

**PHASE 3
WATSHED MANAGEMENT PLAN
WATER RESOURCE INVENTORY AREA 53**

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GLOSSARY

A reference to the terminology in the WRIA 53 Watershed Plan. This glossary represents the definition of the referenced statement as presented throughout the WRIA 53 Watershed Plan.

COMPREHENSIVE PLAN: A plan prepared by the cities, county, tribes, state agencies, or other entities that includes a thorough, long-range approach for provisions of management for a specified area.

CONSENSUS: As pertaining to the voting process developed and followed by the Water Resources Inventory Area (WRIA) 53 Planning Unit for this watershed project, 'consensus' is defined as a general agreement or accord by all voting Planning Team members.

HABITAT ELEMENT: One of the four optional elements of watershed planning defined in Chapter 90.82 RCW (the Watershed Planning Act). This element addresses fish habitat within the management area.

INITIATING GOVERNMENTS: Within each watershed management area, a specific set of local and tribal governments designated by the Watershed Planning Act for the purposes of initiating watershed planning. For the WRIA 53 Watershed Planning Process, the following entities served as the initiating governments: City of Davenport, Sevens Bays Water Association, Lincoln County, Grant County (opted out), Ferry County and Okanogan County.

INSTREAM FLOW ELEMENT: One of the four optional elements of watershed planning defined in the Watershed Planning Act. This element addresses recommendations for setting or revising minimum instream flows.

MINIMUM INSTREAM FLOWS: The term, instream flow, is used to identify a specific stream flow (typically measured in cubic feet per second, or cfs) at a specific location for a defined time, and generally following seasonal variations. Instream flows are usually defined as the stream flow needed to protect and preserve instream resources, such as fish, wildlife, and recreation. Minimum instream flows are most often described and established in a formal legal document, typically an adopted state rule. Once defined, instream flows are used for water management decisions, including regulatory decisions regarding whether additional water can be appropriated for future uses and to define what flows need to be in the stream. An instream flow can be described as a water right for the instream resources that the stream supports. Statutory provisions related to establishing instream flow rules can be found in Chapters 90.82, 90.22, 90.03, and 90.54 RCW.

OBLIGATION: Any agreed upon required action for counties, state agencies, and/or any other organization as a result of activities outlined in this Plan, and to be undertaken while implementing provisions of the Plan that impose a fiscal impact, a redeployment of resources, or a change of existing policy, per the Watershed Planning Act.

PLANNING UNIT: A volunteer group that represents a wide range of water resource interests within the watershed, tasked to organize, conduct a watershed assessment, and develop a watershed plan for each Water Resource Inventory Area, according to the *Guide to Watershed Planning and Management* (Economic and Engineering Services, 1999,). The initiating governments were responsible for development of the planning unit.

WATER QUALITY ELEMENT: One of four optional elements of watershed planning defined in the Watershed Planning Act, which addresses surface and groundwater quality within the management area.

WATER QUANTITY ELEMENT: The one element of watershed planning that is required if watershed planning grant funds are used, as defined in the Watershed Planning Act. The Plan should address strategies for increasing water supplies in the watershed, which may include, but are not limited to: increasing water supplies through conservation, water reuse, use of reclaimed water, voluntary water transfers, aquifer recharge and recovery, additional water allocations, or additional water storage or water storage enhancements. The objective of these strategies is to supply water in sufficient quantities to satisfy the minimum instream flows (if proposed) for fish and provide water for future out-of-stream uses.

WATER RESOURCE(s): Water resource is defined as those five (5) watershed planning elements addressed in the Plan (water quantity, water quality, habitat, instream flow, and water storage).

WATER RESOURCE INVENTORY AREA (WRIA): One of the 62 geographic areas within Washington State, defined on the basis of surface water resources and codified in the Washington Administrative Code (WAC) 173-500.040. WRIA 53 is the number assigned to the Lower Lake Roosevelt Watershed.

WATER STORAGE ELEMENT: One of four optional elements of watershed planning defined in the Watershed Planning Act, which addresses storage alternatives which may assist in the alternatives to meet instream and out-of-stream needs within the watershed management area.

WATERSHED PLAN: A document presenting the findings and recommendations of the planning unit for a water management program in the Lower Lake Roosevelt Watershed and its tributaries.

WATERSHED PLANNING PROCESS: In Chapter 90.82.040 RCW of the Watershed Planning Act, the watershed planning grants and eligibility criteria are defined, which outline four specific phases of the planning process. The four phases are:

1. **Phase One – Initial organization phase.** Planning units have one year to complete this phase, in accordance with Chapter 90.82.060 RCW.
2. **Phase Two – Technical assessment phase.** Planning units have four years after entering into Phase Two to conduct watershed assessments and complete the watershed plan, in accordance with Chapter 90.82.070 RCW. If the initiating agencies choose to apply for optional funds, the work can include application for supplemental watershed assessment grants to help fund detailed assessments of the following elements: (a) Instream Flows, (b) Water Quality, and/or (c) Multipurpose water storage opportunities.
3. **Phase Three – Watershed plan development.** Planning units have four years after entering into Phase Two to develop and complete a watershed plan, in accordance with Chapters 90.82.060 through 90.82.100 RCW.
4. **Phase Four – Watershed plan implementation.** If planning units choose to apply for the Phase Four grant, they must complete a detailed implementation plan within the first year of receiving the grant funds, in accordance with Chapter 90.82.130 RCW. Planning units can apply for up to three years of implementation grant funding, with an additional two-year extension of funding and time available.

ACRONYMS and ABBREVIATIONS

AF	acre-feet
amsl	above mean sea level
ASR	Aquifer Storage and Recovery
BLM	Bureau of Land Management
BMP	Best Management Practices
BOR	United States Bureau of Reclamation
BPA	Bonneville Power Administration
CD	Compact Disc or Conservation District
cfs	cubic feet per second
County	Lincoln County
Counties	Lincoln, Adams, Grant and Spokane Counties
CRBG	Columbia River Basalt Group
CRI	Columbia River Initiative
CRP	Conservation Reserve Program
CTED	Community Trade and Economic Development
DOH	Washington State Department of Health
DNS	Determination of Non-Significance
DS	Determination of Significance
Ecology	Washington Department of Ecology
EIM	Environmental Information Management
EIS	Environmental Impact Statement
EPA	United States Environmental Protection Agency
EQIP	Environmental Quality Incentive Program
ESA	Endangered Species Act
ESHB	Engrossed Substitute House Bill
FCAAP	Flood Control Assistance Account Program
FCRPS	Federal Columbia River Power System
FEMA	Federal Emergency Management Agency
FERC	Federal Energy Regulatory Commission
FPA	Forest Practices Act
ft	feet
GIS	Geographic Information System
GMA	Growth Management Act (Chapter 36.70A RCW)
gpd	Gallons Per Day
gpm	Gallons Per Minute
HB	House Bill
IGOAS	Issues, Goals, Objectives and Alternative Solutions
LCCD	Lincoln County Conservation District
LIP	Landowner Incentive Program
MIGOA	Mission, Issues, Goals, Objectives and Alternative Actions
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
NEPA	National Environmental Policy Act

NMFS	National Marine Fisheries Service
NPCC	Northwest Power and Conservation Council
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resource Conservation Service
Plan	Watershed Plan for WRIA 53
Planning Unit	WRIA 53 Watershed Planning Unit Team (for Phases One through Three of the planning process)
QAPP	Quality Assurance Project Plan
RCW	Revised Code of Washington
RM	River Mile
SEPA	State Environmental Policy Act
SMA	Shorelines Management Act
SRA	Salmon Recovery Act
SRFB	Salmon Recovery Funding Board
SWSL	Surface Water Source Limitation
TMDL	Total Maximum Daily Load
UGA	Urban Growth Area
USDA	United States Department of Agriculture
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
VARQ	Variable Flow
WA	Washington
WAC	Washington Administrative Code
WCC	Washington Conservation Commission
WDFW	Washington Department of Fish and Wildlife
WDOH	Washington Department of Health
WETRC	Washington Environmental Training Centre
WHIP	Wildlife Habitat Incentive Program
WIT	Watershed Implementation Team
WP	Watershed Planning Alternatives as identified in <i>Final Environmental Impact Statement for Watershed Planning Under Chapter 90.82 RCW (Ecology, 2003)</i>
WPA	Watershed Planning Act (Chapter 90.82 RCW)
WPU	Watershed Planning Unit
WRIA	Water Resource Inventory Area
WRIA 53	Water Resource Inventory Area 53 (the Lower Lake Roosevelt Watershed)
WRP	Wetland Resource Program
WSDOT	Washington State Department of Transportation

1.0 INTRODUCTION

Citizens, private industry and local, state, and federal government are increasingly looking for comprehensive answers to complex issues in regard to protecting, maintaining, and providing water resources. Water is a limited resource and given the continuing competing demands for the resource, controversy in water management is a continuing issue. The Watershed Planning Act, codified as Chapter 90.82 RCW, was established in 1998 in an attempt to better manage the water resources of Washington State by establishing a local framework to participate in the water management process. The citizens and local agencies of Water Resource Inventory Area (WRIA) 53 - Lower Lake Roosevelt Watershed, formed a local planning group to participate in the Watershed Planning process in order to promote the interests and values of the local water users and agencies in management of the water resources. This Watershed Plan presents the goals and recommendations developed by the watershed planning unit who dedicated their time to the planning process for WRIA 53, the Lower Lake Roosevelt Watershed. The boundaries of the WRIA 53 watershed are defined in Chapter 173-500 WAC, (Figure 1).

The objective of the WRIA 53 Planning Unit was to participate in a process to provide local input and potential shared management of the water resources within this watershed. The Planning Unit worked cooperatively to address the water resource issues of the unique hydrologic conditions of Lower Lake Roosevelt and its tributaries for the environmental, economic and social benefit of all water users (landowners, residents, and communities) within the watershed, under the guidance of the Watershed Planning Act and other associated statutes. It is the intent of the WRIA 53 Planning Unit by preparing this WRIA 53 Watershed Plan to establish a framework for the state agencies and local communities to move forward with appropriate management of water resources in the watershed.

The Watershed Plan for WRIA 53 – Lower Lake Roosevelt Watershed consists of:

- Description of the watershed process undertaken to complete this Watershed Plan;
- The “Mission Statement” of the WRIA 53 Planning Unit;
- The defined scope, scale and focus for the Water Quantity planning element undertaken by the Planning Unit;
- The goals and action items developed by the Planning Unit; and
- Recommendations of the Planning Unit.

1.1 WATER RESOURCE AND WATERSHED PLANNING

Numerous statutes have been enacted in Washington State (prior to watershed planning) that set forth policy and management responsibilities for water. The legislature, recognizing that watershed plans could potentially contain language that would be inconsistent with existing state law, specifically required that watershed plans not infringe upon those existing statutes. Laws, Revised Codes of Washington (RCWs) and Rules, Washington Administrative Codes (WACs) that pertain to water management and cannot be infringed upon include:

- RCW 90.03 – Washington Water Code (1917)
- RCW 90.14 – Water Right Claims Registration and Relinquishment (1967)
- RCW 90.22 – Minimum Water Flows and Levels (1969)
- RCW 90.42 – Water Resources Management (1991)
- RCW 90.44 – Regulation of Public Groundwaters (1945)
- RCW 90.46 – Reclaimed Water Use (1995)
- RCW 90.54 – Water Resources Act (1971)
- RCW 90.82 – Watershed Planning Act (1997)
- WAC 173-18 – Shorelines Management Act-Streams and River (amended 2003)
- WAC 173-128A – Odessa Groundwater Management Subarea (1988)
- WAC 173-130A – Odessa Groundwater Subarea Management Policy (1988)
- WAC 173-152 – Water Rights (1998)
- WAC 173-154 – Protection of Upper Aquifer Zones (amended 1998)
- WAC 173-200 – Water Quality Standards for Groundwater (amended 1990)
- WAC 173-201A – Water Quality Standards for Surface Waters (amended 2003)
- WAC 173-500 – Water Resource Management Program Established Pursuant to the Water Resource Act of 1971 (amended 1991)
- WAC 197-11 – State Environmental Policy Act (SEPA) (amended 2003)
- WAC 508-12 – Administration of Surface and Groundwater Codes (amended 1988)
- WAC 508-14 – Columbia Basin Project – Groundwater (amended 1988)

1.1.1 Overview of Watershed Planning Act (RCW-90.82)

The Watershed Planning Act was passed by the legislature in 1998 as ESHB 2514 to provide a framework for water users, interest groups and government agencies to join together in a collaborative process to develop Watershed Plans for management of the limited water resources of the state. The opportunity to conduct watershed planning efforts was available to each of the State's major watersheds, Water Resource Inventory Areas (WRIAs), as described in Chapter 173-500 WAC. Within WAC 173-500, the boundaries for the Lower Lake Roosevelt watershed were delineated as WRIA 53. It is important to note that the Legislature did NOT require Watershed Planning be conducted. If the local communities chose to conduct this planning process, they would receive funds made available to them as long as they worked within the parameters of the planning process. It was a funded un-mandate.

The Watershed Planning Act establishes the framework for the collaborative process to be followed to address water resources (water quantity) and four additional optional elements: water storage, water quality, instream flow, and habitat. The water quantity component is required, while the remaining four elements are optional. This process recognizes that in some cases, water quantity issues could not be addressed separate from the other four elements.

The water quantity element of a watershed plan addresses water supply and uses in the watershed and how to develop strategies for future use. The water storage element consists of assessing existing conditions, identifying potential storage options, and

developing strategies that can assist with current and future instream and out-of-stream needs in the watershed.

The water quality element consists of synthesizing available data to develop localized and/or basin-wide approaches to identify and potentially developing recommendations for mitigating impacts. The Planning Unit initially had some concerns relative to nitrate impacts in southern areas of the watershed, and potential arsenic impacts in the northern part of the watershed near the Columbia River, but elected to not undertake the Water Quality element at this time.

Instream flow components of a watershed plan are designed to assess and provide recommendations for protection of instream uses. Other than the Columbia River, Hawk Creek is the major surface water body in the watershed. However, this creek is not a priority for the state in developing instream flows. Therefore the Planning Unit elected not to undertake the instream flow optional element.

The habitat element generally addresses the watershed needs to protect and/or enhance the aquatic or terrestrial habitat within the watershed. At the time of developing the scope for watershed planning, the Planning Unit elected not to address habitat within the watershed.

The water storage element consists of 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. This can include aquifer recharge and recovery or additional water storage and water storage enhancements. The assessment may include the identification of potential site locations for water storage projects for either large or small projects and cover the full range of possible alternatives. The possible alternatives include off-channel storage, underground storage, the enlargement or enhancement of existing storage, and on-channel storage. After conducting the initial water quantity assessment for the WRIA 53 watershed, the planning unit decided that conducting this element would be beneficial for the watershed planning process.

The WRIA 53 Planning Unit elected to only address the Water Quantity element at the time planning was started. Grant applications to conduct the Water Storage optional element was submitted later, but was not funded.

The primary purpose of the Watershed Planning Act is to assess the current conditions of a watershed and develop a plan for the future water management. The legislature directed state agencies to provide technical assistance to Watershed Planning Units. A Memorandum of Understanding (MOU) between 12 Washington State agencies simplified the process for state participation as a member of the Planning Unit. The Watershed Planning Act designated the Department of Ecology as the primary agency to represent the State and to speak on behalf of the other agencies. The agencies defined in the MOU include:

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

Watershed planning may be conducted under RCW 90.82 is initiated for a WRIA, or a group of WRIsAs, with the unanimous consent of the Initiating Governments within the watershed. As defined under Chapter 90.82.060 (2) RCW initiating governments are defined as follows: watershed planning may be initiated for a WRIA only with the concurrence of (a) all the counties within the WRIA; (b) the largest city or town; and (c) the water supply utility obtaining the largest quantity of water from the WRIA.

The Act provides the foundation for conducting four phases of planning.

Phase 1: The organizational phase. During this phase the initiating governments (1) appoint a lead agency, (2) decide which elements will be addressed in the watershed planning effort, (3) form a Planning Unit consisting of participants with various water user interests in the watershed, and (4) develop operating procedures.

Phase 2: The Technical Assessment. This phase compiles available data within the watershed for the elements selected under Phase 1. The Technical Assessment, as defined under RCW 90.82.070, must include the following minimum requirements:

- Estimate of the surface and groundwater present in the WRIA;
- Estimate of the surface and groundwater available in the WRIA, taking into account seasonal and other variations;
- Estimate of water in the WRIA represented by claims in the water right claims registry, water use permits, certificated rights, existing minimum instream flows, federally reserved rights, and any other rights to water;
- Estimate of surface and groundwater actually being used in the WRIA;
- Estimate of the water needed in the future in the WRIA;
- An identification of the location of areas where aquifers are known to recharge surface water and surface areas that recharge aquifers;
- An estimate of the surface and groundwater available for future appropriation, taking into account adopted minimum instream flows, including the data needed to evaluate flows necessary for fish.

The Phase 2 Technical Assessment also allows for the identification of data gaps to address issues for future planning.

- Phase 3: Development of the Watershed Management Plan. This phase undertakes the process of reviewing the information compiled in the Phase 2 Technical Assessment, researching additional information (if needed), and development of short-term and long-term recommendations and policy to address current and future water needs within the WRIA. Recommendations can also be in the form of obligations, where an entity or organization or agency agrees to obligate itself to conduct a specific action which may have staffing or financial implications. No entity may be obligated without its consent.
- Phase 4: Phase 4 – Implementation is undertaken after a watershed plan is completed and adopted according to the procedures identified in Chapter 90.82.130 RCW. The primary task, and requirement, is development of a Detailed Implementation Plan. No additional implementation funds may be awarded until the DIP is complete. This phase provides a mechanism for coordinating and overseeing the actual implementation of recommendations and obligations defined in the Watershed Management Plan.

