

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM MUNICIPAL STORMWATER PERMIT PROGRAM ANNUAL REPORT FOR CALENDAR YEAR 2001

King County
March 29, 2002

PROGRESS ON ADDRESSING EXCEPTIONS TO SWMP APPROVAL

A Washington State Department of Ecology letter of August 1, 1997, partially approved King County's stormwater management program (SWMP). Exceptions to the approval included the County's proposed revised Surface Water Design Manual (SWDM) and the County's actions to control phosphorous in Lake Sammamish.

Lake Sammamish (the Lake)

Water Quality

Water quality goals for Lake Sammamish continue to be based on the assumption that the Lake is phosphorus limited and control of phosphorus loading to the lake will control primary productivity and water clarity. All of the water quality control activities currently being carried out in this watershed address external phosphorus loading from the watershed to varying degrees. Control of external phosphorus loading also results in many secondary benefits to the watershed, such as the control of erosion and sedimentation, and preservation of fish habitat, forest, and riparian cover.

An empiric goal of 22 $\mu\text{g/L}$ mean annual volume-weighted total phosphorus (VWTP) is used to meet the mean summer chlorophyll-*a* goal of 2.8 mg/m^3 . Concentrations of chlorophyll-*a* $\leq 2.8 \text{ mg/m}^3$ historically resulted in summer average Secchi dish transparency of ≥ 4.0 meters. Summer epilimnion VWTP, which is approximately the photic zone of the lake and more directly involved in phytoplankton dynamics during the stratified period, is being evaluated as a management tool for maintaining the summer chlorophyll-*a* and Secchi goals for the Lake. Concentrations of summer epilimnion VWTP goal would have to be significantly lower than the whole lake mean annual VWTP goal to achieve the similar levels of lake protection. Preliminary analysis shows total phosphorus concentrations of $\leq 10 \mu\text{g/L}$ in the epilimnion may achieve summer chlorophyll-*a* concentrations of $\leq 2.8 \text{ mg/m}^3$ and Secchi disk transparencies of ≥ 4.0 meters.

The water quality for Lake Sammamish in 1998, 1999, 2000, and 2001 has been very good. Phosphorus concentrations in the past three years are as low as has been measured during the last twenty years. At the south mid-lake sampling station (0612) the annual mean VWTP for 1998 and 1999 was 12 $\mu\text{g/L}$, and was 13 $\mu\text{g/L}$ for both 2000 and 2001, substantially lower than the 22 $\mu\text{g/L}$ goal (Figure 1). The low VWTP in the last four years is much better than the increasing trend toward the 22 $\mu\text{g/L}$ goal of the last ten to fifteen years. Annual mean VWTP at the north

mid-lake sampling station (0611) has been similarly low at 13 µg/L, 14 µg/L, and 12 µg/L for 1998, 1999, and 2000, respectively. A combination of weather and stream inflow patterns as well as decreased loading from the watershed may be the reason for the lower VWTP concentrations in recent years.

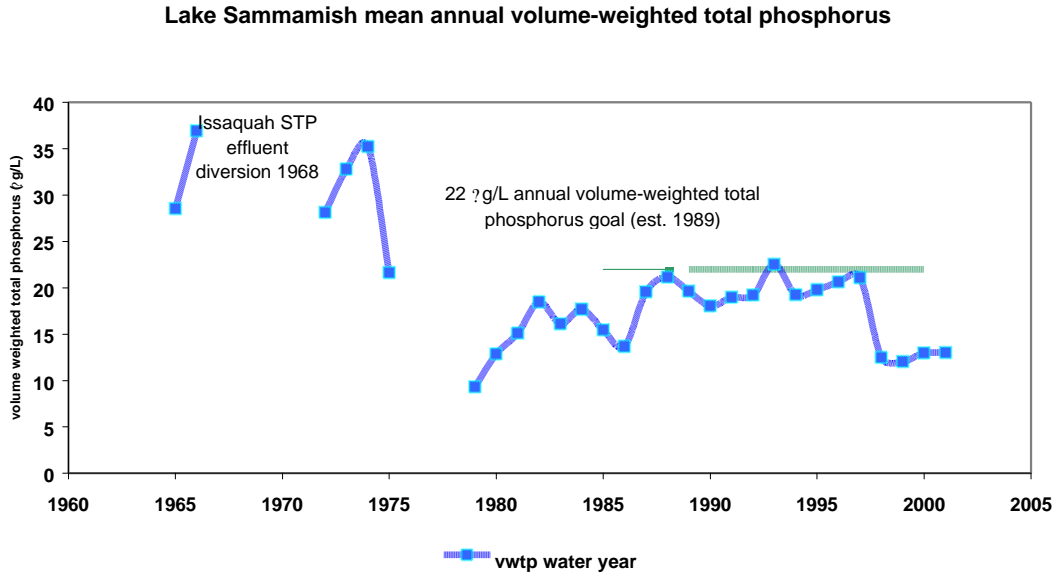


Figure 1. Mean annual volume weighted total phosphorus (VWTP) concentrations at the south mid-lake sampling station (0612).

For a decrease in the whole lake mean annual VWTP to result in decreased phytoplankton productivity and increased water clarity, the concentrations of phosphorus in the photic zone (that part of the lake where sunlight and nutrients interact and support phytoplankton growth) also need to decrease. The more direct relationship between nutrient concentrations in the epilimnion (which approximates the photic zone), phytoplankton productivity, and lake transparency are reasons for looking at VWTP in this part of the lake. Figure 2 illustrates the epilimnion 12-month running means as well as the summer monthly epilimnion VWTP.

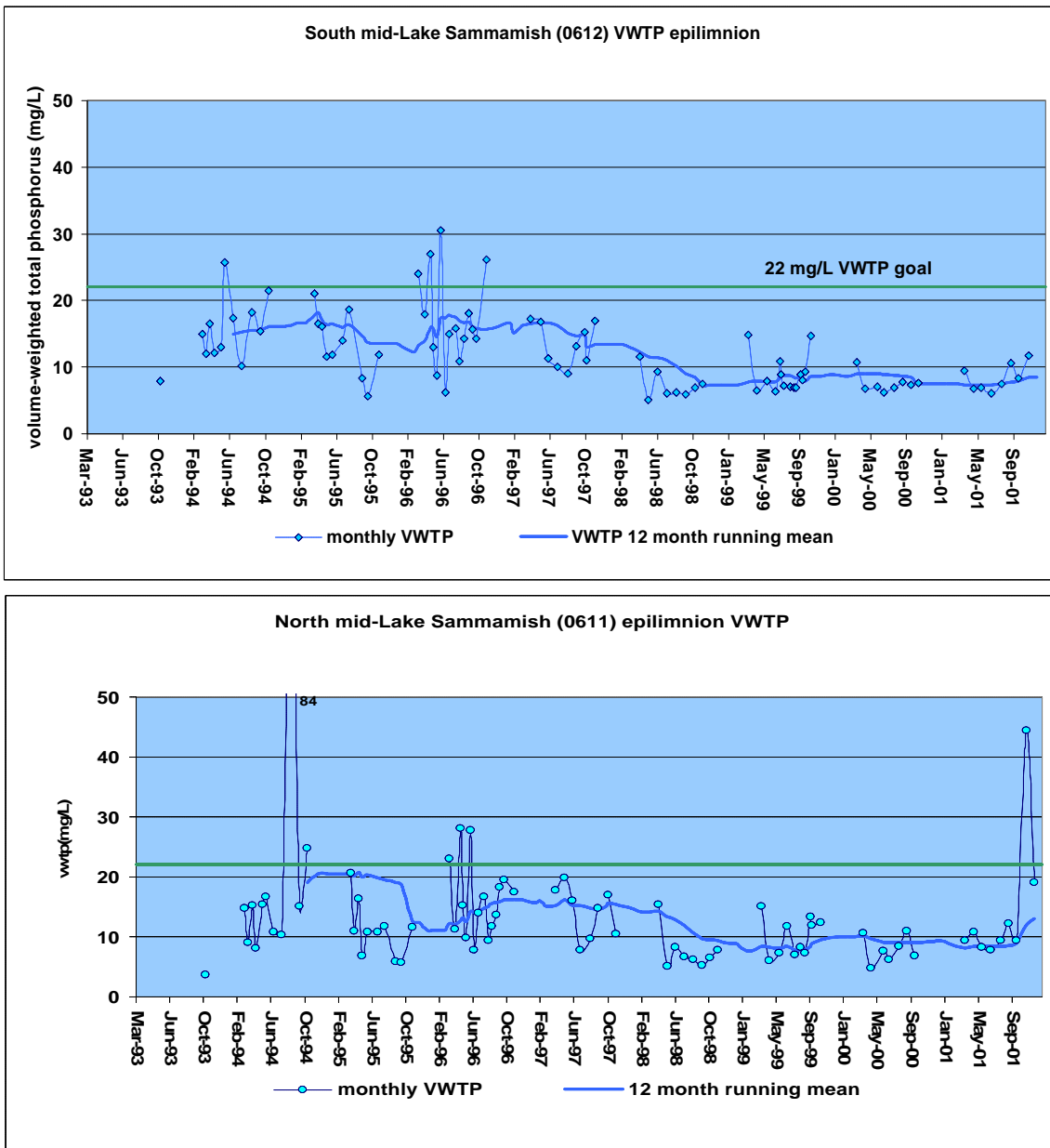


Figure 2. Monthly epilimnion VWTP concentrations for north and south lake are indicated by the dashed lines for 0612 (diamonds) and 0611 (circles). No epilimnion data is shown for the winter period when the lake is not stratified. The solid line is a 12-month VWTP running mean for the epilimnion. A running mean deseasonalizes data to show long term trends. During winter mixed conditions, data from the top 15 meters was used to generate this mean.

