Section 4
General Strategies and Tools

Key planning issues for WRIA 35 have been identified in Sections 5 and 6 in the areas of water supply, instream flow, water quality, and aquatic habitat. General strategies or "tool sets" that can be used to address the key planning issues are discussed below, and specific tools (e.g. programs, projects, BMPs, regulations, etc) are described in detail in Appendix B. The strategies and tools include measures that can be implemented by the Planning Unit, federal, state, and local agencies, tribes, conservation districts, individual landowners, and other stakeholders and water users in addressing key planning issues. The inclusion of a specific strategy or tool herein is not intended as a recommendation for its use within WRIA 35, rather, it is provided here as a menu of some of the possible actions or strategies. This listing of possible tools, while extensive, is by no means exhaustive, and the Planning Unit and other stakeholders may identify and select other means to address the key planning issues discussed within this Plan.

A listing of the tools is provided in Appendix B, presented in eight broad categories:

- Water conservation
- Water storage
- Water quality
- Groundwater management
- Groundwater quality
- Regulatory / administrative
- Habitat Enhancement
- Monitoring

Tools within each of these categories may apply to one or more of the key planning issues; many tools can affect multiple planning issues. Appendix B is composed of five
s identifying the specific tools within each category. Each table provides a description of the tool, the potential benefits normally expected with implementation of the tool, approximate cost range (e.g. low, medium, high), potential parties responsible for implementation, and other issues (e.g., social, legal, technical) that could be a factor when considering undertaking any of the listed strategies.

This section (and Appendix B) is designed to be used as a general reference for the Planning Unit and other stakeholders and individuals involved in watershed planning activities. The lists are not intended to be exhaustive, but rather to provide a range of options available when considering activities in each Implementation Area. As such, these strategies and tools are not specific to any of the Implementation Areas per se; the discussion of recommended strategies per Implementation Area is provided in Section 6.

4.1 Strategies & Tools for Water Supply Issues

Water supply issues arise when there is increased competition for water and a limited supply of the resource. Competition for water is increasing throughout Washington State as population and economic growth occurs and as regions prepare for anticipated future growth. Multiple demands include needs for municipal water, agricultural uses (e.g. irrigation and stock watering), recreation, and commercial/industrial use, as well as federal and state requirements for salmon protection and recovery and instream flows. Water supply tools are primarily intended to address the demand for water for human-related uses, such as municipal and irrigation use, but may also benefit instream flow. Tools identified under Instream Flow Strategies and Aquatic Habitat Strategies are primarily designed to benefit fish and natural habitats.

When addressing water quantity issues in a WRIA planning process, a number of strategies must be considered, including water conservation, water reuse, water reclamation and reuse, voluntary water transfers, aquifer recharge, additional water allocations, or additional water storage enhancements (Chapter 90.82 RCW).

An index to the strategies and tools that can be used to address water supply issues is provided in Table 4-1. These strategies and tools are described in detail with information on benefits, costs, implementing party, and related social and technical issues in Appendix B.

