

**NISQUALLY RIVER BASIN PLAN**

**FINAL**

**SUPPLEMENTAL ENVIRONMENTAL**

**IMPACT STATEMENT**





2401 South 35th Street  
Tacoma, Washington 98409-7460  
(253) 798-7210 • FAX (253) 798-7425

August 20, 2008

Dear Interested Party:

Attached is the ***Final Supplemental Environmental Impact Statement (Final SEIS)*** for the ***Proposed Nisqually River Basin Plan (Basin Plan)*** issued on August 20, 2008. The Final SEIS revises the Draft Supplemental Environmental Impact Statement (Draft SEIS) in response to comments received during the 30-day comment period. A new section called "Responses to Comments" has been added.

The Pierce County Department of Public Works and Utilities, Surface Water Management, proposes to update the *1991 Pierce County Storm Drainage and Surface Water Management Plan* (1991 Plan) by adopting a basin-specific plan for unincorporated, non-federal areas of Pierce County draining to the Nisqually River, excluding the Muck Creek drainage basin. The Proposed Basin Plan evaluates flooding, water quality, habitat, and other storm drainage problems and recommends capital improvement projects and nonstructural measures to solve the problems.

This Final SEIS is prepared as a non-project environmental impact statement per Washington Administrative Code, Chapter 197-11-442. The non-project Final SEIS provides a general discussion of the probable significant adverse environmental impacts of implementing the Proposed Basin Plan and the No-Action Alternative. Many proposed actions covered in the Final SEIS will be subject to project-specific environmental review prior to construction or implementation.

There is no comment period for this Final SEIS. An appeal of the adequacy of the Final SEIS may be filed at the Pierce County Development Center, Pierce County Public Services Building (Annex), 2401 South 35th Street, Tacoma, WA 98409 by filing a notice of appeal together with an appeal fee of \$1323.00 by 4:30 p.m. on September 3, 2008. More information on the appeal of a Final SEIS may be obtained at the Development Center.

The Proposed Basin Plan and Final SEIS (Chapter 10 of the Plan) are posted on the County's website at <http://www.piercecountywa.org/pc/services/home/environ/water/ps/basinplans>. Printed copies of the Proposed Basin Plan and Final SEIS may be purchased for the cost of printing at Pierce County Public Works and Utilities, 2702 South 42<sup>nd</sup> Street, Tacoma, Washington, or at the Pierce County Planning and Land Services Department at 2401 South 35th Street, Suite 175, Tacoma, Washington. Copies of the FSEIS and Proposed Basin Plan can also be reviewed at the following libraries: Pierce County Library–DuPont Branch, Pierce County Library–Eatonville Branch, and Pierce County Library–Graham Branch.

For more information about the Final SEIS, call Adonais Clark at (253) 798-7165. For questions regarding the Proposed Nisqually River Basin Plan, contact Roy Huberd, (253) 798-6793 or Randy Brake, at (253) 798-4651, Pierce County Public Works and Utilities, Surface Water Management.

Sincerely,

CHARLES F. KLEEBURG  
Director

By: Adonais Clark  
Environmental Designee



## CHAPTER TEN SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT

### FACT SHEET

#### Final Supplemental Environmental Impact Statement (FSEIS)

**Title and  
Description of  
“Proposed Action”**

***Final Nisqually River Basin Plan.*** Pierce County proposes to update its *1991 Storm Drainage and Surface Water Management Plan* (1991 Plan) by adopting and implementing a basin-specific update for the Nisqually River Basin. The 1991 Plan has guided the identification, design, construction, and operation of surface water management facilities and the implementation of Surface Water Management throughout unincorporated Pierce County. The proposed Nisqually River Basin Plan (Basin Plan) would include basin-specific capital improvement projects and programmatic measures (activities) to solve flooding, water quality, habitat, and other storm drainage problems within the unincorporated portion of the Nisqually Basin.

This *Final Supplemental Environmental Impact Statement* (FSEIS) evaluates two alternatives. The “Proposed Action” is the adoption and implementation of the Nisqually River Basin Plan. The “Proposed Action” would achieve the County’s goals and objectives to reduce flood hazards, improve water quality, improve fish habitat, demonstrate responsible use of public resources, and influence methods for new development. The “No Action” Alternative is the continued implementation of the 1991 Plan and other current Pierce County surface water management activities.

This Nisqually River Basin Plan FSEIS adds information to the “Environmental Impact Statement” for the 1991 Plan. New and additional information since 1991 includes changes to regulations and policies, constructed stormwater facilities, revised existing conditions, new growth and development patterns in Pierce County, and updated information on water quality, flooding problems, and habitat problems in the Nisqually River Basin.

**Location of Proposal** The planning area is the unincorporated Pierce County portion of the Nisqually River Basin. The planning area excludes the Muck Creek Basin and areas within other jurisdictions, such as incorporated towns and cities, most commercial timber lands, and federal lands.

**Proponent** Proponent and Lead Agency: Pierce County Department of Public Works and Utilities, Surface Water Management

**Proponent Contact** Roy Huberd, Planner  
Pierce County Public Works and Utilities, Surface Water Management  
9850 64<sup>th</sup> Street West  
University Place, WA 98467-1078  
(253) 798-6793

**Lead Agency** Pierce County Department of Public Works and Utilities, Surface Water Management

**Responsible Official** Charles F. Kleeburg, Director, Pierce County Planning and Land Services

**Lead Agency Contact** Adonais Clark  
Environmental Designee  
Pierce County Planning and Land Services  
2401 South 35<sup>th</sup> Street  
Tacoma WA 98409-7490  
(253) 798-7165

**List of Permits & Approvals Required**

Pierce County Storm Drainage and Surface Water Management Advisory Board review, and Pierce County Planning Commission review and recommendation. County Council approval of an ordinance adopting the Nisqually River Basin Plan as an update of the *1991 Storm Drainage and Surface Water Management Plan*.

After approval and adoption of the Basin Plan, capital projects affecting water resources and other environmentally sensitive areas may require the appropriate federal, state, or local permits and approvals at the time the future projects are proposed and designed. Potential permits and approvals could include Hydraulic Project Approvals, Shoreline Substantial Development Permits, Section 404 Permits, Critical Areas Approvals, SEPA review, and/or other approvals.

**Authors & Principal Contributors**

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Pierce County Public Works and Utilities Department,  
Surface Water Management

Mike Milne, Nathan Foged, Ada Hamilton, Robin Lee, Tim Krause, and Colleen Doten of Brown and Caldwell, Inc.

Jeanette Dorner and Florian Leischner of the Nisqually Indian Tribe

**Date of DSEIS Issuance**

June 9, 2008

**End of DSEIS Comment Period**

July 11, 2008

<b>Public Meeting(s)</b>	<p>Two public meetings on the Draft Basin Plan and DSEIS have been held:</p> <p>June 18<sup>th</sup>, 2008, 6:30 to 8:30 P.M. Weyerhauser Elementary School Gymnasium 6105 365<sup>th</sup> Street East, Eatonville</p> <p>June 19<sup>th</sup>, 2008, 6:30 to 8:30 P.M. Eatonville Community Center 305 Center Street West, Eatonville</p> <p>Prior to Basin Plan adoption, the Pierce County Planning Commission and the Pierce County Council will schedule public hearings.</p>
<b>Date of FSEIS Issuance</b>	<p>August 20, 2008</p>
<b>Date of Final Action</b>	<p>Action by the Pierce County Council is anticipated in November 2008.</p>
<b>Subsequent Environmental Review</b>	<p>Project-specific environmental review for future capital projects and programmatic actions will be performed when site and implementation alternatives are identified and designed. Individual environmental review will precede issuance of applicable development permits or construction.</p>

**Location of proposed  
Nisqually River  
Basin Plan and  
FSEIS, and the  
Original EIS for the  
1991 Plan**

Pierce County Public Works and Utilities  
Environmental Services Building  
9850 64<sup>th</sup> Street West  
University Place, WA 98467-1078  
253-798-2725

Pierce County Planning and Land Services  
2401 South 35<sup>th</sup> Street, Suite 175  
Tacoma, Washington 98409

Reference copies are available for review at the following libraries:

- Pierce County Library–DuPont Branch
- Pierce County Library–Eatonville Branch
- Pierce County Library–Graham Branch

The FSEIS, Basin Plan, and other information regarding the Nisqually River Basin Plan also are available at the following internet address:

<http://www.piercecountywa.org/pc/services/home/environ/water/ps/basinplans>

**Cost of FSEIS**

The Final Basin Plan and FSEIS may be purchased for the cost of printing at:

Pierce County Public Works and Utilities  
Environmental Services Building  
9850 64<sup>th</sup> Street West  
University Place, WA 98467-1078  
253-798-2725

Pierce County Planning and Land Services  
2401 South 35<sup>th</sup> Street, Suite 175  
Tacoma, Washington 98409

## 10.1 SUMMARY

The Pierce County Public Works and Utilities, Surface Water Management (Surface Water Management), proposes the adoption and implementation of the Nisqually River Basin Plan (Basin Plan or Plan). The Basin Plan would meet the goals and objectives for basin planning in Pierce County, and would be consistent with the recent laws and policies regarding water quality, stormwater management, and natural habitat. If adopted, the Basin Plan would amend the County's *1991 Storm Drainage and Surface Water Management Plan* for the Nisqually River Basin within unincorporated Pierce County.

Pierce County has prepared this Final Supplemental EIS (FSEIS) for the proposed Basin Plan. This FSEIS has been issued to comply with the requirements of the *Washington State Environmental Policy Act* (SEPA).

### 10.1.1 Background

In 1991, Pierce County adopted the original *1991 Stormwater Drainage and Surface Water Management Plan* (1991 Plan). The 1991 Plan was intended to provide a comprehensive, County-wide program for surface water management of non-federal land in unincorporated Pierce County. Pierce County has been using the 1991 Plan as the basis for its Capital Improvement Program (CIP), although other stormwater projects have been developed to respond to more recent information and drainage problems. The 1991 Plan addressed 26 drainage basins in Pierce County, and the Nisqually Basin was studied as a rural basin. The 1991 Plan identified stormwater and surface water management measures in response to the legal requirements and flooding problems existing at that time.

Since the 1991 Plan was prepared, surface water management has increased in complexity. New legal requirements include the *Stormwater National Pollutant Discharge Elimination System* (NPDES) permit, provisions of the *Clean Water Act*, *Endangered Species Act* (ESA) listings, and *Growth Management Act* (GMA) mandates. The 1991 Plan emphasized flood protection. Water quality, aquatic habitat, protection of critical areas, endangered species, and support for community design and multiuse preferences have become important concerns. Since 1991, growth in Pierce County has made development impacts on storm drainage systems and associated surface water more widespread and apparent.

To maintain consistency with these new requirements since 1991, Pierce County has updated the 1991 Plan through a series of basin plans. This Nisqually River Basin Plan is one of the series of new basin plans. This Basin Plan identifies specific flooding, water quality, and habitat problems in the Nisqually Basin, and recommends capital improvement projects and programmatic measures to address the problems. The proposed Basin Plan also addresses

changes in stormwater policies and planning to meet the requirements of the *NPDES*, *Clean Water Act*, the *Endangered Species Act*, and the *Growth Management Act*.

### 10.1.2 Objectives

Under SEPA, the objectives are the intended goals that a proposal would address. The goals and objectives for the Nisqually River Basin Plan form the basic criteria for the selection and prioritization of the actions recommended in the Basin Plan. The goals and objectives are described in detail in Chapter 1, and are listed below.

- Reduce flood hazards
- Improve fish passage
- Improve water quality
- Demonstrate coordinated and responsible use of public resources
- Influence location and methods for new development

The goals and objectives for the Basin Plan listed above are based on guidance prepared by Pierce County Surface Water Management. These goals and objectives reflect the new legal and policy requirements for Pierce County stormwater planning, which have developed since the 1991 Plan was issued.

### 10.1.3 Alternatives

The Nisqually Basin SEIS evaluates two alternatives. The “Proposed Action” is the adoption and implementation of the Nisqually River Basin Plan for drainage and surface water management of the Nisqually Basin within unincorporated Pierce County. The “No Action” Alternative is the continued implementation of the 1991 Plan and other current County surface water management activities.

The “Proposed Action” covers the entire length of the Nisqually River within unincorporated Pierce County. The Basin Plan, however, excludes incorporated towns and cities, most commercial timber lands, and federal lands. It also excludes the Muck Creek basin, which has been addressed in a separate basin plan.

The Basin Plan includes recommendations for site-specific projects and basin-wide programmatic measures to remedy existing problems and to prevent future water resource and habitat problems. The components of the Basin Plan would achieve the County’s goals and objective for basin planning, and would be consistent with recent laws and regulations regarding stormwater.

The Basin Plan would append and update the 1991 Plan. The Basin Plan would provide guidance for Pierce County's future capital projects, non-capital expenditures, water resource protection policies, and public education programs in the Nisqually Basin.

The proposed Nisqually River Basin Plan is a set of recommended solutions in the form of capital improvement projects (CIP) and programmatic measures that would address identified flooding, water quality, and habitat problems. Most of these proposed CIP improvements are site-specific in nature, and are designed to deal with existing site-specific flooding, water quality, or habitat issues. Programmatic measures are basin-specific or County-wide activities such as inspection, maintenance, monitoring, and educational programs.

The Basin Plan proposes 42 CIP projects and 21 programmatic measures for the Nisqually Basin. The types of projects and programs are summarized below:

- 9 habitat restoration projects
- 3 fish passage projects
- 16 property acquisition projects
- 12 culvert replacement projects
- 1 revegetation project
- Programs to reduce stormwater runoff from future development, by promoting Low Impact Development (LID) techniques and adopting updated stormwater management standards.
- Programs for education, outreach, and technical and financial assistance with landowners, students, government agencies, and community groups in the Nisqually Basin.
- Programs to increase inspection and/or maintenance activities for culverts, ditches, stormwater facilities, levees, and septic tanks.
- Programs for long-term monitoring of surface water and for fish and wildlife habitat.
- Programs to restore and enhance floodplains and riparian, wetland, and estuarine habitats.
- Programs to control invasive species and to restore native vegetation.
- Program for acquisition and management of properties for floodplain, water quality, and habitat protection.
- Programs to protect and enhance shellfish, fisheries, and other aquatic resources.

- Programs for coordination and financial support with the Nisqually River Land Trust and Nisqually River Council.
- Program to implement elements of total maximum daily load (TMDL) for fecal coliform bacteria in Nisqually tributaries, where required, to improve water quality.
- A study to analyze sediment and aggradation effects on the floodplain along the upper Nisqually River.

The “No Action” Alternative means that the proposed Basin Plan would not be adopted. Under the “No Action” Alternative, stormwater would continue to be managed under the previous 1991 Plan and other current County programs. The 1991 Plan does not contain any remaining CIP projects to be constructed in the Nisqually Basin. The County would increasingly rely on more opportunistic means of identifying and prioritizing capital projects, such as citizen complaints and judgment of County staff. Few, if any, capital projects likely would be proposed in the Nisqually Basin.

The “No Action” Alternative would not address most of the specific flooding, water quality, and habitat problems identified in the Basin Plan. “No Action” would not achieve many of the County’s updated goals and objectives for basin planning. The “No Action” Alternative also would not be consistent with many of the new legal and policy requirements for Pierce County stormwater planning, which have developed since the 1991 Plan was issued.