Epilimnion VWTP in both the north and south ends of Lake Sammamish remains near 10 $\mu\text{g/L}$, and the whole lake annual VWTP is below the 22 $\mu\text{g/L}$ goal. Based on the models used to monitor Lake Sammamish, chlorophyll-*a* and Secchi disk transparency should both meet or exceed the water quality goals as well (VWTP \leq 22 $\mu\text{g/L}$ and Secchi \geq 4.0m). The north and south summer mean chlorophyll-*a* concentrations for 1998 (2.3 mg/m^3 and 2.5 mg/m^3) were less than the chlorophyll-*a* goal 2.8 mg/m^3 , while in 1999 (3.9 mg/L and 3.8 mg/L) and 2000 (4.5

mg/L and 4.0 mg/L) the summer mean chlorophyll-*a* concentrations slightly exceeded the goals (Table 1). Secchi disk transparency for all three years was at or better than the water quality goal of 4.0 m.

Table 1. Lake Sammamish chlorophyll-*a* and Secchi disk transparency and summer means (June-September) collected at the north mid-lake station (0611) and the south mid-lake station (0612).

collect date	north mid-lake (0611)		south mid-lake (0612)	
	chlorophyll- <i>a</i> mg/m ³	Secchi depth meters	chlorophyll- <i>a</i> mg/m ³	Secchi depth meters
June 3, 1998	1.6	7.5	1.7	Not recorded
June 17, 1998	1.8	6.5	2.1	6.0
July 6, 1998	4.5	5.5	5.2	3.8
July 20, 1998	2.9	4.5	3.1	5.5
August 5, 1998	2.0	6.0	2.8	5.0
August 19, 1998	2.0	6.5	1.7	7.0
September 8, 1998	1.6	7.0	1.3	7.0
September 23, 1998	2.0	6.6	1.7	8.0
summer average	2.3	6.3	2.5	6.0
June 8, 1999	3.5	4.0	3.2	4.0
June 22, 1999	5.2	3.0	5.3	3.5
July 7, 1999	2.6	4.5	2.8	5.2
July 20, 1999	3.1	4.0	2.8	3.5
August 3, 1999	4.1	3.5	4.3	3.5
August 17, 1999	6.2	3.3	6.3	2.7
September 8, 1999	4.0	4.5	3.5	4.5
September 21, 1999	2.6	5.0	2.5	4.5
summer average	3.9	4.0	3.8	3.9
June 13, 2000	4.3	5.0	3.5	Not recorded
July 5, 2000	2.5	7.0	2.1	6.0
July 18, 2000	5.0	4.0	3.7	4.2
August 8, 2000	3.9	6.2	3.9	6.0
August 22, 2000	8.2	5.0	6.3	5.0
September 6, 2000	5.2	3.3	5.5	3.2
September 19, 2000	2.5	3.0	2.9	3.0
summer average	4.5	4.8	4.0	4.6
June 19, 2001	5.5	4.5	5.2	4.0
July 2, 2001	3.2	4.0	2.8	6.0
July 17, 2001	3.0	6.5	2.2	6.0
August 7, 2001	1.7	5.5	2.0	6.5
August 21, 2001	1.7	6.2	1.4	7.0
September 5, 2001	2.1	7.5	1.9	8.0
September 18, 2001	1.7	9.0	2.0	8.5
summer average	2.7	6.2	2.5	6.6

The higher chlorophyll-*a* concentrations in 1999, and 2000 did not result in as great a loss of water clarity as expected from the model, or observed in the past. One reason may be a shift to more colonial forms of algae that concentrate chlorophyll-*a*, but because they are clumped do not decrease transparency to the same degree as unicellular algae. This phenomenon needs to be investigated in further detail. Lower chlorophyll-*a* in 2001 did result in higher summer water clarity, particularly in July and August. Transparency is also affected by factors other than algal growth, including suspended solids. Decreased inputs of suspended materials from streams due to the dry weather conditions have a positive influence on summer water clarity.

The relationship between the annual whole lake VWTP, and summer chlorophyll-*a* in Lake Sammamish is still functioning. The relationship between chlorophyll-*a* and secchi disk transparency also still works with the exception of periods where colonial phytoplankton predominate. The water quality goals that have been agreed upon for the Lake of 22 µg/L for mean annual VWTP, 2.8 mg/m³ for chlorophyll-*a*, and 4.0 m for Secchi disk transparency are still appropriate.

While summer water quality in Lake Sammamish has seen improvement, there are serious water quality issues in the fall. During the late summer and early fall of 1997, an extensive, toxic bloom of *Microcystis aeruginosa* covered much of the Lake. This bloom occurred even though the Lake met the water quality goals during this period. During the late summer of 1998, a bloom of *Microcystis aeruginosa* did not occur, however a sample was collected and analyzed for toxicity. Mouse bioassay tests indicated the cyanobacteria was not toxic. Subsequent strain analysis done at the University of Washington indicated that while the cyanobacteria species was the same (i.e., *Microcystis aeruginosa*), the specific strain was different and non-toxic. In an effort to examine potential environmental factors that influence the production of toxins, a graduate student investigated this issue in Lake Sammamish with the support of King County, Seattle University, and the University of Washington.

In 1999, low concentrations of *Microcystis aeruginosa* were collected from the lake and tested positive for toxicity when analyzed using the ELISA test. While there was no bloom of toxic cyanobacteria in the lake during the fall of 1998 or 1999, the same strain of toxic algae, producing toxins at low levels, was present in the lake. It is apparent that the toxic strain of *Microcystis aeruginosa* is endemic in Lake Sammamish. If water quality conditions in Lake Sammamish deteriorate in the future and result in a cyanobacterial bloom, it would be expected that toxic *Microcystis aeruginosa* would be present. There were no blooms of toxic cyanobacteria recorded in Lake Sammamish in 2000. In 2001, a preliminary survey for microcystins in lakes Washington, Sammamish and Union was initiated. Data from this survey will be used to develop a sampling analysis plan for the long term monitoring of cyanobacteria toxicity.

In 1998 it was hypothesized that *el Niño* was influential in the excellent summer water quality. Summer primary productivity is dependent on addition of phosphorus to the stable upper photic zone of the lake (i.e., epilimnion) by a combination of external loading during storm events and internal loading from the hypolimnion. The large toxic bloom observed in 1997 occurred after a significant late summer rainfall event that discharged into a very stable epilimnion. In

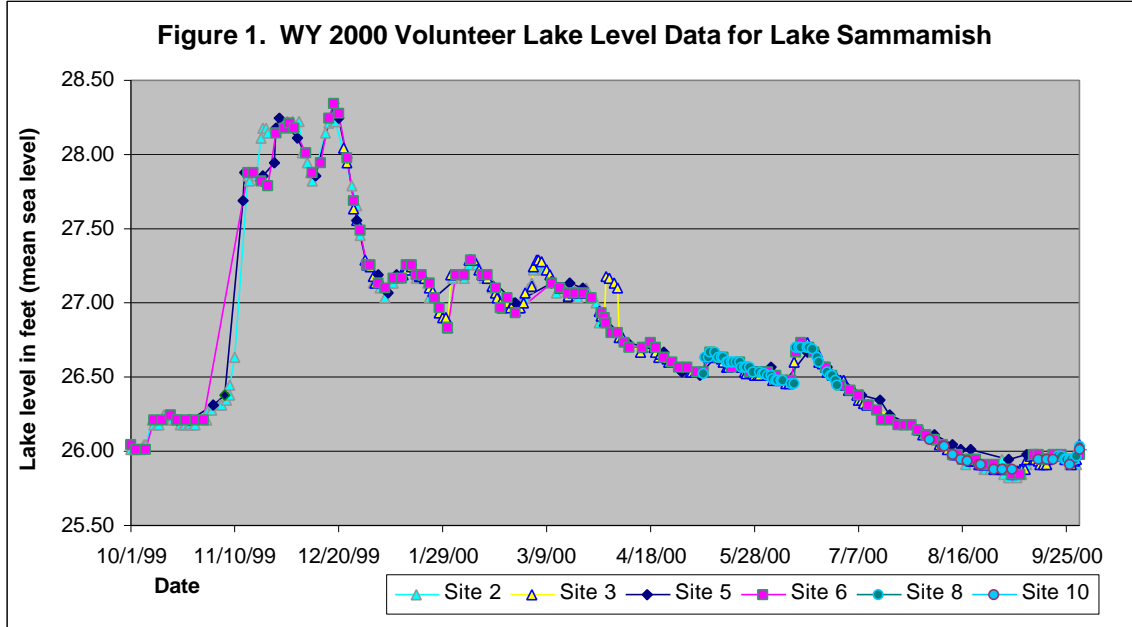
comparison, during the summer of 1998, 1999, and 2000, there was little rain and subsequently little external loading from the watershed or mechanism for mixing hypolimnetic water into the epilimnion and photic zone. These conditions likely resulted in the low VWTP measured in the lake and the corresponding low primary productivity and lack of a fall algal bloom.

