CHAPTER TWO
Applicable Programs, Policies, and Regulations

Numerous federal, State of Washington and local regulations, laws, policies and programs affect how stormwater and surface water are managed in unincorporated Pierce County. This chapter describes those pertinent to the Clear/Clarks Creek Basin with an emphasis on coordination with other programs and consistency with adopted policies and plans. Chapter Two presents federal regulations and programs first followed by those of the State of Washington (State), Pierce County (County), and other agencies respectively.

2.1 Federal Regulations, Policies and Programs

2.1.1 Clean Water Act

National Pollutant Discharge Elimination System (NPDES)

In 1987, amendments to the Federal Clean Water Act (CWA) required the Environmental Protection Agency (EPA) to promulgate regulations for storm water discharges. EPA defined certain stormwater discharges as point source discharges subject to federal regulations under the National Pollutant Discharge Elimination System (NPDES) Permit Program. Two broad areas were created as follows:

1. "Stormwater Discharges Associated with Industrial Activity"
2. "Municipal Separate Storm Sewer Systems" in two phases. Phase I applies to municipalities with populations greater than 100,000 people. Phase II requirements, expected to be implemented by 2006, apply to municipalities with populations of 10,000 people or more and certain urban areas.

EPA delegated responsibility for implementation of the NPDES permit program to the Washington State Department of Ecology (Ecology).

Ecology issued the “Phase I” NPDES permit for the South Puget Sound Water Quality Management Area (which includes Pierce County) in July 1995. It was administratively extended in 2000 pending development of a “Phase II” permit.

The NPDES stormwater permit requires that permit holders control pollutants in stormwater to the maximum extent practicable, primarily by implementing a stormwater management program, a functional component of which is the basin plans. Ecology approved the Pierce County’s Stormwater Management Program in 1998. Required elements include:

- A program to control runoff from new development, redevelopment, and construction sites
- Treatment and source control measures for existing commercial and residential areas
- An operation and maintenance program for new and existing stormwater facilities
- Practices for maintaining public streets and highways to reduce stormwater runoff impacts

- A program to include water quality considerations in flood management projects
- A program to reduce pollutants from pesticide and fertilizer use
- A program to detect, remove, and prevent illicit discharges to the municipal separate storm sewer system
- A program to reduce stormwater pollution from industrial facilities that discharge into the separate storm sewer system. An educational program for residents, businesses, industries, construction contractors, government employees, and others
- A monitoring plan to determine the effectiveness of program activities
- Reporting requirements
- Coordination among jurisdictions sharing water bodies

Effect of the Current Stormwater NPDES Permit on the Clear/Clarks Creek Basin Plan

Recommendations of the basin plan must adhere to the County's Stormwater NPDES Permit requirements cited above and provisions of the Pierce County Stormwater Management Plan. For a description of inter-jurisdictional coordination, see Chapter Three. Chapter Four describes existing water quality conditions. Chapter Six analyzes water quality problems and presents alternative solutions. Chapter Nine contains the recommendations for addressing water quality problems most cost-effectively.

Section 303(d) List and Total Maximum Daily Loads (TMDLs)

Section 303(a, b, and c) of the Clean Water Act requires that states establish standards to protect the quality of the waters of the United States.

Ecology classified all major bodies of water in Washington based on their current or potential beneficial uses and established a set of water quality standards for each class. Section 303(d) of the CWA requires Ecology to prepare a list of waterbodies that are not meeting, or will not meet water quality standards, after application of the required technology-based effluent limits.

Ecology submitted its candidate Section 303(d) list for 1998 to EPA in June 1998. Clear Creek, Clarks Creek, Swan Creek, and Diru Creek were on the list as water bodies that do not meet the standards (for additional information, see Chapter Four, "Existing Conditions, Water Quality").

If a waterbody is not in compliance with standards for a particular pollutant, 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 waterbody without violating the water quality standard for the pollutant.

Limits for all pollutant sources discharging to the water body are adjusted downward until the TMDL can be met.

Effect of 303(d) listings and TMDLs on the Clear/Clarks Creek Basin Plan

The timing of activities has implications for basin planning. Pierce County's NPDES stormwater permit requires that the stormwater management program be amended to take into account TMDLs within 4 months of their promulgation. If a basin contains a water body that is on the

Section 303(d) list but has not yet had a TMDL calculated, then the basin planning effort should anticipate the TMDL and focus on water quality control measures that address the listed pollutant(s).