#### 10.1.4 SEPA Process and Public Involvement

The *Washington State Environmental Policy Act* (SEPA), Chapter 43.21C RCW, requires that an environmental impact statement (EIS) be prepared for proposed “actions” that could result in probable significant adverse environmental impacts. “Actions” include adoption of new or revised plans by Pierce County. Under SEPA, decisions on plans, policies, and programs are “nonproject actions.” Both the original 1991 Plan and the proposed Basin Plan are nonproject actions under SEPA.

Pierce County prepared a nonproject EIS for the 1991 Plan that compared the potential adverse impacts of the 1991 Plan with “No Action”. Since then, some of the information and legal requirements evaluated in the original 1991 EIS have changed. Updated information exists on flooding, water quality, and habitat problems in the Nisqually Basin. New or additional information also includes development and growth patterns in Pierce County that have occurred since 1991. The legal requirements and Pierce County goals and objectives for stormwater planning have substantially changed since 1991.

Because of the new information since the 1991 Plan, Pierce County has prepared this Final Supplemental EIS (FSEIS) for the proposed Basin Plan. A supplemental EIS under SEPA has been prepared to determine whether any new information or substantial changes in County

programs since 1991 could result in probable significant adverse environmental impacts (WAC 197-11-405(4)).

This FSEIS compares the implementation of the “Proposed Action” (Nisqually River Basin Plan) with the “No Action” Alternative. This Nisqually Plan FSEIS is based in part on information provided in the previous 1991 EIS. This FSEIS identifies new information on stormwater-related problems and legal requirements in the Nisqually Basin, which are discussed in detail in the accompanying Basin Plan.

Pierce County has prepared this FSEIS under the nonproject and phased review provisions of SEPA (WAC 197-11-704 and WAC 197-11-774) and the Pierce County SEPA Ordinance (PCC, Title 18D). A nonproject (or programmatic) analysis under SEPA provides a general discussion of potential environmental impacts, and considers other existing regulations and plans. Phased review under SEPA covers general matters in a broader environmental document, with subsequent narrower documents that concentrate on the issues relating to specific projects (Section WAC 197-11-776 WAC).

Implementation of the Basin Plan would be phased. Pierce County would not implement a particular recommendation until it is included in a Capital Improvement Program (CIP) or other approved program.

Projects and programs to implement the Basin Plan may require future environmental review under SEPA. Individual projects may require project-level federal, state, and local government approvals and permits, including SEPA review. Individual projects also could require review under the *National Environmental Policy Act* (NEPA) if a project involves federal permits and approvals. Proposed projects would complete environmental review under SEPA/NEPA and obtain required permits and approvals when individual projects are proposed and prior to construction. The location, design, construction, and operation of individual projects would comply with all applicable federal, state, and Pierce County regulations and policies.

Public involvement has been an integral part of the County’s basin planning and SEPA processes. Key stakeholders have included basin residents and landowners, citizen and environmental groups, the Nisqually Tribe, and federal, state, and local agencies. Their concerns regarding habitat, water quality, and flooding in the Nisqually Basin have been evaluated within the Basin Plan. Pierce County prepared a citizen questionnaire, conducted a mail survey, held public meetings, and contacted a variety of organizations and agencies. Stakeholder involvement and agency coordination are described in detail in [Chapter 3](#) of the Basin Plan, and specific details are provided in Appendix B.

During the basin characterization phase, Pierce County held two public meetings to present draft findings and to solicit public input. The first meeting was held on June 1, 2005, toward the beginning of the characterization phase, at Weyerhaeuser Elementary School near Eatonville. This meeting was intended to inform residents of the planning process and to solicit information

regarding drainage/flooding, water quality, and/or fish habitat problems in the basin. A second public meeting was held on September 6th, 2006, at Weyerhaeuser Elementary School, to present the draft findings of the Nisqually Basin characterization and obtain citizen input of identified problems.

During environmental review under SEPA, two public meetings were held on the DSEIS. The public meetings were held on June 18th, 2008, at the Weyerhaeuser Elementary School near Eatonville, and on June 19th, 2008, at the Eatonville Community Center. During the 30-day comment period on the DSEIS, the public and agencies had opportunities to provide written comments and testimony at the two public meetings. Responses to the comments on the DSEIS are provided in the back of this FSEIS.

### 10.1.5 Comparison of Alternatives

*Table 10-1* summarizes and compares potential environmental impacts under the alternatives. The identification of potential environmental impacts assumes that future implementation of any proposed projects would be conducted in accordance with applicable land use, development, and environmental regulations.

**TABLE 10-1**  
Comparison of Alternatives

Element	“Proposed Action” Basin Plan	Probable Significant Adverse Environmental Impact?	“No Action” Alternative	Probable Significant Adverse Environmental Impact?
Water Resources and Water Quality	<p>A series of CIP projects and programmatic measures would address specific water quality and flooding problems in the Nisqually River, its tributaries, and area lakes. The proposed Basin Plan would improve water quality and reduce flooding problems, at a higher level than the “No Action” Alternative.</p> <p>CIP projects to replace culverts would reduce localized flooding of roadways and adjacent properties.</p>	No	<p>Most of the water resource and water quality problems identified in the Nisqually Basin would not be addressed. Degradation of water quality may continue.</p> <p>Few projects and programs to improve water resource conditions, if any, would be proposed for the Nisqually Basin. Any improvements to</p>	<p>“No Action” would not meet County’s updated goals and objectives for basin planning. The “No Action” Alternative also would not be consistent with many of the new legal and policy requirements for water</p>

**TABLE 10-1  
Comparison of Alternatives**

Element	“Proposed Action” Basin Plan	Probable Significant Adverse Environmental Impact?	“No Action” Alternative	Probable Significant Adverse Environmental Impact?
	<p>Acquisition and restoration projects that preserve and enhance riparian areas and floodplains would provide natural storage to reduce flooding, and would improve water quality.</p> <p>Low impact development (LID) techniques and updated stormwater standards would reduce stormwater impacts from existing and future development.</p> <p>Programmatic measures would increase inspection and maintenance activities, develop an acquisition and management plan, establish a monitoring program, and implement public education and outreach on water resource problems and solutions.</p> <p>Potential for short-term impacts during construction of individual projects on or near water, by temporarily increasing erosion and sedimentation. All projects would include “Best Management Practices” (BMPs) to reduce erosion, comply with all applicable regulations, and obtain necessary permits and approvals.</p>		<p>flooding and water quality would occur a lower level compared to the “Proposed Action”.</p> <p>Potential for short-term impacts during construction of any individual projects. Construction would include mitigation measures similar to “Proposed Action”.</p>	<p>quality and flood hazards.</p>
Fishery Resources	<p>The proposed CIP projects and programmatic measures would address identified fishery and habitat problems in the Nisqually Basin planning area.</p>	<p>No</p>	<p>Most of the fishery and habitat problems identified in the Nisqually Basin would not be addressed. “No</p>	<p>“No Action” would not meet County’s updated goals and objectives</p>

**TABLE 10-1  
Comparison of Alternatives**

Element	“Proposed Action” Basin Plan	Probable Significant Adverse Environmental Impact?	“No Action” Alternative	Probable Significant Adverse Environmental Impact?
	<p>The Basin Plan would protect and restore the overall fishery resources and aquatic habitat, at a higher level than the “No Action” Alternative.</p> <p>CIP projects to improve fish passage will increase upstream habitat anadromous fish.</p> <p>CIP restoration projects would improve fish access, native vegetation, the channel migration zone, the original floodplain, estuarine habitat, and riparian areas.</p> <p>CIP projects to acquire property would protect aquatic and riparian habitats, preserve channel migration zones, reduce future degradation of water quality, and make areas available for future habitat restoration</p> <p>Programmatic measures to benefit fisheries would provide nutrients to juvenile salmon with salmon carcasses, and would monitor the effectiveness of habitat improvement projects.</p> <p>Other programmatic measures would enhance riparian habitat and improve water quality, which would indirectly benefit fisheries resources.</p> <p>Potential for short-term impacts</p>		<p>Action” may result in continued degradation of habitat.</p> <p>Few future projects and programs, if any, would be proposed. Any improvements to fish habitat would occur a lower level compared to the “Proposed Action”.</p> <p>Potential for short-term impacts during construction of individual projects, if any. Construction would include mitigation measures similar to “Proposed Action”.</p>	<p>for basin planning. The “No Action” Alternative also would not be consistent with many of the new legal and policy requirements for habitat protection.</p>

**TABLE 10-1  
Comparison of Alternatives**

Element	“Proposed Action” Basin Plan	Probable Significant Adverse Environmental Impact?	“No Action” Alternative	Probable Significant Adverse Environmental Impact?
	<p>during construction of individual projects, by temporarily increasing erosion and sedimentation. Construction would include BMPs and mitigation measures to reduce erosion.</p>			
Plants and Animals	<p>The proposed CIP projects and programmatic measures would address identified habitat problems, which would generally benefit plant and animal resources in the Nisqually Basin. The projects and programs would restore and protect plant and animal habitat, at a higher level than the “No Action” Alternative</p> <p>CIP projects would restore riparian habitat, native vegetation, wetlands, and the original floodplain.</p> <p>Acquisition of property would protect riparian and wetland habitats, preserve the floodplain, reduce future degradation of water quality, and make areas available for future habitat restoration.</p> <p>Programmatic measures would enhance riparian, wetland, and in-shore habitats, and would improve water quality.</p> <p>Removal of invasive plants would restore native vegetation and improve wildlife habitat in</p>	No	<p>Few projects and programs to improve fish habitat, if any, would be proposed for the Nisqually Basin. Any improvements to plant and animal habitat would occur a lower level compared to the “Proposed Action”.</p> <p>The “No Action” Alternative would not address many of the habitat problems identified in the Nisqually Basin. “No Action” may result in continued degradation of plant-and-animal habitat in the watershed.</p> <p>Individual projects, if any, could result in site-specific impacts, although future impacts would be relatively small. Similar to the “Proposed Action”, any future project would include BMPs and revegetation.</p>	<p>“No Action” would not meet County’s updated goals and objectives for basin planning. The “No Action” Alternative also would not be consistent with many of the new legal and policy requirements for habitat protection.</p>

**TABLE 10-1  
Comparison of Alternatives**

Element	“Proposed Action” Basin Plan	Probable Significant Adverse Environmental Impact?	“No Action” Alternative	Probable Significant Adverse Environmental Impact?
	<p>the long term.</p> <p>Construction activities could temporarily alter vegetation and displace wildlife. Future projects would include required BMPs, and would restore disturbed vegetation and habitat after construction.</p>			
Soil and Geology	<p>Projects and programs to restore riparian areas, stabilize stream channels, and control stormwater would reduce erosion and sedimentation in streams.</p> <p>Future projects could require limited excavation, grading/filling, and impervious surfaces. All projects would comply with applicable regulations for grading and filling activities and critical areas, would obtain any necessary permits, and may include site-specific mitigation.</p> <p>Construction activities could result in temporary erosion. All construction activities would include required erosion control measures and “Best Management Practices” (BMPs), and stream banks would be stabilized and revegetated.</p>	No	<p>Limited erosion control would occur at a lower level than “Proposed Action”.</p> <p>Future projects, if any, could result in excavation, grading, and filling. Similar to “Proposed Action”, future projects would comply with applicable regulations, would obtain any necessary permits and critical areas review, and may include site-specific mitigation</p> <p>Temporary construction impacts and mitigation of individual projects, similar to “Proposed Action”.</p>	No
Land Use	Projects and programs would address identified flooding of	No	Few projects, if any, would address flooding	The “No Action” Alternative

**TABLE 10-1  
Comparison of Alternatives**

Element	“Proposed Action” Basin Plan	Probable Significant Adverse Environmental Impact?	“No Action” Alternative	Probable Significant Adverse Environmental Impact?
	<p>land uses in the Nisqually Basin.</p> <p>The Basin Plan would not induce new growth or development, and changes to existing and planned land uses are not anticipated.</p> <p>By better accommodating planned growth and providing required stormwater facilities, the “Proposed Action” would reduce development-related stormwater impacts.</p> <p>Projects and programs to acquire property in the Nisqually Basin would not result in displacement of residences or businesses. Any future land acquisition would purchase property from willing sellers.</p> <p>Future projects would be consistent with site-specific land use and shoreline policies and regulations, and would obtain all required land use permits and approvals.</p> <p>Basin Plan would be consistent with the <i>County Comprehensive Plan</i> and its land use and stormwater policies.</p>		<p>of land uses.</p> <p>Future projects and programs, if any, would not change existing and planned land uses and not induce growth.</p> <p>Development-related stormwater impacts from planned growth would be addressed by existing regulations, but at lower level than the “Proposed Action”.</p> <p>The few projects likely would not displace residences, demolish structures, or inundate property.</p> <p>Future projects would be consistent with land and shoreline regulations and policies, and would obtain all applicable permits.</p> <p>The “No Action” Alternative may be inconsistent with the <i>County Comprehensive Plan</i>.</p>	<p>would not be consistent with many of the new legal and policy requirements for land use.</p>
Historic and Cultural Resources	<p>Individual projects could have the potential to encounter cultural, archaeological, or historic resources. Future projects would be located and designed to avoid any identified</p>	No	<p>Individual projects, if any, could encounter historic or cultural resources. The location and design of future projects would be</p>	No

**TABLE 10-1  
Comparison of Alternatives**

Element	“Proposed Action” Basin Plan	Probable Significant Adverse Environmental Impact?	“No Action” Alternative	Probable Significant Adverse Environmental Impact?
Public Services and Utilities	<p>resources. Pierce County would conduct site surveys, evaluate potential impacts and mitigation, and coordinate with appropriate tribes and agencies.</p> <p>Projects and programmatic measures to control stormwater, reduce erosion, and restore stream channels would be a benefit to streamside historic and cultural resources.</p> <p>Water quality and habitat projects and programs would protect and restore fishery resources that are an important cultural resource for the Nisqually Tribe.</p> <p>If any cultural resources were encountered during construction of individual projects, the County would immediately consult with appropriate officials regarding appropriate measures.</p> <p>Projects and programs would not substantially increase the demand for public services and utilities. Implementation of the Basin Plan would affect the services provided by Pierce County Surface Water Management, which provides drainage utility services.</p> <p>Proposed projects and programs would reduce flooding of roadways and properties, which would improve public safety and reduce demand for public</p>	No	<p>coordinated with appropriate officials, similar to “Proposed Action”.</p> <p>Limited erosion control and fishery restoration, which would provide a lower level of cultural benefits than the “Proposed Action”.</p> <p>If any cultural resources were discovered during construction activities, the County would immediately consult with appropriate officials regarding appropriate measures.</p> <p>Future projects, if any, would not require new utilities or services.</p> <p>Few projects, if any, would address identified roadway and property flooding problems.</p> <p>Potential for temporary disruptions during construction of individual projects. Construction would include mitigation</p>	No

**TABLE 10-1**  
**Comparison of Alternatives**

<b>Element</b>	<b>“Proposed Action” Basin Plan</b>	<b>Probable Significant Adverse Environmental Impact?</b>	<b>“No Action” Alternative</b>	<b>Probable Significant Adverse Environmental Impact?</b>
	<p>services and utilities.</p> <p>The projects and programs to improve water quality, habitat, and fisheries also would benefit recreational areas.</p> <p>Construction of individual CIP projects may temporarily affect roadways and disrupt local services and utilities. Pierce County would coordinate mitigation measures with local service providers and utilities to maintain access and services during construction</p>		<p>measures similar to “Proposed Action”.</p>	

## 10.2 ALTERNATIVES, INCLUDING THE “PROPOSED ACTION”

This section describes the FSEIS alternatives to achieve the goals and objectives for basin planning in Pierce County. The alternatives evaluated are the “**Proposed Action**”, which is the adoption of the Nisqually River Basin Plan (Basin Plan), and the “**No Action**” **Alternative**, which is the continued use of the previous *1991 Stormwater Drainage and Surface Water Management Plan* (1991 Plan) and other current County surface water management activities. This section of the FSEIS also provides background on the original 1991 Plan, and identifies the subsequent changes in regulatory and planning requirements. It concludes with a summary comparison of the FSEIS alternatives.

