposits, which can support highly productive wells. Groundwater flows toward the mainstem Nisqually River. Detailed regional hydrogeologic studies have not been completed in the sub-basin. Estimates of annual groundwater recharge in these sub-basins range significantly, between 16.6 and 23.3 inches (WPN, 2002).

Toboton/Powell/Lackamas Sub-basins

The geology underlying the Toboton/Powell/Lackamas Sub-basin is diverse. Volcanic and glacial deposits underlie the majority of the sub-basin; however glacial outwash and alluvium are also common. The volcanic material is predominately found on the eastern side of the sub-basin. Roughly 92% of the soils in the sub-basin are considered to have slow to very slow infiltration rates.

The aquifers in the eastern area of the sub-basin are limited to small areas near the fractures and joints in bedrock. The western end of the sub-basin has areas of coarse-grained deposits that can support highly productive wells. The flow direction is likely northwestward toward the main stem Nisqually River. Detailed regional hydrogeologic studies have not been completed in this sub-basin.

Mashel Sub-basin

The Mashel Sub-basin initiates on the flanks of Mount Rainier, the underlying geology is mostly volcanic deposits and undifferentiated glacial drift. The soils are primarily of low to moderate permeability.

The majority of the Mashel Sub-basin was not covered by continental glacial ice, resulting in a surficial geology of sedimentary and volcanic bedrock. The aquifers in these areas are limited to small areas near the fractures and joints in bedrock. The western end of the sub-basin has areas of coarse-grained deposits which have the ability to contain confined aquifers.

4.2.2 Regional Water Supply – Nisqually Aquifer

Recommendations in this Watershed Plan consider the fact that some sub-basins appear to have prolific supply while others have minimal supply and/or use of that supply in some sub-basins may impact prairie streams or instream flows in general. It is the goal of the Planning Unit to explore the concept of utilizing water from a sub-basin with available supply to serve the needs of other sub-basins within the WRIA. The Planning Unit recommends the transfer of water between sub-basins only when the needs of the sub-basin from which the water originates can be met first. Where practical, the Planning Unit is attempting to identify solutions in which water supply(s) for the WRIA are located in sub-basins where water is available for use with the least cost to the natural resource.

The concept of a regional water supply was previously investigated by Thurston County, Olympia, Lacey and Tumwater in 1995. Although this effort was unsuccessful in identifying an acceptable location for the source of a regional water supply, the reasons cited in 1995 for pursuing cooperative water supply planning are still applicable today. These reasons include:

- Identification of groundwater as a finite resource that is vital to human communities, fish and wildlife;
- Water demand within the North Thurston Urban Growth Area is projected to require 81,648 gpm by year 2030; and

- Water supply planning is beneficial to water resources and creates efficiencies for jurisdictions by maximizing returns in public investments for water supply and mitigation.

See the McAllister Sub-basin Action Plan for further background and discussion of a Regional Water Supply in WRIA 11 (Chapter 8).

Results from groundwater modeling and field studies performed in the McAllister sub-basin suggest that there is a large quantity of groundwater that discharges from WRIA 11, directly to Puget Sound (PGG, 1997; PGG, 1998; CDM, 2001; CDM, 2002). The source of this water, which will be referred to as the **Nisqually Aquifer**¹, may have the potential to provide a significant amount of water to support limited growth in the region without negatively impacting instream flow regulations set on the Nisqually River. The aerial extent and the hydrogeologic composition of the Nisqually Aquifer has not been yet been defined.

It is understood that the Nisqually Indian Tribe (Tribe) holds a reserved water right from time immemorial. The Nisqually Indian Tribe will maintain its senior right to these waters. The Nisqually Aquifer may be a potential source of potable water supply on a regional scale. To ensure Tribal water right interests are acknowledged and protected, the Tribe will initiate the discussion and lead the investigations that determine, with its regional partners, how much water is available for appropriations from the Nisqually Aquifer. If it is determined that a regional water supply is available from the McAllister sub-basin, the Tribe will initiate discussions to facilitate agreements, with its regional partners, on ownership, management, operation, and finance of a Nisqually Aquifer Regional Water Supply. All agreements must include approval from the Nisqually Indian Tribe.

The potential shift of Olympia's water withdrawal from McAllister Springs to a deeper groundwater source will likely improve water quality, fish habitat and instream flows in McAllister Creek, as the Spring is the Creek's source. The following is a brief discussion of the concept of the Nisqually Aquifer as a regional groundwater source and its relationship to aquifers, springs and wellfields in the vicinity.

McAllister Wellfield/Nisqually Aquifer

The geographic extent and hydrogeologic composition of the 'Nisqually Aquifer' has not yet been defined, nor is it identified in the McAllister Numerical Model as a distinct hydrogeologic unit or set of units. For purposes of this Plan, the term 'Nisqually Aquifer' is used to identify that portion of the Sea Level (Qc) aquifer and the Undifferentiated deposits (TQu) that are below sea level and discharge primarily to Puget Sound. The actual vertical and horizontal extent of the Nisqually Aquifer will need to be defined in the future, in a manner similar to that used to define the highly transmissive areas of the East Lacey Aquifer and McAllister Aquifers.

Since 1949, the primary source of drinking water for the City of Olympia has been McAllister Springs. McAllister Springs is a large, valley bottom spring with mean annual discharge ranging between 23 and 40 cfs (CDM, 2002), prior to withdrawals by the City of Olympia. Below Olympia's intake, remaining flow to McAllister Creek (as measured between 1979 and 1988) ranges from 21.2 and 25.6 cfs with an average annual flow of 24 cfs (USGS, 1999). Abbott Springs, adjacent to McAllister Springs, is owned by the City of Olympia and is currently not used for water supply. The discharge from Abbott Springs has been estimated at 5 to 10 cfs.

¹ The Nisqually Aquifer defined here to be that portion of the Qc (Salmon Springs Drift and penultimate deposits) and TQu (unconsolidated and undifferentiated sediments underlying the Qc) that are below sea level and discharge primarily to Puget Sound.

According to CDM (2002), McAllister and Abbott Springs "...are located at the junction of two high permeability (groundwater) zones—one (extending) from Long Lake to the southwest and the other from Lake St. Clair to the south. McAllister Springs receives groundwater from both areas".

A productive aquifer that underlies this valley springs area is referred to as the McAllister Aquifer (Figure 7). The McAllister Aquifer consists of the McAllister Gravels and units in hydraulic connection including advance and recessional Vashon Outwash (also referred to as the Qva and Qvr units, respectively), the Salmon Springs Formation (also known as the Sea Level Aquifer, or the Qc unit), and Undifferentiated Quaternary and Tertiary Deposits (also known as the TQu unit). The deeper units of the McAllister Aquifer likely comprise part of the Nisqually Aquifer, a portion of which discharges to Puget Sound. (Figure 8)

Furthermore, there is likely continuity between the McAllister Gravel deposits and the Nisqually Aquifer. The continuity between hydrogeologic units and the different sources of groundwater that converge in the vicinity of the McAllister Aquifer is indicated by differences in water chemistry between McAllister and Abbott springs. AGI (2001) reported that "the chemistry of McAllister Springs is different from that of Abbott Springs but similar to the chemistry of unit Qc (sea level aquifer). The water chemistry of Abbott Springs is similar to that of the units Qf and TQu. Discharge from McAllister Springs is typical of the shallow portion of the Sea Level Aquifer (which includes both Qc and TQu aquifers.)"

The City of Lacey currently has several high capacity production wells located west of McAllister Springs in an area commonly referred to as the East Lacey aquifer (see Figure 7). According to PGG (2002), the most significant hydrogeologic units in the East Lacey aquifer include the advance and recessional Vashon Outwash (Qva and Qvr, respectively), Sea Level Deposits (Qc), and Undifferentiated Deposits (TQu unit). Lacey's production wells are all screened within the Qc or sea level unit.

The City of Olympia holds water right certificates for the diversion of up to 19.6 million gallons per day (MGD) from McAllister Springs and a permit to divert up to 6.5 MGD from Abbott Springs. To meet the future demand for a reliable high-quality drinking water source, the City of Olympia has initiated the development of a replacement groundwater source for McAllister Springs, referred to as the McAllister Wellfield. The McAllister Wellfield is located south of McAllister Springs (Figure 7), and is hydraulically upgradient of the springs. Wells in this wellfield are completed in the same aquifer that discharges at McAllister Springs and other springs in the area. As part of the McAllister Wellfield development, the City has drilled and tested a production well and two test wells, and developed a groundwater flow model of the McAllister Valley to evaluate the potential impacts associated with the development of the wellfield.

The McAllister Numerical Model, developed to evaluate potential impacts of Olympia's McAllister wellfield, has estimated that a large amount (50,000 acre-feet/year, or 68.8 cfs) of water flows through the vicinity and discharges as subsurface flow to Puget Sound (CDM, 2002). As part of the development of this Watershed Plan, it was suggested that further investigation was warranted to determine if this water destined for Puget Sound could be tapped as a regional water supply. The "Nisqually Aquifer" would consist of that portion of the Sea Level (Qc) aquifer and the Undifferentiated deposits (TQu) that are below sea level and discharge primarily to Puget Sound. Although this aquifer is likely to be in hydraulic continuity with shallower geologic units, it would be defined by areas where capture of water from shallower units is minimal.

The Nisqually Aquifer may have the potential to provide a high-quality drinking water source both inside and outside the McAllister sub-basin and the Nisqually Watershed. It also may have the potential to serve as a water source for other municipalities in the area. In developing the aquifer,

surface-groundwater interactions are of concern in areas such as Lake St. Clair, kettle lakes, McAllister Wetlands, McAllister Springs, McAllister Creek, the valley border springs, and Nisqually River bluff springs. In order to better understand these benefits and impacts associated with developing this potential source of water for future population growth, the Cities of Olympia and Lacey have developed a baseline monitoring program to evaluate surface water, groundwater, and aquatic habitat conditions in the McAllister Springs area. The baseline monitoring program includes:

- Baseline hydrologic monitoring, including stream gauge installation;
- Development of a calibrated numerical model; and
- Long term evaluation and monitoring of the aquifer.

As studies have yet to be completed and the Nisqually Aquifer has yet to be formally defined, the actual impacts of withdrawal of water from the Nisqually Aquifer are unknown. However, there is likely some level of hydraulic continuity between the unstudied Nisqually Aquifer and the McAllister Aquifer, and studies indicate that water withdrawal from the McAllister Aquifer has the potential to impact the system in the following ways:

- Decreased water levels in existing wells from interference drawdown (CDM, 2002);
- Decreased surface water flow from induced groundwater recharge with disturbed aquatic environments and fisheries resources (CDM, 2002);
- Increased flow from McAllister Springs with increases in flooding and soil water logging (CDM, 2002);
- Decreased discharge from valley-side springs, including those feeding fish hatcheries, from changes in groundwater withdrawal locations (CDM, 2002);
- Changes in the “source of water” during the shift from McAllister Springs to McAllister Wellfield (CDM, 2002); and/or
- Saltwater intrusion (CDM, 2002); and
- Potential measurable impact to the water resources of the Nisqually Tribe or River (Personal Communication, Nisqually Indian Tribe, September 18, 2003).

The preliminary results of the groundwater flow modeling of Olympia’s proposed wellfield development in the McAllister Aquifer (CDM, 2002) indicate the following under extended average climatic conditions:

- Average annual groundwater levels are predicted to decline about three feet in the McAllister Wellfield and about one foot at the City of Lacey wells;
- The average annual discharge from the McAllister Springs and wetland complex is predicted to decrease by about 16% in comparison with non-wellfield conditions;
- Under annual average discharge conditions and a fully operational Wellfield, the Spring discharge to McAllister Creek is predicted to increase from 17.9 to 23.3 cfs (by 5.4 cfs) assuming the City ceases Spring withdrawal. With the Wellfield operating at 50% capacity and continued withdrawal of 5 cfs from the Springs, the model predicts an average annual increased discharge to McAllister Creek of 3.1 cfs.
- The average annual flow from the aquifer system to the Upper Nisqually River (above the tidal line at RM4.3) is predicted to be 1.4% lower (by 0.08 cfs) compared to non-Wellfield conditions; and

- The average annual saturated zone seepage from Lake St. Clair to the McAllister Gravels aquifer under average climate conditions is predicted to increase by about 0.06 cfs (or 45 AFY) when the Wellfield is fully operational. The combined average annual groundwater discharge to these three kettle lakes located west of the McAllister area is predicted to decline by 0.1 cfs under Wellfield pumping conditions.

It is uncertain what the impact of Olympia's wellfield withdrawals would be on the Nisqually Aquifer. It is likely that the wellfield will withdraw some water from the Nisqually Aquifer, but this can only be determined after the aquifer is defined.

Additional modeling will likely be required once data from the baseline monitoring program have been evaluated. Evaluation of impacts associated with development of a regional water supply developed in the Nisqually aquifer will also require additional modeling.

Estimates of Groundwater Flux and Discharge to Surface Water and Puget Sound

Several estimates have been made of groundwater flow in the vicinity of the McAllister sub-basin, and subsequent discharge to surface water and Puget Sound. Each of the estimates used different models and boundary conditions to define flow, and hence, the estimates vary.

PGG (1997) used a mass balance approach to estimate groundwater flow and underflow (including discharge to surface water, the Nisqually River and Puget Sound). They did not break down the underflow component of the water balance:

PGG (1997) Mass Balance Summary

Groundwater Flow at McAllister Spring (cfs)	Discharge to McAllister Spring (cfs)	Underflow (cfs)
100.5	23.2	77.3

Note: Underflow includes all groundwater bypassing McAllister Springs. No determination was made of discharge to Puget Sound or to surface water.

The USGS (1999) developed a groundwater flow model for the Nisqually basin. The model was developed for the entire basin and did not focus on the McAllister Springs area. It also included a portion of the Deschutes watershed. The USGS evaluated the model mass balance for the current conditions (i.e. no development of the McAllister wellfield). The USGS mass balance components for the McAllister Springs area and Nisqually River is summarized as follows:

USGS Groundwater Flow Model

Feature	Discharge (cfs)
McAllister Spring	25.6
Nisqually River	132
Submarine Seepage	121.6

Note: The USGS estimate of discharge to Nisqually River over whole river extent in model. The estimate of submarine seepage is over the entire model domain.

CDM (2002) refined the existing USGS groundwater flow model in the vicinity of McAllister Springs. The model was initially run in steady-state mode for calibration. The steady-state model

assumed the same pumping rates as the USGS model. The components of the mass balance for the steady-state model are:

CDM Groundwater Flow Model Steady-State Mass Balance Summary

Feature	Discharge (cfs)	Note
McAllister Springs	29.6	
Other Area Springs and Seeps	40.0	Includes Abbott Springs and seeps supporting wetlands
West McAllister Valley	3.1	
McAllister/Medicine Creek	1.9	
Nisqually River-Above Muck Creek	68.8	
Nisqually River-Below Muck Creek	38.6	
Puget Sound	68.8	Over entire model domain excluding Budd Inlet

4.2.3 Hydraulic Continuity

Hydraulic Continuity refers to the hydraulic interaction between surface and groundwater within a watershed (Ecology, 1998). Hydraulic continuity exists when an aquifer is discharging to a surface water body (gaining reach of a river) or is being recharged by a surface water body (losing reach of a river). Hydraulically connected groundwater and surface water cannot be considered independent resources.

Hydraulic continuity in the Nisqually Watershed is not fully understood due to a lack of information on both streamflow and hydrogeology. A qualitative evaluation of the major hydrogeologic units completed in the Level 1 Technical Assessment found that of the five geohydrologic units assessed in the Nisqually Watershed, two of them were estimated to have a high potential for hydraulic continuity. Additionally, the Level 1 Technical Assessment ranked sub-basins based on the potential for stream flow to be affected by groundwater use based on ranking criteria from the Ecology draft guidance manual “The Report on the Technical Advisory Committee on the Capture of Surface Water by Wells” (Ecology, 1998). In this assessment, the Qvr unit in all of the sub-basins was found to have a high potential for hydraulic continuity with surface water, and the Qva in the Mashel, Toboton/Powell/Lackamas, and Tanwax/Kreger/Ohop Sub-basins was assessed as having high potential for continuity with surface water.

Prairie streams that are generally located in the lower basin (Muck/Murray, Yelm, McAllister, Mashel, Toboton/Powell/Lackamas, and Tanwax/Kreger/Ohop Sub-basins) also have enhanced continuity with groundwater. In the upper reaches of prairie streams, the presence of very permeable recessional outwash materials results in significant recharge of groundwater from surface flows (losing reaches of “prairie tributaries”) while down at the mouths of most prairie tributaries, there is significant discharge of water from the aquifer to the stream (and in some cases this occurs as springs). The Nisqually aquifer is also likely to be in continuity with the Nisqually River.

Obtaining an improved understanding of the hydraulic continuity in the Watershed can help determine how future demands can best be met to minimize impacts on streamflows; and, provide guidance in the development of water resource and water allocation policy addressing continuity.

4.2.4 WRIA Boundaries versus Groundwater Boundaries

Groundwater divides do not necessarily follow surface water divides. Current WRIA and sub-basin boundaries are based on surface features and represent surface water divides. Groundwater flow

directions and boundaries could be different, especially in the case of deeper, and more regional, groundwater systems. Ensuring consistency in water-related policies across WRIA boundaries is addressed in greater detail in Chapter 11.

In the upper Muck Creek Sub-basin, the actual groundwater divide near the boundary between WRIA 11 (Nisqually Watershed) and WRIA 12 (Chambers Clover Watershed) is unknown. It is likely that some of the groundwater in the Upper Muck Sub-basin (located in WRIA 11) is actually flowing toward WRIA 12. It is also likely that some of the groundwater in WRIA 13 (Deschutes Watershed) is flowing into WRIA 11, both along the boundary of the McAllister Sub-basin and the southern edge of the Yelm Sub-basin.

Sub-basin boundaries in the Nisqually as indicated in Figure 1 are also based on surface topography and are not always indicative of groundwater flow paths and divides.

4.2.5 Critical Recharge Areas and Wellhead Protection Areas as Components of Critical Areas Ordinances

Under the 1990 Growth Management Act, every county and city in Washington undergoing comprehensive planning was required to adopt Critical Areas Ordinances to protect the integrity and character of agricultural, forest, and mineral resource lands; wetlands, streams, and other valuable wildlife habitats; and critical aquifer recharge areas. The State Department of Community, Trade, and Economic Development adopted a new rule (WAC 365-195-900 through 925) in August of 2000 requiring local governments to utilize "best available science" in their critical area regulations updates (consistent with RCW 36.70A.172) and providing guidance for acquiring and evaluating scientific information to determine whether it constitutes the best available science.

Pierce and Thurston Counties and their cities planning under the GMA are required to review, and if necessary, update their comprehensive plans and development regulations, such as Critical Areas Ordinances, by December 1, 2004 (RCW 36.70A.130). Many entities within the Nisqually Watershed include Critical Aquifer Recharge Areas and/or Wellhead Protection Areas as a component of their critical areas ordinances with the intention of protecting groundwater quality and supply. Critical Aquifer Recharge Areas in Pierce and Thurston Counties and Wellhead Protection Areas in the entire watershed are shown in Figure 9. The following is a summary of Critical Aquifer Recharge Area protections in the Watershed.

Thurston County

Chapter 17.15 of the Thurston County Code contains the Critical Areas Ordinance. The Critical Areas Ordinance governs how land is developed in environmentally sensitive areas in Thurston County. Examples of environmentally sensitive areas include floodplains, wetlands, aquifer-recharge areas and high-groundwater areas. The purpose of the Critical Aquifer Recharge Area designation in Thurston County is to maintain groundwater recharge, prevent degradation of groundwater resources, recognize the delicate balance between surface and groundwater resources, and balance competing needs for water while preserving essential natural functions and processes (Thurston County Code 17.15.500). The Critical Areas Ordinance also designates wellhead protection areas and sets standards to prevent contamination of these areas by existing and proposed land use changes and development (Thurston County Code 17.15.850).

Lacey

Lacey Municipal Code addresses wellhead protection in Chapter 14.36, Critical Aquifer Recharge Areas Protection. This section specifically addresses building, construction, and land use within wellhead protection areas. This section also requires review of all planned activities that use, handle, store, or dispose of hazardous materials within 10-year capture zones. The review is supposed to be conducted by the water purveyor and the local health authority, and gives the Thurston County Health Officer the authority to deny applications if it is determined that adequate protection of the source water supply is not ensured.

Lacey relies heavily on County authority to protect its wellhead areas, in part because a significant amount of Lacey's wellhead areas are located outside city limits. Article VI of the Thurston County Code, the Non-point Source Pollution Ordinance, is intended to protect the waters of Thurston County from nonpoint source pollution. The ordinance establishes practices and procedures for controlling and preventing nonpoint source pollution that apply to all persons, activities, and locations in Thurston County. Thurston County also implements a Business Pollution Prevention Program to regularly inspect, educate, and provide technical assistance to small quantity generators (i.e. those generating between 200 - 2,220 lbs per month) located within wellhead areas of the municipal water purveyors in Thurston County. This program is sponsored by the Thurston County Hazardous Waste Program and addresses activities such as proper storage, use, floor washing activities, incidental dumping, abandoned materials, and intentional ground disposal of hazardous wastes.

Pierce County

Section 18E.50.010 of the Pierce County Code contains the Critical Area Development Regulations. Erosion, landslide, seismic, volcanic, mine and flood hazard areas; streams; wetlands; fish and wildlife habitat; and aquifer recharge areas all constitute critical areas. Within these regulations, specific rules pertaining to aquifer recharge and wellhead protection areas are contained in the Aquifer Recharge and Wellhead Protection Area regulations, which protect such areas from degradation or depletion resulting from new or changed land use activities.

Aquifer Recharge Areas in Pierce County are defined as the boundaries of the two highest DRASTIC zones that are rated 180 and above on the DRASTIC index range, as identified in a Map of Groundwater Pollution Potential, Pierce County, Washington; and the Clover/Chambers Creek Aquifer Sub-basin boundary as identified in the Clover/Chambers Creek Watershed Groundwater Management Program. Wellhead Protection Areas are defined as the wellhead protection areas that lie within the ten-year time of travel zone boundary of a group A public water system well, as delineated by the water system purveyor pursuant to WAC 246-290-135.

Currently, Pierce County Council is reviewing an update to the Pierce County Critical Area Regulations. The proposed regulatory changes provide direction in protecting and restoring habitat and addressing natural hazard mitigation within and adjacent to Pierce County. Proposed changes to the Aquifer Recharge and Wellhead Protection Area Chapter include: prohibiting certain uses (landfills (other than inert and demolition), underground injection wells (Class I, III and IV), metals mining, wood treatment facilities, pesticide manufacturing, petroleum refining facilities, storage of large volumes (>70,000 gallons) of liquid petroleum or other hazardous products) within the aquifer recharge/wellhead protection areas; adding new maximum impervious surface limitations when it cannot be demonstrated that post-development infiltration rates cannot meet pre-development infiltration volumes, and; requiring that new agricultural activities must submit a farm management plan and meet standards.

Yelm

Chapter 14.08 of the Yelm Municipal Code regulates Critical Areas pursuant to the requirements of the Growth Management Act and the policies of Yelm's Comprehensive Plan. Pursuant to the Growth Management Act, Yelm's Critical Areas Code adopts regulations to protect fish and wildlife habitat, frequently flooded areas, wetlands, critical aquifer recharge areas, and geologic hazard areas. The Critical Areas regulations are currently being reviewed by the Planning Commission, which will recommend updates to the City Council in 2003 to ensure that the regulations are based on the best available science. The Yelm Critical Areas Code contains regulations for new development to protect critical aquifers. The city is also currently processing regulations for wellhead protection and should have adopted rules in place by 2004.

Eatonville

The Town of Eatonville has drafted a Critical Areas Ordinance for the Town Comprehensive Plan, but the final version has not yet been adopted. Currently there is not an ordinance addressing aquifer recharge or wellhead protection areas.

Olympia

Currently, the City of Olympia has three water supply areas: McAllister Springs, Allison Springs, and East Olympia. McAllister Springs is located within Thurston County. The McAllister Wellhead Protection Area is within the McAllister Geologically Sensitive Area (MSGA) of Thurston County. This overlay zone is identified as part of the Critical Areas Ordinance. Within the MGSA, only single family residential with one unit per five acres is allowed, engineered septic systems are required for new or repaired systems, best management practices must be used on farms, all stormwater must be properly treated so it does not degrade groundwater and no commercial or industrial land uses are allowed.

The City of Olympia works in coordination with the Thurston County Health Department to provide education, technical assistance, and special programs for residents and business owners living in and working with the McAllister Springs Wellhead Protection Area. Examples of the work carried out to protect groundwater quality in the McAllister Springs Wellhead Protection Area include: newsletter mailed to residents educating them on protecting groundwater, installation of demonstration water wise gardens, and tours of the McAllister Springs facility. City staff work with County staff to carry out technical assistance visits with businesses to ensure businesses are in compliance with Article VI of the Thurston County Code, the Non-point Source Pollution Ordinance. (See the description of the ordinance and program under the Lacey section.)

4.2.6 Water Supply Systems and Exempt Wells

4.2.6.1 Group A and B Water Systems

Group A water systems are defined by WAC 246-290-020 as being larger public water systems, which are further broken down into community and non-community group A water systems. Community Group A water systems provide service to 15 or more connections used by year-round residents for 180 days per year or more. These may include municipalities, subdivisions, mobile home parks, apartment complexes, and others. Non-community Group A water systems provide service to non-community entities. These may include schools, daycares, businesses, restaurants, campgrounds, and others. Group B water systems are smaller than Group A systems and are defined by WAC 246-291-010. Group B water systems are public water systems constructed to serve less than 15 residential services, regardless of the number of people. Group B systems serve an average

residential population of less than 25 per day for 60 or more days year or any number of people for less than 60 days per year.

4.2.6.2 *Exempt Wells*

RCW 90.44.050 identifies certain water uses that are exempt from obtaining a water right from the Department of Ecology. This statute permits exempt wells for the withdrawal of public ground waters for the following uses:

- Stock-watering purposes, or
- The watering of a lawn or of a noncommercial garden not exceeding one-half acre in area, or
- Single or group domestic uses in an amount not exceeding 5,000 gallons per day, or
- An industrial purpose in an amount not exceeding 5,000 gallons per day.

These uses “shall be exempt from the provisions of this section, but, to the extent that it is regularly used beneficially, shall be entitled to a right equal to that established by a permit issued under the provisions of this chapter: Provided, however, that the department from time to time may require the person or agency making any such small withdrawal to furnish information as to the means for and the quantity of that withdrawal.”

The instream flow rule, WAC 173-511-070 also provides the following exemption: “(3) Domestic use for a single residence shall be exempt from the provisions of this chapter; provided that, if the cumulative effects of numerous single domestic diversions and/or withdrawals would seriously affect the quantity of water available for instream uses, then only domestic in-house use shall be exempt if no alternative source is available.”

An important distinction to be made is that there are two statutes governing water withdrawals that are exempt from water right permit requirements. The instream flow rule exemption allows for household use only when no alternative source is available. The exempt well rule (RCW 90.44.050) allows for an assortment of uses, not exceeding 5,000 gallons per day. Thus, some wells are exempt from obtaining a water right from Ecology under the exempt well statute, but are not exempt from compliance with an Ecology instream flow rule. It does not appear that the instream flow exemption provision (WAC 173-511-070) is currently being enforced in WRIA 11.

An amount of 5,000 gpd is the maximum “exempt” withdrawal allowed without a water permit. However, “a right developed under the exemption of RCW 90.44 is not automatically established at 5,000 gpd” (Department of Ecology, 1991). An exempt well only has the right to withdraw the amount of water that has historically been put to beneficial use. Although RCW 90.44 states that Ecology may require exempt users to provide information regarding the method and quantity of withdrawal, this is not done in practice.

This legislation effectively provides an exemption from permitting (in regards to water rights) for any private well used for domestic/residential purposes, up to 5000 gallons per day. Since 5000 gallons per day is far more than the amount of water typically required for a single family residence, developers often utilize a single exempt well to provide water to six single family residences (called “six packs”).

The case of *Ecology v. Campbell & Gwinn* (2002) addressed intent of the “single and group domestic . . . 5,000 gallons per day” provision. The Court found that “the developer of a subdivision is,

necessarily, planning for adequate water for group uses, rather than a single use, and accordingly is entitled to only one 5,000 gpd exemption for the project.” The case was in response to the multiple “six-pack” well configurations that developers throughout the State (including Thurston and Pierce Counties) were using to provide water to subdivisions with no other water supply option. There has been significant debate as to the cumulative impact of exempt wells on instream surface flows and groundwater quantity and quality.

The following are local Exempt Well policies that are implemented by different entities within the Nisqually Watershed:

Exempt Well Policies - Thurston County

In Thurston County, Commissioners are currently reviewing policies applied to subdivisions and urban growth areas regarding exempt wells. The current policy is being updated in response to recent court decisions. Exempt wells are also affected by county regulations. In Thurston County, the Health Department is notified of any new exempt well. Through an interagency agreement, Thurston County Health Department inspects a minimum of 40% (generally 50-55%) of all the wells drilled in the County during or after well drilling. Thurston County provides a quarterly report of these inspections to Ecology. All new wells must be constructed in accordance with WAC 173-160. If a new well were constructed in violation of these standards, Thurston County or the Department of Ecology would require the driller to correct the construction deficiencies or properly decommission the well. Any enforcement action taken against licensed well drillers is the decision, and under the authority of, Ecology. Any building permit for a structure that requires water requires a Certificate of Water Availability, which is issued when a well driller report is submitted. If the well was inspected, it is required to have passed. If, for any reason, the well fails inspection, the following can happen:

- The building permit is not issued; and/or
- The well driller loses their license; and/or
- Civil infraction is imposed.

A major issue regarding exempt wells in Thurston County involves the number of gallons per day that can be assigned to each residence, and the sum of the permitted withdrawal. RCW 90.44.050 (mentioned on the previous page) states that single or **group** domestic uses in an amount not exceeding 5,000 gallons per day are exempt from applying for a water right. The DOH design guidelines for Group A (15 or more connections) systems are 800 gpd/connection, and Group B (less than 15 connections) are 750 gpd/connection. Six-pack wells are therefore, legal and defensible under DOH guidelines, because one exempt well provides an adequate supply of water to service six connections under the current exempt well limitation of 5000 gallons per day.

In Thurston County’s attempt to address the six pack issue, they are re-evaluating the current water usage per connection and per exempt well. In revising their exempt well policies, and with the goal of curbing the use of the exempt well rule to circumvent water rights permitting, the Thurston County Board looked at four options – 400 gpd/exempt well; 575 gpd/exempt well; 625 gpd/exempt well; and 750 gpd/exempt well. As studies indicate actual maximum flow values can range from 220 - 800 gallons per day per residence, this would permit more realistic single family domestic use of exempt wells. As of August 2003, however, the County has adopted an interim policy that will continue to apply the current policy of 5,000 gpd per exempt well, and allot 750 gpd per connection for families on a single-family well and for Group B systems. However, for "cluster" subdivisions and mobile home parks the flow figure will be reduced to 357 gpd per residence providing the applicant adheres to all water conservation mitigation measures. This interim policy will be further evaluated in the near future.

The Thurston County Board has agreed to add to the exempt well policy, "All new land use projects, which propose to withdraw more than 5,000 gpd of groundwater, regardless of the water supply proposed, must obtain certification from the Washington State Department of Ecology that the project is in compliance with chapter 90.44 RCW prior to final approval." This permitting method does not allow **multiple** six-pack wells per project, as they are beginning to look at the entire project, rather than individual units.

Thurston County must also decide how to regulate separate but adjacent projects, and whether to link related projects that are permitted under different names. This determination will prescribe how the State Environmental Policy Act (SEPA) is enforced with respect to the cumulative impacts of adjoining projects. As of October 2003, Thurston County had not amended the SEPA code to address the linkage of adjacent projects. However, the County has adopted an interim policy to address the issue.

Exempt Well Policies - Pierce County

The Tacoma-Pierce County Health Department regulates the drilling of new individual wells within Pierce County. The Pierce County Comprehensive Plan contains a policy that no new individual wells are allowed in the Urban Growth Area except for special circumstances. In order to implement that policy, Pierce County land use regulations require an applicant wishing to construct an individual well within an urban growth area to obtain written consent for the construction of the well from Pierce County Planning and Land Services Department prior to approval of the well by the Tacoma-Pierce County Health Department. However, most of WRIA 11 in Pierce County is outside the Urban Growth Area.

Other Tacoma-Pierce County Health Department regulations pertaining to individual wells include the following:

- An individual well must produce at least 400 gallons of water per day to be considered adequate with respect to quantity, and;
- If a parcel is part of a subdivision or short subdivision that gained approval subject to the provision of public water, or if the parcel's building permit was conditioned upon the use of public water, then a new individual well on the parcel may not be approved. (Tacoma-Pierce County Board of Health Resolution No. 2001-3282).

The Tacoma-Pierce County Health Department regulates Group B water systems operating within Pierce County. In regard to new developments proposing to utilize a Group B water system as the source of water the following regulations apply:

- If the proponent of a project proposes the creation of a new Group B Water System to serve the project, then the proponent shall assign and record an allocation of water of at least 750 gallons per day for each newly created lot;
- No newly formed Group B Water System may have more than six connections without demonstrating approval of water rights by the Washington State Department of Ecology and;
- Maximum number of lots for a proposed subdivision cannot exceed the following criteria: Proposed Group B water system – 6 lots. Proposed individual wells – 12 lots.

4.3 Recommended Actions

4.3.1 Regional Supply Actions

GW-1 (RS) Identify the Nisqually Aquifer as a possible source for a regional water supply to be used to supply water in multiple sub-basins in WRIA 11 (see also McAllister Sub-basin Action Plan, Chapter 8, MC-1, MC-3, MC-5). Furthermore, the State of Washington should formally recognize the Nisqually Aquifer, as that portion of the Qc (Salmon Springs Drift and penultimate deposits) and TQu (unconsolidated and undifferentiated sediments underlying the Qc) that are below sea level and discharge primarily to Puget Sound.

GW-2 (RS) Investigate the technical feasibility of development of a regional water supply in the McAllister Sub-basin that does not have a negative impact to existing water right holders, and has the potential to cause the least impact to, or improve, the quality and quantity of surface waters as compared to other potential source options. The Nisqually Indian Tribe will initiate the discussion and lead the investigations that determine, with its regional partners, how much water is available for appropriations from the Nisqually Aquifer. If it is determined that a regional water supply is available from the McAllister sub-basin, the Tribe will initiate discussions to facilitate agreements, with its regional partners, on ownership, management, operation, and finance of a Nisqually Aquifer Regional Water Supply. All agreements must include approval from the Nisqually Indian Tribe.

The Planning Unit supports the concept of developing groundwater supply in areas with plentiful supply and least impact to the resource and using this supply as a regional source to augment supply in sub-basins in need; potentially resolving supply problems and low flow conditions in some areas. The Planning Unit recommends transfer of water between sub-basins only when the needs of the sub-basin from which the water originates can be met first.

Projects and rationale supporting this regional (inter-basin) supply concept are presented in the McAllister and Yelm Sub-basin Action Plans (see Chapters 8 and 9).

4.3.2 Policy statements and action items regarding differences in WRIA boundaries and groundwater divides

GW-3 (GD) Policy Statement Addressing WRIA Boundaries versus Groundwater Divides

For instances where WRIA boundaries and groundwater divides are not the same, the Nisqually Watershed (WRIA 11) Planning Unit will work with the Planning Units from WRIA 12 (Chambers Clover Watershed) and WRIA 13 (Deschutes Watershed) to develop a policy for coordination and congruence for groundwater that does not follow the WRIA boundaries. It is important to recognize that the Nisqually Aquifer receives a significant amount of recharge and flow through from areas that are defined by surface boundaries as WRIA 13. In turn, the Regional Water Supply is intended to meet demand in both WRIA 11 and WRIA 13. Consequently, WRIAs 11 and 13 should coordinate on efforts for preserving the quality and quantity of water that supplies the Nisqually Aquifer. This action is supported by action MC-6 in the McAllister Sub-basin Action Plan.

We recommend that the WRIA 11 Planning Unit and its successor (i.e., the authority that will implement the Nisqually Watershed Plan), lead a collaborative approach between WRIA 11 and WRIA 13 for managing and protecting groundwater resources that supply

the Nisqually Aquifer. In addition to completing technical studies listed in this plan, it will be necessary to identify actions that extend beyond the boundaries of WRIA 11, and for quantifying recharge from WRIA 13 that will be needed to provide sufficient recharge of a regional water supply that supplies both WRIs. This will likely include policy to address systems such as the Nisqually Aquifer which flows beneath both WRIA 11 and WRIA 13 and water rights processing in the upper Muck Sub-basin (WRIA 11 and WRIA 12). For water rights processing in the upper Muck area, oversight of groundwater should be based on the location of the groundwater divide.

GW-4 (GD) Address locations of groundwater divides through a joint study, or development of joint management strategies, with the Chambers Clover Planning Unit to identify groundwater divide between WRIs 11 and 12.

4.3.3 Actions Pertaining to Aquifer Recharge Areas

GW-5 (AR) Address Aquifer Recharge Areas under the Critical Areas Ordinances to preserve the long-term integrity of recharge areas (both quantity and quality) and implement studies to delineate critical recharge areas.

GW-5a (AR) During any amendments mandated by the Growth Management Act, evaluate adequacy of Critical Areas Ordinances and data supporting them, and whether they provide adequate protection (e.g., paving, permeability, land use issues). This includes geographic scope and dynamics of recharge areas. This will require coordination with Fort Lewis, as Fort Lewis lands overlay a critical aquifer recharge area for the regional Nisqually Aquifer.

GW-5b (AR) Ensure that a process is in place to obtain the input of municipalities when a Critical Areas Ordinance is updated. Support current efforts, suggest a review process, and link projects to updates of the Critical Areas Codes or Ordinances for respective entities (e.g., cities and counties). Critical Areas Ordinance language to protect aquifer recharge should include stormwater provisions that encourage low impact development techniques to retain natural land cover, reduce impervious surfaces, and maximize infiltration of stormwater.

GW-5c (AR) Coordinate the collection of relevant technical information regarding recharge areas and assure it is made available during updates of critical areas ordinances. Assure that all wellhead protection areas as delineated by water purveyors are incorporated into Critical Areas Codes or Ordinances.

GW-5d (AR) Perform jurisdictional review of Critical Areas Ordinances and include the following activities:

Land uses and practices that could threaten groundwater quality, particularly when located in Critical Aquifer Recharge Areas, include landfills, direct application of pesticides, herbicides, and other pollutants, accumulation of animal waste, logging and other silvicultural activities, municipal and industrial discharge, industrial point source pollution, mining, commercial operations such as gas stations, and others.