A TMDL for fecal coliform bacteria is being developed by the City of Puyallup as part of their Clarks Creek Pollution Reduction project. As of November 2003, monitoring has been completed, but no TMDL has been calculated. Nevertheless, recommendations for the Clarks Creek Basin should contain various measures to minimize the likelihood of fecal coliform in stormwater runoff from County drainage areas.

Capital improvement projects and other control measures recommended for the drainage areas of streams identified in the 1998 303(d) list should be designed with the objective of removing the stream and listed parameter from the 303(d) list.

Section 404 Wetland Fill Permits

Section 404 of the CWA regulates placement of fill in waters of the United States. For the purposes of Section 404, waters of the United States are defined as wetlands adjacent to streams with flow greater than five (5) cubic feet per second and isolated wetlands greater than one acre that are hydraulically connected to regulated streams. Storm drainage projects that involve filling or work in small areas of wetlands may be permitted under one of several nationwide general permits. An individual permit, subject to a broader level of review, must be obtained for projects that that exceed the limits for nationwide permits.

Section 404 is administered by the U.S. Army Corps of Engineers (Corps); the Corps' Seattle District is responsible for issuing Section 404 permits in Pierce County. Because the goal of Section 404 is to avoid any net loss of wetlands, some of the projects identified in Pierce County's 1991 Plan have proven more costly to build than estimated. In general, capital projects that adversely effect wetlands should be avoided.

Effect of Section 404 Regulations on the Clear/Clarks Creek Basin Plan

Wetland protections argue for several basin plan approaches. First, wherever possible wetlands can be acquired to conserve the natural stormwater runoff and flood storage capacities they provide. Second, the cost estimates of future storm drainage facilities should include the costs of compensatory mitigation. Third, basin plans can identify new programs or program revisions designed to protect existing wetlands or create wetlands. Fourth, basin plan recommendations can be prioritized in part upon the extent to which wetland protection and enhancement can be achieved.

2.1.2 Endangered Species Act

The Endangered Species Act (ESA) directs the U.S. Fish and Wildlife Service (USFWS) and the National Oceanic and Atmospheric Administration (NOAA) Fisheries[1] to promulgate a list of endangered and threatened species and designate critical habitat for the listed species. Listed species with the greatest potential to affect surface water management in Pierce County are the chinook salmon (listed as threatened in March 1999) and the bull trout (listed as threatened in

[1] NOAA Fisheries was previously called the National Marine Fisheries Service (NMFS).

October 1999). NOAA Fisheries has indicated that additional salmonid species may be listed in the next few years. Chinook salmon are found in the Clear/Clarks Creek Basin (see *Section 4.7*).

Section 9 of the ESA prohibits "taking" of endangered species. To "take" means "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct". The regulation explains that "harm" may include "significant habitat modification where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering".

If a proposed action is federally funded, or if it requires a permit from a federal agency, and if it could have an effect on a listed species, then Section 7 of the ESA requires the involved federal agency to consult with USFWS or NOAA Fisheries. After consultation, USFWS or NOAA Fisheries issues a biological opinion regarding the effects of the action. If USFWS or NOAA Fisheries finds that the action could jeopardize the continued existence of the species, the action cannot be permitted. If USFWS or NOAA Fisheries finds that the continued existence of the species is not jeopardized, then one of the agencies will issue an "Incidental Take Statement" and allow the action to proceed.

Section 4(d) of the ESA requires USFWS and NOAA Fisheries to adopt regulations as necessary to conserve the species listed as threatened. USFWS typically applies the Section 9 "take" prohibitions directly to threatened species. NOAA Fisheries typically promulgates "4(d) rules" that identify specific activities that can be conducted without constituting an unlawful take of the threatened species.

Pierce County has policies and programs that help to preserve and restore salmon habitat. The County is implementing early actions to preserve and restore salmonid habitat in coordination with King and Snohomish Counties. NOAA Fisheries has approved a set of transportation maintenance procedures that if followed protect transportation maintenance projects from liability under ESA. Other early actions include culvert replacements to improve fish passage and restoration and acquisition of key habitats.