Summer weather and stream inflow patterns have a significant influence on summer water quality, but other factors obviously influence the response of the lake. The lack of extreme winter storm events and the resultant erosion and sediment transport into the lake is a probable cause. Improved watershed management in the basin by citizens' groups and local governments may be another factor in this improvement. While neither citizens' groups nor County policies are responsible for the weather, the water quality improvements seen in the summers of 1998, 1999, 2000, and 2001 show that limiting external phosphorus loading to the lake can result in improved water quality. All of the management policies in the Lake Sammamish watershed are designed to reduce external loading by controlling discharge of non-point source pollution to the Lake and associated streams. Assuming these policies are continued and successful, we should be able to meet the long-term water quality goals for Lake Sammamish.

Volunteer Program Summary

To coordinate the activities of government and citizens in improving water quality and aquatic habitat in Lake Sammamish, King County and *Save Lake Sammamish* have joined in a partnership to train and use citizen volunteers in data collection. Most of these citizens live on the lakeshore and are collecting data on a much more frequent schedule than would be possible without their efforts. Increased training results in data that can be used directly in evaluation and management of the resources. It is hoped that this project will continue and be expanded.

In April of 1999, eleven citizen volunteers were trained by King County staff to collect physical data along the shoreline. This data augments data currently collected at seven sites on the Lake by the King County Environmental Lab. Parameters monitored by volunteers included daily lake level, daily rainfall, weekly Secchi disk measurements, weekly water color, and weekly temperature. The volunteers chose to monitor the weekly parameters from their dock or from their boat anchored approximately 100 meters offshore. Volunteers also collected lake use information including the presence of boats, swimmers, birds, wildlife, and algal blooms. They also collected suspicious water quality samples if noticed, and alerted King County staff when present. Monitoring data was submitted on a quarterly basis.



Implementation of Lake Sammamish Management Program

During 2000, King County implemented the Lake Sammamish Management Program as follows:

1. Forest Conservation-Conservation of forested land in the Lake Sammamish Basin continues. Forested lands are protected as timberlands (privately owned forests managed for harvest), Public Benefit Rating System lands (privately owned parcels receiving reduced taxation as a result of voluntary commitment to conservation), and as open space (publicly owned). There are currently 99 parcels, comprising 517 acres, of forested lands in the Basin conserved through the Timberlands and PBRs programs.
2. Non-point Source Control Program – Education activities for the Lake Sammamish Basin are now developed and implemented through the WRIA 8 process. However, traditional planting events, workshops, and the Issaquah Salmon Days emphasis on the whys and wherefores of phosphorus as a pollutant have continued.
3. Regulatory Compliance and Enforcement – the King County Erosion Control program continued with dedicated inspectors, however most of the developing land in the Lake Sammamish Basin has incorporated or been annexed, so King County’s role in protecting the lake from phosphorous inputs from construction sites is extremely limited. However, the cities of Issaquah and Sammamish also have erosion control inspectors.
4. Enhanced Operations and Maintenance – no changes were made in maintenance practices for detention and water quality facilities in the basin in 2001.

5. Lake Protection Standards – 50 percent phosphorus removal standards for new development were adopted for the unincorporated parts of the basin in January 1998. These standards have been implemented since that time and were superseded by adoption of the 1998 King County Design Manual in 1998. In 1999, the County applied for and received a \$250,000 grant from the United States Environmental Protection Agency to evaluate the feasibility of implementing regional stormwater treatment in the Lake Sammamish Basin. The contract for the study was awarded to *Gray and Osborne*, which was notified that it could begin work on September 10, 2001.

Work completed during the 4th Quarter of 2001 included a kick off meeting with the major consultants involved in the project. The meeting was held to determine roles, identify work items to be completed and project schedule. Two major treatment methods were identified in the meeting for initial review. The first is rehabilitation of the State Park wetlands. This rehabilitation will allow for the entrapment of suspended solids during high flow events prior to their entering the lake. The second methodology is the installation of treatment technologies, such as rapid sedimentation. Other treatment technologies, such as vault filter technology and vortex technology, were discussed. However, they will be given a lower priority in the analysis of regional treatment technologies as they are typically intended for smaller site development and smaller retrofit situations.

The majority of the effort in the fall quarter of 2001 was to identify data needs, data availability and to begin a literature review. Additionally, data analysis was completed that identified potential flow regimes for wetland treatment. Other work included the development of a technology treatment rating criteria worksheet and the identification of permitting needs.

The first quarter of 2002 will be focused on continuing the literature review, reviewing data from selected pilot programs for rapid sedimentation technologies, completing of the rating criteria worksheet and refining the understanding of the lower Issaquah Creek hydraulics.

6. Public Ownership and Shoreline Access – King County has purchased and is developing the East Lake Sammamish Trail. Citizens, the King County Land Trust, and King County Parks are also evaluating possible shoreline parcel acquisitions in conjunction with the trail development. King County and the City of Issaquah are cooperating to develop a Waterways riparian corridor from Lake Sammamish State Park to the Taylor Mountain site purchased by the County in 1997 in upper Issaquah Creek (headwaters of Holder and Carey Creeks). During 2001, work continued towards acquiring additional parcels, with 33 acres of streamside properties being added to the waterways program.

The three short-term programmatic actions identified for King County action? an erosion control program, a source control program, and implementation of the 50 percent phosphorus standards for new development? have all been incorporated into the County's ongoing management of the Lake. Two of the eight capital projects identified as short term actions? Valley Growers Nursery and Weowna Creek, ? were constructed or completed during 1997 or 1998. Three are now under the jurisdiction of the City of Issaquah (Kelly Ranch, and the Bianca and Interpace Mines). The Issaquah State Hatchery design project has been stopped

and currently is in an alternative design review for a less expensive yet equally efficient form of phosphorous removal and public education at the site. No firm date has been set for future construction. [More detail available in the Lake Sammamish Initiative Table provided in the appendix.]

Surface Water Design Manual (SWDM)

The publication of Ecology's *Stormwater Management Manual for Western Washington* in August of 2001 mooted the dialogue between the County and Ecology on the equivalency of the County's Surface Water Design Manual with Ecology's Stormwater Manual for the Puget Sound Basin. King County has begun the process of reviewing the SWDM for equivalency with Ecology's new manual and plans to publish a full public review draft of proposed changes to the SWDM during the summer of 2002.

The following discussion focuses on the elements of the annual report required by the above referenced permits.

S10 (B) 1: STATUS OF IMPLEMENTING THE COMPONENTS OF THE SWMP

All the requisite components of a SWMP are in place in King County, with the exceptions noted above. Although there are some minor changes in the timing, magnitude, or name of some of our compliance activities, our program today continues to be substantially the same as that described in our approved SWMP.

S10 (B) 2: NOTIFICATION OF RECENT OR PROPOSED ANNEXATIONS OR INCORPORATIONS RESULTING IN A... DECREASE IN PERMIT COVERAGE AREA

From January 1, 2001 to December 31, 2001, King County lost just over 1000 acres to annexations. Information about the specific recent annexations and incorporations is shown on a map included in the Appendix.

In 2001, King County lost over \$100,000 in surface water management fee revenues to annexations. No incorporations occurred in 2001 and none are expected in 2002.

S10 (B) 3 & 4: DIFFERENCES BETWEEN PLANNED AND ACTUAL EXPENDITURES FOR THE REPORTING PERIOD & REVISIONS TO THE REMAINING YEARS OF THE FISCAL ANALYSIS

King County's detailed fiscal analysis is included in the Appendix. In summary, the County's planned spending for NPDES stormwater related activities in 2001 was \$49,317,666. Actual spending for 2001 was \$50,932,872--an increase of 7.51% from 2000 actuals. The adopted budget for 2002 by the County Council is \$48,108,845--a decrease of 2.45% from the 2001 adopted budget.

S10 (B) 6: A SUMMARY DESCRIBING COMPLIANCE ACTIVITIES, INCLUDING THE NATURE AND NUMBER OF OFFICIAL ENFORCEMENT ACTIONS, INSPECTIONS, AND TYPES OF PUBLIC EDUCATION ACTIVITIES

Enforcements and Inspections

DSS Inspections and Enforcement Activities

Drainage facility inventory numbers have remained fairly constant--new facilities are keeping up with annexations and incorporations. The Drainage Services Section (DSS) of the Water and Land Resources Division continues to inventory commercial conveyance-only facilities, but does not inspect them.

DSS continues to be the initial investigators of drainage complaints. As shown, many facility complaints result in corrective work orders. Additionally DSS corrects drainage problems by designing small improvement projects in our Neighborhood Drainage Assistance program.¹ These programs may increase as a result of the extension of the SWM service area to the rural portion of the County². The 2-year maintenance/defect program continues to include quarterly inspections of new drainage systems. Maintenance programs have remained unchanged in 2000.

¹ The Neighborhood Drainage Assistance Program (NDAP) is a DSS program that addresses drainage problems not covered by other R/D or road maintenance programs. It builds small projects to remedy off right-of-way drainage problems, of which many are located on private property. NDAP projects quite often result from a DSS drainage complaint investigation that escalates to a drainage review. The projects are prioritized and then funded for construction on an annual basis. Contracted maintenance crews perform the work under the guidance of DSS engineers. NDAP has been a successful program for addressing problems neither referred to other agencies nor addressed by general maintenance programs within DSS.

² The SWM service area and fee extension was passed by the Council at the very end of 1999 and continues to be controversial though supported by the Council through 2000.

DSS provided maintenance assessments and notification of maintenance needs to Commercial/Multi-Family property owners in unincorporated King County and to several Cities under contract. Property owner compliance increased from the previous Self-Assessment program. Additional program changes are in progress to enhance the Stormwater Management Program. The complaint tracker program is being upgraded with GIS/GPS capabilities to facilitate monitoring drainage complaints and using facility maps. The R/D inspection Management Information System³ is also being redeveloped to improve maintenance tracking and scheduling. Both will facilitate the use of historical data to address drainage problems.