Compare Critical Areas Codes and Ordinances for consistency in activities that are permitted in the Critical Aquifer Recharge Areas to ensure that new land uses with the potential to degrade groundwater quality are not allowed in Critical Aquifer Recharge Areas in any jurisdiction, or impacts are mitigated through the development review

process. Groundwater quality will be affected by restrictions placed on new land uses, and can be partially protected by implementing the standards of the local Critical Areas Code or Ordinance for new land uses in Critical Aquifer Recharge Areas. Also, Critical Areas Codes or Ordinances should be assessed to gain a complete picture of pollutant levels that are allowed by each use.

Assess the provisions for Critical Aquifer Recharge Areas designations, and determine if any non-conforming land uses are currently sited within the 6-month to one-year time-of-travel zone in delineated wellhead protection areas. If these non-conforming land uses are found, they need to be closely monitored for potential pollution practices and any reported spills or accidents need to be reported to the jurisdiction immediately. Some cities in these areas are looking at phasing out non-conforming uses, such as landfills, gas stations, dry cleaners, etc., after the sale of the property occurs or if the contamination threat is great, setting a timeline for eliminating the land use activity all together (such as within 10 years).

GW-5e (AR) All land uses within critical recharge areas that are shown to contaminate groundwater, or soils, that have the potential for contaminating groundwater, should have the highest priority for expedited cleanup. If these land uses are nonconforming uses they should be prohibited from further contaminating groundwater.

4.3.4 Actions Pertaining to Exempt Wells

Ecology review comments state that “if the Planning Unit’s technical analysis suggests specific areas are being negatively impacted by exempt wells, it may be reasonable to invoke WAC 173-511-070(3) at the suggestion of the Planning Unit”.

GW-7 (EW) This plan recommends that Ecology provide more thorough oversight of exempt wells (see WAC 173-511-070). The issuance of a start card (notice of intent to drill) for an exempt well by well drillers and Ecology’s database of start cards should be consistent with available information on Coordinated Water System Plan service area boundaries, available hydrogeologic information on local aquifers, and cumulative effects of exempt wells. Small water withdrawals are appropriate in areas of dispersed development and where other sources of water are not available. This recognition, however, does not preclude the management of exempt wells to avoid impacts to streams and to prevent overuse of aquifers and to prevent impairment of nearby water supplies.

GW-7a (EW) Exempt wells are a statewide issue, caused in part by the fact that, due to the lack of resources, the Department of Ecology has not consistently enforced existing laws and requirements or followed the Attorney General’s 1998 opinion on exempt wells.

The Department of Ecology should study the cumulative impacts of exempt wells and consider setting a basin-wide standard for the number of houses allowable per exempt well.

This plan recommends that Ecology increase their enforcement of the exempt well statute² and develop an Exempt Well Action Plan to achieve compliance with the intent of the exempt well withdrawal statute including the following:

² Ecology comments stated that they have selectively enforced the exempt well laws as resources have permitted.

- Evaluate hydrologic impacts of exempt wells on surface and groundwater resources, including impacts on state objectives for minimizing the proliferation of water systems and ensuring effective conservation.
- Assess effectiveness of current exempt well withdrawal statute and implementation practices.
- Require the decommissioning of existing old wells when they have been replaced by new “replacement wells”
- Identify rule or policy development needed to ensure effective implementation of the statute, and initiate rule/policy formation.
- Define and issue a clear timeline for the Ecology exempt well action plan including clear milestones, based on the most expedient, feasible timeframe.
- Clarify the intent and include in the exempt well action plan information regarding WRIA 11 Instream Resource Protection Program WAC 173-511-070 reference to exempt wells.
- If Ecology determines that there is a role for counties in implementing the exempt well action plan, the state will need to provide resources to the counties.

GW-7b (EW) Once sufficient information is gathered on the cumulative impacts of exempt wells as directed in GW-7a (EW), the Planning Unit may wish to consider avenues to address the drilling of exempt wells in areas where technical data indicate they may have impact on surface water systems. In sensitive areas, this might include the option of drilling in deeper aquifers that are more protective of surface water, if available. In these cases, however, practical consideration should be given to the occurrence of high iron and manganese in deeper subsurface systems in the watershed. Technical data are required. At a later date, after the recommendations to the Department of Ecology have been addressed by Ecology, the Planning Unit may also wish to prescribe mitigations for exempt wells where deeper withdrawal levels are unattainable.

GW-8 (EW) Develop a policy of transfer of exempt wells’ water rights within a water service area or urban growth area to a water purveyor and submit to Ecology for water right credit. Define how much credit should be granted for taking exempt wells off line as part of this policy. Currently, RCW 90.44.105 specifies requirements for consolidation of rights for exempt wells. The statute specifies that “The amount of water to be added to the permit holders certificate upon discontinuance of the exempt well, shall be the average withdrawal from the well in gallons per day, for the most recent five year period preceding the date of the application except that the amount shall not be less than 800 gallons per day for each residential connection or such alternative minimum amount as may be established by the Department in consultation with the Department of Health and shall not exceed 5000 gallons per day. Ecology has stated it is interested in responding to any proposals the Planning Unit has with respect to determining the appropriate amount of credit for exempt wells in specific sub-basins.

5.0 WATER RIGHTS (GENERAL AND PROCESSING IN CLOSED SUB-BASINS)

5.1 Problem Statement

- Water rights applications are not being processed.
 - Limited instream flow and current regulatory and/or institutional barriers are not enabling applicants to acquire water rights throughout the State. This problem can result in an inability to supply water for growth. Ecology can choose not to approve water rights, or may require mitigation to avoid a net consumption of surface water.
 - Yelm, McAllister, Horn, Muck, Eaton, Thompson and Ohop Creeks are currently closed year-round to further water appropriation. The Mashel River, Red Salmon, Clear, Tanwax, Toboton, Lackamas, and Murray Creeks are all tributaries to the Nisqually River that have seasonal closures. Water right applications are not currently being processed in closed sub-basins, and will not likely be granted in closed sub-basins unless drop for drop mitigation of water use is provided by the applicant. This is currently an issue for Yelm, Olympia, Lacey, Eatonville, and Graham Hill Mutual.
 - There is a general lack of knowledge regarding how much water is available and is not consumptive of surface flows in each sub-basin, and the general level of continuity between surface water and ground water in those sub-basins.

5.2 Background

The following background information is included to provide a current overview of water right application processing in the Nisqually Watershed and the general level of allocation in the Watershed. Sub-basin closures due to limited or questionable streamflow in individual tributaries are also discussed. These closures are listed in Chapter 6, which describes the regulations regarding instream flow in the watershed. Detailed information regarding water allocation by sub-basin is provided in the Level 1 Technical Assessment (WPN, 2002).

5.2.1 Water Rights

State Water Rights

Figure 10 and Table 2 show all pending groundwater and surface water right applications in the lower Nisqually Watershed as included in Ecology's WRATs database (Ecology, 2003). The priority numbers listed in Table 2 are not necessarily those assigned by Ecology, but were based on priority dates listed for WRIA 11 applications within the WRATs database. The priority numbers in Table 2 are not intended to recommend that applications be processed in that order. The processing of these water right applications is currently on hold until this Watershed Plan is complete.

Existing water permits, certificates and claims as of May 2002 in the Nisqually Watershed (excluding the Upper Basin) are summarized in the Level 1 Technical Assessment by sub-basin. Water Right applications in the Upper Basin were processed in 2001 upon completion of a separate Phase II, Level 1 Technical Assessment for the Upper Basin (David Evans and Associates, 2000). The Nisqually Watershed Planning Unit requested that Ecology process pending water right applications in the Upper Basin based on information provided in the report.

Federal Water Rights

There are six recognized federal reservations of water rights in the Nisqually Watershed: Mt. Rainier National Park, National Forest Lands, Fort Lewis, Nisqually National Wildlife Refuge, Nisqually Indian Reservation, and Treaty Reserved Fishing Rights. The rights of the Nisqually Indian Tribe are discussed below under Tribal Water Rights. Since the remainder of these federal rights are unquantified, they are summarized here qualitatively:

Mt. Rainier National Park was established on March 2, 1899, and its reserved water right has a priority of that date. The uses covered by the federally reserved water right include recreation, wildlife protection, aesthetic and scenic resources and wilderness preservation.

The Gifford Pinchot National Forest occupies portions of the headwaters of the Upper Nisqually Watershed. It was established in 1897 as part of the Mt. Rainier Forest Reserve and has a federally reserved water right with that priority date. Originally the uses of the federal reservation were for timber production. Over time and through court decisions, those uses have expanded to include others: wilderness preservation, wildlife, recreation and fisheries.

Federally reserved water rights for Fort Lewis are considered to date to the inception of the military installation in 1919. Army policy states that the Army will assert Federal reserved rights for present and foreseeable future needs for water on land reserved for the public domain, where the use is necessary for the primary purposes of the military reservation. The rights at Fort Lewis have been construed to include recreational and conservation uses as well.

The US Fish and Wildlife Service has a 1977 water right at the Nisqually National Wildlife Refuge located at the Nisqually Delta.

Tribal Water Rights

The Nisqually Indian Tribe is a sovereign nation with rights over natural resources, including enough water to fulfill the purposes of their reservation, which are reserved by and protected in treaties, executive orders, and federal statutes. The United States has a trust obligation to the Nisqually Tribe to preserve and protect these rights, which was upheld by the 1908 "*U.S. Supreme Court Decision in U.S. vs. Winters (the Winters doctrine)*." Washington State does not have the authority to alter tribal water rights.

The Nisqually Indian Tribe possesses the earliest priority rights to water within the Nisqually Watershed. Nothing in this Plan can affect or modify any trust or treaty right of the Nisqually Indian Tribe. However, the Tribe recognizes that recommendations proposed in this Plan may directly affect the Tribe's interests. The Planning Unit understands that implementation of this Plan will require significant interaction and cooperation with the Tribe, and has made a commitment to work with the Tribe in a relationship that recognizes the Tribe's senior water rights, interests in co-management of affected fish and wildlife resources, and respects the sovereignty of the Nisqually Tribal Government.

TABLE 2

TRS	PRIORITY NUMBER	SURFACE (S) GROUND (G)	KEY MAIN	DOCUMENT NUMBER	PURPOSE LIST	BUSINESS NAME	PRIORITY DATE	CFS	GPM	ACRES IRR	DOMESTIC UNITS	COUNTY NAME
T18N/R04E-24	1	G	219941927225844	G2-28269	DM	Down To Earth Inc	9/18/1991		120		18	PIERCE
T18N/R04E-22	2	G	219941927231545	G2-28361	DM	Graham Hill Mutual Water Co Inc	12/9/1991		500		250	PIERCE
T18N/R04E-22	3	G	219941927231558	G2-28362	DM	Graham Hill Mutual Water Co Inc	12/9/1991		500		250	PIERCE
T18N/R04E-28	4	G	219941927231758	G2-28371	DM		1/9/1992		200		80	PIERCE
T18N/R04E-28	5	G	219941927231811	G2-28372	DM		1/9/1992		200		80	PIERCE
T18N/R01E-07	6	S	219941928035338	S2-28469	DS		4/13/1992	0.02			1	THURSTON
T18N/R04E-20	7	G	219941927234616	G2-28546	DM·CI	Rainier View Water Co	5/13/1992		600			PIERCE
T18N/R01E-31	8	G	219941927234722	G2-28551	DM		7/2/1992		100		9	THURSTON
T17N/R04E-23	9	G	219941927235449	G2-28591	DM	Boyd Real Estate Investments	8/18/1992		100		177	PIERCE
T17N/R03E-11	10	G	219941928003005	G2-28776	DM	Talmo Inc	3/11/1993		500		600	PIERCE
T16N/R03E-06	11	G	219941928003204	G2-28788	ST·DM·CI	Wilcox Farms Inc	3/19/1993		200			PIERCE
T17N/R02E-27	12	G	219941928003746	G2-28829	DM		4/30/1993		80		18	PIERCE
T16N/R04E-11	13	G	219941928004751	G2-28884	DM	Hope International	6/29/1993		13.3		4	PIERCE
T18N/R01E-07	14	G	219941928004717	G2-28881	IR·DS		7/16/1993		60	4	1	THURSTON
T18N/R04E-18	15	G	219941928005831	G2-28934	DM	Spanaway Christensen Water	8/24/1993		45		7	PIERCE
T18N/R04E-15	16	S	219941928051107	S2-28964	IR		9/27/1993	0.7		23		PIERCE
T17N/R04E-24	17	G	219941928010434	G2-28967	DM	Boyd Real Estate Investments	12/1/1993		125		150	PIERCE
T17N/R03E-17	18	G	219941928010840	G2-28986	DM	Rainier View Water Co	12/29/1993		60			PIERCE
T17N/R01E-23	19	G	219941928013014	G2-29084	IR	Yelm City	1/10/1994		1500	500		THURSTON
T17N/R01E-23	20	G	219941928013033	G2-29085	MU	Yelm City	1/10/1994		3000			THURSTON
T17N/R01E-23	21	G	219941928013051	G2-29086	MU	Yelm City	1/10/1994		3000			THURSTON
T17N/R04E-17	22	G	219941008141012	G2-29005	DM		2/15/1994		45		7	PIERCE
T17N/R02E-28	23	G	219941928011640	G2-29020	ST·IR		2/17/1994		450			THURSTON
T17N/R04E-10	24	G	219941928011744	G2-29024	DM	Land Recovery Inc	3/21/1994		10		2	PIERCE
T17N/R03E-19	25	G	219941928011903	G2-29029	DM	Gervais Meadows	4/15/1994		40		8	PIERCE
T17N/R04E-34	26	G	219941928012411	G2-29053	ST·IR·DS·CI	Metropolitan Park Dist Of Tacoma	5/13/1994		100			PIERCE
T17N/R03E-06	27	G	219941928012632	G2-29064	FP·DM	Lacamas Farmsteads Water System	6/30/1994		225			PIERCE
T17N/R04E-27	28	G	219941928012833	G2-29075	DM	New Concept Homes Inc	7/26/1994		110		100	PIERCE
T19N/R01E-33	29	G	219941928013237	G2-29097	IR·DM		8/3/1994		35	3	2	PIERCE
T18N/R04E-29	30	G	294111800150635	G2-29127	IR		9/28/1994		30	8		PIERCE
T16N/R03E-12	31	S	295010900132849	S2-29163	IR·DS		12/13/1994	0.02			1	PIERCE
T18N/R04E-27	32	G	295021300111858	G2-29183	DM	Bethel School Dist 403	2/2/1995		50			PIERCE

TABLE 2

TRS	PRIORITY NUMBER	SURFACE (S) GROUND (G)	KEY MAIN	DOCUMENT NUMBER	PURPOSE LIST	BUSINESS NAME	PRIORITY DATE	CFS	GPM	ACRES IRR	DOMESTIC UNITS	COUNTY NAME
T16N/R05E-28	33	S	295030700160256	S2-29193	PO		2/13/1995	0.4				PIERCE
T16N/R03E-32	34	G	2950321X0100544	G2-29197	DM	Clearwood Community Association	3/3/1995		1000		1355	THURSTON
T17N/R02E-35	35	G	2950918X0162649	G2-29277	DM		8/22/1995		30		319	PIERCE
T16N/R04E-14	36	S	2951103X0153919	S2-29290	DS		9/28/1995	0.02			1	PIERCE
T17N/R02E-03	37	G	295111700153616	G2-29312	MU·FR	Roy City	10/30/1995		500			PIERCE
T18N/R02E-33	38	G	295111700153350	G2-29313	MU·FR	Roy City	10/30/1995		490			PIERCE
T16N/R01E-14	39	G	295111700152657	G2-29316	DM	Champion Estates Water System	11/13/1995		5		12	THURSTON
T16N/R04E-05	40	S	296031900133842	S2-29358	IR		2/22/1996	2.2		10		PIERCE
T16N/R04E-05	41	S	296031300164446	S2-29360	IR		2/22/1996	0.8		10		PIERCE
T17N/R03W-04	42	G	296051300162336	G2-29372	DM		4/11/1996		50		41	PIERCE
T16N/R03E-30	43	G	296051500103648	G2-29379	ST·IR·DS·CI		4/26/1996		150	50	1	THURSTON
T17N/R01W-01	44	G	296090500142133	G2-29393	DM	Evergreen Valley Water Co	7/15/1996		24		9	THURSTON
T17N/R01E-11	45	G	297022000131940	G2-29458	IR·DM	Yelm School Dist 2	2/6/1997		150	6	2	THURSTON
T17N/R03E-25	46	G	297033100164429	G2-29474	IR	R W H Co LLC	3/4/1997		130	47		PIERCE
T16N/R02E-15	47	G	297100700151517	G2-29517	DM·CI	H & N International	9/5/1997		145		5	THURSTON
T18N/R01E-17	48	G	297111700152507	G2-29521	ST·IR·DS		9/15/1997		80	2	1	THURSTON
T16N/R03E-30	49	G	298011600090609	G2-29570	DM		12/15/1997		30		5	THURSTON
T16N/R03E-30	50	G	298011600084747	G2-29571	IR·DS		12/24/1997		30	2	1	THURSTON
T16N/R04E-17	51	G	298021200093749	G2-29576	DS		12/30/1997		10		1	PIERCE
T16N/R04E-17	52	S	298022600083611	S2-29584	PO·FS		12/30/1997	0.04				PIERCE
T18N/R01E-31	53	S	298040700083949	S2-29592	DS		2/6/1998	0.01			1	THURSTON
T16N/R03E-14	54	G	298052100095514	G2-29607	IR		3/19/1998		40	40		PIERCE
T17N/R02E-20	55	G	298081300155647	G2-29629	MU	Yelm City	4/10/1998		1000			THURSTON
T17N/R04E-26	56	S	298071724082353	S2-29663	DM		6/16/1998	0.18			2	PIERCE
T17N/R04E-30	57	G	298091700135045	G2-29702	IR·DM	Eatonville School Dist 404	6/26/1998		80	2		PIERCE
T17N/R03E-12	58	G	298091700135307	G2-29701	IR·DS·CI		6/29/1998		15	4	1	PIERCE
T18N/R01E-31	59	G	298092300091320	G2-29777	DM	Twin Capes Water System	6/29/1998		35		14	THURSTON
T18N/R01E-32	60	S	298092300092156	S2-29776	DS		7/1/1998	0.02			1	THURSTON
T17N/R04E-07	61	G	298091700135641	G2-29705	IR·DS		7/6/1998		20	1	1	PIERCE
T17N/R04E-07	62	G	298091700135508	G2-29706	IR		7/6/1998		40	9		PIERCE
T18N/R02E-34	63	G	299010500092716	G2-29816	DM	D C I Development Inc	12/10/1998		200		25	PIERCE
T16N/R04E-16	64	G	299060200092747	G2-29850	DM	Heritage Homes & Land	4/30/1999		30		6	PIERCE
T17N/R03E-30	65	G	299080500093707	G2-29868	DS		7/21/1999		19		1	PIERCE
T18N/R01E-29	66	G	200022400145056	G2-29900	MU	Olympia City	1/14/2000		13600			THURSTON
T18N/R04E-29	67	G	201070500113135	G2-29993	IR·DS		6/7/2001		60	8	1	PIERCE
T16N/R4E-11	68	G		G2-30092	DM		1/18/2003		42.2			PIERCE
T18N/R01W-24	L1	G	295011000112107	G2-29165	MU	Lacey City	12/16/1994		2400			THURSTON
T18N/R01W-24	L2	G	295111700151904	G2-29304	MU	Lacey City	9/20/1995		1000			THURSTON
T18N/R01W-13	L3	G	295111700151108	G2-29305	MU	Lacey City	9/20/1995		2500			THURSTON
T18N/R01W-24	L4	G	295111400154023	G2-29306	MU	Lacey City	9/20/1995		1800			THURSTON

5.2.2 Tributary Closures and Their Effects on Future Water Allocation

In February 1981, the Washington State Department of Ecology published a report titled *Nisqually River Watershed Instream Resources Protection Program* (Ecology, 1981). The report is a proposal to establish minimum instream flows and sub-basin closures in the Nisqually Watershed and adopt previously set flows and closures. These minimum instream flows and closures were codified in Washington Administrative Code (WAC) Chapter 173-511 and are listed in Tables 3 and 4, of Section 6 of this report. The WAC can be viewed online at <http://www.ecy.wa.gov/pubs/wac173511.pdf>.

WAC 173-511-040: Surface water source limitations to further consumptive appropriations. (1) The department has determined that (a) certain streams exhibit low summer flows or have a potential for going dry thereby inhibiting anadromous fish passage during critical life stages, and (b) historic flow regimes and current uses of certain other streams indicated that no water is available for additional appropriation.

Based upon these determinations, the streams and lakes identified in the WAC are closed to further appropriation either seasonally or year round (see Tables 3 and 4). Closures recommended in the IRPP Report and codified in WAC 173-511 are primarily tributary oriented. Within the tributary sub-basin, no further allocation of surface water can occur during the period of the tributary closures. If withdrawal of groundwater will affect tributary surface water flows in these sub-basins, then no further allocation of groundwater will be permitted. Streamflows on the mainstem Nisqually downstream of Alder Dam, La Grande Dam, and Centralia Diversion Dams are federally regulated under the Federal Energy Regulatory Commission (FERC). However, WAC 173-511 does specify a seasonal closure of both the Bypass Reach and the middle Reach of the Nisqually River between June 1 and October 31.

Under WAC 173-511, consumptive appropriations of surface water, and groundwater in hydraulic continuity with surface water, are closed for the sub-basins listed in Tables 3 and 4. These sub-basins were closed by Ecology based information that indicated there was no water available for further appropriation. All water uses developed since the enactment of WAC 173-511 have been reviewed by Ecology on a case by case basis and must be proven to not be in hydraulic continuity with surface waters of the sub-basin. The Upper Basin is not closed to further appropriations, and water rights in this sub-basin were batch processed upon completion of a Level 1 Technical Assessment for the Upper Basin (David Evans and Associates, December 2000) in 2001.

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

5.2.3 Minimum Instream Flows and Their Effects on Water Allocation

Minimum instream flow regulations have also been established in WRIA 11 by Ecology under the Instream Resource Protection Program (IRPP) and are described in Chapter 173-511 of the Washington Administrative Code. Instream Flows and closures in the Nisqually Watershed have a priority date of February 1981, when they were adopted as administrative rule. WAC 173-511 was then revised in 1988.

Flow regulations in WRIA 11 consist of minimum instream flow levels set at three locations on the Nisqually River, one location on the bypass reach, and at the USGS gauge on the Mashel River (Figure 10). These State-specified flows are specified every 15 days, year-round at the instream flow

control points on these rivers. The methodology used to determine instream flow levels set at these locations is unclear, and records are not available to verify methodologies. Additional minimum instream flow requirements are in place for flow in the bypass section and in the mainstem Nisqually River from La Grande powerhouse to the Yelm Project Diversion (between River Mile (RM) 40.7 and 12.7), as set by the Federal Energy Regulatory Commission (FERC) as an operational requirement for the dam.

The State specified flows with a priority date of 1981 are a form of a water right established by the State. Water rights with a priority date older than the instream flow regulation are not governed by the instream flow regulation. These water rights are called “senior” to the instream flow regulation. Senior water rights may not be affected by existing or new instream flow regulations.

Where minimum instream flows are established, exercise of water rights that are issued subsequent to establishment of the regulation may be curtailed if actual instream flows drop below those defined by regulation. These “junior” water rights are therefore “interruptible.”

5.2.4 Hydraulic Continuity

See Section 4, Groundwater Resources and Supply, for a description of hydraulic continuity (interaction between surface water and groundwater) in the Nisqually Watershed.

Obtaining an improved understanding of the hydraulic continuity in the Watershed can help determine how future demands can best be met to minimize impacts on streamflow; and, provide guidance in the development of water resource and water allocation policy addressing continuity.

5.3 **Recommended Actions**

WR-1 Current Water Right Application Processing - Recommendation to Department Ecology

Ecology Water Resources staff have agreed to “include the processing of WRIA 11 applications in its 2004 workplan provided that they concur that adequate information exists to support their decision making” (Ecology Water Resources Comments on Draft Nisqually Watershed Management Plan – August 14, 2003).

The Nisqually Watershed Planning Unit recommends that the Washington State Department of Ecology (Ecology) batch process water right applications by sub-basin in the Nisqually Watershed when data available for processing are considered adequate for each sub-basin. The Planning Unit is recommending that sub-basins be processed in a specific order because some sub-basins have data that are adequate for processing water rights while others do not. Sub-basin based processing will help to avoid delay in processing water rights where data are available. The order of processing is based on the Planning Unit’s understanding of information currently available, and is proposed as follows:

1. McAllister
2. Yelm and Mashel
3. Toboton/Powell/Lackamas
4. Muck/Murray and Tanwax/Kreger/Ohop
5. Upper Basin

The Planning Unit recommends that McAllister sub-basin be processed at the time Ecology begins addressing water right applications in WRIA 11. Yelm and Mashel sub-basins should be processed after additional information (outlined below) is collected. The order of processing is subject to revision based on availability of additional data, and the Planning Unit recognizes that the order of the recommendation is subject to change.

The Planning Unit requests regular meetings with Ecology during the processing of water rights to assure the intent of this recommendation is maintained, and that revisions to the order above are consistent with the intent. Furthermore, the Planning Unit advises that if applicants in the Yelm and Mashel sub-basin(s) are still involved in data collection activities at the time those sub-basins are eligible for processing, that Ecology move forward to the next sub-basin. If Ecology determines that a sub-basin is lacking sufficient data for processing, Ecology will provide comment on what data are required prior to moving to the next sub-basin in the order.

The adequacy of data and the issues of concern that should be considered while processing water right applications in each sub-basin are discussed below, by sub-basin. These considerations and recommendations are reflective of the participation on the Nisqually Watershed Planning Unit.

It should be noted that this recommendation to process water rights in a sub-basin does not imply a recommendation to approve water right applications. In some sub-basins, there may be inadequate data that can only be overcome by a large data collection project. The Planning Unit does not want to place the financial burden of a large data collection project or study on an individual or small water purveyor waiting for the processing of their water right application.

WR-1a ***McAllister Sub-basin –13 pending applications***

The McAllister Numerical Model is the best available tool for evaluating impacts to McAllister Creek from withdrawals from the McAllister/East Lacey and Nisqually aquifers. We recommend that all water rights applications for water withdrawal from the McAllister/East Lacey aquifer within the McAllister sub-basin be evaluated using either the McAllister Numerical Model or a new expanded model built upon it.

Upon adoption of this Plan, Ecology Water Resources should add processing all water rights applications within the McAllister Sub-basin to their work plan. Data collection and modeling have occurred in the McAllister sub-basin, and will assist in processing current water right applications. At this time sufficient technical information is believed to be available for Ecology to process water rights applications from within the sub-basin. Yelm's applications may also be included in this batch if Yelm is able to provide information showing that its wells primarily capture water within the McAllister Sub-basin. In addition, it is possible that there are applications for groundwater listed in WRATs as WRIA 13 that will request water primarily from within the McAllister Sub-basin. (See recommended action WR-3 and the McAllister Sub-basin Action Plan for additional detail and applicable, acceptable mitigation strategies). The burden of proof that a proposed water right actually draws from the Nisqually Aquifer although it is physically located outside the sub-basin boundary resides with the applicant.

The McAllister Numerical Model (CDM, 2001; CDM, 2002; ongoing) is the most current tool available for evaluating impacts to McAllister Creek resulting from withdrawals from the Nisqually Aquifer. It is recommended that for larger municipal water right

applications, impacts from proposed withdrawals from the Nisqually Aquifer be evaluated using the McAllister Numerical Model (CDM, 2002).

WR-1b ***Yelm Sub-basin – 8 pending applications***

If the City of Yelm can provide data supporting that its water right application(s) for groundwater supply are actually withdrawing water from the Nisqually Aquifer, it is recommended that the City's application(s) be batch processed with the McAllister Sub-basin. If data are not conclusive that the subject applications tap the Nisqually Aquifer, then the applicants in the Yelm Sub-basin (City of Yelm) should complete studies specified in the Yelm Short Term Action Plan, including:

- A study of hydraulic continuity between groundwater at depth and Yelm and Thompson Creeks;
- Determination of the groundwater flow direction and hydraulic continuity in the southwest corner of the City, wherein an application for municipal rights is pending.

After these initial short-term studies have been complete, the data necessary to batch process water rights in the Yelm Sub-basin is considered to be adequate to proceed with processing.

WR-1c ***Mashel Sub-basin – 2 pending applications***

It is the recommendation of this Planning Unit that the Town of Eatonville complete the data collection efforts specified in the short-term action plan for the Mashel/Ohop Sub-basins prior to the processing of water rights in this sub-basin. Studies recommended in the Mashel/Ohop Short Term Action Plan include:

- Study to determine whether adequate groundwater is available in the Mashel or Ohop Sub-basin (currently ongoing)
- Address the current situation wherein Town water has been determined to be groundwater under the influence of surface water (GWUI). Address the impacts of continued groundwater withdrawal and filtration of GWUI to instream flow on the Mashel River.

After these initial short-term assessments have been completed, the data necessary to batch process water rights in the Mashel Sub-basin is considered to be adequate to proceed with processing. However, Ohop Creek is closed to further appropriation, and the Mashel River has instream flows set that are not always met. The applicant will be responsible for showing that the pending water right would not impact flows in either Ohop Creek or the Mashel River, or that proposed actions would mitigate these impacts.

WR-1d ***Toboton/Powell/Lackamas Sub-basins – 4 pending applications***

There are currently two pending surface water and two pending groundwater rights applications in this group of sub-basins. The Planning Unit recommends that Ecology move forward with processing the groundwater applications in these sub-basins as soon as possible. The Planning Unit requests that Ecology use the following information from the Level 1 Watershed Assessment (WPN, 2002) in their evaluation of the water right applications.

The Level 1 referenced the 1998 “Report to the Technical Advisory Committee on the Capture of Surface Water by Wells,” which recommends methods for evaluating the influence of groundwater pumping on streamflow. Using these methods, these three sub-basins are rated as having low potential for streamflow to be affected by groundwater use from a moderately complex aquifer system.

The Level 1 Watershed Assessment also estimates net depletions under the assumption that all groundwater withdrawals are completely connected to the river. In addition, Ecology should consider that the streamflow in this sub-basin reflects minimal use and, therefore is more representative of natural flows in the sub-basin.

The Planning Unit requests Ecology to consider the above referenced information when requesting the applicants to provide additional information on whether stream flows will be impacted by the two proposed groundwater right applications. Ecology should also consider that seasonal closures of Toboton and Lackamas Creeks indicated the possibility of inadequate instream flows during drier months in these drainages.

WR-1e ***Muck/Murray Sub-basin – 30 pending applications***

The groundwater divide between WRIA 11 (Nisqually) and WRIA 12 (Chambers Clover) has not been identified with certainty. Once the location of the divide is confirmed, the Planning Unit recommends that the water right applications be batch processed with the appropriate WRIA (based on groundwater divide). The processing recommendation for those applications that will influence groundwater that flows into WRIA 12 should be made by the WRIA 12 Planning Unit.

Until the time that the location of the divide is determined, the Planning Unit requests that Ecology recognize instream flow issues associated with prairie streams and deny all applications for surface water rights or for groundwater rights that draw water from shallow groundwater in the vicinity of prairie streams. Water right applications in this sub-basin can be processed at this time, however, it is expected that proof that streamflows will not be impacted by the proposed groundwater withdrawals will be provided by the applicant. Both Muck and Murray Creeks are closed to further appropriation and further appropriation of groundwater could impact flows in either of these two creeks. Additional groundwater studies may be necessary to determine impacts on flows.

WR-1f ***Tanwax/Kreger/Ohop Sub-basins – 15 pending applications***

There is no indication of a productive regional aquifer in these sub-basins. Furthermore, closures of Tanwax and Ohop Creeks indicate likelihood of inadequate instream flows during drier months. The Planning Unit requests that Ecology recognize instream flow issues associated with prairie streams in Tanwax and Kreger sub-basins and deny all applications for surface water rights or for groundwater rights that draw water from shallow groundwater in the vicinity of prairie streams. Water right applications in this grouping of sub-basins can be processed at this time, however, it is expected that proof that streamflows will not be impacted by the proposed groundwater withdrawals will be provided by the applicant. Additional groundwater studies may be necessary to determine impacts on flows.

WR-1g *Upper Basin – 0 pending applications*

The Upper Basin is not currently closed to water allocation, and water rights in this sub-basin were batch processed upon completion of the Upper Basin Level 1 Technical Assessment, in 2001, prior to other sub-basins in WRIA 11. The Planning Unit recommends that new applications in the Upper Basin only be considered after batch processing of the rest of the sub-basins occur with the exception of public health emergencies.

Information in the Upper Basin Level 1 Technical Assessment indicates that most of the available groundwater follows the Nisqually River valley and that groundwater supplies are very limited in bedrock areas away from the immediate valley. This fact, and Tacoma Power's large downstream water right for hydroelectric generation, suggests that future substantial water rights may be difficult to obtain in the Upper Basin.

WR-2 The Planning Unit recommends that the Washington State Department of Ecology be staffed at a level that ensures timely response to water right applications and oversight and monitoring of water withdrawals within the watershed.

WR-3 Mitigation Strategies for Water Right Processing

The following mitigation strategies are recommended for water right holders and applicants (towns, cities, counties, purveyors, tribes, private, federal) to improve supply such that it can be extended to meet demand. These mitigations are recommended by the Nisqually Watershed Planning Unit to the Washington State Department of Ecology (Ecology) to be considered as mitigation in Ecology's processing of water right applications. Ecology stated they would consider these strategies during meetings with the Planning Unit in 2002 and 2003. This general list of mitigation strategies is recommended for consideration by any water right holder or applicant within the entire Nisqually Watershed. The list provided below includes general options; some of the sub-basins have identified preferred mitigation strategies, and these are presented in individual Sub-basin Action Plans (Chapters 8-10).

- Direct augmentation of surface water using groundwater;
- Infiltration of reclaimed water near stream headwaters and upstream;
- Aquifer storage and recovery of reclaimed water;*
- Aquifer storage and recovery of surface water;
- Storm water improvements (e.g., increased detention);*
- Infiltration of drinking water treatment backwash water;
- Habitat enhancements – onsite and off site;
- Relinquishment of existing water rights;
- Direct augmentation using reclaimed water;
- Transfer of surface water rights to groundwater;
- Relinquishment of water rights;
- Putting active water rights into trust;
- Sub-basin transfer of water that improves streamflow;

- Credit for consolidation of exempt wells;
- Conservation planning and implementation; and
- Stormwater improvements (e.g. increased detention).

*May conflict with current State statutes.

WR-4 Credit for Reclaimed Water

Pursue with the Ecology and the Legislature the development of either a policy or legislation that would provide additional water rights equal to the amount used for aquifer recharge and/or streamflow augmentation.

or

Pursue with the Department of Ecology and Health the development of a policy that would provide for the recalculation of water use considering the return of reclaimed water from aquifer recharge, wetland enhancement and/or streamflow augmentation. An example of such policy is provided in the Yelm Sub-basin Action Plan (Chapter 9).

WR-5 Recommendation to Ecology to Reconcile Ambiguity in Reclaimed Water Act

The Department of Ecology should assure consistency between water quality and water resources statutes to encourage reclaimed water projects. This effort should include review and amendment of RCW 90.46.130 to remove current conflicts between water quality and water resource values, including the removal of the impairment prohibition, utilization of Ecology's Trust Water Program to purchase assumed impaired rights, or other means.

Furthermore, it is recommended that Ecology develop a streamlined water reuse permitting and water right credit system that will enable water reuse project proponents to receive appropriate water right benefits for their investment in improving water quality and conserving the potable water resource (see WR-4 above).

Review an amendment of RCW 90.44.035 that specifically excludes reclaimed water uses for ASR and another of RCW 90.46.120 that places the authority of ownership in the entity that treats the water, and not the one that stores the water. These amendments will likely occur as part of a feasibility study and pilot project for a specific storage project.

Upon preliminary review of this document, Ecology supports the above recommendations and states, "The concept of gaining "credit" for reclamation projects is not new to Ecology, and we have been working through policy development to provide better guidance on how to integrate the water right process with Chapter 90.46 RCW. Ecology is supportive of creating a mechanism that would allow communities with reclamation projects to gain preferential standing in the allocation of new water rights." Furthermore, "We are aware that in certain circumstances reclaimed water might be useful to mitigate for the impacts associated with a new consumptive withdrawal. Ecology is developing guidelines that address using waters generated through reclamation as mitigation, and also attempting to gain some sort of priority processing for applications that are water-budget neutral. It is unlikely that Ecology is going to pursue a legislative change to Chapter 90.46 RCW that completely omits the requirement for the proponent to conduct an impairment assessment, and if applicable, to provide

compensation for any impairments. Instead, Ecology is working to develop clearer guidelines on how much an assessment should be conducted and how we should define which water users are legally entitled to protection.” (Ecology comment on preliminary Draft Plan, August 14, 2003)

WR-6 Mechanism for WRIA 11 Water Rights Governing Body to Support Water Right Applications

The Planning Unit recommends creation of a mechanism for a WRIA 11 “water rights governing body” charged with providing comment on water right applications for new rights or transfers within the Nisqually Watershed. This governing body would develop a mechanism for review of applications as part of the Implementation Phase of Watershed Planning. Ecology Water Resources is “available to work with the Planning Unit to develop an appropriate mechanism for sharing in the evaluation of pending applications.” Recommendations from the governing body could include requests to expedite particular batches of application, to include or exclude applications that are located in adjacent WRIA’s but connected from a ground water standpoint, or to place an application “on hold” rather than deny if a mitigation plan is being developed (Ecology comment on preliminary Draft Plan, August 14, 2003).

As part of the water right application review process, the Department of Ecology should continue its policy to notify and solicit comment from the Nisqually Indian Tribe, and also solicit comment from the WRIA 11 water rights governing body (as discussed above), on specific water right applications within the watershed at the time the application is processed.

It does not appear that there is a need for a WRIA-wide Conservancy Board at this time. The Implementing Body for this Watershed Plan shall however, give a briefing to the Thurston and Lewis County Conservancy Boards to ensure that consistent decisions are being made, and make themselves available as a technical resource.

WR-7 Address Sub-basin Closures (SEE ISF- 2 and ISF-3)

The Watershed Management Plan recommends a study to better understand basis of closures and current instream flow conditions. This study could determine the level of continuity any one well, proposed well, or aquifer has to associated surface water. Results could provide an understanding of potential mitigation needed to consider the opening of closures, where they appear to be in conflict with known technical information. Other potential effects of these studies are that greater restrictions be set on previously set streamflows, or new closures are enacted. It is also recommended that the Planning Unit or other governing body work closely with WDFW to evaluate existing closures. Beneficial use studies may also be appropriate to evaluate closures.

WR-8 Water Bank

Investigate the potential for purchase, sale or lease of water rights (e.g., water bank).