Effect of ESA on the Clear/Clarks Creek Basin Plan

The salmonid listings have a broad effect on storm drainage and surface water management plans. Water quantity and water quality, as crucial features of fish habitat affected by the ways of solving flooding and storm drainage problems, must be addressed to protect listed species. Coordination with the varied agencies working on fish habitat initiatives should be reflected in recommended solutions to prevent overlap or duplication of effort.

2.1.3 National Flood Insurance Program

In 1968, the U.S. Congress initiated the National Flood Insurance Program (NFIP) (Chapter 44 CFR) under the National Flood Insurance Act to relieve the burden of disaster relief on the national treasury and state and local tax bases. The NFIP is administered by the Federal Insurance Administration (FIA), which is part of the Federal Emergency Management Agency (FEMA). The NFIP makes available affordable flood insurance to communities that adopt approved floodplain management regulations. Communities that do not participate in the NFIP do qualify for certain flood disaster relief. FEMA's Flood Insurance Rate Maps (FIRMs) form the basis for critical area zoning for flood hazards.

Pierce County participates in the NFIP. Flood hazard management regulations are codified in Title 17A.50 of the County Code and criteria and procedures are laid out in Chapter Nine of the Pierce County Stormwater Management and Site Development Manual. Federally subsidized flood insurance is available to local residents. To continue coverage, the County must remain in the NFIP and maintain minimum floodplain management regulations. FEMA requires a certification letter for any revisions to a FIRM. Certification activities include stream channel modifications, installation of culverts, and bridge construction.

Community Rating System (CRS)

As a reward for communities willing to do more than meet minimum NFIP requirements by taking actions to minimize flood losses and promote public awareness of flood hazards, FEMA created the Community Rating System (CRS). Community participation in the CRS is voluntary. The CRS offers reduced insurance rates based upon the class rating of a community. The CRS contains ten classes. "Class 1" gives the greatest insurance premium reduction. A "Class 10" community receives no premium reduction. Pierce County was the first county in the nation to earn a "Class 5" rating.

Effect of the NFIP and the CRS on the Clear/Clarks Creek Basin Plan

Basin plans serve as part of the flood hazard mitigation plan for Pierce County. To serve in meeting the prerequisites for a "Class 4" rating, the Clear/Clarks Creek Basin Plan has been developed to meet or exceed the following criteria:

Floodplain Management Planning Elements - CRS Planning Steps

- Organize – Use a steering committee of department staff
- Involve the public – Engage people living and working in floodplains to identify problems, community goals and alternatives that will solve problems
- Coordinate with other local governments in the planning area, state and federal agencies, Indian tribes, and other Pierce County departments and programs
- Assess the hazard(s)
- Assess the problem(s)
- Set goals
- Review possible activities
- Draft an action plan
- Adopt the plan
- Implement the plan, evaluate it periodically, and revise it as needed to keep it current and effective

TABLE 2-1
Federal and State Laws and Regulations
and Clear/Clarks Creek Basin Plan

Law or Regulation	Application to the Clear/Clarks Creek Basin
Federal Laws	
Clean Water Act. Section 402 National Pollutant Discharge Elimination System (NPDES)	Pierce County Stormwater NPDES Permit, consistency with coordination requirement,
Clean Water Act. Section 303(d) Total Maximum Daily Load (TMDL) Listing	Must consider ways of reducing stormwater contributions to pollutant loads
Clean Water Act. Section 404 Permit Requirements for Wetland Filling	Pierce County provides direction for basin plans to avoid recommendations that would have negative impacts on wetlands
Endangered Species Act	Consistency between the basin plan & Tri-County Endangered Species Act Response
	Implementation of the Puyallup WRIA Conservation Plan
National Flood Insurance Program	Acknowledgement of the programs initiated with the Consistency with NFIP objectives and CRS standard Pierce County Flood Hazard Management Code
State Laws, Plans & Regulations	
Water Quality Standards	Analyze water quality and develop projects & programs toward maintaining water quality standards and anti-degradation rule
Puget Sound Water Quality Management Plan	Drainage development standards; Stormwater Management Manual; Stormwater Pollution Control Manual
Growth Management Act	Critical areas regulations, consistency between comprehensive plans and capital improvement plans required
State Environmental Policy Act	Environmental review for basin plan and individual projects
Shoreline Management Act	Pierce County Shoreline Master Program (adopted as WAC)
State Hydraulic Code	Hydraulic Project approvals required for in-stream work
Watershed Management Act	N/A
The Non-Point Rule	Lower Puyallup WRIA Watershed Action Plan