The process for adoption of a Watershed Management Plan is outlined in RCW 90.82.130. The Planning Unit must approve the Watershed Management Plan by consensus of all of the members of the Planning Unit or by consensus among members appointed to represent units of government and a majority vote of the nongovernmental members of the Planning Unit (RCW 90.82.130(1)(a)). Upon an approved vote by the Planning Unit, the Watershed Management Plan is then submitted to the counties with territory within the WRIA, unless they have opted out under RCW 90.82.130(2)(c). The legislative authority in each county in the watershed is required to provide public notice and hold at least one public hearing on the proposed Watershed Management Plan. After the public hearings have been conducted, the legislative authorities of these counties shall convene in a joint session to consider the proposed Watershed Management Plan. At the joint session, the counties may approve or reject the proposed Watershed Management Plan, but can not amend it. Approval of the Watershed Management Plan is completed by a majority vote of the members of each of the counties with territory in the WRIA. If the proposed Watershed Management Plan is not approved, the legislative bodies can return the proposed Watershed Management Plan back to the Planning Unit with recommendations for revisions. The Planning Unit can evaluate the county recommendations and make revisions and submit it to the county legislative authorities a second time. In such a case, the county review process would begin again. If approval of the revised Watershed Management Plan is not achieved on the second attempt, the process ends.

When the Watershed Management Plan is approved by the applicable county legislative authorities, Chapter 90.82.130 RCW provides directive to agencies and organizations about plan recommendations, obligations and expectations. These are:

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

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

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

RCW 90.82.130(4) - *After a plan is adopted in accordance with RCW 90.82.130(3), and if the department participated in the planning process, the plan shall be deemed to satisfy the watershed planning authority of the department with respect to the components included under the provisions of RCW 90.82.070 through 90.82.100 for the watershed or watersheds included in the plan. The department shall use the plan as the framework for making future water resource decisions for the planned watershed or watersheds. Additionally, the department shall rely upon the plan as a primary consideration in determining the public interest related to such decisions.*

In summary, the legislature has deemed it worthy to attach the following notes as part of RCW 90.82.040, and shall be adopted as a guiding principle to adopt and implement Watershed Management Plans:

"The legislature declares and reaffirms that a core principle embodied in chapter 90.82 RCW is that state agencies must work cooperatively with local citizens in a process of planning for future uses of water by giving local citizens and the governments closest to them the ability to determine the management of water in the WRIA or WRIs being planned.

The legislature further finds that this process of local planning must have all the tools necessary to accomplish this task and that it is essential for the legislature to provide a clear statutory process for implementation so that the locally developed plan will be the adopted and implemented plan to the greatest extent possible.

The legislature is committed to meeting the needs of a growing population and a healthy economy statewide; to meeting the needs of fish and healthy watersheds statewide; and to advancing these two principles together, in increments over time.

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.”

With the above outlined statutory mandates passed by the Washington State legislature and signed by the Governor, it is the intent of the WRIA 53 Planning Unit to approve this Watershed Management Plan in order to develop a strategy with the State agencies to manage the water resources within WRIA 53.

The WRIA 53 Planning Unit was formed in January 2008 under the authority of the Watershed Planning Act (RCW 90.82). The initiating governments consisted of:

- Lincoln County – (lead agency)
- Okanogan County
- Ferry County
- Grant County (opted out)
- Davenport (largest City)
- Seven Bays Water Association (largest water purveyor)

The Colville and Spokane Tribes were also invited to participate. However, both tribal governments opted not to participate in the Lower Lake Roosevelt Planning effort. Letters representing their intent not to participate in the planning process are presented in the WRIA 53 Level I Report (September 4th, 2009). On June 3, 2008, Grant County sent a letter to Lincoln County that they were opting out of the WRIA 53 planning process in accordance with RCW 90.82.130. A copy of their letter opting out is presented in Appendix A. In addition, the National Park Service and the US Bureau of Reclamation were invited to participate in the process. Both Federal agencies agreed to participate, but only in an advisory role. The Planning Unit currently consists of approximately 20 members consisting of local agencies, city and town representatives, County Commissioners, local private water purveyors, ranchers and farmers, and private citizens. Okanogan and Ferry County participated in the Phase 1 and 2 planning process, but did not participate in Phase 3 Plan development. The active members of the WRIA 53 Planning Unit have not included the Okanogan or Ferry County portions of the WRIA 53 watershed in any assessments, analyses, or technical studies. The watershed plan does not contain any recommendations that pertain to portions of the watershed that are located in either Ferry or Okanogan County. The technical assessments, data analyses and planning process specifically excluded portions of the WRIA located in Ferry and Okanogan County.

2.0 WATERSHED PLANNING IN WRIA 53

The process for developing the WRIA 53 Watershed Plan began with the formation of the Planning Group in January 2008. The visions of local landowners and local and state agency representatives over a five year time period are synthesized into this Watershed Plan. The following subsections summarize the local process undertaken to reach the completion of Phase 3 Watershed Planning.

2.1 WRIA 53 INITIATING GOVERNMENTS

The initiating governments for WRIA 53 are Lincoln, Grant, Ferry, and Okanogan Counties, the City of Davenport, and the Seven Bays Water Association. The Seven Bays Water Association is the largest water purveyor (after the City of Davenport) in WRIA 53, and supported the initiation of WRIA 53 Watershed Planning, but did not participate through Phase 2 and 3. Grant County, which contains less than five percent of the area within WRIA 53 decided to opt out of Watershed Planning under the guidelines set forth in RCW 90.82.130(c). Ferry and Okanogan Counties participated during Phase 1 and Phase 2 activities, but have not participated in the Phase 3 watershed planning process but have not opted out.

The Colville Confederated Tribes and the Spokane Tribe of Indians were notified of the planning process at its inception. However, both declined to participate. No tribal authorities participated in the WRIA 53 planning process. The Bureau of Reclamation has participated in the WRIA 53 Planning Unit as a non-voting advisory participant.

2.1.1 WRIA 53 Lead Agency

In accordance with the Watershed Planning Act (RCW 90.82.060), the initiating governments for WRIA 53 designated Lincoln County as the lead agency. As lead agency, Lincoln County received grant funding from the State of Washington and contracted with Ecology to conduct the watershed planning effort. After receipt of funding, Lincoln County contracted the Lincoln County Conservation District (LCCD) to conduct Phase 2 Level 2 studies for the watershed planning effort and throughout Phase 1, 2 and 3 contracted with the Water & Natural Resource (WNR) Group, Inc. to conduct the facilitation, prepare the Phase II Level 1 Technical Assessment and write the Plan.

Section 2.1.2 WRIA 53 Planning Unit

The lead agency assembled a team of local representatives and land owners to develop an understanding of the water resource issues within the watershed. Lincoln County facilitated six meetings between January and June 2008 during the initial formation of the Planning Unit. During this time frame, an agreed upon Mission Statement and Voting and Operating Procedures were developed. The WRIA 53 Operating Procedures are included in Appendix B. Although an effort was made to invite a diversified group of interests, the Planning Unit primarily consisted of local landowners and several representatives from the local towns.

2.1.2 Process for Developing Plan

During Phase 1 planning, the initiating governments decided to address only the Water Quantity element of watershed planning. Later during Phase 2, the Planning Unit decided to also undertake the Water Storage element and submitted a grant application. However, this element has not been funded.

Planning Unit meetings were held monthly from July 2008 through December 2009 to discuss the issues and findings within WRIA 53.

2.1.2.1 Phase 2 – Technical Assessment

In July 2008, the WRIA 53 Planning Unit entered into Phase 2 Watershed Planning. Support of the Phase 2 planning effort by Lincoln County was provided by Ferry County, Okanogan County, Lincoln County, Seven Bays Water Association, and the City of Davenport during Phase 2. These entities attended meetings and provided information and recommendations on the direction and development of the watershed planning process. The Planning Unit started the Phase 2 Level 1 Technical Assessment by conducting an assessment of water quantity related information of the watershed. The primary objective of the Planning Unit was to identify whether or not a sustainable supply of water was available in the watershed.

The Phase 2 Level 1 Technical Assessment resulted in a report of findings completed by Water & Natural Group, Inc. and GSI Water Solutions in September, 2009. A copy of the report can be found on the WRIA 53 web site. A brief summary of the findings of the Phase 2 Technical Assessment report is provided later in Section 3 of this Watershed Plan.

Limited funding for Phase II Level 2 groundwater monitoring was available from 2009 through 2013. The Planning Unit decided that additional assessment was needed in order to understand what water resources are available in the watershed and where they are located. Additional assessment work, which was requested but not funded included:

- 1) Develop Water Well Supply Inventory which will consist of GPS of wells throughout the County, identification of which aquifer the well is withdrawing from, and installing data loggers in some priority wells to monitor aquifer levels.
- 2) Spring /Seep identification and monitoring consisting of GPS location of seeps springs, identification of flows, water quality sampling, and age dating of some priority springs.
- 3) Stream Flow monitoring of Hawk and Welch Creek, consisting of installing continuous data loggers in streams to determine losing and gaining reaches of creek, and determining where potential stream restorations and/or storage opportunities may exist.
- 4) Conduct Arsenic sampling on wells in northern part of watershed to potentially identify source of arsenic, and Conduct nitrate sampling in domestic wells to identify elevated areas of nitrate and BMP alternatives.
- 5) Complete hydrostratigraphic modeling in eastern extent of watershed to determine aquifer connection into WRIA 54 (and the West Plains area) and aquifer flow direction through the basement high areas.

2.1.2.2 Phase 3 – Plan Development

Watershed Plan development for WRIA 53 began in July 2012, when limited funding was finally approved by Ecology. Limited funding for the Phase II Level 2 groundwater monitoring was conducted from 2009 through 2014. Although full funding was not always available, the Planning Unit continued to meet to move the Planning Process forward and develop this Watershed Plan.

2.1.2.4 Comprehensive Issues

The Plan was developed using the format of Goals and Action Items, in an attempt to focus recommendations for future water supply management, -and development of potential local land use and development policies. The primary comprehensive goal of the planning process as developed by the Planning Unit is to “assure sustainable water supplies are available throughout the watershed”. The watershed is located at the headwaters of the Columbia River Basalt basin and appears to primarily be recharged by precipitation. Development of management policies are essential in assuring future “mining” of aquifer resources resulting in a depleted aquifer system does not occur.

2.1.2.5 Public Outreach

The WRIA 53 lead agency made efforts throughout the planning process to notify and inform a diversified group of citizens and agencies to participate and provide input into the planning effort. Public Outreach was conducted in accordance with a Public Participation Plan (PPP) developed by the Planning Unit and Approved at their April 15, 2009 meeting. A copy of the PPP is included in Appendix D. In addition, during Phase 2, the WNR Group provided a general overview presentation on watershed planning in various towns throughout the WRIA. Public attendance at these meetings ranged from 12 to 30 people. Public participation was fairly consistent through the preliminary stages of Phase 3, at which time the participation has waned to a few local agencies and public members within Lincoln County.

Lincoln County has maintained public outreach throughout the process in order to develop information needed to develop the Watershed Plan. This information primarily involved development of projects and collection of data that will assist Lincoln County in future land use planning decisions in which it has the legal liability in making water availability decisions.

2.2 WATERSHED PLAN SCOPE, SCALE, AND FOCUS

The following section presents the WRIA 53 Planning Units approved Scope, Scale, and Focus.

2.2.1 Scope

The WRIA 53 Initiating Governments agreed in 2008 to participate in the Watershed Planning process and address the required Water Quantity element. The three optional elements of Water Quality, Habitat, and Instream flow were not addressed. In 2009, the Planning Unit submitted an application for the Water Storage optional element, but it was not funded. Funding was received by the Planning Unit only for the Water Quantity

element for Phase II. Funding for the optional element of Water Storage is still being requested by the Planning Unit at the time this Plan was prepared.

A Level 1 Technical Assessment Report was prepared for the Planning Unit and finalized in September 2009. The Technical Assessment document compiles the readily available technical data for the Water Quantity element of the Scope of this Plan. The Level 1 Technical Assessment report provides much more detail than is presented in the Plan, and is the foundation for the development of the goals and action items to be addressed within the watershed. Copies of the Technical Assessment report, along with the administrative record for this planning effort, are available in the Lincoln County Planning office in Davenport, Washington, and on the WRIA 53 web site maintained by the Lincoln County Planning Department.

2.2.2 Scale

Although the WRIA 53 Basin has been divided into five subbasins (Figure 1), the Planning Unit has elected to ONLY address the three subbasins (Hawk Creek, Brody Creek, and Coulee Dam South) all of which are located south of the Columbia River. This was done because lands lying north of the Columbia River are within the boundaries of the Colville Reservation, and because they are essentially disconnected from the water resources on the south side of Lake Roosevelt.

It is the intent of the Planning Unit to identify basin-wide issues and provide solutions that will be the foundation for more specific solutions in future. Therefore, detailed actions within the identified subbasins may be developed in future scheduled modifications to the Plan dependent on results of proposed additional basin wide and/or site specific assessments.

It was also recognized by the PU that the issues in WRIA 53 also occurred throughout Lincoln County. The PU felt that whatever issues and solutions the PU identified; it should try to apply them to the County as a whole (where applicable).

County wide issues discussed by the PU included the development of a county wide hydrogeologic assessment protocol for permitting of new developments, and development of “areas” where the probability of groundwater yield was low, moderate or high, which could be correlated to minimum lot size. These issues will have to be further investigated and vetted through the county planning process.

2.2.3 Focus

The Initiating Governments and Planning Unit Members played an essential role in the overall focus of the Watershed Assessment and development of the Watershed Plan. The Planning Unit undertook evaluation of the required Water Quantity element available under the watershed planning process, and focused on one key issue that directly affects the citizens, landowners, and economy within the watershed: improving the overall water resources within WRIA 53.

2.3 SUPPORTING TECHNICAL AND PLANNING DOCUMENTS

No comprehensive planning documents had been prepared for WRIA 53 prior to the completion of this Watershed Plan. During the watershed planning process, a Phase 2 Level 1 Technical Assessment was completed (WNR Group, September 2009). This Technical Assessment addressed the Water Quantity planning element. A summary of the findings of the Level 1 Technical Assessment is provided in the following section of the Plan. In addition to the Phase 2 Level 1 Technical Assessment, the WRIA 53 Planning Unit completed a groundwater level monitoring program (WNR Group, June 29, 2010, June 20, 2011, June 19, 2013 and June 27, 2014), a Preliminary Critical Aquifer Recharge (CARA) Analysis (WNR Group, June 30, 2010), and Groundwater Inventory and Mapping Project (Lincoln County Planning, June 30, 2010). These are summarized in the following section.

Studies and information are continually being developed and/or refined in the Lower Lake Roosevelt Watershed, and this Plan acknowledges that some components of the Phase 2 Technical Assessment may be outdated. The WRIA 53 Planning Unit encourages any entity or person using this Plan to communicate with the WRIA 53 Planning Unit (or subsequent designated implementing group) to determine if new data has been developed or policies have changed. The Planning Unit is conducting an ongoing program for monitoring of groundwater levels throughout the watershed. As additional data becomes available through time, the findings of potential impacts on groundwater may change.

3.0 STUDIES CONDUCTED BY WRIA 53 PLANNING UNIT

This section provides a summary of the reports and technical data that the WRIA 53 Planning Unit has reviewed and conducted to date. Information presented below are only summaries of the key findings of each project report completed. A review of the final reports should be conducted in order to obtain all data and conclusions of the tasks completed. Complete reports and data collected by the WRIA 53 Planning Unit during this watershed process can be found at the WRIA 53 web site - <http://www.co.lincoln.wa.us/Planning/wria53>. Specific studies conducted by the Planning Unit are listed below and presented in the reference section.

- September 4, 2009, Water Resource Inventory Area 53 – Lower Lake Roosevelt Watershed: Phase 2 – Level 1 Hydrogeologic Technical Assessment.
- December 28, 2009) Quality Assurance Project Plan for WRIA 53 – Lower Lake Roosevelt Watershed: Groundwater Level Gauging Program: Northern Lincoln County.
- June 29th, 2010, Technical Memorandum: Update on Groundwater Level Gauging – Lower Lake Roosevelt Watershed, Lincoln County, Washington.
- June 30th, 2010, Technical Memorandum: Preliminary Critical Aquifer Recharge Area (CARA) Analysis – Lower Lake Roosevelt Watershed, Lincoln County, Washington.
- June 30th, 2010, WRIA 53 (Lower Lake Roosevelt Watershed) - Groundwater Inventory and Mapping Project.
- June 20th, 2011, Groundwater Level Gauging Project – Lower Lake Roosevelt Watershed (WRIA 53), Northern Lincoln County, Washington
- June 19th, 2013, Groundwater Level Gauging Project – Lower Lake Roosevelt Watershed (WRIA 53), Northern Lincoln County, Washington
- June 27th, 2014, Groundwater Level Gauging Project – Lower Lake Roosevelt Watershed (WRIA 53), Northern Lincoln County, Washington,

3.1 PHASE II – LEVEL 1 HYDROGEOLOGIC TECHNICAL ASSESSMENT

The Phase II – Level I Hydrogeology Technical Assessment was completed in 2009 by the WNR Group, Inc. on behalf of the Planning Unit. This Level 1 Technical Assessment represented a compilation and review of readily available data for WRIA 53 for the preliminary evaluation of the Water Quantity element of watershed planning. The watershed includes lands along the lower portions of Lake Roosevelt, the reservoir that is formed behind Grand Coulee Dam. Land to the north of Lake Roosevelt drain into the lake, as do the near shore lands on the south side. The southern part of the watershed drains further to the south, away from Lake Roosevelt. Water resources in the main stem of the Columbia River (including Lake Roosevelt) is under federal control to manage the flows for flood prevention and power, and the State of Washington administers the instream flows in the river per WAC 173-563 (Appendix E).