Enforcement Actions & Inspections--R/D facilities

The spreadsheet below identifies the total number of retention/detention (R/D) inventories and assessment activities for 2000.

	INVENTORY TOTALS (as of 12/31/02)	WORK PROGRAM	INSPECTION TOTALS			
			2000	2001		
RESIDENTIAL						
2-Year Bond	130	2-Year M/D Bond Inspections	272	350		
Residential R/D	1420	Inspections	986	950		
		Special Use Permits	37	45		
Total	1720	New Facilities Inventoried	68	45		
COMMERCIAL						
M/F Comm incl City	1165	Inspections	1396	1130		
NPDES Facilities (conveyance-only)	468	NPDES Inspections	6	10		
Total	1,633	New Facilities Inventoried	37	45		

³ The DSS Management Information System (MIS) enhances the Drainage Investigation and Inspection (DI&I) Unit's R/D inspection and maintenance program. This computerized program is used to maintain a facility inventory, perform facility inspections, produce work authorizations or maintenance correction letters, and to track completion of work. The historical database contained in this program is used to do a "phased" analysis for inspection scheduling. This software is currently being redeveloped to better suit the redefined responsibilities of DI&I, and to fit many of the newer R/D facility features developed in the Design Manual.

Enforcement Actions & Inspections--KCC 9.12 Activities (Including corrections to the information provided in the 1999 report for calendar year 1998.)

INVESTIGATION TYPE	CARRY OVER	NEW (in '01)	CLOSED (in '01)	OPEN
COMPLAINTS† (quick response)	50	107	114	43
REVIEWS† (more complex response)	187	91	45	233
SITE CONSULTATIONS† (for businesses)	197	37	27	207
ENFORCEMENTS† (violations issued)	28	7	6	29
INSPECTIONS † (permit-driven inspections, not needing a full site consultation)		30	21	9

† **Complaints (quick response):** All water quality complaints that are received by WLR are reviewed by a Senior Engineer to see if an initial quick visit by a technician may be sufficient to solve the problem. If so, a technician visits the site and collects all pertinent information. If the problem is a simple problem or one that can be resolved with a little bit of information or education by the technician the complaint can then be closed. If the Senior Engineer determines the complaint is more involved at the time of the initial review, an Engineer investigates the problem as a **Review**.

If a technician visits the site and finds more involved issues at the site, or if the individual or business where the complaint originates needs more detailed, technical information the complaint is “turned into” a **Review**.

† **Reviews:** (Handled by an Engineer) These problems often require writing letters to the property or business owner where the water quality problem is occurring and explaining in more detail KCC code 9.12, or outlining additional ways to correct the water quality problem. A review often requires additional research to find the source, potential impacts, and severity of the water quality problem. A review also may require coordination with other agencies such as DOE, KC Health, Hazardous Waste, Solid Waste, Roads, or others.

† **Site consultations:** An engineer visits a business site with the owner/property manager. All BMPs that are required for the site to achieve compliance with KCC 9.12 are discussed and an implementation schedule is agreed upon. Once the owner/property manager feels that all BMPs are in place, the engineer revisits the site, and if the site is in compliance, the file is closed.

† **Enforcements:** These cover a variety of problems. The first step in the process is a Notice of Violation that explains the specific violation and the steps necessary to correct the Violation.

Once the violation is corrected, a Release of Violation letter is sent. The types of violations we see vary and involve both business and residential properties.

† **Inspections:** The completion of a building permit triggers a site consultation. A quick inspection of the business and business practices was conducted and it was determined that the business does not have enough pollution-generating activities to require a full site consultation.

Erosion and Sedimentation Control

The Erosion Control Inspection & Enforcement Program (the Program) is based in the King County Department of Development and Environmental Services. The program for permitted sites was reduced from four to three FTE positions in the 2001 budget. All three positions were filled for the first 3 quarters of 2001--one of the 3 positions was vacated in August 2001 and remained unfilled the rest of the year. An additional four (4) Site Development Specialists are assigned to cover non-permitted activities, especially those relevant to ESA issues. The scope of the Program continues to include enhanced inspections of permitted activities for Erosion/Sediment Control compliance (ESC) in the whole County. Additionally, the Small Works Program for sites that remain non-compliant is still in operation. Under this program, the County lets contracts for erosion and sedimentation control contractors for sites remaining non-compliant after enforcement action begins. Once the contractors complete the work, the site is re-inspected and when it passes, the developer's restoration bond is seized to pay the contract. The developer is responsible for any additional charges in excess of the bond amount. Once the work is completed, and the bill paid, the developer is authorized to recommence work.

Regular ESC inspections involve identifying potential drainage-related erosion problems on permitted sites. However, the regular inspectors typically visit sites for other project inspections and processes--the ESC inspection is incidental to the overall inspection process. Based upon their current workload and process priorities, the regular inspectors visit project sites less frequently than might be optimal for ensuring full compliance. The inspectors performing enhanced ESC inspections visit sites only for the purposes of observing whether appropriate ESC Best Management Practices (BMP's) are used. They have the time and are authorized not only to note violations, but also to provide on-site training in the proper use and installation of ESC BMP's--a function that is not performed by regular inspectors. Enhanced ESC inspection areas include the Green River, Cedar River, Sammamish River, Bear Creek, and the Snoqualmie River Basins. [See the Appendix for a map showing enhanced ESC inspections performed during 2001.] With the incorporation of the City of Sammamish and annexations by Issaquah on the eastern side of the lake, and the annexation by Bellevue on the western side of lake, the Program's services to the Lake Sammamish drainage area are limited to activities permitted by DDES prior to incorporation and annexation. Additionally, the Program provided training for City of Sammamish residential inspectors and inspection services as requested by the City under the interlocal agreement governing the incorporation. The Program also implements that portion of the County's response to the Endangered Species Act (ESA) relating to the inspection of non-permitted sites.

The enhanced ESC inspection program serves three main functions. First, it enhances ESC inspections on permitted activities, as described above. These include permitted activities from

clearing and grading, short plats, subdivisions, commercial, and residential. The Appendix includes a map that shows the number of permitted sites with enhanced erosion inspections during 2001. For the year, a total of about 3447 separate inspections were conducted at construction sites that were not possible in earlier years with only one inspector and limited coverage area. This is an increase of approximately 694 inspection visits over the 2753 inspections during 2000. Some inspections resulted in violation notices and enforcement actions. Frequently, as a result of the increased number of inspectors, enforcement occurred *before* rain events, which meant that the program was more successful in monitoring and preventing potential erosion problems.

The second of the program's three main functions involves the provision of technical assistance through guidance on the use of BMP's at specific construction sites and more general training for the development community, county staff, and the public. Many of the site visits focused builders' attention on better erosion control practices. In addition, the DDES web page offers additional information to builders (<http://www.metrokc.gov/ddes/>) --from the hot topics, choose *Erosion Control and the ESA*).

The third main function of the enhanced ESC inspection program is the pursuit of enforcement actions on sites that are not permitted and are in violation of the 1998 King County Surface Water Design Manual (Appendices C & D), other regulations as they apply to water quality, and ESA issues for both permitted and non-permitted activities.

During 2001, the lead engineer of the ESC inspection program sat on the committee developing DDES's new policy on engineered soils. The policy will set standards and BMP's to improve water quality on sites that use Cement Kiln Dust (CKD) and Concrete Treated Base (CTB) applications to engineer for compaction and stability.

Inspections & Consultations—Hazardous Waste

In the year 2001, the Hazardous Waste Management Program conducted over 3,500 on-site technical assistance visits to local businesses. The program helped local businesses stop discharging over 6,800 gallons of hazardous-chemical-bearing wastewater, including silver-contaminated wastes from photo processors, solvents, oils, and corrosive chemicals. Over 2,500 pounds of solvent-contaminated materials were also diverted from municipal landfills.

Surface Water Engineering and Environmental Services

PROGRAM OVERVIEW

The primary role of the Surface Water Engineering and Environmental Services (SWEES) Section is to design and build capital projects in direct support of the Water and Land Resources (WLR) Division's capital needs. In addition, SWEES provides a broad range of engineering and environmental support services. SWEES "clients," both internal and external to King County government, include King County's Department of Natural Resources (DNR), Wastewater Treatment Division (WTD), Solid Waste Division (SWD), Parks Department, and Department of Transportation (DOT). Other municipalities as well as County and State agencies also commonly request support.

Self-directed interdisciplinary teams within the SWEES group are responsible for developing and implementing projects and providing innovative "state-of-the-art" expertise to its clients. These teams offer technical direction and advice for a variety of challenging ecological and surface and storm water related problems and issues. SWEES team members are comprised of ecologists, engineers, geologists, landscape architects, water quality specialists, and other technical support specialists. They produce multi-objective projects that address water quality problems, fish and wildlife habitat enhancement and restoration, localized flooding impacts, damage from erosion and sedimentation, hazards to human health and safety, and alterations to hydrology. Solutions to these problems include implementing a variety of traditional and non-traditional capital projects such as:

- ✍ Regional storm-water storage facilities that aid in flood damage reduction and improvements to water quality;
- ✍ Allowing access to upstream habitat by removing or replacing antiquated culverts that are barriers to fish migration;
- ✍ Restoring and enhancing stream, wetland, and floodplain habitats for fish and wildlife;
- ✍ Reducing sediment impacts from landslides and channel and streambank erosion.