The alternatives have been developed by the Pierce County Public Works and Utilities Surface Water Management (Surface Water Management). Surface Water Management is responsible for surface water management in unincorporated Pierce County. Surface Water Management builds and maintains storm drainage and surface water management facilities, and it identifies non-structural solutions to surface water problems. Surface Water Management prepares basin plans to identify and prioritize capital improvement projects and other Surface Water Management activities in individual drainage basins. Basin plans comprehensively address the flooding, water quality, and fish habitat aspects of surface water management in the major stream systems of the non-federal lands within unincorporated Pierce County. The basin plans will be implemented primarily through Surface Water Management activities.

### 10.2.1 Introduction and Background

#### *Pierce County Storm Drainage and Surface Water Management Plan (1991 Plan)*

The Pierce County Council established the County’s Surface Water Management Utility in March 1988 by Ordinance 87-205. In 1991, the County adopted the original *Stormwater Drainage and Surface Water Management Plan* (1991 Plan). The 1991 Plan was intended to provide a comprehensive program for surface water management operations, for non-federal lands within unincorporated Pierce County. The 1991 Plan also was prepared to satisfy Washington State Department of Ecology (Ecology) requirements for a *Comprehensive Flood Control Management Plan* (WAC 173-145).

The 1991 Plan addressed 26 of the drainage basins in Pierce County, to varying degrees. The 1991 Plan studied in detail eight urban and urbanizing basins: Gig Harbor, Hylebos Creek, Clear/Clarks Creek, Clover/Steilacoom Creek, Chambers Bay, Tacoma West/Browns-Dash Point, Muck Creek, and American Lake. The rural study areas were comprised of small groups of basins: 1) Key Peninsula, Burley/Minter Creek, and Islands; 2) South Prairie Creek, Upper Carbon River, and Lower Carbon River; 3) Lower White River, Upper White River, and Mud Mountain; 4) Upper Puyallup River and Mid Puyallup River; 5) Ohop Creek, Mashel River, and

Upper Nisqually River; and 6) Lower Nisqually River and Mid-Nisqually River. Surface water management objectives were developed for each basin and for the County.

The 1991 Plan included recommendations for both capital projects (structural) and programmatic measures (non-structural activities) of accomplishing its goals and objectives. The programmatic recommendations tended to be broad and countywide rather than basin or study-area specific. The 1991 Plan focused primarily on capital projects aimed at addressing flooding problems that existed in 1991. The 1991 Plan recommended specific flooding projects for a Capital Improvement Program (CIP).

Four short-term and six long-term goals were developed as part of the 1991 Plan. The short-term goals were to have been implemented within two years of Plan development. They included: 1) adoption of the 1991 Plan; 2) establishment of a permanent Storm Drainage and Surface Water Management Utility; 3) provision of a funding mechanism to implement the entire plan; and 4) implementation of all the non-structural recommendations. A fifth goal, listed separately, was to adopt a drainage manual. To date, all the short-term goals have been implemented, at least in part.

The six long-term goals of the 1991 Plan are listed below:

1. Prevent the loss of life, the creation of public health or safety problems, and the loss or damage of public and private property.
2. Establish and adopt a systematic and comprehensive approach.
3. Minimize expenditure of public funds.
4. Maintain the varied uses of the existing natural drainage system within the County.
5. Prevent the degradation of the quality of both surface water and the water entering the region's aquifers.
6. Coordinate with public and private sectors.

Pierce County has continued the pursuit of these goals since the 1991 Plan was issued. Most of the goals were related to the planning, construction, operation, and maintenance of storm drainage facilities. Many of the objectives in the 1991 Plan have been met.

### ***Use of the 1991 Plan As Principal Focus of CIP Has Evolved***

Pierce County has been using the 1991 Plan as the basis for its Capital Improvement Program (CIP) proposals since 1991. Projects have been selected every year and adopted by the County Council as part of the County's six-year Capital Facilities Plan. Other projects not in the 1991

Plan also have been developed to respond to more recent information and drainage problems. Many of the projects proposed as part of the 1991 Plan have been constructed, while others could not be constructed because development patterns made acquisition of construction sites prohibitively expensive.

The 1991 Plan identified stormwater and surface water management measures in response to the legal requirements and flooding problems existing at that time. Since 1991, development and flooding conditions in Pierce County have changed, and stormwater requirements are more complex. While the 1991 Plan emphasized flood protection, newer laws and policies consider water quality, habitat, protection of critical areas, and community concerns. The programs, policies, and regulations that currently affect stormwater and surface water management in Pierce County are described in Chapter 2 of the Basin Plan.

The 1991 Plan was developed before adoption of the *Pierce County Comprehensive Plan (County Comprehensive Plan)*, which was adopted in 1995 pursuant to the Growth Management Act (GMA). Zoning and other land use regulations have changed development patterns in some areas of the County, and the future growth estimates used to develop the 1991 CIP list are no longer valid.

The GMA requires the establishment of “critical areas”, such as flood hazard areas, fish and wildlife habitat, and wetlands. It also requires their protection. GMA directed a revision of the *County Comprehensive Plan* to meet statewide growth management objectives. The GMA requires the internal consistency of the various elements of the *County Comprehensive Plan*, and consistency of implementing plans and budget decisions with the policies of the *County Comprehensive Plan*. The *County Comprehensive Plan* designated urban growth areas (UGAs) and rural areas; and it set out policy on environmental protection, economic development, public facilities and services, and land uses. The *County Comprehensive Plan* became effective in 1995.

In 1995, jurisdictions with populations over 100,000, including Pierce County, were required by the Washington State Department of Ecology (Ecology) to create stormwater management programs under the federal Clean Water Act’s National Pollutant Discharge Elimination System (NPDES) program.

In the late 1990’s, the federal government listed Chinook salmon and bull trout under the Endangered Species Act (ESA). The National Marine Fisheries Service in May 2007 listed the Puget Sound steelhead as threatened under the ESA. The Nisqually Basin planning area includes Chinook salmon and steelhead, and has the potential for bull trout.

The requirement to maintain consistency with these laws and policies has led Surface Water Management to initiate an update of the 1991 Plan through a series of basin plans. The basin plans identify and address the flooding, water quality, and habitat problems in more detail than was possible in 1991. The basin plans also address the relevant laws, regulations, and policies

enacted since the 1991 Plan, including the Growth Management Act, CRS, NPDES, total maximum daily load (TMDL) requirements of the federal Clean Water Act, and the fish listings under the federal Endangered Species Act (ESA).

The proposed Nisqually River Basin Plan is one of 10 basin plans developed by Surface Water Management. Basin plans describe existing conditions that affect storm drainage and surface water, forecast future hydrological conditions, identify existing and potential problems, and evaluate alternative solutions based on technical, environmental, and cost considerations. The basin plans are used to develop Surface Water Management's capital improvement, maintenance, repair, property acquisition, and program schedules and budgets.

### 10.2.2 Objectives

Under SEPA, the objectives are the intended goals that a proposal would address. The objectives for stormwater planning in Pierce County have changed since the 1991 Plan was issued, because of the new legal and policy requirements identified in the previous section. The development of the goals and objectives for Pierce County basin planning is described in [Chapter 1](#).

The goals and objectives for the Nisqually River Basin Plan are provided in *Table 10-2*. These goals and objectives in *Table 10-2* form the basic criteria for the selection and prioritization of the actions recommended in the Basin Plan.

**TABLE 10-2  
Goals and Objectives of the Nisqually River Basin Plan**

Goal	Objectives
Reduce flood hazards	Property loss and repetitive damage are reduced. Streams will not be adversely impacted by flood events. Pierce County standing under the Federal Emergency Management Agency's Community Rating System is improved. New development is located outside of flood-prone areas.
Improve fish habitat	Number of stream miles available for wild, native fish populations is increased. Population numbers of species listed as endangered or threatened under the ESA are maintained or increased. Quality and quantity of available wetlands and riparian habitat is improved.
Improve water quality	State Surface Water Quality Standards (WAC 173-201a) are met. Number of impaired (303d listed) water bodies is reduced. Pierce County complies with its NPDES permit for stormwater by meeting permit terms and condition to the maximum extent practicable. Risk of groundwater contamination is reduced. Rates of erosion are reduced.
Demonstrate coordinated and responsible use of public resources	Cost of maintaining stormwater facilities are reduced. Project value is favorable when measured in terms of costs and benefits. Polls demonstrate that public awareness of flooding, fish habitat, and water quality issues has increased. Monitoring and enforcement programs demonstrate an increase in services per dollar spent. Basin plan implementation addresses elements of other Pierce County plans. Other agencies and jurisdictions use basin plan to support their surface water management activities.
Influence location and methods for new development	Low Impact Development techniques are widely used. Effective BMPs are identified and widely used.

Source: *Guidance for Basin Planning, Pierce County Surface Water Management*, Pierce County Public Works & Utilities, Surface Water Management; Pierce County Storm Drainage and Surface Water Management Advisory Board, June 2005.

### 10.2.3 “Proposed Action” - Nisqually River Basin Plan

The “Proposed Action” is the adoption of the Nisqually River Basin Plan for drainage and surface water management of the Nisqually Basin within unincorporated Pierce County. The “Proposed Action” includes recommendations in the Basin Plan for capital projects and programmatic measures to remedy existing problems and to prevent future water resource

degradation. The projects and programs in the Basin Plan would achieve the County's updated goals and objectives for basin planning in *Table 10-2*.

The Basin Plan would append and update the 1991 Plan. The proposed projects in the Basin Plan would supplement and update the 1991 Plan and the County's Capital Improvement Plan. Programmatic recommendations would augment and/or replace the nonstructural recommendations contained in the 1991 Plan. The proposed Basin Plan would provide guidance for Pierce County's future Capital Improvement Projects, non-capital expenditures, water resource protection policies, and public education programs in the Nisqually Basin.

The Basin Plan has been prepared in accordance with the *Guidance for Basin Planning*, by Pierce County Surface Water Management. This guidance document lists the tasks for the preparation of a basin plan and the directions for completing the tasks.

The Basin Plan provides more detailed analyses of existing and future flooding, drainage, water quality, and habitat problems in the Basin than were possible for the 1991 Plan. Citizens in the Nisqually Basin provided information about the basin, and they commented on problems and solutions at public meetings and other public outreach efforts. Their concerns regarding flooding, drainage, habitat, and water quality issues were evaluated within the Basin Plan.

The Nisqually Basin planning area includes the unincorporated Pierce County portion of Water Resource Inventory Area (WRIA) 11, exclusive of the Muck Creek basin. Moreover, the Basin Plan does not cover areas of the Basin that lie within other jurisdictions, such as incorporated towns and cities, commercial timber lands regulated by the state Department of Natural Resources, Thurston and Lewis counties, and federal lands, except where activities in these areas may contribute to surface water management problems in unincorporated Pierce County. The Nisqually Basin planning area is shown in *Figure 1-1* of the Basin Plan.

The proposed Nisqually River Basin Plan is a set of recommended solutions in the form of capital improvement projects (CIP) and programmatic measures that would address identified flooding, water quality, and habitat problems. The proposed recommendations in the Basin Plan are described in detail in Chapter 9.

The Basin Plan contains site-specific capital improvement projects (CIPs), which are described in *Table 9-6* and shown in *Figures 9-1* through *9-8* of the Basin Plan. Most of these proposed CIP improvements are site-specific in nature, and are designed to deal with identified flooding or habitat issues within the Nisqually Basin. The proposed CIPs would include the following types of projects:

- 9 habitat restoration projects
- 3 fish passage projects
- 16 property acquisition projects

- 12 culvert replacement projects
- 1 revegetation project

The proposed Basin Plan also includes programmatic or non-structural measures. Programmatic measures include programs that would be specific to the Nisqually Basin, and other programs that would be County-wide but would benefit the Nisqually Basin. The proposed programmatic measures are described in *Table 9-7* of the Basin Plan. The Basin Plan includes the following programs:

- Programs to reduce stormwater runoff from future development, by promoting Low Impact Development (LID) techniques and adopting updated stormwater management standards.
- Programs for education, outreach, and technical and financial assistance with landowners, students, government agencies, and community groups in the Nisqually Basin.
- Programs to increase inspection and/or maintenance activities for culverts, ditches, stormwater facilities, levees, and septic tanks.
- Programs for long-term monitoring of surface water and for fish and wildlife habitat.
- Programs to restore and enhance floodplains and riparian, wetland, and estuarine habitats.
- Programs to control invasive species and to restore native vegetation.
- Program for acquisition and management of properties for floodplain, water quality, and habitat protection.
- Programs to protect and enhance shellfish, fisheries, and other aquatic resources.
- Programs for coordination with the Nisqually River Land Trust and Nisqually River Council.
- Program to implement a total maximum daily load (TMDL) for fecal coliform bacteria in Nisqually tributaries, where required, to improve water quality.
- Studies to assess aquatic habitat for restoration.
- Studies to assess culverts for fish passage.
- Studies to analyze flooding and channel migration hazards on the upper and lower Nisqually River.

### 10.2.4 “No Action” Alternative

The “No Action” Alternative means that the proposed Basin Plan would not be adopted. Pierce County would continue to use the 1991 Plan as its guide for managing drainage and surface water activities. The 1991 Plan does not contain any remaining CIP projects to be constructed in the Nisqually Basin. The “No Action” Alternative would continue Surface Water Management’ activities as they currently exist. Capital projects would be selected based on the identification of problems as they arise. The County would increasingly rely on more opportunistic means of identifying and prioritizing capital projects, such as citizen complaints and judgment of County staff. Few, if any, site-specific projects and basin-wide programs likely would be proposed in the Nisqually Basin.

The “No Action” Alternative would not address most of the specific flooding, water quality, and habitat problems identified in the Basin Plan. “No Action” also would not achieve many of the County’s updated goals and objectives for basin planning in *Table 10-2*. The “No Action” Alternative would not be consistent with many of the new legal and policy requirements for Pierce County stormwater planning, which have developed since the 1991 Plan was issued.

### 10.2.5 Comparison of Alternatives

*Table 10-3* summarizes the major characteristics of the “Proposed Action” and the “No Action” Alternative.