WR-9 Water Balance

Recommend development of a watershed-wide water balance (refinement of water balance in Level 1 Technical Assessment) to better understand water availability by sub-basin. This study would include an assessment of actual water use versus permitted/certificated use. It will also consider water conservation, reuse, consumptive

and non-consumptive components such that they can be quantified as mitigation (credit) in water right application processing.

The sub-basin action plans in this document are recommending additional work on sub-basin water balances (see Chapters 8-10). This watershed-wide water balance assessment should be performed after these sub-basin specific water balances are complete.

6.0 INSTREAM FLOWS AND SURFACE WATER/GROUNDWATER CONTINUITY ISSUES

6.1 Problem Statement

- Instream flows and sub-basin closures have been established in the Nisqually Watershed and are outlined in Chapter 173-511 of the Washington Administrative Code (WAC) and summarized in Table 3 and Table 4, below. The technical basis for these closures (and calculated net consumptive use) is not apparent from known information. There is a need to further explore the hydrology of all streams, net consumptive uses, and the basis for these closures.
- Flows are insufficient to meet the needs of salmonids in many tributaries to the Nisqually River at certain times of the year. Some prairie streams may be, by nature, intermittently dry. There is a need to determine if they are historically dry, to better understand their hydrology, and also to develop strategies to augment flow.
- There is not a clear understanding of the hydraulic continuity between groundwater and surface water in the areas of intermittent flows. This lack of understanding makes it difficult to address effective strategies to supplement streamflow and determine the impacts of pending groundwater right application on net consumptive use and streamflow.

6.2 Background

6.2.1 Instream Flow in the Nisqually Watershed

The Level 1 Technical Assessment (WPN, 2002) includes additional information about instream flow in the Nisqually Watershed. The Executive Summary of the Level 1 is included as Appendix A to this document. The entire Level 1 for the lower basin is available on the internet at: <http://www.ecy.wa.gov/programs/eap/wrias/assessments/wria11/index.html>

Figure 10 illustrates instream flow control points and reaches to which to which they apply. Figure 11 illustrates streamflow gauges in the Nisqually Watershed.

6.2.2 Administrative Status of Instream Flows

Administrative rules regarding instream flows in the Nisqually Watershed have been established by the Washington State Department of Ecology in accordance with Chapter 173-500 of the Washington Administrative Code. Under this Water Resources Management Program, Ecology is authorized to "...establish flows on perennial streams of the State in amounts necessary to provide for preservation of wildlife, fish, scenic, aesthetic, and other environmental values..." and "...set forth streams closed to further appropriation". Regulations on streams commonly take the form of minimum instream flows and/or closures to further consumptive use, or both. These regulations have an associated priority date and are a form of a water right established by the State. Water rights with a priority date older than the instream flow regulation are not governed by the instream flow regulation. These water rights are called "senior" to the instream flow regulation. Senior water rights may not be affected by existing or new instream flow regulations.

Where minimum instream flows are established, exercise of water rights that are issued subsequent to establishment of the regulation may be curtailed if actual instream flows drop below those defined by regulation. These "junior" water rights are therefore "interruptible."

Streams may also be closed to further appropriation (i.e., no water rights will be issued) for “consumptive uses.” Although closures directly address surface water, the regulations usually also apply to groundwater to the degree that groundwater use will impact surface water (Ch. 173-500 WAC). The relationship between surface water and groundwater is called hydraulic continuity. Recent court decisions have interpreted the significance of hydraulic continuity in the processing of water right applications to a very strict standard (Hubbard v. Ecology, 1997).

6.2.3 Nisqually Watershed Instream Resource Protection Program (IRPP)

Minimum instream flow regulations have been established in WRIA 11 by Ecology under the Instream Resource Protection Program (IRPP) and are described in Chapter 173-511 of the Washington Administrative Code. Instream Flows and closures in the Nisqually Watershed have a priority date of February 1981, when they were adopted as administrative rule. WAC 173-511 was then revised in 1988. The full text of the administrative code is available on the Washington State Department of Ecology web site at <http://www.ecy.wa.gov>.

Flow regulations in WRIA 11 consist of minimum instream flow levels and sub-basin closures to further consumptive use. In WAC 173-511, instream flow levels were set at three locations on the Nisqually River, the bypass reach, and at the USGS gauge on the Mashel River (Figure 11). Additional minimum instream flow requirements are in place for the bypass reach and the reach below LaGrande Dam, as set by the Federal Energy Regulatory Commission (FERC) as an operational requirement for the dam. Flows are specified every 15 days, year-round at the instream flow control points on these rivers.

In addition to these minimum flows, 20 tributaries and lakes and 2 segments of the Nisqually mainstem have been closed, at least seasonally, to further allocation. The closures are listed in Tables 3 and 4 below. Table 3 lists new stream closures (Ecology, 1981) and the period of those closures. Table 4 lists previous closures to additional appropriation dating back to 1944. These closures also have a priority date of 1981, when they were adopted as administrative rule. The older closures do not have a period of closure designation, and it is assumed that the closure is applied year round.

Under WAC 173-511, consumptive appropriations of surface water, and groundwater in hydraulic continuity with surface water, are closed in the sub-basins listed in Tables 3 and 4. These sub-basins were closed by Ecology based on information that indicated there was no water available for further appropriation. All water uses developed since the enactment of WAC 173-511 have been reviewed by Ecology on a case by case basis and must be proven to not be in hydraulic continuity with surface waters of the watershed. Under WAC 173-511-050, future groundwater withdrawal proposals will not be affected unless it is verified that such withdrawal would clearly have an adverse impact on the surface water system contrary to the intent and objectives of this chapter.

The Supreme Court recently clarified that ground water withdrawal in continuity with surface waters are subject to instream flow rules, regardless of the IRPP text on the topic. What this means is that Ecology assumes continuity to surface water unless the water-right applicant proves otherwise.

TABLE 3

Closures pursuant to WAC 173-511-040, Effective February 1981

Stream or Lake. Section, Township, and Range of Mouth or Outlet	Tributary to	Period of Closure
Mashel River. NE1/4SW1/4 Sec. 29, T16N, R4E and all tributaries	Nisqually River	June 1 - Oct. 31
Red Salmon Creek (Mounts Creek) NE1/4NW1/4 Sec. 33, T19N, R1E and all tributaries	Nisqually River	April 1 - Oct. 31
Clear Creek NE1/4SE1/4 Sec. 21, T18N, R1E and all tributaries	Nisqually River	April 1 - Oct. 31
Tanwax Creek NW1/4NE1/4 Sec.20, T16N, R3E and all tributaries	Nisqually River	April 1 - Oct. 31
McAllister Creek (except Medicine Creek) NW1/4N1/4 Sec. 6, T18N, R1E and all tributaries	Puget Sound	all year
Lake Saint Clair. SE1/4NW1/4 Sec. 6, T17N, R1E		all year
Toboton Creek (above Hopson Road) SW1/4SW1/4 Sec. 19, T16N, R3E and all tributaries	Nisqually River	April 1 - Nov. 30
Lackamas Creek. SE1/4SE1/4 Sec. 13, T16N, R2E and all tributaries	Nisqually River	April 1 - Nov. 30
Murray Creek NW1/4NW1/4 Sec. 16, T17N, R2E	Nisqually River	April 1 - Nov. 30
Bypass Reach, Nisqually River. NE1/4SE1/4 Sec. 11, T17N, R1E	Puget Sound	June 1 - Oct. 31
Mid Reach, Nisqually River. SE1/4NW1/4 Sec. 1, T16N, R2E	Puget Sound	June 1 - Oct. 31

Table 4 below lists stream and lake low flows and closures adopted in 1981 under WAC 173-511, that were previously established administratively under the authority of chapter 90.03 RCW and RCW 75.20.050.

TABLE 4

Closures pursuant to RCW 75.20.050

Stream or Lake Section, Township, and Range of Mouth or Outlet	Tributary to	Action	Date of Closure
Eaton Creek. SE1/4NW1/4 Sec. 6, T17N, R1E	Lake St. Clair	Closure	12/1/53
Harts Lake and outlet streams SW1/4SE1/4 Sec. 1, T16N, R2E	Nisqually River	Low Flow (0.5 cfs bypass)	10/7/44
Horn Creek. SW1/4NE1/4 Sec. 1, T16N, R2E	Nisqually River	Closure	7/22/74
Muck Creek and all tributaries SW1/4SW1/4 Sec. 36, T18N, R1E	Nisqually River	Closure	5/26/48
Ohop Creek and all tributaries SW1/4NE1/4 Sec. 25, T16N, R3E	Nisqually River	Closure	2/15/52
Ohop Lake. NE1/4SE1/4 Sec. 10, T16N, R1E	Ohop Creek	Lake Level (523 ft)	3/25/66
Thompson Creek and all tributaries SE1/4NE1/4 Sec. 11, T17N, R1E	Nisqually River	Low Flow (1.0 cfs bypass)	11/19/51
Unnamed Stream and all tributaries SW1/4NW1/4 Sec. 11, T15N, R4E	Alder Lake (Nisqually River)	Closure	4/28/64
Unnamed Stream and all tributaries SW1/4SE1/4 Sec. 17, T17N, R2E	Centralia Canal (Nisqually River)	Low Flow (0.75 cfs bypass)	11/19/51
Unnamed Stream and all tributaries SE1/4SE1/4 Sec. 27, T17N, R2E	Nisqually River	Low Flow (0.50 cfs bypass)	12/6/50
Yelm Creek and all tributaries SW1/4SW1/4 Sec. 12, T.17N, R1E	Nisqually River	Closure	8/7/51

6.2.4 Technical Basis for Existing Instream Flow Levels and Sub-basin Closures

The Level 1 Technical Assessment states that, “the instream flows specified in the permit to operate the dam are based on intensive studies and are believed to be a good estimate of fish habitat needs. The other instream flows and closures (listed in the WAC 173-511) are based on poorer information. Review of these closures and instream flows may be in order” (WPN, 2002).

The Nisqually River Watershed Instream Resource Protection Program (IRPP) Report (Ecology, 1981) was completed prior to adoption of closures and instream flows. IRPP reports generally summarize water resources in the Watershed and broadly describe methods used in determining the recommended instream flows. Golder Associates attempted to obtain more detailed documentation regarding data and methods used in developing recommendations for instream flows described in the IRPP and adopted in the WAC through contact with the Washington Department of Fish and Wildlife, the Nisqually Tribe and the Washington Department of Ecology, but no previous studies were available. Typically, Ecology’s primary management objective in setting flows and closing sub-basins under the Instream Resource Protection Program was to help guide future water allocation decision making.

A general description of the method used statewide to determine instream flows and closures, as described in the IRPP is summarized below:

Planning teams consisting of, at least, local, state, federal and tribal members were created to determine “flows required to maintain, preserve, and protect existing fish populations and other aquatic organisms, wildlife, water quality, scenic and aesthetic values, and recreational activities to the extent possible commensurate with the human needs for water.” The first step involved undertaking a comprehensive stream system analysis using, where possible, existing gauge data. Next, the planning team classified each stream reach and/or major tributary as to its importance to the instream resource. Team members rated each stream on a scale of one to four for specific instream attributes that would be considered along with other factors in establishing minimum flows and/or stream closures. Technical water resources information was then developed including the creation of discharge-duration hydrographs (exceedance hydrographs).

Team members considered additional data on:

- Available fish habitat for spawning and rearing at various instream flow levels
- Socioeconomic aspects of flow levels, and,
- Municipal, irrigation, and other out-of-stream uses.

With this information, planning team members made minimum flow level and stream closure recommendations to the Department of Ecology. These recommendations were then reviewed by Ecology and presented to the public and the State Ecological Commission for review and comment. After a comment period, public hearing, and Ecology response period proposed rules are considered for adoption by Ecology as is, with changes or with recommendations for further study. However, documentation of these analyses is not available for the Mashel River.

6.2.5 Current and Future Instream Flow Assessments

The Nisqually Watershed Planning Unit has opted to apply supplemental funds available under the Watershed Planning Act (Chapter 90.82 RCW) to address and potentially reassess instream flows in the Mashel Sub-basin. The decision to focus solely on the Mashel River, rather than applying the assessment to other portions of the sub-basin for the following reasons:

- Ecology has not clarified, beyond a doubt, whether opting for supplemental funding will require reassessment of sub-basin closures and subsequent rule change. Some members of the Planning Unit are not comfortable initiating a process that could lead to a potential instream flow rule change that would be less protective than the current “closed” status of other sub-basins.
- The Mashel River is the only tributary in the Nisqually Watershed with instream flows set by rule.

The Planning Unit has discussed instream flow assessments of other sub-basins using possible SRFB funding that clearly does not require the re-opening of the stream closing rule if funding is accepted. The Planning Unit is currently awaiting notification of funding under this grant. The Planning Unit will determine additional sub-basins for instream flow assessment under this grant if, and when, funding becomes available.

6.2.6 Process for Establishing New Minimum Instream Flows (per RCW 90.82)

In undertaking an instream flow assessment, the Planning Unit, as a whole, may consider that modification of existing minimum instream flows for specific streams may include the following options:

- Recommending lower minimum instream flows,
- Recommending higher minimum instream flows,
- Closing streams to further consumptive uses,
- Affirmation of existing instream flows (no change), or
- Establishment of minimum instream flows for streams for which they are not currently defined.

Alternatives to establishing minimum instream flows may be considered. The description of the regulatory process presented here should not be interpreted to constrain approaches that the WRIA 11 Planning Unit may consider. Creative approaches should be sought and may include flexible minimum instream flow numbers, mitigation frameworks for offsetting negative impacts, and other options.

Recommending modifications to existing minimum instream flows requires a unanimous vote of the Planning Unit. Establishing a minimum instream flow on a stream currently without any regulations requires unanimous approval of tribes and local governments present for a recorded vote, and majority approval of non-governmental members of the Planning Unit present for a recorded vote.

Ecology will undertake rule making upon receipt of a request from the Planning Unit to change existing regulations. The priority date of new regulations will be two years after funding is received from Ecology (i.e., the priority date of new regulations will be the Summer of 2004). The priority date of any pre-existing portion of a new rule will remain in effect. Ecology must consult with affected tribes before proceeding with any instream flow regulations.

6.2.7 Hydraulic Continuity

See Section 4, Groundwater Resources and Supply, for a background description of hydraulic continuity (interaction between surface water and groundwater) in the Nisqually Watershed.

Obtaining an improved understanding of the hydraulic continuity in the Watershed can help determine how future demands can best be met to minimize impacts on streamflows; and, provide guidance in the development of water resource and water allocation policy addressing continuity.

6.2.8 Data Gaps Identified in the Phase II, Level 1 Technical Watershed Assessment

The Level 1 Technical Assessment (WPN, 2002) provides top priority data collection recommendations addressing instream flows as follows:

Top Priority Recommendation from Level 1 Technical Assessment (WPN, 2002, p. 7-7): Instream Flows

The instream flows set on the mainstem Nisqually were based on robust data and no further review of those flows is recommended. However, instream flows and seasonal or year round closures in the sub-basins are based on minimal or unknown data. A closer review of the methods used to develop these instream flows is recommended. Instream flow studies may be merited in some sub-basins with

an abundance of fish habitat or significant future water demand (Mashel, Muck, Lower Ohop, and Tanwax).

McAllister Creek is also closed to further withdrawals. No instream flow study has been conducted in this stream. Given the high demand for water in the sub-basin, an assessment of the relationship between flow and habitat conditions is recommended. The creek is influenced by tides over its entire length and a saltwater wedge extends most the way up the creek. Therefore, an alternative method to complete an analysis of the effects of streamflow on beneficial uses is recommended.

The Level 1 Technical Assessment (WPN, 2002) further identifies the following specific data collection activities to address instream flows in tributaries in the watershed:

Data Gap and Recommendation from Level 1 (WPN, 2002, p. 7-1): Estimation of Natural Streamflows

Streamflow measurements in the watershed reflect current use and not natural streamflow. To better understand the impact of water right allocations, new streamflow measurements combined with current use estimates should be used to estimate naturalized flow. A comparison of estimated natural flow and water allocation could then be performed.

Data Gap and Recommendation from Level 1 (WPN, 2002, p. 7-4) - Stream gauging

Relatively long term stream gauging records exist for the Mashel and Ohop tributaries, and for most of the mainstem Nisqually River. However, the extrapolation of the short-term record from Muck Creek to the remaining tributary sub-basins caused significant uncertainty in the analysis of water quantity and flow elements in the Level 1 Technical Assessment. Estimates of water availability in the tributaries were further complicated by the differing flow patterns that occur in prairie streams (which typically discharge to aquifers) versus at the mouths of most tributaries where groundwater typically recharges the stream. The uncertainty is greatest for streams in the lower watershed. Estimates of water availability by sub-basin could be significantly improved if additional stream gauging data, where available with a longer period of record.

The following is a prioritized list of recommendations from the Level 1 Technical Assessment for maintenance/development of the stream gauge system in the lower Nisqually. However, as part of this recommended study to better understand the hydrology of the lower basin, further data evaluation should occur to optimize the design of a stream gauging monitoring network, prior to data collection:

- Maintain all currently active stream gauges in the Lower Nisqually Watershed
- Continue collecting streamflow data at the Ecology gauge at RM 4.6 of the Nisqually River

Yelm Creek

The Yelm Creek sub-basin has undergone significant development in the past decade, and will likely see more in the future. The lower one-mile of Yelm Creek is an important reach used by anadromous fish. No long-term streamflow records are available for this sub-basin. Significant errors in estimated water availability likely exist due to extrapolation of the short-term record from Muck Creek to the Yelm Creek sub-basin (i.e., the approach used in the Level I analysis). The presence of Crystal Springs at approximately RM 1.3 result in significantly different flow patterns at the mouth versus upstream. At least one permanent stream gauge should be located on Yelm Creek (upstream of Crystal Springs), with an additional permanent or temporary gauge (the intent of “temporary” gauges is explained below) located near the mouth.

Muck Creek

The Muck Creek portion of the Muck/Murray sub-basin has also undergone significant development in the past decade, and will likely see more in the future. Muck Creek is also an important tributary used by anadromous fish. The USGS gauge located at approximately RM 6 has been discontinued, however, the existing record provides a good characterization of the “prairie” portion of the sub-basin. The presence of significant spring flow downstream of the gauge location (e.g., Exeter Springs, RM 2.3) results in significantly different flow patterns at the mouth versus upstream. Pierce County has and monitors two gauges on Muck Creek. One is located at the site of the USGS gauge, on the bridge. The other is on the North Fork, just inside Fort Lewis.

Powell, Murray, Toboton, Tanwax, and Horn Creeks

All of these tributaries are important anadromous fish streams, however, development pressure has been lower, and will likely be lower in the future, than in the Yelm and Muck Creek sub-basins. The USGS maintained a stream gauge near the mouth of Tanwax Creek for a five year period, but this gauge is now discontinued. The recommended approach would be to reestablish a permanent gauge on Tanwax Creek, and establish temporary gauges at the mouths of the remaining creeks. Additionally, Powell, Murray, and Toboton Creeks experience significant spring flow near their mouths, so temporary gauges could also be located upstream of the spring flow reaches.

Permanent Gauges

It is recommended that permanent gauges be established and maintained by the USGS and their Cooperative Program.

Temporary Gauges

Temporary gauges are defined here as gauges that are intended to be maintained for relatively short time periods at a given location, and then moved to another site. The intent of these gauges is to collect enough data to develop correlations with nearby permanent gauges. For example, if a permanent gauge were established in Yelm Creek upstream on the “prairie”, a temporary gauge at the mouth would provide short-term data to characterize flow inputs from springs. Once these correlations are developed the records from the permanent stations could be used to develop more accurate synthetic hydrographs for the temporary locations. Establishment and maintenance of the temporary gauges would be most cost-effective if performed by a local entity.

6.3 Recommended Actions

6.3.1 Policy/Process

ISF -1 Policy Statement:

Support protection of resources by maintaining closures unless new technical information suggests otherwise, or a change in closure status would result in improved flow or habitat conditions in the closed stream or closed streams in other sub-basins.

If a change in closure status in a specific sub-basin would result in a reduced impact on flows in that sub-basin or other sub-basins within WRIA 11, then it should be considered. Similarly, the potential for re-opening a closure to set a target flow or to improve fish habitat conditions may occur. It should also be possible to re-open a closure if the proposed mitigation implementation approaches (such as stream restoration, conservation package, or streamflow augmentation) result in improved overall functionality of the sub-basin or meet the “no consumptive appropriation” test of the WAC, which provides the necessary parameters to protect surface water resources.

6.3.2 Projects

ISF-2 Gain a better understanding of the technical basis for stream closures watershed-wide (Closures listed in Tables 3 and 4). The basis of closures could be studied as part of instream flow study. This project is supported by top priority recommendations from the Level 1 Technical Assessment as described above in Section 6.2.8. The recommendation highlights McAllister Creek, Mashel River, Muck Creek, Lower Ohop Creek, and Tanwax Creek for study.

A scope of work for an instream flow study of the Mashel River has been prepared as part of the Step A Instream Flow Report, conducted under a supplemental grant for Watershed Planning.

ISF-3 Identify flow compromised streams based on intermittent nature and beneficial use(s). Design and install a network of stream gauging stations to monitor these streams and develop an understanding of the hydrology, including current and historical (or naturalized) conditions via data collection, analysis and modeling. This project is supported for each of the streams of interest by top priority recommendations from the Level 1 Technical Assessment as described in Section 6.2.8. The recommendation in the Level 1 includes installation of gauging stations on:

ISF3a: Yelm Creek

ISF3b: Muck Creek

ISF3c: Powell, Murray, Toboton, Tanwax, and Horn Creeks

ISF-4 Research the groundwater/surface water continuity issues that are relevant to water rights processing in Yelm and Eatonville

Hydraulic Continuity in and around Eatonville is being proposed in the Scope of Work in the current Instream Flow Step A Assessment. In addition, refer to the Yelm and Mashel/Ohop Sub-basin Action Plans (Sections 8 and 9).

ISF-5 Identify or study methods of surface water augmentation.

Methods of surface water augmentation could include reuse, artificial recharge, and/or storage-related projects. This Plan recommends development of strategies to improve and/or augment instream flows in intermittent streams. This could include identification of storage options to augment flows when they are critically low or intermittent. Recommendations for pilot projects should be made as part of this study.

An overview of potential storage options in the Nisqually Watershed was completed as part of the Scope of Work being developed in the Supplemental Storage Assessment Step A Report. The Step A Storage Report is included as Appendix E in this Plan. The information in the Step A report information could drive decisions and further planning recommendations. Potential methods to augment streamflow are also addressed in individual Sub-basin Action Plans for the Yelm, McAllister and Mashel Sub-basins.

7.0 WATER QUALITY

7.1 Problem Statement

- Numerous water quality monitoring programs are ongoing in the watershed. There is no current mechanism for providing consistency between every program's protocols, list of parameters measured or analyzed, analytical requirements, quality control/quality assurance, and reporting methods; nor is there a central data storage location or mechanism for facilitating the comparison of data across programs.
- There is no current mechanism for providing inter-agency and inter-jurisdictional consistency in the handling of potential water quality pollutants within the Nisqually Watershed.
- Land uses and handling of potential pollutants that may threaten water quality and/or public health need to be addressed on an inter-jurisdictional, watershed-wide basis.

7.2 Background

The Water Quality Monitoring Plan and Water Quality Data Management Plan for the Nisqually watershed, created as a supplemental technical assessment in Phase III of WRIA 11 Watershed Planning is included as Appendix C to this document. The Water Quality Monitoring Plan contains detailed information about monitoring efforts currently underway in the watershed, as well as recommendations of monitoring and data management priorities within watershed. The Data Management Plan details the Nisqually Water Quality Data System, a web-based data system with a spatial component for storing, viewing, and manipulating water quality data in WRIA 11, and explains data collection and reporting procedures for the Nisqually Water Quality Data System.

Overall, water quality in the Nisqually watershed is good. Where water is degraded, the Coordinated Tribal Water Quality Program information (http://www.nwifc.org/ctnrm/2001_water.htm) cites sources of water quality pollution as:

- Urbanization;
- Agricultural practices;
- Logging and other silvicultural activities;
- Failing septic systems;
- Stormwater runoff and sewer overflows;
- Municipal and industrial discharge;
- Industrial point source pollution;
- Municipal and industrial water diversions; and
- Mining.

Landfills have also been recognized by the Planning Unit for their potential to impact water quality in the watershed. In particular, the LRI Landfill in Pierce County was identified by the Planning Unit as being an issue to some residents. Ongoing water quality monitoring for both surface and groundwater has occurred at the landfill since it opened in December 1999. To date, monitored parameters have not been of levels that would warn of potential threats to ground or surface water quality. However, the landfill is slated to expand from its current 27 acres to 168 acres. As such, the Planning Unit cited

the need to develop policies to address the landfill in the implementation phase of the Watershed Planning process.

7.2.1 Groundwater Quality

The Level 1 Technical Assessment cites isolated areas of concern for groundwater quality due to nitrate hotspots. Most of the water quality problems in the Nisqually watershed are attributed to natural conditions, and are generally related to iron and manganese. A 1998 USGS study concluded contamination of groundwater in Thurston County by commercial and industrial activities to be minimal (WPN, 2002). More recent groundwater quality data for Thurston County can be obtained from the County, and is available through the Nisqually Water Quality Data System.

In terms of meeting drinking water standards, groundwater quality appears to be good. Nitrate is the most widespread pollutant in shallow wells, and although it is not a problem throughout the entire watershed, there are localized areas that exhibit elevated nitrate levels. Drost et al. (1998) noted that elevated nitrate levels generally are located in the shallowest aquifers. Thurston County has mapped locations of elevated nitrate in groundwater, which are illustrated in Figure 8. There are no known sub-basin level groundwater quality problems.

Figure 8 also illustrates other areas of groundwater concern and vulnerability in the watershed. Critical Aquifer Recharge Areas are shown for Pierce and Thurston Counties. Wellhead Protection Areas are illustrated in grey hatches. These areas should be regarded as sensitive to groundwater contaminants. Known potential groundwater quality threats provided by Pierce and Thurston Counties are also illustrated on the map, including landfills, pollutants, and pesticides.

The Town of Eatonville receives its drinking water from three wells near the Mashel River. The Department of Health has determined two of these wells to be groundwater under the influence of surface water. This creates concern for public health, and the Town is being required to either find an alternate source of water, or install a filtration plant to filter the water that is under the influence of surface water. The Town is investigating options for obtaining another groundwater source within the Watershed.

The City of Olympia receives its water from McAllister Springs. Forecasted increases in withdrawal from the Springs are anticipated to have a backwater effect and cause surface water to be withdrawn as well. Filtration would be necessary to support increased use of McAllister Springs. As such, the City of Olympia has initiated the development of a replacement groundwater source for McAllister Springs, referred to as the McAllister wellfield.

7.2.2 Surface Water Quality

The EPA is required by section 303(d) of the Clean Water Act to create and maintain a list of "impaired" waterbodies in the US. This listing occurs because of violation of State water quality standards after implementation of technology-based controls as described by WAC 173-201A. Ten water bodies in the Nisqually watershed have been placed on the congressionally mandated 303(d) list for impairment (Figure 12). Causes of impairment for stream reaches in the watershed include fecal coliform, temperature, dissolved oxygen, and instream flow. Two of the listed water bodies are lakes, which are listed for total phosphorus. This information is important because it gives an indication of stream health problems throughout the watershed.

When a waterbody is placed on the 303(d) list, the establishment of Total Maximum Daily Loads (TMDLs) for pollutants in the waterbody is required. To achieve this, the Nisqually and Henderson Quality Assurance Project Plan (Sargeant, Roberts, and Carey, 2003) is currently being implemented

by Ecology with assistance from Thurston County. It is being conducted on the Nisqually Reach, Nisqually River, McAllister Creek, and Ohop Creek, as well as others in the Deschutes watershed. Each of these streams is listed on the 1998 303(d) list for fecal coliform bacteria; McAllister Creek is listed for dissolved oxygen as well. The Quality Assurance Project Plan describes a technical study that will monitor all levels of 303(d) listed contaminants in these waterbodies to form a basis for proposed TMDL levels.

Other problem sites were noted in the Level 1 where temperature and dissolved oxygen levels are of concern for fish. These are Powell, Upper Murray, and Ohop Creeks. In each of these cases, water quality is likely a reflection of the presence of lakes or wetlands above the sampling stations, and may or may not be a natural situation.

Whiley and Walter (2000) cited five main recommendations for water quality monitoring in the Nisqually Watershed:

- Routine monitoring including expanded sampling in the Upper Basin and an emphasis on storm water sampling;
- Temperature studies including temperature data loggers at expanded locations and a study of reasons for increased temperatures in the Mashel River and Murray Creek;
- Nutrient studies to assess potential relationships between concentrations and land use activities. This study should also assess biological effects on nutrient loading on the estuary;
- Construction of a model of Alder Reservoir to examine the influence of the reservoir on the lower river water quality;
- Expanded monitoring on all lakes to assess nutrient loading and temperature, with a special emphasis on Harts Lake because of its listing on the 303(d) list and its potential as salmonids habitat.

Water quality concerns, and further detail about water quality monitoring in the Nisqually watersheds, can be found in the Nisqually Water Quality Monitoring Plan and Nisqually Water Quality Data Management Plan, included as an appendix to this document.

7.2.3 Current Water Quality Plans and Programs

Groundwater

Groundwater quality data for Group A and B wells was obtained from DOH. These wells are illustrated in Figure 13. In order to meet State standards for drinking water, wells are sampled for a large variety of parameters including nutrients, iron, manganese, fecal coliform, fecal streptococci, chloride, physical characteristics and other parameters. Groundwater monitoring is also conducted by the Department of Ecology through both their groundwater quality program and numerous shorter-term studies. The Cities of Yelm, Olympia, and Lacey each also conduct groundwater sampling to monitor physical parameters and/or groundwater levels. These monitoring locations are not included in Figure 13 because data were not available with georeference information, but they could be added to the figure in the future.

Groundwater quality monitoring programs in the watershed include:

- **Washington Department of Health, Public Water Supply Water Quality Monitoring**
Parameters: antimony, arsenic, barium, beryllium, cadmium, chloride, chromium, color, conductivity, copper, cyanide, fluoride, hardness, iron, lead, manganese, mercury, nickel, nitrate-N, nitrite-N, total nitrogen, selenium, silver, sodium, sulfate, thallium, turbidity, zinc
- **USGS, Groundwater Quality Monitoring Program**
Parameters: nitrate, chloride
- **WSDOH, Luhr Beach Nature Center Septic System (inactive)**
Parameters: fecal coliform
- **Ecology, Groundwater Quality Program**
Parameters: nitrate, chloride
- **City of Olympia, Hydrologic Monitoring, Groundwater Levels**
Parameters: stream habitat, riparian characteristics, groundwater level.
- **Pacific Groundwater Group, McAllister Creek Seepage Inflow Study**
Parameters: groundwater inflow
- **Ecology, Henderson and Nisqually TMDL Study**
Parameters: ammonia-N, dissolved oxygen, nitrate+nitrite, total persulfate N, total phosphate, soluble reactive phosphate
- **Yelm, Quality Assurance Project, City of Yelm Groundwater Monitoring**
Parameters: fecal coliform, toxics, nutrients, ammonia, nitrate, chloride, metals, iron, manganese, inorganic compounds.
- **LRI Landfill Monitoring**
Parameters: alkalinity, ammonia as nitrogen, chloride, total dissolved solids, sulfate, calcium, iron, magnesium, manganese, potassium, sodium. Also, landfill leak detection and collection system.

Surface Water

Information on surface water quality monitoring programs in the watershed was collected. Where spatial information was available, locations of monitoring sites were input to a GIS system and are illustrated in Figure 14. Surface water quality in urban or urbanizing areas is affected by stormwater runoff. In the Nisqually Watershed, this is particularly important because of the important habitat and shellfish resources in the area. The Nisqually Watershed Plan defers to the Puget Sound Water Quality Management Plan to manage stormwater runoff and pollutants in the watershed.

Surface water quality monitoring programs in the watershed include:

- **Ecology, River and Stream Water Quality Monitoring Program.**
Parameters: fecal coliform, pH, dissolved oxygen, nutrients, turbidity/TSS, color, nitrate, water temperature, streamflow
-Active: Nisqually River at Nisqually
-Inactive: Nisqually River at McKenna, Nisqually River above Powell Cr., Nisqually River at LaGrande, Nisqually River at Elbe
*Ecology took over water quality monitoring on the Nisqually River from the USGS in 1980

- **Ecology, Henderson and Nisqually TMDL Study**
Parameters: fecal coliform, e.coli, pH, conductivity, temperature (at surface and at depth), flow (McAllister at Steilacoom) dissolved oxygen, nutrients, turbidity, total phosphorus, ammonia, nitrate + nitrite, temperature, flow, salinity, time of travel, flow paths.
- **Ecology, McAllister Creek Monitoring (inactive)**
Parameter: fecal coliform
- **Thurston County, Environmental Health Ambient Monitoring Data.**
Parameters: fecal coliform, salinity/conductivity, dissolved oxygen
- **USGS, Water Quality Monitoring, four sites (inactive)**
Parameters: total coliform, pH, specific conductivity, dissolved oxygen, nutrients, color, nitrate, chloride, inorganics, temperature, discharge.
- **USGS, National Streamflow Information Program**
Parameters: streamflow
-Active: Nisqually River near National, Mineral Creek near Mineral, Nisqually River at LaGrande, Centralia Power canal near McKenna, Nisqually at McKenna, Ohop Creek near Eatonville, Mashel River at LaGrande.
-Inactive: Eaton Creek near Yelm, McAllister Springs near Olympia, Nisqually River near Ashford, East Creek near Elbe, Nisqually River near Alder, Little Nisqually River near Alder, Alder Reservoir at Alder WA, Tacoma Power Conduit near LaGrande, Lynch Creek near Eatonville, Nisqually River near McKenna, LaGrande Reservoir at LaGrande WA, Tanwax Creek near McKenna, Yelm Creek near Yelm, Muck Creek near Loveland, Muck Creek at Roy.
- **Pierce County, Muck Creek Monitoring**
Parameters: streamflow
- **Thurston County, Centennial grant project for pollution source ID in McAllister Creek**
Parameters: fecal coliform
- **Nisqually Tribe, Nisqually Indian Tribe Analysis of Fecal Coliform Concentrations in the Nisqually River Drainage. (inactive)**
Parameters: fecal coliform
- **Nisqually Tribe, Nisqually Indian Tribe Identification of Pollution Sources Impacting Salmon Habitat in the Mashel River and Ohop Creek Drainages. (inactive)**
Parameters: fecal coliform, pH, dissolved oxygen, turbidity/tss, phosphorus, ammonia, nitrate, water temperature, streamflow
- **LRI Landfill Monitoring. (3 sites)**
Parameters: total suspended solids, turbidity, pH, specific conductivity, temperature, dissolved oxygen, chloride, nitrate, ammonia, total organic carbon, fecal coliform, common compounds, volatile organic compounds.

7.3 Recommended Actions

WQ-1 Implementation of a watershed-wide Water Quality Monitoring Plan.

A watershed-wide Water Quality Monitoring Plan was created in conjunction with this Watershed Plan, and is included as Appendix C to this document. The Water Quality Monitoring Plan is intended to enable long-term water quality monitoring in WRIA 11, and be used for agency and public data access. The purpose of the monitoring plan is to provide the basis for a coordinated data collection effort throughout WRIA 11. As applicable, the plan will assist planning efforts by providing a framework to determine whether data of the appropriate quantity and quality are collected, optimize the sample locations, improve consistency in the data collected, improve coordination of sampling efforts, and be cost-effective for future studies. The Planning Unit recommends implementation of actions recommended in the Water Quality Plan.

Surface water and groundwater data collections have been and are currently conducted throughout WRIA 11 for a variety of purposes by a number of organizations. Data have been collected by tribes, counties, municipalities, counties, State and federal agencies, public water systems, and non-profit organizations. The Water Quality Monitoring Plan makes recommendations on monitoring parameters, locations, standards, and means of comparison between waterbodies.

WQ-2 Maintenance of and use of the Nisqually Water Quality Data System.

The Water Quality Monitoring Plan also recommends creation of the Nisqually Water Quality Data System, a dynamic GIS/Access water quality database in which water quality data from throughout the watershed can be stored, compared, and accessed through a spatial GIS interface. Funding for the creation of this database was provided as a supplemental grant to the Watershed Planning process. The database will be created in October 2003. It will provide those interested in water quality in WRIA 11 with a comprehensive source of data and information. This database will improve efficiency and collaboration between data collectors in the watershed.

It is the recommendation of this watershed plan that the Water Quality Data System be maintained, and that data collectors in the watershed work together to provide data for the database in a useful and consistent format, as described in the Water Quality Data Management Plan, included as Appendix C. Maintenance of the Nisqually Water Quality Data System requires the appointment of a responsible agency (the Nisqually Tribe) for upkeep, maintenance, and monitoring of the database. It is the recommendation of this Plan that the Tribe designate an employee for this responsibility.

WQ-3 Convene a workgroup to address potential inconsistencies in handling of pollutants between federal and State agencies and utilities.

The Planning Unit recommends a thorough review of procedures on the handling of potential water pollutants by local, federal, and state agencies, and utilities including towns, counties, the Tribe, WA Department of Transportation, Tacoma Power, Fort Lewis, and others. This review would include assessing potential inconsistencies in procedures regarding the spraying of pesticides, toxics handling, and other relevant activities. The Planning Unit also recommends that a workgroup be convened to achieve inter-jurisdictional consistency in the handling of potential water quality pollutants throughout the watershed.

WQ-4 Address land uses that may threaten watershed health through an open forum with agencies and the public.

The Planning Unit recognizes that local residents are concerned about landfills and other potentially hazardous land uses in the watershed that have the potential to impact water quality. The Planning Unit also recognizes that landfills are permitted land uses that have gone through and adhered to State permitting, operating, and monitoring guidelines. More information is needed in order to address water quality policies in regard to landfills; the Planning Unit will gather this information during the implementation phase of this Watershed Plan.

WQ-5 Ensure adequate water quality monitoring of groundwater in designated critical aquifer recharge areas.

Critical aquifer recharge areas and their designation under Critical Areas Ordinances are discussed in Section 4, Groundwater Resources, and are illustrated in Figure 8. As part of the Nisqually Watershed Water Quality Monitoring Plan, the adequate monitoring of groundwater in these areas should be addressed. This will require coordination with Fort Lewis, as Fort Lewis grounds overlay a critical aquifer recharge area for the regional Nisqually Aquifer. This recommendation is consistent with GW-5 through GW-5e, and is made here to highlight its importance to groundwater quality.