Table 4-1
Tools to Address Water Supply Issues

Conservation Tools	Water Storage Tools	Regulatory / Administration Tools	Aquatic Habitat Tools	Monitoring Tools
■ Municipal-Consumer Demand Management Program for Residential, Business and Public Properties ■ Municipal-Operational Efficiency Management Program for Water Systems ■ Agricultural water conservation and irrigation efficiency strategies ■ Industrial Conservation Measures ■ Water reuse facilities by wastewater facilities ■ On-site greywater segregation and use	■ Construct and operate new on-channel storage facilities ■ Raise and operate existing on-channel storage facilities ■ Construct and operate new on-channel storage facilities ■ Use existing storage facilities for additional beneficial uses ■ Raise and operate existing off-channel storage facilities ■ Construct and operate artificial recharge/ aquifer storage projects ■ New riparian storage or field flooding storage ■ New or modified riparian wetlands ■ Modification of existing sediment basins ■ Alternative source for irrigation ■ Direct stream augmentation ■ New water supply ■ Protect and restore floodplain connectivity, protect existing wetlands	■ Transfer existing water rights for out-of-stream uses to other out-of-stream beneficial uses within the watershed ■ Transfer existing water rights for out-of-stream uses to instream beneficial uses through the Trust Water Rights Program ■ Transfer water through interties of public water systems or irrigation systems ■ Short-term or long-term allocation ■ Complete or partial closure of a basin or subbasin from appropriations ■ Adjudication of water rights ■ Assignment of watermaster ■ Increase enforcement against illegal water use within a basin or subbasin ■ Evaluate existing water rights within a basin or subbasin (without an adjudication) ■ Evaluate tribal water rights claims within a basin or subbasin ■ Adopt rules and/or regulations regarding wells ■ Extend public water systems services into areas served by exempt wells	■ Encourage landowner participation in the Conservation Reserve Enhancement Program (CREP) and Wetland Reserve Program (WRP) ■ Pipe open ditch conveyance systems ■ Irrigation Efficiencies	■ Analyze baseline water conditions in the watershed ■ Monitor current water permitting system for the watershed ■ Monitor stored water levels ■ Monitor groundwater use ■ Monitor water meters ■ Monitor existing water rights ■ Analyze outstanding water rights applications on file with state water agency ■ Monitor conservation programs ■ Monitor irrigation efficiency projects ■ Evaluate impacts of drought emergency relief ■ Monitor utility rates for pumping costs

4.2 Strategies and Tools for Instream Flow Issues

The term "*instream flow*" is used to identify a specific stream flow (typically measured in cubic feet per second, or cfs) at a specific location for a defined time, and typically following seasonal variations. Instream flows are usually defined as the stream flow needed to protect and preserve instream resources and values, such as fish, wildlife and recreation.

An index to the strategies and tools that can be used to address instream flow issues is provided in Table 4-2. These strategies and tools are described in detail with information on benefits, costs, implementing party, and related social and technical issues in Appendix B.

Table 4-2

Tools to Address Instream Flow Issues

Conservation Tools	Water Storage Tools	Regulatory / Administration Tools	Aquatic Habitat Tools	Monitoring Tools
■ Municipal-Consumer Demand Management Program for Residential, Business and Public Properties ■ Municipal-Operational Efficiency Management Program for Water Systems ■ Agricultural water conservation and irrigation efficiency strategies ■ Industrial Conservation Measures ■ Water reuse facilities by wastewater facilities ■ On-site greywater segregation and use	■ Construct and operate new on-channel storage facilities ■ Use existing storage facilities for additional beneficial uses ■ Construct and operate artificial recharge/ aquifer storage projects ■ New riparian storage or field flooding storage ■ New or modified riparian wetlands ■ Modification of existing sediment basins ■ Alternative source for irrigation ■ Direct stream augmentation ■ New water supply ■ Protect and restore floodplain connectivity, protect existing wetlands	■ Transfer existing water rights for out-of-stream uses to other out-of-stream beneficial uses within the watershed ■ Transfer existing water rights for out-of-stream uses to instream beneficial uses through the Trust Water Rights Program ■ Transfer water through interties of public water systems or irrigation systems ■ Short-term or long-term allocation ■ Complete or partial closure of a basin or subbasin from appropriations ■ Adopt minimum instream flows to restrict new water rights ■ Adjudication of water rights ■ Assignment of watermaster ■ Increase enforcement against illegal water use within a basin or subbasin ■ Evaluate existing water rights within a basin or subbasin (without an adjudication) ■ Evaluate tribal water rights claims within a basin or subbasin ■ Adopt rules and/or regulations regarding wells ■ Extend public water systems services into areas served by exempt wells	■ Encourage landowner participation in Conservation Reserve Enhancement Program (CREP) ■ Encourage landowner participation in the Environmental Quality Incentives Program (EQIP) ■ Encourage landowner participation in the Wetlands Reserve Program (WRP)	■ Analyze baseline water conditions in the watershed ■ Monitor current water permitting system for the watershed ■ Monitor stored water levels ■ Monitor groundwater use ■ Monitor water meters ■ Monitor existing water rights ■ Analyze outstanding water rights applications on file with state water right agency ■ Monitor conservation programs ■ Monitor irrigation efficiency projects ■ Evaluate impacts of drought emergency relief ■ Monitor utility rates for pumping costs

4.3 Strategies and Tools for Surface Water Quality Issues

The state's surface water quality standards set limits on pollution in lakes, rivers and marine waters in order to protect water quality. Standards are designed to prevent pollution from chemicals, bacteria, toxics and other sources, as well as protect fish species that are sensitive to factors such as water temperature. The federal Clean Water Act (CWA) requires that the water quality standards protect beneficial uses, such as swimming, fishing, aquatic life habitat, and agricultural and drinking water supplies.