**TABLE 10-3  
Comparison of the Alternatives**

<b>Feature</b>	<b>“Proposed Action” (Basin Plan)</b>	<b>“No Action” Alternative</b>
Comprehensive stormwater planning within Basin	X	
Comprehensive stormwater planning County-wide		X
Focus on identified flooding, water quality, and habitat problems within Basin	X	
Basin-specific flooding projects	X	
Basin-specific water quality projects	X	
Basin-specific habitat projects	X	
Annual Capital Facilities Element	X	X
County-wide programmatic or non-structural solutions	X	X
Basin-specific programmatic or non-structural solutions	X	
Meet updated goals and objectives for Pierce County basin planning	X	
Consistent with new legal and policy requirements for stormwater	X	
Basin-wide public education, outreach, and technical assistance	X	

## 10.3 AFFECTED ENVIRONMENT, SIGNIFICANT IMPACTS, AND MITIGATION MEASURES

The planning area for the Nisqually River Basin Plan includes the unincorporated Pierce County portion of Water Resource Inventory Area (WRIA) 11. The planning area excludes the Muck Creek Basin, which has been addressed in a separate Pierce County basin plan. The planning area also does not cover areas within other jurisdictions, such as incorporated towns and cities, commercial timber lands regulated by the state Department of Natural Resources, Thurston and Lewis counties, and federal lands; except where activities in these areas may contribute to surface water management problems in unincorporated Pierce County. The Nisqually Basin planning area encompasses approximately 240 square miles within the 760-square mile Nisqually River Watershed. The Nisqually Basin planning area is shown in *Figure 1-1* of the Basin Plan.

### 10.3.1 Water Resources and Water Quality

This section describes the affected environment of the Nisqually Basin and potential impacts on water resources and water quality. The laws, regulations, plans, and policies concerning water resources and water quality are evaluated separately in Section 10.3.8, Plans and Policies.

#### *Affected Environment*

The Nisqually River originates on Mount Rainier and flows approximately 78 miles before discharging into Puget Sound. The LaGrande Canyon at river mile 42 divides the Watershed into two distinct physiographic areas. In the eastern portion of the Basin above the Canyon, volcanic rock and steeper mountainous terrain dominate the area. Subbasins in the east are covered primarily by designated forest lands. In the western portion below the Canyon, the Watershed consists of low hills and prairie plains of glacial outwash. Western drainage areas are characterized by mixed forest, rural residential, and agricultural uses.

The three largest tributaries in the planning area are the Mashel River, Ohop Creek, and Tanwax Creek. Other major streams include Red Salmon Creek, Murray Creek, Brighton Creek, Horn Creek, Kreger Creek, Lynch Creek, the Little Mashel River, and Elbe Creek. To allow for more detailed characterization, the Nisqually Basin planning area has been subdivided into 23 subbasins based on existing topographic and hydrographic data. The 23 subbasins are shown in *Figure 4-8* and are described in detail in Chapter 4.

Development in the Nisqually Basin planning area is relatively limited. The few small communities in the upper Basin are Elbe, Ashford, and Park Entrance (just outside Mount Rainier Nation Park). In the lower Basin are agricultural and rural residential uses in the Wilcox Flats area and in communities of McKenna and Whitewater Estates. *Figure 4-9* shows areas of development and other important features such as levees and dams.

Several hydroelectric projects are located on the Nisqually mainstem. The hydroelectric dams are the Alder Dam and LaGrande Dam, which comprise the Nisqually River Project owned and operated by Tacoma Power. The Centralia Diversion Dam is a run-of-the-river project, which is owned and operated by City of Centralia Light Department as the Yelm Hydroelectric Project. These hydroelectric projects are regulated by the Federal Energy Regulatory Commission (FERC), and their operation is outside the scope of Pierce County basin planning.

### ***Drainage and Flooding***

Major floods in the Nisqually Basin occurred in 1933, 1965, 1974, 1975, 1977, 1996, 1997, and 2006. Major floods typically occur between October and March as a result of rainstorms, which are sometimes augmented by melting snow. Existing and future flooding problems in the Nisqually Basin planning area are described in Chapter 6.

In the mainstem of the Nisqually River, the most substantial flooding problem area is located near the community of McKenna. Other locations along the Nisqually mainstem that have incurred flood damages include the Wilcox Flats area and some areas upstream of Lake Alder. Flows in the lower reaches of the Nisqually mainstem are regulated by the Nisqually hydroelectric project, but the small storage capacity of Lake Alder is inadequate to prevent downstream flooding.

In the Nisqually tributaries, flood hazard areas exist in the low-elevation areas west of Eatonville. Subbasins such as Murray Creek, Brighton Creek, Horn Creek, Tanwax Creek, Kreger Creek, and Ohop Creek have extensive flood hazard areas in low-lying regions and around lakes, in addition to riverine flooding along the major tributaries. Beavers are a common cause of minor flooding, by blocking outlets to lakes and roadway culverts. Insufficient culvert design and maintenance have flooded local roadways, which has closed roads and flooded adjacent properties.

The Nisqually Basin planning area is primarily rural and does not have many constructed drainage facilities aside from ditches and culverts associated with roads. Culverts and bridges have been constructed throughout the Basin at driveway, road, and highway crossings. The Nisqually mainstem contains several levee systems, near the Mount Rainier National Park entrance, near Elbe, and in the Nisqually National Wildlife Refuge.

New mainstem flooding problems could arise due to (1) filling within the floodplain without providing compensatory volume or (2) building below the maximum flood elevation. Overtopping or failure of the existing County-maintained levee on the Upper Nisqually River near the National Park entrance could expose nearby structures to flood damage. Climate change could lead to lower freezing elevations during the late fall and winter, resulting in more winter rain (instead of snow). This could increase the risk of flooding due to late fall/early winter rain or rain-on-snow events. Channel migration could also lead to future flooding problems on the mainstem.

Although most of the basin will remain rural, current zoning and community plans allow for small areas of more intense development in vicinity of Roy, Eatonville, and the Upper Nisqually communities of Elbe, Ashford, and Park Entrance. Localized flooding and stream channel erosion could occur in these areas. . However, new development would be subject to County site development and critical areas regulations. These regulations are intended to minimize the risk of flooding and stream channel erosion.

Other potential causes of future stormwater and tributary flooding problems include:

- Beavers dams blocking culverts and channels.
- Invasive weeds reducing ditch and stream channel capacities.
- Debris accumulations in roadside ditches, culverts, and lake outlet channels.

### ***Water Quality***

In the Nisqually Basin planning area, the most common water quality problems are bacterial pollution, which is indicated by high fecal coliform levels, and high nutrient (particularly phosphorus) levels in lakes. Turbidity is reportedly a problem in a number of lakes as well as in the Lower Nisqually River. The water quality problems in the Nisqually Basin planning area are described in Chapter 7.

High fecal coliform levels may indicate a health risk to people who ingest it or contact contaminated water through recreational uses (swimming and boating). High levels of phosphorus can lead to algal blooms and accelerated eutrophication of a lake system. High levels of suspended sediments can harm aquatic organisms, transport pollution, decrease drainage capacity, and increase water turbidity.

Sources of bacteria and phosphorus include failing septic systems, dairies, hobby farms, and stormwater runoff. Septic-system failures are a common problem in the Nisqually Basin planning area. Stormwater runoff may contribute to water quality problems from developed areas at Eatonville, growth anticipated in the Upper Nisqually Valley, and development around lakes. Sources of suspended sediments include shoreline construction, logging (and logging roads), and off-road vehicle use.

Ecology has prepared a list of water bodies that have not met state water quality standards, in response to the federal Clean Water Act. The listed water bodies within the Nisqually Basin planning area include the Mashel River, Nisqually River (lower reaches), Ohop Creek, Red Salmon Creek, Clear Lake, Harts Lake, and Ohop Lake (see *Table 4-20*). Ecology must develop a total maximum daily load (TMDL) for each “listed” water body that can’t meet the water quality standards through technology-based controls.. The TMDL is the maximum amount of the pollutant that can be discharged into the water body without violating the standard. TMDLs are implemented through NPDES permits and “Best Management Practices”. Ecology recently established TMDLs for fecal coliform bacteria in Ohop Creek, Lynch Creek (a tributary to Ohop Creek), and Red Salmon Creek.

The Upper Nisqually River mainstem appears to be in good condition and meets water quality standards. In the marine waters near the mouth of the Nisqually River (Nisqually Reach), the Washington State Department of Health previously had closed the Nisqually Reach adjacent to the mouth of the Nisqually River and McAllister Creek to harvesting of shellfish because of high fecal coliform levels.

### ***Significant Impacts and Mitigation Measures***

#### **“Proposed Action” (Basin Plan)**

The “Proposed Action” recommends a series of CIP projects and programmatic measures to address specific water resource problems identified in the Nisqually River, its tributaries, and area lakes. The proposed Basin Plan would improve water quality and reduce flooding problems in the Nisqually Basin planning area, at a higher level than the “No Action” Alternative. Improved water quality and floodplain restoration also would result in positive benefits for fishery resources, plant and animal habitat, scenery, and recreation.

The Basin Plan includes twelve culvert replacement projects and that would address flooding and drainage problems. Replacing culverts would reduce localized flooding of roadways and adjacent properties. Most of these proposed CIP improvements are site-specific in nature, and are designed to deal with existing localized flooding issues. Some of the culvert replacement projects also would improve fish passage, as discussed under Fisheries Resources below.

The Basin Plan also includes sixteen property acquisition projects and nine habitat restoration projects. In addition, the Basin Plan prescribes several studies that would improve understanding of flood frequencies and flood hazard areas near McKenna and Wilcox Flats along the Nisqually mainstem and improve emergency response in those areas. The study results are intended to support development of more accurate floodplain maps and flood hazard mitigation measures, such as buy-outs or elevating flood-prone structures.

The acquisition and restoration projects would preserve and enhance riparian areas and floodplains that provide natural storage of floodwaters. Maintaining and enhancing natural storage of floodwaters would reduce flooding, and would not require new man-made, flood-control structures.

CIP projects to preserve and restore riparian areas would improve water quality because healthy riparian vegetation can moderate stream temperatures, control erosion, and filter runoff. Acquiring property may reduce future degradation of water quality. Most of the acquisition and restoration projects also would protect and enhance habitat for fish, plants, and animals, as described in the sections on Fisheries and Plants and Animals below.

In addition to the CIP projects, the Basin Plan includes programmatic measures to address stormwater runoff from future residential development, which could increase flooding and water quality problems. Implementation of a Low Impact Development (LID) Program would promote

the use of LID in new development and redevelopment. The LID Program would focus on lakeshore areas where much of the new development is likely to be concentrated. In addition, potential stormwater impacts from future development would be addressed by adopting updated stormwater management standards.

Several programmatic measures would provide education, outreach, and technical and financial assistance with landowners, students, government agencies, and community groups in the Nisqually Basin. These programs would increase public awareness of water resource issues in the Basin, and would persuade the public to voluntarily implement water quality and habitat improvements. Public education and outreach programs likely would result in a net benefit on surface water quality and habitat, depending upon the success of various education programs (Ecology, 2003).

Other programs would increase inspection and maintenance activities related to water resources. One program would prioritize the inspection of septic systems, which would reduce failures of septic tanks that are a source of fecal coliform bacteria in Basin receiving waters. Another program would increase the inspection of existing and future stormwater facilities, to confirm regular maintenance and compliance with current regulations. Development of a BMP Manual for Pierce County maintenance activities would include practices and techniques that protect water quality and aquatic habitat while preserving the flood control functions of stormwater facilities. To maintain culverts, Pierce County would cooperate with the Washington State Department of Fish and Wildlife (WDFW) to clear culverts and other blockages caused by beaver activity.

The Basin Plan includes several programmatic measures to improve the overall management of water resources in the Nisqually Basin. Pierce County would develop and implement a program for land acquisition and management for floodplain, water quality, and habitat protection. One program would enhance degraded riparian habitat and water quality, and would form partnerships with volunteer groups and other organizations such as the Pierce Conservation District, Nisqually River Council, Nisqually Indian Tribe, lake homeowners associations, and Pierce Stream Team. A program to implement elements of a total maximum daily load (TMDL) for fecal coliform bacteria in Nisqually tributaries could result in a more rapid improvement in water quality. Water quality issues at the various lakes in the basin would be addressed by a lake management program. Monitoring programs for surface water and for fish and wildlife habitat would assess the conditions and monitor the effectiveness of various Pierce County projects and programs.

Although the Basin Plan would improve the overall water resources in the Nisqually Basin, individual projects have the potential for site-specific impacts, particularly those constructed within or adjacent to the streams, lakes, or wetlands. Site preparation and construction activities could result in short-term impacts from erosion, temporarily reducing water quality. Measures to minimize construction-related impacts for individual projects would include temporary erosion and sediment control (TESC) measures and related “Best Management Practices” (BMPs) to

reduce erosion and sedimentation. Standard erosion control measures such as silt fencing, coverage of exposed earth, and permanent seeding of disturbed areas following construction, would further reduce temporary sediment and water quality impacts. Construction work adjacent to or within streams would be limited to low-flow periods, typically the summertime. The standard requirements for control of erosion and other construction-related pollutants, such as fuels and lubricants, would assure that the construction impacts on water resources would be short term and not significant. Impacts on water quality during construction would be minor if appropriate erosion-control BMPs would be properly implemented.

The design and construction of each project would be required to meet Pierce County construction and erosion control requirements, as well as applicable state and federal requirements. Potential reviews, approvals, and permits for individual projects could include environmental review (SEPA, NEPA), Shoreline Management Act compliance, Critical Areas compliance, ESA assessment, NPDES compliance, water quality (Army Corps of Engineers 404 Permit and Ecology 401 Certification), and Hydraulic Project Approval (HPA).

Overall, the projects and programs under the proposed Nisqually River Basin Plan are expected to cumulatively result in long-term benefits to the flooding, drainage, erosion, and water quality conditions within the Nisqually Basin. The types of projects under the Basin Plan would require minimal construction and minor structures, and would not result in long-term adverse impacts. All projects would include site-specific mitigation, comply with all applicable regulations, and obtain necessary permits and approvals. No significant adverse environmental impacts on water resources would occur under the “Proposed Action”.

The Basin Plan would meet the County’s updated goals and objectives for basin planning in *Table 10-2*. The Basin Plan would meet the goals to reduce flood hazards, improve water quality, and influence methods for new development. The Basin Plan also would be consistent with the new legal and policy requirements for Pierce County stormwater planning (see Section 10.3.8, Plans and Policies). The Basin Plan includes multiple projects and programmatic measures that would be consistent with the current requirements of the NPDES stormwater permit. The Basin Plan includes programmatic measures to implement a TMDL program in the Nisqually Basin. The projects and programs under the Basin Plan would reduce overall flood hazards, which would possibly improve the County’s flood ratings and make the area eligible for reduced flood insurance.