Source: Pierce County Water Programs

2.1.4 Settlement Agreement with the Puyallup Tribe

In 1989, the U.S. Congress passed the "Agreement between the Puyallup Tribe of Indians, Local Governments in Pierce County, the State of Washington, the United States of America, and certain private property owners" (Settlement Agreement). Pierce County signed the Settlement Agreement in 1988. In the Settlement Agreement, the County agreed that, "The Tribe's treaty

fishery must be managed to achieve increased salmon and steelhead production, including protection of necessary habitat, while providing for residential, commercial, industrial and other development, natural resource use, and protection of lives and property from flooding."

The County promised to consult with the Tribe when amending land use and resource plans lying within the 1873 Survey Area (See *Figure 1.2, Study Area*). Consultation consists of notifying the Tribe of the proposal, giving an opportunity for consultation and discussion, and making good faith efforts to accommodate the concerns of the Tribe in rendering its decision.

Effect of the Settlement Agreement on the Clear/Clarks Creek Basin Plan

The Settlement Agreement underscores the basin plan objective of protecting and enhancing fish habitat through stormwater management activities. It imposes an obligation for the parties to consult with one another as set out in Document 7 of the Settlement Agreement.

2.2 State Regulations, Plans and Permits

2.2.1 State Water Quality Standards

Washington Administrative Code (WAC) 173-201A and 173-200 affect the discharge of stormwater to surface water and groundwater, respectively, by establishing water quality standards for each of the different classes of water and articulating the federal anti-degradation policy. WAC 173-200 also calls for designation of special groundwater protection areas based on unique characteristics (e.g., aquifer recharge areas, wellhead protection areas, or sole source aquifers). Chapter Four describes the water quality standards and how well the Mid-Puyallup Basin streams achieve the standards.

In July 2003, Washington adopted a new set of water quality standards. The new standards cannot be used until they are approved by EPA, which is expected in 2004. Updated rules establish standards for temperature to protect temperature-sensitive fish, such as bull trout and Dolly Varden. A new indicator (enterococci) will be used to measure the amount of bacteria in marine waters that are not used for shellfish harvesting. New values for ammonia in waters without salmon species have been added.

Ecology will classify fresh waters by actual use (such as fish habitat, swimming and water supply), rather than by class (AA, A, B, C and Lake classes), to make the standards less complicated to interpret and provide future flexibility as the uses of a waterbody evolve.

Effect of Water Quality Standards on the Clear/Clarks Creek Basin Plan

Storm drainage planning considers ground and surface water quality standards along with other factors when developing specific capital improvement alternatives, such as a large regional infiltration basin. This is largely because the standards are the foundation for other water quality programs such as NPDES permits, water clean-up plans (also known as TMDLs), and 401 Water Quality Certifications. Water quality standards are also used as benchmarks for developing recommendations for non-structural solutions.

2.2.2 Aquifer and Wellhead Protection

The Safe Drinking Water Act of 1974 (SDWA) transferred responsibility for regulation of drinking water to the EPA and called on the EPA to take a number of steps to protect the quality of the nation's drinking water supplies. EPA has set maximum contaminant levels (MCL) in drinking water for more than 100 substances. Section 1424(e) of the SDWA established a Sole Source Aquifer Program. EPA was authorized to identify aquifers that are the only or principal source of drinking water for an area. The program also calls for EPA to review all federally funded projects planned for the area. Based on the review, the EPA administrator may withhold federal financial assistance for projects determined to be potential threats to a designated aquifer. The Clear/Clarks Creek Basin lies in a designated sole source aquifer.

In 1986, a new provision of the SDWA (Section 1428) required every state to develop a wellhead protection program to guard the quality of groundwater bodies used for water supply so that water arrives at a well uncontaminated. The Tacoma-Pierce County Health Department administers the wellhead protection program in Pierce County.

Effect of Aquifer and Wellhead Protection Regulations on the Clear/Clarks Creek Basin Plan

Basin plans take into account the locations of wells and wellhead protection requirements in siting new storm drainage facilities or recommending improvements to existing facilities. Stormwater infiltration facilities must be designed to meet groundwater quality standards or be sited to avoid areas where groundwater intersects aquifers providing potable water supplies.