Section 3
Sub-basin Action Plans

Section 3

Section 3 of this Watershed Plan contains sub-basin action plans for the Yelm, McAllister and Mashel/Ohop Sub-basins. Members of the Planning Unit chose to address water-related planning activities more specifically in these sub-basins where local near-term actions have been identified to address pending water issues. Sub-basin committees comprised of Planning Unit members specifically involved in these Sub-basins were formed to develop and negotiate near term action plans. Other Sub-basins do not have locally specific prescriptive issues, and are addressed in Section 2 under watershed-wide planning recommendations.

Recommendations in the sub-basin action plans are consistent with watershed-wide actions discussed in Chapters 3-7. If conflicts are identified between sub-basin and watershed-wide actions, the watershed-wide actions will supercede recommended actions made in the sub-basin plans.

Each chapter of Section 3 is a stand-alone Sub-basin Action Plan consisting of both short-term and long-term planning actions.

McAllister Sub-basin Action Plan – Chapter 8

Yelm Sub-basin Action Plan – Chapter 9

Mashel/Ohop Sub-basin Action Plan – Chapter 10

Sub-basin Action Plans were written by Sub-basin Committees.

8.0 MCALLISTER SUB-BASIN ACTION PLAN

8.1 Problem Statement

- Water rights applications show that there is a very large demand for water from the sub-basin, primarily for use outside of the watershed by the City of Olympia and the City of Lacey.
- Water rights processing will require mitigation to offset impacts to surface flows because the McAllister Creek Sub-basin (except Medicine Creek) is closed to further appropriation. All impacts to surface waters from new appropriations must be mitigated.
- Some water rights applications will conflict with senior water rights, particularly those held by the Nisqually Indian Tribe.
- Processing water rights has been approached on an application-by-application basis, with little coordination within the watershed.
- Lacey projects a shortfall of annual supply before 2008. Applications for new appropriation from the Madrona wellfield, located in the sub-basin, were submitted in 1994 and 1995.
- Because of threats to drinking water quality, Olympia entered into an agreement with the Washington State Department of Health to provide a plan to protect public health from the surface water source at McAllister Springs. Any new groundwater source developed to replace McAllister Springs will require the City of Olympia to acquire new water rights, and will require an agreement on governance of what would be a regional water supply with the Nisqually Indian Tribe.
- The Reservation of Future Public Water Supply for Thurston County (WAC 173-591) has not been implemented, and does not accurately reflect water supply service areas or sources of supply.
- There could be some duplication/overlap in the water budgets developed for WRIA 11 and WRIA 13, and water rights identified in these WRIAs.
- There are water quality problems, especially in estuarine areas, which are affected by McAllister Creek.

8.2 Background

The McAllister Sub-basin is illustrated in Figure 16. Of the seven sub-basins in the Nisqually Watershed, the McAllister sub-basin currently has the highest demand for water (WPN 2002). Although modeling has shown that there is a large quantity of groundwater in the sub-basin, several factors complicate determining how much water is available for appropriation. These factors include:

- The senior water rights held by the Nisqually Indian Tribe;
- The closure of McAllister Creek to further appropriation;
- The lack of clarity regarding cross-WRIA transfers of water use and appropriations,
- The possibility that a significant portion of allocated water rights in the sub-basin are not being used, and
- The difficulty in quantifying impacts on habitat value from varying flow regimes in McAllister Creek because it is tidally-influenced.

Because most of these factors still need to be addressed, the McAllister Sub-basin water balance prepared for the Phase II, Level 1 Technical Assessment does not reflect the true nature of the sub-basin.

Five applications for new water rights have been submitted to Ecology for withdrawing groundwater from highly transmissive aquifers within the McAllister Sub-basin. These applications are Olympia's application to withdrawal 13,600 gpm (19.6 MGD) from a new wellfield location, and Lacey's four applications totaling 8,450 gpm (12.2 MGD) from the Madrona wellfield and another nearby well. Seven other applications have been submitted requesting water from the McAllister Sub-basin total 139 gpm (for groundwater) and 0.05 cfs (for surface water). Table 5 lists existing applications for water from within the McAllister Sub-basin.

TABLE 5

Existing Applications for Water from the McAllister Sub-basin

Control No.	Applicant	TRS	Use	Qi Requested*
S2-28469	Sinclair	18N/01E-07	DS	0.02 cfs
G2-28881	Briggs	18N/01E-07	IR-DS	60 gpm
G2-29393	Evergreen Valley Water Co	18N/01W-01	DM	24 gpm
G2-29521	Honc	18N/01E-17	ST-IR-DS	80 gpm
S2-29592	Ledford	18N/01E-31	DS	0.01 cfs
G2-29777	Twin Capes Water System	18N/01E-31	DM	35 gpm
S2-29776	Holm	18N/00E-32	DS	0.02 cfs
G2-29165	City of Lacey	18N/01W-24	MU	2,200 gpm
G2-29304	City of Lacey	18N/01W-24	MU	2,200 gpm
G2-29305	City of Lacey	18N/01W-24	MU	2,250 gpm
G2-29306	City of Lacey	18N/01W-24	MU	1,800 gpm
G2-29900	City of Olympia	18N/01E-29	MU	13,600 gpm

* "Qi Requested" is the instantaneous quantity requested on the application, in cubic feet per second for surface water sources, and gallons per minute for groundwater sources.

Source: WRATs database, with addition of applications from City of Lacey listed in WRATs as WRIA 13. Modeling suggests that the aquifers that flow to the McAllister Sub-basin extend beyond the Sub-basin watershed boundaries. Consequently, it is very possible that there are other applications for groundwater that are listed as being for water within WRIA 13, and are within the WRIA 13 surface watershed boundaries, but would capture water destined to flow into the McAllister Sub-basin because their wells would tap into water flowing into WRIA 11.

The City of Yelm faces a water supply shortfall and acquiring additional water rights is difficult due to the closure of Yelm Creek. Preliminary investigation suggests that wells drilled in the southwest region of Yelm's Urban Growth Area may fall within the McAllister Sub-basin based on the direction of groundwater flow in the vicinity of the wells. As a result of this initial finding, Yelm is included as a potential applicant for water within the McAllister Sub-basin, and as a potential participant in solutions and actions within this action plan. Other potential participants are likely to be identified. The Technical Group for WRIA 11 is currently working with their counterparts at WRIA 13 to identify applications that have the potential to capture McAllister Sub-basin water.

It is advantageous that a significant amount of technical work has already been completed within this sub-basin. For processing Olympia's applications for a new wellfield in the sub-basin, Ecology required Olympia to provide a model that would predict impacts to McAllister Creek, Lake St. Clair, Nisqually River, and existing holders of water rights. A conceptual model was first prepared by AGI, and the McAllister Numerical Model was completed by CDM. (AGI is a consulting firm that was

purchased by CDM). Ecology also wants to evaluate Lacey's applications using the McAllister Numerical Model.

Results from the McAllister Numerical Model suggest that there is a high probability that a large quantity of groundwater discharges directly to Puget Sound. The source of this water will be referred to throughout this Action Plan as the **Nisqually Aquifer**¹. Developing the Nisqually Aquifer as a regional water supply, if feasible, could take several years.

There is an understanding that the Nisqually Indian Tribe (Tribe) holds a reserved water right from time immemorial. The Nisqually Indian Tribe will maintain its senior right to these waters. To ensure Tribal water right interests are acknowledged and protected, the Tribe will initiate the discussion and lead the investigations that determine, with its regional partners, how much water is available for appropriations from the Nisqually Aquifer. If it is determined that a regional water supply is available from the McAllister sub-basin, the Tribe will initiate discussions to facilitate agreements, with its regional partners, on ownership, management, operation, and finance of a Nisqually Aquifer Regional Water Supply. Water supply solutions are needed for the Nisqually Tribe, Olympia, Lacey, Yelm and other purveyors (for example see the Yelm Sub basin Plan) to meet current supply obligations in the short-term.

8.3 McAllister Sub-basin Goals

The Nisqually Watershed Planning Unit has agreed upon the following goals for guiding watershed management within the McAllister Sub-basin:

1. An understanding that groundwater in the Nisqually Aquifer flows under the Nisqually Indian Reservation, and the Nisqually Tribe holds a reserve water right for these waters as of the date of the creation of the Reservation.
2. An understanding of the cultural significance and connection to the water in the sub-basin.
3. Preserve groundwater quality and quantity in the sub-basin and in the Nisqually Watershed and protect and restore surface water quality.
4. Provide water for agricultural uses in designated resource areas.
5. Properly manage the supply of drinking water from the Nisqually Aquifer to relieve pressures on scarce supply in other sub-basins and watersheds and preserve other water dependent resources such as fisheries and agriculture.
6. Enhance the productivity and viability in the estuarine habitat as a critical fisheries and shellfish resource and preserve the abundance and quality of fish migration and rearing habitat.
7. Preserve water-dependent recreational uses for surface water bodies throughout the watershed.

To support these goals, solutions within the McAllister Creek Sub-basin are intended to create an opportunity for developing additional water supply in the watershed while recognizing and protecting Nisqually Tribal senior water rights, protecting current agricultural water rights in designated areas, and improving instream flows and water quality within McAllister Creek. These solutions also require consideration of Ecology's Total Maximum Daily Load (TMDL) and Thurston County's

¹ The Nisqually Aquifer is not identified in the McAllister Numerical Model as a distinct hydrogeologic unit. We are using this name to identify that portion of the Sea Level (QC) aquifer and the Undifferentiated deposits (Tqu) that are below sea level and discharge primarily to Puget Sound.

shellfish protection district efforts that are currently in progress to address water quality problems in the watershed.

8.4 Action Plan

8.4.1 Short-Term Actions

MC-1 Identify the Nisqually Aquifer as a possible source for a regional water supply.

The concept of a regional water supply was previously investigated by Thurston County, Olympia, Lacey and Tumwater in 1995. Although this effort was unsuccessful in identifying an acceptable location for a regional water supply, the reasons cited in 1995 for pursuing cooperative water supply planning are still applicable today. These reasons include: identifying groundwater as a finite resource that is vital to human communities, fish and wildlife; noting that water demand within the North Thurston Urban Growth Area is projected to require 81,648 gpm by year 2030; and recognizing that water supply planning is beneficial to water resources and creates efficiencies for jurisdictions by maximizing returns in public investments for water supply and mitigation.

MC-1a The McAllister sub-basin committee supports WRIA-wide action GW-2(RS).

The McAllister Sub-basin Committee has identified the following reasons for investigating a regional supply:

- Appropriate regional water supply locations will reduce municipal demand on groundwater resources that impact surface flows, leading to improvements in the water quantity and quality in McAllister Creek and possibly Yelm Creek;
- Reducing the proliferation of smaller water supply wells helps to protect groundwater quality; and
- Consolidating supply at regional supply wellfields will help to simplify tracking water use and water rights in specific aquifers.
- A regional supply will help direct the projected growth to urban areas by removing a barrier to development in the UGA.

The McAllister Sub-basin Committee anticipates that most of this investigation can be done using an expanded McAllister Numerical Model. The following are issues that need to be addressed in a feasibility investigation:

- Quantify how much water could be available;
- Is water really available (i.e., can it be reasonably tapped);
- Possible locations;
- Potential impacts to existing water rights holders (e.g., Nisqually Indian Tribe, agricultural wells);
- Potential water quality issues (e.g., iron, manganese, hydrogen sulfide, seawater intrusion); and
- Address aquifer boundaries and important recharge areas.

MC-1b Identify potential participants in a regional water supply. The Nisqually Indian Tribe will maintain its senior rights to these waters and will initiate discussions to facilitate agreements, with its regional partners, on ownership, management, operation, and finance of a Nisqually Aquifer Regional Water Supply. All agreements must include approval from the Nisqually Indian Tribe.

Potential participants could include the Nisqually Tribe, Olympia, Lacey, Yelm, Thurston County PUD #1, Tumwater, Rainier, major private purveyors and Thurston County. Potential participants with comprehensive water system plans should provide projections (both short-term and long-term) for water needed from the regional supply. Other potential participants should estimate projected water needs.

As noted in the Yelm Sub-basin Action Plan, the City of Yelm proposes to develop a wellfield in an area where groundwater appears to flow towards the McAllister Sub-basin. Yelm's potential for participation in a regional water supply can be assessed with 1) McAllister Numerical model, possibly needing smaller cell sizes in vicinity of Yelm's wells, and 2) a comparison of water chemistry (Stiff diagrams) from Yelm test wells and the McAllister wellfield and Yelm's other sources from the Yelm Creek system.

MC-1c Research logistics for governing a Regional Water Supply

The first action should be to investigate potential legal authorities for creating a regional water supply. The statutory authority for WAC 173-591 (Reservation of Future Public Water Supply for Thurston County) could provide authority for a regional water supply.

If evaluation in recommendation MC-1a above indicates that a regional water supply may be feasible, the Planning Unit recommends investigating whether an interim governing structure is needed to oversee further development of a regional water supply.

MC-2 The McAllister Sub-basin committee supports WRIA-wide recommendation WR-1a, batch processing of water rights within logical surface and groundwater boundaries. Within the McAllister Sub-basin, this would include the applications listed in Table 6 above.

In addition, the McAllister Sub-basin Committee recommends the following short-term solutions (MC-2a and MC-2b) to specifically address water supply applications submitted by the cities of Lacey and Olympia. **Both of the following recommendations are contingent upon anticipated agreements between the Nisqually Indian Tribe and the affected Cities.**

MC-2a City of Lacey

[Placeholder for Recommendations specific to Lacey's transfer applications and application G2-29165.]

MC-2b City of Olympia

[Placeholder for Recommendations specific to Olympia's application G2-29900.]

MC-3 Improve understanding of direction of groundwater flow.

The McAllister Numerical model needs to be expanded to evaluate groundwater flow in vicinity of wells proposed by Lacey and possibly Yelm to the extent their proposed wells are found to be connected to the Nisqually Aquifer (see Yelm Sub-basin Plan).

An expanded McAllister Numerical model should be used to clarify direction of groundwater flow from south and west (with coordination w/ the Nisqually Indian Tribe, Olympia, Lacey, Yelm, and Rainier).

MC-4 Recommend options for mitigating impacts from other applications and long-term water supply solutions.

For all applications within the sub-basin that require mitigation, mitigation strategies that are most practical for the McAllister Sub-basin include: acquisitions and relinquishments of existing water rights, except those serving designated agricultural lands; infiltration of reclaimed water at or near headwaters of streams; and habitat enhancements to offset impacts surface waters.

We recommend a comprehensive approach to mitigation (e.g. moving Olympia's withdrawal from McAllister Springs, LOTT wastewater re-use, Yelm wastewater re-use) to offset impacts from short-term municipal supply recommendations and other potential impacts from regional water supply development.

Although Ecology has indicated that moving Olympia's withdrawal to a groundwater wellfield should not be part of a mitigation package, this Plan recommends that it should be part of Olympia's application because moving their withdrawal from McAllister Springs will undoubtedly benefit flows in McAllister Creek.

Applicants requiring mitigation should demonstrate which surface waters are impacted using water chemistry, Stiff diagrams, or other means. For example, Lacey should demonstrate whether its Madrona wells impact bluff springs that feed McAllister Creek, or Little McAllister Creek.

MC-5 Develop programs for monitoring potential impacts to existing water rights

The following programs should be developed through the implementing authority that will oversee implementation of the Nisqually Watershed Plan.

Two separate monitoring programs are recommended:

MC-5a One program may be needed to monitor flows in the Lower Nisqually River, possibly at the control point located at RM 4.3.

MC-5b If the Regional Water Supply appears to be feasible based on initial technical evaluation recommended in this action plan, a long-term program for monitoring water quality and water quantity of both surface and ground waters should be designed to evaluate impacts from this regional supply. Appropriate locations should be selected and, if needed, baseline data should be collected prior to establishment of the regional supply.

MC-6 The McAllister Sub-basin committee cites its support of WRIA-wide recommendation GW-3(GD).

MC-7 Recommendations for Nisqually/McAllister TMDL

The McAllister Sub-basin committee recommends that the Nisqually TMDL focus on reducing all controllable sources. Model runs should include load reductions achieved under varying flow conditions, which will be especially important for fecal coliforms and dissolved oxygen. Example flow conditions include the following: after Olympia moves its withdrawal from McAllister Springs, after Lacey secures additional water rights at the Madrona wellfield, and after a Regional Water Supply replaces some source wells. Technical subcommittee members will continue to track and review the progress of the Nisqually TMDL to ensure that potentially changing flows are included in the model runs.

8.4.2 Long-Term Actions

MC-8 Establish a Regional Water Supply Governing Structure for the development of a Regional Water Supply with the Nisqually Indian Tribe initiating discussions.

This recommendation will build on investigations conducted for short-term action MC-1. The first step is to develop the process for creating a governing structure. The second step will be to identify and recruit participants for the governing structure. Short-term action MC-1a recommends technical studies for evaluating the feasibility of the Nisqually Aquifer as a regional water supply. The following recommendations are only applicable if a Regional Water Supply is technically feasible.

If it is determined that a regional water supply is available from the McAllister sub-basin, the Tribe will initiate discussions to facilitate agreements, with its regional partners, on ownership, management, operation, and finance of a Nisqually Aquifer Regional Water Supply. All agreements must include approval from the Nisqually Indian Tribe.

MC-9 Develop and implement strategies for protecting regional supply

MC-9a The Regional Water Supply will need an enforceable wellhead protection plan that protects both the quality and quantity of water of the Nisqually Aquifer. Although development of the wellhead protection plan is likely to be overseen by the Regional Water Supply governing structure, established in MC-8, this watershed planning process is anticipating technical studies that will be needed to support a wellhead protection plan.

MC-9b Recharge areas may be identified in technical studies recommended in short-term action MC-1 and MC-1a. Additional study may be required to identify areas of exceptionally high transmissivity, such as those found during preliminary findings for work related to Olympia's proposed wellfield. In addition, time-of-travel areas will need to be modeled. Both recharge and time-of-travel areas should be used to delineate appropriately protective wellhead protection areas for the Regional Water Supply.

MC-9c After technical work is completed, critical areas ordinances need to be re-evaluated to determine whether they are protective of the regional water supply. Revisions should be made, as needed.

MC-10 Implement long-term programs for monitoring water quality and water quantity that were developed in short-term recommendations MC-5 through MC-7.

Monitoring programs will include establishing baseline conditions prior to full implementation of the watershed Plan.

MC-11 Recommend Ecology establish target flows for freshwater spring discharges to McAllister Creek and establish a basis for these flows with the understanding that levels in these creeks are under tidal influence.

A cooperative effort involving Ecology, the Department of Fish and Wildlife, the Nisqually Indian Tribe, and the Cities should be used to establish target flows for freshwater contributions from springs. This approach will protect flows in the creek while recognizing that instream flow control points in McAllister Creek make little sense due to tidal influence that extends the entire length of the Creek. In addition to establishing a scientific basis for regulating flows in McAllister Creek, this recommendation addresses the possibility that the closure of McAllister Creek could present an overly restrictive barrier in the development of a regional water supply.

MC-14 Update Water Budget for Sub-basin

The water budget for this Sub-basin needs to be updated using data collected for the various studies recommended in this action plan. As noted in the Level 1 Technical Assessment, this water budget needs to be refined based on improved understand of:

- The direction of groundwater flow, and the quantity of groundwater flow through from WRIA 13;
- Inter-WRIA export (including reclaimed water use); and
- Real versus paper water rights, especially for irrigation water rights

9.0 YELM SUB-BASIN ACTION PLAN

9.1 Problem Statement

- Currently, the City of Yelm has sufficient water rights to supply the growth of Yelm anticipated by the Growth Management Act for the next four to nine years depending on the effectiveness of water conservation and the reclaimed water program. The City of Yelm applied for additional water rights in 1994 from Section 27, Township 17 North, Range 1 East. These applications have not been processed and are currently ranked 19, 20, and 21 on the Department of Ecology WRATS database for WRIA 11.
- Yelm Creek and Thompson Creek have historic low to no flow conditions in the upper reaches during the summer months. Because of these flow conditions, Yelm sub-basin has been closed to any additional surface water withdrawals since 1950. Over time, the decision to prohibit (restrict) additional groundwater withdrawal has been associated with the low / no flow condition in Yelm Creek.
- The uncertainty of future water rights allocations will at some point pressure for development to move out of the Urban Growth Area (UGA). Increased dependence on the utilization of exempt wells to support this rural development results in expanded groundwater withdrawals that further exacerbates the City's ability to obtain additional water rights needed for the planned growth and development within their designated Urban Growth Area established under the Growth Management Act (GMA).
- The water balance methodology presented for the Yelm sub-basin in the Level 1 Technical Assessment should be reviewed for technical competency. Further refinement of the water balance, including the connectivity between ground and surface water and the City's reclaimed water program, is needed before any water rights decisions and mitigation can be determined.
- The City of Yelm utilizes groundwater recharge and streamflow augmentation as components of the water reclamation facility. As the City grows and new facilities are built, the system will produce more and more reclaimed water, which in turn will provide for additional aquifer recharge and streamflow augmentation. The Washington State Department of Ecology has been unable to approve additional water rights in recognition of the aquifer recharge and/or stream-flow augmentation components of Yelm's water reuse facility.

9.2 Background

The City of Yelm has recently completed an update of their Comprehensive Water System Plan (CWSP) pursuant to Chapter 246-290 WAC. The WSP identifies water rights and infrastructure needs to comply with the Growth Management Act. The critical elements of the WSP were the identification of the shortfall between the future potable water demand, based on population projections and available water rights. Based on twenty-year projections, the City of Yelm will need an additional 1,230 acre-feet of water. Based on 50-year projections, the City will need an additional 3,000 acre-feet of water.

In order to meet current demand with the existing water rights, the City of Yelm has undertaken a very aggressive water conservation plan. The conservation plan includes: a new block-rate tiered structure; an annual leak detection program; and a proactive public information program. At the very heart of the conservation program is an extensive water re-use program that maximizes the use of reclaimed water to conserve potable water and extend its supply.

The water re-use program provides the potential for substantial potable water conservation. Every gallon of potable water that is replaced via the City's use of reclaimed water translates to a gallon of water that does not have to be pumped from the aquifer. Reclaimed water is currently used for irrigation of schoolyards and playgrounds, parks, streetscapes and churches. It is used for fire fighting, school bus washing and for a wetland park. Reclaimed water recharges groundwater via infiltration ponds in the vicinity of the City's water supply wells. Furthermore, reclaimed water is used for streamflow augmentation in the Nisqually River via discharge to the Centralia Power Canal. In order to maximize the use of reclaimed water, the City of Yelm is extending the reclaimed water distribution lines to large users of reclaimed water such as the high school, and they are constructing a 500,000 gallon storage tank to provide equalizing storage.

In pursuit of additional water rights, test wells were drilled in Section 27 Township 17 North, Range 1 East WM. The test wells "did show a completely unexpected set of water levels" [differing from those found in the Yelm Prairie] (Thurston Highlands Associates, 1995). A study of the Yelm area shows water levels trending northerly across Yelm Prairie to the Nisqually River. However, the wells drilled in Section 27, 2.5 miles west of the downtown area of Yelm revealed a groundwater gradient tending away from the Nisqually River and towards McAllister Springs. Further study of this aquifer may indicate that it is part of the larger **Nisqually Aquifer**¹. If this is the case, Yelm will be included as a potential applicant for water rights within the McAllister sub-basin (and be batch processed with McAllister sub-basin water right applications), and as a potential participant in developing solutions and actions within that that plan.

The following table lists existing water rights applications for the Yelm sub-basin:

Existing Applications for Water from the Yelm Sub-Basin

Control No.	Applicant	TRS	Use	Qi Requested *
G2-29084	City of Yelm	T17N/R01E-23	IR	1500 gpm
G2-29085	City of Yelm	T17N/R01E-23	MU	3000 gpm
G2-29086	City of Yelm	T17N/R01E-23	MU	3000 gpm
G2-29020	L.J. Schorno	T17N/R02E-28	ST-IR	450 gpm
G2-29316	Champion Estates Water System	T16N/R01E-14	DM	5 gpm
G2-29458	Yelm School District 2	T17N/R01E-11	IR-DM	150 gpm
G2-29517	H & N International	T16N/R02E-15	DM-CI	145 gpm
G2-29629	City of Yelm	T17N/R02E-20	MU	1000 gpm

* "Qi Requested" is the instantaneous quantity requested on the application, in cubic feet per second for surface water sources, and gallons per minute for groundwater sources.

¹ The Nisqually Aquifer is not identified in the McAllister Numerical Model as a distinct hydrologic unit. We are using that name to identify that portion of the Sea Level Aquifer (Qc) and the Undifferentiated Deposits (Tqu) that are below sea level and discharge primarily to Puget Sound.

9.3 Action Plan

9.3.1 Short-term Actions

Y-1 Refine or revise Yelm sub-basin water balance

The water balance for the Yelm Sub-Basin in the Level 1 Technical Assessment should be reviewed for technical competency. If the methodology for computing the water balance can be improved upon, a new approach will be developed and the water balance and resulting water use summaries will be revised using the new methodology. The new water balance approach should consider the non-consumptive use of reclaimed water that is returned to the hydrologic system.

Y-2 Pursue opportunities for existing water rights transfers.

The City should continue to seek out and pursue any and all opportunities to transfer existing water rights to one of the City's existing wells, while protecting current water rights in designated resource areas. This will help provide protection of the aquifer when the old wells are abandoned.

Y-3 Using available data on groundwater flow direction and well level information, along with an initial assessment of the water chemistry of the wells located southwest of the downtown area, determine if there is a likelihood that the wells draw water from the Nisqually Aquifer.

Y-4 Develop policy for the transfer of exempt wells' water rights to the City of Yelm and submit to DOE for credits.

Y-4a The Department of Ecology has indicated they would entertain a proposal to transfer exempt wells within the Urban Growth Area to the City. The Department of Ecology should put this policy into action with the transfer of additional water rights to the city's existing rights.

Y-4b When transfers are found to be acceptable, the City should adopt policies and procedures to facilitate these transfers from the exempt well(s) to the City's existing wells.

Y-4c The City should research records of past development to capture wells that were abandoned as part of approved or proposed development. This procedure should be standardized as part of the development process.

Y-5 Pursue with the Departments of Ecology and Health the development of a policy that would provide for the recalculation of water use or additional water rights considering the return of reclaimed water from aquifer recharge, wetland enhancement and/or stream-flow augmentation.

Y-5a Develop a scientifically based approach to calculate the amount of water that returns to the aquifer through the infiltration of constructed wetlands.

Example of recalculation of water use:

The quantity of water, in acre-feet, remaining after deducting the amount of reclaimed water that ultimately is returned to the Aquifer for groundwater recharge,

from the total amount pumped, should be the total quantity of water used to measure the total annual withdrawal.

The water that is “put back” into the aquifer or surface water, should be calculated into the water balance of the system. Only the quantity of water that is not returned to the system should count towards the total annual withdrawal.

Illustration of example:

If 500 acre-feet were pumped from a well, and 300 acre-feet of water were reclaimed and put back into the same aquifer through ground water recharge, the total annual withdrawal from the well would be only 200 acre feet. In this case, the agency would have 300 acre feet of annual withdrawal available in their water right.

- Y-5b Contact should be made with other agencies and organizations with similar goals and interest, to possibly form a committee (alliance), to present a unified approach and common message to DOE.
- Y-5c The City of Yelm should meet with the Association of Washington Cities (AWC) to assist in promoting this concept.
- Y-6 Draft and adopt a Comprehensive Water Reuse Plan (CWRP) to maximize the use of reclaimed water to offset the need for potable water, thus extending use of existing water rights available.
- Y-6a Water conservation utilizing the benefits offered by the City’s reclaimed water system is an important part of Yelm’s long-term strategy for meeting their water needs. The Facilities Plan that was developed in support of the water reclamation project only addressed specific water reuse sites and options. Now that the facility is maturing, a more comprehensive approach has to be developed for the reclaimed water distribution system to identify new reuse opportunities and the location and sizing of new reclaimed water pipe.
- Y-6b The City should take steps to develop the CWRP so it is integrated with the Water System Plan. The planning process should pursue and include in the plan opportunities to utilize reclaimed water as mitigation for new water rights.
- Y-6c Once the new CWRP is developed, the planned improvements can be planned, budgeted and implemented.

9.3.2 Long-term Actions

- Y-7 If in the initial assessment (Y-3) it is determined that there is a high likelihood that the wells located in the south west of downtown Yelm area are located in the Nisqually Aquifer, the City should expand the McAllister Numerical Model to include the Yelm Sub-basin. The City should participate in a feasibility investigation with other potential participants to determine if a regional water supply, that does not have a negative impact to the existing water right holders, and has the least impact to or improves the quality and quantity of surface waters in the Watershed could be utilized. There is an understanding that the Nisqually Indian Tribe (Tribe) holds a reserved water right from time immemorial. The Nisqually Indian Tribe will maintain its senior right to these waters. To ensure Tribal water right interests are acknowledged and protected, the Tribe will

initiate the discussion and lead the investigations that determine, with its regional partners, how much water is available for appropriations from the Nisqually Aquifer.

Y-8 If participation in a Regional Water Supply is not feasible, then studies should be conducted of the Yelm sub-basin aquifer to determine the correlation between the summer-time low/no flow conditions in Yelm Creek and use of the Yelm Prairie aquifer.

Y-8a A consultant should be retained to perform Yelm Sub-basin-wide modeling and analysis of the aquifer to determine the origin and quantity of water in the aquifer. The study should determine if the aquifer boundaries coincide with the surface water boundaries.

Y-8b Scientific data should be gathered that would demonstrate a conclusive relationship between groundwater withdrawals and the surface flow in Yelm and Thompson Creek. This information will give a better understanding of how to regulate the issuance of water rights and the impact of exempt wells.

Y-8c This study should also make recommendations on measures that could be used for mitigation to the low flows in these streams. An approximation of the measurable benefits that could be obtained with specific levels of mitigation will allow proposals to be brought forward that could support additional groundwater withdrawals in the Yelm sub-basin.

Y-9 Yelm sub-basin committee supports GW-7, GW-7a, and GW-7b.

10.0 MASHEL-OHOP SUB-BASIN ACTION PLAN

The Town of Eatonville straddles two Sub-basins in the Nisqually Watershed. The Mashel Sub-basin drains an area of 89.2 square miles. The three major tributaries to the Mashel River are Busy Wild Creek and Beaver Creek in the upper reaches and the Little Mashel River in the lower reach. The Mashel River is the largest contribution to the Nisqually River. Ohop Creek, a part of the larger Tanwax/Kreger/Ohop Sub-basin, is also a large tributary to the Nisqually, contributing approximately 9% of the average annual flow to the Nisqually. Ohop Creek is influenced by Ohop Lake.

The Town of Eatonville has limited capacity to provide water to support future growth as projected in the current Eatonville Comprehensive Growth Management Plan (1993). This plan is presently being updated. The Town's water rights included two groundwater and one surface water source in the Mashel River. The two groundwater wells are groundwater under the influence of surface water (Mashel River). Consequently the Washington Department of Health (DOH) has ruled that the Town's water supply must be filtered to meet the Surface Water Treatment Rule. The DOH requires that the Town begin planning for a filtration system (at a cost of approximately \$2.75 million (Grey and Osbourne)), or find an alternative source that meets the current health standards for drinking water. The DOH requires that the Town take immediate action to show progress on addressing this issue within the next few months.

In order to address Eatonville's water supply concerns, the Sub-basin Committee recommends a number of short-term and long-term actions. Short-term actions include completing groundwater hydrologic investigations to assess the potential for alternative water supply, developing a Conservation Plan, updating the Water System Plan and completing the Stormwater Management Plan. Long-term actions include evaluating several water supply alternatives that have the potential to secure abundant water supplies and also could result in benefits to fish and habitat; development of interlocal agreements with Pierce County to increase protection of water resources and address the inconsistencies between the Growth Management Act and watershed planning efforts; and to investigate the potential for a coordinated process within the watershed to assist small towns with implementing the watershed action plan.

10.1 Problem Statement

- The Mashel River flow is low in the summer, although instream flow requirements are currently set on the river. Current instream flows need to be assessed to determine their adequacy in meeting fish habitat needs. The sub-basin is closed to further allocation of surface water during certain times of the year.

The Town of Eatonville's water rights include two groundwater and one surface water source in the Mashel River. The two groundwater wells are designated as groundwater under the influence of surface water (Mashel River).

It would be beneficial to the Town, and support the goals of the watershed Planning Unit, to be less dependent on surface water sources in order to address anticipated population growth while maintaining the natural water resource and associated habitat. Decreasing the Town's dependence of a surface water source also potentially could improve instream flows in the Mashel River.

- The Town of Eatonville's future growth is constrained by the availability of water as well as storage capacity to meet fire flow code requirements in select areas of the Town. In addition, the per capita per day water use in the Town is high and should be reduced.

There are approximately 39 remaining hook-ups available within the current municipal boundaries (Gray and Osborne, 2003). The Town has limited capacity to provide water to

support future growth as projected in the current Comprehensive Growth Management Plan (1993). This plan is presently being updated to include critical areas, update land use, housing, transportation, capital facilities and utilities sections, including bringing the water and sewer plans up to date. The Comprehensive Plan is designed to satisfy the Washington Growth Management Act and the Pierce County-Wide Planning Policies.

The GMA encourages development in urban areas where adequate public facilities and services exist or can be provided in an efficient manner. Planning for infrastructure such as roads, electricity, telecommunications and sewage disposal and other types of man-made utilities, is very different than planning for future water demands. The Mashel and Ohop Sub-basins of the Nisqually Watershed are closed systems where no new water rights are available. The Town is challenged with finding a groundwater source not in association with surface waters. Population projections in the Town of Eatonville may not be achievable over the short-term due to the lack of an identified water supply. The Comprehensive Plan update should acknowledge this constraint. Planning policies at a local and county level must address water supply requirements inherent in UGA expansions. In addition, an interlocal agreement should be developed to provide for consistency in zoning and permitting within the UGA. The Town would like to investigate mitigation strategies that may be feasible to off-set additional water rights.

- The effects of land use on water quality in this Sub-basin need to be better understood.

10.2 Background

The Mashel/Ohop Sub-basin is illustrated in Figure 18. The Town of Eatonville is located within two Sub-basins, the Mashel and the Ohop Creek portion of the Tanwax/Kreger/Ohop Sub-basin. Specifically, Eatonville straddles the Mashel River and a small portion of the town and its Urban Growth Area touches Ohop Creek downstream of Ohop Lake. This Sub-basin action plan, therefore, will consider problems and action plans that touch on both Sub-basins; it does not consider the non-Ohop parts of the Tanwax/Kreger/Ohop Sub-basin.

10.2.1 Water Demand

In 2001, Eatonville's population amounted to 2040 persons and its water service area population amounted to 2103. During the same year, Eatonville's water production at the main pump house was 317,000 gallons/day. The overall per capita water consumption in Eatonville in 2001 was 150.7 gallons/day/person. This includes water consumed by commercial establishments, government institutions and other non-residential users. The residential per capita/day use is considerably lower than the overall 150.7 gallons/day/person figure. Mart Kask, the Town Consultant, estimates residential consumption rate somewhere between 100 and 130 gallons per day per person.

Population forecasts suggest Eatonville's population will increase from 2070 to 4120 persons in 2022, a 99% increase. The forecast is based on a 3.5% per year growth rate, somewhat less than the town's historic growth rate from 1980 to 2000. Some of the forecasted growth will occur within the current municipal corporation boundary and some will occur outside of the boundary in future annexation areas.

The Comprehensive Water Supply Plan (Gray & Osborne. 1997) and subsequent engineering reports project water demand for Eatonville (see Table 7). Note that the currently updated population forecasts show the population is about 5% below earlier forecasts used by Gray and Osborne to calculate the figures in Table 1.

TABLE 7

Current and Projected Water Demand for Town of Eatonville

Water Production	2000	2005	2010	2015	2025
Average day (gallons)	326,000	380,000	461,000	540,000	788,000
Average day (gallons/minute)	226	264	320	375	547
Max. day (gallons)	722,000	874,000	1,060,000	1,240,000	1,810,000
Max. day (gallons/min)	495	607	740	861	1257
Max day, (18 hr source, gallons/min)*	656	809	987	1148	1676

Note: Year 2000 data is "actual use"; Year 2025 data was projected by Mart Kask, Town Planner

10.2.2 Existing Water Rights

The Town of Eatonville has three certificates of water rights issued by the Washington Department of Ecology (Ecology). Two certificates are for groundwater sources and one for a surface water source from the Mashel River (see Table 8).

TABLE 8

Town of Eatonville Water Rights (Gray & Osborne, Inc. 1997)

Source	Date	Certificate	Total Annual acre feet	Instantaneous gallons/minute
Groundwater	1966	5676-A	394	360
Groundwater	1967	G2-01087C	400	250
Surface water	1967	10307	525	1032
Total			525	1642

The three water rights are NOT additive. Taken together, the drawdown from the three water rights cannot exceed 525-acre feet/year or 171,150,000 gallons annually. This amount converts to about 469,000 gallons/average day. The three water rights also limit the Town to a peak withdrawal rate. For the surface water (Mashel River) withdrawal, the peak withdrawal rate is 1032 gallons/minute. The groundwater sources, taken together, have an instantaneous withdrawal rate of 610 gallons/minute, making the total peak withdrawal rate for all three certificates 1642 gallons/minute.

There may be other water rights that exist for the Town as a result of acquisition of utility easements through private property, connecting the sand filters and the wellfield with the clear well and the pump house.

The supply source capacity is measured in maximum gallons/day and maximum gallons/min. The three wells produce a maximum of 325 gallons/minute or 468,000 gallons/day (24 hour pumping). The surface water source capacity is determined by the capacity of the filtration plant which has the practical capacity of 170 gpm for a short period of time before it gets plugged up and has to be shut down for scraping and cleaning of the filters. The supply capacity by source is shown in Table 9.

TABLE 9

Supply Capacity by Source

Water Production	Wells	River	Total
Average day (gallons)	468,000	250,000	718,000
Maximum day (gallons)	468,000	250,000	718,000
24 hr source (gallons/minute)	325	170	495
18 hr source (gallons/minute)	325	170	495

Source: Grey and Osbourne, 1997.

During the high river flow periods (January and February) the Town does not take water from the river due to the high level of turbidity and tendency to plug up the sand filters. Therefore, the 495 gallons per minute supply capacity is not available year round. However, the peak demand usually occurs in the month of July, when both sources are operating.

10.2.3 Water Supply Quality

The Washington State Department of Health has ruled that filtered river water meets the health standards for drinkable water. The DOH has also ruled that because Eatonville's well water has high turbidity resulting from surface water infiltration, it therefore does not meet the current health standards. The DOH has ordered the Town to either filter the current well water or find an alternative source that meets the current health standards. The requirement is that turbidity be less than 1.0 NTU.