### **“No Action” Alternative**

Under the “No Action” Alternative, water resources and water quality would continue to be managed under the previous 1991 Plan and other current County programs. The 1991 Plan does not contain any remaining CIP projects to be constructed in the Nisqually Basin. County efforts would continue to focus on serious drainage complaints rather than assuming a more proactive, comprehensive approach for the Nisqually Basin. Few future site-specific projects and basin-wide programs to improve water resource conditions, if any, would likely be proposed for the Nisqually Basin. Any improvements to flooding and water quality would occur a lower level

compared to the “Proposed Action”. Periodic maintenance of ditches, culverts, and other County drainage facilities by County crews would continue. During construction of any individual projects, if any, the short-term impacts and mitigation measures would be similar to those discussed under the “Proposed Action”.

The “No Action” Alternative would not address most of the specific flooding and water quality problems identified in the Nisqually Basin. Many identified water quality and flooding problems in the Nisqually planning area would continue. As further development occurs, water resource problems are expected to intensify. “No Action” may continue to result in degradation of water quality. “No Action” also would not achieve many of the County’s updated goals and objectives for basin planning in *Table 10-2*. The “No Action” Alternative would not be consistent with many of the new laws, regulations, programs, and policy requirements for stormwater planning in Pierce County, which have developed since the 1991 Plan was issued (see Section 10.3.8, Plans and Policies).

### 10.3.2 Fishery Resources

This section summarizes the existing fisheries resources of the Nisqually Basin and evaluates potential impacts on fishery resources and aquatic habitat. The laws, regulations, plans, and policies concerning fishery resources and habitat are evaluated separately in Section 10.3.8, Plans and Policies.

#### ***Affected Environment***

The salmonid species present in the Nisqually River Watershed are Chinook salmon, coho salmon, chum salmon, pink salmon, cutthroat trout, and steelhead trout. Bull trout are no longer present in the freshwater portion of the Nisqually River Watershed; however, the Nisqually Estuary is believed to be a potential foraging, migration, and overwintering area for Puyallup River bull trout and bull trout from other core areas (USFWS, 2004). Non-native species such as bass and pumpkinseed are present in the Nisqually mainstem, and other non-natives such as bluegill, brook trout, catfish, kokanee, and yellow perch are present in lakes of tributaries or above LaGrande Dam, and are likely present in the mainstem Nisqually River. The fish species, stream conditions, and aquatic habitat in the Nisqually mainstem and tributaries are described in detail in Chapter 4. Known fish distributions within the Nisqually River Basin planning area are shown on *Figures 4-17 through 4-23*.

In Pierce County waters, the National Oceanographic and Atmospheric Administration, National Marine Fisheries Service (NOAA Fisheries) has listed the Puget Sound Evolutionary Significant Unit (ESU) Chinook salmon and Puget Sound Distinct Population Segment (DPS) steelhead as threatened, and the United States Fish and Wildlife Service (USFWS) has listed the Coastal-Puget Sound DPS bull trout as threatened under the Endangered Species Act (ESA). A species categorized as “endangered” is in danger of extinction. One listed as “threatened” is likely to become endangered within the foreseeable future.

NOAA Fisheries also has designated the marine nearshore of Puget Sound, portions of the mainstem Nisqually River, and portions of several tributaries including McAllister Creek, Lynch Creek, Powell Creek, Tanwax Creek, Twentyfive Mile Creek, Yelm Creek, Horn Creek, Ohop Creek, three unnamed tributaries, and the Mashel and Little Mashel Rivers, as designated Critical Habitat (70 Federal Register 170) for the Puget Sound ESU Chinook salmon. The USFWS has designated Critical Habitat for bull trout along the eastern nearshore areas of Puget Sound, which includes the areas around the mouth of the Nisqually River (70 Federal Register 185). Critical habitat has not yet been designated for steelhead at this time.

The Nisqually River mainstem is utilized extensively by multiple salmon species for spawning, rearing, and as a migration corridor. Much of the Nisqually mainstem is still in good condition, especially when compared to most other lowland Puget Sound rivers in urbanizing areas. Although the mainstem and its tributaries provide productive habitat, some aquatic habitat has been lost or impaired because of alterations that have occurred over the last century.

Major aquatic habitat alterations include loss of instream woody cover, channel modifications, loss of estuary habitat, reduced riparian (streamside) vegetation, fish passage barriers, impaired water quality, elevated stream temperatures, and altered peak and base flows in several tributaries. The major aquatic habitat problems and specific locations of habitat degradation are described in [Chapter 8](#).

Anadromous fish travel great distances during juvenile outmigration to estuarine and ocean feeding grounds and, as adults, during their return trip to their breeding grounds to spawn. Access to upstream salmonid habitat in several tributaries has been blocked completely or partially by culverts, irrigation diversions, and beaver dams. The Pierce Conservation District (PCD) in 2002 completed an inventory of culverts and identified a number of culverts that appeared to block or impede fish passage. These “problem” culverts and other obstructions to fish passage are described in [Chapter 5](#). These activities have impaired or eliminated access by anadromous fish to habitat that historically has been occupied by such fish.

Forest practices, agriculture, and rural residential development have altered the Nisqually River channel and banks, drained wetlands, and removed riparian vegetation. Development also has adversely affected water quality and flows as the result of stormwater runoff and erosion. Drainage projects have modified channels, hardened banks, and removed riparian vegetation. Degraded water quality, altered flows, and loss of riparian vegetation have adversely affect aquatic habitat and fishery resources. In addition, conversion of much of the Nisqually Estuary to diked agricultural land has altered salmon habitat. Although considered largely undisturbed, the Nisqually River Estuary has been reduced in size by approximately 30 percent as a result of modification by dikes (Glass and Salminen, 2002).

## ***Significant Impacts and Mitigation Measures***

### **“Proposed Action” (Basin Plan)**

The “Proposed Action” includes a series of proposed CIP projects and programmatic measures that would address fishery problems identified in the Nisqually River Basin planning area. The proposed Basin Plan would protect and restore fishery resources and aquatic habitat, at a higher level than the “No Action” Alternative. Fishery restoration and protection also would benefit riparian vegetation, wetlands, and wildlife.

The Basin Plan includes three CIP projects that would address existing fish passage problems in the Nisqually River Basin. The Basin Plan also includes twelve CIP projects that would replace culverts, some of which would improve fish passage. Improving passage would increase upstream habitat for anadromous fish and restore the habitat that had been historically occupied by such fish. Spawning, rearing, and migration areas would increase, although the magnitude would depend on the quality of the habitat available upstream. Fish passage restoration in combination with other stream improvement projects would likely result in a positive cumulative impact on fishery resources, provided that non-native fish species are not introduced into upstream populations (Ecology, 2003). All culverts replaced must meet the fish passage criteria as required by WDFW.

The Basin Plan includes nine habitat restoration projects that would improve fish habitat. Depending on location, these CIP projects would restore fish access, native vegetation, and the channel migration zone or original floodplain and riparian areas. Another project would remove the last remaining dikes on Nisqually Tribe’s estuary property, which would restore the Red Salmon Slough of the Nisqually Estuary.

In general, restoring streamside vegetation and floodplains tends to improve both aquatic and terrestrial habitat. Streamside vegetation provides riparian habitat for wildlife, shade for streams, bank stabilization, run-off filtration, and is a source of large-woody debris recruitment in streams. The restoration of natural stream channels tends to improve the abundance of pools and the sorting of spawning gravels.

Preservation and restoration values in the Nisqually mainstem are relatively high. Restoration would be expected to lead to substantial improvements, especially in salmon and trout abundance but also in the productivity and diversity of the populations. In addition, several tributaries (Ohop Creek and Mashel River) have the potential to sustain much larger salmon populations.

The Basin Plan would include sixteen CIP projects to acquire property in the Nisqually River Basin. Acquisition of property would protect aquatic and riparian habitats, preserve channel migration zones, reduce future degradation of water quality, and make areas available for future habitat restoration. Acquisition of property also would protect plant and animal habitat, open space, and scenic and recreational resources.

Although the CIP projects likely would result in an overall positive benefit on fishery resources, the construction of individual projects has the potential for short-term, adverse impacts, primarily from temporary erosion and sedimentation. Measures to minimize construction-related impacts for individual projects would include temporary erosion and sediment control (TESC) measures and related BMPs to reduce erosion and sedimentation. Impacts on fisheries during construction would be minor if appropriate erosion-control BMPs would be properly implemented. As discussed previously under Water Resources, the construction and design of each project would be required to meet Pierce County and state erosion control requirements, and all projects would be required to obtain any applicable federal, state, and local permits and approvals.

The proposed Basin Plan includes programmatic measures to enhance fisheries resources in the Nisqually River Basin. A program for “Salmon Carcass Nutrient Enhancement” would provide nutrients to juvenile salmon in key salmon streams, including but not limited to the mainstem Nisqually and Mashel River. Another program to “Develop and Implement a Fish and Wildlife Habitat Monitoring Program” would evaluate the effectiveness of aquatic and riparian habitat improvement projects in cooperation and coordination with other entities, such as the Nisqually Tribe.

Other programmatic measures would enhance riparian habitat and provide improvements to water quality, which would benefit fisheries resources. The water quality could be improved by programs that promote low-impact development (LID) techniques in future development projects, monitor surface water quality, manage water quality in lakes, update stormwater management standards, increase inspection and maintenance of stormwater facilities, and implement TMDL measures. Riparian habitat could be benefited by programs for land acquisition, riparian habitat enhancement, invasive species control, and vegetation management. Public education, outreach, and technical assistance programs likely would benefit surface water quality and habitat. Some programs would protect and enhance wetland and estuarine habitats.

Overall, the implementation of the multiple projects and programs in the Basin Plan would cumulatively result in long-term benefits for the fishery resources and aquatic habitat within the Nisqually River Basin. The types of projects under the Basin Plan would require minimal construction, minor disturbance of habitat, and minor structures, and would not result in long-term adverse impacts. All projects would include site-specific mitigation, comply with all applicable regulations, and obtain necessary federal, state, and local permits and approvals prior to construction. No significant adverse environmental impacts on fishery resources would occur under the “Proposed Action”.

### **Endangered Species Act**

The Nisqually River Basin planning area supports populations of Chinook salmon and steelhead, and has the potential to support populations of bull trout. All three of these salmonid species are listed as threatened under the Endangered Species Act (ESA). The proposed Basin Plan includes a number of projects and programmatic measures that are designed to protect or restore habitat and to improve water quality for listed and non-listed salmonids alike. Construction of

individual CIP projects, however, could affect threatened salmonids in the short term. Implementing the Basin Plan in combination with other habitat improvement efforts would likely have positive, cumulative impacts on the listed salmonid species in the Nisqually River Basin. The consistency of the Basin Plan with the Endangered Species Act is evaluated in Section 10.3.8, Plans and Policies.

### **“No Action” Alternative**

Under the “No Action” Alternative, stormwater would continue to be managed under the 1991 Plan and other current County surface water management activities. Few site-specific projects and basin-wide programs to improve fish habitat, if any, would likely be proposed for the Nisqually River Basin. Any improvements to fish habitat would occur at a lower level compared to the “Proposed Action”. If any projects were to occur, short-term impacts and mitigation measures associated during construction would be similar to those discussed under the “Proposed Action”.

The “No Action” Alternative would not address most of the specific fish habitat problems identified in the Nisqually River Basin. Problems associated with habitat and water quality would continue. “No Action” may result in continuing degradation to water quality and fish habitat, which would adversely affect fish and other aquatic species. “No Action” also would not achieve many of the County’s updated goals and objectives for fish habitat in *Table 10-2*. The “No Action” Alternative would not be consistent with many of the new laws, regulations, programs, and policy requirements for fisheries in Pierce County, which have developed since the 1991 Plan was issued (Section 10.3.8, Plans and Policies).

## **10.3.3 Plants and Animals**

### ***Affected Environment***

#### **Habitat**

The Nisqually River Basin has a mix of plant-and-animal habitats. The major habitats include wetlands, riparian, upland, near-shore, and forest lands. The streams and lakes provide habitat for a variety of fish, birds, shellfish, aquatic vegetation, and mammals. The habitats in most of the Nisqually River Basin planning area are undeveloped. Portions of the natural habitats have been altered in areas of logging and residential and agricultural development, particularly in the lower watershed. Habitat related to fish is discussed in the previous section.

#### **Wetlands**

Wetlands generally include swamps, marshes, bogs, and similar areas. Many of the freshwater wetlands are associated with ponds, lakes, rivers, and shorelines; while others can be “isolated” wetlands that are not directly connected to other surface water bodies. Wetlands are capable of performing a number of functions, including groundwater recharge and discharge, stormwater and floodwater detention, water quality improvement, erosion control, food chain support, and wildlife habitat and corridors (Ecology, 2003).

In the Nisqually River Basin planning area, most wetlands are located in the northwestern half of the Basin, in areas where lakes exist. Other wetlands are associated with the Nisqually River or its tributaries. *Figure 4-26* shows the wetlands in the Nisqually River Basin, and *Table 4-17* summarizes the wetland areas by subbasin.

Many wetlands have been altered by residential and agricultural development and by previous flood-control structures. In the Lower Nisqually River Watershed, wetlands have been drained and ditched to convert land to agriculture. Residential development has cleared some wetlands and encroached on wetland buffers. Stream channel and bank modifications have adversely affected wetlands, such as at the mouths of the creeks in the Nisqually River floodplain. Wetland alteration has directly and indirectly affected water quality, wildlife, and fishery resources. [Chapter 4](#) discusses the wetland alterations that have occurred within each Nisqually subbasin.

### **Riparian Habitat**

Riparian habitat occurs in areas adjacent to rivers, streams, seeps, and springs. Riparian habitat is an important transitional zone between aquatic and upland habitats. Suitable riparian habitat is essential for fish and aquatic wildlife, by providing shade and cooler water temperatures, stabilizing stream banks and reducing erosion, filtering sediments and pollutants, reducing peak flood flows, contributing food and nutrients, providing instream habitat through recruitment of large woody debris (LWD), and supplying overhanging cover. Riparian habitat also is important for land animals, by providing shelter, foraging habitat, nesting cavities, food for insect-eating birds, and shade for large animals such as deer and elk (Ecology, 2003).

Riparian habitat has been altered along the Nisqually River and in its floodplain. Many riparian forests have been cleared and are now either converted to non-forest areas or are in a recovery state dominated by younger hardwood stands. The clearing of streamside vegetation has directly affected riparian plant communities and associated wildlife, and affected water quality and fishery resources. The conditions of the riparian habitats within each Nisqually subbasin are described in [Chapter 4](#).

### **Upland Habitat**

Upland habitat in the Nisqually River Basin includes primarily coniferous and deciduous forestland, grassland (prairie), and landscaped areas associated with rural residential development. Development has disturbed many of the uplands in the lower Basin, leaving fragmented patches of forest land and grassland. Most of the conifer and deciduous forest in the lower Basin has been changed from its pre-European settlement condition by two to three timber harvests, and over the last century by conversion to agriculture and residential land uses.

### **Forest Land**

Much of the Upper Nisqually River Watershed is forest land. Forest land provides habitat for wildlife and plays an important role in the hydrological cycle. Forest lands in some areas of the Nisqually River Basin planning area have been developed into rural residential parcels,

particularly in the lower subbasins. Development of forestland has removed valuable plant and animal habitat and has adversely affected water quality. The estimated decreases in forested area within each Nisqually River subbasin are shown in *Table 4-14*.