2.2.3 The Growth Management Act and the Comprehensive Plan for Pierce County Washington

The Growth Management Act (GMA) directed local governments of fast-growing counties, cities, and towns to prepare and adopt comprehensive plans and implementing regulations for managing their growth. Pierce County was required to prepare a comprehensive plan that meets the GMA precepts. The Comprehensive Plan for Pierce County Washington (County Comprehensive Plan) became effective in December 1994. Development regulations to implement the comprehensive plan were adopted in 1995.

Three GMA planning goals directly apply to storm drainage planning. They are as follows:

> "*Urban growth. Encourage development in urban areas where adequate public facilities and services exist or can be provided in an efficient manner."*
>
> *"Environment. Protect the environment and enhance the state's high quality of life, including air and water quality, and the availability of water."*
>
> *"Public facilities and services. Ensure that those public facilities and services necessary to support development shall be adequate to serve the development at the time it is available for occupancy and use without decreasing service levels below locally established minimum standards."*

The GMA influences the provision of storm drainage and surface water management services and facilities by requiring that: 1) frequently flooded areas (flood hazard areas) be identified and protected; 2) urban facilities be constructed in urban areas only; 3) a level of service standard be

established for storm drainage facilities; and 4) capital improvements be identified to meet the adopted level of service given planned land use.

Effect of the GMA on the Clear/Clarks Creek Basin Plan

The GMA mandates that comprehensive plans be internally consistent (RCW 36.70A.070) and that counties perform their activities and make capital budget decisions in conformity with their comprehensive plans. (RCW 36.70A.120) Because basin plans recommend capital improvement projects and form the basis of the annual capital budget for the County Storm Drainage and Surface Water Management Utility, basin plan recommendations are required to be consistent with the County Comprehensive Plan. Basin plans are also used to formulate the longer-term (six-year) capital improvement plan, also known as the "Capital Facilities Element" of the County Comprehensive Plan (The Supplemental Environmental Impact Statement in Chapter Ten examines the consistency of this plan's recommendations with the County Comprehensive Plan).

Land use decisions drive stormwater management infrastructure needs. Adopted land use/zoning and current development regulations are used in this Basin plan to model future hydrologic conditions and determine the type, size and location of facilities that will be needed to support planned growth. Critical areas designations are used to indicate potential sites for stormwater facilities, such as infiltration ponds (aquifer recharge areas) or natural stormwater detention sites (wetlands and riparian corridors). Conversely, surface water management recommendations can influence land use density and intensity choices, for instance if a basin plan identifies stream reaches that must be protected from the adverse hydrologic effects of new development. Existing and planned land use is described in Chapter Four, "Existing Conditions".

2.2.4 Shoreline Management Act

The Shoreline Management Act (SMA) establishes a broad policy for how Shorelines of the State can be used, giving preference to uses that:

- Protect the quality of water and the natural environment
- Depend on proximity to the shoreline (water-dependent uses)
- Preserve and enhance public access or increase recreational opportunities for the public along shorelines

Shorelines of the State include all marine waters, streams with a mean annual flow greater than 20 cubic feet per second; lakes 20 acres or larger; upland areas 200 feet landward from mean high water; biological wetlands; river deltas; and some or all of the 100-year floodplain, including all wetlands within the entire floodplain, when they are associated with one of the other listed waters.

The SMA divides authority for compliance between local and State governments. Cities and counties are the primary regulators. Each city and county adopts a shoreline master program and use regulations that are based on State guidelines but tailored to the needs of the community.

Pierce County adopted its Shoreline Master Program in 1974 and the Use Regulations in 1975 (amended in 1992). Shoreline use regulations set out a permit system for administering the program.

Effect of the Shoreline Master Program and Use Regulations on the Clear/Clarks Creek Basin Plan

Many of the proposed projects contained in this basin plan are likely to be located within a regulated shoreland and subject to permit requirements. The conditions that might be imposed on recommended projects are considered in Chapter Ten, Supplemental Environmental Impact Statement, Land and Shoreline Use section.