10.2.4 Wastewater Treatment Facility

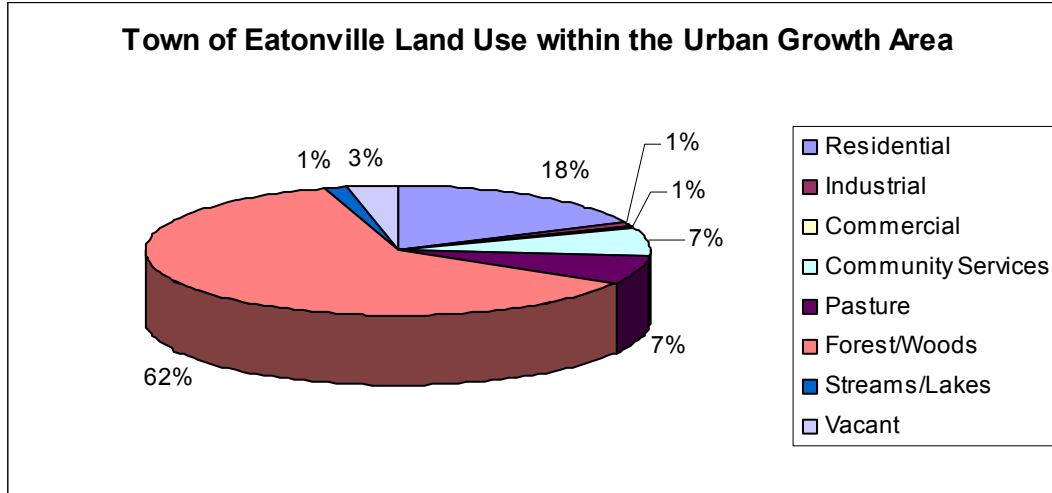
The Town of Eatonville wastewater treatment plant is located approximately 0.6 miles downstream of the water system intake in the Mashel River. The wastewater is treated through a Sequencing Batch Reactor (SBR)/River outfall system (activated sludge system). Treated effluent percolates out of a 12-inch PVC perforated pipe and up through the river bed at approximately RM 5.3. The Mashel River is designated a Class A (excellent) freshwater body under the State Water Quality Standards (WAC 173-201(A)). Maximum daily flow averages approximately 0.58 mgd. A significant percentage of the water withdrawn from the river and from groundwater in continuity with the river for the Town water supply is returned to the river downstream of the withdrawals via the Wastewater Treatment Facility.

10.2.5 Land Use

Land use within a watershed may directly affect water availability through changes in watershed parameters affecting runoff (e.g., impermeable area associated with certain land uses, changes in

vegetation patterns), as well as indirectly through the variable water demand associated with different land uses.

Land Use within the sub-basins is mostly forest (62%) with 18% residential land use and 1% in commercial and industrial.



10.2.6 Stream Habitat and Instream Flows (WPN, 2002)

Streams in the Mashel/Ohop Sub-basin include Ohop Creek and its tributaries: Lynch Creek and Twenty-five Mile Creek, the Mashel River and its tributaries the Little Mashel River, Beaver Creek, Busy Wild Creek. These streams drain low mountainous areas with relatively shallow surface soils underlain by bedrock. The upper sections have steeper gradients and receive some snowpack in the winter. The primary land use in these drainages is commercial timber.

The Mashel River drains an area of 89.2 square miles in southeastern Pierce County. Since this Sub-basin reaches into the higher elevations on the flanks of Mount Rainier, its headwaters lies within both snow dominated and rain-on-snow zones. This means that it can experience sudden changes in discharge during winter warming periods. The Mashel River has its confluence with the Nisqually River at RM 39.6 and is the largest tributary to the Nisqually River. The average annual discharge of the Sub-basin is 254 cfs and it contributes 14% of the mean annual flow to the Nisqually River.

Several species of salmonids are present in the Mashel River and its tributaries, including Coho, Chinook, pink salmon, steelhead and coastal cutthroat trout. The Mashel River system appears to have limited spawning habitat. Salmon primarily spawn in gravels, however, much of the river is too steep to allow for the accumulation of gravels of suitable size. The upper portion of the Sub-basin lies in a steep canyon where spawning size material would not be expected to collect in abundance. The lower portion of the mainstem (below river mile 6.0) has a more moderate gradient and contains good amounts of spawning substrate. This is particularly true below river mile 3.2, where much of the salmon spawning in recent years has been observed (Nisqually Tribe 2001, draft report comments). Habitat is also affected by the availability of large woody debris, which is limited in most portions of this Sub-basin.

The Mashel River is rip rapped and channelized near Eatonville, between RM 5.1 and RM 6.0. Upstream of RM 6.6, the river banks are unstable and failing in places resulting in mass wasting. Low quantities of large woody debris exist along the river. Young second growth limits future large woody debris recruitment to the river and provides limited shade.

Ohop Creek is the third largest tributary in the Sub-basin that is accessible to anadromous salmonids. In general, habitat appears to have low quantities of large woody debris, high quantities of fine sediment in spawning gravels, and poor riparian conditions (at least along the lower portions of the creek). The best spawning area and riparian conditions in Ohop Creek are found upstream and downstream of the Highway 161 bridge in the vicinity of Eatonville and its UGA.

Salmon habitat restoration plans are being developed for both the Mashel River and Ohop Creek downstream of Ohop Lake. The Pierce Conservation District (PCD) is taking the primary lead in developing the plans. Currently the PCD is conducting a parcel by parcel assessment of the shoreline areas of the Mashel River and developing site-specific detailed restoration proposals for sections of Ohop Creek.

10.2.7 Instream Flows

Instream flows refer to the amount of water required in a stream to support fish, particularly salmon, and other aquatic life. The amount of necessary instream flow varies with season and salmon life stage. Instream flows are generally higher in the winter, the time of salmon spawning. Lower summer instream flows can support juvenile salmon rearing. It is not unusual to have instream flows established for an important salmon stream like the Mashel River.

Instream flow recommendations become codified under WAC when they are adopted as administrative rules. The seniority of instream flow rules with respect to water right is the date of their adoption; they do not supercede senior water rights but rather condition those rights approved after the instream flow rule adoption. These are termed junior rights. The Mashel River and tributaries are closed to further allocation by the Ecology (seniority of closure is 1982) (WAC 173-511). The period of closure is June 1 – October 31.

Older closures to additional appropriation were also included in the regulations. This includes the Ohop Creek and tributaries which were closed in February, 1952.

The IRPP instream flows are set at three control points on the Nisqually River, and one point on the Mashel River. These are described moving upstream from the mouth of the river. The Mashel River control point is at RM 3.25 (USGS gage 12-0870-00), with the affected reach from the mouth upstream to the headwaters, including all tributaries. These instream flows range from 20 to 100 cfs, with a closure from June 1 through October 31 (Table 10) (WAC 173- 511).

TABLE 10

Stream Closures in the Mashel River

Month/Day	Mashel River RM 3.25
January/ALL	100
Feb/ALL	100
March/ALL	100
April/ALL	100
May 1	100
15	80
June 1	80 (C)
15	70 (C)
July/1	50 (C)
15	40 (C)
Aug 1	30 (C)
15	30 (C)
Sept 1	20 (C)
15	20 (C)
Oct/ALL	20(C)
Nov	40
15	70
Dec/1	100
15	100

Instream flows set for the Nisqually River Watershed under Department of Ecology Instream Resources Protection Program (WAC 173-511). Flows in cubic feet per second (cfs) for the Mashel River RM 3.25. (C) Indicates months closed to additional appropriation.

The IRPP flows set for the Mashel River are not based on studies of the relationship between flow and fish habitat. Reevaluation of these instream flows is recommended for the Mashel River since current or future water withdrawals may result in significant decreases in the volume of instream water. Therefore, the Planning Unit has initiated a Step A instream flow plan for the Mashel River (see Appendix D, "Draft Report Nisqually River Watershed (WRIA 11) Instream Flow Assessment - Mashel River Step A and Step B Scope."). This report discusses in detail how the current instream flows for the Mashel were determined and recommends a scope of study to better understand Mashel River flows and instream flow needs.

10.2.8 Water Quality

Water quality in the Mashel/Ohop Sub-basin has been studied extensively (Whiley et al., 1994 and Whiley & Walter, 2000). Water quality problems documented include elevated temperature, relatively low dissolved oxygen, turbidity and high fecal coliform bacteria levels. This information is summarized in more detail in the Level 1 Technical Assessment (WPN, 2002).

Agricultural activities (identified as agriculture, small farms, and dairy/cattle) are implicated as probable sources of water quality problems in the lower Ohop valley. Forestry is implicated in Lynch Creek (Ohop) and the upper Mashel. Residential development is only implicated as a problem source in parts of the Ohop system. In particular, the stormwater from the Town of Eatonville discharges primarily into Lynch Creek and may contribute to downstream water quality problems.

Temperature and dissolved oxygen levels are at or approaching levels of critical concern for fish in Ohop Creeks (particularly below the lake). As there are lakes or wetlands above these sampling stations, the water quality readings may be a reflection of this and may reflect natural parameter levels. However, Lower Ohop Creek also has significant temperature and dissolved oxygen problems likely related to land use.

In summary, the two major water quality questions to be addressed for this Sub-basin are elevated temperature in the Mashel River, which may be related in part to low flows, and the impacts of stormwater discharge on Lynch Creek and Ohop Creek.

10.3 Action Plans

As of September 8, 2003, the Town of Eatonville has begun to address the challenges or “problem statements” above. Actions taken thus far include:

Steps taken to comply with the DOH order to treat groundwater under the influence or move to a new source:

- The Town is in the process of selecting a consulting engineering firm to design a water filtration plant. Finalist firms have been identified and interviews for selecting the design firm have been scheduled.
- Golder Associates, Inc. has been retained by the Town to conduct detailed site specific hydrogeologic investigations and to drill two test or production wells in the town limits.
- Golder Associates, Inc. has also been contracted to investigate the potential of increasing the effectiveness and productivity of the existing well field.
- The Town is in the process of selecting a consulting engineering firm to update its Water System Plan. Finalist firms have been identified and interviews for selecting the contract firm have been scheduled.

Steps taken to address future growth and peak day demand requirements:

- On September 8, 2003, the Town Council adopted a resolution temporarily suspending the approval of plats and limiting the number of available water hookups to 39 equivalent residential units, to be awarded on a first come, first served basis.
- The Eatonville Public Works Department is in the process of researching the existing water billing records and evaluating the existing water rate schedule to determine its ability to equitably distribute the cost of delivery to the user.
- The Town has purchased a portable electric generating unit that can be used to power electric pumps during emergency electric power outages.
- The Town has adopted an emergency water use ordinance restricting excessive water use during drought periods, such as lawn watering, etc.

Steps taken to remedy the Town's fire flow situation:

- On September 8, 2003, the Town Council amended its fire flow ordinance by reducing the flow requirement, leaving one commercial property without adequate fire flow.
- The Town has retained an engineering firm to design an additional (third) water storage tank (300,000 – 800,000 gallons). Partial financing for the design and construction of the tank has been arranged.

Steps taken to remedy the Town's high per capita water use:

- The Town has initiated a water conservation program with the objectives of reducing the current 153 gallons per capita per average day use.
- The Town is evaluating its water use rate schedule to determine if it is possible and desirable to charge higher rates to high water users.

The following recommended actions have been divided into two parts: short-term and long-term actions. In some instances, the following actions may address, in more detail, some of the steps already begun by the Town.

10.3.1 Short-term Action Plan

MO-1 Complete an instream flow assessment on the Mashel River, and assess the adequacy of the current low flow regulations. (See Instream Flow Assessment, Scope of Work, Section 5.0, Appendix D).

MO-2 Complete the groundwater hydrology investigations as recommended by the Eatonville planning consultant.

MO-3 Obtain guidance from DOH to address the Conservation portion of the WSP.

MO-4 Begin developing a Conservation Strategy for the Town of Eatonville. Seek funding as soon as possible to prepare a Conservation Plan. Commit to holding a public meeting (Town Council or Planning Commission forum) on Conservation.

The Conservation Plan would address accurate consumption records, identify/reduce unaccounted for water (leaks, unmetered usage), identify major consumers and assist with reducing consumption and conduct water use audits. The Conservation Plan will also address conservation based pricing, community education, and providing assistance to residences through various programs (shower head program, flow restrictors, low flush toilets, washer rebates).

MO-5 Update the Water System Plans (WSP) for the Town of Eatonville (required by DOH). The WSP will address, through an approved methodology of calculating water use, current water use (including all approved plats) and future growth within the Eatonville UGA. The WSP will also address regional sources.

MO-6 Seek funding (30 to 50K) to update WSP as soon as possible.

MO-7 Complete the Stormwater Management Plan and mitigate stormwater runoff problems.

MO-8 Address long-term UGA boundaries and adjust to reflect realistic future land use.

10.3.2 Long-Term Action Plan

MO-9 Protect Fish Habitat

- Continue to study flow patterns on the Mashel River, and maintain the USGS gauges on Mashel River and Ohop Creek.
- As options become available through funding opportunities, implement the salmon habitat restoration plans that are being developed for both the Mashel River and Ohop Creek.

MO-10 Evaluate Supply Potential

- Move away from dependence on surface water sources (including wells in association with surface water). Consider potential for further limitation of surface water use due to instream flow requirements of fish.
- Assess the potential to develop groundwater supply in the Nisqually Watershed to accommodate future growth.
- Evaluate potential for re-use and or infiltration and opportunities for mitigation.
- Evaluate other potential mitigation strategies including credit for water replaced through the Wastewater Treatment Facility. A better understanding of what measures might be used for mitigation of future Town of Eatonville water rights is needed, with the understanding that additional environmental compliance mandates regarding endangered species would have to be considered.

MO-11 Improve Shoreline Protection

- Develop a Critical Areas Ordinance that provides opportunities for mitigation of water removals from the Mashel (e.g. increased shading of shoreline, fish habitat improvements, etc.).
- Evaluate Shorelines Management Act requirements and adjust to provide enhanced riparian habitat with the goal of increasing the level of instream habitat protection.
- Evaluate other shoreline mitigation possibilities along conservancy land, including implementation of salmon habitat restoration plans currently being drafted by Pierce Conservation District.

MO-12 Protect Water Quality

- Develop and implement the water quality monitoring plan for the Mashel-Ohop Sub-basins.
- Investigate use of the Source Water Protection Assessment Program (SWAP) to protect the Town of Eatonville's water supply and the water quality of the Mashel sub-basin. Actions include delineating the source water protection area, conducting a containment source inventory, and determining the susceptibility of the public water supply to contamination from the inventoried sources. This would require coordination with Pierce County as much of the Town's water supply watershed is outside of the Town's jurisdictional boundaries.

MO-13 Address long-term impacts of land use on water quality.

A comprehensive, long-term water quality monitoring plan should be developed to assess the effects of land use within these sub-basins. Protection of public drinking water supply, critical recharge areas and stream fish habitat should be enhanced by revising Stormwater Management programs, and developing a new Critical Areas ordinance for the Town of Eatonville and surrounding areas within the sub-basins.

MO-14 Other Actions

- Assess viable storage alternatives to seasonally augment water supply.
- Investigate the potential to purchase existing water rights within Mashel Sub-basin.

MO-15 Growth Management Act Issues

- Develop Interlocal Agreement with Pierce County.
- Provide Eatonville with some level of oversight on permit applications outside town boundaries but inside the UGA, and consistency in zoning within the UGA (currently lands not annexed to town but within UGA are under County zoning).

MO-16 The Mashel/Ohop sub-basin committee supports WRIA-wide action GLU-3.

Section 4
Recommended Actions, Implementation, SEPA,
and Related Processes

Section 4

Section 4 of this Watershed Plan addresses overall planning recommendations and their implementation. Chapter 11 discusses other water programs, plans and policies that are related to Watershed Planning in WRIA 11 and actions recommended in this Plan. Chapter 12 summarizes the recommended actions addressing watershed-wide issues from Section 2, and from sub-basin action plans presented in Section 3. Chapter 12 is intended to be a stand alone, pullout chapter containing recommended policies, programs and projects resulting from this planning process. Chapter 13 addresses SEPA considerations for activities recommended in the plan, and Chapter 14 addresses future implementation of watershed planning activities as prescribed in this plan.

11.0 WATER RELATED PROGRAMS, PLANS AND PROCESSES

Numerous ongoing plans, programs and processes in the Nisqually Watershed are related or interact in some way with the Watershed Management Planning process. Furthermore, watershed boundaries do not follow political boundaries, so watershed planning may be a component of or be affected by water-related activities in adjacent WRIAs. This section addresses the interrelationships between the elements of this plan and existing water programs and processes occurring within the WRIA. Roles are clarified in an effort to avoid duplication of efforts.

The relationships between the WRIA 11 Watershed Management Plan and other water related plans and policies are illustrated in Figure 19. Although there are many plans and policies ongoing in and adjacent to WRIA 11, Figure 19 includes only those with explicit relationships to recommended actions in the Nisqually Watershed Management Plan. Related plans and policies are then shown as they relate to key issues in order to help clarify the interaction. These plans and policies are discussed below.

11.1 Issues Affecting Neighboring WRIAs

There are a number of issues identified by the Planning Unit that impact not only the Nisqually Watershed (WRIA 11), but also the neighboring Deschutes Watershed (WRIA 13) and Chambers-Clover Watershed (WRIA 12). The jurisdictional area affected by this Watershed Management Plan is defined by the boundaries of the Nisqually Watershed (WRIA 11), which are drawn based on surface water divides. However, Watershed Management Plans are intended to address groundwater and marine water concerns as well as surface water concerns, and ground and surface water divides are often not the same. There are several components of this plan that require projects or planning associated with groundwater that traverses the boundary between WRIA 11 (Nisqually) and WRIA 13 (Deschutes), and the boundary between WRIA 11 (Nisqually) and WRIA 12 (Chambers Clover). Marine water quality considerations address waters that are not delineated in a WRIA. The difficulty in putting a border around these waters illustrates the need for cooperation between WRIAs.

Ensuring consistency in the planning actions addressing these cross-WRIA issues is of great importance to the Nisqually Planning Unit. As part of this planning effort the Nisqually Watershed Planning Unit will work to facilitate agreements with Planning Units for the Deschutes and Chambers Clover Watershed such that policies and projects addressing groundwater that traverses WRIA boundaries and marine water quality are consistent. This includes, but is not limited to:

- Establishing water quality monitoring agreements when groundwater and surface water boundaries are not the same (The Water Quality Monitoring Plan has been developed under supplemental funding will be used to aid in establishing monitoring agreements).
- Ensuring consistency in policy pertaining to critical groundwater recharge areas that are addressed under critical areas ordinances.
- Batch processing water rights by groundwater divide rather than WRIA boundary. Water right applications for groundwater in the Upper Muck Sub-basin that are included in the Chambers-Clover watershed should be processed with WRIA 12 water rights.
- Investigating and developing a regional water supply from a deeper, and more regional, groundwater system(s) that is present beneath several WRIAs.
- Understanding the impacts of water withdrawal in one WRIA and subsequent use in another (all water balances performed for sub-basins or full watersheds should consider the impacts of withdrawal in one basin and use in another).

- Establishing water quality monitoring agreements for marine and estuarine areas. This has historically been the responsibility of the Nisqually Indian Tribe. These areas could be construed as being within WRIA 13.

11.2 Other Watershed-wide Watershed Plans

11.2.1 Nisqually River Management Plan

The 1987 Nisqually River Management Plan was prepared under Substitute House Bill 323 with the purpose of providing an “overall management plan for the Nisqually River (emphasizing) the natural and economic values of this river of statewide significance” (SHB 323). The Nisqually River Management Plan was prepared by the Nisqually River Task Force, a group that represents a broad range of watershed stakeholders including timber, agriculture, and hydropower interests, conservation and environmental organizations, private landowners, resource management agencies, and the Nisqually Indian Tribe. It currently provides the framework for management of resources within the Nisqually Watershed. This plan has been adopted by Pierce and Thurston Counties as an addendum to their respective comprehensive plans. The Plan provides “policy recommendations and implementation guidelines for stewardship of the economic, cultural and natural resources of the river watershed” (Nisqually River Management Plan, 1987). The key issues addressed by the Nisqually River Management Plan are:

- Public access to the river;
- Flood control and emergency warning systems;
- Fish and Wildlife protection and enhancement;
- Community desires to maintain rural landscapes and economics; and
- Balancing the rights of private landowners with statewide public interests.

Implementation of the Nisqually River Management Plan occurs through the Nisqually River Council, a group formed in 1987 as a coordination organization with no independent authority of its own. It is a council of governments that includes representation of nongovernmental interests.

The Nisqually River Management Plan differs from this Watershed Management Plan (RCW 90.82) in that its focus is narrower, concerning generally the Nisqually River and occasionally adjacent riparian areas. The Watershed Management Plan (RCW 90.82) affects the entire watershed, and affects more large-scale management actions. However, the two plans do interact and overlap. Where there is overlap, cooperation and consistency in goals of both plans will help to focus resources and expenditures on overall needs.

The 1987 Nisqually River Management Plan is currently undergoing an update, to be completed in 2004. It is anticipated that in the plan update, this Watershed Management Plan, other sub-area plans, and the Nisqually Chinook Recovery Plan (or Multi-Species Recovery Plan) will be referenced extensively relative to specific direction on resource management issues addressed in those plans, with the goal of having a unified, coordinated approach to resource management in the Nisqually watershed.

11.2.2 Nisqually Chinook Recovery Plan/Nisqually Multi-Species Recovery Plan

The Nisqually Chinook Recovery Plan was completed in August 2001 with guidance provided by House Bill 2496. Planning was conducted by a stakeholder group called the Nisqually Chinook

Recovery Team and is lead by the Nisqually Tribe. The Nisqually Chinook Recovery Plan has identified both long and short term goals which represent the community's vision for the watershed and the future of its salmon populations. The Nisqually Chinook Recovery Plan is available online at <http://www.nisquallyriver.org/stewards/report.html>.

The proposed recovery plan is an initial product of a three-year effort to develop an integrated multi-species plan for the Nisqually Basin. Restoration of Nisqually Chinook production will contribute toward the recovery of the Puget Sound Chinook stocks that are listed as "threatened" under the Endangered Species Act (ESA). The health of a salmon population depends upon the condition of its environment and the genetic fitness of that population. Information about the past and current Nisqually River Chinook populations, and their environment, provides clues to the causes of their decline and to the potential for their recovery. The Nisqually Chinook Recovery Plan will eventually become a multi-species recovery plan for salmonids. Currently, fall Chinook are being used as an indicator species of habitat conditions and viability of salmonid species in the watershed. In order to avoid duplication of efforts, the WRIA 11 Planning Unit has chosen to defer to the Nisqually Chinook Recovery Plan to address the majority of the habitat component of this Watershed Management Plan.

11.3 Other smaller-scale planning occurring in WRIA 11

On a smaller scale, local sub-basin and stream plans, including the Muck Basin Plan, the Yelm Creek Plan, and the McAllister/Eaton Creek Drainage Plan interact with the overall Watershed Management Plan. In many cases, goals and objectives in these smaller-scale plans have helped drive recommended actions in this Watershed Management Plan.

11.3.1 2003 Muck Creek Basin Plan, Pierce County Public Works and Utilities, Environmental Services, Water Programs

Pierce County Water Programs is currently preparing a series of plans for individual drainage basins in the County. The purpose of the plans, referred to as basin plans, is to describe the actions that are needed to reduce flood hazards and protect water quality and floodplain habitat in each of the 26 basins in the County thereby creating a more focused approach to watershed management than has occurred in the past. Collectively, the basin plans will replace the Countywide Storm Drainage Plan prepared in 1991. Activities in each basin will proceed in three phases. The first two phases are planning phases. Plan implementation and monitoring will occur in the third phase.

Currently, the 2003 Muck Creek Basin Plan is undergoing the Pierce County Council review and approval process. Located in southwest Pierce County, Muck Creek Sub-basin is the largest tributary in size in the Nisqually River Watershed. The Sub-basin is 93 square miles in size and includes Muck Creek and three significant tributaries: Lacamas Creek, the North Fork of Muck Creek and the South Fork of Muck Creek.

The Muck Creek Basin Plan contains a series of capital improvement projects as well as "programmatic" recommendations, or non-structural actions, such as changes to regulations, policies, programs or operations. Twenty-one capital improvement projects are recommended, including three regional infiltration basins, a number of culvert upgrades and improvements to several local drainage systems. Nine stream and riparian restoration projects are also identified. Programmatic recommendations in the Basin Plan are as follows:

- Conduct a Low Impact Development Pilot;
- Adopt updated stormwater management standards;

- Increase compliance inspections;
- Develop and implement a land acquisition program for riparian areas;
- Develop and implement a program to enhance degraded riparian habitat and water quality;
- Develop and implement an education, outreach and technical assistance program;
- Develop and implement a surface water management monitoring program;
- Develop and implement BMP manual for Pierce County Surface Water Utility maintenance activities;
- Develop and implement an invasive species management program.

Four studies are also recommended in the Plan, including an evaluation of groundwater migration near the Northeast Muck Creek/Clover Creek Basin boundary. In addition to providing a basis for determining appropriate basin boundaries, the study would include information to develop alternatives for stormwater management within this particular area. Specifically, the study would (a) confirm groundwater movement in the area; (b) determine and assess impacts of alternative solutions for stormwater management; (c) determine basin boundaries; and (d) contain a public process for local community involvement during the study.

The Basin Plan's recommended actions have been prioritized as "high", "medium", or "low". To ensure that the full benefits of all projects are realized, implementation will not follow the exact sequence of the first project to the last project in the "high" category, followed by the first action in the "medium" category and so forth. The following factors will impact the exact implementation order:

- Available funds;
- Available staff and professional service needs;
- Cooperation from private landowners;
- The fact that the best implementor may be an agency other than Pierce County Public Works and Utilities; and
- New information, regulations or emerging issues.

11.3.2 Fort Lewis

Approximately one quarter of the Muck Creek basin lies within Fort Lewis and includes nearly all of the lower portions of the stream system. Training activities at the Fort have the potential to impact the stream. However, the Army has installed hardened crossing sites and restricts vehicular traffic along the creek to minimize any impacts to the stream.

Nearly the entire lower portion of the Muck Creek stream system lies within Fort Lewis. Actions carried out on the Fort will be critical in maintaining and improving stream habitat and water quality. These action may include: stream and wetland restoration projects; a field assessment of Muck Creek; management of flow relates from Chambers Lake in a manner consistent with Pierce County's Muck Creek Basin Plan and; assistance in the Basin Plan's long term monitoring program.

11.3.3 Community planning

Community planning is taking place in Pierce County. Community Plans will be consistent with Comprehensive Plans, but will include greater detail. Community planning involves local citizens and looks at the community scale issues as opposed to the county wide scale covered in a Comprehensive Plan. The Community planning process is also currently occurring in Graham.

11.4 **Supplemental Assessments**

Watershed Plans are required to address water quantity, and may choose to address water quality, storage, instream flows, and habitat. In WRIA 11, water quality, storage, and instream flows are being addressed through funding for supplemental assessments, as described in Section 1.4.1 of this document. In order to avoid duplication of efforts, the WRIA 11 Planning Unit has chosen to defer to the Nisqually Chinook Recovery Plan to address habitat. Development and implementation of salmon habitat recovery measures under HB 2496 & 5595 is lead by the Nisqually Indian Tribe.

11.5 **Hydroelectric Projects**

There are two hydroelectric projects on the Nisqually River. Each operates under license issued by the Federal Energy Regulatory Commission (FERC) and these licenses determine, among other things, the minimum flow requirements downstream of the project.

11.5.1 Tacoma Power – Nisqually River Hydroelectric Project – Project No. 1862

Tacoma Power owns and operates a hydroelectric project on the Nisqually River. The project consists of two dam facilities located between river mile (RM) 40.8 and RM 51.6. The Alder development includes a 285-foot high concrete arch dam that impounds Alder Lake, a 7.4-mile long reservoir with a maximum surface area of 3,065 acres. The LaGrande development consists of a 192-foot high concrete gravity dam impounding the 45-acre LaGrande reservoir. The project is operated under a license issued by the Federal Energy Regulatory Commission (FERC). The 40-year FERC License (No. 1862) for the Nisqually River Hydroelectric Project was issued on March 7, 1997. This license contains articles pertaining to mitigation and operational requirements including minimum seasonal instream flows and ramping rates.

On September 17, 2003, the Low Impact Hydropower Institute (LIHI) awarded the Nisqually Project a low impact certification. The Nisqually Project became the third hydropower facility to earn LIHI certification in Washington State and the eighth nationwide.

11.5.2 City of Centralia – Yelm Hydroelectric Project – Project No. 10703-001

The Yelm Hydroelectric Project is a 12 MW run of river project located on the Nisqually River. The project consists of a low head diversion dam located at RM 26.2, a 9.1-mile power canal and a powerhouse (located at RM 12.6) with three vertical Francis turbine generators. The dam, reconstructed in 1985, is a concrete gravity dam with a structural height of 20 feet, but a hydraulic height of only 4 feet at low stages. During high stages the dam is almost completely submerged with a difference between headwater and tailwater of less than one foot.

The Centralia Power Canal diverts water at the diversion dam about six miles southeast of Yelm, and returns flow to the Nisqually River at the powerhouse approximately three miles northwest of Yelm. The difference in elevation between the water in the canal and the river is about four feet at the downstream side of the diversion dam and increases to 200 feet at the powerhouse.

This project was first constructed in 1930 and expanded in 1955. The project is operated under a 40-year FERC license (No. 10703-001) issued on March 7, 1997.

11.6 Planning Processes Related to Key Plan Issues

Figure 18 illustrates the relationship between each of the key issues identified in this watershed plan and related programs, projects and planning processes. The following sections further describe these relationships.

11.6.1 Growth and Land Use

The overarching planning umbrella that affects the Growth and Land Use component of this Watershed Management Plan is the Growth Management Act, which prescribes Comprehensive Land Use Plans for municipalities including Lacey, Olympia, Yelm, Roy, Eatonville, and Pierce, Thurston, and Lewis Counties. These Comprehensive Land Use Plans include policies and programs that affect Growth and Land Use in the watershed, and subsequently use of watershed resources (Figure 18).

In addition to the Pierce County Comprehensive Plan, Pierce County has also elected to develop Community Plans. Community Plans express the voice of local citizens in how the general Comprehensive Plan and its development regulations will be carried out in specific communities. Community Plans indicate specific land use designations, appropriate densities, and design standards. In 1999, the Pierce County Council adopted a Community Plan for the Upper Nisqually Valley. Currently, residents of the Graham area are working to complete a Graham Community Plan which is expected to be completed in 2004.

Two additional planning processes affect the way in which water supply is developed in the Nisqually Watershed; each of these planning umbrellas operate at a different scale. The State of Washington requires that Water System Plans be prepared by each individual water purveyor that serves one thousand households or more. These plans demonstrate how each individual water system provides water based on land use, zoning and local growth projections. Recommended actions in this Watershed Management Plan may affect Water System Plans.

Water System Plans are, in all of Pierce County and parts of Thurston County, under the umbrella of Coordinated Water System Plans (CWSP). CWSPs affect the Growth and Land Use component of the Watershed Management Plan. Coordinated Water System Plans (CWSPs) are implemented to coordinate groups of public water systems within a defined area. Three separate Coordinated Water System Plans are currently being implemented in the Nisqually Watershed; two in Thurston County and one that encompasses the entirety of Pierce County. There is no CWSP for Lewis County. Each CWSP is overseen by a committee of water purveyors that form a Water Utilities Coordinating Committee (WUCC). Currently, each CWSP in the Nisqually Watershed is implemented differently; changes in CWSPs are included as action items in the Growth and Land Use section of this Watershed Management Plan.

Preliminary identification of regional groundwater supply options also affects the Growth and Land Use component, as many of the recommended actions depend upon the regional aquifer concept. This concept is still in the discussion stages, and is not a concrete policy or plan.

11.6.2 Groundwater Resources

Upgrading Critical Areas Ordinances for consistency and protection of Critical Aquifer Recharge Areas is also specified by this Watershed Management Plan. These Critical Areas Ordinances both affect and are affected by actions specified in the Groundwater Resources component of the

Watershed Management Plan. Exempt Well Policies are currently undergoing review and changes in many localities in the watershed. The outcome of these changes is both affected by and will affect the Groundwater Resources component of this Watershed Management Plan (see Figure 18).

Preliminary identification of regional groundwater supply options also affects the Groundwater Resources component, as many of the actions recommended in this section depend upon the regional aquifer concept. The source of this water, which will be referred to as the Nisqually Aquifer, has the potential to provide water for supporting some growth in the region without negatively impacting instream flows in the Nisqually River. However, more study and a clear definition of the lateral and vertical extent of this aquifer are required before the role of the aquifer in providing regional supply can be confirmed.

11.6.3 Water Rights

The Water Rights component of this Watershed Management Plan intends to guide the manner in which the Department of Ecology conducts water rights processing in the watershed (Figure 18). The Watershed Management Plan makes recommendations to Ecology to batch process water right applications by sub-basin with specific recommendations for each sub-basin. This recommended action is considered a directive to Ecology, as the agency has been waiting to process water rights in WRIA 11 until the Planning Unit provided input and guidance in this Watershed Management Plan. Water rights processing by Ecology is also affected by minimum instream flow regulations that have been established in WRIA 11 by Ecology under the Instream Resource Protection Program (IRPP) (Chapter 173-511 of the Washington Administrative Code). The Reclaimed Water Act and Yelm's Reclaimed Water Comprehensive Plan both affect the Water Rights component of this Watershed Management Plan in regard to recommended mitigation strategies for water rights processing. In Thurston County, a Conservancy Board gives direction to Ecology for the processing of water right transfers.

11.6.4 Instream Flows

The Instream Flow component of this Watershed Management Plan is affected by any mechanism that determines the amount of water in a stream at any time. Therefore minimum instream flow regulations in WRIA 11 under the Instream Resource Protection Program (IRPP) strongly affect the Instream Flow component of the Watershed Management Plan, as does water rights processing by Ecology. The instream flow component of the Plan is also affected by local sub-basin and stream plans including the Muck Basin Plan and the Yelm Creek Plan, although the other two aforementioned processes generally have a stronger, more direct effect on overall instream flows within the watershed.

11.6.5 Water Quality

The Water Quality component of the Watershed Management Plan is affected by Stormwater Management Plans in municipalities including Yelm, Roy, Eatonville, Pierce County, and Thurston County, as stormwater management practices may drive water quality in some situations. Also, Wellhead Protection Plans in municipalities including Eatonville, Yelm, Lacey, Olympia, Pierce County, and Thurston County provide directives and recommendations that affect the Groundwater Quality component of this Watershed Management Plan.

11.7 **Related and Concurrent Processes**

Some planning and political processes simply occur concurrently with the Watershed Management Planning process. A comprehensive list of these processes, along with water related plans and

policies pertinent to the actions prescribed in this Plan, are listed in Figure 20. In this figure, related plans and processes are grouped by responsible agency. Start dates and finish dates listed generally pertain to either a plan/process update or to an implementation timeframe. Although all plans and processes included in this figure may not necessarily affect watershed planning *at this time*, most have some application to the water resource in the Nisqually watershed.

12.0 NISQUALLY WATERSHED MANAGEMENT PLAN – SUMMARY OF RECOMMENDED ACTIONS

The Nisqually Watershed Planning Unit has opted to address Watershed Planning at two scales, a watershed-wide scale and a sub-basin scale. Recommended actions are also provided at these two scales. High priority issues affecting the entire watershed were defined by the Planning Unit, and this plan prescribes recommended actions in the form of policy statements, management strategies, and projects at a watershed scale for these high priority issues. In three sub-basins, pending water issues require specificity and immediate action. Three sub-basin action plans that specify recommended local, near-term actions are also included as part of this plan.

This chapter is intended to serve as a stand-alone document listing all the recommended actions in the Plan for purposes of review. The code used for the action in the text and a short description or title of each of the recommended actions is provided as a reference in the following Tables 11-19. A description of each action is presented following the summary tables. The “action code” is consistent throughout the document for reference.

Recommended action items are excerpted from the following sections of the Plan:

Watershed-wide Issues/Actions

- Growth and Land Use – Table 11
- Groundwater Resources and Supply – Table 12
- Water Rights in Closed Watersheds – Table 13
- Instream Flows – Table 14
- Water Quality – Table 15

Actions/ Issues from Sub-basin Action Plans

- McAllister Sub-basin – Table 16
- Yelm Sub-basin – Table 17
- Mashel/Ohop Sub-basin – Table 18

Actions/Issues from Implementation Chapter

- Implementation – Table 19

TABLE 11

Growth and Land Use – Action Code and Title
(Corresponds with Chapter 3 and Chapter 12.1.)

Code	Action Title
GLU-1	Consider water supply availability in planning for growth.
GLU-1a	Look for opportunities to resolve inconsistencies between Pierce and Thurston County CWSPs
GLU-1b	CWSPs required to include a supply element.
GLU-1c	County-wide CWSP for Thurston County.
GLU-1d	Linkage between water availability certificates and exempt wells within CWSPs.
GLU-1e	CWSPs address water rights associated with failed systems.
GLU-1f	Purveyors provide counties with amount of water for hook-ups.
GLU-2	Amendments to Comprehensive Plan updates should demonstrate how infrastructure needs will be met.
GLU-3	Consideration of water supply availability in UGA expansions outside the water service area.
GLU-4	Retain adequate water rights on agricultural lands.
GLU-5	No water right transfers from designated agricultural land without suitable surrogate water supply.

TABLE 12

Groundwater Resources and Supply – Action Code and Title
(Corresponds with Chapter 4 and Chapter 12.2.)

Code	Action Title
GW-1 (RS)	Identify Nisqually Aquifer as a possible regional supply.
GW-2 (RS)	Investigate technical feasibility of the Nisqually Aquifer as a regional supply.
GW-3 (GD)	Policy statement addressing WRIA boundaries versus groundwater divides.
GW-4 (GD)	Address locations of groundwater divide between WRIAs 11 and 12.
GW-5 (AR)	Address Aquifer Recharge Areas under Critical Areas Ordinances.
GW-5a (AR)	Evaluate adequacy of protection provided by Critical Areas Ordinances.
GW-5b (AR)	Ensure process is in place to update CAOs with municipalities' input.
GW-5c (AR)	Ensure relevant technical information available for CAO updates.
GW-5d (AR)	Jurisdictional review of CAOs.
GW-5e (AR)	Land uses with potential to pollute groundwater in CARAs should have priority for expedited clean-up.
GW-7 (EW)	Ecology should provide more thorough oversight of exempt wells.
GW-7a(EW)	Ecology should study cumulative impacts of exempt wells and increase enforcement.
GW-7b(EW)	Address drilling of exempt wells where they may impact surface water.
GW-8 (EW)	Develop policy on exempt well water rights transfer for water right credit.