The Level I Assessment completed by the Planning Unit for the areas south of the Columbia River focused on review of readily available information in order to determine

if sufficient data was available to develop a water balance. During the review and evaluation, a widespread lack of hydrologic and hydrogeologic data was identified for the watershed. Specifically for the flows of Hawk and Welch Creek, and groundwater elevations in the aquifers throughout the WRIA 53 watershed. As a result of this lack of data, the Planning Unit sought funds to begin data collection of stream flows and groundwater elevations in the watershed.

3.2 QUALITY ASSURANCE PROJECT PLAN (QAPP) FOR WRIA 53

After completion of the Level I Assessment, the WRIA 53 Planning Unit developed a sampling plan to measure groundwater elevations in the watershed. This plan outlined a groundwater monitoring program which could measure quarterly well elevations in up to 50 wells across the watershed, and within each of the four distinct aquifers. Prior to conducting field activities, in December 2009, the Planning Unit developed a QAPP (WNR Group, December 28, 2009) which outlined the sampling plan and QA/QC procedures for monitoring of the wells. The QAPP (WNR Group, December 18, 2009) presents detailed procedures and quality assurance protocols for collecting groundwater level measurements to determine aquifer properties, specifically to determine if fluctuations (seasonal or sustained) in the groundwater table have occurred.

3.3 GROUNDWATER LEVEL GAUGING

The Lincoln County Conservation District under contract to the Planning Unit collected groundwater data during 2010 and 2011 while Phase 2 Level 2 was occurring. Measurements were also collected periodically in 2012, 2013 and 2014 when Ecology funding was available. Over 300 flyers were mailed to residents of Lincoln County to request access to measuring of their wells. Landowner access agreements were signed with 58 property owners to collect data. The Lincoln County Conservation District conducted the well monitoring program. Wells were selected and monitored in three general hydrogeologic units: 1) basalt wells, 2) sand & gravel wells, and 2) granite wells. Data during the sampling for the first half of 2010 was summarized in a technical memorandum prepared by the WNR Group on June 29th, 2010. A final report was prepared on June 20th, 2011 by the WNR Group summarizing all the data collected from December 2009 through June 2011. Annual data reports were also prepared on June 19th, 2013 and June 27th, 2014 by the WNR Group.

A total of 52 wells were gauged in the WRIA 53 Groundwater Gauging Project. Figure 2 shows the location of the wells being gauged for the project. Hydrographs are presented in Attachment 1 of the 2014 WNR Group Water Level Gauging report which includes all data collected on each well site. The data is kept by the Lincoln County Planning Department and for the WRIA 53 Planning Unit.

The following is a summary of the results presented in the WNR Group June 27th, 2014 report. Data tables and graphs have also been updated for measurements collected by the LCCD during 2012, 2013 and 2014 under Ecology grant funding.

3.3.1 Sand & Gravel Wells

Six (6) wells which withdraw groundwater from the sand & gravel aquifers in WRIA 53 were gauged for the project. Two sand & gravel wells are gauged in Hawk Creek drainage,

two in the Welch Creek drainage, and two in the area of Grand Coulee which are in direct hydraulic continuity with Lake Roosevelt. Table 2 presents a summary of the gauging measurements collected in the sand & gravel wells located in Hawk and Welch Creeks. These sand and gravel wells are in the valley gravels and appear to be in hydraulic connection with Hawk and Welch Creeks in their respective drainages. Graph 1 is a graphical presentation of the sand and gravel wells located in the Hawk and Welch Creek drainages. Seasonal fluctuations in groundwater have been observed to date in the sand & gravel wells and are inferred to be directly related to precipitation and stream flow.

Table 3 presents the results of monitoring within the two sand and gravel wells near Grand Coulee. Lake levels of Lake Roosevelt are also presented in the table. As shown on Graph 2, these wells are in direct hydraulic continuity with the lake, and fluctuate with the raising and lowering of the reservoir. During the early spring 2011, maintenance occurring on Grand Coulee Dam lowered the lake to approximately 1230 feet amsl, and to approximately 1240 feet amsl in spring 2014, which dramatically decreased the water table elevations in the wells hydraulically connected to the lake.

TABLE 2: SUMMARY OF WATER LEVEL ELEVATIONS IN SAND & GRAVEL WELLS

Date	APQ814-HC	ELL1977-HC	NEL1968-WC	HOP1991-WC
12/29/2009	1479.37			
1/8/2010		1726.38		
2/4/2010	1479.72			
2/19/2010		1726.93	1509.48	
3/8/2010	1480.06			
3/16/2010		1726.92	1509.83	
4/20/2010	1482.22			
4/27/2010		1726.81	1510.87	1722.72
6/4/2010		1726.41	1510.09	1721.12
6/8/2010	1482.25			
7/26/2010	1481.61	1725.39	1510.36	1719.32
8/18/2010	1481.42	1725.01	1510.18	1718.12
9/22/2010	1481.12	1724.95	1509.94	1716.32
10/22/2010	1480.69	1724.99	1509.53	1715.72
11/19/2010		1725.13	1509.31	1715.02
1/7/2011	1479.76	1726.35	1508.89	1718.92
2/14/2011	1480.09	1727.22	1509.89	1723.12
3/22/2011	1482.57	1727.61	1511.16	1730.12
4/18/2011	1485.57	1727.46	1513.64	1734.22
6/23/2011	1485.62	1726.83	1515.37	1731.92
5/24/2012		1726.51	1515.81	1724.92
6/28/2012		1725.99	1515.98	1722.92
2/14/2013	1479.47		1512.87	1719.62
4/16/2013	1480.63	1727.08	1513.70	1722.52
4/25/2014	1480.37	1726.69	1508.28	1713.12
6/19/2014	1481.17	1725.27	1507.06	1711.52

Note: HC = Located in Hawk Creek, WC = Located in Welch Creek

TABLE 3: SUMMARY OF WATER LEVEL ELEVATIONS IN SAND & GRAVEL WELLS in CONNECTION WITH LAKE ROOSEVELT near GRAND COULEE DAM

Date	Lk Roos	BBH538	ABQ390	IAN1991
1/19/2010	1287.24	1292.42		
2/12/2010	1283.83	1288.35	1287.01	
3/8/2010	1278.58	1283.30	1281.41	
4/22/2010	1276.74	1275.36	1273.71	
6/3/2010	1271.81	1276.84	1270.61	
7/26/2010	1288.16	1293.01	1289.61	
8/18/2010	1282.21	1288.24	1285.61	
9/22/2010	1283.14	1287.85	1283.41	
10/22/2010	1288.39	1293.21	1289.41	
11/19/2010	1284.68	1289.97	1285.81	
1/7/2011	1281.56	1285.98	1283.61	
2/14/2011	1273.02	1282.50	1281.41	
3/22/2011	1253.67	1258.47	1256.61	
4/19/2011	1230.61	1234.28	1237.41	
6/22/2011	1264.66	1269.85	1262.01	
5/22/2012	1245.54		1246.01	1246.75
6/25/2012	1286.64	1291.88	1283.11	1279.95
2/12/2013	1280.72	1285.84	1282.21	1282.55
4/11/2013	1278.50	1283.79	1280.91	1283.65
4/22/2014	1239.12		1244.71	1252.45
6/17/2014	1287.66	1292.19	1282.41	1278.95

3.3.2 Basalt Wells

Forty-one (41) wells which withdraw groundwater from the basalt aquifers were gauged for the WRIA 53 project. CRBG wells are inferred to be in the following units:

- 14 wells in the Wanapum Basalt Aquifer
 - 10 in the Davenport area
 - 4 in other areas of the WRIA
- 27 wells in the Grande Ronde Basalt Aquifer
 - 9 in the Hawk Creek area
 - 4 in the Grand Coulee area
 - 7 in the Welch Creek area
 - 3 in the Davenport area
 - 4 in the Grand Coulee and 7-Bays areas which are in direct hydraulic continuity with Lake Roosevelt.

3.3.2.1 Wanapum Basalt Wells

Fourteen wells inferred to be in the Wanapum Basalt are currently being monitored for the project. Table 4 presents the groundwater elevations of the 10 groundwater wells being monitored in the Davenport area. Graph 3 presents the hydrographs of these 10 wells. As

shown on the hydrograph, Wanapum wells in the Davenport area remained fairly stable until the winter of 2011, at which time, many of the groundwater elevations rose. This is interpreted to be a result of some recharge to the shallow basalt aquifer from precipitation and a potential reduction in pumping in the area. Groundwater elevations in the Wanapum aquifer were relatively stable between 2011 and 2013. Measurements collected in 2014 reveal that the groundwater table within the Wanapum Aquifer near Davenport dropped approximately two feet in most wells. Aquifer declines in other wells in 2014 included AFA197 (drop of approximately 15 feet), ENS1965 (drop of approximately 33 feet) and STU1979 (drop of approximately 53 feet).

Table 5 presents a summary of the gauging measurements collected in the Wanapum basalt wells located in other areas (outside Davenport area) throughout the watershed. As shown on the Table 5, and in Graph 4, no major fluctuations in groundwater have been observed in these wells through 2013, except for APC864, which is located in Welch Creek. The groundwater table in this well rose approximately 18 feet from July 2010 through April 2011 and has not fluctuated much since that time. The other wells have remained at a fairly stable static level until 2014 at which time the groundwater table has declined approximately one to two feet, and approximately ten feet in well APC864.

TABLE 4: SUMMARY OF GROUNDWATER LEVEL MEASUREMENTS IN WANPUM BASALT WELLS IN DAVENPORT, WA AREA.

Date	AHJ350	DAVEN #2	DAVEN #1	STI1987	AGG084	STU1979	STUCWIN	AFA197	ENS1965	ACW391
1/8/2010	2293.54									
2/12/2010										
3/8/2010	2292.64	2285.42	2286.65							
4/20/2010	2293.22									
4/28/2010		2285.79	2286.00	2411.73						
6/4/2010	2293.10	2284.84	2285.98							
6/8/2010				2411.84	2219.15	2352.08	2361.65	2321.10	2329.65	
7/9/2010									2329.65	
7/26/2010	2292.40	2282.40	2283.45	2410.07	2217.55	2348.10	2360.11	2312.00	2329.95	
8/18/2010	2292.50	2280.65	2281.62	2409.47	2216.55	2348.00	2359.26	2307.70	2330.05	
9/22/2010	2292.52	2280.46	2281.25	2409.21	2217.15	2348.00	2358.73	2307.50	2329.85	
10/22/2010	2292.42	2280.69	2281.44	2408.85	2217.35		2358.55	2311.00	2336.85	2408.15
11/22/2010	2292.54	2281.29	2282.09							
1/7/2011	2292.63	2283.53	2284.53	2410.46	2219.35		2360.52	2317.60		2409.85
2/14/2011	2293.33	2289.11	2291.63	2413.64	2221.15		2364.46	2323.80		2412.95
3/22/2011	2294.05	2291.51	2293.15	2414.32	2222.55		2366.01	2328.60	2325.92	2414.18
4/18/2011	2293.57	2292.69	2294.34	2413.29	2222.85	2294.00	2365.95	2331.90	2328.37	2412.35
6/23/2011	2293.28	2290.34	2291.66	2412.09	2222.75	2294.83	2363.42	2333.50	2329.96	2411.45
2/9/2012		2283.36	2284.20						2324.15	
5/23/2012	2292.91	2288.24	2289.43	2413.09	2220.95	2286.25	2361.97	2326.60	2320.37	2411.45
6/27/2012	2292.87	2286.85	2288.01	2411.16	2219.65	2288.92	2361.57	2323.30	2317.92	2410.55
2/11/2013	2292.66	2285.04	2286.02	2411.38	2219.35		2361.20	2321.10	2317.65	
4/12/2013	2293.27	2290.39	2291.72	2413.31	2220.95	2275.84	2364.37	2321.60		2412.65
4/23/2014	2292.73	2289.89	2289.14	2410.64	2220.35		2363.89	2324.30		2410.15
6/19/2014	2292.09	2286.56	2287.59	2408.68	2218.95	2222.07	2361.71	2309.50	2284.75	2408.15

Note: EGC=East of Grand Coulee, WC=Welch Creek, EHC=East of Hawk Creek

TABLE 5: SUMMARY OF GROUNDWATER LEVEL MEASUREMENTS IN WANAPUM BASALT WELLS OUTSIDE DAVENPORT, WA AREA

Date	DID1982-EGC	APC864-WC	Platt1992-EHC	Scharf1992
2/12/2010	2428.22			
3/8/2010	2427.82			
4/22/2010	2427.62			
6/8/2010				2498.75
7/26/2010	2403.22	2322.77	2377.15	2496.95
8/18/2010	2403.02	2333.17	2377.35	2496.55
9/22/2010	2402.82	2334.77	2377.35	2496.55
10/22/2010	2403.02	2335.17	2377.35	2495.95
11/22/2010	2403.62	2335.87		
1/7/2011	2403.22	2336.37	2377.95	2495.75
2/14/2011	2402.82	2337.17	2377.65	2495.95
3/22/2011	2402.42	2338.57	2377.65	2496.25
4/19/2011	2402.02	2340.37	2377.28	2496.35
6/27/2011	2401.32	2337.67	2376.75	2497.25
5/25/2012		2339.17	2376.75	2497.85
6/29/2012	2400.22	2334.47	2376.55	2497.15
2/15/2013	2400.02	2337.37	2377.65	2494.85
4/10/2013	2399.52	2338.37	2376.95	2495.55
4/22/2014	2398.72	2334.57	2376.95	2495.55
6/17/2014	2397.52	2324.47	2376.55	2493.95

Note: EGC=East of Grand Coulee, WC=Welch Creek, EHC=East of Hawk Creek

3.3.2.2 Grande Ronde Basalt Wells

Twenty-seven groundwater wells withdrawing from the Grande Ronde Basalt aquifer were monitored in the study area for this study. During 2014, only 19 of the Grande Ronde wells were monitored due to access restrictions. These wells were monitored in four different areas of the watershed: the Hawk Creek area, the Grande Coulee area, the Welch Creek area, and other areas in the watershed. Table 6 presents the groundwater elevations in nine Grande Ronde wells measured in the Hawk Creek area, primarily in those areas around the Hawk Creek development. A hydrograph of the nine Hawk Creek Grande Ronde wells is presented in Graph 5. As shown on the table and graph, there is a large variation in groundwater elevations in the Hawk Creek area. This is interpreted to be a result of the wells being screened in various Grande Ronde interflows, and/or being influenced by structural controls in the Hawk Creek drainage. Only five Hawk Creek Grande Ronde wells were monitored during 2014. In general, during 2014, groundwater elevations have slightly fallen.

**TABLE 6: SUMMARY OF WATER LEVEL ELEVATIONS IN GRANDE RONDE BASALT WELLS-
HAWK CREEK**

Date	APQ811	APQ806	BAC950	APB762	APP839	ALN867	ALN853	AHC407	ACW361
12/29/2009		1966.74			2214.00	1493.35			
1/19/2010								1632.22	
1/22/2010	1475.15								
1/29/2010							1519.08		
2/4/2010	1474.85	1964.03	1703.94	1939.59	2214.10	1494.98	1519.30		
2/12/2010								1638.42	
3/8/2010	1475.49	1965.23	1703.64	1938.99	2214.26	1495.80	1520.06		
3/16/2010								1640.31	1833.28
4/20/2010	1475.99	1966.39	1703.74	1938.59	2214.28	1496.48	1521.15		
4/22/2010								1637.27	1834.38
6/3/2010									1831.78
6/8/2010	1475.47	1966.23	1702.24	1937.17	2214.13	1496.17	1520.93		
7/26/2010	1475.68	1966.21	1702.54	1937.19	2214.02	1495.81	1519.53	1610.92	
8/18/2010	1475.58	1965.34	1703.14	1937.39	2213.97	1495.65	1520.53	1590.12	
9/22/2010	1475.54	1962.27	1703.14	1938.09	2213.89	1495.45	1519.63	1624.72	
10/22/2010	1475.43	1959.15	1703.44	1938.39	2213.82	1495.21	1519.73	1632.02	
11/22/2010								1632.21	
1/7/2011	1476.20	1956.29	1704.44	1940.09	2213.95	1494.70	1518.13		
2/14/2011	1476.80	1965.77	1704.54	1939.49	2214.87	1496.33	1519.93	1641.82	
3/22/2011	1477.40	1968.52	1703.74	1938.79	2215.90	1499.08	1522.33	1651.38	
4/19/2011	1478.80	1972.27	1703.74	1938.39	2216.16	1500.72	1525.42	1644.11	
6/23/2011	1477.40	1975.42	1702.94	1936.99	2215.87	1499.48	1524.93	1554.22	
5/23/2012	1476.60		1702.14				1521.73	1621.52	
6/27/2012	1476.00		1701.74				1520.13	1633.05	
2/11/2013	1475.60	1964.34	1702.34		2214.25		1485.03	1633.15	
4/12/2013	1476.10	1965.94	1701.94		2215.11		1516.03	1640.07	
4/25/2014		1966.14	1700.34				1517.13	1628.32	
6/19/2014	1475.20	1963.34	1699.14				1515.53	1632.06	

Table 7 presents a table of groundwater elevations in Grande Ronde wells which were monitored in the Welch Creek drainage. Graph 6 presents a hydrograph of the Welch Creek Grande Ronde wells. As shown on the table and graph, there is a large variance in groundwater elevations in these wells. It is inferred from geologic mapping by others that structural controls, as described in Hawk Creek drainage may be influencing the hydrostatic heads in this drainage also. Although there is a large variance in the groundwater elevations, no major groundwater table fluctuations were observed in the Grande Ronde wells in Welch and Hawk Creek.