Most commercial forest activities are regulated by the Washington State Department of Natural Resources (DNR), and are outside the scope of Pierce County Basin Plans. Conversion of forest land to residential or agricultural uses, however, is subject to Pierce County's SEPA review and development regulations (see [Chapter 2](#)). Past and foreseeable conversions of timberland have been identified and evaluated under the Basin Plan.

### **Near-Shore Habitat**

The Nisqually Reach is the near-shore area where the Nisqually River flows into Puget Sound. The Reach provides habitat for shellfish, including clams, oysters, geoducks, and mussels. Much of the Nisqually Estuary has been diked and converted to agricultural land. The Washington State Department of Health previously had closed the Nisqually Reach adjacent to the mouth of the Nisqually River and McAllister Creek to harvesting of shellfish, because of high fecal coliform bacteria levels. The Nisqually Reach shellfish harvesting areas are located primarily within Thurston County. The near-shore areas are important rearing areas for juvenile salmonids as they transition out of fresh water into salt water. Near-shore areas also provide holding/resting areas for adult salmonids prior to their upstream spawning migrations.

### **Vegetation**

The Nisqually River Basin supports several plant communities that include conifer, deciduous, and mixed conifer-deciduous forests, grassland (agriculture), and shrub land. Generally, the western portion contains a mix of pasture, farmfields, clear cuts, meadows, and mixed deciduous/coniferous forest, while the eastern portion contains a mix of forest types and ages (Pierce County, 1999). Overall, the Nisqually River Basin planning area is relatively undeveloped, and most of the native vegetation remains.

In areas developed for residential and commercial uses, vegetation includes non-native trees, shrubs, and grasses. Non-native and invasive plants have established themselves in the Nisqually River Basin as the result of land clearing for agriculture and development. Ground disturbance and sedimentation of streamside areas, especially in wetlands and lowland pastures, have led to an explosion of invasive plant species, including reed canarygrass, Scots broom, and Himalayan blackberry.

### **Wildlife**

Wildlife found in the Nisqually River Basin consists of native wildlife associated with the wetland, riparian, upland, near-shore, and forest habitats, and with the area's streams and lakes. Much of the Upper Nisqually River Watershed is relatively undeveloped and supports a greater diversity of native animals. In areas of residential and agricultural development, wildlife includes species that can tolerate or benefit from close association with humans and habitat fragmentation.

The Nisqually River Basin contains a variety of wildlife, including large and small mammals, amphibians, reptiles, bird species, and invertebrates. Much of the Upper Nisqually is undeveloped and supports the habitat required for large mammal species such as cougar, bobcat, bear, elk, and deer. The large tracts of land used for forestry, single-family residential, or left vacant contribute to a continuous habitat for species with a large home range (Pierce County, 1999). River otter, muskrat, and beaver can be found along the Nisqually River, and other animals such as shrews, voles, frogs, snakes, and birds can be found throughout the Basin. Fish, amphibians, waterfowl, birds of prey, and mammals, such as beaver and muskrat, depend on various types of wetlands for food, forage, nesting, and cover.

The Nisqually River Basin planning area contains documented raptor habitat and active nests, including bald eagle nesting areas. Lower portions of the Basin contain nesting and feeding habitat for seabirds and marine mammals. Riparian areas and wetlands provide nesting, migratory, and wintering areas for migratory bird species.

The Nisqually River Basin planning area includes several plant and animal species considered threatened or endangered by federal and state agencies. Besides the Chinook salmon, bull trout, and steelhead trout discussed under Fisheries, other species of concern include the bald eagle, spotted owl, water howellia, marbled murrelet, blue heron, pileated woodpecker, peregrine falcon, and western pond turtle. The state and federal endangered species and habitats are discussed in [Section 10.3.8, Plans and Policies](#).

### ***Significant Impacts and Mitigation Measures***

#### **“Proposed Action” (Basin Plan)**

The Basin Plan includes proposed CIP projects and programmatic measures to address habitat and water quality problems identified in the Nisqually River Basin, which would generally benefit plant and animal resources in the Nisqually River Basin. Several of the projects and programs would restore and protect plant and animal habitat, at a higher level than the “No Action” Alternative. Many of the habitat restoration projects and programs also would benefit fishery, scenic, and recreational resources.

The Basin Plan includes nine stream restoration projects, one vegetation control projects, and one revegetation project that would improve overall plant and animal habitat. Depending on location, these CIP projects would restore riparian habitat, native vegetation, wetlands, or the original floodplain. One project would remove the last remaining dikes on Nisqually Tribe’s estuary property, which would restore the Red Salmon Slough of the Nisqually Estuary. The overall long-term impacts on plants and animals are likely to be positive for the Nisqually River Basin.

In general, restoring riparian areas tends to improve aquatic, wetland, and terrestrial habitat. Restoration projects that revegetate stream banks would directly benefit riparian habitat for plants and animals. Floodplain enhancement would provide improved or additional wetlands,

riparian, and upland habitats. Riparian and upland plant communities are likely to benefit through increased native plant presence and diversity. The development of expanded riparian corridors also may provide migration corridors for terrestrial species (Ecology, 2003). In addition, projects to improve water quality also would benefit plant and animal species and diversity. Restoring riparian, estuaries, and wetland areas would benefit raptors, seabirds, and migratory waterfowl.

The Basin Plan would include sixteen CIP projects to acquire property in the Nisqually River Basin. Acquisition of property would protect riparian and wetland habitats, preserve the floodplain, reduce future degradation of water quality, and make areas available for future habitat restoration. Acquisition of property also would preserve fishery habitat, open space, and scenic and recreational resources.

The Basin Plan includes several programmatic measures to restore and enhance riparian, wetland, and estuarine habitat in the Nisqually River Basin. One measure would be to develop and implement a program to enhance degraded riparian habitat and water quality. Another measure would develop and implement a watershed vegetation management plan, which would restore and manage riparian vegetation in the Nisqually River Watershed. A shellfish protection program would protect shellfish resources, prevent degradation of shellfish growing areas, and protect and improve water quality. A fish and wildlife habitat monitoring program would evaluate the effectiveness of habitat improvement projects in the Nisqually River Basin. Other programmatic measures would enhance fishery habitat and improve water quality, which would benefit plant and animal resources.

The Basin Plan also would include programs to control invasive species. The potential programs could inventory the invasive plant problem, develop a guidance manual, and coordinate efforts with other agencies and volunteers. Removal of invasive plant species and restoration of native vegetation would provide a positive benefit for improved plant-species diversity and wildlife. Control of invasive species would enhance riparian, wetland, and upland habitats.

Although the overall impacts on plants and animals are likely to be positive for the Nisqually River Basin, construction of individual projects could alter vegetation and displace wildlife in the short term. Individual projects would undergo future environmental review, which could include an evaluation of plants and animals in the project area, determination of the amount of vegetation and wildlife habitat to be removed or altered, review under the Pierce County Critical Areas Ordinance, and recommendation of project-specific mitigation where required. Construction of individual projects would include BMPs, and may require minimizing the area of disturbance, restoring and revegetating disturbed areas with native plant species to the extent possible, and maintaining the areas replanted with native species until those species are well-established. As discussed previously under Water Resources, all projects would be required to obtain any applicable federal, state, and local permits and approvals. Construction work would avoid sensitive nesting and rearing periods, where possible, which would be determined during individual permitting.

Taken together, the various projects and programs under the Basin Plan would cumulatively result in long-term benefits to plant and animal habitat within the Nisqually River Basin. The Basin Plan would be consistent with the County goals and objectives for stormwater planning (*Table 10-2*) and with the new laws and policies related to habitat protection (Section 10.3.8, Plans and Policies, below). Individual projects would be relatively small and would not permanently convert large areas of natural habitat to developed areas. Potential short-term impacts during construction would be relatively minor, and would be mitigated with BMPs, revegetation, and other site-specific mitigation. All projects would be located, designed, and operated to comply with applicable regulations, and would obtain required permits prior to construction. No significant adverse environmental impacts on plants and animals would occur under the “Proposed Action”.

### **“No Action” Alternative**

Under the “No Action” Alternative, stormwater would continue to be managed under the 1991 Plan and other current County surface water management activities. Few site-specific projects and basin-wide programs to improve plant and animal habitat, if any, would be proposed for the Nisqually River Basin. Any improvements to plant and animal habitat would occur at a lower level compared to the “Proposed Action”. If any projects were to occur, construction impacts and mitigation measures would be similar to those discussed under the “Proposed Action”.

The “No Action” Alternative would not address most of the habitat problems identified in the Nisqually River Basin. Problems associated with habitat and water quality would continue. If projects or programs are not proposed in the Nisqually River Basin and the identified habitat problems remain, taking “No Action” may result in continued degradation of plant-and-animal habitat in the Watershed. “No Action” also would not achieve many of the County’s updated goals and objectives for habitat in *Table 10-2*. The “No Action” Alternative would not be consistent with many of the new laws, regulations, programs, and policy requirements for habitat protection in Pierce County, which have developed since the 1991 Plan was issued (Section 10.3.8, Plans and Policies).

## **10.3.4 Soils and Geology**

### ***Affected Environment***

Elevations in the Nisqually River Basin range from sea level to over 14,000 feet, although most of the Basin lies below 1,000 feet. Slopes range from relatively level in the valley floors to extremely steep in the eastern mountainous areas. The varied topographical landforms in the Nisqually River Basin are the product of volcanic activity, tectonic uplifting, glacial advances and retreats, and erosion by rivers and streams. The surficial geology of the Nisqually River Basin planning area is shown in *Figure 4-5*.

Glaciation has modified the landscape of the western portion of the Nisqually River Basin. Ice from the most recent episode of glaciation, known as the Vashon stage, retreated about 12,500 years ago. Glacial deposits resulting from the Vashon glaciation include advance outwash,

glacial till, and recessional outwash. Continental glacial ice did not cover large areas of the eastern Basin, where surface geology generally consists of sedimentary and volcanic formations (bedrock).

Pierce County has designated volcanic, landslide, seismic, and erosion hazard areas under its Critical Areas Ordinance (Title 18E). The Nisqually River Basin planning area includes landslide and erosion hazard areas, which often occur in areas with steep slopes. The planning area also has seismic hazards, which typically include alluvial or recessional outwash surficial geologic units. Volcanic hazards in the planning area occur along the river valleys leading from Mount Rainier.

Soil permeability influences the movement of water through and within the soil layers. Soils in the western portion of the Watershed are generally more permeable than those in the eastern portion. Because most of the planning area is undeveloped, the native soils have not been altered extensively. *Table 4-1* describes the four classes of hydrologic soil groups and *Figure 4-6* shows the hydrologic soil groups in the Nisqually River planning area.

### ***Significant Impacts and Mitigation Measures***

#### **“Proposed Action” (Basin Plan)**

The Basin Plan includes projects and programmatic measures to address flooding and water quality problems. Several of these projects and programs also would reduce soil erosion and sedimentation in the Nisqually River Basin. The overall projects and programs under the Basin Plan would address erosion problems at a higher level than the “No Action” Alternative.

CIP projects to preserve and restore riparian areas would control erosion. Revegetation and channel stabilization projects also would reduce erosion and sedimentation in streams. Several programmatic measures would address soil erosion, by enhancing riparian habitat, promoting low-impact development (LID) techniques, updating stormwater management standards, increasing inspection and maintenance of stormwater facilities, and providing public education.

Some individual projects could require limited excavation, filling, and/or grading activity. In general, the amounts of filling or grading would be relatively small, if any. Projects also could result in a relatively minor amount of additional impervious surfaces. The Basin Plan would rely on natural systems for stormwater control rather than new structures, which would minimize grading/filling activities and new impervious surfaces. In addition, some projects could be located in geological hazards regulated under the Pierce County Critical Areas Ordinance. Specific information on grading/filling, impervious surfaces, and geological hazards would be determined during project-level design and environmental review. All projects would comply with applicable regulations for grading and filling activities and critical areas, would obtain any necessary permits, and may include site-specific mitigation. The future projects are not anticipated to result in significant, adverse impacts on soil and geology in the long term.

In the short term, construction of individual projects would have the potential for temporary adverse impacts from erosion. Activities such as land clearing, excavation, grading, and filling could increase soil erosion, if uncontrolled, by removing protective vegetation, disaggregating the soil, and modifying slopes and drainage patterns. The magnitude of potential construction impacts would depend on the type and scale of the construction activities, the site-specific soils and any geological hazards, and the season during which the construction would occur (Ecology, 2003). Potential construction impacts and site-specific mitigation would be determined during environmental review and permitting of individual projects.

As mitigation measures during construction of individual projects, standard erosion control measures and “Best Management Practices” (BMPs) would be implemented to avoid serious erosion and sedimentation problems. Examples of typical BMPs could include installing filter fabric fences or hay bales, covering exposed soils, using temporary soil covers such as mulch, diverting stormwater with temporary berms, and using settling ponds or grass-lined swales to prevent sediment from moving into receiving waters. After construction, vegetation would be restored and stream banks would be stabilized. As discussed previously under Water Resources, the construction and design of each project would be required to meet Pierce County and state erosion control requirements, and all projects would be required to obtain any applicable federal, state, and local permits and approvals.

### **“No Action” Alternative**

Under the “No Action” Alternative, stormwater would continue to be managed under the previous 1991 Plan and other current County programs. Limited erosion control would continue in the Nisqually River Basin, but at a lower level compared to the “Proposed Action”. Few site-specific projects and basin-wide programs, if any, would likely be proposed for the Nisqually River Basin. If any projects were proposed, short-term impacts and mitigation measures associated during construction would be similar to those discussed under the “Proposed Action”.

## **10.3.5 Land and Shoreline Use**

Land and shoreline use in the Nisqually River Basin is guided primarily by Washington’s Growth Management Act (GMA), the Washington Shoreline Management Act (SMA), and the *Comprehensive Plan for Pierce County, Washington (County Comprehensive Plan)*. The GMA, SMA, and *County Comprehensive Plan* are described in Chapter 2 of the Basin Plan. Applicable land use regulations, plans, and policies are evaluated in Section 10.3.8, Plans and Policies, of this FSEIS.

### ***Affected Environment***

Land use and population density can affect surface water drainage/flooding, water quality, and fish and wildlife habitat. Undeveloped forested land allows for maximum infiltration of rainwater, has the least potential for causing water pollution, and provides natural habitat for native species. Highly developed areas (characterized by large areas of impervious surfaces) increase the surface runoff of stormwater that carries pollutants from the manmade surfaces.

Poor agricultural practices, such as improperly applied irrigation methods and feeding or watering livestock too close to a stream, can contribute to water quality and fishery problems.

Pierce County has experienced substantial population growth in previous years and is expected to support more growth over the next 30 years. The estimated 2000 population in the Nisqually River Basin planning area was 12,881, which is 1.8 percent of the County's total population. Assuming that the planning area will continue to capture at least 2 percent of the County's growth, the population residing in the planning area will be approximately 16,300 in 2010 and 18,000 in 2020. *Figure 4-3* shows a distribution of the population in the Nisqually River Basin planning area.