Pollution in a watershed can come from point and nonpoint sources. Point sources, such as direct discharges from wastewater treatment plants, irrigation return ditches, or industrial discharges, are regulated by discharge permits specific to the individual discharge. The discharge permits, regulated under the National Pollutant Discharge Elimination System (NPDES), set limits on the pollutant concentrations allowed in the discharge. Water quality issues attributable to direct discharges are generally addressed by the regulatory agency and the permit holder.

Nonpoint sources of pollution include run-off from land activities such as logging, urbanization, roads and agriculture. Nonpoint sources of pollution are difficult to identify and control since they are generated by a wide variety of sources, mostly individual actions. There are a variety of federal, state and local tools to assist in implementing projects that will improve nonpoint sources of pollution in a watershed, from changing agricultural, logging, road management, right-of-ways, and landscaping practices to collecting and treating runoff.

An index to the strategies and tools that can be used to address water quality issues is provided in Table 4-3. These strategies and tools are described in detail with information on benefits, costs, implementing party, and related social and technical issues in Appendix B.

Table 4-3
Tools to Address Water Quality Issues

Conservation Tools	Water Quality Tools	Regulatory / Administration Tools	Aquatic Habitat Tools	Monitoring Tools
■ Municipal-Consumer Demand Management Program for Residential, Business and Public Properties ■ Municipal-Operational Efficiency Management Program for Water Systems ■ Agricultural water conservation and irrigation efficiency strategies ■ Industrial Conservation Measures ■ Water reuse facilities by wastewater facilities ■ On-site greywater segregation and use	■ Develop a Total Maximum Daily Load (TMDL) Water Cleanup Plan ■ Develop a Soil Water Assessment Tool (SWAT) ■ Implement Irrigation Water Management ■ Implement cropland management activities ■ Implement Agricultural Chemical Practices ■ Implement Livestock Management Practices ■ Implement Other Agricultural Controls/ Practices ■ Roads ■ Plan/ Implement Municipal Stormwater Runoff Control ■ Plan/ Implement Industrial Stormwater Runoff Control ■ Manage Urban Landscaping ■ Implement a pollution trading (credit) system for water to facilitate compliance with a Total Maximum Daily Load (TMDL) ■ Incorporate requirements for improving the quality of discharges from existing industries when issued State Waste Discharge Permits or National Pollutant Discharge Elimination System Permits (NPDES) ■ Increase level of inspection of commercial dairy operations and	■ Transfer existing water rights for out-of-stream uses to other out-of-stream beneficial uses within the watershed ■ Transfer existing water rights for out-of-stream uses to instream beneficial uses through the Trust Water Rights Program ■ Transfer water through interties of public water systems or irrigation systems ■ Short-term or long-term allocation ■ Complete or partial closure of a basin or subbasin from appropriations ■ Adjudication of water rights ■ Assignment of watermaster ■ Increase enforcement against illegal water use within a basin or subbasin ■ Evaluate existing water rights within a basin or subbasin (without an adjudication)	■ Encourage landowner participation in the Conservation Reserve Enhancement Program (CREP) ■ Encourage landowner participation in the Environmental Quality Incentives Program (EQIP) ■ Encourage landowner participation in the Wetlands Reserve Program (WRP) ■ Implement habitat improvement projects involving construction or placement of instream structures ■ Implement habitat improvement projects involving out-of-stream riparian restoration or enhancement ■ Restore natural floodplain function in channelized stream reaches ■ Move river dikes back from existing river channels to allow for floodplain restoration and channel maintenance ■ Plant native vegetation ■ Fence riparian areas ■ Manage grazing in riparian areas ■ Relocate, repair or	■ Monitor livestock use of riparian areas ■ Monitor efficacy of habitat improvement projects ■ Conduct water quality monitoring ■ Evaluate TMDL implementation and effectiveness ■ Monitor conservation programs ■ Monitor irrigation efficiency projects