Table 8 presents the Grande Ronde well data for the Grand Coulee (4 wells), Lincoln (1 well), and Davenport (2 wells), Washington areas. During 2014 only three Grand Coulee wells and one well east of Davenport were measured. As shown in Table 8 and in Graph 7, groundwater levels have remained fairly constant throughout the monitoring period, except for ACS240 which fell in elevation approximately 19 feet during 2014. Wells in the Grande Ronde in the Davenport area are approximately 500 to 1000 feet higher in elevation than the other wells in the Lincoln and Grand Coulee areas.

**TABLE 7: SUMMARY OF WATER LEVEL ELEVATIONS IN WELCH CREEK
GRANDE RONDE BASALT WELLS**

Date	AHS539	BBH041	BAC976	BAS262	BAC970	BAC969	AKT389
1/8/2010				2198.29	2370.00	2282.94	
1/22/2010		1548.11					
2/19/2010		1548.18	2129.77	2160.69	2327.99	2282.90	
3/16/2010	1462.95	1548.26	2129.75	2161.00	2328.10	2282.71	
4/22/2010	1461.64						
4/28/2010		1548.33	2129.56	2161.99	2328.15	2283.03	
6/3/2010	1462.61						
6/4/2010		1548.26	2129.36	2161.09	2327.81	2282.42	
7/27/2010	1456.11	1548.18	2129.36	2161.09	2326.92	2282.00	1750.28
8/17/2010	1460.30	1548.04	2129.24	2160.59	2326.60	2281.72	1750.38
9/21/2010	1457.23	1547.94	2129.37		2326.33	2282.08	1750.28
10/21/2010	1458.95	1547.92	2129.23		2326.00	2282.14	1750.48
11/19/2010	1460.59	1547.93	2129.20		2325.84	2282.44	1750.48
1/14/2011		1548.02					1750.48
2/10/2011	1462.42	1548.15	2128.48		2325.45	2282.54	1750.48
3/23/2011	1463.25	1548.34	2127.67		2325.72	2283.18	1750.28
4/19/2011	1463.57	1548.61	2127.55		2326.07	2284.05	1750.38
6/22/2011	1463.26	1549.12	2127.84		2327.05	2284.61	1750.28
5/22/2012	1462.70	1548.91	2129.84		2329.01	2293.45	1750.28
6/25/2012	1462.61	1548.80	2129.38		2329.01	2283.22	1750.28
2/14/2013		1548.42					1750.38
4/11/2013	1462.06	1548.53	2129.37		2328.21	2280.73	1750.38
4/22/2014	1457.01	1548.05	2127.61		2327.73	2283.46	1750.38
6/17/2014	1458.70	1547.90	2129.41		2327.56	2283.97	1750.18

Table 9 presents the monitoring results of four wells which withdraw water from the Grande Ronde basalt, but are in direct hydraulic continuity with Lake Roosevelt. As shown on the table and on Graph 8, the groundwater elevations fluctuate with the lake and dropped significantly with the lowering of the lake in the spring of 2011 and 2014. Although these wells are in direct hydraulic continuity with Lake Roosevelt, it does not appear that this water table is hydraulically connected to the Grand Ronde aquifers to the south. The GWMA studies have identified a basement ridge/barrier between these basalts and the main WRIA 53 Grande Ronde basalts underlying the watershed to the south. This discontinuity is also evident from the differences in groundwater elevations, where these wells have static elevations of 1230-1300 feet amsl, the other basalts to the south of the basement ridge have groundwater static elevations of 1500 – 2200 feet amsl.

TABLE 8: SUMMARY OF WATER LEVEL ELEVATIONS IN GRANDE RONDE BASALT WELLS IN GRAND COULEE, LINCOLN AND DAVENPORT AREAS

Date	BAC955-GC	APF669-GC	ACS240-GC	AHC421-GC	LIV1987-LINC	REIN300-NDAV	ABI086-EDAV
1/19/10	1698.13	1700.18		1350.46			
2/12/10	1697.61	1700.48	1366.20	1352.88			
3/8/10	1697.53	1700.43	1364.70	1353.03	1585.94		
4/22/10	1697.68	1700.50	1365.30	1353.03	1585.74		
4/28/10						2322.90	2476.19
6/3/10	1697.62	1700.48	1366.30	1354.22			2475.08
6/4/10					1584.94	2321.90	
7/27/10	1697.60	1700.41	1360.83	1354.44	1584.74	2344.50	2474.68
8/17/10	1697.54	1700.39		1354.36	1584.94	2345.00	2474.18
9/21/10	1697.56	1700.41	1350.25	1354.07	1585.44	2344.90	2474.18
10/21/10	1697.54	1700.37	1358.70	1353.95	1585.34	2345.10	2473.48
11/19/10	1697.58	1700.42		1353.99			
1/14/11	1697.45	1700.29	1374.30	1354.28	1586.34		2473.28
2/10/11	1697.28	1700.18	1377.75	1354.90	1586.34		2474.28
3/23/11	1697.40	1700.33	1383.58	1356.62	1585.54		2474.88
4/19/2011	1697.36	1700.23	1385.00	1357.40	1585.74		2475.28
6/23/2011	1697.41	1700.31	1382.00	1359.35	1585.04		2476.08
5/23/2012	1697.47	1700.28	1380.58	1361.28			2475.78
6/25/2012	1697.32	1700.23	1370.37	1360.02			2475.38
2/12/2013	1697.11	1700.68	1372.35				2473.08
4/11/2013	1697.22	1700.28	1372.10				2474.08
4/22/2014	1697.31	1700.38					2473.58
6/17/2014	1697.17	1700.08	1353.50				2472.58
	Grand Coulee				Lincoln	N-Dav	E-Dav

3.3.3 Granite Wells

Five (5) wells which withdraw groundwater from the basement (granite) aquifers were initially gauged for the project. However, since 2011 only four wells were measured due to access limitations. Table 10 presents a summary of the gauging measurements collected in the granite wells. As shown on the table, and in Graph 9, no major sustained drawdown in groundwater elevations have been observed in the bedrock wells. However, the granite wells in the area do have water tables that fluctuate, interpreted to be a result of delayed recharge and potential impacts from other granite wells in the same fractures.

TABLE 9: SUMMARY OF WATER LEVEL ELEVATIONS IN GRANDE RONDE BASALT WELLS IN GRAND COULEE AND DAVENPORT AREAS WHICH ARE IN HYDRAULIC CONTINUITY WITH LAKE ROOSEVELT

Date	LKRoos	ROY1991-GC	BAC967-7B	AKL333-7B	BAF483-7B
2/12/2010	1283.83	1300.44	1285.99		1282.50
3/8/2010	1278.58	1295.05	1279.39		1276.60
4/22/2010	1276.74	1288.78	1272.39	1274.43	1271.20
6/3/2010	1271.81	1282.43			
6/8/2010	1283.53		1279.89	1279.73	1266.80
7/27/2010	1287.66	1303.29	1288.19	1289.53	1283.80
8/17/2010	1282.79	1299.77	1282.79	1284.43	1280.70
9/21/2010	1282.61	1295.64	1282.49	1284.03	1276.60
10/21/2010	1288.13	1302.86	1288.29	1289.83	1283.40
11/19/2010	1284.68	1301.68			
1/14/2011	1280.80	1297.64	1282.89		1280.80
2/10/2011	1277.14	1296.17	1275.59	1277.43	1276.40
3/23/2011	1253.20	1272.51	1254.59	1256.43	1255.40
4/18/2011	1231.41	1255.96	1233.79	1236.93	1243.20
6/23/2011	1264.66	1265.33	1261.99	1261.03	1246.00
5/23/2012	1247.24	1257.98	1245.39	1246.33	1241.40
6/27/2012	1286.95	1292.10	1285.19	1285.93	1271.20
2/11/2013	1280.75	1294.26	1280.79	1282.03	1275.00
4/12/2013	1277.26	1295.39	1278.29	1280.03	1274.40
4/23/2014	1238.40	1263.90	1240.99	1242.63	1247.80
6/19/2014	1287.66	1291.28	1285.59	1286.43	1270.00

Note: GC = Grand Coulee, 7B = Seven Bays Area

3.4 PRELIMINARY CARA ANALYSIS

A Preliminary Critical Aquifer Recharge Area (CARA) Analysis for the watershed was prepared for the WRIA 53 Planning Unit. This analysis is summarized in a Technical Memorandum prepared by the WNR Group on June 30th, 2010, called Preliminary Critical Aquifer Recharge Area (CARA) Analysis – Lower Lake Roosevelt Watershed, Lincoln County, Washington. The report summarizes the soil and groundwater conditions in the watershed. Aquifers were characterized based on the susceptibility of the aquifer to potential impacts. The susceptibility analysis is dependent on the natural hydrogeologic conditions of the watershed, both the soil column above the aquifer (vadose zone), and the characteristics of the aquifer itself. The susceptibility of the Lower Lake Roosevelt Aquifer was analyzed on a regional basis. Susceptibility rankings were determined in accordance with Ecology guidelines (Cook, 2000 and Morgan, 2005). Aquifers in the watershed were characterized into the three main hydrogeologic systems: basalt, granite, and sand and gravel. Figure 3 presents a map of the aquifer systems in the watershed. Depth to groundwater was also mapped throughout the watershed as presented in Figure 4. The study resulted in the development of a map outlining the high, moderate and low susceptibility rankings of the watershed. As shown in Figure 5, the majority of the watershed is identified as a low susceptibility aquifer. The high susceptibility areas are the main drainages of Hawk and Welch Creek. The high susceptibility ranking is defined as an area where water supplies have a high probability of being impacted by surficial contamination.

TABLE 10: SUMMARY OF WATER LEVELS IN GRANITE WELLS

Date	ALN861-HC	ALN860-HC	REIN715-NDAV	AHC420-GC	APC865-GC
12/29/2009	2063.84				
1/19/2010				1369.71	1272.53
2/4/2010	2064.74	1783.14			
2/12/2010				1372.96	1284.83
3/8/2010	2064.88	1785.75		1375.50	1300.61
4/20/2010	2064.39	1786.39			
4/22/2010				1379.25	1285.63
4/28/2010			1972.49		
6/3/2010				1370.41	1245.63
6/8/2010	2065.45	1785.47	1969.19		
7/26/2010	2063.83	1785.51	1964.40	1368.29	1227.23
8/18/2010	2063.45	1785.10	1965.60	1374.05	1254.43
9/22/2010	2062.77	1784.46	1966.40	1371.24	1240.13
10/22/2010	2060.47	1783.89	1964.80	1370.14	1240.23
11/19/2010				1372.71	1260.63
1/7/2011	2065.35	1783.88	1968.60	1382.82	1284.63
2/14/2011	2064.92	1787.66	1966.60	1382.19	1281.43
3/22/2011	2065.66	1793.89	1969.20	1383.76	1261.43
4/18/2011	2064.70	1794.57	1966.80	1388.34	1290.23
6/22/2011	2064.30		1964.70	1374.45	1200.03
5/22/2012			1963.50	1373.60	1234.63
6/25/2012			1962.70	1371.67	1226.83
2/12/2013	2066.02		1964.20	1384.47	1280.93
4/11/2013	2064.48		1964.20	1388.10	1294.53
4/25/2014	2064.04		1966.70	1395.64	1305.73
6/19/2014	2063.34		1965.20	1381.20	1252.43

Note: GC = Grand Coulee Area, NDAV = North of Davenport, HC = Hawk Creek Area

3.5 GROUNDWATER INVENTORY MAPPING PROJECT

The Lincoln County Planning Department completed a Groundwater Inventory and Mapping project, which is summarized in their report, dated June 30th, 2010. This project consisted of a GIS analysis of known data within the watershed. The report presents graphs and maps of geologic and hydrogeologic data, as developed from the WRIA Level I and II studies. Data used to develop maps are located within the Lincoln County Planning Department and used for land use planning decisions.

3.6 HAWK CREEK FLOW MONITORING

During the Phase 2 watershed planning effort, Ecology and the LCCD conducted stream flow monitoring in Hawk Creek on behalf of the Planning Unit. The Planning Unit identified six potential stream monitoring locations on Hawk Creek during the initial Phase 2 planning effort. However, due to land access and stream morphology, Ecology was only able to collect flow measurements at three of these locations (HC-1, HC-3, and HC-5). Locations of the monitoring stations are shown on Figure 6. Ecology monitored the three stream stations on Hawk Creek from October 2009 through June 2010. The LCCD then

monitored the three stations from August 2010 through June 2011. Table 11 presents a summary of the flow monitoring results collected during the Phase 2 and 3 planning process.

As shown in Table 11 and in Graph 10, Hawk Creek appears to be a gaining stream from station HC-1(near the headwaters) to station HC-5 which is (at the bridge on Miles Creston Road). During all monitoring events, the stream appeared to proportionally gain from each station to the next. Flows in the late winter and early spring of 2011 are almost three times the flows recorded during the same period in 2010. This appears to be a result of the numerous rain on snow events and a result of higher-than-normal precipitation observed during early 2011.

Date	HC-1	HC-3	HC-5
6/16/2014	1.26	2.59	6.57
4/11/2014	3.93	5.92	10.38
4/9/2013	5.95	10.97	22.79
2/13/2013	3.40	6.74	15.00
10/5/2012	0.70	2.81	8.78
6/7/2012	3.07	6.98	15.99
6/20/2011	6.45	11.61	24.83
5/20/2011	9.44	16.63	29.81
4/20/2011	7.53	21.46	36.78
3/17/2011	14.35	26.23	48.51
2/23/2011	7.91	11.92	23.71
1/24/2011	5.51	7.71	21.54
12/27/2010	2.06	3.80	11.23
11/15/2010	1.10	2.67	8.40
10/19/2010	1.23	2.54	8.75
9/20/2010	0.15	2.28	7.58
8/13/2010	0.62	3.20	7.31
6/2/2010	3.32	7.55	16.29
3/30/2010	5.22	10.52	19.10
1/11/2010	3.26	7.60	13.19
10/14/2009	1.91	5.25	10.37

Note: Gauging site locations shown on Figure 6.

3.7 OTHER STUDIES

The GWMA has some data relative to their Columbia Basin hydrostratigraphic mapping project, and for development of their groundwater model. Specific site data can be obtained from the GWMA program. Other regional reports of the entire Columbia River Basalt Aquifer system completed by the USGS in 2010, 2011(a), 2011(b), and 2012 include limited information relative to the area within WRIA 53. These reports are listed in the reference section of this Plan.

3.8 ESTIMATE OF WATER USE IN WATERSHED

During the Phase 2 Level I Technical Assessment, the WRIA 53 Planning Unit compiled data to attempt to determine the amount of water being used in the WRIA 53. This section includes a discussion and analysis of the available information and data that describe current water use within the WRIA 53 watershed. Water use in WRIA 53 is documented as being used for seven basic purposes: 1) irrigation, 2) municipal (Group A water purveyors), 3) industry, 4) stockwatering, 5) domestic rural, 6) wildlife, and 7) instream flow. An analysis was conducted using the existing WRATS database and current land use and management conditions to interpret how much water is being used by the local residents and stakeholders.

A review of Ecology's well database for that portion of WRIA 53 in Lincoln County reveals approximately 600 well log records in the area. Lincoln County tax records indicate that there are 935 rural home addresses in the WRIA. Of the Ecology well records, approximately 344 were located for use in this assessment. These located wells are deemed usable because: (1) they have a clear description of location, (2) they are legible, and (3) the descriptions of well geology and construction appear to be complete and interpreted to be representative of actual conditions. Well locations as reported on the well logs are assumed to be correct as most wells were not field located for this project.

Of the approximately 344 wells used in this assessment, all but 29 are listed as domestic wells. Table 12 gives one an idea of the distribution these wells in the WRIA. Given that we used well records for approximately 311 wells compared to the 935 tax records we assume that the following discussion encompasses approximately one-third of the domestic wells in the WRIA.

Ground Water Use – Domestic Wells

The largest concentrations of domestic wells in the WRIA are located in and near the Hawk Creek drainage (63%) with smaller concentrations of wells occurring near Grand Coulee (26%) in the west end of the WRIA and above Lake Roosevelt near Sterling Valley Road (11%) predominantly in T27N R34E in the Brody Creek subbasin. Reviewing geology, construction, and location information, the data is summarized in Table 12. Approximately 17 percent of the domestic wells in the WRIA are pumping from the alluvial aquifer system, 19 percent from the pre-basalt basement aquifer system, and 64 percent from the basalt aquifer system.

The alluvial wells are predominantly located on Pleistocene Cataclysmic Flood gravel and sand bars near Lake Roosevelt and likely display a high degree of hydrologic continuity with the Lake. These wells appear to usually be capable of supporting single family domestic uses, and several of them seem to be capable of supporting larger pumping demands. A small number of these wells though may not be in direct connection with the Lake for a variety of local geologic reasons, including the presence of buried bedrock highs and the presence of landslide blocks truncating or restricting that connection. In such cases, wells in these settings may experience water level declines and decreased pumping capacity if the local use outpaces the local recharge. Further site specific assessment would be needed to better delineate areas such as these.