TABLE 13

Water Rights (General and Processing in Closed Sub-basins) – Action Code and Title
(Corresponds with Chapter 5 and Chapter 12.3)

Code	Action Title
WR-1	Current water right application processing – Recommendations to Ecology
WR-1a	Water right applications – McAllister subbasin
WR-1b	Water right applications – Yelm subbasin
WR-1c	Water right applications – Mashel subbasin
WR-1d	Water right applications – Toboton/Powell/Lackamas subbasin
WR-1e	Water right applications – Muck/Murray subbasin
WR-1f	Water right applications – Tanwax/Kreger/Ohop subbasin
WR-1g	Water right applications – Upper Basin subbasin
WR-2	Recommendation that Ecology be staffed at a level that ensures timely response to water right applications and monitoring of withdrawals.
WR-3	Recommended mitigation strategies for water rights processing.
WR-4	Credit for reclaimed water.
WR-5	Recommendation to Ecology to reconcile ambiguity in Reclaimed Water Act.
WR-6	Mechanism for water rights governing body support of water right application.
WR-7	Address sub-basin closures (see ISF-2 and ISF-3).
WR-8	Investigate the potential for a water bank.
WR-9	Development of watershed-wide water balance.

TABLE 14

Instream Flows and SW/GW Continuity Issues – Action Code and Title
(Corresponds with Chapter 6 and Chapter 12.4)

Code	Action Title
ISF-1	Creation of a policy statement to support protection of instream resources.
ISF-2	Gain better understanding of technical basis for stream closures watershed-wide.
ISF-3	Identify and gage flow compromised streams based on intermittent nature and beneficial use(s).
ISF-3a	Yelm Creek ISF-3
ISF-3b	Muck Creek ISF-3
ISF-3c	Powell, Murray, Toboton, Tanwax, and Horn Creek ISF-3
ISF-4	Research the GW/SW continuity issues in Yelm and Eatonville
ISF-5	Identify or study methods of surface water augmentation.

TABLE 15

Water Quality – Action Code and Title
(Corresponds with Chapter 7 and Chapter 12.5.)

Code	Action Title
WQ-1	Implement watershed-wide Water Quality Monitoring Plan
WQ-2	Maintenance and use of the Nisqually Water Quality Data System.
WQ-3	Convene a workgroup to address potential inconsistencies in handling of pollutants between federal and State agencies and utilities
WQ-4	Address land uses that may threaten watershed health through an open forum.
WQ-5	Ensure adequate water quality monitoring of groundwater in designated CAOs.

TABLE 16

McAllister Sub-basin Action Plan – Action Code and Title
(Corresponds with Chapter 8 and Chapter 12.6.)

Code	Action Title
MC-1	Identify the Nisqually Aquifer as a possible source for a regional water supply.
MC-1a	Sub-basin committee support of GW-2(RS).
MC-1b	Identify potential participants in a regional water supply.
MC-1c	Research logistics for governing a regional water supply.
MC-2	Sub-basin committee support of WR-1a.
MC-2a	City of Lacey short term water supply solutions.
MC-2b	City of Olympia short term water supply solutions.
MC-3	Improve understanding of direction of groundwater flow.
MC-4	Recommend options for mitigating impacts from other applications and long term water supply solutions.
MC-5	Develop programs for monitoring potential impacts to existing water rights.
MC-5a	Potential flow monitoring on Lower Nisqually River
MC-5b	Long term monitoring for impacts from regional supply.
MC-6	Sub-basin committee support of GW-3(GD)
MC-7	Recommendations for Nisqually/McAllister TMDL
MC-8	Regional water supply governing structure.
MC-9	Develop and implement strategies for protecting regional supply.
MC-9a	Wellhead protection plan for regional water supply.
MC-9b	Recharge and time-of-travel areas should be used to delineate wellhead protection areas.
MC-9c	Critical Areas Ordinances protection of regional water supply needs to be evaluated.
MC-10	Implement long-term monitoring programs from MC-5 through MC-7.
MC-11	Recommend Ecology establish target flows for freshwater spring discharges into McAllister Creek.
MC-12	Update water budget for sub-basin.

TABLE 17

Yelm Sub-basin Action Plan – Action Code and Title
(Corresponds with Chapter 9 and Chapter 12.7.)

Code	Action Title
Y-1	Refine or revise Yelm sub-basin water balance.
Y-2	Pursue opportunities for existing water rights transfers.
Y-3	Determine if there is a likelihood that wells draw water from Nisqually Aquifer.
Y-4	Develop policy of transfer of exempt wells' water to City of Yelm and submit to DOE for credits.
Y-4a	Ecology to put Y-4 into action.
Y-4b	Policies and procedures to facilitate exempt well transfers.
Y-4c	Capture abandoned wells.
Y-5	Develop policy to provide water use credit for reclaimed water.
Y-5a	Calculate water that returns to the aquifer through constructed wetlands.
Y-5b	Contact others with similar goals (Y-5) and perhaps form a committee.
Y-5c	City of Yelm should meet with AWC to promote this concept (Y-5).
Y-6	Draft and adopt a CWRP.
Y-6a	Comprehensive approach for reclaimed water system to identify new reuse opportunities and the location and sizing of new reclaimed water pipe.
Y-6b	Develop CWRP so it is integrated with WSP.
Y-6c	Plan, budget, and implement improvements in the CWRP.
Y-7	If applicable, expand McAllister Numerical Model to southwest Yelm and participate in a feasibility study.
Y-8	If regional water supply is not feasible, determine correlation between summer low/no flow conditions in Yelm Creek and use of the Yelm Prairie aquifer.
Y-8a	Retain consultant to perform Yelm Prairie aquifer modeling and analysis.
Y-8b	Gather data to demonstrate relationship between groundwater and surface water flows in Yelm and Thompson Creeks.
Y-8c	Recommendations on mitigation to low flows in Yelm and Thompson Creeks.
Y-9	Sub-basin committee support of GW-7, GW-7a, GW-7b.

TABLE 18

Mashel/Ohop Sub-basin Action Plan – Action Code and Title
(Corresponds with Chapter 10 and Chapter 12.8.)

Code	Action Title
MO-1	Complete instream flow assessment of Mashel River.
MO-2	Complete groundwater hydrology investigations as recommended by Eatonville planning consultant.
MO-3	Obtain DOH guidance to address the conservation portion of WSP.
MO-4	Begin developing conservation strategy for the Town of Eatonville.
MO-5	Update Eatonville's WSP.
MO-6	Seek funding to update WSP.
MO-7	Complete Stormwater Management Plan and mitigate stormwater runoff problems.
MO-8	Address long term UGA boundaries and adjust to reflect realistic future land use.
MO-9	Protect fish habitat.
MO-10	Evaluate supply potential.
MO-11	Improve shoreline protection.
MO-12	Protect water quality.
MO-13	Land use impacts on water quality.
MO-14	Other actions including storage and purchase of water rights.
MO-15	Growth Management Act issues.
MO-16	Sub-basin committee support of GW-3.

TABLE 19

Implementation – Action Code and Title
(Corresponds with Chapter 14 and Chapter 12.9.)

Code	Action Title
IM-1	Enable spending supplemental dollars on phase IV
IM-2	Support existing and new programs to prevent duplication and inconsistencies.
IM-3	Partnership and/or coordination with other on-going or planned processes.
IM-4	Implementing body should participate in seeking funding.

The following Sections 12.1 through 12.9 contain action codes and a description of each action as excerpted directly from the text of the WRIA 11 Watershed Management Plan.

12.1 Growth and Land Use Actions

GLU - 1 Water supply availability should be considered in city and county land use planning activities. As such, an integrated approach to planning for water for growth in WRIA 11 via the CWSP process should be developed.

Actions Specific to CWSP Updates

GLU – 1a Look for opportunities to resolve inconsistencies between Pierce and Thurston CWSPs such that all CWSPs within the Nisqually Watershed are consistent in their review and coordination of Water System Plans and are also reviewed with respect to consistency with comprehensive plans.

As a part of this action, the Planning Unit expects the implementation body for watershed planning and the counties to work together to develop coordinated programs for CWSPs that are then approved by the counties.

GLU – 1b Recommend to DOH that each CWSP be required to include a supply element (and not just service area) from individual water supply plans. This recommendation does not require a revision to the Coordination Act.

GLU – 1c Recommend that a County-wide CWSP for Thurston County be developed as a means to implement recommendations identified in this section including ensuring adequate water supply and limiting the numbers of exempt wells where alternate supply is available. This CWSP will address any potential inconsistencies between South Thurston and North Thurston CWSPs and form an integrated North and South Thurston CWSP.

GLU – 1d Develop linkage between issuance of water availability certificates and exempt wells in areas encompassed by a CWSP (see Exempt Wells, Section 4.2.6)

GLU-1e Recommend that CWSPs address water rights associated with failed water systems. CWSPs should specify that when purveyors take over failed water systems that have their own source(s), the acquisition should also include the water rights for the water service area.

GLU-1f CWSPs should require purveyors to provide counties information about how much water is available for hook-ups through approval of Water System Plans. This would allow Counties a working number of connections remaining under the existing Water System Plan or Water Right approval, understanding that this number may be subject to change based on water usage and mitigation factors.

General Planning Policies

GLU – 2 Legislative amendments to comprehensive plan land use designations that intensify land use should demonstrate how infrastructure needs will be met at the time of development.

GLU - 3 For proposed Urban Growth Boundary expansions that are outside the jurisdiction of a water service area, the proposal for expansion should include documentation of the city or town's intention to provide water, their ability to provide water, or the ability of the development to provide water if it is to be self-served. Burden of proof is left to the applicant for the expansion

GLU-4 Adequate water supply should be retained on and provided to designated agricultural land of long-term commercial significance and other important agricultural areas. These areas are defined through comprehensive plans and codified in zoning ordinances. Zoned agricultural areas for Thurston and Pierce County are shown in Figure 6.

GLU -5 Ecology should not grant permits for transfers of existing water rights from designated agricultural lands, unless long-term arrangements are made for a suitable surrogate water supply to maintain agricultural use. (This action statement mirrors recent amendments proposed by the Thurston County Planning Commission for the County's Comprehensive Plan, and may require a rule change by Ecology).

12.2 Groundwater Resources and Supply

Regional Supply Actions

GW-1 (RS) Identify the Nisqually Aquifer as a possible source for a regional water supply to be used to supply water in multiple sub-basins in WRIA 11 (see also McAllister Sub-basin Action Plan, Chapter 8, MC-1, MC-3, MC-5). Furthermore, the State of Washington should formally recognize the Nisqually Aquifer, as that portion of the Qc (Salmon Springs Drift and penultimate deposits) and TQu (unconsolidated and undifferentiated sediments underlying the Qc) that are below sea level and discharge primarily to Puget Sound.

GW-2 (RS) Investigate the technical feasibility of development of a regional water supply in the McAllister Sub-basin that does not have a negative impact to existing water right holders, and has the potential to cause the least impact to, or improve, the quality and quantity of surface waters as compared to other potential source options. The Nisqually Indian Tribe will initiate the discussion and lead the investigations that determine, with its regional partners, how much water is available for appropriations from the Nisqually Aquifer. If it is determined that a regional water supply is available from the McAllister sub-basin, the Tribe will initiate discussions to facilitate agreements, with its regional partners, on ownership, management, operation, and finance of a Nisqually Aquifer Regional Water Supply. All agreements must include approval from the Nisqually Indian Tribe.

The Planning Unit supports the concept of developing groundwater supply in areas with plentiful supply and least impact to the resource and using this supply as a regional source to augment supply in sub-basins in need; potentially resolving supply problems and low flow conditions in some areas. The Planning Unit recommends transfer of water between sub-basins only when the needs

Projects and rationale supporting this regional (inter-basin) supply concept are presented in the McAllister and Yelm Sub-basin Action Plans (see Chapters 8 and 9).

Policy statements and action items regarding differences in WRIA boundaries and groundwater divides

GW-3 (GD) Policy Statement Addressing WRIA Boundaries versus Groundwater Divides

For instances where WRIA boundaries and groundwater divides are not the same, the Nisqually Watershed (WRIA 11) Planning Unit will work with the Planning Units from WRIA 12 (Chambers Clover Watershed) and WRIA 13 (Deschutes Watershed) to develop a policy for coordination and congruence for groundwater that does not follow the WRIA boundaries. It is important to recognize that the Nisqually Aquifer receives a significant amount of recharge and flow through from areas that are defined by surface boundaries as WRIA 13. In turn, the Regional Water Supply is intended to meet demand in both WRIA 11 and WRIA 13. Consequently, WRIAs 11 and 13 should coordinate on efforts for preserving the quality and quantity of water that supplies the Nisqually Aquifer. This action is supported by action MC-6 in the McAllister Sub-basin Action Plan.

We recommend that the WRIA 11 Planning Unit and its successor (i.e., the authority that will implement the Nisqually Watershed Plan), lead a collaborative approach between WRIA 11 and WRIA 13 for managing and protecting groundwater resources that supply the Nisqually Aquifer. In addition to completing technical studies listed in this plan, it

will be necessary to identify actions that extend beyond the boundaries of WRIA 11, and for quantifying recharge from WRIA 13 that will be needed to provide sufficient recharge of a regional water supply that supplies both WRIsAs. This will likely include policy to address systems such as the Nisqually Aquifer which flows beneath both WRIA 11 and WRIA 13 and water rights processing in the upper Muck Sub-basin (WRIA 11 and WRIA 12). For water rights processing in the upper Muck area, oversight of groundwater should be based on the location of the groundwater divide.

GW-4 (GD) Address locations of groundwater divides through a joint study, or development of joint management strategies, with the Chambers Clover Planning Unit to identify groundwater divide between WRIsAs 11 and 12.

Actions Pertaining to Aquifer Recharge Areas

GW-5 (AR) Address Aquifer Recharge Areas under the Critical Areas Ordinances to preserve the long-term integrity of recharge areas (both quantity and quality) and implement studies to delineate critical recharge areas.

GW-5a (AR) During any amendments mandated by the Growth Management Act, evaluate adequacy of Critical Areas Ordinances and data supporting them, and whether they provide adequate protection (e.g., paving, permeability, land use issues). This includes geographic scope and dynamics of recharge areas. This will require coordination with Fort Lewis, as Fort Lewis grounds overlay a critical aquifer recharge area for the regional Nisqually Aquifer.

GW-5b (AR) Ensure a process is in place to obtain the input of municipalities when a Critical Areas Ordinance is updated. Support current efforts, suggest a review process, and link projects to updates of the Critical Areas Codes or Ordinances for respective entities (e.g., cities and counties). Critical Areas Ordinance language to protect aquifer recharge should include stormwater provisions that encourage low impact development techniques to retain natural land cover, reduce impervious surfaces, and maximize infiltration of stormwater.

GW-5c (AR) Coordinate the collection of relevant technical information regarding recharge areas and assure it is made available during updates of critical areas ordinances. Ensure that all wellhead protection areas as delineated by water purveyors are incorporated into Critical Areas Codes or Ordinances.

GW-5d (AR) Perform jurisdictional review of Critical Areas Ordinances and include the following activities:

Land uses and practices that could threaten groundwater quality, particularly when located in Critical Aquifer Recharge Areas, include landfills, direct application of pesticides, herbicides, and other pollutants, accumulation of animal waste, logging and other silvicultural activities, municipal and industrial discharge, industrial point source pollution, mining, commercial operations such as gas stations, and others.

Compare Critical Areas Codes and Ordinances for consistency in activities that are permitted in the Critical Aquifer Recharge Areas to ensure that new land uses with the potential to degrade groundwater quality are not allowed in Critical Aquifer Recharge Areas in any jurisdiction, or impacts are mitigated through the development review

process. Groundwater quality will be affected by restrictions placed on new land uses, and can be partially protected by implementing the standards of the local Critical Areas Code or Ordinance for new land uses in Critical Aquifer Recharge Areas. Also, Critical Areas Codes or Ordinances should be assessed to gain a complete picture of pollutant levels that are allowed by each use.

Assess the provisions for Critical Aquifer Recharge Areas designations, and determine if any non-conforming land uses are currently sited within the 6-month to one-year time-of-travel zone in delineated wellhead protection areas. If these non-conforming land uses are found, they need to be closely monitored for potential pollution practices and any reported spills or accidents need to be reported to the jurisdiction immediately. Some cities in these areas are looking at phasing out non-conforming uses, such as landfills, gas stations, dry cleaners, etc., after the sale of the property occurs or if the contamination threat is great, setting a timeline for eliminating the land use activity all together (such as within 10 years).

GW-5e (AR) All land uses within critical recharge areas that are shown to contaminate groundwater, or soils, that have the potential for contaminating groundwater, should have the highest priority for expedited cleanup. If these land uses are nonconforming uses they should be prohibited from further contaminating groundwater.

Actions Pertaining to Exempt Wells

Ecology review comments state that “if the Planning Unit’s technical analysis suggests specific areas are being negatively impacted by exempt wells, it may be reasonable to invoke WAC 173-511-070(3) at the suggestion of the Planning Unit”.

GW-7 (EW) This plan recommends that Ecology provide more thorough oversight of exempt wells (see WAC 173-511-070). The issuance of a start card (notice of intent to drill) for an exempt well by well drillers and Ecology’s database of start cards should be consistent with available information on Coordinated Water System Plan service area boundaries, available hydrogeologic information on local aquifers, and cumulative effects of exempt wells. Small water withdrawals are appropriate in areas of dispersed development and where other sources of water are not available. This recognition, however, does not preclude the management of exempt wells to avoid impacts to streams and to prevent overuse of aquifers and to prevent impairment of nearby water supplies.

GW-7a (EW) Exempt wells are a statewide issue, caused in part by the fact that, due to lack of resources, the Department of Ecology has not consistently enforced existing laws and requirements or followed the Attorney General’s 1998 opinion on exempt wells.

The Department of Ecology should study the cumulative impacts of exempt wells and consider setting a basin-wide standard for the number of houses allowable per exempt well.

This plan recommends that Ecology increase their enforcement of the exempt well statute¹ and develop an Exempt Well Action Plan to achieve compliance with the intent of the exempt well withdrawal statute including the following:

¹ Ecology comments stated that they have selectively enforced the exempt well laws as resources have permitted.

- Evaluate hydrologic impacts of exempt wells on surface and groundwater resources, including impacts on state objectives for minimizing the proliferation of water systems and ensuring effective conservation.
- Assess effectiveness of current exempt well withdrawal statute and implementation practices.
- Require the decommissioning of existing old wells when they have been replaced by new “replacement wells”
- Identify rule or policy development needed to ensure effective implementation of the statute, and initiate rule/policy formation.
- Define and issue a clear timeline for the Ecology exempt well action plan including clear milestones, based on the most expedient, feasible timeframe.
- Clarify the intent and include in the exempt well action plan information regarding WRIA 11 Instream Resource Protection Program WAC 173-511-070 reference to exempt wells.
- If Ecology determines that there is a role for counties in implementing the exempt well action plan, the state will need to provide resources to the counties.

GW-7b (EW) Once sufficient information is gathered on the cumulative impacts of exempt wells as directed in GW-7a (EW), the Planning Unit may wish to consider avenues to address the drilling of exempt wells in areas where technical data indicate they may have impact on surface water systems. In sensitive areas, this might include the option of drilling in deeper aquifers that are more protective of surface water, if available. In these cases, however, practical consideration should be given to the occurrence of high iron and manganese in deeper subsurface systems in the watershed. Technical data are required. At a later date, after the recommendations to the Department of Ecology have been addressed by Ecology, the Planning Unit may also wish to prescribe mitigations for exempt wells where deeper withdrawal levels are unattainable.

GW-8 (EW) Develop a policy of transfer of exempt wells’ water rights within a water service area or urban growth area to a water purveyor and submit to Ecology for water right credit. Define how much credit should be granted for taking exempt wells off line as part of this policy. Currently, RCW 90.44.105 specifies requirements for consolidation of rights for exempt wells. The statute specifies that “The amount of water to be added to the permit holders certificate upon discontinuance of the exempt well, shall be the average withdrawal from the well in gallons per day, for the most recent five year period preceding the date of the application except that the amount shall not be less than 800 gallons per day for each residential connection or such alternative minimum amount as may be established by the Department in consultation with the Department of Health and shall not exceed 5000 gallons per day. Ecology has stated it is interested in responding to any proposals the Planning Unit has with respect to determining the appropriate amount of credit for exempt wells in specific sub-basins.

12.3 Water Rights (General and Processing in Closed Sub-basins) Recommended Actions

WR-1 Current Water Right Application Processing - Recommendation to Department Ecology

Ecology Water Resources staff have agreed to “include the processing of WRIA 11 applications in its 2004 workplan provided that they concur that adequate information exists to support their decision making” (Ecology Water Resources Comments on Draft Nisqually Watershed Management Plan – August 14, 2003).

The Nisqually Watershed Planning Unit recommends that the Washington State Department of Ecology (Ecology) batch process water right applications by sub-basin in the Nisqually Watershed when data available for processing are considered adequate for each sub-basin. The Planning Unit is recommending that sub-basins be processed in a specific order because some sub-basins have data that are adequate for processing water rights while others do not. Sub-basin based processing will help to avoid delay in processing water rights where data are available. The order of processing is based on the Planning Unit’s understanding of information currently available, and is proposed as follows:

6. McAllister
7. Yelm and Mashel
8. Toboton/Powell/Lackamas
9. Muck/Murray and Tanwax/Kreger/Ohop
10. Upper Basin

The Planning Unit recommends that McAllister sub-basin be processed at the time Ecology begins addressing water right applications in WRIA 11. Yelm and Mashel sub-basins should be processed after additional information (outlined below) is collected. The order of processing is subject to revision based on availability of additional data, and the Planning Unit recognizes that the order of the recommendation is subject to change.

The Planning Unit requests regular meetings with Ecology during the processing of water rights to assure the intent of this recommendation is maintained, and that revisions to the order above are consistent with the intent. Furthermore, the Planning Unit advises that if applicants in the Yelm and Mashel sub-basin(s) are still involved in data collection activities at the time those sub-basins are eligible for processing, that Ecology move forward to the next sub-basin. If Ecology determines that a sub-basin is lacking sufficient data for processing, Ecology will provide comment on what data are required prior to moving to the next sub-basin in the order.

The adequacy of data and the issues of concern that should be considered while processing water right applications in each sub-basin are discussed below, by sub-basin. These considerations and recommendations are reflective of the participation on the Nisqually Watershed Planning Unit.

It should be noted that this recommendation to process water rights in a sub-basin does not imply a recommendation to approve water right applications. In some sub-basins, there may be inadequate data that can only be overcome by a large data collection project. The Planning Unit does not want to place the financial burden of a large data

collection project or study on an individual or small water purveyor waiting for the processing of their water right application.

WR-1a ***McAllister Sub-basin –13 pending applications***

The McAllister Numerical Model is the best available tool for evaluating impacts to McAllister Creek from withdrawals from the McAllister/East Lacey and Nisqually aquifers. We recommend that all water rights applications for water withdrawal from the McAllister/East Lacey aquifer within the McAllister sub-basin be evaluated using either the McAllister Numerical Model or a new expanded model built upon it.

Upon adoption of this Plan, Ecology Water Resources should add processing all water rights applications within the McAllister Sub-basin to their work plan. Data collection and modeling have occurred in the McAllister sub-basin, and will assist in processing current water right applications. At this time sufficient technical information is believed to be available for Ecology to process water rights applications from within the sub-basin. Yelm's applications may also be included in this batch if Yelm is able to provide information showing that its wells primarily capture water within the McAllister Sub-basin. In addition, it is possible that there are applications for groundwater listed in WRATs as WRIA 13 that will request water primarily from within the McAllister Sub-basin. (See recommended action WR-3 and the McAllister Sub-basin Action Plan for additional detail and applicable, acceptable mitigation strategies). The burden of proof that a proposed water right actually draws from the Nisqually Aquifer although it is physically located outside the sub-basin boundary resides with the applicant.

The McAllister Numerical Model (CDM, 2001; CDM, 2002; ongoing) is the most current tool available for evaluating impacts to McAllister Creek resulting from withdrawals from the Nisqually Aquifer. It is recommended that for larger municipal water right applications, impacts from proposed withdrawals from the Nisqually Aquifer be evaluated using the McAllister Numerical Model (CDM, 2002).

WR-1b ***Yelm Sub-basin – 8 pending applications***

If the City of Yelm can provide data supporting that its water right application(s) for groundwater supply are actually withdrawing water from the Nisqually Aquifer, it is recommended that the City's application(s) be batch processed with the McAllister Sub-basin. If data are not conclusive that the subject applications tap the Nisqually Aquifer, then the applicants in the Yelm Sub-basin (City of Yelm) should complete studies specified in the Yelm Short Term Action Plan, including:

- A study of hydraulic continuity between groundwater at depth and Yelm and Thompson Creeks;
- Determination of the groundwater flow direction and hydraulic continuity in the southwest corner of the City, wherein an application for municipal rights is pending.

After these initial short-term studies have been complete, the data necessary to batch process water rights in the Yelm Sub-basin is considered to be adequate to proceed with processing.

WR-1c ***Mashel Sub-basin – 2 pending applications***

It is the recommendation of this Planning Unit that the Town of Eatonville complete the data collection efforts specified in the short-term action plan for the Mashel/Ohop Sub-basins prior to the processing of water rights in this sub-basin. Studies recommended in the Mashel/Ohop Short Term Action Plan include:

- Study to determine whether adequate groundwater is available in the Mashel or Ohop Sub-basin (currently ongoing)
- Address the current situation wherein Town water has been determined to be groundwater under the influence of surface water (GWUI). Address the impacts of continued groundwater withdrawal and filtration of GWUI to instream flow on the Mashel River.

After these initial short-term assessments have been completed, the data necessary to batch process water rights in the Mashel Sub-basin is considered to be adequate to proceed with processing. However, Ohop Creek is closed to further appropriation, and the Mashel River has instream flows set that are not always met. The applicant will be responsible for showing that the pending water right would not impact flows in either Ohop Creek or the Mashel River, or that proposed actions would mitigate these impacts.

WR-1d ***Toboton/Powell/Lackamas Sub-basins – 4 pending applications***

There are currently two pending surface water and two pending groundwater rights applications in this group of sub-basins. The Planning Unit recommends that Ecology move forward with processing the groundwater applications in these sub-basins as soon as possible. The Planning Unit requests that Ecology use the following information from the Level 1 Watershed Assessment (WPN, 2002) in their evaluation of the water right applications.

The Level 1 referenced the 1998 “Report to the Technical Advisory Committee on the Capture of Surface Water by Wells,” which recommends methods for evaluating the influence of groundwater pumping on streamflow. Using these methods, these three sub-basins are rated as having low potential for streamflow to be affected by groundwater use from a moderately complex aquifer system.

The Level 1 Watershed Assessment also estimates net depletions under the assumption that all groundwater withdrawals are completely connected to the river. In addition, Ecology should consider that the streamflow in this subbasin reflects minimal use and, therefore is more representative of natural flows in the subbasin.

The Planning Unit requests Ecology to consider the above referenced information when requesting the applicants to provide additional information on whether stream flows will be impacted by the two proposed groundwater right applications. Ecology should also consider that seasonal closures of Toboton and Lackamas Creeks indicated the possibility of inadequate instream flows during drier months in these drainages.

WR-1e ***Muck/Murray Sub-basin – 30 pending applications***

The groundwater divide between WRIA 11 (Nisqually) and WRIA 12 (Chambers Clover) has not been identified with certainty. Once the location of the divide is confirmed, the

Planning Unit recommends that the water right applications be batch processed with the appropriate WRIA (based on groundwater divide). The processing recommendation for those applications that will influence groundwater that flows into WRIA 12 should be made by the WRIA 12 Planning Unit.

Until the time that the location of the divide is determined, the Planning Unit requests that Ecology recognize instream flow issues associated with prairie streams and deny all applications for surface water rights or for groundwater rights that draw water from shallow groundwater in the vicinity of prairie streams. Water right applications in this sub-basin can be processed at this time, however, it is expected that proof that streamflows will not be impacted by the proposed groundwater withdrawals will be provided by the applicant. Both Muck and Murray Creeks are closed to further appropriation and further appropriation of groundwater could impact flows in either of these two creeks. Additional groundwater studies may be necessary to determine impacts on flows.

WR-1f ***Tanwax/Kreger/Ohop Sub-basins – 15 pending applications***

There is no indication of a productive regional aquifer in these sub-basins. Furthermore, closures of Tanwax and Ohop Creeks indicate likelihood of inadequate instream flows during drier months. The Planning Unit requests that Ecology recognize instream flow issues associated with prairie streams in Tanwax and Kreger sub-basins and deny all applications for surface water rights or for groundwater rights that draw water from shallow groundwater in the vicinity of prairie streams. Water right applications in this grouping of sub-basins can be processed at this time, however, it is expected that proof that streamflows will not be impacted by the proposed groundwater withdrawals will be provided by the applicant. Additional groundwater studies may be necessary to determine impacts on flows.

WR-1g ***Upper Basin – 0 pending applications***

The Upper Basin is not currently closed to water allocation, and water rights in this sub-basin were batch processed upon completion of the Upper Basin Level 1 Technical Assessment, in 2001, prior to other sub-basins in WRIA 11. The Planning Unit recommends that new applications in the Upper Basin only be considered after batch processing of the rest of the sub-basins occur with the exception of public health emergencies.

Information in the Upper Basin Level 1 Technical Assessment indicates that most of the available groundwater follows the Nisqually River valley and that groundwater supplies are very limited in bedrock areas away from the immediate valley. This fact, and Tacoma Power's large downstream water right for hydroelectric generation, suggests that future substantial water rights may be difficult to obtain in the Upper Basin.

WR-2 The Planning Unit recommends that the Washington State Department of Ecology be staffed at a level that ensures timely response to water right applications and oversight and monitoring of water withdrawals within the watershed.

WR-3 **Mitigation Strategies for Water Right Processing**

The following mitigation strategies are recommended for water right holders and applicants (towns, cities, counties, purveyors, tribes, private, federal) to improve supply

such that it can be extended to meet demand. These mitigations are recommended by the Nisqually Watershed Planning Unit to the Washington State Department of Ecology (Ecology) to be considered as mitigation in Ecology's processing of water right applications. Ecology stated they would consider these strategies during meetings with the Planning Unit in 2002 and 2003. This general list of mitigation strategies is recommended for consideration by any water right holder or applicant within the entire Nisqually Watershed. The list provided below includes general options; some of the sub-basins have identified preferred mitigation strategies, and these are presented in individual Sub-basin Action Plans (Chapters 8-10).

- Direct augmentation of surface water using groundwater;
- Infiltration of reclaimed water near stream headwaters and upstream;
- Aquifer storage and recovery of reclaimed water;*
- Aquifer storage and recovery of surface water;
- Storm water improvements (e.g., increased detention);*
- Infiltration of drinking water treatment backwash water;
- Habitat enhancements – onsite and off site;
- Relinquishment of existing water rights;
- Direct augmentation using reclaimed water;
- Transfer of surface water rights to groundwater;
- Relinquishment of water rights;
- Putting active water rights into trust;
- Sub-basin transfer of water that improves streamflow;
- Credit for consolidation of exempt wells;
- Conservation planning and implementation; and
- Stormwater improvements (e.g. increased detention).

*May conflict with current State statutes.

WR-4 Credit for Reclaimed Water

Pursue with the Ecology and the Legislature the development of either a policy or legislation that would provide additional water rights equal to the amount used for aquifer recharge and/or streamflow augmentation.

or

Pursue with the Department of Ecology and Health the development of a policy that would provide for the recalculation of water use considering the return of reclaimed water from aquifer recharge, wetland enhancement and/or streamflow augmentation. An example of such policy is provided in the Yelm Sub-basin Action Plan (Chapter 9).

WR-5 Recommendation to Ecology to reconcile ambiguity in Reclaimed Water Act

The Department of Ecology should assure consistency between water quality and water resources statutes to encourage reclaimed water projects. This effort should include review and amendment of RCW 90.46.130 to remove current conflicts between water quality and water resource values, including the removal of the impairment prohibition, utilization of Ecology's Trust Water Program to purchase assumed impaired rights, or other means.

Furthermore, it is recommended that Ecology develop a streamlined water reuse permitting and water right credit system that will enable water reuse project proponents to receive appropriate water right benefits for their investment in improving water quality and conserving the potable water resource (see WR-4 above).

Review an amendment of RCW 90.44.035 that specifically excludes reclaimed water uses for ASR and another of RCW 90.46.120 that places the authority of ownership in the entity that treats the water, and not the one that stores the water. These amendments will likely occur as part of a feasibility study and pilot project for a specific storage project.

Upon preliminary review of this document, Ecology supports the above recommendations and states, "The concept of gaining "credit" for reclamation projects is not new to Ecology, and we have been working through policy development to provide better guidance on how to integrate the water right process with Chapter 90.46 RCW. Ecology is supportive of creating a mechanism that would allow communities with reclamation projects to gain preferential standing in the allocation of new water rights." Furthermore, "We are aware that in certain circumstances reclaimed water might be useful to mitigate for the impacts associated with a new consumptive withdrawal. Ecology is developing guidelines that address using waters generated through reclamation as mitigation, and also attempting to gain some sort of priority processing for applications that are water-budget neutral. It is unlikely that Ecology is going to pursue a legislative change to Chapter 90.46 RCW that completely omits the requirement for the proponent to conduct an impairment assessment, and if applicable, to provide compensation for any impairments. Instead, Ecology is working to develop clearer guidelines on how much an assessment should be conducted and how we should define which water users are legally entitled to protection." (Ecology comment on preliminary Draft Plan, August 14, 2003)

WR-6 Mechanism for WRIA 11 Water Rights Governing Body to support water right applications

The Planning Unit recommends creation of a mechanism for a WRIA 11 "water rights governing body" charged with providing comment on water right applications for new rights or transfers within the Nisqually Watershed. This governing body would develop a mechanism for review of applications as part of the Implementation Phase of Watershed Planning. Ecology Water Resources is "available to work with the Planning Unit to develop an appropriate mechanism for sharing in the evaluation of pending applications." Recommendations from the governing body could include requests to expedite particular batches of application, to include or exclude applications that are located in adjacent WRIA's but connected from a ground water standpoint, or to place an application "on hold" rather than deny if a mitigation plan is being developed (Ecology comment on preliminary Draft Plan, August 14, 2003).

As part of the water right application review process, the Department of Ecology should continue its policy to notify and solicit comment from the Nisqually Indian Tribe, and also solicit comment from the WRIA 11 water rights governing body (as discussed above), on specific water right applications within the watershed at the time the application is processed.

It does not appear that there is a need for a WRIA-wide Conservancy Board at this time. The Implementing Body for this Watershed Plan shall however, give a briefing to the Thurston and Lewis County Conservancy Boards to ensure that consistent decisions are being made, and make themselves available as a technical resource.

WR-7 Address Sub-basin closures (SEE ISF- 2 and ISF-3)

The Watershed Management Plan recommends a study to better understand basis of closures and current instream flow conditions. This study could determine the level of continuity any one well, proposed well, or aquifer has to associated surface water. Results could provide an understanding of potential mitigation needed to consider the opening of closures, where they appear to be in conflict with known technical information. Other potential effects of these studies are that greater restrictions be set on previously set streamflows, or new closures are enacted. It is also recommended that the Planning Unit or other governing body work closely with WDFW to evaluate existing closures. Beneficial use studies may also be appropriate to evaluate closures.

WR-8 Water Bank

Investigate the potential for purchase, sale or lease of water rights (e.g., water bank).

WR-9 Water Balance

Recommend development of a watershed-wide water balance (refinement of water balance in Level 1 Technical Assessment) to better understand water availability by sub-basin. This study would include an assessment of actual water use versus permitted/certificated use. It would also consider water conservation, reuse, consumptive and non-consumptive components such that they can be quantified as mitigation (credit) in water right application processing.

The sub-basin action plans in this document are recommending additional work on sub-basin water balances (see Chapters 8-10). This watershed-wide water balance assessment should be performed after these sub-basin specific water balances are complete.

12.4 Instream Flows and Surface Water/Groundwater Continuity Issues Recommended Actions

ISF -1 Policy Statement:

Support protection of resources by maintaining closures unless new technical information suggests otherwise, or a change in closure status would result in improved flow or habitat conditions in the closed stream or closed streams in other sub-basins.

If a change in closure status in a specific sub-basin would result in a reduced impact on flows in that sub-basin or other sub-basins within WRIA 11, then it should be considered. Similarly, the potential for re-opening a closure to set a target flow or to

improve fish habitat conditions may occur. It should also be possible to re-open a closure if the proposed mitigation implementation approaches (such as stream restoration, conservation package, or streamflow augmentation) result in improved overall functionality of the sub-basin or meet the “no consumptive appropriation” test of the WAC, which provides the necessary parameters to protect surface water resources.

ISF-2 Gain a better understand the technical basis for stream closures watershed-wide (Closures listed in Tables 3 and 4). The basis of closures could be studied as part of instream flow study. This project is supported by top priority recommendations from the Level 1 Technical Assessment as described above in Section 6.2.8. The recommendation highlights McAllister Creek, Mashel River, Muck Creek, Lower Ohop Creek, and Tanwax Creek for study.

A scope of work for an instream flow study of the Mashel River has been prepared as part of the Step A Instream Flow Report, conducted under a supplemental grant for Watershed Planning.

ISF-3 Identify flow compromised streams based on intermittent nature and beneficial use(s). Design and install a network of stream gauging stations to monitor these streams and develop an understanding of the hydrology, including current and historical (or naturalized) conditions via data collection, analysis and modeling. This project is supported for each of the streams of interest by top priority recommendations from the Level 1 Technical Assessment as described in Section 6.2.8. The recommendation in the Level 1 includes installation of gauging stations on:

ISF-3a Yelm Creek

ISF-3b Muck Creek

ISF-3c Powell, Murray, Toboton, Tanwax, and Horn Creeks

ISF-4 Research the groundwater/surface water continuity issues that are relevant to water rights processing in Yelm and Eatonville

Hydraulic Continuity in and around Eatonville is being proposed in the Scope of Work in the current Instream Flow Step A Assessment. In addition, refer to the Yelm and Mashel/Ohop Sub-basin Action Plans (Sections 8 and 9).

ISF-5 Identify or study methods of surface water augmentation.

Methods of surface water augmentation could include reuse, artificial recharge, and/or storage-related projects. This Plan recommends development of strategies to improve and/or augment instream flows in intermittent streams. This could include identification of storage options to augment flows when they are critically low or intermittent. Recommendations for pilot projects should be made as part of this study.

An overview of potential storage options in the Nisqually Watershed was completed as part of the Scope of Work being developed in the Supplemental Storage Assessment Step A Report. The Step A Storage Report is included as Appendix E in this Plan. The information in the Step A report information could drive decisions and further planning

recommendations. Potential methods to augment streamflow are also addressed in individual Sub-basin Action Plans for the Yelm, McAllister and Mashel Sub-basins.

12.5 Water Quality Recommended Actions

WQ-1 Implementation of a watershed-wide Water Quality Monitoring Plan.