PROGRAM ELEMENTS

Capital projects are received from a number of sources, but the majority originate within the WLR Division. Sources include:

1. Basin plans and other reconnaissance efforts performed by the former Surface Water Management (SWM) Division or WLR and its partners have historically been the main source of large projects. Numerous projects identified by basin plans remain to be implemented; some remain in unincorporated King County while others have become the primary responsibility of cities as new areas are annexed or incorporated.
2. The WLR Division Drainage Services Section recommends projects created in response to citizens' drainage complaints and requests from other agencies and municipalities.
3. The rural capital reconnaissance, begun in 2000, is developing into an important new source of projects to address long-standing drainage, sedimentation, and water quality problems in the expanded surface water area.
4. Future capital projects identified through Water Resources Inventory Area planning are expected to solve water quantity and quality problems while restoring degraded aquatic habitat.

A committee of project proponents and the ecologists and engineering staff who will ultimately do the design and permitting prioritizes projects in a two-step process. First, effectiveness and feasibility are used to rank projects. "Effectiveness" measures the overall value of a project on the basis of considerations such as the severity of the original problem, how thoroughly the proposed project would resolve the problem, project cost, durability of the design once built, and possible upstream and downstream impacts of the project. "Feasibility" reflects the

constructibility of the project by considering the issues such as physical access to the site, landowner willingness to participate in the project, and the likelihood of securing permits for the projects. Finally, project rankings are adjusted to reflect a number of secondary considerations such as the multiple benefits provided by some projects, public visibility or support for certain projects, and geographic equity among potential projects.

To efficiently manage the diversity of capital projects, the capital improvement program is divided into four principal areas: Large, Small, Emergency, and Opportunity.

LARGE CIP

The Large Project Capital Improvement Program includes capital projects identified in basin plans through special studies as well as other sources. Projects were prioritized through the CIP Master List process involving CIP and Basin Planning personnel. Large and small basin plan CIP projects are prioritized during preparation of the basin plans. Upon completion of the basin plan, CIP and Basin Planning personnel adjust priorities based on changing basin conditions, but strive to respect the basin plan's original ranking of projects and the intent of the basin plan's goals and objectives. Expenditures in this category represent a majority of the capital program.

SMALL CIP

The SWEES Section constructs small capital improvement projects to resolve small habitat and localized flooding problems. These problems, individually, do not represent a significant threat to water resources or cause major property damage, but exhibit cumulative effects that may lead to the system-wide deterioration of valuable habitat and dissatisfaction on the part of King County residents. The Small CIP consists of three program elements:

Neighborhood Drainage Assistance Program (NDAP)

The SWEES Section's NDAP addresses localized flooding, erosion and sedimentation problems that primarily affect private property, and are caused by nonexistent, inadequate or malfunctioning storm-water conveyance systems within the Surface Water Fee Service Area. The NDAP applies to both residential and commercial properties. Neighborhood drainage problems will be addressed through selected enforcement action, maintenance procedures, the construction of capital improvement projects, and through the provision of technical assistance for privately funded solutions. The goal of the NDAP is to provide customer service within the Surface Water Fee Service Area.

The NDAP gives SWEES the authority, funding, and ability to manage surface water runoff outside of County maintained right-of-ways and tracts. The NDAP, along with existing SWEES activities and coordination with the Roads Division, provides SWEES the opportunity to more comprehensively manage storm water systems. Citizens will receive direct benefits from solving flooding and erosion problems that cause property damage, threaten health and safety, and degrade natural resources within their neighborhoods. The NDAP also gives SWEES the opportunity to control surface and storm water runoff at their sources, therefore preventing degradation of our valuable streams, lakes, and wetlands. The NDAP will not immediately address the entire off-road drainage system, rather, it will solve problems as they arise. In many cases the NDAP will accept regular maintenance responsibility for new facilities and those repaired by County crews.

SWEES is notified of neighborhood drainage problems when citizens file a drainage complaint, usually after a storm event. Approximately 40-percent of the total complaints received by SWEES each year is outside of County maintained roadways. NDAP field staff will investigate all problems in the off-road system to collect drainage-related information, and screen and prioritize the problems using impact criteria. The criteria include the type and number of items affected (home vs. yard), severity of impact on the items affected (yard eroded vs. minor yard flooding), potential to cause further damage, damage to natural resources, and the need to adjust expenditures and revenues in identified basins. NDAP staff then routes the problem to one of three solution groups: enforcement, maintenance, or capital construction. Staff will perform a cost/benefit analysis and solve as many problems as funding allows. The SWEES Section staff also offers technical assistance and recommended solutions to all program participants.

Drainage and Habitat Improvement (DHI) Program

The DHI Program builds small capital projects that resolve minor drainage, erosion, and sedimentation problems, and/or improve water quality, and enhance wetlands and habitat in or along natural stream systems. The program focuses on projects that 1) are technically complex, requiring hydrologic modeling, backflow analysis, detailed plans, and/or extensive survey; 2) could have significant downstream impacts; or 3) require use of heavy equipment.

DHI projects are ranked and prioritized by the DHI Core Team using objective criteria such as 1) protection of public health, safety, and private property; 2) protection of beneficial uses such as aquatic, wetland or fish resources; 3) project cost, liability, and chance of success.

Small Habitat Restoration Program (SHRP)

The purpose and goal of the Small Habitat Restoration Program (SHRP) is to build effective and inexpensive small scale habitat restoration projects in stream corridors and wetlands that restore physical, chemical, and biological habitat forming processes for fish and wildlife. The program focuses on 1) developing habitat management plans; 2) providing technical assistance; and 3) constructing habitat restoration projects. These may include stabilizing eroding streambanks, installing livestock fencing, controlling invasive weeds, and planting native vegetation. In the Rural Service Area SHRP is focusing efforts on specific stream corridors in order to reduce or eliminate the "piecemealing" of projects among sites scattered throughout different basins. This stream corridor focus is a landscape-level approach to restoring habitat-forming processes and practicing adaptive management. SHRP projects originate from Basin Plans, County staff, and the general public and community groups.

SHRP also provides technical assistance to property owners and other agencies interested in pursuing their own habitat or enhancement projects.

EMERGENCY CIP PROJECTS

The emergency capital improvement program was designed to respond to emergencies or critical needs without drawing funds from other programs. Typical examples of emergencies are system failures, washouts, and erosive slides that threaten public health and safety, or property. For emergency responses to storm events, special funding appropriation will be sought to augment

the emergency CIP fund when necessary. This category also includes critical projects, in advance of basin plan completion, that solve long-standing problems.

OPPORTUNITY CIP PROJECTS

These are generally large CIP projects that become a high priority for another jurisdiction or a developer, who in turn offers to participate in the funding. If the project fits into any SWEES plans or objectives for the area or problem, an attempt is made to establish an arrangement to share funding and identify a participant's scope of responsibilities through an interlocal agreement.

OTHER PROGRAMS

The Ecological Services Unit (ESU) manages other programs that directly support the surface water CIP program. They include:

Native Plant Salvage Program

ESU continues to salvage, hold, and propagate native plants for use in surface water CIP and Roads CIP programs where re-establishing native vegetation is desirable or required. In conjunction with WLR's Public Involvement staff, ESU held six volunteer-staffed events throughout King County. Approximately 6,000 native plants were salvaged from development sites in 2001, of which approximately 3,000 plants were salvaged by landowners for re-establishing native vegetation and habitat in their yards. About 12,000 plants were replanted at project sites during the fall and winter dormant periods. These will include salvaged plants, plants propagated at the holding facility, and plants donated to the holding facility by the National Tree Trust, local vocational nursery programs, and private property owners. The program results in significant cost savings to the County and promotes the preservation of native plant gene pools through the extensive use of locally adapted plants.

Management of the Washington Conservation Corps Crew

ESU manages the Washington Conservation Corps (WCC) crew for use on numerous surface water and Roads CIP projects. Crews provide extensive construction support for stream and wetland restoration projects and for projects where work in sensitive areas requires the extensive use of hand labor. Besides offering a low impact method to construct projects in sensitive areas, the use of the WCC crew results in considerable cost savings to the County. In return, crew members receive training and job experience in the field of ecological restoration.

CIP Monitoring Program

ESU manages the CIP Monitoring Program. This program creates and implements project-monitoring plans in order to assess project performance and to meet regulatory monitoring requirements. In 2001, ESU monitored 19 previously constructed projects. Eighteen of these projects required the preparation of yearly monitoring reports that were submitted to regulatory agencies (the King County Department of Development and Environmental Services, the Washington State Department of Fish and Wildlife, and the US Army Corps of Engineers) in compliance with permit conditions. Twelve reports were *final* reports.

In addition, the monitoring team designed and implemented water quality monitoring programs for projects under construction, where turbidity issues were of special concern to the Washington

State Department of Ecology (DOE), the US Army Corps of Engineers, the US Fish and Wildlife Service, and the National Marine Fisheries Service. With the recent listings of bull trout and chinook salmon as threatened species under the Endangered Species Act, substantial water quality monitoring during construction is likely to become a standard requirement for many projects. ESU will also use this information to help DOE develop more realistic water quality thresholds for construction projects.

CIP HIGHLIGHTS

SWEES constructed 15 capital projects during 2001, at a cost of 2.3 million dollars, and plans to construct 17 capital projects in 2002.

Road Maintenance Activities

The year 2001 saw continued efforts to improve the Road Maintenance Program to address salmonid impacts. A detailed report on these efforts is provided in the Appendix.