Table 4-3
Tools to Address Water Quality Issues

Conservation Tools	Water Quality Tools	Regulatory / Administration Tools	Aquatic Habitat Tools	Monitoring Tools
	feedlot operations and enforcement of water quality as appropriate ■ Project and restore floodplain connectivity, protect existing wetlands.	■ Evaluate tribal water rights claims within a basin or subbasin ■ Adopt rules and/or regulations regarding wells ■ Extend public water systems services into areas served by exempt wells ■ Evaluate NPDES and State Waste Discharge permit conditions	decommission roads and campgrounds further from stream edges where assessments show potential for erosion and other adverse effects ■ Develop regulations or programs to control sources of sediment that are not addressed through critical areas ordinances or other regulations ■ Re-establish historic wet meadow complexes	

4.4 Strategies and Tools for Groundwater Management Issues

Management of groundwater as a resource is an important component of a watershed planning effort because it is heavily used as a source of water supply and can also affect stream flow where surface water is hydraulically connected to groundwater.

Groundwater management can have a significant effect on management of stream flows. Where groundwater is hydraulically connected with surface water, pumping of wells can reduce baseflows in nearby streams by reducing the water table gradient in the alluvial and basalt aquifers. This is due to capture of groundwater that otherwise would have discharged to surface water. These types of effects are complex and vary according to many factors including the nature of the local hydrogeology and topography.

Most of the existing programs utilized for groundwater management are based on State and federal legislation designed to provide water quantity and/or quality protection. Regulatory programs such as Sole Source Aquifer Program (SSA), Aquifer Protection Areas (APA), and Growth Management Act Critical Areas, focus primarily on water quality issues and management.

An index to the strategies and tools that can be used to address groundwater management issues is provided in Table 4-4. These strategies and tools are described in detail with information on benefits, costs, implementing party, and related social and technical issues in Appendix B.

Table 4-4
Tools to Address Groundwater Management Issues

Groundwater Management Tools	Monitoring Tools
■ Develop a Groundwater Management Program (GWMP) ■ Implement water demand reduction strategies ■ Implement recharge enhancement with SAR (shallow aquifer recharge) projects ■ Implement recharge enhancement with ASR (aquifer storage and recovery) projects ■ Implement Water Rights Transfers ■ Pursue regional coordination ■ Conduct groundwater monitoring program, including development of a groundwater model ■ Conduct a hydrogeologic study	■ Identify land use activities and contaminants to be addressed with technical management strategies ■ Conduct groundwater monitoring program, including development of groundwater model

4.5 Strategies & Tools for Groundwater Quality Issues

A number of federal environmental laws are directly or indirectly designed to protect groundwater from contamination. Examples of these laws include the Safe Drinking Water Act (SDWA); Resource Conservation and Recovery Act (RCRA); Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA); and Toxic Substances Control Act (TSCA). In most cases, state agencies are responsible for promulgating regulations in the state of Washington in accordance with these federal laws. Examples of state agencies with regulatory authority to protect groundwater quality under the aforementioned federal laws include the Washington State Department of Health (DOH), Ecology, and Washington State Department of Agriculture (WSDA).

Ecology has several programs related to groundwater quality protection. Examples include the Aquifer Vulnerability Project under the Water Quality Program and the Underground Injection Control Program (UIC). The purpose of the Aquifer Vulnerability Project is to develop a method for identifying areas of the state that are vulnerable to groundwater contamination and assess areas of the state that are relatively more vulnerable to groundwater contamination from pesticides to support the proposed State Pesticide Management Plan. The UIC program protects groundwater quality by regulating the disposal of fluids into the subsurface. Most UIC wells or injection wells are simple devices that allow fluids into the shallow subsurface under the force of gravity.

The potential for groundwater contamination from UIC wells can occur and is dependent on the well construction and location, the volume and quality of the fluids injected and the hydrogeologic setting.