TABLE 12: DISTRIBUTION OF WELLS IN WRIA 53				
TN/RE	Area comments	Total wells	Non-domestic wells	Hydrogeology
25/35		1	0	
25/36	Upper Hawk Creek	39	11	1 basement
25/37	Davenport	39	7	All bslt, 1 art.
25/38		2	0	Bslt
26/34	NE of Creston	4	0	Bslt
26/35	W of Hawk Creek	31	1	1 sed
26/36	Middle Hawk Creek	49	0	1 base, 1 sed, 3 sed/bslt
26/37		13	0	4 base, 1 bslt/sed
27/32-27/33	Above Lake R.	3	0	2 bslt, 1 base
27/34		27	1	Most basement
27/35	Lower Hawk Creek	48	4	5 base; 7 sed
27/36	East of Hawk Creek	22	1	6 base; 10 sed/bslt
27/37		17	0	9 base, rest mixed
28/31	Coulee City	33	1	Mix
28/33-28/36	Col R. highlands	16	3	Mix
	Totals	344	29	

Basalt domestic wells generally fall into two basic groups. A small number of these wells located near the mouth of Hawk Creek appear to be in hydrologic connection with Lake Roosevelt. One would assume that pumping limitations on these wells will only be controlled by the capacity of these basalts to transmit water from the Lake to the well. Most basalt wells however are not in direct connection to the Lake. As discussed earlier, these wells are in a part of the aquifer system where modern recharge is derived solely from modern precipitation. In areas of low well density, it generally appears that such recharge is keeping pace with domestic demand and can be sustained (based on relatively stable water levels in the few regional monitoring wells available). However, in areas of greater well density this should not be assumed. Although we do not have any direct water level measurements to call upon, the anecdotal observations reported by WRIA participants suggest water level declines in the basalt aquifer system are occurring in these areas. If such a situation is occurring, it would clearly indicate that pumping demand (whatever that is, and we do not know as there are no records) is exceeding the ability of that portion of the aquifer system to supply that water.

Domestic wells in pre-basalt basement are universally reported to be very low volume producers, commonly capable of only providing a few gallons, or less, per minute. It seems likely that few if any wells in the pre-basalt basement aquifer system produce more than a few gallons per minute.

Pumping demands on the domestic wells are very difficult to quantify as there are few pumping records available and it seems likely that not all domestic wells in the WRIA are represented in the records we reviewed (as suggested by our use of 311 well logs, but County record indicating 935 rural homes). Assuming we are looking at approximately one-third of the total domestic wells in the WRIA (311 well logs vs. 935 tax records) we estimate there are approximately 600 domestic wells in the Hawk Creek area, 250 in the Brody Creek subbasin, and 100 in the vicinity of Grand Coulee. If each well uses

approximately 800 gallons per day (gpd) total estimated pumping, and pumping within the 3 subbasins is as follows:

- Total pumping, 760,000 gpd
- Hawk Creek, 480,000 gpd
- Brody Creek, 200,000 gpd
- Coulee Dam, 80,000 gpd

A more definite evaluation of actual pumping by area and aquifer system would require field verification of well use and location.

Ground Water Use – Non-Domestic Wells

Within the databases, we found 29 non-domestic wells with usable well records. Uses for these wells are reported to include a mix of irrigation, stock watering, municipal supply, small water systems, industrial applications, and recreational sites.

The greatest concentrations of non-domestic wells are found in the same basic areas as the domestic wells. Most of the non-domestic wells are located in the area around the lower reaches of Hawk Creek and around Davenport. The lower Hawk Creek wells consist predominantly of a mix of irrigation and small water system wells. Those near Davenport consist predominantly of municipal (City of Davenport) and irrigation wells. Location of the municipal and Group A water purveyors are identified in Figure 7. As of this writing we do not have records describing water use in any of these wells except for the City of Davenport. Verbal communications from City staff indicate an average daily use of approximately 1.2 million gallons per day for all wells in the City system. The water rights review in the WRIA 53 Level 1 Report (WNR Group, 2009) probably gives the best estimate of potential use from wells for which water rights have been issued. Except for the wells having records, any further estimate of groundwater use will not be based on real data and should be considered a data gap that needs to be filled for future WRIA planning.

In order to determine the approximate quantity of water used in WRIA 53, a secondary analysis was conducted utilizing the WRATS database, Lincoln County Planning E911 database, and GIS layers to estimate irrigable acreage. In order to estimate the quantity of water used, the following assumptions were made:

- Municipal Group A water purveyors: quantities were recorded as presented in the WRIA 53 WRATS database and summarized in Table 13. Water purveyor demand is estimated at 6918 acre-feet (Davenport = 2,503 AF; Group A's = 4,415 AF) as defined by papered water rights;
 - City of Davenport is currently using approximately 1,344 acre-feet per year;
 - Other Group A system are currently at approximately 23% build-out, therefore 23% of the papered water rights would be an actual use of approximately 1,015 acre-feet per year.
- Ten Group B water systems are located in the watershed (Table 14, Figure 8). Assuming 5,000 gpd, an estimated 56.0 AF of water is used by Group B systems.
- Irrigation: quantities estimated using GIS layers to estimate irrigable lands (those farmlands/fields as visible from aerial photographs that appear to be irrigated, or

- could be irrigated) and assuming a water duty of 4 feet per acre resulted in an estimated 2,000 acres of irrigable land for 8,000 AF);
- Industrial/Commercial Use: quantities estimated from WRATS database (five users were identified using 1,531.9 acre-feet);
 - Domestic Rural: quantities were estimated using the E911 data base and assuming an average use of 800 gallons per day per home (estimated at 935 rural homes using 838 acre-feet). The 800 gpd value was derived from RCW 90.44.105 and DOH guidance;
 - The Lincoln County Planning Department estimates approximately 350 rural homes are hobby farms or contain multiple livestock (horses, cows, sheep, etc.), and has provided an estimate of approximately three animals per each of these homes. This would result in an estimation of approximately 1050 animals at the residential homes. Assuming an animal consumes approximately 0.16 AF/year, this would result in an annual stockwatering use of approximately 168 AF/year in the watershed;
 - Wildlife: wildlife allocations was based on DNR water rights in the WRATS database (documented at 33.5 acre-feet); and
 - One trust water right for instream flow is in the WRATS database. This is identified as a groundwater right (documented at 24.7 acre-feet).

Using the above outlined estimates of water use in the watershed, an estimated annual use, or existing estimated Net Demand, of approximately 13,011 acre-feet per year is being used by the residents and stakeholders in the southern portion of WRIA 53. This is an estimation of the actual use occurring in the southern part of WRIA 53. If the full papered water rights for the Group A water systems is used, an additional 4559 acre-feet of water must be accounted for once their full build-out occurs. Therefore, if the estimated actual use of the Group A water systems is used (2503 AF for Davenport and 4415 AF for the remaining Group A systems), an estimated annual water use of approximately 17,570 acre-feet can be used by the water users in the area evaluated in WRIA 53.

TABLE 13: SUMMARY OF GROUP A WATER PURVEYORS IN WRIA 53

Water Right Name	System Name	Permitted Qa	T R S	Sub-Basin	Potential Connections	Actual Connections
Seven Bays Inc	Seven Bays	1386.00	27.0N 35.0E 12	Hawk Creek	369	0
Davenport City	City of Davenport	2887.00	25.0N 37.0E 21/20/16	Hawk Creek	1000	800
Lanway, Orville	Lakeview Heights	452.00	27.0N 36.0E 06	Hawk Creek	58	5
Addink, Ben	Ridgeview	86.66	27.0N 35.0E 13	Hawk Creek	95	0
Behrens, Greg	Columbia Springs	60.00	28.0N 31.0E 18	Coulee S	43	24
HANSON F W	Hanson Harbor	22.50	28.0N 33.0E 13	Brody S	124	40
MACKS FRED	FDR Estates	627.60	28.0N 31.0E 17	Coulee S	23	2
Mattox Raymond	Rocky Top Estates	38.00	27.0N 36.0E 18	Hawk Creek	48	4
PFAFFLE WILLARD E	Lakeview Subdivision	60.00	28.0N 33.0E 17	Coulee S	28	25
Rantz Marine Park	Rantz Marine Park	17.00	28.0N 34.0E 20	Brody S	18	17
Riverside Property LLC	Roosevelt Views	120.00	28.0N 33.0E 20	Coulee S	66	0
SERESUN ANDREW		45.60	28.0N 31.0E 18	Coulee S		
Spencer-Livingston A Partnership	Deer Meadows	1500.00	28.0N 35.0E 36	Hawk Creek	401	110
Roosevelt Lake Ranch Water System Inc	Lincoln		27.0N 35.0E 20	Brody S	334	132

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TABLE 14: GROUP B WATER SYSTEMS IDENTIFIED IN DEPARTMENT OF HEALTH DATABASE	
System Name	Comment
Brougher Ranch 2 Well 1	Group B System
Brougher Ranch 3 Well 1	Group B System
Brougher Ranch Spring	Group B System
Campbell Bay Farms	Group B System
Char-Donnie Water System	Group B System
Columbia Springs Estate Well 1	System has a water right and is grouped in the Group A
Columbia Springs Estate Well 2	System has a water right and is grouped in the Group A
FDR Estates Well 1	System has a water right and is grouped in the Group A
FDR Estates Well 2	System has a water right and is grouped in the Group A
FDR Estates Well 3	System has a water right and is grouped in the Group A
FDR Estates Well 4	System has a water right and is grouped in the Group A
FDR Estates Well 5	System has a water right and is grouped in the Group A
Lake Roosevelt Hideaway	Group B System
Lakeview Catering	Group B System
Lakeview Heights Water System	System has a water right and is grouped in the Group A
Livingston Water System	System has a water right and is grouped in the Group A
Sterling Acres Water System	Group B System
Todd Group B	Group B System
Ridgeview Heights	Group B System

3.9 ESTIMATE OF WATER BUDGET

The primary objective of the Level I Assessment was to develop a water budget of the WRIA. The following outlines the findings of the water budget:

The final annual water balance for WRIA 53 could not be developed due to the limited aquifer water data, specifically in the areas in the southern part of the watershed where groundwater is flowing from the WRIA 53 basin. The GWMA is currently developing an aquifer model that encompasses the area within WRIA 53. Once the groundwater parameters in the basalt aquifers are developed at the completion of that model, a more defined water balance can be developed. In order to develop an estimate of the water availability in the watershed, several scenarios utilizing assumptions were developed for a preliminary water budget

For the inputs of the water balance, the following was determined:

- Precipitation: precipitation for WRIA 53 was determined to be about 124,227 acre-feet for the area north of the Columbia River, and 217,020 acre-feet for the area south of the Columbia River. Precipitation estimates for each of the subbasins are presented in Table 15.

TABLE 15: ESTIMATE OF PRECIPITATION INPUT INTO WRIA 53 (assuming average of 12.555 inches of rain/year)			
Sub-Basin	Acreage	Precipitation (Acre-Feet) Northern WRIA 53	Precipitation (Acre-Feet) Southern WRIA 53
Coulee Dam N	71,358	74,659	-----
Brody Creek N	47,377	49,568	-----
Coulee Dam S	37,692	-----	39,435
Brody Creek S	50,669	-----	53,013
Hawk Creek	119,065	-----	124,572
TOTAL		124,227	217,020

- Groundwater inflow: groundwater located in the granitic basement rock in the eastern and western extents of the basin are insignificant, and can be assumed to be zero. For the basalt aquifers, they extend well beyond the watershed boundaries. Groundwater inflow from the west and east is not known, but it is generally accepted by the GWMA and USGS studies that groundwater in southern Lincoln County generally flows in a southerly direction, which would result in minimum inflow along the eastern and western margins of the basin. Groundwater inflow into the basalt aquifer from the north (Columbia River) appears to be minimal or negligible. For the preliminary water budget, no inflow of groundwater in the basalts was used. The USGS (1986) study shows the groundwater in the Wanapum basalt flows to the north in WRIA 53 from a hydrogeologic divide roughly paralleling Highway 2. This would suggest that recharge to the Wanapum aquifer is derived from precipitation north of Highway 2. The same study (USGS 1986) also portrays groundwater flow in the Grande Ronde to the south within the boundaries of WRIA 53. This would suggest that recharge to the lower Grande Ronde aquifer is derived from within the basin.
- Surface water inflow: for the watershed, there is no continuous stream gauge data to evaluate this component. The Columbia River bisects the watershed separating the Coulee Dam N and Brody Creek N sub-basins from the Coulee Dam S, Brody Creek S and Hawk Creek sub-basins. All surface water in the north and south halves of the WRIA flow to the Columbia River. In respect to the southern half of the watershed, all streams are formed from precipitation or from springs. No major tributaries enter the southern portion of the watershed. Therefore, there is essentially no surface water entering the watershed.

For the outputs of the water balance, the following was determined:

- Evapotranspiration: On naturally vegetated, minimally disturbed, permeable substrates, no more than 10 percent of the annual precipitation falling within the WRIA is assumed to be available for groundwater recharge because of moisture retention capacity, run-off, and evapotranspiration. Therefore, for precipitation that falls on vegetated, permeable soils and substrates, approximately 1 to 10 percent is available for potential ground water recharge. Given the precipitation patterns measured for the area, this yields potential water quantities available to

groundwater recharge between 0.09 inches to 1.9 inches per unit area per year for such areas. This would result in an evapotranspiration value of 90 – 99 percent of rainfall, or about 197,164 to 216,881 acre-feet. Estimated annual recharge by the USGS across the basin was estimated at less than one inch per year for areas adjacent to the Columbia Rivers (USGS, 2011a).

- Net Demand: the net demand for the watershed under existing estimated conditions is estimated at 13,011 acre-feet of water (estimated current actual use) to an estimated 17,570 acre-feet (estimated use at full build-out of Group A water purveyors).
- Groundwater outflow: this component is assumed to be a large number across the entire basalt aquifers as the WRIA 53 southern watershed is the headwaters for the Columbia River Basalt Regional Aquifer system that extends throughout eastern and central Washington. A cross-section of the southern WRIA boundary through the aquifers is approximately 47 miles. To estimate an outflow of groundwater, the following assumptions were made:
 - a. The cross-sectional area of the southern boundary of WRIA 53 is 47 miles
 - b. Hydraulic continuity values of the aquifers is approximately 5 ft/day in both the Wanapum and Grande Ronde aquifers as discussed in the USGS report (2011a).
 - c. The estimated thickness of aquifers in the southern boundary of WRIA 53 is estimated at 200 feet (estimated from cross-sections provided in USGS 2011a report).
 - d. The hydraulic gradient is approximately 50 ft/mile or 0.01 ft/ft.

To develop a preliminary water budget, the following scenarios were developed:

1. No groundwater leaves the basin to the south (based on the 1986 USGS report showing the hydrogeologic divide near Highway 2); and
 2. The Wanapum and Grande Ronde aquifers discharge the entire quantity of water to the south. Using the values identified above, this would result in an annual groundwater outflow of 20,800 AF per year leaving the basin from the basalt aquifers.
- Surface Water Outflow: no continuous stream measurements were currently available for the tributaries in WRIA 53. Year 2010 has the most data collected as shown in Table 16. Using this data and estimated weighted average for each monitoring period was developed. Using this methodology, and estimated 8,819 AF per year is discharge from Hawk Creek to the Columbia River (FDR Lake). No values for discharge from Welch Creek could be developed as no measurements of flow have been collected on the creek.

In summary, the following water balance is presented:

$$\text{PPT} + \text{GWI} + \text{SWI} = \text{ET} + \text{ND} \pm \text{GWO} \pm \text{SWO}$$

Where: PPT = precipitation
 GWI = groundwater inflow
 SWI = surface water inflow
 ET = evapotranspiration
 ND = net demand
 GWO = groundwater outflow
 SWO = surface water outflow

TABLE 16: STREAM FLOW MEASUREMENTS FROM HAWK CREEK AND ESTIMATED DISCHARGE FOR YEAR 2010				
Date of Measurement	HC-5 Flow (cfs)	Period of Estimated Discharge	Days	Discharge (AF) for Period
1/11/2010	13.19	Jan 1 - Feb 28	59	1544
3/30/2010	19.10	March 1 - April 30	61	2311
6/2/2010	16.29	May 1 - June 30	61	1971
8/13/2010	7.31	July 1 - Aug 31	62	899
9/20/2010	7.58	Sept 1 - Sept 30	30	451
10/19/2010	8.75	Oct 1 - Oct 31	31	538
11/15/2010	8.40	Nov 1 - Dec 15	45	750
12/27/2010	11.23	Dec 16 - Dec 31	16	356
TOTAL ESTIMATED ANNUAL DISCHARGE - HAWK CREEK				8820

Two groundwater budget scenarios are presented in Table 17: 1) no groundwater leaving the basin and 2) all groundwater leaving the basin through the Wanapum and Grande Ronde aquifer (assuming a 200 foot thickness). These two scenarios were further defined with estimating current water use in the area and with estimated use if full build-out occurred in all Group A water systems.

Due to the lack of data in WRIA 53, a definitive water budget could not be developed, and the estimated below are presented using reasonable assumptions to develop values for the water budget. The primary unknown is the groundwater inflow and outflow. Recommendations and strategies were developed during the watershed planning process in order to achieve a better technical understanding of the groundwater and surface water in the basin. The Planning Unit is collecting groundwater level data and periodic flow measurements in Hawk Creek, dependent on available funding. Other critical elements needed to develop a water budget are outlined in this Plan as recommendations.