A watershed-wide Water Quality Monitoring Plan was created in conjunction with this Watershed Plan, and is included as appendix C to this document. The Water Quality Monitoring Plan is intended to enable long-term water quality monitoring in WRIA 11, and be used for agency and public data access. The purpose of the monitoring plan is to provide the basis for a coordinated data collection effort throughout WRIA 11. As applicable, the plan will assist planning efforts by providing a framework to determine whether data of the appropriate quantity and quality are collected, optimize the sample locations, improve consistency in the data collected, improve coordination of sampling efforts, and be cost-effective for future studies. The Planning Unit recommends implementation of actions recommended in the Water Quality Plan.

Surface water and groundwater data collections have been and are currently conducted throughout WRIA 11 for a variety of purposes by a number of organizations. Data have been collected by tribes, counties, municipalities, counties, State and federal agencies, public water systems, and non-profit organizations. The Water Quality Monitoring Plan makes recommendations on monitoring parameters, locations, standards, and means of comparison between waterbodies.

WQ-2 Maintenance of and use of the Nisqually Water Quality Data System.

The Water Quality Monitoring Plan also recommends creation of the Nisqually Water Quality Data System, a dynamic GIS/Access water quality database in which water quality data from throughout the watershed can be stored, compared, and accessed through a spatial GIS interface. Funding for the creation of this database was provided as a supplemental grant to the Watershed Planning process. The database will be created in October 2003. It will provide those interested in water quality in WRIA 11 with a comprehensive source of data and information. This database will improve efficiency and collaboration between data collectors in the watershed.

It is the recommendation of this watershed plan that the Water Quality Data System be maintained, and that data collectors in the watershed work together to provide data for the database in a useful and consistent format, as described in the Water Quality Data Management Plan, included as Appendix C. Maintenance of the Nisqually Water Quality Data System requires the appointment of a responsible agency (the Nisqually Tribe) for upkeep, maintenance, and monitoring of the database. It is the recommendation of this Plan that the Tribe designate an employee for this responsibility.

WQ-3 Convene a workgroup to address potential inconsistencies in handling of pollutants between federal and State agencies and utilities.

The Planning Unit recommends a thorough review of procedures on the handling of potential water pollutants by local, federal, and state agencies, and utilities including towns, counties, the Tribe, WA Department of Transportation, Tacoma Power, Fort Lewis, and others. This review would include assessing potential inconsistencies in

procedures regarding the spraying of pesticides, toxics handling, and other relevant activities. The Planning Unit also recommends that a workgroup be convened to achieve inter-jurisdictional consistency in the handling of potential water quality pollutants throughout the watershed.

WQ-4 Address land uses that may threaten watershed health through an open forum with agencies and the public.

The Planning Unit recognizes that local residents are concerned about landfills and other potentially hazardous land uses in the watershed that have the potential to impact water quality. The Planning Unit also recognizes that landfills are permitted land uses that have gone through and adhered to State permitting, operating, and monitoring guidelines. More information is needed in order to address water quality policies in regard to landfills; the Planning Unit will gather this information during the implementation phase of this Watershed Plan.

WQ-5 Ensure adequate water quality monitoring of groundwater in designated critical aquifer recharge areas.

Critical aquifer recharge areas and their designation under Critical Areas Ordinances are discussed in Section 4, Groundwater Resources, and are illustrated in Figure 8. As part of the Nisqually Watershed Water Quality Monitoring Plan, the adequate monitoring of groundwater in these areas should be addressed. This will require coordination with Fort Lewis, as Fort Lewis grounds overlay a critical aquifer recharge area for the regional Nisqually Aquifer. This recommendation is consistent with GW-5 through GW-5e, and is made here to highlight its importance to groundwater quality.

12.6 McAllister Sub-Basin Recommended Actions

Short-Term Actions

MC-1 Identify the Nisqually Aquifer as a possible source for a regional water supply.

The concept of a regional water supply was previously investigated by Thurston County, Olympia, Lacey and Tumwater in 1995. Although this effort was unsuccessful in identifying an acceptable location for a regional water supply, the reasons cited in 1995 for pursuing cooperative water supply planning are still applicable today. These reasons include: identifying groundwater as a finite resource that is vital to human communities, fish and wildlife; noting that water demand within the North Thurston Urban Growth Area is projected to require 81,648 gpm by year 2030; and recognizing that water supply planning is beneficial to water resources and creates efficiencies for jurisdictions by maximizing returns in public investments for water supply and mitigation.

MC-1a The McAllister sub-basin committee supports WRIA-wide action GW-2(RS).

The McAllister Sub-basin Committee has identified the following reasons for investigating a regional supply:

- Appropriate regional water supply locations will reduce municipal demand on groundwater resources that impact surface flows, leading to improvements in the water quantity and quality in McAllister Creek and possibly Yelm Creek;
- Reducing the proliferation of smaller water supply wells helps to protect groundwater quality; and
- Consolidating supply at regional supply wellfields will help to simplify tracking water use and water rights in specific aquifers.
- A regional supply will help direct the projected growth to urban areas by removing a barrier to development in the UGA.

The McAllister Sub-basin Committee anticipates that most of this investigation can be done using an expanded McAllister Numerical Model. The following are issues that need to be addressed in a feasibility investigation:

- Quantify how much water could be available;
- Is water really available (i.e., can it be reasonably tapped);
- Possible locations;
- Potential impacts to existing water rights holders (e.g., Nisqually Indian Tribe, agricultural wells);
- Potential water quality issues (e.g., iron, manganese, hydrogen sulfide, seawater intrusion); and
- Address aquifer boundaries and important recharge areas.

MC-1b Identify potential participants in a regional water supply. The Nisqually Indian Tribe will maintain its senior rights to these waters and will initiate discussions to facilitate agreements, with its regional partners, on ownership, management, operation, and finance of a Nisqually Aquifer Regional Water Supply. All agreements must include approval from the Nisqually Indian Tribe.

Potential participants could include the Nisqually Tribe, Olympia, Lacey, Yelm, Thurston County PUD #1, Tumwater, Rainier, major private purveyors and Thurston County. Potential participants with comprehensive water system plans should provide projections (both short-term and long-term) for water needed from the regional supply. Other potential participants should estimate projected water needs.

As noted in the Yelm Sub-basin Action Plan, the City of Yelm proposes to develop a wellfield in an area where groundwater appears to flow towards the McAllister Sub-basin. Yelm's potential for participation in a regional water supply can be assessed with 1) McAllister Numerical model, possibly needing smaller cell sizes in vicinity of Yelm's wells, and 2) a comparison of water chemistry (Stiff diagrams) from Yelm test

wells and the McAllister wellfield and Yelm's other sources from the Yelm Creek system.

MC-1c Research logistics for governing a regional water supply

The first action should be to investigate potential legal authorities for creating a regional water supply. The statutory authority for WAC 173-591 (Reservation of Future Public Water Supply for Thurston County) could provide authority for a regional water supply.

If evaluation in recommendation MC-1a above indicates that a regional water supply may be feasible, the Planning Unit recommends investigating whether an interim governing structure is needed to oversee further development of a regional water supply.

MC-2 The McAllister Sub-basin committee supports WRIA-wide recommendation WR-1a, batch processing of water rights within logical surface and groundwater boundaries. Within the McAllister Sub-basin, this would include the applications listed in Table 6 above.

In addition, the McAllister Sub-basin Committee recommends the following short-term solutions (MC-2a and MC-2b) to specifically address water supply applications submitted by the cities of Lacey and Olympia. **Both of the following recommendations are contingent upon anticipated agreements between the Nisqually Indian Tribe and the affected Cities.**

MC-2a City of Lacey

[Placeholder for Recommendations specific to Lacey's transfer applications and application G2-29165.]

MC-2b City of Olympia

[Placeholder for Recommendations specific to Olympia's application G2-29900.]

MC-3 Improve understanding of direction of groundwater flow.

The McAllister Numerical model needs to be expanded to evaluate groundwater flow in vicinity of wells proposed by Lacey and possibly Yelm to the extent their proposed wells are found to be connected to the Nisqually Aquifer (see Yelm Sub-basin Plan).

An expanded McAllister Numerical model should be used to clarify direction of groundwater flow from south and west (with coordination w/ the Nisqually Indian Tribe, Olympia, Lacey, Yelm, and Rainier).

MC-4 Recommend options for mitigating impacts from other applications and long-term water supply solutions.

For all applications within the sub-basin that require mitigation, mitigation strategies that are most practical for the McAllister Sub-basin include: acquisitions and relinquishments of existing water rights, except those serving designated agricultural lands; infiltration of reclaimed water at or near headwaters of streams; and habitat enhancements to offset impacts surface waters.

We recommend a comprehensive approach to mitigation (e.g. moving Olympia's withdrawal from McAllister Springs, LOTT wastewater re-use, Yelm wastewater re-use) to offset impacts from short-term municipal supply recommendations and other potential impacts from regional water supply development.

Although Ecology has indicated that moving Olympia's withdrawal to a groundwater wellfield should not be part of a mitigation package, this Plan recommends that it should be part of Olympia's application because moving their withdrawal from McAllister Springs will undoubtedly benefit flows in McAllister Creek.

Applicants requiring mitigation should demonstrate which surface waters are impacted using water chemistry, Stiff diagrams, or other means. For example, Lacey should demonstrate whether its Madrona wells impact bluff springs that feed McAllister Creek, or Little McAllister Creek.

MC-5 Develop programs for monitoring potential impacts to existing water rights

The following programs should be developed through the implementing authority that will oversee implementation of the Nisqually Watershed Plan.

Two separate monitoring programs are recommended:

MC-5a One program may be needed to monitor flows in the Lower Nisqually River, possibly at the control point located at RM 4.3.

MC-5b If the Regional Water Supply appears to be feasible based on initial technical evaluation recommended in this action plan, a long-term program for monitoring water quality and water quantity of both surface and ground waters should be designed to evaluate impacts from this regional supply. Appropriate locations should be selected and, if needed, baseline data should be collected prior to establishment of the regional supply.

MC-6 The McAllister Sub-basin committee cites its support of WRIA-wide recommendation GW-3(GD).

MC-7 Recommendations for Nisqually/McAllister TMDL

The McAllister Sub-basin committee recommends that the Nisqually TMDL focus on reducing all controllable sources. Model runs should include load reductions achieved under varying flow conditions, which will be especially important for fecal coliforms and dissolved oxygen. Example flow conditions include the following: after Olympia moves its withdrawal from McAllister Springs, after Lacey secures additional water rights at the Madrona wellfield, and after a Regional Water Supply replaces some source wells. Technical subcommittee members will continue to track and review the progress of the Nisqually TMDL to ensure that potentially changing flows are included in the model runs.

Long-Term Actions

MC-8 Establish a Regional Water Supply Governing Structure for the development of a Regional Water Supply with the Nisqually Indian Tribe initiating discussions.

This recommendation will build on investigations conducted for short-term action MC-1. The first step is to develop the process for creating a governing structure. The second step will be to identify and recruit participants for the governing structure. Short-term action MC-1a recommends technical studies for evaluating the feasibility of the Nisqually Aquifer as a regional water supply. The following recommendations are only applicable if a Regional Water Supply is technically feasible.

If it is determined that a regional water supply is available from the McAllister sub-basin, the Tribe will initiate discussions to facilitate agreements, with its regional partners, on ownership, management, operation, and finance of a Nisqually Aquifer Regional Water Supply. All agreements must include approval from the Nisqually Indian Tribe.

MC-9 Develop and implement strategies for protecting regional supply

MC-9a The Regional Water Supply will need an enforceable wellhead protection plan that protects both the quality and quantity of water of the Nisqually Aquifer. Although development of the wellhead protection plan is likely to be overseen by the Regional Water Supply governing structure, established in MC-8, this watershed planning process is anticipating technical studies that will be needed to support a wellhead protection plan.

MC-9b Recharge areas may be identified in technical studies recommended in short-term action MC-1 and MC-1a. Additional study may be required to identify areas of exceptionally high transmissivity, such as those found during preliminary findings for work related to Olympia's proposed wellfield. In addition, time-of-travel areas will need to be modeled. Both recharge and time-of-travel areas should be used to delineate appropriately protective wellhead protection areas for the Regional Water Supply.

MC-9c After technical work is completed, critical areas ordinances need to be re-evaluated to determine whether they are protective of the regional water supply. Revisions should be made, as needed.

MC-10 Implement long-term programs for monitoring water quality and water quantity that were developed in short-term recommendations MC-5 through MC-7.

Monitoring programs will include establishing baseline conditions prior to full implementation of the watershed Plan.

MC-11 Recommend Ecology establish target flows for freshwater spring discharges to McAllister Creek and establish a basis for these flows with the understanding that levels in these creeks are under tidal influence.

A cooperative effort involving Ecology, the Department of Fish and Wildlife, the Nisqually Indian Tribe, and the Cities should be used to establish target flows for freshwater contributions from springs. This approach will protect flows in the creek while recognizing that instream flow control points in McAllister Creek make little sense due to tidal influence that extends the entire length of the Creek. In addition to establishing a scientific basis for regulating flows in McAllister Creek, this recommendation addresses the possibility that the closure of McAllister Creek could present an overly restrictive barrier in the development of a regional water supply.

MC-14 Update Water Budget for Sub-basin

The water budget for this Sub-basin needs to be updated using data collected for the various studies recommended in this action plan. As noted in the Level 1 Technical Assessment, this water budget needs to be refined based on improved understanding of:

- The direction of groundwater flow, and the quantity of groundwater flow through from WRIA 13;
- Inter-WRIA export (including reclaimed water use); and
- Real versus paper water rights, especially for irrigation water rights

12.7 Yelm Sub-Basin Recommended Actions**Short-term Actions****Y-1** Refine or revise Yelm sub-basin water balance

The water balance for the Yelm Sub-Basin in the Level 1 Technical Assessment should be reviewed for technical competency. If the methodology for computing the water balance can be improved upon, a new approach will be developed and the water balance and resulting water use summaries will be revised using the new methodology. The new water balance approach should consider the non-consumptive use of reclaimed water that is returned to the hydrologic system.

Y-2 Pursue opportunities for existing water rights transfers.

The City should continue to seek out and pursue any and all opportunities to transfer existing water rights to one of the City's existing wells, while protecting current water rights in designated resource areas. This will help provide protection of the aquifer when the old wells are abandoned.

Y-3 Using available data on groundwater flow direction and well level information, along with an initial assessment of the water chemistry of the wells located southwest of the downtown area, determine if there is a likelihood that the wells draw water from the Nisqually Aquifer.**Y-4** Develop policy for the transfer of exempt wells' water rights to the City of Yelm and submit to DOE for credits.**Y-4a** The Department of Ecology has indicated they would entertain a proposal to transfer exempt wells within the Urban Growth Area to the City. The Department of Ecology should put this policy into action with the transfer of additional water rights to the city's existing rights.**Y-4b** When transfers are found to be acceptable, the City should adopt policies and procedures to facilitate these transfers from the exempt well(s) to the City's existing wells.

- Y-4c The City should research records of past development to capture wells that were abandoned as part of approved or proposed development. This procedure should be standardized as part of the development process.
- Y-5 Pursue with the Departments of Ecology and Health the development of a policy that would provide for the recalculation of water use or additional water rights considering the return of reclaimed water from aquifer recharge, wetland enhancement and/or stream-flow augmentation.
- Y-5a Develop a scientifically based approach to calculate the amount of water that returns to the aquifer through the infiltration of constructed wetlands.

Example of recalculation of water use:

The quantity of water, in acre-feet, remaining after deducting the amount of reclaimed water that ultimately is returned to the Aquifer for groundwater recharge, from the total amount pumped, should be the total quantity of water used to measure the total annual withdrawal.

The water that is “put back” into the aquifer or surface water, should be calculated into the water balance of the system. Only the quantity of water that is not returned to the system should count towards the total annual withdrawal.

Illustration of example:

If 500 acre-feet were pumped from a well, and 300 acre-feet of water were reclaimed and put back into the same aquifer through ground water recharge, the total annual withdrawal from the well would be only 200 acre feet. In this case, the agency would have 300 acre feet of annual withdrawal available in their water right.

- Y-5b Contact should be made with other agencies and organizations with similar goals and interest, to possibly form a committee (alliance), to present a unified approach and common message to DOE.
- Y-5c The City of Yelm should meet with the Association of Washington Cities (AWC) to assist in promoting this concept.
- Y-6 Draft and adopt a Comprehensive Water Reuse Plan (CWRP) to maximize the use of reclaimed water to offset the need for potable water, thus extending use of existing water rights available.
- Y-6a Water conservation utilizing the benefits offered by the City’s reclaimed water system is an important part of Yelm’s long-term strategy for meeting their water needs. The Facilities Plan that was developed in support of the water reclamation project only addressed specific water reuse sites and options. Now that the facility is maturing, a more comprehensive approach has to be developed for the reclaimed water distribution system to identify new reuse opportunities and the location and sizing of new reclaimed water pipe.
- Y-6b The City should take steps to develop the CWRP so it is integrated with the Water System Plan. The planning process should pursue and include in the plan opportunities to utilize reclaimed water as mitigation for new water rights.

Y-6c Once the new CWRP is developed, the planned improvements can be planned, budgeted and implemented.

Long-term Actions

Y-7 If in the initial assessment (Y-3) it is determined that there is a high likelihood that the wells located in the south west of downtown Yelm area are located in the Nisqually Aquifer, the City should expand the McAllister Numerical Model to include the Yelm Sub-basin. The City should participate in a feasibility investigation with other potential participants to determine if a regional water supply, that does not have a negative impact to the existing water right holders, and has the least impact to or improves the quality and quantity of surface waters in the Watershed could be utilized. There is an understanding that the Nisqually Indian Tribe (Tribe) holds a reserved water right from time immemorial. The Nisqually Indian Tribe will maintain its senior right to these waters. To ensure Tribal water right interests are acknowledged and protected, the Tribe will initiate the discussion and lead the investigations that determine, with its regional partners, how much water is available for appropriations from the Nisqually Aquifer.

Y-8 If participation in a Regional Water Supply is not feasible, then studies should be conducted of the Yelm sub-basin aquifer to determine the correlation between the summer-time low/no flow conditions in Yelm Creek and use of the Yelm Prairie aquifer.

Y-8a A consultant should be retained to perform Yelm Sub-basin-wide modeling and analysis of the aquifer to determine the origin and quantity of water in the aquifer. The study should determine if the aquifer boundaries coincide with the surface water boundaries.

Y-8b Scientific data should be gathered that would demonstrate a conclusive relationship between groundwater withdrawals and the surface flow in Yelm and Thompson Creek. This information will give a better understanding of how to regulate the issuance of water rights and the impact of exempt wells.

Y-8c This study should also make recommendations on measures that could be used for mitigation to the low flows in these streams. An approximation of the measurable benefits that could be obtained with specific levels of mitigation will allow proposals to be brought forward that could support additional groundwater withdrawals in the Yelm sub-basin.

Y-9 Yelm sub-basin committee supports GW-7, GW-7a, and GW-7b.

12.8 Mashel-Ohop Sub-Basin Recommended Actions

Short-term Action Plan

MO-1 Complete an instream flow assessment on the Mashel River, and assess the adequacy of the current low flow regulations. (See Instream Flow Assessment, Scope of Work, Section 5.0, Appendix D).

MO-2 Complete the groundwater hydrology investigations as recommended by the Eatonville planning consultant.

MO-3 Obtain guidance from DOH to address the Conservation portion of the WSP.

MO-4 Begin developing a Conservation Strategy for the Town of Eatonville. Seek funding as soon as possible to prepare a Conservation Plan. Commit to holding a public meeting (Town Council or Planning Commission forum) on Conservation.

The Conservation Plan would address accurate consumption records, identify/reduce unaccounted for water (leaks, unmetered usage), identify major consumers and assist with reducing consumption and conduct water use audits. The Conservation Plan will also address conservation based pricing, community education, and providing assistance to residences through various programs (shower head program, flow restrictors, low flush toilets, washer rebates).

MO-5 Update the Water System Plans (WSP) for the Town of Eatonville (required by DOH). The WSP will address, through an approved methodology of calculating water use, current water use (including all approved plats) and future growth within the Eatonville UGA. The WSP will also address regional sources.

MO-6 Seek funding (30 to 50K) to update WSP as soon as possible.

MO-7 Complete the Stormwater Management Plan and mitigate stormwater runoff problems.

MO-8 Address long-term UGA boundaries and adjust to reflect realistic future land use.

Long-Term Action Plan

MO-9 Protect Fish Habitat

- Continue to study flow patterns on the Mashel River, and maintain the USGS gauges on Mashel River and Ohop Creek.
- As options become available through funding opportunities, implement the salmon habitat restoration plans that are being developed for both the Mashel River and Ohop Creek.

MO-10 Evaluate Supply Potential

- Move away from dependence on surface water sources (including wells in association with surface water). Consider potential for further limitation of surface water use due to instream flow requirements of fish.
- Assess the potential to develop groundwater supply in the Nisqually Watershed to accommodate future growth.
- Evaluate potential for re-use and or infiltration and opportunities for mitigation.
- Evaluate other potential mitigation strategies including credit for water replaced through the Wastewater Treatment Facility. A better understanding of what measures might be used for mitigation of future Town of Eatonville water rights is needed, with the understanding that additional environmental compliance mandates regarding endangered species would have to be considered.

MO-11 Improve Shoreline Protection

- Develop a Critical Areas Ordinance that provides opportunities for mitigation of water removals from the Mashel (e.g. increased shading of shoreline, fish habitat improvements, etc.).
- Evaluate Shorelines Management Act requirements and adjust to provide enhanced riparian habitat with the goal of increasing the level of instream habitat protection.
- Evaluate other shoreline mitigation possibilities along conservancy land, including implementation of salmon habitat restoration plans currently being drafted by Pierce Conservation District.

MO-12 Protect Water Quality

- Develop and implement the water quality monitoring plan for the Mashel-Ohop Sub-basins.
- Investigate use of the Source Water Protection Assessment Program (SWAP) to protect the Town of Eatonville's water supply and the water quality of the Mashel sub-basin. Actions include delineating the source water protection area, conducting a containment source inventory, and determining the susceptibility of the public water supply to contamination from the inventoried sources. This would require coordination with Pierce County as much of the Town's water supply watershed is outside of the Town's jurisdictional boundaries.

MO-13 Address long-term impacts of land use on water quality.

A comprehensive, long-term water quality monitoring plan should be developed to assess the effects of land use within these sub-basins. Protection of public drinking water supply, critical recharge areas and stream fish habitat should be enhanced by revising Stormwater Management programs, and developing a new Critical Areas ordinance for the Town of Eatonville and surrounding areas within the sub-basins.

MO-14 Other Actions

- Assess viable storage alternatives to seasonally augment water supply.
- Investigate the potential to purchase existing water rights within Mashel Sub-basin.

MO-15 Growth Management Act Issues

- Develop Interlocal Agreement with Pierce County.
- Provide Eatonville with some level of oversight on permit applications outside town boundaries but inside the UGA, and consistency in zoning within the UGA (currently lands not annexed to town but within UGA are under County zoning).

MO-16 The Mashel/Ohop sub-basin committee supports WRIA-wide action GLU-3

12.9 Implementation Actions

IM-1 Formal PU Recommendation to the State Legislature to enable spending of Supplemental Watershed Planning funds during Phase IV, Implementation.

- IM-2 In developing its implementation plan, the implementing body will support the development and implementation of existing plans and programs occurring within the Watershed while striving to eliminate activities or policies that are duplicate or inconsistent.
- IM-3 The Planning Unit recommends the partnership and/or coordination of the implementing body with other on-going or planned processes.
- IM-4 The implementing body should participate in seeking funding for plan implementation.

13.0 STATE ENVIRONMENTAL POLICY ACT

The State Environmental Policy Act (SEPA) (43.21C RCW) was enacted by the state legislature to ensure that state and local agencies consider likely environmental consequences of proposed actions during decision making processes concerning such activities. This consideration occurs during the SEPA review process. Under SEPA Rules, nonproject actions are defined as governmental actions involving changes to policies, plans, and programs (197-11 WAC). Such actions can include the adoption or amendment of policies, programs, and plans, such as Watershed Plans under RCW 90.82. Any nonproject 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, the Department of Ecology published a Final Environmental Impact Statement for Watershed Planning under Chapter 90.82 RCW ("Watershed Planning EIS") (Ecology, 2003). In accordance with the SEPA rules, the Watershed Planning EIS provides Planning Units with four options for SEPA compliance:

- **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.
- **Adoption, DS, and Addendum.** Same as DS but the addendum provides local decision makers with additional local information such as land cover, environment, etc.
- **Adoption and Supplemental EIS.** If the Watershed Planning EIS addresses some but not all of the probable significant adverse environmental impacts.
- **Adoption and Determination of Non-Significance (DNS).** This could be issued 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, Comprehensive Water System 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 the Final Watershed Planning EIS) are defined by the SEPA rules as:

- "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 (WAC 197-11-704)", (Ecology, 2003).

The Final Watershed Planning EIS presents a range of "alternatives," including a "no action" alternative, that represent the types of recommended actions that planning units may include in their watershed plans to achieve the objectives of the Watershed Management Act. Since these alternatives are discussed in the Final Watershed Planning EIS, the Planning Unit concluded that it would be redundant to discuss alternatives to actions in the WRIA 11 Watershed Management Plan.

13.1 NEPA compliance

NEPA, the National Environmental Policy Act, is triggered when action by or permit from a federal agency is required or if federal funding is involved. Fort Lewis, a federal agency, is located in the Nisqually Watershed. However, the Nisqually Watershed Management Plan does not require permit, action, or funding by Fort Lewis, or any other federal agency. Thus, the actions specified in the WRIA 11 Watershed Management Plan do not appear to trigger NEPA.

13.2 SEPA compliance for the Nisqually Watershed Management Plan

Pierce County is the lead SEPA agency for the Watershed Planning process in WRIA 11. Pierce County has opted to adopt the programmatic watershed planning EIS and to issue a determination of significance (DS) for the WRIA 11 Watershed Management Plan. The Watershed Planning EIS lists alternatives that are intended to represent the recommended actions that Planning Units may include in their Watershed Plans. Recommended actions in the Nisqually Watershed Management 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 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 (such as CWSPs) 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 the alternatives in the Watershed Planning EIS 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 “Y-6d – Yelm should secure funding prior to the development of the new wellfield,” further environmental review of such an action under SEPA is not required.

Based upon alternatives listed in the Final Watershed Planning EIS and the factors listed above, the WRIA 11 Watershed Management Plan will not require an addendum or additional EIS for its Determination of Significance. The Final Watershed Planning EIS will be used for all actions in the Plan that require SEPA review.

The Watershed Planning EIS lists 25 “alternatives” for achieving the goals of the water quantity component of watershed planning that fall into 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.

The Watershed Planning EIS lists another 29 “alternatives” (or actions) for water quality, habitat, and instream flows. Of all the alternatives listed in the final Watershed Planning EIS, the following apply to the WRIA 11 Plan:

- WP 5 – Request local governments or sewer utilities to construct and operate water reclamation and reuse facilities (for example, reclamation plants and day use areas) to provide water for beneficial uses.
- WP 9 – Transfer of water through interties of public water systems or irrigation systems.
- WP 10 – Request Ecology to allocate additional ground or surface water on a short-term or long-term basis.
- WP 14 – Request Ecology to increase enforcement against illegal water use within a basin or sub-basin.
- WP 16 – Request local governments to adopt regulations or for Ecology to adopt rules to minimize the 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 24 – Construct and operate artificial recharge/aquifer storage projects.
- WP 26 – Request Ecology to set instream flows by administrative rule (in the Washington Administrative Code).
- WP 27 – Take no action regarding instream flows. (Applies to all subbasins except Mashel-Ohop)
- WP 32 – Request Ecology to expedite development and implementation of a Total Maximum Daily Load for a basin or sub-basin.
- WP 35 – Request local governments and state agencies to continue to implement or more fully implement existing water quality plans, including plans developed under Chapter 400-12 WAC.
- 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 and urban setting, or with focus on pollution sources associated with a rural setting.
- WP 37 – Request local governments and Ecology to develop and operate water quality monitoring programs, including installation and maintenance of monitoring devices, to measure the extent of nonpoint pollution and/or measure the effectiveness of nonpoint pollution control measures.
- WP 40 – Request local governments to modify local regulations such as critical areas ordinances, stormwater regulations, and on-site sewage regulations to help achieve reductions in or prevent nonpoint pollution and/or implement Total Maximum Daily Loads established for federal 303(d) listed water bodies.

- WP 42-WP 56 – Conduct instream modifications to fish habitat. (Various alternatives available in Watershed Planning EIS. Habitat planning in Mashel Ohop subbasin is in early planning stages and specific alternatives have not been specified.)
- WP 49 – Request local governments to amend or modify Growth Management Act, comprehensive plans, or other land use plans, Shoreline master programs, and/or critical areas ordinances to protect habitat or control floodplain development.

13.3 Application of Watershed Planning EIS Alternatives to WRIA 11 Watershed Management Plan

The following tables (Tables 20-28) identify specific SEPA alternatives that apply to recommended actions in the plan. Actions that do not require a SEPA alternative are noted by type: those that are studies (study), actions without a foreseeable adverse environmental impact (no adverse impact), and those actions that are still in early planning stages (early planning stages) and have too little information to make a SEPA judgment at this time. Actions currently in the “early planning stages” may undergo further SEPA project or non-project level review during plan/policy/program adoption.

TABLE 20

Growth and Land Use – Action Code and Title
(Corresponds with Chapter 3 and Section 12.1 in text.)

Action Code	Action Title	Application of SEPA Alternative
GLU-1	Consider water supply availability in planning for growth.	No adverse impact
GLU-1a	Look for opportunities to resolve inconsistencies between Pierce and Thurston County CWSPs	No adverse impact, Early planning stages
GLU-1b	CWSPs required to include a supply element.	Other review
GLU-1c	County-wide CWSP for Thurston County.	Early planning stages
GLU-1d	Linkage between water availability certificates and exempt wells within CWSPs.	Early planning stages
GLU-1e	CWSPs address water rights associated with failed systems.	Early planning stages
GLU-1f	Purveyors provide counties with amount of water for hook-ups.	No adverse impact
GLU-2	Amendments to Comprehensive Plan updates should demonstrate how infrastructure needs will be met.	No adverse impact
GLU-3	Consideration of water supply availability in UGA expansions outside the water service area.	No adverse impact
GLU-4	Retain adequate water on agricultural lands.	No adverse impact
GLU-5	No water right transfers from designated agricultural land without suitable surrogate water supply.	No adverse impact

TABLE 21

Groundwater Resources and Supply – Action Code and Title
(Corresponds with Chapter 4 and Section 12.2 in text.)

Code	Action Title	Application of SEPA Alternative
GW-1 (RS)	Identify Nisqually Aquifer as a possible regional supply.	WP 9
GW-2 (RS)	Investigate technical feasibility of the Nisqually Aquifer as a regional supply.	Study
GW-3(GD)	Policy statement addressing WRIA boundaries versus groundwater divides.	No adverse impact
GW-4 GD)	Address locations of groundwater divide between WRIAs 11 and 12.	Study
GW-5 (AR)	Address Aquifer Recharge Areas under Critical Areas Ordinances.	WP 40
GW-5a(AR)	Evaluate adequacy of protection provided by Critical Areas Ordinances.	Study/WP 40
GW-5b(AR)	Ensure process is in place to update CAOs with municipalities' input.	WP 40
GW-5c(AR)	Ensure relevant technical information available for CAO updates.	No adverse impact
GW-5d(AR)	Jurisdictional review of CAOs.	WP 40
GW-5e(AR)	Land uses with potential to pollute groundwater in CARAs should have priority for expedited clean-up.	WP 40
GW-7 (EW)	Ecology should provide more thorough oversight of exempt wells.	WP 14
GW-7a(EW)	Ecology should study cumulative impacts of exempt wells and increase enforcement.	Study, WP 16
GW-7b(EW)	Address drilling of exempt wells where they may impact surface water.	WP 16
GW-8 (EW)	Develop policy on exempt well water rights transfer for water right credit.	WP 16, WP 17

TABLE 22

Water Rights (General and Processing in Closed Sub-basins) – Action Code and Title
(Corresponds with Chapter 5 and Section 12.3 in text)

Code	Action Title	Application of SEPA Alternative
WR-1	Current water right application processing – Recommendations to Ecology	WP 10
WR-1a	Water right applications – McAllister subbasin	WP 10
WR-1b	Water right applications – Yelm subbasin	WP 10
WR-1c	Water right applications – Mashel subbasin	WP 10
WR-1d	Water right applications – Toboton/Powell/Lackamas subbasin	WP 10
WR-1e	Water right applications – Muck/Murray subbasin	WP 10
WR-1f	Water right applications – Tanwax/Kreger/Ohop subbasin	WP 10
WR-1g	Water right applications – Upper Basin subbasin	WP 10
WR-2	Recommendation that Ecology be staffed at a level that ensures timely response to water right applications and monitoring of withdrawals.	WP 10, WP 14
WR-3	Recommended mitigation strategies for water rights processing.	WP 10
WR-4	Credit for reclaimed water.	WP 5
WR-5	Recommendation to Ecology to reconcile ambiguity in Reclaimed Water Act.	WP 5
WR-6	Mechanism for water rights governing body support of water right application.	No adverse impact
WR-7	Address sub-basin closures (see ISF-2 and ISF-3).	Study
WR-8	Investigate the potential for a water bank.	Study
WR-9	Development of a watershed-wide water balance	Study

TABLE 23

Instream Flows and SW/GW Continuity Issues – Action Code and Title
(Corresponds with Chapter 6 and Section 12.4 in text)

Code	Action Title	Application of SEPA Alternative
ISF-1	Creation of a policy statement to support protection of instream resources.	WP 26
ISF-2	Gain better understanding of technical basis for stream closures watershed-wide.	Study (WP 26)
ISF-3	Identify and gage flow compromised streams based on intermittent nature and beneficial use(s).	Study (WP 26)
ISF-3a	Yelm Creek ISF-3	Study (WP 26)
ISF-3b	Muck Creek ISF-3	Study (WP 26)
ISF-3c	Powell, Murray, Toboton, Tanwax, and Horn Creeks ISF-3	Study (WP 26)
ISF-4	Research the GW/SW continuity issues in Yelm and Eatonville	Study (WP 26)
ISF-5	Identify or study methods of surface water augmentation.	Study (WP 26)

TABLE 24

Water Quality – Action Code and Title
(Corresponds with Chapter 7 and Section 12.5 in text.)

Code	Action Title	Application of SEPA Alternative
WQ-1	Implement watershed-wide Water Quality Monitoring Plan	WP 35
WQ-2	Maintenance and use of the Nisqually Water Quality Data System.	WP 35
WQ-3	Convene a workgroup to address potential inconsistencies in handling of pollutants between federal and State agencies and utilities	WP 35, WP 36 (no adverse impact)
WQ-4	Address land uses that may threaten watershed health through an open forum.	WP 35, WP 36 (no adverse impact)
WQ-5	Ensure adequate water quality monitoring of groundwater in designated CAOs.	WP 35, WP 37

TABLE 25
 McAllister Sub-basin Action Plan – Action Code and Title
 (Corresponds with Chapter 8 and Section 12.6 in text.)

Code	Action Title	Application of SEPA Alternative
MC-1	Identify the Nisqually Aquifer as a possible source for a regional water supply.	WP 10, No adverse impact/study
MC-1a	Sub-basin committee support of GW-2(RS)	Study
MC-1b	Identify potential participants in a regional water supply.	Study /no adverse impact
MC-1c	Research logistics for governing a regional water supply.	Study
MC-2	Sub-basin committee support of WR-1a.	WP 10
MC-2a	City of Lacey short term water supply solutions.	Pending
MC-2b	City of Olympia short term water supply solutions.	Pending
MC-3	Improve understanding of direction of groundwater flow.	Study
MC-4	Recommend options for mitigating impacts from other applications and long term water supply solutions.	No adverse impact
MC-5	Develop programs for monitoring potential impacts to existing water rights.	Study
MC-5a	Potential flow monitoring on Lower Nisqually River	Study/no adverse impact
MC-5b	Long term monitoring for impacts from regional supply.	Study/no adverse impact
MC-6	Sub-basin committee support of GW-3(GD).	No adverse impact
MC-7	Recommendations for Nisqually/McAllister TMDL	WP 32
MC-8	Regional water supply governing structure.	No adverse impact
MC-9	Develop and implement strategies for protecting regional supply.	Early planning stages
MC-9a	Wellhead protection plan for regional water supply.	WP 40
MC-9b	Recharge and time-of-travel areas should be used to delineate wellhead protection areas.	Study/early planning stages
MC-9c	Critical Areas Ordinances protection of regional water supply needs to be evaluated.	WP 40
MC-10	Implement long-term monitoring programs from MC-5 through MC-7.	Early planning stages
MC-11	Recommend Ecology establish target flows for freshwater spring discharges into McAllister Creek.	Early planning stages
MC-12	Update water budget for sub-basin.	Study/early planning stages

TABLE 26

Yelm Sub-basin Action Plan - Action Code and Title
(Corresponds with Chapter 9)

Code	Action Title	Application of SEPA Alternative
Y-1	Refine or revise Yelm sub-basin water balance.	Study/early planning stages
Y-2	Pursue opportunities for existing water rights transfers.	Study/early planning stages
Y-3	Determine if there is a likelihood that wells draw water from Nisqually Aquifer.	Study
Y-4	Develop policy of transfer of exempt wells' water to City of Yelm and submit to DOE for credits.	WP 16
Y-4a	Ecology should put Y-4 into action.	WP 16
Y-4b	Policies and procedures to facilitate exempt well transfers	WP 16
Y-4c	Capture abandoned wells.	WP 16
Y-5	Develop policy to provide water use credit for reclaimed water.	WP 5
Y-5a	Develop a scientifically based approach to calculate the amount of water that returns to the aquifer through infiltration through constructed wetlands.	Study
Y-5b	Contact others with similar goals (Y-5) and perhaps form a committee.	No adverse impact
Y-5c	City of Yelm should meet with AWC to promote this concept (Y-5).	No adverse impact
Y-6	Draft and adopt a CWRP.	WP 5
Y-6a	Comprehensive approach for reclaimed water system to identify new reuse opportunities and the location and sizing of new reclaimed water pipe.	WP 5
Y-6b	Develop CWRP so it is integrated with WSP.	WP 5
Y-6c	Plan, budget, and implement improvements in the CWRP.	WP 5
Y-7	If applicable, expand McAllister Numerical Model to southwest Yelm and participate in a feasibility study.	Study
Y-8	If regional water supply is not feasible, determine correlation between summer low/no flow conditions in Yelm Creek and use of the Yelm Prairie aquifer.	Study/early planning stages
Y-8a	Retain consultant to perform Yelm Prairie aquifer modeling and analysis.	Study
Y-8b	Gather data to demonstrate relationship between groundwater and surface water flows in Yelm and Thompson Creeks.	Study
Y-8c	Recommendations on mitigation to low flows in Yelm and Thompson Creeks.	Study
Y-9	Sub-basin committee support of GW-7, GW-7a, GW-7b.	WP 14, WP 16

TABLE 27

Mashel/Ohop Sub-basin Action Plan – Action Code and Title
(Corresponds with Chapter 10.)