WSDA is currently developing a statewide pesticide management plan to address the potential for pesticide occurrences in groundwater. Development of this plan is being driven by several state and federal initiatives designed to protect groundwater quality from the unintended movement of pesticides resulting from labeled agricultural and urban use.

Existing statewide regulations have limitations, which occasionally fail to protect groundwater from contamination. Local government agencies often need to develop and implement a groundwater management program to address the limitations of the regulations.

An index to the strategies and tools that can be used to address groundwater quality issues is provided in Table 4-5. These strategies and tools are described in detail with information on benefits, costs, implementing party, and related social and technical issues in Appendix B.

Table 4-5
Tools to Address Groundwater Quality Issues

Groundwater Quality Tools	Monitoring Tools
■ Conduct "Level 1" risk assessment ■ Identify land use activities and contaminants to be addressed with technical management strategies ■ Enforce Wellhead Protection Program requirements for all Group A Public Water Systems (PWS) ■ Encourage Group B Public Water Systems to voluntarily establish a wellhead protection program ■ Select and implement technical management strategies based on assessment findings ■ Evaluate the need for greater involvement of stakeholders in cleanup actions at Ecology-regulated facilities and sites ■ Evaluate the need for independent cleanup actions ■ Provide oversight for well decommissions to ensure decommissions consistent with safe practices ■ Assess drinking water supplies that are unprotected and "at risk" of becoming impacted in the future ■ Develop and implement management protocols of unprotected groundwater sources located outside the service areas of large and medium water purveyors	■ Conduct water quality monitoring programs ■ Evaluate TMDL implementation ■ Monitor impacts to groundwater supplies

4.6 Strategies and Tools for Aquatic Habitat Issues

The initiating governments and the Planning Unit chose to include a habitat component in this watershed plan, and the PU coordinated and developed the habitat component in a manner that serves to protect or enhance fish habitat in the WRIA. Planning activities under Chapter 90.82 RCW must also be integrated with strategies developed as part of other processes undertaken in response to potential or actual listing of salmon and other fish species as being threatened or endangered under the federal Endangered Species Act. Because habitat restoration activities are being developed and have been implemented under the Salmon Recovery Act (Chapter 77.85 RCW), in WRIA 35 such activities have been relied upon as the primary nonregulatory habitat component for fish habitat in this watershed plan.

An index to the strategies and tools that can be used to address aquatic habitat issues is provided in Table 4-6. These strategies and tools are described in detail in Appendix B.

Table 4-6

Tools to Address Aquatic Habitat Issues

Conservation Tools	Water Storage Tools	Regulatory / Administration Tools	Aquatic Habitat Tools	2 Monitoring Tools
■ Municipal – Consumer Demand Management Program for Residential, Business and Public Properties ■ Regional agricultural water conservation and irrigation efficiency strategies ■ Agricultural water conservation and irrigation efficiency strategies ■ Industrial conservation measures ■ Water reuse facilities by wastewater utilities	■ Construct and operate new off-channel storage facilities ■ Operate off-channel storage facilities ■ Construct and operate artificial recharge / aquifer storage projects ■ New riparian storage or field flooding storage ■ New or modified riparian wetlands ■ Modification of existing sediment basins ■ Alternative source for irrigation ■ Direct stream augmentation ■ New water supply	■ Transfer existing water rights for out-of-stream uses to instream beneficial uses through the Trust Water Right Program ■ Short-term or long-term allocation ■ Complete or partial closure of a basin or subbasin from appropriations ■ Increase enforcement against illegal water use within a basin or subbasin ■ Evaluate tribal water rights claims within a basin or subbasin ■ Adopt rules and/or regulations regarding wells ■ Extend public water system services into areas served by exempt wells ■ Implement a pollution trading (credit) system for water to facilitate compliance with a Total Maximum Daily Load (TMDL) ■ Incorporate requirements for improving the quality of discharges from existing industries when issuing state Waste Discharge Permits or National Pollutant Discharge Elimination System Permits (NPDES) ■ Increase the level of inspection of commercial dairy operations and enforcement of water quality ■ Water banking	■ Encourage landowner participation in the Conservation Reserve Enhancement Program (CREP) ■ Encourage landowner participation in the Environmental Quality Incentives Program (EQIP) ■ Encourage landowner participation in the Wetlands Reserve Program (WRP) ■ Implement fish habitat improvement projects involving construction or placement of structures within the waterway ■ Construct pool and riffle habitat using instream modifications ■ Implement habitat improvement projects involving out-of-stream riparian restoration or enhancement ■ Implement habitat improvement projects intended to 'daylight' streams currently contained within enclosed channels ■ Restore natural floodplain function in channelized stream reaches ■ Move river dikes back from existing river channels to allow for floodplain restoration and channel maintenance ■ Plant native vegetation ■ Fence riparian areas	■ Monitor the status of focal species ■ Study the behavior of focal species ■ Monitor core populations ■ Conduct creel surveys ■ Evaluate fish passage limitations ■ Monitor progress of restoring recreational and tribal fisheries ■ Monitor and compare life histories of hatchery and wild fish ■ Monitor impact of non-native fish species on native fish species ■ Monitor riparian habitat condition ■ Monitor livestock use of riparian areas ■ Monitor efficacy of habitat improvement projects ■ Conduct water quality monitoring ■ Evaluate TMDL implementation ■ Monitor water conservation programs ■ Monitor irrigation efficiency projects