Table 17 presents the water budget for the two groundwater outflow scenarios. Under each of the scenarios, values were also developed using the two net demand values of estimated actual and estimated full build-out with existing Group A water purveyor water rights. Precipitation was used for the average year and Evapotranspiration values were for 90%. Using these scenarios, the following calculations were made:

- 1) Assuming there is no groundwater outflow and the net demand of actual current use (13,011 AF/yr); the estimated water budget would result in -1,975 AF/yr.
- 2) Assuming there is groundwater outflow and the net demand of actual current use is used (13,011 AF/yr); the estimated water budget would result in -22,768 AF/yr.
- 3) Assuming there is no groundwater outflow and the net demand of full build-out of existing Group A water rights is used (17,570 AF/yr); the estimated water budget would result in -6,535 AF/yr.
- 4) Assuming there is groundwater outflow and the net demand of full build-out of existing Group A water rights is used (17,570 AF/yr); the estimated water budget would result in -27,328 AF/yr.

TABLE 17: ESTIMATED WATER BUDGET FOR THE TWO SCENERIOS IN WRIA 53 (all values presented in acre-feet per year)									
SCENERIO	PPT	GWI	SWI	ET	ND	GWO	SWO	H2O Balance (all H2O Users)	H2O Balance (No 7-Bays & Ridgeview)
1	217,020	0	0	197,164	13,011	0	8,820	-1,975	-1,636
2	217,020	0	0	197,164	13,011	20,800	8,820	-22,768	-21,295
3	217,020	0	0	197,164	17,570.36	0	8,820	-6,535	-6,196
4	217,020	0	0	197,164	17,570.36	20,800	8,820	-27,328	-25,855

Note: SWO is based on estimated 2010 annual discharge from Hawk Creek (per Table 16).

It should be noted that some Group A entities such as Seven Bays, Inc. and Ridgeview Estates are conveying water from aquifers that are in direct hydraulic continuity with Lake Roosevelt. Therefore, the net demand of water from these entities should be removed from the water budget for the southern part of the basin. This would result in a reduction of approximately 339 AF of actual use, and approximately 1,473 AF of papered use from the water balance.

As shown in the estimated water budget table above, the WRIA 53 basin may expect water supply issues in the future if a water management plan is not developed. The WRIA 53 Planning Unit will strive to achieve funding to help refine this water budget in order to develop more reliable water resource planning policies.

4.0 WATERSHED PLANNING STRATEGIES

The Planning Unit understands that in order to develop long range water supply sustainability, water planning strategies must be developed and implemented in the watershed. Groundwater users to the south of WRIA 53 are experiencing declining groundwater tables within the Odessa subarea. The area within this watershed is the headwaters for the basalt aquifers. In order to protect and assure future water supplies are available within the watershed, the group has undertaken this watershed planning process.

4.1 *STRATEGIES FOR INCREASING WATER SUPPLIES*

Water diversions occur from streams and groundwater in WRIA 53 based on water right seniority. Most water users throughout the watershed rely on groundwater from the basalt aquifers for the municipal, agricultural and domestic supplies. The variability in groundwater tables in certain areas of the watershed may be an indicator that the water availability for further appropriation may not be certain in the watershed. Of specific concern, is the recent interpretation that the basalt aquifers are not being recharged from the Columbia River, and there is essentially a granitic basement “barrier” between the Columbia River Basalt Group aquifers and the major surface water bodies in the northern portion of Lincoln County. Currently, new water rights are not being issued in WRIA 53 and new groundwater appropriations are occurring from the transfer of water rights from upstream sources.

Several strategies may be warranted to assure future water supplies are sustainable in WRIA 53 as specified in RCW 90.82.070(2).

4.1.1 Water Storage Strategies

Retaining and/or slowing the transport of water within the watershed is a strategy that is being undertaken throughout eastern Washington. Within WRIA 53, large scale storage in Hawk Creek has been evaluated by Ecology in their Columbia River storage assessment, and has ranked within the top two feasible locations. In addition to large scale storage facilities, small and medium size storage opportunities may help to store and/or infiltrate surface water to assist with “flattening” the hydrograph. The Planning Unit would like to further evaluate water storage opportunities, and has submitted water storage grant applications during the planning process. Smaller scale water storage strategies discussed by the planning unit included

- Small Scale Offstream Storage – most feasible in the Hawk Creek drainage, dependent upon available flows.
- Instream Storage – this could include constructing dams on the main tributaries, within the wetted perimeter. However, feasible alternatives are limited in the watershed.
- Onsite Catchment Systems – most feasible on private properties to assist with retaining spring runoff and infiltrating this water into the aquifers.
- Groundwater Recharge and Storage – this strategy could be integrated with the Columbia River Water Management Program to assess potential opportunities to divert available surface waters from the Columbia River and recharge the basalt interflows hosting the aquifers to the south.

4.1.2 Groundwater Supply Strategies

The WRIA Planning Unit recommends that a more detailed review and evaluation of the GWMA hydrogeologic model be completed to determine if the data could support the development of a

groundwater management and supply strategy which would include the proper management of the aquifers to prevent over-pumping. In the watershed, groundwater is primarily pumped from the bedrock Wanapum aquifer. Several strategies may be implemented to potentially protect the shallow unconfined aquifer and/or protect the basalt aquifers.

- Support activities to permit replacement and/or install future groundwater wells (in high density areas) to deeper basalt interflows. Encourage development of wells which are documented to be recharged from recent precipitation, as determined from the age dating results throughout the watershed.
- Support activities to case new wells and replacement wells that are developed in the deeper basalt aquifers to avoid cross contamination and the potential of “dewatering” upper aquifers.
- Support activities to abandon inactive wells. Inactive wells that are not constructed properly or that have lost the integrity of their seal may allow aquifer cross-contamination, and/or the depletion of the upper Wanapum aquifer.

4.1.3 Conservation

Water efficiency and conservation programs can help reduce water use. Conservation efforts can include local residents using water in a smart and effective way in order to reduce waste and lower consumption by the water user. In addition, municipal water providers can initiate water conservation efforts to include promoting effective water use, to reducing waste of water through reduction of leaking infrastructure. Promoting water conservation strategies is an effective way to assist local watershed water users a sustainable resource for the future.

Conservation strategies discussed by the Planning Unit and identified as future management activities include:

- Agricultural water conservation by irrigators in WRIA 53 to reduce increasing irrigation costs and reduce withdrawals from the basalt aquifers;
- Education of home owners on proper residential irrigation and water use to reduce both in-house and outdoor water uses.
- Water system inspection by local water purveyors to assure their delivery systems do not contain leaks.

The degree of conservation effort by the public and private Group A water system is varied. Most water purveyors in the watershed are implementing conservation efforts as outlined in their water system plans. Other methodologies for conservation efforts in the private sector should also be undertaken in the watershed by local landowners and residents.

4.2 SPECIFIC RECOMMENDATIONS

In order to meet the water strategies outlined above, the following specific recommendations should be undertaken by the WRIA 53 Planning Unit.

With respect to the surface water the following is recommended:

1. Establish flow gauging stations at selected streams and springs to better characterize water flowing out of the watershed. Focus on the Hawk Creek and Welch Creek

drainages which are the perennial streams in the watershed. Use flow measurements to establish a baseline flow datum.

2. Conduct period water quality measurements to better understand stream and spring health, especially as rural home density increases. Water quality monitoring should be conducted at the same locations where stream flow monitoring is occurring.

For the aquifer systems underlying the WRIA we recommend data be collected to develop baseline conditions in order to understand trends as follows:

1. Develop a groundwater monitoring plan and strategy.
2. Establish some groundwater level monitoring areas having both high and low well density to better track pumping effects on the 3 aquifer systems and to better characterize potential aquifer recharge conditions.
3. Collect aquifer pumping test data to better characterize aquifer physical conditions for use in evaluating long term aquifer hydrologic trends.
4. Conduct a limited amount of groundwater geochemical sampling for anions and cations in order to better understand aquifer recharge conditions and evaluate surface water/groundwater continuity.
5. Conduct a more detailed GIS evaluation to inventory and map available data on ground and surface water resources and the relationship to current and future land use in WRIA 53. The goal of such an evaluation would be to identify aquifer boundaries, recharge areas, high groundwater pumping areas, and potential sustainable aquifer pumping targets, and areas in which potential mining of groundwater is occurring.

For planning efforts, the Planning Unit WRIA should:

1. Implement the WRIA 53 Public Participation Plan which was prepared by Lincoln County.
2. Further evaluate the status of County Planning Department land management policies in the watershed in order to develop proposed building densities in various areas of the watershed.
3. Initiate an evaluation of domestic exempt wells to potentially develop a watershed policy of exempt wells, specifically in those areas in which water is documented as being greater than 10,000 years old in the GWMA study. This evaluation will assist the County in the development of required hydrogeologic data required from the building applicants in various areas of the watershed.
4. The Planning Unit and Lincoln County should petition Ecology for removal of the Hawk Creek adjudication from the open adjudication process.
5. Further define groundwater resources in WRIA 53 for the County to develop future code modifications and/or policy for minimum lot sizes and/or housing density.
6. Further discuss and/or evaluate the potential nitrate in groundwater in agricultural areas to protect domestic water uses.

The Planning Unit believes it is important to study potential water storage opportunities and evaluate potential water storage options for increasing water supplies in the watershed.

5.0 WRIA 53 WATER RESOURCE MANAGEMENT PLAN

This chapter of the WRIA 53 Watershed Management Plan (Plan) describes the goals, recommendations, and the action items developed for the Lower Lake Roosevelt Watershed. The primary function of this chapter of the Plan is to address the water resource concerns identified by the watershed planning group.

Lack of definitive groundwater data in WRIA 53 makes it difficult to develop and propose detailed projects and policy. Therefore, most action items set forth in this Plan are to collect and evaluate additional information in order to develop future projects and policies that will protect and enhance the water resources in WRIA 53.

To successfully administer and implement the Plan and manage the water resources in the future in accordance with RCW 90.82, a cooperative process between the local residents, landowners, local agencies in WRIA 53, and state agencies, should be developed and implemented. Therefore, these entities are required as stated in RCW 90.82, and other Washington water laws, to work within this framework to reach agreed upon solutions on management of water resource matters. The potential solutions and guidelines described in this Plan will be implemented in Phase 4.

The Goals and Action Items developed within this Plan focus on several key components to successfully manage the water resources in WRIA 53. The action items were developed using the following basic understandings and watershed planning philosophy:

- 1) The Planning Unit and the local agencies support the concept of local watershed planning. However, due to the nature of the rural counties and their limited resources, no financial obligations will be placed upon the counties and local entities. Recommendations put forth in this Watershed Plan are non-binding, and are only recommended if additional funding and resources are available. In accordance with RCW 90.82.050(2) – “no claim for damages may be filed against the state or any county, city, town, water supply utility, tribal governments, conservation district, or planning unit that or member of a planning unit who participates in a WRIA planning unit for performing responsibilities under this chapter.”
- 2) Action Items put forth in the Plan are developed to meet the needs of the residents and local landowners in WRIA 53.
- 3) Recommended Action Items presented within the WRIA 53 Watershed Plan are non-binding recommend actions to various state and local entities,. The recommendations will be implemented dependent upon available funding for local entities to administer and implement the recommendation outlined in the Watershed Plan.
- 4) The WRIA 53 Planning Unit requests that the BOR and Ecology work with the WRIA 53 Planning Unit and Lincoln County to develop an understanding of how the WRIA 53 action items put forth in the Watershed Plan can be supported by the goals and objectives of the Columbia River Management Program.
- 5) Implementation of water resource projects are promoted on various scales, and as such, the Planning Unit and the state agencies will promote voluntary actions by

residents, landowners, and local towns to address the water resource concerns wherever and whenever possible.

The Planning Unit's philosophy in undertaken the watershed planning process is:

“To understand the aquifers in WRIA 53 relative to depth, yield, and sustainability in order to allow Lincoln County to develop land use management alternatives to protect long term sustainability of water supplies for all Lincoln County and WRIA 53 Water Users.”

In 2009, the Planning Unit developed the following list of actions which needed to be undertaken in the watershed:

- 1) Continue Phase 2 aquifer level monitoring and GIS database development on groundwater wells;
- 2) Conduct the Water Storage Optional Element study.
- 3) Initiate and complete Phase 3 Watershed Management Plan development;
- 4) Conduct studies to collect data needed for Plan implementation and for long term water management and decision-making;
- 5) Identify, prioritize and implement early action items;
- 6) Initiate Phase 4 implementation.

Specific project action items which the Planning Unit has identified are listed below in the order of **priority ranking**:

- 1) Develop Water Well Supply Inventory which will consist of GPS locations of wells throughout the county, identification of which aquifer the well is withdrawing from, and installing data loggers in some priority wells to monitor aquifer levels. This inventory will be developed to provide water managers with the information necessary to make water resource decisions.
- 2) Spring /Seep identification and monitoring consisting of GPS locations of seeps springs, identification of flows, water quality sampling, and age dating of some priority springs.
- 3) Stream Flow monitoring of Hawk and Welch Creek, consisting of installing continuous data loggers in streams to determine losing and gaining reaches of creek, and determining where potential stream restorations and/or storage opportunities may exist.
- 4) Conduct arsenic sampling on wells in southern part of watershed to potentially identify source of arsenic, and conduct nitrate sampling in domestic wells to identify areas of elevated nitrate and BMP alternatives.
- 5) Complete a groundwater study to include hydrostratigraphic modeling in eastern extent of watershed to determine aquifer connection into WRIA 54 (and the West Plains area) and aquifer flow direction through the basement high areas.

In 2011, th list above was refined to include the goals and action items listed in Table 18 below. The goals are listed in order of priority based on votes received.

TABLE 18: INTIAL WRIA 53 PLANNING UNIT GOALS	
PRIORITY	Goal
1	Improve understanding of groundwater resources.
2	Improve understanding of surface and groundwater interaction.
3	Identify & implement water conservation & efficiency measures.
4	Establish and maintain ongoing education and public involvement program to promote conservation, reuse and reclamation.
5	Future water should be available for agriculture, municipal, domestic, and industrial uses.
6	Acquire water rights to enhance instream flows from willing sellers and place these rights in trust.
7	Ensure adequate long term groundwater resource availability to meet existing and future drinking water demand on public water systems and exempt wells, consistent with adopted city and county land use plans.
8	Promote funding of projects included in Watershed Plans.
9	Protect public health and the drinking water supply (public and private).
10	Develop a database of water resource information for WRIA 53.
11	Establish Reliable Water Supply
12	Influence water-permitting process for the Columbia River
13	Provide long-term reliable and predictable water supplies for human uses, balanced with habitat and water quality needs.
14	Manage surface and groundwater resources to ensure adequate recharge of both deep and shallow aquifers.
15	Support actions to reduce per capita water consumption.
16	Protect existing surface and groundwater rights.
17	Collect additional data to better define the impact of exempt wells on water use and model calibration.
18	Ensure sustainable growth and development.

5.1 WATER QUANTITY PLANNING ELEMENT

The water quantity component of watershed planning is the required element in watershed planning. Statutory requirements are set forth under RCW 90.82.070. Results of The Phase 2 – Level 1 Technical Assessment (WNR Group, Inc, 2009) provided a general overview of the surface water and groundwater resources within the boundaries of WRIA 53. The assessment incorporated readily available information on water rights (from the WRTS database), climatic conditions, surface water conditions, and hydrogeologic information.

The assessment determined that very little is known regarding the hydrologic connection between deeper groundwater and surface water within the watershed. Several aquifers are known to exist within the boundaries of WRIA 53, including the shallow unconfined

valley fill aquifers and deeper Columbia River basalt aquifers (Wanapum and Grande Ronde Basalts). The shallow unconfined valley fill aquifers are intrinsically connected to the surface waters of the Welch and Hawk Creek drainages. These drainages are assumed to have numerous gaining and/or losing reaches connecting the surface waters to the valley fill aquifers. However, the hydraulic connection of this surface water to the CRBG aquifers is unknown. These larger basalt aquifers supply most of the water throughout the watershed. It is unknown where the basalt aquifer recharge areas are located or specifically how these basalt aquifers are recharged. One potential source of recharge was believed to be the Columbia River and Lake Roosevelt, but it has been determined through the GWMA studies that there appears to be little or no hydraulic connection between the Columbia River and these basalt aquifers in WRIA 53.

Based on recent work conducted by the Columbia Basin Ground Water Management Area (GWMA) on the Columbia River basalt aquifer system in Lincoln County, it is known that the Columbia River basalt covers much of the area south of Lake Roosevelt, with the contact between the Columbia River basalt (CRB) and older “basement rock” exposed above the southern shore of Lake Roosevelt. The CRB south of Lake Roosevelt in WRIA 53 ranges from less than 500 feet to more than 3,000 feet thick and consists of 5 to 12 or more individual flows. These individual basalt flows are regionally extensive, often covering more than 20,000 square miles. This results in a regionally extensive, stratified (or layered) system, but due to the nature of each individual flow, they are not consistent in either their extent or thickness. The contact between successive Columbia River basalt flows are hydrogeologically important in that they host aquifers and, where they outcrop, can serve as basalt aquifer recharge and/or discharge sites. The layering seen in the CRB (specifically the dense centers of the flows) tends to separate the individual aquifers into a sequence of stacked, disconnected water-bearing systems. The physical characteristics of CRB flows are important because they exert fundamental controls on groundwater occurrence and movement within the CRB.