Public Involvement and Training Activities

Department of Natural Resources

Public Involvement Program

The fate of Northwest salmon stocks remains a serious concern to professional resource managers, the media, and King County residents generally. Our public outreach messages and activities continue to emphasize the relationship between water quality and the health of the region's salmon and watersheds.

☞ Water Quality Advertising and Education Program

King County Department of Natural Resources (KCDNR) had active citizen outreach at three major regional events: the **Northwest Flower and Garden Show, King County Fair, and Issaquah Salmon Days**, along with other smaller local events. The combined attendance at the shows was over 289,000 and the booths have been popular with citizens who want information on environmental gardening techniques and programs. Environmental gardening programs were also highlighted at the Solid Waste Division's successful spring compost bin sales.

In 2001, the Water Quality Program integrated advertising and educational efforts with several other public agencies including the **Hazardous Waste Management Program, Solid Waste's Grasscycling Program, Wastewater's Trash in the Sewer and Seattle Public Utilities' Children's Educational Program.**

In addition to the **Natural Lawn Care** television advertisements and events run in partnership with Hazardous Waste (see below), the Water Quality Program also ran a series of radio ads linked to the TV ad through Bert the Salmon, featuring ways homeowners can help protect water quality, ie. using professional car washing, cleaning up pet poop, using native plants, natural yard care, etc. Total gross impressions for the campaign was over 56 million.

The Water Quality Program brought the Cisco Morris radio program to two live-remote appearances, first to Grasscycling's "**Mower for Less**" event and then to "**Suds Free Saturday**" in partnership with the **Puget Sound Car Wash Association**. Again, the messages focused on what homeowners can do to protect water quality and natural resources through their own behaviors. Total gross impressions for both broadcasts was 66,000.

Water Quality also supported the **Regional Wastewater Treatment Program** in 2001 by creating a newspaper ad campaign around the theme of King County being a good neighbor. Ads were placed in Pacific Magazine but were also focused primarily in local newspapers.

Water Quality continued to shepherd the **Bert the Salmon Mascot Program**. Bert (worn by stalwart WLRD staff and others) appeared all over the County, notably at an April 21 Mariners game attended by 38,000 people, to raise awareness of water quality, salmon health and personal responsibility. (More information on Bert is provided in the Hazardous Waste Management Program section below.)

Volunteers Program

About 600 volunteers **planted** 3,200 plants along local streams and rivers to prevent erosion, improve water quality and protect salmon rearing beds along the Sammamish River and at three other sites. This year's restoration events emphasized maintaining existing plantings (removing invasives and other work) as well as planting new plants. Both maintenance and planting projects were greatly enhanced by the work of volunteer team leaders, 20 of whom received **leadership training** on two September evenings in conjunction with staff from the cities of Redmond and Issaquah.

More than 400 people participated in four **native plant salvage** events, digging up a total of 4,000 native plants (worth over \$22,000) from development sites to be used in future plantings. Volunteers and staff moved the native plant holding facility and its 15,000 plants to a beautiful new site at Duthie Hill Park. More than 200 citizens also participated in the **Habitat Partners Program**, removing invasives and providing other maintenance at a dozen events.

In 2001, approximately 150 volunteers stenciled 1,050 storm drains with a water quality message "dump no waste/drains to stream", and four charity car washes were held using clean water carwash kits. Staff also helped four incorporated areas (Maple Valley, Bothell, Shoreline and Mercer Island) start stenciling programs by sharing materials and protocols, and provided similar information to Covington on carwash kits. Flyers were updated and new web pages created for both programs.

Grants Program

The Water and Land Resources Division continued to award numerous grants to support improvements to water quality, including habitat. The Appendix contains a table showing grants awarded in 2001. Details about these grant programs are available on the web at: <http://dnr.metrokc.gov/wlr/resource.htm> .

☞ **Public Information and Education Programs**

Classroom water quality presentations reached more than 5,300 students at 80 schools in 13 districts. Staff presented an hour long, hands-on class about water quality, wastewater treatment and individual responsibility for a healthy environment.

Ninety-five volunteer **Beach Naturalists** made more than 16,000 contacts with public visitors to seven area beaches on low tide weekends from May 26 to July 22. This is an increase of more than 30% over year 2000 visitors for this cooperative project with The Seattle Aquarium. Naturalists were also present on the beaches for six school days in May and June, surveying groups from more than 60 schools totaling about 4,800 students and adults, and providing identification and stewardship messages as numbers allowed.

In the fourth year of the **Cedar River Naturalist** program, 46 trained volunteers (30% more than last year) helped more than 4,000 visitors (up 36% from last year) spot spawning salmon along the Cedar River and understand the natural and human history of the watershed. Teams of naturalists were also present to deliver these messages on three summer Saturdays at the Ballard Locks; more than 15,000 people visited the Locks during that time.

A total of 337 people attended three **Naturescaping workshops** around the County. Attendees learned how and why to use native plants in their home landscapes, thereby keeping pesticides and fertilizers out of lakes, streams, rivers and marine waters.

King County's **Programs for Educators 2001-2002 School Year Edition** booklet was also published and distributed, both in hard copy and on the web. It continues to serve as a valuable resource for environmental educators with updated listings of action projects, classroom programs, curricula, field trips, grants, Internet resources, newsletters, teacher workshops and videos.

62 schools participated in the **Wheels to Water** environmental school bus program last year reaching 2,358 students. This program provides free Metro bus transportation to water quality education sites throughout the County.

Staff helped create and maintain the **Interactive Salmon Quiz** on the WLR Web site. By visiting the site, more than 600 citizens tested their knowledge and learned about salmon, watersheds, and how to protect water quality. The Salmon Quiz was developed jointly by WLR, Roads Division, and the Executive's Office.

Staff updated and reprinted the popular "**Home and garden hints** for clean streams and salmon" and created a new version of "**Get Your Feet Wet**", an engaging brochure that lists all our volunteer opportunities. The unit also worked to update the **Community Stewardship Network Directory** (now ready for release as the Watershed Stewardship Directory) in an on-line version (<http://dnr.metrokc.gov/wlr/wkdir>). Another new product created was a laminated pocket-sized list of **emergency flood numbers** perfect for field staff to use. By phone, mail and web, staff provided daily support to individuals, community groups, agencies and businesses looking for volunteer opportunities, educational resources, grant sources and more.

Over 14,000 **Spring Into Action** and over 18,000 **Fall for Salmon** flyers listing dozens of ways for King County residents to get involved in protecting water quality were distributed in 2001. Both flyers listed seasonally-appropriate tips for citizens to employ at home (water conservation tips, natural gardening tips, information about disposing of household hazardous waste successfully) as well as some of the volunteer activities listed above. The fall brochure was distributed via the Metro bus distribution system for the first time ever. This was in addition to the usual mailing and retail distribution network.

A watershed video, **Watershed H2ope for the Future**, was produced as a follow-up for the successful Natural Connections video and curriculum. Several hundred videos were produced and distributed to teachers in King County. They are also available in libraries throughout the county. Additionally, the video was featured in a Salmon Information Television program broadcast by more than 20 local cable stations.

Lake Stewardship Program

In 2001, the Lake Stewardship Program

- ✍ trained and supported citizen lake monitors on 50 small lakes to sample and record water quality and quantity information;
- ✍ distributed over 100 annual reports of the results of the monitoring efforts completed in 1999;
- ✍ conducted a follow-up workshop to the two workshops presented in 2000 on lake-friendly landscaping and aquatic land restoration;
- ✍ published and distributed the quarterly *Lake Steward* newsletter to approximately 2,400 lakeside residents, providing information on water quality protection and enhancement activities;
- ✍ managed an survey effort in 38 county lakes to identify milfoil infestations and to produce a regional plan for milfoil control, which is slated to be made available in mid 2002;
- ✍ managed a program for the cities of Maple Valley and Covington of noxious weed removal targeting the *Hydrilla* infestation of Pipe/Lucerne Lakes;
- ✍ provided technical assistance to over 200 lakeside residents, addressing water pollution and protection activities;
- ✍ provided LMD renewal support to the city of Sammamish and the residents of the Beaver Lake watershed.
- ✍ analyzed long term data sets for statistically significant trends in water quality parameters and published a report covering the results in November 2000, which was distributed to lake volunteers, municipalities and branch libraries of the King County library system;
- ✍ enhanced the program's website to increase public access to the program's resources. View it at <http://dnr.metrokc.gov/wlr/waterres/smlakes/index.htm> .

Hazardous Waste Management Program

The Hazardous Waste Management Program has several efforts that aim to protect water quality by reducing residents' use of pesticides. Since 1997 the Natural Lawn Care Program, a cooperative effort with King County Department of Natural Resources, Seattle Public Utilities and other public agencies, has used advertising, media events, brochures, community outreach and other methods to encourage people to change their lawn care methods. Natural lawn care methods will mean reduced use of pesticides, fertilizers and water.

In 2001 the Natural Lawn Care Program ran television advertisements, featuring the cartoon “spokefish” Bert the Salmon, during Mariners baseball games. Total gross impressions (the number of men ages 25-54 who might have seen the ad based on viewership) were 4,619,300. A natural lawn care video created in 2000 was marketed and distributed through community groups, public events, mulch mower sales, libraries, and other means.