Code	Action Title	Application of SEPA Alternative
MO-1	Complete instream flow assessment of Mashel River.	WP 26
MO-2	Complete groundwater hydrology investigations as recommended by Eatonville planning consultant.	Study
MO-3	Obtain DOH guidance to address the conservation portion of WSP.	No adverse impact/early planning stages
MO-4	Begin developing conservation strategy for the Town of Eatonville.	Early planning stages
MO-5	Update Eatonville's WSP.	Early planning stages
MO-6	Seek funding to update WSP.	Early planning stages
MO-7	Complete Stormwater Management Plan and mitigate stormwater runoff problems.	Early planning stages
MO-8	Address long term UGA boundaries and adjust to reflect realistic future land use.	Early planning stages/study
MO-9	Protect fish habitat.	Early planning stages/WP 42 – WP 56
MO-10	Evaluate supply potential.	WP 24/study
MO-11	Improve shoreline protection.	WP 49
MO-12	Protect water quality	WP 35/WP 37
MO-13	Land use impacts on water quality.	Study
MO-14	Other actions including storage and purchase of water rights.	Study
MO-15	Growth Management Act issues.	Early planning stages
MO-16	Sub-basin committee support of GW-3.	No adverse impact

TABLE 28

Implementation – Action Code and Title
(Corresponds with Chapter 14.)

Code	Action Title	Application of SEPA Alternative
IM-1	Enable spending supplemental dollars on Phase IV.	No adverse impact
IM-2	Support existing and new programs to prevent duplication and inconsistencies.	No adverse impact
IM-3	Partnership and/or coordination with other on-going or planned processes.	No adverse impact
IM-4	Implementing body should participate in seeking funding.	No adverse impact

14.0 IMPLEMENTATION

Phase IV of the watershed planning process is implementation, which commences when the final plan is adopted by each participating county. Effective implementation, including coordination and oversight, is critical to the success of the watershed planning process. Although the Planning Unit has put years of work into this Watershed Plan, it can only be successful if it is seen through Phase IV. Planning Units are encouraged to develop a detailed implementation plan within one year of the Watershed Plan's adoption. State funding for Implementation is \$400,000, distributed over five years, and requires 10% matching funds, which may consist of in-kind goods and services.

Phase IV implementation funding will be used to finalize governance structure for Phase IV watershed planning activities in the Nisqually watershed, and to resolve the details of several Phase III issues addressing project funding and prioritization, and coordination of water right processing. The following checklist is provided to guide initial implementation activities:

- Amend the Memorandum of Agreement (MOA) to specifically address Phase IV - Implementation
- Finalize governance structure and lead agency responsibility;
- Where possible, prioritize projects for funding and implementation;
- Explore options to provide funding to allow consistent representation on the Planning Unit;
- Address the planned future use of existing water rights for municipal water supply purposes that are inchoate;
- Address additional state requirements resulting from 2003 legislation; and
- Determine mechanism for governing body to provide input to Ecology on batch processing of water right applications in WRIA 11.

14.1 Governance

Because Plan implementation will involve many different organizations including multiple counties, cities, towns, tribes and federal agencies, some method of coordination is required to ensure consistent implementation watershed-wide. The Planning Unit proposes that a locally-based "Implementing Body" be designated to coordinate implementation of the plan and future operation. There are several governance options for the Phase IV Implementing Body. These options include, but are not limited to:

- The current Nisqually Watershed Planning Unit with one designated lead agency from the Planning Unit (current lead agency is the Nisqually Indian Tribe), or
- A technical subcommittee of the Nisqually River Council (NRC) that is formed from elected leadership of the NRC and the current Planning Unit, or
- A new entity formed from a number of agencies currently represented on the Planning Unit.

The final structure of this coordinating and advisory entity will be determined as a first step in Phase IV, Implementation. Currently, the Nisqually Indian Tribe has volunteered to continue lead agency activities. Members of the Nisqually Planning Unit agree that ongoing governance and management by the IB is essential to the success of the current plan and the long-term future of the Watershed. ***It is anticipated that the current, expanded Planning Unit will remain committed to finding an equitable and balanced governance and operational structure.*** Considerations should include lead agency and in-kind service options.

The Nisqually Planning Unit considers this Watershed Management Plan a *working plan*, whereby additional recommended actions would be determined once projects are implemented, data are collected and issues are better understood. As such, the implementing body would also continue to build on the recommended actions in this Plan and provide ongoing guidance and stakeholder input. The group should also include State agencies in an advisory role.

14.2 Project Selection

The Nisqually Planning Unit or implementing body may prioritize projects, policies and management strategies identified in this Watershed Plan for future funding and implementation. To prioritize projects for funding in the longer term, the Planning Unit recommends that during the implementation phase of this project the governing body develop a refined list of criteria, and, as part of the Implementation Plan, prioritize projects within each sub-basin in this Watershed Plan based on those criteria.

14.3 Funding Options

Annual funding will be required for this implementing body to operate successfully. Current legislation under House Bill 1336 provides \$100,000 per year for three years to fund Phase IV Implementation activities under Watershed Planning. At the end of the three-year period, a two-year extension may be available for up to \$50,000 each year. A ten percent match is required to apply for implementation funding, which could include financial contributions or in-kind goods and services directly related to coordination and oversight functions. The match can be provided by the Planning Unit or combined commitments from federal agencies, tribal governments, local governments, special districts, or other local organizations. 2E2SHB 1336 also requires a detailed implementation plan within one year of accepting phase IV implementation funding.

Furthermore, Senate Bill 5073 provides statutory and fiscal authority for local government entities providing water-related services to more fully cooperate and coordinate efforts in implementation of the Watershed Plan. Cities, counties and special district entities are authorized to expend up to ten percent of their existing water-related revenues and water-related funds on implementation of new (not ongoing) watershed plan projects or activities under this bill. Additional future funding for implementation of the Plan is uncertain at this time.

If funding from outside sources is not secured, the Nisqually Planning Unit or implementing body agrees to seek an equitable funding method to continue the coordination and implementation of the Plan. Members recognize the long-term goals and commitments of this plan and will remain committed to the process. The implementing body described above will identify additional options for ongoing funding to support governance/oversight and implementation of this plan. These options should include, but are not limited to, grant (writing) applications, identification and solicitation of federal funding, foundation funding, public/private initiatives and providing lead agency support and in-kind services.

The Planning Unit also requests that the Legislature consider rolling supplemental funding associated with Phase III Planning into Phase IV Implementation, enabling cross-over between technical assessment, planning and plan implementation. The following is a recommendation from the Planning Unit to the state legislature in their 2004 session.

IM – 1 Formal PU Recommendation to the State Legislature to enable spending of Supplemental Watershed Planning funds during Phase IV, Implementation.

If a regional water supply authority is developed as part of the Nisqually Regional Aquifer concept (see McAllister Sub-basin Plan, Chapter 8), staff from that authority could provide support to the ongoing implementation and coordination of this Watershed Management Plan.

14.4 Planning Area

The jurisdictional area affected by this Watershed Management Plan is defined by the boundaries of Water Resource Inventory Area 11 (WRIA 11), the Nisqually Watershed. WRIA boundaries are defined by surface water divides. However, groundwater divides do not necessarily follow surface water divides, nor do they follow political boundaries. There are several components of this plan that require projects or planning associated with groundwater that traverses the boundary between WRIA 11 (Nisqually) and WRIA 13 (Deschutes), and the boundary between WRIA 11 (Nisqually) and WRIA 12 (Chambers Clover).

As part of this planning effort the Nisqually Watershed Planning Unit or implementing body will work to facilitate agreements with Planning Units for the Deschutes and Chambers Clover Watershed such that policies and projects addressing groundwater that traverse WRIA boundaries are consistent. This includes, but is not limited to:

- Establishing water quality monitoring agreements when groundwater and surface water boundaries are not the same (The Water Quality Monitoring Plan developed under supplemental funding will be used to aid in establishing monitoring agreements).
- Assuring consistency in policy pertaining to critical groundwater recharge areas that are addressed under critical areas ordinances.
- Batch processing water rights by groundwater divide rather than WRIA divide. Water right applications for groundwater in the Upper Muck Sub-basin that are included in the Chambers-Clover drainage should be processed with WRIA 12 water rights.
- Investigating and potentially developing a regional water supply from a deeper, and more regional, groundwater system that is present beneath several WRIsAs.
- Understanding the impacts of water withdrawal in one WRIA and subsequent use in another (all water balances performed for sub-basins or full watersheds should consider the impacts of withdrawal in one sub-basin or watershed and use in another).
- Establishing water quality monitoring agreements for marine and estuarine areas. This has historically been the responsibility of the Nisqually Indian Tribe. These areas could be construed as being within WRIA 13.

14.5 Intent to Support Development and Implementation

It is the intent of the Planning Unit to minimize duplication of efforts. Chapter 11 of the Watershed Management Plan addresses coordination efforts needed to support the development and implementation of existing processes occurring within the Watershed. The comprehensive list of related programs and processes also demonstrates to residents of the Nisqually Watershed that many efforts are occurring to protect and enhance the health of the Nisqually Watershed.

Recent legislation (2E2SHB 1336) requires the Planning Unit, in developing its implementation plan, to consult with other entities planning in the Watershed and identify and seek to eliminate any activities or policies that are duplicate or inconsistent. Given this requirement, the Planning Unit has established implementation policies IM-1 and IM-2 in regard to development of the Watershed Management Plan Implementation Program and coordination with other planning activities.

IM-2 In developing its implementation plan, the implementing body will support the development and implementation of existing plans and programs occurring within the Watershed while striving to eliminate activities or policies that are duplicate or inconsistent.

IM-3 The Planning Unit recommends the partnership and/or coordination of the implementing body with other on-going or planned processes.

IM-4 The implementing body should participate in seeking funding for plan implementation.

14.6 Plan Obligations

This Plan provides a vision and framework for water resource management in the Nisqually Watershed. At this time in Plan development, details of implementation obligations are undecided. These obligations will depend in large measure on the availability of funding, staff resources, technical capability, priorities of the entities involved, and of the recommended priorities of the Plan. These questions will be decided during the Planning Unit's development of the Phase 4 implementation plan if they choose to undertake this effort. Still, these recommendations are the Planning Unit's desire and vision and address important, even vital, issues related to water resources. The success of this Plan depends in large measure on the actions taken to implement the recommendations, and the Planning Unit encourages action on recommendations prior to Phase 4 where resources exist.

After the Watershed Management Plan is approved by the county legislative authorities, participants must also work to implement those actions prescribed by the Plan. Implementing participants will likely sign an agreement formalizing specific responsibilities. Washington State, the Nisqually Tribe, and participating Counties are required, by law, to adopt plan actions by rule or ordinance. State and County commitment to non-regulatory plan actions will likely be in the form of cooperative agreements. Other participants in the planning process, including cities, towns, and water districts are not required by law to adopt plan actions. However, the Nisqually Planning Unit recommends that voluntary, cooperative measures are preferred over regulatory enforcement approaches to obligate State and local governments.

Obligation is defined as any action required as a result of plan approval that imposes upon a Tribal government, county government, or State government, either: a fiscal impact; a redeployment of resources, or a change of existing policy. The following is a summary of the nature of plan obligations for governmental agencies:

- No plan elements can be passed that create an obligation(s) for a governmental entity without that governmental entities' representation on the Planning Unit.
- Addition of a plan element that creates an obligation(s) requires a recorded vote of all members of the PU and must be followed by specific written approval from the obligated government per the Expanded Initiating Government's Memorandum of Agreement.
- State agencies must adopt by rule the obligations of both State and county governments.
- State agencies are to take other actions to fulfill their obligations as soon as possible after plan approval. The Act does not specify what these actions might or should be. It is assumed that a letter(s) of commitment and/or a memorandum of agreement(s) are examples of what constitutes "other actions".
- Counties are to adopt any ordinances necessary for implementation and take other actions to fulfill their obligations as soon as possible after Plan approval. The Act does not specify what "other actions" might or should be relative to plan implementation. It is assumed that a letter(s) of commitment and/or a memorandum of agreement(s) are examples of what constitutes "other actions."
- Under current legislation (House Bill 1336) a county legislative authority may choose to opt out of watershed planning and the public hearing processes if the county's affected

territory within a particular management area is less than five percent of the total area, or if all other initiating governments within the management area consent. A county choosing to opt out shall not be bound by obligations contained in the plan.

- Cities – There is no language in the Watershed Management Act specific to cities and towns and how they are to fulfill their obligations. It is presumed that towns and cities that are seeking new water rights should expect to implement actions that are associated with water needs in this plan. If they do not have financial resources to utilize, they should expect to seek funding through grants and continue to participate on the coordination entity formed to assist in implementing this plan.
- For many obligatory actions, the State or County can only be held responsible for *initiation* of the action. (For example, if a public hearing process is necessary to adopt certain rules or program changes, the agency cannot determine the outcome of the public hearing process.) Also, the implementation of many actions is dependent upon funding and adequate staffing.

14.6.1 Planning Unit Recommendation for State, Local and Federal Obligations

The Nisqually Planning Unit recommends that voluntary, cooperative measures are preferred over regulatory enforcement approaches to obligate State, local and Tribal governments.

The Planning Unit accepts that any strategies, actions, obligations or potential obligations assigned to local, State or federal agencies and tribes as a result of this Planning Process and the current Watershed Management Plan are contingent on securing necessary funding, resources, and legislative authorizations where required, and are subject to applicable regulations including SEPA and NEPA requirements.

The Planning Unit recognizes that many of the implementation actions included in this plan may need additional assessment and planning before implementation can proceed and responsibilities can be assumed. It also recognizes that implementation is subject to budgetary constraints, and that no entity is obligated to implement a prescribed action in this Plan unless adequate funding is available to do so, as described in 2E2SHB 1336. However, towns and cities that are seeking new water rights should expect to implement actions that are associated with water needs in this Plan. If they do not have financial resources to obligate, they should expect to seek funding through grants and continue to participate on the coordination entity formed to assist in implementing this plan. It is expected that Federal entities will support the Plan elements within the limits of available resources and mission requirements.

14.6.2 Actions and Obligations Tables

Implementation obligations are assumed for the state, tribe and counties in the watershed, as described in the Watershed Management Act. Other agencies and groups in the watershed assume responsibility for implementing plan actions, but are not legally obligated under the Act. However, 2E2SHB 1336 equates participation in the Watershed Planning process and adoption of the Watershed Plan with an acceptance of obligation by local entities involved. A group or agency cannot be obligated unless they are represented in the planning process and agree to accept the obligation. Furthermore, obligations can only be fulfilled if the agency(s) involved have adequate funding and staff.

The following Tables 29-37 list obligated agencies and groups for each action recommended in the plan. The reference to “Implementation Body” refers to the Planning Unit or other multi-stakeholder body created during Phase IV (Implementation) Watershed Planning in WRIA 11. Agencies or groups listed in the Obligated agency/party/organization column enclosed in brackets “[agency]” have not been formally involved in the watershed planning process. These agencies and groups cannot be officially obligated by this Watershed Management Plan.

TABLE 29

Growth and Land Use – Action Code and Title
(Corresponds with Chapter 3 and Section 12.1 in text.)

Action Code	Action Title	Obligated agency/party/organization
GLU-1	Consider water supply availability in planning for growth.	Thurston, Pierce and Lewis Counties, Yelm, Roy, Eatonville, Olympia, Lacey, and water suppliers.
GLU-1a*	Look for opportunities to resolve inconsistencies between Pierce and Thurston County CWSPs	[Water Utilities Coordinating Committees], Pierce County Public Works and Utilities, [Thurston County Public Utilities District #1], Implementation body.
GLU-1b*	CWSPs required to include a supply element.	Washington Department of Health (DOH)
GLU-1c*	County-wide CWSP for Thurston County.	[Thurston Water Utilities Coordinating Committees], [Thurston County Public Utilities District #1], Dept. of Health
GLU-1d*	Linkage between water availability certificates and exempt wells within CWSPs.	Pierce County Public Works and Utilities, [Thurston County Public Utilities District #1], [Water Utilities Coordinating Committees], DOH
GLU-1e*	CWSPs address water rights associated with failed systems.	Pierce County Public Works and Utilities, [Thurston County Public Utilities District #1], [Water Utilities Coordinating Committees].
GLU-1f*	Purveyors provide counties with amount of water for hook-ups.	Thurston and Pierce Counties, [water purveyors]
*GLU-1a-f are expected to be addressed through CWSP updates, not as standalone actions by Counties. As CWSP updates have not been scheduled in Thurston County, the PUD and water utilities would need to secure sufficient funding sources in order to carry out the update.		
GLU-2	Amendments to Comprehensive Plan updates should demonstrate how infrastructure needs will be met.	Thurston, Lewis, and Pierce Counties, Yelm, Eatonville, Olympia, Lacey.
GLU-3	Consideration of water supply availability in UGA expansions outside the water service area.	Thurston, Lewis, and Pierce Counties, Yelm, Eatonville, Olympia, Lacey.
GLU-4	Retain adequate water on agricultural lands	Ecology, Thurston, Lewis, and Pierce Counties
GLU-5	No water right transfers from designated agricultural land without suitable surrogate water supply.	Ecology, [Water Conservancy Board of Thurston Co]

Note - Agencies or groups listed in the Obligated agency/party/organization column enclosed in brackets “[agency]” have not been formally involved in the watershed planning process. These agencies and groups cannot be officially obligated by this Watershed Management Plan.

TABLE 30

Groundwater Resources and Supply – Action Code and Title
(Corresponds with Chapter 4 and Section 12.2 in text.)

Code	Action Title	Obligated or responsible agency/party/organization
GW-1 (RS)	Identify Nisqually Aquifer as a possible regional supply.	Ecology
GW-2 (RS)	Investigate technical feasibility of the Nisqually Aquifer as a regional supply.	Implementing body, Nisqually Indian Tribe
GW-3 (GD)	Policy statement addressing WRIA boundaries versus groundwater divides.	Implementing body
GW-4 (GD)	Address locations of groundwater divide between WRIAs 11 and 12.	WRIA 11 and [WRIA 12] Implementing bodies.
GW-5 (AR)	Address Aquifer Recharge Areas under Critical Areas Ordinances.	Thurston, Lewis and Pierce Counties, Yelm, Lacey, Olympia
GW-5a (AR)	Evaluate adequacy of protection provided by Critical Areas Ordinances.	Thurston, Lewis, and Pierce Counties, Yelm, Olympia, Lacey, Eatonville
GW-5b (AR)	Ensure process is in place to update CAOs with municipalities' input.	Thurston, Lewis., and Pierce Counties
GW-5c (AR)	Ensure relevant technical information available for CAO updates.	Thurston, Lewis and Pierce Counties, Yelm, Lacey, Olympia
GW-5d (AR)	Jurisdictional review of CAOs.	Thurston, Lewis, and Pierce Counties, Yelm, Eatonville, Olympia, Lacey, and water suppliers.
GW-5e (AR)	Land uses with potential to pollute groundwater in CARAs should have priority for expedited clean-up.	Thurston, Lewis, and Pierce Counties, Yelm, Eatonville, Olympia, Lacey, and water suppliers.
GW-7 (EW)	Ecology should provide more thorough oversight of exempt wells.	Ecology
GW-7a (EW)	Ecology should study cumulative impacts of exempt wells and increase enforcement.	Ecology
GW-7b (EW)	Address drilling of exempt wells where they may impact surface water.	Implementing Body
GW-8 (EW)	Develop policy on exempt well water rights transfer for water right credit.	Implementing Body

Note - Agencies or groups listed in the Obligated agency/party/organization column enclosed in brackets “[agency]” have not been formally involved in the watershed planning process. These agencies and groups cannot be officially obligated by this Watershed Management Plan.

TABLE 31

Water Rights (General and Processing in Closed Sub-basins) – Action Code and Title
(Corresponds with Chapter 5 and Section 12.3 in text)

Code	Action Title	Obligated or responsible agency/party/organization
WR-1	Current water right application processing – Recommendations to Ecology	Ecology
WR-1a	Water right applications – McAllister subbasin	Ecology
WR-1b	Water right applications – Yelm subbasin	Ecology
WR-1c	Water right applications – Mashel subbasin	Ecology
WR-1d	Water right applications – Toboton/Powell/Lackamas subbasin	Ecology
WR-1e	Water right applications – Muck/Murray subbasin	Ecology
WR-1f	Water right applications – Tanwax/Kreger/Ohop subbasin	Ecology
WR-1g	Water right applications – Upper Basin subbasin	Ecology
WR-2	Recommendation that Ecology be staffed at a level that ensures timely response to water right applications and monitoring of withdrawals.	Ecology
WR-3	Recommended mitigation strategies for water rights processing.	Ecology
WR-4	Credit for reclaimed water.	Ecology, [State Legislature]
WR-5	Recommendation to Ecology to reconcile ambiguity in Reclaimed Water Act.	Ecology
WR-6	Mechanism for water rights governing body support of water right application.	Ecology, Implementing body, [Water Conservancy Board of Thurston County]
WR-7	Address sub-basin closures (see ISF-2 and ISF-3).	Ecology, Implementing body, WDFW
WR-8	Investigate the potential for a water bank.	Implementing body with state agency support
WR-9	Development of a watershed-wide water balance.	Implementing body

Note - Agencies or groups listed in the Obligated agency/party/organization column enclosed in brackets “[agency]” have not been formally involved in the watershed planning process. These agencies and groups cannot be officially obligated by this Watershed Management Plan.

TABLE 32

Instream Flows and SW/GW Continuity Issues – Action Code and Title
(Corresponds with Chapter 6 and Section 12.4 in text)

Code	Action Title	Obligated or responsible agency/party/organization
ISF-1	Creation of a policy statement to support protection of instream resources.	Ecology, Implementing body
ISF-2	Gain better understanding of technical basis for stream closures watershed-wide.	Implementing body
ISF-3	Identify and gage flow compromised streams based on intermittent nature and beneficial use(s).	Implementing body
ISF-3a	Yelm Creek ISF-3	Implementing body
ISF-3b	Muck Creek ISF-3	Implementing body
ISF-3c	Powell, Murray, Toboton, Tanwax, & Horn Creeks ISF-3	Implementing body
ISF-4	Research the GW/SW continuity issues in Yelm and Eatonville	Yelm, Eatonville
ISF-5	Identify or study methods of surface water augmentation.	Implementing Body

TABLE 33

Water Quality – Action Code and Title
(Corresponds with Chapter 7 and Section 12.5 in text.)

Code	Action Title	Obligated or responsible agency/party /organization
WQ-1	Implement watershed-wide Water Quality Monitoring Plan	Implementing Body
WQ-2	Maintenance and use of the Nisqually Water Quality Data System.	Nisqually Tribe, with cooperation from water sampling programs in the watershed
WQ-3	Convene a workgroup to address potential inconsistencies in handling of pollutants between federal and State agencies and utilities	State agencies, Pierce, Lewis, and Thurston counties, local, utilities, towns, Nisqually Indian Tribe, Department of Transportation, Tacoma Power, Fort Lewis
WQ-4	Address land uses that may threaten watershed health through an open forum.	Implementing Body
WQ-5	Ensure adequate water quality monitoring of groundwater in designated CAOs.	Thurston, Lewis, and Pierce Counties, Fort Lewis.

TABLE 34

McAllister Sub-basin Action Plan – Action Code and Title
(Corresponds with Chapter 8)

Code	Action Title	Obligated or responsible agency/party /organization
MC-1	Identify the Nisqually Aquifer as a possible source for a regional water supply.	Local, state, federal, and other agencies and groups working with the Nisqually Aquifer in WRIA 11.
MC-1a	Sub-basin committee support of GW-2(RS)	Implementing body
MC-1b	Identify potential participants in a regional water supply.	Nisqually Indian Tribe, Implementing body
MC-1c	Research logistics for governing a regional water supply.	Nisqually Indian Tribe, Implementing body
MC-2	Sub-basin committee support of WR-1a	Ecology
MC-2a	City of Lacey short term water supply solutions.	Lacey
MC-2b	City of Olympia short term water supply solutions.	Olympia
MC-3	Improve understanding of direction of groundwater flow.	Nisqually Indian Tribe, Olympia, Lacey, Yelm, [Rainier]
MC-4	Recommend options for mitigating impacts from other applications and long term water supply solutions.	Ecology
MC-5	Develop programs for monitoring potential impacts to existing water rights.	Implementing body
MC-5a	Potential flow monitoring on Lower Nisqually River	Implementing body
MC-5b	Long term monitoring for impacts from regional supply.	Implementing body
MC-6	Sub-basin committee support of GW-3(GD)	Implementing body
MC-7	Recommendations for Nisqually/McAllister TMDL	Thurston County, Ecology
MC-8	Regional water supply governing structure.	Implementing body, Nisqually Indian Tribe
MC-9	Develop and implement strategies for protecting regional supply.	Implementing body
MC-9a	Wellhead protection plan for regional water supply.	Implementing body, Proposed regional water supply governing structure
MC-9b	Recharge and time-of-travel areas should be used to delineate wellhead protection areas.	Implementing body
MC-9c	Critical Areas Ordinances protection of regional water supply needs to be evaluated.	Governments with Critical Areas Ordinances within regional water supply
MC-10	Implement long-term monitoring programs from MC-5 through MC-7.	Implementing body, Proposed regional water supply governing structure
MC-11	Recommend Ecology establish target flows for freshwater spring discharges into McAllister Creek.	Ecology, Washington Dept of Fish and Wildlife, Nisqually Indian Tribe, Lacey, Olympia, (Yelm).
MC-12	Update water budget for sub-basin.	Implementing body

Note - Agencies or groups listed in the Obligated agency/party/organization column enclosed in brackets “[agency]” have not been formally involved in the watershed planning process. These agencies and groups cannot be officially obligated by this Watershed Management Plan.

TABLE 35

Yelm Sub-basin Action Plan - Action Code and Title
(Corresponds with Chapter 9)

Code	Action Title	Obligated or responsible agency/party /organization
Y-1	Refine or revise Yelm sub-basin water balance.	Implementing body, Yelm
Y-2	Pursue opportunities for existing water rights transfers.	Yelm
Y-3	Determine if there is a likelihood that wells draw water from Nisqually Aquifer.	Implementing body, Yelm
Y-4	Develop policy of transfer of exempt wells' water to City of Yelm and submit to DOE for credits.	Ecology, Yelm
Y-4a	Ecology put Y-4 into action.	Ecology, Yelm
Y-4b	Policies and procedures to facilitate exempt well transfers.	Ecology, Yelm
Y-4c	Capture abandoned wells.	Ecology, Yelm
Y-5	Develop policy to provide water use credit for reclaimed water.	Implementing body, Ecology, DOH, Yelm
Y-5a	Develop a scientifically based approach to calculate the amount of water that returns to the aquifer through infiltration through constructed wetlands.	Implementing body, Yelm
Y-5b	Contact others with similar goals (Y-5) and perhaps form a committee.	Implementing body, Yelm
Y-5c	City of Yelm should meet with AWC to promote this concept (Y-5).	Yelm
Y-6	Draft and adopt a CWRP.	Yelm, Implementing body
Y-6a	Comprehensive approach for reclaimed water system to identify new reuse opportunities and the location and sizing of new reclaimed water pipe.	Yelm
Y-6b	Develop CWRP so it is integrated with WSP.	Yelm
Y-6c	Plan, budget, and implement improvements in the CWRP.	Yelm, Implementing body
Y-7	If applicable, expand McAllister Numerical Model to southwest Yelm and participate in a feasibility study.	Yelm
Y-8	If regional water supply is not feasible, determine correlation between summer low/no flow conditions in Yelm Creek and use of the Yelm Prairie aquifer.	Yelm
Y-8a	Retain consultant to perform Yelm Prairie aquifer modeling and analysis.	Yelm
Y-8b	Gather data to demonstrate relationship between groundwater and surface water flows in Yelm and Thompson Creeks.	Yelm
Y-8c	Recommendations on mitigation to low flows in Yelm and Thompson Creeks.	Yelm
Y-9	Sub-basin committee support of GW-7, GW-7a, GW-7b.	Yelm, Ecology, Thurston County

TABLE 36

Mashel/Ohop Sub-basin Action Plan – Action Code and Title
(Corresponds with Chapter 10.)

Code	Action Title	Obligated or responsible agency/party /organization
MO-1	Complete instream flow assessment of Mashel River.	Implementing body
MO-2	Complete groundwater hydrology investigations as recommended by Eatonville planning consultant.	Implementing body, Eatonville
MO-3	Obtain DOH guidance to address the conservation portion of WSP.	Eatonville, DOH
MO-4	Begin developing conservation strategy for the Town of Eatonville.	Implementing body, Eatonville
MO-5	Update Eatonville's WSP.	Eatonville
MO-6	Seek funding to update WSP.	Implementing body, Eatonville
MO-7	Complete Stormwater Management Plan and mitigate stormwater runoff problems.	Eatonville
MO-8	Address long term UGA boundaries and adjust to reflect realistic future land use.	Eatonville
MO-9	Protect fish habitat.	Implementing body, Eatonville
MO-10	Evaluate supply potential.	Implementing body, Eatonville
MO-11	Improve shoreline protection.	Implementing body, Eatonville
MO-12	Protect water quality.	Implementing body, Eatonville
MO-13	Land use impacts on water quality	Implementing body, Eatonville
MO-14	Other actions including storage and purchase of water rights.	Implementing body, Eatonville
MO-15	Growth Management Act issues.	Eatonville, Pierce County
MO-16	Sub-basin committee support for GLU-3	Thurston, Lewis, and Pierce Counties,

TABLE 37

Implementation – Action Code and Title
(Corresponds with Chapter 14.)

Code	Action Title	Obligated or responsible agency/party /organization
IM-1	Enable spending supplemental dollars on phase IV	Ecology
IM-2	Support existing and new programs to prevent duplication and inconsistencies.	Implementing body
IM-3	Partnership and/or coordination with other on-going or planned processes.	Implementing body
IM-4	Implementing body should participate in seeking funding.	Implementing body

15.0 REFERENCES

- AGI Technologies 2001. McAllister Baseline Monitoring Program Final Report. Technical Memorandum #3. pg 34.
- Carpenter, C.C. 2003. Personal Communication. June 10, 2003. Tacoma, WA
- CDM 2001. McAllister Baseline Monitoring Program: Final Report. Vol. 1-3. Prepared for the City of Olympia Public Works Department by: Camp, Dresser, and McKee, Water Resources Group, PO Box 1158, Gig Harbor, WA 98335.
- CDM 2002. Interim Report, Model Construction and Steady-State Calibration, McAllister Wellfield Numerical Model. Prepared for the City of Olympia Public Works Department by: Camp, Dresser and McKee, Water Resources Group, PO Box 1158, Gig Harbor, WA 98335. April 2002.
- David Evans and Associates, Inc. 2000. Upper Nisqually Level 1 Technical Assessment. Prepared for Nisqually River Watershed Planning Unit. December 2000.
- Drost, B.W., Ely, D.M., and Lum, W.E. 1999. Conceptual Model and Numerical Simulation of the Ground-Water-Flow System in the Unconsolidated Sediments of Thurston County, Washington. U.S. Geological Survey Water Resources Investigation Report 99-4165. Prepared in cooperation with Thurston County Department of Health.
- Gray & Osborne Consulting Engineers. 1997.
- Ecology, August 2003. Water Resources comments on preliminary Draft Watershed Management Plan for WRIA 11. August 14, 2003.
- Ecology, July 2003. Final Environmental Impact Statement for Watershed Planning under Chapter 90.82 RCW. Washington Department of Ecology, Shorelands and Environmental Assistance Program, Ecology Publication #03-06-013, July 18, 2003.
- Ecology, June 2003. WRATs database query and personal communication with Jill Walsh.
- Ecology, 1998. Draft Report on the Technical Advisory Committee on the Capture of Surface Water by Wells. Washington Department of Ecology Publication #98-154. January 1998.
- Ecology, 1981. Nisqually River Basin Instream Resources Protection Program Including Proposed Administrative Rules (Water Resources Area 11). W.W.I.R.P.P. Series – Number 9. Prepared by Water Resources Policy Development Section, Washington State Department of Ecology. February 1981.
- Ecology v. Campbell & Gwinn, L.L.C., 2002.
- Expanded Initiating Governments, 1999. Memorandum of Agreement (WRIA 11). September 7, 1999.
- Harr, R.D. 1981. Some characteristics and consequences of snowmelt during rainfall in western Oregon. *J. Hydrology* 53:27-304.
- Hubbard v. Ecology. 1997

- Nisqually Indian Tribe. 2003. Personal communication. Yelm, WA.
- Nisqually River Task Force. 1987. Nisqually River Management Plan. Shorelands and Coastal Zone Management Program. Washington Department of Ecology. Olympia, WA 98504.
- Pacific Groundwater Group. 1998. McAllister Springs Wellfield – Phase II Supplemental Analysis of Pumping Effects and Proposed Mitigation. Prepared for: City of Olympia. Prepared by: Pacific Groundwater Group, 2377 Eastlake Avenue East, Suite 200, Seattle, WA 98177.
- Pacific Groundwater Group. 1997. Results of Well Installation and Testing: McAllister Springs Wellfield Testing Program. Prepared for: City of Olympia. Prepared by: Pacific Groundwater Group, 2377 Eastlake Avenue East, Suite 200, Seattle, WA 98177.
- Sargeant, D., M. Roberts, and B. Carey. 2003. Quality Assurance Project Plan: Henderson and Nisqually TMDL Study. Washington Department of Ecology publication #03-03-100. Electronic version available at: <http://www.ecy.wa.gov/biblio/0303100.html>.
- Thurston Highlands Associates. January, 1995. Preliminary Ground Water Exploration Report.
- Whiley et al. 1994, Water Quality Investigations of the Lower Nisqually Basin 1991-93, Nisqually Indian Tribe, Yelm, Washington.
- Whiley, A.J. and Walter, G. 2000. The Review and Analysis of Water Quality for the Nisqually River and the Major Lakes of the Nisqually Watershed. Nisqually Indian Tribe, Natural Resources Water Quality Program, Technical Report Number 6.
- Watershed Professionals Network. (WPN) 2002. Nisqually River Level I Watershed Assessment (WRIA 11).

16.0 SUMMARY OF APPENDICES

A complete set of Appendices is available from the Nisqually Tribe. Please contact George Walter at (360) 438-8687. Provided below is a summary of what is included in the Appendices.

APPENDIX A: EXECUTIVE SUMMARY, LEVEL 1 TECHNICAL ASSESSMENT

- Executive Summary, Level 1 Technical Assessment

APPENDIX B: PLAN FRAMEWORK AND WORKSHOP OUTCOMES

- Final Nisqually Watershed Planning Framework (3/7/03)
- WRIA 11 Workshop I Outcomes (12/11/02)
- Workshop II Outcomes Sub Basin Issues and Solutions (1/8/03)

APPENDIX C: WATER QUALITY PLAN SUPPLEMENTALS

- Final Water Quality Monitoring Report (October 31, 2003)
- Water Quality Data Management Plan (October 31, 2003)

APPENDIX D: INSTREAM FLOW STEP A REPORT

- Instream Flow Step A Report (June 30, 2003)

APPENDIX E: STORAGE ASSESSMENT SUPPLEMENTAL REPORT

- Storage Assessment Step A Report (June 30, 2003)

APPENDIX F: OUTREACH AND PUBLIC COMMENT

- Nisqually Watershed Plan Final Public Outreach Plan (March 2003)
- Press Releases
- Public Meeting
- Publications
- Meetings
- Letters
- Comments Received

APPENDIX G: MEMORANDUM OF AGREEMENT

- Memorandum of Agreement, Watershed Planning, Nisqually WRIA 11

APPENDIX H: RECORD OF PLANNING UNIT MEETINGS AND COMMUNICATIONS

- 04/12/00 Planning Unit Meeting Minutes
- 10/09/02 Planning Unit Meeting Minutes
- 11/06/02 Technical Group Meeting Agenda
- 11/06/02 Technical Group Meeting Minutes
- 11/13/02 Planning Unit Meeting Agenda
- 11/13/02 Planning Unit Meeting Minutes
- 12/04/02 Technical Group Meeting Minutes

- 12/18/02 Technical Group Meeting Agenda
- 12/18/02 Technical Group Meeting Minutes
- 01/22/03 Technical Group Meeting Agenda
- 01/22/03 Technical Group Meeting Minutes
- 02/12/03 Planning Unit Meeting Agenda
- 02/12/03 Planning Unit Meeting Minutes
- 03/05/03 Technical Group Meeting Agenda
- 03/05/03 Technical Group Meeting Minutes
- 03/17/03 Technical Group Meeting Agenda
- 03/17/03 Technical Group Meeting Minutes
- 03/12/03 Planning Unit Meeting Agenda
- 03/12/03 Planning Unit Meeting Minutes
- 04/09/03 Technical Group Meeting Agenda
- 04/09/03 Technical Group Meeting Minutes
- 05/07/03 Technical Group Meeting Minutes
- 05/07/03 Technical Group Meeting Minutes
- 05/14/03 Planning Unit/Technical Group Meeting Agenda
- 05/14/03 Planning Unit/Technical Group Meeting Minutes
- 05/21/03 Technical Group Meeting Agenda
- 05/21/03 Technical Group Meeting Minutes
- 06/04/03 Technical Group Meeting Agenda
- 06/04/03 Technical Group Meeting Minutes
- 06/11/03 Planning Unit/Technical Group Meeting Agenda
- 06/11/03 Planning Unit/Technical Group Meeting Minutes
- 06/18/03 Technical Group Meeting Agenda
- 06/18/03 Technical Group Meeting Minutes
- 07/09/03 Planning Unit/Technical Group Meeting Agenda
- 07/09/03 Planning Unit/Technical Group Meeting Minutes
- 08/06/03 Planning Unit Meeting Agenda
- 08/06/03 Planning Unit Meeting Minutes
- 08/27/03 Technical Group Meeting Agenda
- 08/27/03 Technical Group Meeting Minutes
- 09/10/03 Planning Unit/Technical Group Meeting Agenda
- 09/10/03 Planning Unit Meeting Minutes
- 09/17/03 Technical Group Meeting Agenda
- 10/07/03 Public Comment and Planning Unit Meeting Agenda
- 10/07/03 Planning Unit and Public Meeting Minutes
- 10/29/03 Planning Unit Meeting and Vote Agenda
- 10/29/03 Planning Unit Meeting Minutes of the Vote to Approve Nisqually Watershed Plan