2.2.5 State Hydraulic Code

The Washington State Hydraulic Code (RCW 75.20.100-140) regulates any activity affecting the state's fresh waters and salt waters, in order to preserve fish and wildlife habitats. The Hydraulic Code is administered by the Washington State Department of Fish and Wildlife (WDFW). The WDFW requires any person, organization, or government agency whose construction project lies within the ordinary high water line of marine waters and fresh waters of the state to obtain a Hydraulic Project Approval (HPA) Permit. The HPA Permit typically specifies how construction projects are designed, managed, sequenced, and conducted to minimize adverse effects on fish and shellfish.

Effect of the State Hydraulic Code on the Clear/Clarks Creek Basin Plan

Certain alternatives could lie within or near state waters. Conceptual design and cost estimates for these facilities should take into consideration the conditions likely to be imposed on the project via the HPA Permit.

2.2.6 The Nonpoint Rule

WAC Chapter 400-12 establishes criteria and procedures for ranking watersheds in Washington State and for developing and implementing action plans for watersheds that need corrective and/or preventive actions. The purpose of WAC 400-12 is to reduce pollutant loading from nonpoint sources, prevent new sources from being created, enhance water quality, and protect beneficial uses. The planning process encourages collaborative problem solving among local, state, tribal, and federal interests. It relies on voluntary actions, local ordinances, and state and federal laws, regulations, and programs for implementation.

Each lead entity (usually a county) convenes a committee to review and/or re-rank the watersheds wholly or partly within the county boundaries, using criteria specified by the State. Local watershed management committees are then formed to develop action plans for the ranked watersheds. Pierce County has prepared action plans for the Lower Puyallup River, which includes the Clear/Clarks Creek Basin.

Effect of the Nonpoint Rule on the Clear/Clarks Creek Basin Plan

As with the WRIA planning process, the nonpoint action planning process and any completed plans should be considered when developing the basin planning strategy, basin-specific objectives and when evaluating projects.

2.3 Pierce County Regulations, Policies and Programs

2.3.1 Pierce County Storm Drainage and Surface Water Management Master Plan (Volumes I and 2), James M. Montgomery, 1991 (1991 Plan)

The 1991 Plan is the original capital improvement program (CIP) and program plan for the Pierce County Storm Drainage and Surface Water Management Utility. It documents basin characteristics as of 1991, development of the CIP and refinement of alternatives. The Clear/Clarks Creek Basin was one of the basins studied. The 1991 Plan describes physical attributes of the drainage basin (including the Roosevelt Ditch area), the drainage system existing at the time; the hydrologic modeling performed and model results. It identifies alternatives and recommends a CIP specific to the Clear/Clarks Creek Basin.

Over the course of the fourteen years since adoption of the 1991 Plan, significant changes have occurred in the regulatory environment, program policies of federal and State funding agencies and Pierce County policy affecting stormwater management. In 1995, the Storm Drainage and Surface Water Management Plan became part of the Pierce County Comprehensive Plan. Several stormwater studies and plans have been added to the 1991 Plan, such as the Clover Creek Basin and 144th Street East Drainage Plans (informally). In 1995, Pierce County secured a stormwater NPDES permit. These factors coupled with continuing land development and other changes in field conditions, have frequently ruled out projects originally recommended and have required that other alternatives be identified and implemented. Appendix B presents the projects recommended in the 1991 Plan for the Clear/Clarks Creek Basin and reports how the recommendations have been implemented. Projects shown as completed represent most of the existing regional drainage facilities covered in Chapter Four.

2.3.2 Army Corps of Engineers General Investigation New Starts Program

The Army Corps of Engineers General Investigation New Start Program funds large complex projects where there is a federal interest and when co-sponsored by a local government, agency or non-profit with local matching funds. Congressional approval is required to initiate a new start. Projects are managed by the Corps of Engineers. A New Start begins with research and study, a feasibility study, preliminary design and engineering. After the preliminary work is completed, but before construction of the identified projects, Congress must reauthorize the project and allocate funds.

Congress authorized a General Investigation (GI) New Start for the Puyallup/White watershed area. The initial work for the GI New Start relies on work done by a group of scientists representing agencies and governments such as the Puyallup Tribe of Indians, Washington State departments of Fish and Wildlife and Natural Resources, the Port of Tacoma, the cities of Tacoma, Federal Way and Puyallup, the Pierce County Conservation District, and Pierce and King Counties. With the Puyallup/White River watershed area in mind, they identified a number of potential projects that could help in restoring water quality and fish habitat in the watershed.