In August direct retail outreach took place in nine Home Depot stores and five McLendon Hardware stores around King County. Trained volunteers talked to customers about natural lawn care and alternative ways to deal with crane flies; in particular, using organic fertilizers instead of pesticides such as Dursban and Diazinon. To gain media coverage, the program spread the word about a University of Washington research study that found traces of organophosphate pesticides (such as diazinon and Dursban) in almost all young children tested. A media event was also held at a McLendon’s store. Stories ran on four TV stations and interviews on four radio stations. The *Seattle Times* and the *Post Intelligencer* ran large front page stories as well. According to the volunteer reports, 672 customers stopped by to ask questions.

The Hazardous Waste Program worked with 15 suburban cities to mail postcards on pesticide-related topics to the cities’ residents. The postcards aimed to increase perception of the risks of pesticides and provide brief tips on how to reduce pesticide use. Five postcards were produced; topics included the health of children and pets, crane flies, creating an easy-care garden, and garden cleanup. Each postcard included a web site and phone number for more information. Each city mailed at least three postcards, and a few mailed all five cards. Postcards reached about 622,000 residents.

Before-and-after mail surveys found that people who recalled receiving the postcards expressed greater concern about the impacts of common pesticides than did those who did not recall the postcards (10 to 15 percent difference, depending on impact measured). There were significant positive differences in reported behavior changes among those who recalled the postcards and those who didn’t. Those who recalled the cards were more likely to:

- ? Select a plant because it was resistant to insects and/or diseases (52% vs. 32%)
- ? Use a “natural-organic” or “slow-release” fertilizer (69% vs. 59%)
- ? Pull or spot spray weeds (96% vs. 92%)
- ? Amend soil with compost or other organic matter (73% vs. 59%)
- ? Use mulch on flower beds or landscape plants (75% vs. 66%)
- ? Stop using weed and feed products on the lawn (42% vs. 35%)

The Hazardous Waste Program worked with Seattle Public Utilities to develop, produce and distribute 10,000 copies of a new brochure, “How to choose a landscaper for a healthy landscape and healthy environment.” The brochure includes lists of questions for people to ask to determine if their landscape company is protecting the environment (and their landscapes) by improving soil; selecting plants that will thrive; controlling weeds, pests and diseases naturally; and conserving water.

The Hazardous Waste Program has been working with the Washington Association of Landscape Professionals (WALP) on an advanced horticultural management endorsement. Landscapers who pass a field test in environmentally friendly lawn care practices will be certified by WALP and promoted by King County and the City of Seattle. The endorsement was developed as part of WALP's Certified Landscape Technician program. In 2001 three landscapers successfully passed the test and received certification. The governing body, the Associated Landscape Contractors of America, has approved the advanced endorsement. This means that the endorsement is a national model that may be adopted elsewhere in the United States.

Groundwater Program

2001 was the first full year for the King County Groundwater Education Program. Through contacts at various educational and public events and listings in the 2000-2001 *King County Programs for Educators* and the Puget Sound Educational Service District office numerous presentations were made.

Classroom presentations were made to 33 schools in 11 districts, resulting in over 2800 student contacts. Teacher comments in evaluating the presentations included: "Having homework was good. The kids love connecting something they learn in school to their home environment," "It is wonderful that the Department (of Natural Resources and Parks for King County) provides this free service and finds people who know the material". "Hands on props are always a hit with students," "The groundwater demonstration was very visual," "My students were especially impressed with the tubs where water was extracted to show contamination"

The Groundwater Program was also represented at Educational programs at the Northshore School District Watershed Festival, Water Festival 2001 (Highline Community College), the Meridian Elementary (Kent School District)/Soos Creek Science Fair, the Kids Day at Renton River Days, and Salmon Homecoming at the Seattle Aquarium.

Public outreach was accomplished through partnership booths at local festivals including: Renton River Days, Issaquah Salmon Days, and Vashon Island Strawberry Festival (Water District 19), Vashon EarthFair, North Bend Alpine Days, and Arts in Nature at Camp Long,

We continue to build a volunteer group through the WSU Extension Agency's Water Land Stewardship Program and other environmental associations and agencies.

A Groundwater Education web page is being developed at this time. It will include four main areas:

[Resources for teachers](#)

[Fun sites for the young hydrologist.](#)

[Stewardship opportunities](#)

[Links to other agencies, associations](#)

King County Department of Parks and Recreation

King County manages nearly 24,000 acres of land with many of these properties protecting salmon habitat and thus water quality.

Public education about stewardship through the Department's **Interpretive Programs Office** is a high priority. Public programming highlights for 2001 include:

☞ Interpretive Programs (General Public Programs)

Two "Cycling for Salmon" programs were offered on the Cedar River Regional Trail as participants learned about and viewed salmon from their bicycles. A local television station featured the program on the evening news. One program ("You're the Water Scientist") specifically focused on testing water quality at two county parks. Other programs included "Holiday Visit with Salmon", "Wetlands Are Alive," "Just Another Day at the Beach" and "Searchin' for Salmon." Total program attendance for 11 programs was 161 people (adults and children).

☞ Stream, Wetland and Puget Sound Connection (School Programs)

Our family of habitat-based school programs ("Connections") The Stream Connection program continued to attract large numbers of classes. Focusing on salmon and water quality, the program involved 1,487 students in 64 programs. Primary field sites are county parks near Renton, Woodinville and Carnation in the Snoqualmie Valley. Wetland Connection hosted 1,523 students in 60 programs. Field sites include Marymoor Park (Redmond) and Soos Creek Park (Kent). Puget Sound Connection, with an emphasis on marine habitat, hosted 4,172 students in 1765 programs. All of the Connection programs feature a classroom session and a field-based session at an appropriate location.

☞ Water-Related School Programs

Other water-related school programs include "Water Cycles", "Amphibians," "Pond Dipping", "Build a Wetland", "Beavers" and "Hooks & Ladders" (salmon migration). These programs were presented to 2,078 students in 78 programs. Water quality messages are included in each program.

☞ Cedar River Salmon Journey

In 2001, 4031 visitors (up 36% from 2000) participated in *the Cedar River Salmon Journey*, an innovative partnership involving King County Parks, King County DNR Water and Land Resources Division, Seattle Public Utilities, The Seattle Aquarium, the Army Corps of Engineers. With increased volunteer involvement, hours and days were increased. New volunteer naturalists trained totaled 19 with 30 returning from previous years. The volunteer naturalists presented information on salmon and natural and human history of the Cedar River at four sites.

Employee Training Related to Water Quality - Maintenance and Facilities Division

Employee training is an important component of managing the park system acreage to insure compliance with current regulations and model land management practices. Employees attended the following list of courses in 2001.

- ? Best Management Practices Manual Review and Training – 119 employees in 3 sessions
- ? ESA Section 7 Compliance – 1 employee
- ? Society for Ecological Restoration Conference - "Restoration and Recovery" – 8 employees
- ? Wetland Delineation - 1 employee
- ? Snohomish County Watershed Keepers course - 1 employee
- ? King County Land and Water Steward course - 1 employee
- ? Beaver Management - 1 employee
- ? Amphibian Identification and Monitoring - 1 employee
- ? Pesticide Applicators Re-certification - 23 employees (16 hours each)
- ? Alternative Pest Management - 1 employee
- ? King County Road Services ESA and Best Management Practices - 9 employees
- ? Stream and Wetland Training for Maintenance Division Staff - 3 employees
- ? Forest Stewardship Training - 2 employees
- ? Integrated Pest Management. - 1 employee
- ? Pesticide Pre-License - 8 employees (1 day each)
- ? Re-certification classes for Public Applicators License - 1 employee
- ? Center for Urban Horticulture classes on Native Plant Propagation and Native Plant Applications in the Landscapes – 2 employees
- ? UW-Center For Streamside Studies 10th Annual Review – 1 employee (8 hours)
- ? ESA Section 7 -Planning and Writing Biological Assessments – 1 employee (32 hours)
- ? 'Habitat Issues Affecting Fish in Lake Washington', put on by WRIA 8 - 1 employee (2.5 hours)

Department of Development and Environmental Services

In 2001, DDES Environmental Education (EE) outreach staff DDES EE staff held a workshop for the building industry to discuss the new administrative rules related to the listing of Chinook, and to discuss possible regulatory proposals. The educators continued completed field trip training workshops for Parks Maintenance staff on how to identify sensitive areas. The field trips included a discussion of the rationale behind stormwater regulations.

Department of Executive Services

The Environmental Purchasing Program, of the King County Procurement & Contract Services Section, produces periodic (about once a month) e-mail Environmental Purchasing (EP) Bulletins to highlight recycled and environmentally preferable products, events, contracts, and other materials of interest to participants in the program. These bulletins were originally produced for program contacts within King County, but are now distributed to suburban cities

and others and have become a valuable tool for initiating the exchange of information with other programs.

A copy of one of a recent bulletin is included in the Appendix. The program's 2001 annual report is available at <http://www.metrokc.gov/procure/green/annrep01.pdf> .

Past bulletins can be found at: <http://www.metrokc.gov/procure/green/bulindex.htm>

Topic Categories:

- The Program
- 2001 Annual report
- Environmentally Preferable Materials - Construction
- Environmentally Preferable Materials - Office/Janitorial
- Allied King County programs/activities
- Hazardous waste
- Construction, Demolition and LandClearing
- Recycling/Reuse
- Green Building
- Waste Prevention/Source Reduction
- Environmental Purchasing Resources

Integrated Pest Management

The King County government continues its efforts to incorporate Integrated Pest Management (IPM) principles in their internal operations as directed by the 1999 Executive Order. IPM is a well-established, holistic approach to managing pests and landscapes. It seeks to prevent or address pest problems by employing a wide range of strategies, generally using chemical pesticides as a last resort. The IPM approach considers the impacts of management methods on the environment and public health.