Table 4-6
Tools to Address Aquatic Habitat Issues

Conservation Tools	Water Storage Tools	Regulatory / Administration Tools	Aquatic Habitat Tools	2 Monitoring Tools
			■ Manage grazing in riparian areas ■ Remove or replace bridges, culverts, roadways and other infrastructure ■ Construct fish passage facilities where such facilities do not currently exist ■ Relocate campgrounds further from stream edges where assessments show potential for erosion and other adverse effects ■ Implement integrated noxious weed management program ■ Update Wildlife Area Management Plans ■ Implement BMPs ■ Acquire conservation easements ■ Amend or modify plans/ordinances to protect habitat or control floodplain development ■ Continue Operation and Maintenance activities associated with past habitat improvement projects ■ Replace open ditch conveyance systems for irrigation with lined ditches or piping ■ Improve irrigation diversions for fish passage ■ Install a screened lift pump system at irrigation diversions ■ Plant native grasses and shrubs along rural roads	

Table 4-6
Tools to Address Aquatic Habitat Issues

Conservation Tools	Water Storage Tools	Regulatory / Administration Tools	Aquatic Habitat Tools	2 Monitoring Tools
			■ Plant native grasses and shrubs within timber sale boundaries and roads ■ Develop a Habitat Conservation Plan (HCP) ■ Develop a Habitat Incentives Program (HIP) ■ Request local governments to develop regulations and/or programs to control sources of sediment ■ Integrate habitat improvement planning into flood hazard reduction plans ■ Support implementation of the recommendations of Washington's Forest and Fish Report ■ Re-establish historic wet meadow complexes	

4.7 Environmental Considerations for Applying the Strategies and Tools

Implementing any of the tools described in Appendix B will provide both benefits as well as potentially resulting in impacts to the human and natural environment. Prior to implementation of any of the tools provided, the responsible entity should thoroughly evaluate the federal, state, local and/or tribal regulatory and legal requirements involved in site selection, permitting, funding and planning the project. Further, some of the tools will require site specific analyses, assessment, and design prior to implementation, and may require continuous management, maintenance and other controls to be effective.

On July 18, 2003, the Washington Department of Ecology published the Statewide Environmental Impact Statement for Watershed Planning (http://www.ecy.wa.gov/biblio/0306013.html). This environmental impact statement describes the watershed planning process set forth in the Watershed Planning Act, as well as procedures for rule making that may be undertaken by state agencies to support implementation of watershed plans. It describes the existing framework of federal, state, and local laws, regulations, and programs that affect, or are related to management of watersheds. In addition, it evaluates the potential environmental impacts of and identifies mitigation measures, for various types or classes of recommended strategies/tools that may be included in watershed plans.

The information provided in the Statewide EIS or in this document is not intended to replace the requirement for a SEPA or NEPA environmental analysis and proposed mitigation, where applicable, for a site specific project.