The Nisqually River Basin planning area is mostly undeveloped, while any developed areas are generally at rural densities. Urban development occurs at the Cities of Roy and Eatonville. Rural communities include Graham, Elk Plain, Kaposin, Thrift, Rocky Ridge, Alder, Elbe, Ashford, and Park Entrance (just outside Mount Rainier National Park). The major land uses are single-family residential, agriculture, forestry, open space, and recreation. The land uses in the planning area are described in [Chapter 4](#) and are shown in *Figure 4-1*.

The primary type of residential land use is single-family residential. Most residential development is located in the western half of the planning area (west of Eatonville), and along SR-706 approaching Mount Rainier National Park. The single-family developments range from houses on large lots (five+ acres) to cabins on small lots in recreational subdivisions. Many houses are owned by individuals who live outside the area and use them for summer and weekend recreation. Many of the existing small lot subdivisions throughout the valley will slowly transform from seasonal recreational properties to year-round residences (Pierce County, 1999).

Most of the western portion of the planning area is zoned for rural residential development. Rural residential zoning allows a base density of one dwelling per 5, 10, or 20 acres. The R10 and R20 zoning designations are intended to maintain rural character and open space, while allowing resource-based industries such as agriculture and forestry. *Figure 4-2* maps the zoning of the Nisqually River Basin planning area.

The eastern portion of the planning area is predominantly zoned as "Designated Forest Land," which mostly is privately owned land used for commercial timber activities. Designated forest lands can only have one dwelling unit per 80 acres. Forest lands owned by the State of Washington and U.S. Forest Service are managed for timber harvest and recreational use, and are not available for development.

Agricultural lands are scattered throughout the planning area, although most are located in the western portion. Agricultural uses operate as farms or ranches, or grassland pastures. In response to GMA requirements, Pierce County created a new designation for Agricultural Resource Lands, and applied it to prime farmlands in the County.

Pierce County has designated Urban Growth Areas (UGAs). UGAs are areas in which urban growth is encouraged, and where adequate public facilities exist or can be efficiently provided. The majority of the Nisqually River Basin planning area is located outside the UGAs. The limited UGAs are located around the cities of Roy and Eatonville.

The western portion of the Nisqually River Basin planning area (west of Eatonville) has experienced increasing development pressure. Large tracts also are being converted from commercial timber to rural residential, 20-acre parcels, such as between Ohop and Harts Lakes. Areas that were once forested will have reduced trees and native vegetation, more impervious areas, and may have pets, livestock, septic systems, and increased traffic—all possible pollutant sources. Some of these properties have direct access to lakes and wetlands. As the land is developed and forest cover is converted to impervious surface, stormwater drainage systems will be affected by the runoff and potential increased pollutant loading.

To evaluate the development-related stormwater impacts, future stormwater runoff has been modeled on adopted land uses in the *County Comprehensive Plan*. The modeling of hydrological conditions has been based on the future County land use and zoning designations and on anticipated growth. The hydrological modeling has been used to determine the type, size, and location of proposed stormwater facilities needed to support planned growth.

As a basin becomes developed, hydrologic characteristics are altered because of impervious surfaces and structures. Impervious surface area is often used as an indicator of the potential for drainage and water quality problems associated with stormwater runoff. One of the primary physical attributes used for a hydrologic model is the Effective Impervious Area (EIA). The existing and future EIAs for the Nisqually River Basin planning area have been computed based on land use and zoning designations. The existing EIA percentages are relatively low in the Nisqually River Basin planning area. Only five of the 23 subbasins are projected to experience EIA increases of more than 1%. *Table 4-12* shows the existing and future EIAs for each subbasin.

### ***Significant Impacts and Mitigation Measures***

#### **“Proposed Action” (Basin Plan)**

The proposed Basin Plan would address many of the identified flooding, drainage, and water quality problems in the Nisqually River Basin, which would result in long-term benefits on associated land and shoreline uses. The Basin Plan would reduce flooding of land uses and destruction of property and structures. The improvements to flooding, drainage, and water quality problems are evaluated in Section 10.3.1, Water Resources and Water Quality, above.

The proposed projects and programs are not anticipated to result in changes to existing and planned land uses in the Nisqually River Basin planning area. The Basin Plan would not encourage any new growth or development in addition to planned uses in the *County*

*Comprehensive Plan.* The Basin Plan also would not substantially affect farming or timber operations that could induce conversion of agricultural or resource lands to other land uses.

Rather than encouraging new growth, the Basin Plan would support existing and planned land uses by providing stormwater facilities and services. By better accommodating planned growth under the *County Comprehensive Plan*, the Basin Plan would result in a greater reduction in development-related stormwater impacts than the “No Action” Alternative. The Basin Plan has used planned land use/zoning to model future hydrological conditions. The Basin Plan would be internally consistent with the *County Comprehensive Plan*, as required under the GMA (see Section 10.3.8, Plans and Policies).

The Basin Plan includes projects and programmatic measure to acquire property in the Nisqually River Basin. The identified projects would not result in displacement of residences or businesses. Few individual projects, if any, would require demolition of existing structures. Any future land acquisition program would purchase property from willing sellers. Potential mitigation measures would include soliciting public input to the planning process from landowners, and providing sufficient advance notice to potentially affected property owners. Property owners would be compensated at fair market value for any property that may need to be acquired.

Because the Basin Plan does not proposed major new stormwater or flood storage structures, existing land uses would not be inundated by water. Instead, the Basin Plan would rely on natural systems that would minimize impacts on land uses. Adjacent land uses would not be substantially affected by the operation of proposed stormwater projects.

The location, design, construction, and operation of future projects would be consistent with the site-specific land use, zoning, and development regulations and policies. Projects located within a regulated shoreline also would be consistent with the policies and regulations of the County’s Shoreline Master Program. Individual CIP projects could require future land use permits and approvals, and site-specific mitigation measures. Shoreline, zoning, and other land use reviews would occur when individual projects are proposed.

During construction, adjacent land uses could be temporarily affected by dust, runoff, noise, disruption of services, and construction equipment. Future projects would include site-specific mitigation to minimize potential construction impacts on adjacent land uses, which would be determined during environmental and zoning review of individual projects.

No unavoidable significant adverse impacts or cumulative impacts on land and shoreline uses are expected under the projects and programs of the Basin Plan. The Basin Plan would be consistent with the *County Comprehensive Plan* and its land use and stormwater policies. The consistency with applicable plans and policies is evaluated in detail in Section 10.3.8, Plans and Policies.

### **“No Action” Alternative**

The “No Action” Alternative has been developed from the 1991 Plan and is a continuation of the existing County programs. The “No Action” Alternative would not address most of the identified problems concerning flooding and destruction of property. Many identified drainage and flooding problems in the Nisqually River Basin would continue. Development-related stormwater impacts from planned growth would be addressed by existing regulations, which would not adequately address future development-related stormwater impacts from planned land uses. The “No Action” Alternative may be inconsistent with the *County Comprehensive Plan*, as evaluated in Section 10.3.8, Plans and Policies. Future projects, if any, would comply with site-specific land and shoreline regulations, and would obtain all applicable permits.

## **10.3.6 Public Services and Utilities**

### ***Affected Environment***

The Nisqually River Basin planning area has public services and utilities typical of a rural area. Depending on location, existing services and utilities include fire and police protection, schools, libraries, healthcare, electricity, refuse service, telephone, cable, and water and sewer (either on-site or community). The urban areas in the Nisqually River Basin planning area generally have more available services than rural areas. Water is supplied mostly by individual on-site wells and smaller community water systems. Eatonville draws its drinking water from the Mashel River.

The western portion of the Nisqually River Basin planning area is connected to the Pierce County sanitary sewer system, and is within the Tacoma Treatment Plant Sewer Service Planning Area. The eastern portion is largely unsewered, however, and the septic systems contribute to water quality concerns (see Section 10.3.1, Water Resources and Water Quality).

Septic system failures are a common problem in the Nisqually River Basin planning area because many of the rural houses were originally built as part-time residences. In recent years, many residences have been converted to full-time residences. In particular, septic systems serving shoreline houses may provide inadequate treatment if the water table is high or if they are too close to the surface water body. Lack of maintenance can also lead to inadequate treatment.

The Nisqually River Basin planning area is primarily rural and has few constructed drainage facilities. Stormwater facilities are constructed and maintained by Pierce County Surface Water Management. Culverts and ditches within County road rights-of-way are maintained by the Transportation Services Division of Public Works and Utilities.

Roadways are frequently flooded because of flooding and drainage problems. Flooding has closed roads, which can reduce access for emergency vehicles and disrupt services and utilities. A total of 60 roadway flooding problems have been identified in the planning area (see Chapters 4 and 5). Most of these are located in the Murray Creek, upper Tanwax Creek, Brighton Creek,

Horn Creek, upper Ohop, and Kreger Creek subbasins. Beavers are frequently a cause of roadway flooding because they often build inside culverts to create blockages.

Numerous parks and recreational areas are within the Nisqually River Basin. Most of these facilities are built to attract visitors on a regional, state, or national basis. The major recreational areas are Alder Lake Park, Elbe Hills and Tahoma State Forests, Mount Tahoma Ski Trails, Mt. Baker Snoqualmie National Forest, and Mt. Rainier National Park. The Nisqually River itself is an important recreational area for fishing, boating, swimming, sightseeing, and other water-orientated activities. Other recreational areas are the numerous lakes in the planning area.

### ***Significant Impacts and Mitigation Measures***

#### **“Proposed Action” (Basin Plan)**

The projects and programs of the Basin Plan would not result in a significant increase in the long-term need for public services and utilities. Implementation of the Basin Plan would affect the services provided by Pierce County Surface Water Management, which provides drainage utility services. The Basin Plan would have no adverse impacts upon solid waste collection, schools, libraries, landfills, electrical power, natural gas, or telecommunications facilities. Significant adverse impacts on public services and utilities are not expected in the long term under the “Proposed Action”.

The “Proposed Action” recommends a series of CIP projects and programmatic measures to reduce flooding and property destruction, which generally would improve public safety and reduce the need for public services and utilities. Replacing culverts would reduce localized flooding of roadways and adjacent properties. The acquisition and restoration projects would reduce specific flooding problems, and would preserve and enhance floodplains that provide natural storage of floodwaters.

Programmatic measures would increase inspection and maintenance activities of stormwater facilities such as culverts and ditches. One program would prioritize the inspection of septic systems, which would reduce failures of septic tanks that are a source of fecal coliform bacteria in Basin receiving waters.

The projects and programs to improve water quality, habitat, and fisheries also would increase recreational opportunities in the Nisqually River Basin.

Construction of some of the CIP projects could have short-term impacts upon public safety and utilities. Construction activities may temporarily affect roadways, delay emergency vehicles, and disrupt local services and utilities. Replacement or repair of culverts under roadways could disrupt traffic and access. Potential impacts during construction would be short term and site specific, and would be determined when individual projects are proposed. Pierce County would coordinate site-specific mitigation measures with local service providers and utilities to avoid or reduce disruptions during construction. Access for emergency vehicles would be maintained at

all times during construction. Potential construction impacts and mitigation would be evaluated during future environmental review of individual projects.

### **“No Action” Alternative**

Under the “No Action” Alternative, stormwater and flooding would continue to be managed under the previous 1991 Plan and other current County programs. Few, if any, projects would be proposed in the Nisqually River Basin planning area under “No Action”. Limited improvements under “No Action” could reduce some of the existing flooding of roadways and properties. Many of identified roadway flooding problems in the Nisqually River Basin planning area would continue. The “No Action” Alternative would provide a lower level of stormwater-related benefits to public services and utilities, compared to the “Proposed Action”.

Similar to the “Proposed Action”, potential projects would not result in a substantial increase in the long-term need for public services and utilities, but could result in temporary construction impacts. Any projects would undergo future environmental review and include site-specific mitigation, and would be designed, constructed, and operated to avoid or reduce potential impacts on services and utilities.

## **10.3.7 Historic and Cultural Resources**

### ***Affected Environment***

Historic and cultural resources can include archaeological, historic, and traditional cultural places such as buildings, structures, sites, districts, objects, and landscapes. Several historic and cultural resources exist in the Nisqually River Basin planning area. The Nisqually River Basin includes properties that are listed on, or proposed for, national, state, and local preservation registers.

The Nisqually River Basin planning area also has potential for Native American artifacts. More site-specific information on the potential to encounter historic, cultural, or archaeological resources would be assessed when individual projects are proposed and undergo future SEPA and environmental review.

Several state and local data bases identify historic properties and cultural resources. The Washington State Department of Archaeology and Historic Preservation (DAHP) provides an on-line database of the historic and archaeological sites that are listed on the state and national registers. The DAHP has identified resources within the Nisqually River Basin planning area that are listed on the National Register of Historic Places and the Washington Heritage Register (DAHP, 2008). The Pierce County Register of Historic Places and the Pierce County Cultural Resources Inventory also identified resources within the Nisqually River Basin planning area.

In addition, the Nisqually River and its tributaries are an important cultural resource for the Nisqually Tribe. The salmon of the Nisqually River have been the mainstay of their diet, and are the foundation of their culture as well.

## ***Significant Impacts and Mitigation Measures***

### **“Proposed Action” (Basin Plan)**

The Basin Plan is not anticipated to result in any significant, long-term adverse impacts on historic and cultural resources. Individual CIP projects could have the potential to encounter historic or cultural resources, if present. Prior to construction of individual projects, the County would assess the potential for disturbance of cultural, archaeological, or historic sites. Future CIP projects would be located and designed, where possible, to avoid any identified historic or cultural resources. If a project were to potentially affect a historic or cultural resource, Pierce County would evaluate potential impacts and coordinate the project design and mitigation measures with the appropriate local, state, and tribal officials when the individual project is proposed. Pierce County would conduct site surveys, evaluate potential impacts and mitigation, and coordinate with appropriate tribes and agencies during future environmental review of individual projects.

Archaeological resources, particularly those located along streams, can be affected by erosion, channel migration, and extreme flow variations. The “Proposed Action” includes projects and programmatic measures to control stormwater, reduce erosion, and restore stream channels and floodplains, at a higher level than the “No Action” Alternative. Reduced erosion and restoration generally would be a benefit to historic and cultural resources.

The Basin Plan also would protect and restore fishery resources that are an important cultural resource for the Nisqually Tribe. The potential impacts and benefits on fisheries of the Basin Plan are evaluated in Section 10.3.2, Fishery Resources.

The potential exists to encounter archaeological or cultural resources during construction of individual projects. If any cultural resources were discovered during excavation, Pierce County would immediately consult with the state and local historic preservation offices and with affected tribes regarding site-specific mitigation. Potential mitigation measures could include redesigning the project, data recovery, and site monitoring. Potential construction impacts would be evaluated during future environmental review of individual projects, and are not anticipated to be significant.

### **“No Action” Alternative**

Under the “No Action” Alternative, stormwater would continue to be managed in the Nisqually River Basin planning area as it is today. Limited erosion control and fishery restoration, if any, would continue under “No Action”, but at a lower level of cultural benefits than the “Proposed Action”. Few, if any, projects would be proposed in the Nisqually River Basin planning area under “No Action”. If future projects were proposed, projects would be located and designed to avoid identified historic or cultural resources, and any potential impacts and mitigation would be coordinated with the appropriate local, state, and tribal officials.