Some of the landscape management activities used last year that highlight IPM principles were:

- ✍ Continued hand pulling weeds and using mechanical tools such as flame weeders, weed wrench's and string weeders.
- ✍ Using large amounts of mulch for weed suppression.
- ✍ Actively considering alternative methods, practices and products.
- ✍ Tolerating a greater number of weeds in the landscape—although this caused an increase in complaints from a public accustomed to a more manicured look.

Many of these activities are labor intensive; it takes longer to hand weed or use a mechanical mower than to broadcast-spray a herbicide.

Other IPM activities included:

- ✍ The IPM Steering Committee continued to meet monthly to communicate, coordinate and share experiences. The members are from county departments and divisions with a role in managing landscapes.
- ✍ The e-mail Info-Share, created to share expertise, solve problems, announce events and otherwise communicate, was distributed quarterly.
- ✍ Staff continued to research and provide information on local training opportunities and to provide limited financial assistance for the development of local IPM seminars.
- ✍ Continued efforts to make changes in contract language for contractors working on county property. The county hopes this will reduce pesticide use over time as contracts are renewed.
- ✍ Continued the process of reviewing requests to use Tier 1 products for the control of noxious weeds.

Other Compliance Activities

In addition to the documents described above, the Appendix to this report also includes information on other compliance activities continuing in the County, water-related CIP projects (improving fish passage, etc.), and mapping of the County's storm sewer system.

S10 (B) 7: IDENTIFICATION OF KNOWN WATER QUALITY IMPROVEMENTS OR DEGRADATION

Beach Monitoring Program

A public swimming beach monitoring program was conducted 1996-2001 as a cooperative effort of WLRD, KC Environmental Laboratory, and Seattle King County Public Health Department. In 1998, 21 public swimming beaches on lakes Washington, Sammamish, Five-Mile, Wilderness, Pine, Beaver, and Green Lake were sampled weekly from June through September. In 1999-2001, the public swimming beaches on lakes Washington, Sammamish, and Green Lake were sampled weekly from June through September, while the other lakes were sampled by other jurisdictions and private laboratories, and in 2000 included the Magnuson Off-leash Dog Area. All bacterial data was immediately transferred to the Seattle King County Public Health Department for determinations on public health and contacts with the local jurisdictions and parks departments, and published on the King County internet website at <http://dnr.metrokc.gov/wlr/waterres/lakes/bacteria.htm>

Data from the beach monitoring program was used by the SKCPHD to identify potential public health problems. Bacterial counts at nearly all of the beaches monitored were within acceptable ranges and did not warrant swimming beach closures. Juanita Beach (King County parks) was the only beach closed at during the summer of 2001, and this closure was due to a sewer line break associated with construction adjacent to the park. This monitoring program is a joint with King County DNR, the SKCPHD, City of Seattle, and a number of suburban cities to formally address water quality and swimming public health related issues.

Basin Management Evaluation Program (BMEP)

In the year 2001, the Basin Management Evaluation Program (BMEP) annual monitoring activities continued to face many obstacles and permit requirements stemming from the Endangered Species Act. Although some of our monitoring activities continued as planned and projected for 2001, several monitoring programs were altered, challenged, or discontinued because of unforeseen obstacles.

King County Water and Land Resources Division's stream habitat assessments, which have been performed annually since 1997 on Bear and Soos creeks and the Cedar River tributaries, were halted or altered because of a property access issue. The County's property access policies were challenged by a property owner who did not want County scientists accessing and monitoring his land. This issue was presented to a task force for remedy and all forays onto private lands were halted until a reasonable outcome could be determined. King County unsuccessfully attempted to get written letters granting access to contiguous properties in the Bear Creek study sites, and the County disbanded its annual habitat assessments for 2000. Where property access was obtainable, limited habitat surveys were carried out in Bear Creek in 2001.

Since 1994, King County biologists have actively surveyed the Bear Creek, Cedar River, and Issaquah Creek basins as part of an effort to monitor the health of native salmonid populations in WRIA 8. These surveys include active participation from local, state, federal, and tribal agencies. Since the 1999 listing of Puget Sound chinook salmon, particular emphasis has been placed on documenting the distribution and spawning characteristics of these species, and will continue for the next five years. In 2002, surveys will continue to focus upon chinook salmon, with emphasis on making distinctions between hatchery raised and wild fish in the Lake Washington Watershed.

In 2000, King County began to formally survey the nearshore environment along King County beaches to determine the presence of ESA listed species (e.g. chinook salmon and bull trout). In 2001, these efforts were increased to include Vashon Island and the southern portion of Snohomish County. This effort will continue during 2002.

Hydrologic Monitoring continued as planned in King County for 2001. Soos, Bear, and Issaquah creeks were gauged and monitored. Gauges were also maintained in the Cedar River tributaries and in the East Lake Sammamish system. These will be continued in 2002.

Land Use and Land Cover assessments were slated to begin in 2000 but have been postponed until 2002.

Benthic macroinvertebrate monitoring continued on track in 2001. King County Water and Land Resources Division sampled sites in Bear Creek, Soos Creek, Cedar River, Issaquah Creek, and in Shinglemill Creek on Vashon Island.

Water Quality Monitoring continued as projected in 2001. County scientists will continue to monitor water quality in 2002-2003.

Wetland monitoring in King County has changed dramatically since the NPDES permit was written. King County has focused its wetland monitoring resources on mitigation banking sites; these monitoring sites include one site in the Sammamish plateau and another site near Swamp Creek. Wetland monitoring continued at the Urban Planned Development in Bear and Swamp creek systems. Wetland Monitoring activities have also expanded to include vegetation surveys, bird surveys, and amphibian surveys.

Hydrologic monitoring continued as planned in King County for 2001. Gaging in the Bear, East Lake Sammamish, Issaquah Creek, and Lower and Middle Cedar River watersheds supported water quality investigations and habitat studies. New gages were also established in the Green River watershed for water quality assessment. Three new sites were established in WRIA 7 on tributaries to the Snoqualmie River as rate funded surface water activities expanded into these areas. These will be continued in 2002.

A table showing the types and location of monitoring completed during the permit term is included in the Appendix.

S10 (B) 8: STATUS OF WATERSHED-WIDE COORDINATION

ILA Program

As part of our watershed coordination efforts, King County and our regional partners developed in 2000 a groundbreaking new inter-local agreement (ILA) for watershed-based planning and action for the jurisdictions in King County's WRIAs.

This ILA clarifies the roles and responsibilities of local jurisdictions in the development of WRIA-based salmon conservation plans. It is the formal mechanism for demonstrating our collective commitment to watershed planning, which is a key piece of our local and regional Endangered Species Act (ESA) response and compliance strategy. It also provides a mechanism for the implementation of other habitat, water quality, and flood projects with other regional, state, federal and non-profit funds as they become available. In addition, the ILA provides for a functional decision-making structure for the local jurisdictions and stakeholders that have been participating in WRIA-based salmon conservation planning since late 1998. This agreement serves to refine the watershed planning process, to clarify the roles and responsibilities of local governments in these efforts, and to collectively fund nearly \$1.2 million annually for WRIA plan development and coordination among participating local governments.

In 2001, work began on development of work products under the ILA construct involving cost sharing by more than 45 jurisdictions to support the salmon conservation planning effort. With the success of this first year, all jurisdictions have agreed to continue funding for 2002.

In WRIA 7, the final version of the Snohomish Basin Near Term Action Agenda (NTAA) was approved, which included guidance for local governments in updating local policies and regulations while a more detailed salmon conservation plan is developed. In 2002, the Snohomish Basin Multi-Species Salmonid Habitat Conditions Review will be completed and the

Strategic Assessment will be scoped in the first half of 2002 for completion in 2003. In addition, scoping for the Multi-Species Salmon Conservation Plan will take place in 2002.

In WRIA 8, The Draft WRIA 8 Reconnaissance Report, which includes known, probable, and possible factors of decline organized by sub-basin, was published in March 2001. Also, the Reconnaissance Assessment was updated and expanded as a Limiting Factors Report. The first draft of the Near Term Action Agenda was completed in December 2001 with public review to continue through the first quarter of 2002. Detailed scoping for the Salmon Conservation Plan will take place in 2002. Work on the Strategic Assessment will also be underway with completion projected for 2003. The Strategic Assessment will provide technical foundation for the conservation plan as well as baseline information needed for adaptive management.

The draft Near Term Action Agenda for WRIA 9 was completed at the end of 2001 and is based on findings in the WRIA 9 Reconnaissance Report. As with the other NTAA's, it contains actions that can be taken in the next 2-3 years while more detailed conservation planning is underway. In 2002, the NTAA will be completed and the Strategic Assessment will proceed. Detailed scoping for the Comprehensive Salmon Conservation Plan will also begin in 2002 with completion projected for 2004.

While not part of the ILA structure, work in WRIA 10 has also progressed with the release of the Watershed Analysis for the Development of Salmonid Conservation and Recovery Plans within Pierce County. This report includes King County portions of the White and Hylebos basins. In 2002, the Final Strategy Document will be completed and a proposal for an interlocal agreement regarding a Hylebos Salmon Recovery Plan will be initiated.

CONCLUSION

The County's SWMP continues substantially as planned and disclosed in our approved submittal, although the emphasis of our management activities has shifted to addressing threats to the survival of salmonids and to making the water quality improvements (including improved habitat elements--not just water chemistry) necessary to assure that salmonids can thrive in our waters.