Several of the projects lay in the Clear-Clarks Creek Basin as follows:

Swan Creek Stream Restoration (in progress)
Project identified by City of Tacoma
Estuarine aquatic habitat restoration by the City of Tacoma on City of Tacoma-owned land. Excavate approximately two acres of filled wetland, replant with native vegetation within and adjacent to the wetlands, including nearby slopes. Eliminate fish passage impediments.

Clear Creek Floodgate Removal (partially completed through a Port of Tacoma project)
Local co-sponsor: Pierce County Water Programs
Salmonid recovery. Restore natural connectivity between Clear Creek and the Puyallup River by removing the two floodgates at the Clear Creek discharge point, buy out potentially flood prone property, and/or build a setback levee to protect homes. The Port of Tacoma replaced one floodgate with an electronic gate to allow river water to wax and wane into Clear & Swan Creeks with tidal raises in river level. Drainage District #10 maintains the second floodgate.)

Clear Creek Off-Channel Habitat
Local co-sponsor: Port of Tacoma
Restoration of off-channel habitat. Purchase land and conduct restoration actions by excavating/recreating wetlands adjacent to Swan and Clear Creeks, re-establishing riparian vegetation, and connection of wetlands to the streams.

Puyallup-Lower Sub-Basin Barrier Removals
Local co-sponsor: Pierce County Conservation District
Remove and replace culverts that are barriers to fish passage and restore habitat.

Clarks Creek & Meeker Ditch Confluence Improvement
Local co-sponsor: City of Puyallup
Habitat restoration, water quality improvement and flood reduction. Construct off-channel rearing & wetland areas at the confluence of the two streams. Regrade confluence area to create off-channel habitats, provide additional flood storage, and construct a forested wetland complex.

Effect of the GI New Starts Program on the Clear/Clarks Creek Basin Plan

Each of the projects in the GI New Start program is acknowledged in the flooding, habitat and water quality analyses. The Pierce Conservation District identified barriers to fish passage augmented the field investigations performed by the consultant, CH2M HILL. Coordination with each of the local co-sponsors is included in basin planning outreach efforts.

2.3.3 Studies and Reports

- Surface-Water Hydrology and Runoff Simulations for Three Basins in Pierce County, Washington, United States Geological Survey (USGS), 1994. This report documents a hydrologic analysis of the Clover, Clear, and Clarks Creek Basins. The report describes the basin characteristics (e.g., soils, topography, groundwater influences) and the conceptual model of the rainfall-runoff process, and simulates the process using the Hydrologic

Simulation Program-FORTRAN (HSPF) mathematical model. Actual stream discharge measurements and precipitation information were also used to calibrate and validate the simulation model.

- Lower Puyallup Watershed Phase I Report, Lower Puyallup Watershed Management Committee (LPWMC), March 1992. This report is the first phase of the Lower Puyallup Watershed Action Plan, which is an effort to solve the problems of nonpoint source pollution in the watershed. Phase I of the Action Plan provides a characterization of the basin, assesses water quality, defines the nonpoint water pollution problems, and describes the goals and objectives. The report includes a detailed description of the Clear/Clarks Creek Basin, which is one of the sub-watersheds within the Lower Puyallup watershed.

- Ground-Water Hydrology of the Tacoma-Puyallup Area, Pierce County, Washington, United States Geological Survey, 1999. This report describes and quantifies the groundwater movement system, recharge, water use, water level fluctuations, and general groundwater chemistry within the geological landforms of the Tacoma-Puyallup area.

- Water Quality of the Lower Puyallup River Valley and Adjacent Uplands, Pierce County, Washington, United States Geological Survey, Water Resources Investigation Report 86-4154, 1989. This report documents the water quality conditions within the Lower Puyallup watershed. Surface water and groundwater samples were collected and analyzed for a variety of pollutants. Eight sites within the Clear/Clarks Creek Basin were monitored by the USGS.

In addition to these studies, Pierce County completed a drainage inventory of the County-owned structures, pipes, and channels, and the data have been entered into the County's geographic information system (GIS) database. Data from this drainage inventory, as well as other GIS features available from the County, have been incorporated into this Plan.