GWMA recent work on understanding the CRB aquifer system beneath Lincoln County has found that the CRB aquifer system is also subdivided geographically into a series of isolated compartments. The lateral barriers that define these compartments are seen in association with CRB feeder dikes, folds, and faults. The degree of hydrologic separation across these stratigraphic, dike, fold, and fault features varies across the region, but is pronounced enough to create observable changes in the groundwater system across the region. Identifying the presence and extent of the CRB groundwater compartments is important since the lateral extent of the compartment controls the total amount of groundwater available and the sustainability of the groundwater resource within the compartment. The southern boundary of WRIA 53 has several large regional folds and faults which likely form a lateral barrier between the CRB aquifers beneath WRIA 53 and the continuation of the CRB aquifer to the south. Additional compartmentalization of the CRB aquifer system within WRIA 53 is likely based on the presence of mapped geologic faults and folds. However additional detailed hydrogeologic investigation would have to be conducted to identify and map the extent of these potential compartments.

It is also important to note that WRIsAs are generally based on surface topography and drainage basins. WRIA 53 is unusual in this regard because it is based on water that

drains to Lake Roosevelt, but there is very little water and very little drainage like a “basin” and the water supply is primarily based on groundwater, and the regional groundwater resources have very little to do with surface drainage patterns. This is evident by the regional flow of the groundwater to the south, however, surface water drains to the north.

Another major finding from the GWMA investigations is that a large portion of the groundwater found within the CRB aquifer system is Pleistocene in age, being more than 10,000 years old. GWMA found that modern recharge of many of the deeper CRB aquifers within this region is extremely limited or nonexistent, but the sedimentary and shallower CRB aquifers in limited areas within GWMA are being recharged by modern surface water sources (less than 50 year old water). However, due to the small amount of precipitation and high evapotranspiration rates, recharge occurs at rates that are insufficient for providing sustainable well production. Modern recharge, if present, likely is restricted to locations where deep coulees intersect valley fill (i.e. shallow) aquifers. It is possible that some minor recharge occurs in up-dip areas on the CRB above Lake Roosevelt, and possibly the flanks of steptoes where surface materials are conducive to relatively unhindered deep infiltration. Ancient recharge (during the last ice age) would have most likely occurred along the edge of CRB where glacial lake Columbia once stood, in coulees where water spilled out of that lake, and possibly the flanks of steptoes where surface materials are conducive to relatively unhindered deep infiltration. In order to get a better understanding of potential recharge of aquifers in the watershed, additional groundwater studies, building on recent GWMA investigations, would have to be conducted to identify if any portion of the CRB aquifer system is receiving any significant modern recharge and what its potential sustainability might be.

5.2 MANAGEMENT PLAN FOUNDATION

This section of the Plan outlines the Planning Units recommendations for addressing the issues that directly affect the citizens and landowners in WRIA 53. The overall objective of the Planning Unit is to:

“Define and manage the available sustainable water resources in the watershed for all water users in the watershed.”

5.2.1 Issue

After completion of the technical assessment and consideration of the interests and values of the WRIA 53 water users, one primary issue regarding water quantity was developed to guide the planning efforts in WRIA 53. This issue is:

“Management of sustainable water in WRIA 53 has not been conducted”.

This issue was ranked by the watershed planning group as the highest in importance for the watershed. The rural community throughout WRIA 53 relies on these resources for its economic sustainability. The Planning Unit will request funding and provide support into future water quantity studies and projects as presented within this Plan. The Planning Unit emphasizes the need to conduct additional hydrogeologic studies

throughout the watershed in order to properly recommend water resource management and planning actions.

5.2.2 Goals and Action Items

Goals were developed by the Planning Unit for future water quantity management. For each goal, numerous objectives were developed as presented below. As stated previously, the primary focus of the planning unit is to further develop an understanding of the hydrogeologic regime in the watershed. The goals and action items developed to address this are:

Goal A: Understand the physical properties of surface and groundwater.

WRIA 53 surface water resources are limited within the watershed, and all drain to the Columbia River (Lake Roosevelt). Once the winter snows have melted, any surface water in the watershed comes from groundwater discharging to surface (i.e. seeps and springs). The two largest drainages are Hawk Creek and Welch Creek.

No developments such as large storage or hydropower facilities are located within these two surface water bodies. The groundwater resources used by the stakeholders in WRIA 53 primarily consists of those located within the CRBG. These basalt aquifers are located within the “headwaters” of the Columbia Basin Basalt Aquifers. These aquifers are showing declining water levels downgradient in the Odessa subbasin located south of WRIA 53. The Planning Unit has concerns that the declining aquifers may be migrating to the north which would eventually affect the aquifer resources in WRIA 53.

In addition, water rights have been granted to numerous developments the area of the watershed along Lake Roosevelt. These water rights have not been used to the full amounts permitted for the developments. Therefore, it is not known if once final build out of the developments occur, the aquifers will be capable of supporting the allocated water resources. In order to better understand the potential impacts on the water resources in WRIA 53, the following action items were developed by the Planning Unit.

- Action-1: Integrate the available GWMA hydrostratigraphic model into the WRIA 53 aquifer management and protection policies
- Action-2: Develop a more detailed and complete water balance/budget for WRIA 53 by coordinating with the GWMA to improve the groundwater model within the boundaries of WRIA 53
- Action-3: Develop a conceptual groundwater model for WRIA 53 identifying location and status of water resource availability.
- Action-4: Develop a regionally consistent hydrostratigraphic framework for local planning/zoning decision making.
- Action-5: Develop maps for county where known sustainable supplies are located to allow county to focus development in those areas.
- Action-6: Identify aquifer recharge areas in WRIA 53 and develop protection policies.
- Action-7: Evaluate potential recharge areas for recharge augmentation through storage alternatives.

- Evaluate if the State-owned gravel pit east of Lincoln County Public Works Building may be a potential location for aquifer recharge.
- Action-8: Develop alternative water supply sources and protection of existing water sources for the City of Davenport.
- Action 9: Develop water storage information and projects for WRIA 53.
 - Identify funding sources and submit grant applications for water storage studies and projects.
 - Coordinate with Lincoln County Passive Rehydration Project (LCPH) to evaluate if WRIA 53 alternatives can be coordinated with that project.
 - Coordinate with LCPH to determine if stream flow enhancement options may be feasible in WRIA 53.
 - Initiate talks with local landowners to determine if potential small scale exempt water storage projects can be constructed on private property in watershed.

Goal B: Develop a database of water resource information for WRIA 53.

In order to fully develop management goals and objectives for WRIA 53, the Planning Unit determined that a central database repository should be developed. The purpose of the action items listed below will be to allow local landowners, agencies, and the Planning Commission to have local access to current available groundwater and water right data for making informed water resource planning decisions.

- Action-1: Develop a GPS database of groundwater wells located in WRIA 53 from all available sources.
- Action-2: Develop an electronic reference database for WRIA 53.
- Action-3: Have Ecology and Water Conservancy Boards forward to Lincoln County Planning all new water right applications and Change applications

Goal C: Determine municipal water suppliers' inchoate rights and water system sustainability.

As part of watershed planning, the local municipalities and water purveyors need to assure their water systems have enough papered water rights for future growth. In addition, having an efficient water delivery system will assure protection of water resources for the future. Under this goal, the Planning Unit will coordinate with the local water purveyors to assure their water rights and water supply and distribution system are consistent with the goals and objectives the WRIA 53 Watershed Planning effort.

- Action-1: Have local communities review their water resource needs and certificated water rights and have the PU assist with potential future needs
- Action-2: Assist the City of Davenport to acquire funding for the installation of new water supply wells and/or infrastructure
- Action-3: Assist local Group A and B water suppliers in determining potential funding needs to improve/enhance their water supply and distribution systems

Goal D: Evaluate the Hawk Creek water right adjudication in WRIA 53.

Washington State Attorney General records show that one adjudication has been initiated in WRIA 53. This adjudication is identified as “g – Hawkes Creek” adjudication. This

adjudication was conducted in 1932, and was never finalized. The Report of Referee is included in the 2009 WRIA 53 Phase II-Level I Hydrogeologic Technical Assessment document as Appendix E. A summary of the adjudication is provided in the Appendix F. The Hawk Creek adjudication was initiated in 1930 and encompassed the area of the Hawk Creek basin. The adjudication was conducted prior to the construction of Grand Coulee Dam and the subsequent formation of Lake Roosevelt. Much of the area discussed in the adjudication report of referee is now inundated from the formation of the Lake Roosevelt. The Hawk Creek adjudication was not completed. However, the following facts were developed in the adjudication process.

- *The adjudication was started in the matter of: State of Washington (plaintiff) vs. W.M. Messinger and Grace F. Messinger (defendants);*
- *It was filed in the Superior Court of the State of Washington in and for the County of Lincoln;*
- *Hawk Creek Adjudication assigned Case No. 9972;*
- *The petition was filed in the Office of the State Supervisor of Hydraulics on March 28th, 1930 by petition of the China Ditch Company and others in the vicinity of Peach, Washington;*
- *The investigation on the adjudication:*
 - *stated that there were many long breaks in the flow of Hawk Creek, though it is fairly constant in the lower 8-miles, that portion focused on by the referee;*
 - *found that the only diversions are made on the lower section of the creek, and during the irrigation season there is no visible connection between the lower and upper creeks;*
 - *found that only the lower portion of the creek be adjudicated;*
 - *found the bulk of the land irrigated lies in the last mile of the valley and on the banks of the Columbia River;*
 - *determined that 11 ditches varying in length from a few hundred feet to 3-1/2 miles divert water from the creek;*
 - *determined there are 406 acres irrigated and 147 irrigable acres for which water is claimed (553 acres);*
 - *determined there is insufficient water in recent years to cover even the lands under the present ditch systems;*
- *All springs contributing flow to Hawk Creek were treated in the determination;*
- *The irrigation season for the area was determined to begin on May 1 and ends October 1 of each year;*
- *The duty of water was determined by the referee “that a quantity not greater than one cfs, net, for each fifty acres can be beneficially applied to the lands involved. This resulted in 14.4 acre inches per month or six acre feet per acre for the irrigation season;*
- *Nine classes were identified in the adjudication.*

The Hawk Creek adjudication was never completed and is still listed as an open adjudication. In addition, much of the land area addressed in the Report of Referee is now inundated by Lake Roosevelt. The Planning Unit discussed this adjudication and

wanted to have this adjudication dismissed. In addition, due to the outdated findings of this adjudication, the Planning Unit also discussed whether a future adjudication of the subbasins should be conducted. Therefore, the following action items were developed by the Planning Unit.

- Action-1: Explore/Determine if an adjudication of WRIA 53 south of the Columbia River should be completed to delineate actual use for future management of resource is needed.
- Action-2: Resolve the open Lower Hawk Creek Adjudication currently still open with the State

Goal E: Develop recommendations for land use planning alternatives in WRIA 53.

A primary goal of the Planning Unit is to work with Lincoln County Planning Department to development reasonable land use codes which will assist and protect landowners throughout the watershed. Of particular concern is using existing groundwater data to focus development to areas of the watershed where sustainable water supplies maybe present. The Planning Unit feels this objective could be reached by having the Planning Department use groundwater data to determine potential density of housing and parcel size. For example, in the northeastern area of the watershed, where low yielding granitic basement rock aquifers are located, housing density may be less than in areas where CRBG aquifers with high yields are located. By using the available groundwater and water right data that the County compiles, it can help protect the local land owner and future water users in the watershed. In order to meet this goal, the Planning Unit developed the following action items.

- Action-1: Identify areas where low yield (unsustainable) aquifers are located and develop land use codes to minimize development in these areas
- Action-2: Identify areas where known higher yield (more sustainable) aquifers are present and develop land use codes to focus development in those areas
- Action-3: Identify areas where there is insufficient data to determine if sustainable water supplies are available and develop land use codes and procedures for developers to use to prove sustainable water supplies are present prior to issuance of building permits.
- Action-4: Coordinate/Share developed WRIA databases and land use code development with the Lincoln County Planning Commission

Goal F: Identify & implement water conservation & efficiency measures.

Conservation is a key component of any watershed planning effort, and it is certainly true in WRIA 53, which has some of the lowest rainfall amounts in the state. The Planning Unit has developed action items that would encourage conservation efforts by all water users. As with any conservation effort, the primary objective is to develop an educational program that encourages individual awareness and action to conserve water. Therefore, the Planning Unit has developed the following action items to implement a water conservation effort throughout the watershed.

- Action-1: Identify areas where conservation measures can be implemented by water purveyors such as local towns and municipalities and group A and B water systems.
- Action-2: Identify actions that local landowners can use to implement water conservation measures.
 - Develop educational materials for collection of rain water to be used for irrigation.
- Action-3: Develop educational materials to distribute to local landowners outlining recommended water conservation measures and sustainability of local aquifers.
 - Work with local schools to implement an irrigation conservation program.
- Action-4: Assist the cities of Davenport, Reardan, Wilbur and other municipalities to acquire funding for leak detection within each city's distribution system.

Goal G: Continue data collection on water resources in WRIA 53

A primary conclusion of the Phase 2 Level 1 Technical Assessment was that there was limited data on surface and groundwater resources throughout WRIA 53. Therefore, the Planning Unit has focused on collecting additional data to assist with water resource planning decisions in the future. Starting in 2009, the Planning Unit developed a groundwater level monitoring program in the watershed. In addition, periodic stream flow gauging has been conducted at four stations in Hawk Creek. The Planning Unit has placed the collection of this data as a high priority and has sought funding from Ecology to continue the groundwater and surface water monitoring programs. The Planning Unit has identified the following action items as priorities under this goal.

- Action-1: Continue and expand the aquifer level monitoring program.
 - Seek funding to continue aquifer monitoring program.
- Action-2: Continue the Hawk Creek stream gauging program.
 - Seek funding for LCCD to continue stream monitoring program.
- Action-3: Develop new data collection programs to assist with future water resource management decisions.
- Action-4: Develop a monitoring program to determine potential impacts of nitrate and arsenic on groundwater.
- Action-5: Develop maps of known documented arsenic and nitrate-impacted areas in the watershed

Goal H: Implement the WRIA 53 Watershed Plan

The WRIA 53 Planning Unit has been working towards development of a Watershed Plan that provides information and recommendations intended to protect and enhance water resources within the watershed. A key to success in the implementation of the WRIA 53 Watershed Plan will be cooperative management among local landowners, residents, and local and state agencies (Ecology, WDFW, WDOH, etc.). The goals/objectives, recommendations, action items presented in this Plan were developed by local stakeholders and represent the priorities of the local communities to assuring sustainable water resources are protected in their watershed, and as such, should be the underlying principle in implementing and administering the Plan action items.

- Administrative Action-1: Continue to apply for grants to implement the actions of the WRIA 53 Plan.
- Administrative Action-2: Review and update the WRIA 53 Watershed Plan a minimum of every 5 years.
- Administrative Action-3: Identify Lincoln County to provide oversight of the implementation of the WRIA 53 Watershed Plan.

These goals and action items outline the general consensus that the Planning Unit wishes to further understand the water quantity conditions, specifically a better understanding of the hydrogeologic regime in the sustainability of water supplies in the CRB aquifers, prior to developing any planning policies. The primary focus on the goals and action items will be to assure that future land uses in WRIA 53 will be in areas where there are sustainable water supplies.

5.2.3 Obligations

No obligations outlined in this section were developed at this time to implement the action items identified above. Any obligations developed by the Planning Unit will be dependent upon available funding for entities to implement the Watershed Plan. Obligations are binding by the parties to the full extent of RCW 90.82 as funding and resources allow.

5.2.4 Recommendations

This section outlines the Planning Unit's recommendations to implement proactive strategies for the further understanding of the hydrologic and hydrogeologic conditions in the watershed. The Planning Unit understands that in order to fully develop appropriate management strategies, further research and evaluation of the water quantity issues outlined in this Plan must be completed. The strategy to understand and solve the water quantity issue identified by the Planning Unit must be completed in a cooperative framework with local and state agencies with input from the local citizens and landowners in the WRIA.

The recommendations presented below in Table 19 are non-binding recommended actions to various state and local entities, inclusive of the future watershed body assigned to oversee and implement the WRIA 53 Watershed Plan. Due to the lack of information of the complex hydrogeologic conditions, which are the foundation for water quantity management within WRIA 53, many of the recommendations encompass further evaluation and assessment of the watershed. Recommendations provided are consistent with state and local existing policies and procedures that Lincoln County addresses in other programs.