### 10.3.8 Plans and Policies

Numerous federal, state, and local regulations, laws, plans, policies, and programs may affect stormwater, water quality, and habitat in unincorporated Pierce County. Under SEPA, the review of a nonproject proposal should include a consideration of existing regulations, plans, and policies. This section evaluates the various laws and policies that are related to stormwater planning in the Nisqually River Basin planning area. This evaluation represents the requirements applicable to stormwater planning, and is not intended to be an exhaustive list.

The major federal, state, and Pierce County requirements pertinent to the Nisqually River Basin Plan are described in [Chapter 2](#). It should be noted that laws, regulations, and programs are subject to change over time. The evaluations in this section are based on those in effect at the publication of this Basin Plan and SEIS.

The original *1991 Stormwater Drainage and Surface Water Management Plan* (1991 Plan) was prepared in response to the legal and policy requirements existing at that time. Since the EIS for the 1991 Plan was issued, many of the laws and policies have changed. Pierce County has developed the Nisqually River Basin Plan to meet the updated laws and policies for stormwater planning.

#### ***NPDES Stormwater Permit***

Under the federal “Clean Water Act,” municipal stormwater discharges are subject to federal regulations under the *National Pollutant Discharge Elimination System* (NPDES) permit program. An NPDES Municipal Stormwater General Permit is required for larger municipalities with separate storm sewer systems that discharge to surface waters. In response to NPDES requirements, Pierce County adopted its Stormwater Management Program (SWMP) in 1998. Ecology reissued the NPDES permit in January 2007. The current NPDES Permit and the County’s SWMP are described in [Chapter 2](#).

The Nisqually River Basin Plan includes multiple projects and programmatic measures that would be consistent with the current requirements of the NPDES stormwater permit and Pierce County SWMP. The Basin Plan recommends solutions to both site-specific and basin-wide stormwater problems. In comparison, the “No Action” Alternative would not propose multiple projects and programs to address stormwater and water quality issues in the Nisqually Basin.

Under the Basin Plan, Pierce County would adopt the updated stormwater management standards in the *2005 Stormwater Management Manual for Western Washington*. Adoption of either Ecology’s manual or an equivalent manual is required for all municipalities covered under the current (January 2007) NPDES Municipal Stormwater Permit.

One programmatic measure would increase the inspection of public and private stormwater facilities to ensure compliance with current stormwater regulations, including NPDES

requirements. Another program would develop a maintenance manual containing BMPs for Pierce County's stormwater management facilities. The BMP Manual would be designed to achieve compliance with the Pierce County's NPDES permit.

### ***Section 303(d) List and Total Maximum Daily Loads***

Section 303(d) of the "Clean Water Act" (CWA) requires Ecology to prepare a list of water bodies that are not meeting, or will not meet, water quality standards.

If a water body is not in compliance with standards for a particular pollutant and implementation of technology-based approaches are insufficient, the CWA requires that a *Total Maximum Daily Load* (TMDL) of the pollutant be calculated. The TMDL is the maximum amount of the pollutant that can be discharged to the water body without violating the water quality standard for the pollutant. TMDLs are implemented through NPDES permits and "Best Management Practices". Section 303(d) requirements and TMDLs are described in Chapter 2.

Under Section 303(d), Ecology has listed the Mashel River, Nisqually River (lower reaches), Ohop Creek, Red Salmon Creek, Clear Lake, Harts Lake, and Ohop Lake (see *Table 4-20*). Ecology recently established TMDLs for fecal coliform bacteria in Ohop Creek, Lynch Creek (a tributary to Ohop Creek), and Red Salmon Creek.

The Nisqually River Basin Plan includes programmatic measures to implement a TMDL program in the Nisqually Basin. One program would develop a TMDL for fecal coliform bacteria. Another program would monitor surface water quality in key streams and lakes in the Nisqually Basin, including water bodies with pending TMDLs or TMDL implementation plans.

Overall, the projects and programs in the Basin Plan would improve discharges into water bodies with established or pending TMDLs, which would cumulatively improve water quality. In the long term, the number of impaired (303d listed) water bodies would be reduced in the County. In comparison, the "No Action" Alternative would result in few, if any, projects and programs that would address water quality problems.

### ***National Flood Insurance Program***

The National Flood Insurance Program (NFIP) makes available affordable flood insurance to communities that adopt approved floodplain management regulations that meet or exceed Federal Emergency Management Agency (FEMA) standards.

The FEMA process includes a Community Rating System (CRS) that offers reduced insurance rates in areas where flood protection measures are implemented. Under the CRS program, Pierce County was the first county in the nation to earn a "Class 5" rating, and currently holds a "Class 3" rating. The NFIP and CRS program are described in Chapter 2.

The Nisqually River Basin Plan includes projects and programs that would reduce flood hazards in the Nisqually Basin. Projects to replace culverts would reduce localized flooding of roadways and adjacent properties. Recommended studies would improve emergency response and support development of measures to reduce specific flooding problems in the areas of McKenna and Wilcox Flats along the Nisqually mainstem. The proposed acquisition and restoration projects would preserve and enhance riparian areas and floodplains that provide natural storage of floodwaters.

The projects and programs under the Basin Plan would reduce overall flood hazards, which would possibly improve the County's CRS rating and make the area eligible for reduced flood insurance. To help meet the prerequisites for a better rating, the Basin Plan has been developed to be consistent with the CRS process to obtain a better rating.

In comparison, the "No Action" Alternative would result in few, if any, projects and programs that would address flooding problems. The "No Action" Alternative would not likely improve the County's CRS rating.

### ***Regional Watershed Planning***

Several regional planning processes are related to basin planning in Pierce County. These various plans include the *Puget Sound Water Quality Management Plan*, *2003 Nisqually Watershed Management Plan*, and *1987 Nisqually River Management Plan* (see [Chapter 2](#)). Pierce County generally has considered these plans and supporting information when developing the proposed Basin Plan.

The *Puget Sound Water Quality Management Plan*, developed in 1991 and amended in 2000, requires all cities and counties in the Puget Sound basin to adopt stormSurface Water Management that include minimum requirements for new development and redevelopment. These minimum requirements are listed in Ecology's *2005 Stormwater Management Manual for Western Washington*. The proposed Basin Plan would adopt the updated stormwater management standards in the *2005 Stormwater Management Manual for Western Washington*, and therefore would be consistent with the *Puget Sound Water Quality Management Plan*.

The 1998 "Watershed Management Act" provides the framework for locally-based watershed planning. Under the Act, the Nisqually River Watershed has been designated as *Watershed Resource Inventory Area (WRIA) 11*. The *2003 Nisqually Watershed Management Plan* has a broad focus for entire Nisqually Watershed within Pierce, Thurston, and Lewis Counties. The *2003 Nisqually Watershed Management Plan* collected a great deal of hydrologic, land use, water quality, and habitat information that facilitated preparation of this Basin Plan. The recommendations contained in the *2003 Nisqually Watershed Management Plan* also have been considered during development of the Nisqually River Basin Plan.

In Substitute House Bill (SHB) 323, the Legislature directed Ecology in 1985 to create a comprehensive management plan for the Nisqually River. A Task Force created the *1987 Nisqually River Management Plan (1987 NRMP)*, which now is coordinated by the Nisqually River Council. The *1987 NRMP* recommends policies and guidelines but does not identify specific projects or methods for their implementation. Because Pierce County has adopted or endorsed the *1987 NRMP* for those policies that affect County planning, the *1987 NRMP* must be considered during the Pierce County basin planning process. The projects and programs within the proposed Basin Plan are consistent with the policies in the *1987 NRMP*. One proposed measure in the Basin Plan is to provide funding for staff support at the Nisqually River Council.

### ***Endangered Species Act***

The federal *Endangered Species Act (ESA)* directs the U.S. Fish and Wildlife Service (USFWS) and the National Oceanic and Atmospheric Administration (NOAA) Fisheries to promulgate a list of endangered and threatened species and to designate critical habitat for these species. The ESA also regulates the “take” of a listed species, which can include any act that kills, “harms,” or injures a species and may include habitat modification. Federally-related projects that would likely affect an ESA-listed species, such as County actions requiring a federal permit or receiving federal funding, may require consultation with USFWS or NOAA Fisheries. The ESA process is described in [Chapter 2](#).

In addition to the federal ESA listings, several Washington state agencies maintain lists of rare or endangered plants and animal species and habitat. The Washington Department of Fish and Wildlife (WDFW) publishes a *Priority Habitats and Species (PHS)* list and a *Species of Concern (SOC)* list. The PHS List is a catalog of habitats and species considered to be priorities for conservation and management. The SOC List includes all state-listed endangered, threatened, sensitive, and candidate species, as well as federally ESA-listed fish stocks. The Washington Department of Natural Resources (DNR) also lists rare plants and endangered ecosystems under the *Natural Heritage Program*. These state listings are used by local and state agencies for processing “Forest Practice Applications and Hydraulic Project Approvals,” reviewing proposals under SEPA, protecting critical areas under the GMA, and other conservation planning.

Pierce County has several federal ESA-listed species that have the potential to affect surface water management. The Nisqually Basin supports populations of Chinook salmon and steelhead, and has the potential to support populations of bull trout. For these listed fish species, the ESA requires NOAA Fisheries to develop and implement recovery plans for their conservation and survival. Federal recovery plans in draft or final versions are available for the Puget Sound ESU Chinook salmon and Coastal-Puget Sound DPS bull trout. [Chapter 4](#) describes the fish populations in the Nisqually Basin planning area.

The proposed Basin Plan includes a number of projects and programmatic measures that are designed to protect or restore habitat and improve water quality for federal and state listed species. Implementing the Basin Plan in combination with other habitat improvement efforts

would likely have positive, cumulative impacts on the aquatic communities and improve habitat for federal and state listed species and for other native species in the Nisqually Basin.

In comparison, the “No Action” Alternative is based on continuing implementation of the 1991 Plan and other County programs, which would result in limited, if any, habitat restoration and protection for the Nisqually Basin. The 1991 Plan was adopted before the ESA listing of Chinook salmon, bull trout, and steelhead trout in the Puget Sound area.

The “No Action” Alternative would not address most of the identified water quality and habitat problems in the Nisqually Basin, and would not result in basin-specific habitat restoration projects and programs. Taking “No Action” to protect or improve water quality may result in degradation to fish and wildlife habitat through continued pollution of the water, and may, ultimately, exacerbate conditions for those aquatic species listed under endangered species legislation (Ecology, 2003).

Although the proposed Basin Plan would likely result in overall long-term benefits, individual projects could adversely affect federal and state listed species. Species could be affected in the short term by construction activities that could result in erosion or removal of vegetation. Pierce County would determine if listed species and habitats of concern are present during future environmental review and permitting of individual projects.

Proposed projects would be located and designed to avoid impacts on listed species and habitats, where possible, and would include BMPs to reduce construction impacts. Pierce County would coordinate individual projects under the Basin Plan with appropriate agencies and tribes that regulate endangered species, to identify site-specific mitigation measures and obtain required permits and approvals.

Under the “No Action” Alternative, future projects, if any, similarly would be located and designed to avoid impacts on ESA-listed species, would include required site-specific mitigation measures, and would be coordinated with resource agencies and tribes.

### ***Pierce County Comprehensive Plan and Zoning***

The *Pierce County Comprehensive Plan* is codified as Title 19A of the Pierce County Code. The Plan guides development and accommodates population growth for the next 20 years. It integrates citizen's ideas, concerns, and preferences into statements of how the County should be developed, what development regulations should accomplish, what facilities and services levels are needed, and how publicly funded improvements should support these objectives.

Under the land use in the Plan, and Pierce County zoning codes, the eastern portion of the Nisqually Basin planning area is zoned mostly for forest land and the western portion for rural residential development (see *Figures 4-1* and *4-2*). The majority of the Nisqually Basin planning area is located outside the Pierce County Urban Growth Areas (UGAs).

Under the Basin Plan, future capital projects would be located and designed to comply with site-specific land use and zoning policies, designations, and regulations. Individual projects would obtain applicable zoning permits and approvals at the time they are proposed. Similarly under the “No Action” Alternative, potential projects, if any, would be consistent with the County land use and zoning regulations and would obtain applicable permits.

The *Pierce County Comprehensive Plan* addresses stormwater, water quality, and habitat primarily in the Land Use Element (Chapter 19A.30), Environment and Critical Areas Element (Chapter 19A.60), and Utilities Element (Chapter 19A.90). The projects and programs in the proposed Basin Plan would be consistent with the policies and objectives in the Plan. In comparison, the few projects and programs under “No Action,” if any, would not help the County meet the goals and objectives concerning stormwater in the Plan. The key policies in the comprehensive plan are identified in Chapter 2.

### ***Pierce County Critical Areas Ordinance***

The *Growth Management Act* (GMA) requires Pierce County to designate critical areas and to adopt regulations to protect these areas. Pierce County’s Critical Areas Ordinance (Pierce County Code Title 18E) establishes development standards for sites that contain or are adjacent to identified critical areas. The Pierce County critical areas (or hazards) are wetland, landslide, erosion, seismic, volcanic, mine, aquifer recharge, fish and wildlife habitat, flood, marine shoreline critical salmon habitat, and oak and prairie areas (PCC section 18E.10.050). The proposed Basin Plan would not include any changes to the Pierce County Critical Areas Ordinance itself.

The proposed Basin Plan includes site-specific projects and basin-wide programs that would protect and enhance critical areas in the Nisqually Basin. Several projects would restore riparian areas, wetlands, and fish and wildlife habitat. Other acquisition and restoration projects would preserve and enhance the original floodplain that provides natural storage of floodwaters. Programmatic measures would enhance riparian habitat and provide improvements to water quality, which would benefit critical areas. Other programs would control invasive species and restore native vegetation. The “No Action” Alternative, in comparison, would include few projects and programs, if any, which would benefit critical areas.

The proposed projects in the Basin Plan would be located and designed to avoid critical areas, where possible. If a stormwater project were located within or adjacent to a designated critical area or its buffer, then the future project would comply with the Critical Areas Ordinance and obtain applicable critical areas approvals. The presence of a critical area(s) and any site-specific mitigation for individual projects under the Basin Plan would be determined during future review under the Critical Areas Ordinance. Under the “No Action” Alternative, future projects, if any, similarly would avoid critical areas where possible and would comply with the Critical Areas Ordinance.

### ***Project-Specific Permits and Approvals***

Individual projects under the Basin Plan may require project-level federal, state, and local government approvals and permits. Proposed projects would complete environmental review under SEPA and obtain required permits and approvals when individual projects are proposed and prior to construction. The location, design, construction, and operation of individual projects under the Basin Plan would comply with all applicable federal, state, and Pierce County regulations and policies. Any future projects under the “No Action” Alternative, if any, similarly would comply with applicable regulations and would obtain required permits and approvals.

A number of environmental and permitting programs could apply, depending on a projects location and characteristics. The major permits and approvals are described in Chapter 2, and are listed below:

- Section 401 Water Quality Certification
- Corps Section 404 Wetland Permit
- Endangered Species Act Consultation
- Hydraulic Project Approval (HPA)
- Archaeological and Cultural Coordination
- Shoreline Management Act and Shoreline Master Program
- Pierce County Critical Areas Ordinance
- Pierce County Zoning and Development Regulations
- SEPA Environmental Review
- NEPA Environmental Review (if federal funding or permit)

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