Table 19: Water Quantity Actions		
Reference Number Example: A-2 = Water Quantity Goal A, Action Item #2		
Reference Number	Action To Be Undertaken	Agency for Recommendation
A-1	Integrate the available GWMA hydrostratigraphic model into the WRIA 53 aquifer management and protection policies	PU/Lincoln County Planning
A-2	Complete a water balance/budget for WRIA 53 by coordinating with the GWMA to improve the groundwater model within the boundaries of WRIA 53	PU/Lincoln County Planning
A-3	Develop a conceptual groundwater model for WRIA 53 identifying location and status of water resource availability.	PU/Lincoln County Planning
A-4	Develop a regionally consistent hydrostratigraphic framework for WRIA 53 to develop local planning/zoning decision making.	Lincoln County Planning
A-5	Develop maps for county where known sustainable supplies are located to allow county to focus development in those areas.	Lincoln County Planning
A-6	Determine aquifer recharge areas in WRIA 53 and develop protection policies based on the development of the GWMA hydrostratigraphic model.	Lincoln County Planning
A-6(1)	Evaluate if State owned gravel pit east of Lincoln County Public Works Building may a potential location for aquifer recharge	LCCD
A-7	Evaluate potential recharge areas for recharge augmentation through storage alternatives	PU/LCCD
A-8	Develop alternative water supply sources and protection of existing water sources for the City of Davenport.	PU/City of Davenport
A-9	Develop Water Storage information for projects in WRIA 53	PU/LCCD/Lincoln County Planning
A-9(1)	Submit water storage grant application for watershed planning.	PU/Lincoln County Planning
A-9(2)	Coordinate with Lincoln County Passive Rehydration Project (LCPH) to evaluate if WRIA 53 alternatives can be coordinated with that project	PU/LCCD
A-9(3)	Coordinate with LCPH to determine if instream flow enhancement options may be feasible in WRIA 53.	PU/LCCD
A-9(4)	Initiate talks with local landowners to determine if potential small scale exempt water storage projects can be constructed on private property in watershed.	PU/LCCD
B-1	Develop a GPS database of groundwater wells located in WRIA 53 from all available sources	Lincoln County Planning
B-2	Develop an electronic reference database for use by landowners and agencies in WRIA 53.	Lincoln County Planning

B-3	Have Ecology and Water Conservancy Boards forward to Lincoln County Planning all new water right applications and Change applications.	PU
C-1	Have local communities review their water resource needs and certificated water rights and have the PU assist with potential future needs.	PU/Water Purveyors
C-2	Assist the City of Davenport to acquire funding for the installation of new water supply wells and/or infrastructure	PU/City of Davenport
C-3	Assist local Group A and B water suppliers in determining potential funding needs to improve/enhance their water supply and distribution systems	PU
D-1	Explore if an adjudication of WRIA 53 to delineate actual use for future management of resource is needed.	PU
D-2	Resolve the open Lower Hawk Creek Adjudication currently still open with the State.	PU
E-1	Identify areas where low sustainable aquifers are located and develop land use codes to minimize development in these areas.	PU/Lincoln County Planning
E-2	Identify areas where known sustainable aquifers are present and develop land use codes to focus development in those areas.	PU/Lincoln County Planning
E-3	Identify areas where there are insufficient data to determine if sustainable water supplies and develop land use codes for procedures for developers to use to prove sustainable water supplies are present prior to issuance of building permits	PU/Lincoln County Planning
E-4	Coordinate developed WRIA data and land use code development with the Lincoln County Planning Commission.	PU/Lincoln County Planning
F-1	Identify areas where additional conservation can be implemented with the local towns and municipalities	PU
F-2	Identify actions that local landowners can use to implement water conservation measures.	PU/LCCD
F-2(1)	Develop educational materials for collection of rain water to be used for irrigation.	PU/LCCD
F-3	Develop educational materials to distribute to local landowners outlining recommended water conservation measures and sustainability of local aquifers	PU/LCCD/Lincoln County Planning
F-3(1)	Work with local schools to implement an irrigation conservation program	PU/LCCD
F-4	Assist the City of Davenport to acquire funding for leak detection within the City's distribution system.	PU
G-1	Continue and expand the aquifer level monitoring program.	PU/LCCD/Lincoln County Planning

G-1(1)	Seek funding to continue aquifer monitoring program.	PU/LCCD
G-2	Continue the Hawk Creek stream gauging program.	PU/LCCD
G-2(1)	Seek funding for LCCD to continue stream monitoring program	PU/LCCD
G-3	Develop new data collection programs to assist with future water resource management decisions	PU/LCCD/Lincoln County Planning
G-4	Develop a monitoring program to determine potential impacts of nitrate and arsenic on groundwater.	PU/LCCD
G-5	Develop maps of known documented arsenic and nitrate impacted and non-impacted areas in the watershed.	PU/LCCD
H-1	Continue to apply for grants to implement the actions of the WRIA 53 Plan.	PU/Lincoln County Planning
H-2	Review and update the WRIA 53 Watershed Plan a minimum of every 5 years.	PU/Lincoln County Commissioners
H-3	Identify Lincoln County to provide oversight of the implementation of the WRIA 53 Watershed Plan.	PU/Lincoln County Planning

5.3 WATERSHED PLANNING INTO THE FUTURE

The purpose of this Plan is to document the Planning Unit's recommendations to guide implementation of water resource management decisions and actions into the future. The citizens and landowners acknowledge that there is a need for local input to provide guidance, direction and priorities concerning water resource issues in WRIA 53 for the benefit of the landowners, residents, towns and cities in the watershed. The Planning Unit understands that there are insufficient funds and resources to implement all the alternative solutions identified within this Plan and will support the continuing need to identify, apply, and receive funding to implement the recommendations. The alternative solutions will be prioritized into the implementation phase and most recommendations will be contingent upon available funding and resources.

The Planning Unit also recognizes that the priorities and recommendations for WRIA 53 may change over time as more information on the water resources becomes available and as a result of changing environmental regulations, changes in land use and population, and allocation of the finite sources of water supply. As a result of the evolving issues related to water resource planning, the Planning Unit has recommended that this Plan be periodically updated to incorporate new information and adjust the goals and action items of the citizens and landowners within WRIA 53.

5.3.1 Land Use Planning

One of the key elements of the Lincoln County Planning Department is to develop a reasonable and defensible plan to allow development to occur in the watershed while protecting the limited water supplies. An option discussed within the Planning Unit meeting is to develop zones within the watershed on where water supplies are known to be limited, potentially available and/or readily available. The goal would be to develop a procedure of what density of development could occur in each of these zones. Additionally, land development applicants would be required to provide information to assure that a sustainable supply of water is present at the developed property. The Planning Unit will expand on these options as they proceed into the implementation phase of watershed planning.

6.0 STATE ENVIRONMENTAL POLICY ACT

This Chapter of the WRIA 53 Watershed Plan provides documentation of the Programmatic State Environmental Policy Act (SEPA) compliance specific to the Lower Lake Roosevelt - WRIA 53 Watershed Plan for adoption of the Plan by Lincoln County. This Chapter provides information on:

- An overview of the statewide Programmatic Environmental Impact Statement (EIS) for watershed planning.
- A description of the process used to evaluate consistency of the WRIA 53 Plan with the statewide Programmatic (EIS) for watershed planning.
- A summary of the assumptions and process used to select the SEPA determination.

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

In July 2003, Ecology published *Final Environmental Impact Statement for Watershed Planning under Chapter 90.82* (Ecology, 2003). In accordance with the SEPA Rules, Ecology's Watershed Planning EIS (2003) provides Planning Teams with the following four options for SEPA compliance, of which the WRIA 53 Planning Unit reviewed to reach a final determination:

- 1. ADOPTION OF THE PROGRAMMATIC WATERSHED PLANNING EIS and DETERMINATION OF SIGNIFICANCE (DS):** This is an option if the programmatic Watershed Planning EIS adequately addresses all probable adverse impacts. Lincoln County (as lead SEPA agency) will use parts of the existing document (the statewide programmatic watershed planning EIS) to meet all or part of the proponent's responsibilities under SEPA to prepare an EIS or other environmental document. A Determination of Significance (DS) is written by the lead SEPA agency (Lincoln County) that the proposal is likely to have a significant adverse environmental impact and therefore an EIS is required (WAC 197-11-310 and WAC 197-11-360).
- 2. ADOPTION, DS and ADDENDUM:** This option is the same as #1; however, an addendum provides local decision makers with additional local information, such as land cover, environment, etc., that may be supportive of the programmatic Watershed Planning EIS.

3. **ADOPTION and SUPPLEMENTAL EIS:** This option provides for additional independent analyses of environmental impacts through the completion of a supplemental EIS, if the Final Watershed Planning EIS does not address all of the probable significant adverse environmental impacts.
4. **ADOPTION and DETERMINATION OF NON-SIGNIFICANCE (DNS):** This option could be used if it is determined that there are no probable significant adverse impacts associated with the recommended actions contained in the Watershed Plan.

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

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

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

6.1 CONCLUSION OF REVIEW PROCESS AND SELECTION OF EIS OPTION

The *Final Environmental Impact Statement for Watershed Planning under Chapter 90.82* (Ecology, 2003) presents a range of alternatives, including a no action alternative, which represents the types of recommended actions that Planning Teams may include in their watershed plans to achieve the objectives of the Watershed Planning Act. The WRIA 53 Planning Unit reviewed the four EIS options stated above and concluded that since the alternatives were discussed in Ecology's *Final Environmental Impact Statement for Watershed Planning under Chapter 90.82* (2003), it would be redundant to discuss alternatives to the actions identified in this Plan.

Therefore, the WRIA 53 Planning Unit recommends that Lincoln County (as the lead SEPA agency) adopt the statewide programmatic Watershed Planning EIS and issue a determination of non significance (DNS) to meet its obligations to prepare a SEPA compliant review of the WRIA 53 Watershed Plan.

After adoption of the statewide programmatic Watershed Planning EIS, there is a fourteen (14) day waiting period before an action by the County Legislative Authorities can be taken to approve the WRIA 53 Watershed Plan (WAC 197-11-630).

6.2 SEPA COMPLIANCE FOR THE WRIA 53 WATERSHED PLAN

Lincoln County is the Lead Agency for SEPA and the Watershed Planning Act process in WRIA 53. Lincoln County has opted to adopt the programmatic Watershed Planning EIS and to issue a DNS for the WRIA 53 Watershed Plan. The *Final Environmental Impact Statement for*

Watershed Planning under Chapter 90.82 (Ecology, 2003) lists alternatives that are intended to represent the recommended actions that Planning Teams may include in their Watershed Plans. Recommended actions in this Plan that are consistent with alternatives in the programmatic watershed planning EIS do not require supplemental information for SEPA compliance, nor do they require enumeration of alternatives and potential impacts (i.e., action versus no action) in the standard SEPA format. In addition, the following qualifications also apply to the use of the programmatic watershed planning EIS and SEPA compliance for the watershed planning:

- Recommended actions for studies typically do not have the potential to cause an adverse environmental impact and will not trigger a determination of significance.
- Recommended actions for convening interest/stakeholder groups do not have an adverse environmental impact.
- Recommended actions that involve review or revision of existing ordinances, policies, or programs will go through a SEPA review process during adoption of the revised ordinance, policy, or program. The SEPA rules state that, “The fact that proposals may require future agency approvals or environmental review shall not preclude current consideration, as long as proposed future activities are specific enough to allow some evaluation of their probable impacts.” Since a number of alternatives in the *Final Environmental Impact Statement for Watershed Planning under Chapter 90.82* (Ecology, 2003) address modifications to ordinances, plans, and policies, impacts and mitigation measures associated with these types of recommended actions have been addressed adequately for the level of environmental review required for the watershed planning process. These actions may also undergo individual environmental review at the time that each of the revisions is actually proposed.
- If it is determined that a recommended action will not result in probable significant adverse environmental impacts, such as formation of the Implementation Team, further environmental review of such an action under SEPA is not required.

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

In summary, this Chapter of the WRIA 53 Watershed Plan and adoption of the statewide programmatic Watershed Planning EIS fulfils the programmatic SEPA requirements necessary for Lincoln County to adopt the WRIA 53 Plan. SEPA compliance for individual (project and non-project) actions in the WRIA 53 Plan may be required at the time the individual action is implemented.

6.2.1 Water Quantity Component for WRIA 53

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

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

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

6.3 NATIONAL ENVIRONMENTAL POLICY ACT COMPLIANCE

The National Environmental Policy Act (NEPA) is triggered when action by or permit from a federal agency is required or if federal funding is involved. The United States Bureau of Land Management and other federal lands make up approximately 11.3 percent (36,935 acres) of the land base within WRIA 53 (Lincoln County, GIS analysis, 2012). This Plan does not require a permit, action or funding by any federal agency. Lincoln County reserves its rights to exercise powers granted to local governments under NEPA. Federal lands are summarized in Table 20 and shown on Figure 10.

For federal action, NEPA compliance is required when the action is implemented. However, this compliance is not a prerequisite for approval of the WRIA 53 Watershed Plan by the County Legislative Authorities, nor is it a necessity during the state programmatic SEPA review. The WRIA 53 Planning Unit has made recommendations to federal agencies (primarily the BOR) within this Plan, but has not obligated any federal agency to implement any actions.

TABLE 20 – FEDERAL LANDS IN WRIA 53			
	NORTH ½ WRIA	SOUTH ½ WRIA	TOTAL
Total Acres	118,735	207,427	326,162
National Park Service-Acreage	14,891	14,732	29,623
National Park Service- (%)	12.5%	7.1%	9.1%
Bureau Land Management-Acreage	0	7,312	7,312
Bureau Land Management – (%)	0	3.5%	2.2%

6.4 APPLICATION OF FINAL WATERSHED PLANNING EIS ALTERNATIVES TO WRIA 53 WATERSHED PLAN

This Section of the WRIA 53 Watershed Plan and the enclosed tables identify specific SEPA alternatives that apply to the actions that may be required to implement this Plan. Actions that do not require a SEPA alternative as identified in Ecology's *Final Environmental Impact Statement for Watershed Planning under Chapter 90.82* (Ecology, 2003) are noted by the following type:

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

Table 21 presents the reference number, action title, and the application of SEPA Alternative for the Water Quantity planning component. The reference number provided allows for tracing the Action Title by component to the specific obligation or recommendation in Section 4.0.

Table 21: Water Quantity Actions – SEPA Alternatives

Reference Number Example: A-2 = Water Quantity Goal A, Action Item #2		
<i>Reference Number</i>	<i>Action To Be Undertaken</i>	<i>Application of SEPA Alternative</i>
A-1	Integrate the available GWMA hydrostratigraphic model into the WRIA 53 aquifer management and protection policies	No Impact
A-2	Complete a water balance/budget for WRIA 53 by coordinating with the GWMA to improve the groundwater model within the boundaries of WRIA 53	Study
A-3	Develop a conceptual groundwater model for WRIA 53 identifying location and status of water resource availability.	Study
A-4	Develop a regionally consistent hydrostratigraphic framework for WRIA 53 to develop local planning/zoning decision making.	Study
A-5	Develop maps for county where known sustainable supplies are located to allow county to focus development in those areas.	No Impact
A-6	Determine aquifer recharge areas in WRIA 53 and develop protection policies based on the development of the GWMA hydrostratigraphic model.	Study
A-6(1)	Evaluate if State owned gravel pit east of Lincoln County Public Works Building may be a potential location for aquifer recharge	Study/WP24
A-7	Evaluate potential recharge areas for recharge augmentation through storage alternatives	Study/WP 24
A-8	Develop alternative water supply sources and protection of existing water sources for the City of Davenport.	Study
A-9	Develop Water Storage information for projects in WRIA 53	WP-24
A-9(1)	Submit water storage grant application for watershed planning.	No Impact
A-9(2)	Coordinate with Lincoln County Passive Rehydration Project (LCPH) to evaluate if WRIA 53 alternatives can be coordinated with that project	No Impact
A-9(3)	Coordinate with LCPH to determine if instream flow enhancement options may be feasible in WRIA 53.	Study
A-9(4)	Initiate talks with local landowners to determine if potential small scale exempt water storage projects can be constructed on private property in watershed.	WP 24
B-1	Develop a GPS database of groundwater wells located in WRIA 53 from all available sources	Study
B-2	Develop an electronic reference database for use by landowners and agencies in WRIA 53.	No Impact
B-3	Have Ecology and Water Conservancy Boards forward to Lincoln County Planning all new water right applications and Change applications.	No Impact
C-1	Have local communities review their water resource needs and certificated water rights and have the PU assist with potential future needs.	No Impact
C-2	Assist the City of Davenport to acquire funding for the installation of new water supply wells and/or infrastructure	No Impact

C-3	Assist local Group A and B water suppliers in determining potential funding needs to improve/enhance their water supply and distribution systems	WP 1
D-1	Explore if an adjudication of WRIA 53 to delineate actual use for future management of resource is needed.	WP 12
D-2	Resolve the open Lower Hawk Creek Adjudication currently still open with the State.	WP 12/WP 15
E-1	Identify areas where low sustainable aquifers are located and develop land use codes to minimize development in these areas.	No Impact
E-2	Identify areas where known sustainable aquifers are present and develop land use codes to focus development in those areas.	Study
E-3	Identify areas where there are insufficient data to determine if sustainable water supplies and develop land use codes for procedures for developers to use to prove sustainable water supplies are present prior to issuance of building permits	Study
E-4	Coordinate developed WRIA data and land use code development with the Lincoln County Planning Commission.	No Impact
F-1	Identify areas where additional conservation can be implemented with the local towns and municipalities	WP 1
F-2	Identify actions that local landowners can use to implement water conservation measures.	WP 3/WP 4
F-2(1)	Develop educational materials for collection of rain water to be used for irrigation.	No Impact
F-3	Develop educational materials to distribute to local landowners outlining recommended water conservation measures and sustainability of local aquifers	No Impact
F-3(1)	Work with local schools to implement an irrigation conservation program	No Impact
F-4	Assist the City of Davenport to acquire funding for leak detection within the City's distribution system.	WP 1
G-1	Continue and expand the aquifer level monitoring program.	Study
G-1(1)	Seek funding to continue aquifer monitoring program.	Study
G-2	Continue the Hawk Creek stream gauging program.	Study
G-2(1)	Seek funding for LCCD to continue stream monitoring program	Study
G-3	Develop new data collection programs to assist with future water resource management decisions	WP 37
G-4	Develop a monitoring program to determine potential impacts of nitrate and arsenic on groundwater.	Study/WP 36
G-5	Develop maps of known documented arsenic and nitrate impacted and non-impacted areas in the watershed.	No Impact
H-1	Continue to apply for grants to implement the actions of the WRIA 53 Plan.	No Impact
H-2	Review and update the WRIA 53 Watershed Plan a minimum of every 5 years.	No impact
H-3	Identify Lincoln County to provide oversight of the implementation of the WRIA 53 Watershed Plan.	No Impact

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