

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM MUNICIPAL STORMWATER PERMIT PROGRAM ANNUAL REPORT FOR CALENDAR YEAR 2000

King County
March 30, 2001

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, and 2000 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 for 2000 was 13 $\mu\text{g/L}$, substantially lower than the 22 $\mu\text{g/L}$ goal (Figure 1). The low VWTP in the last three 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 $\mu\text{g/L}$, 14 $\mu\text{g/L}$, and 12 $\mu\text{g/L}$ 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.

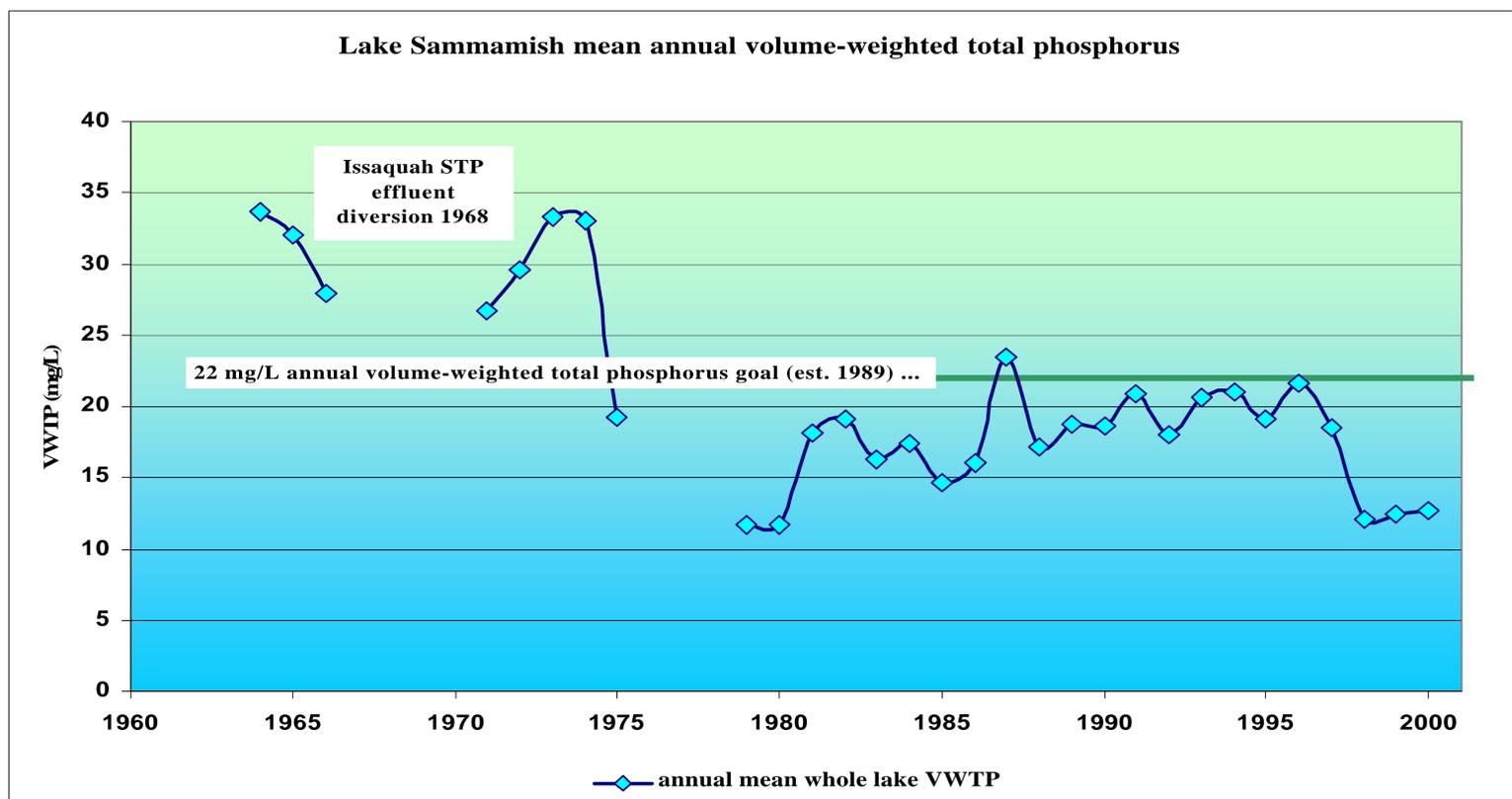


Figure 1. Mean annual volume weighted total phosphorus (VWTP) concentrations at the south mid-lake sampling station (0612).

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.

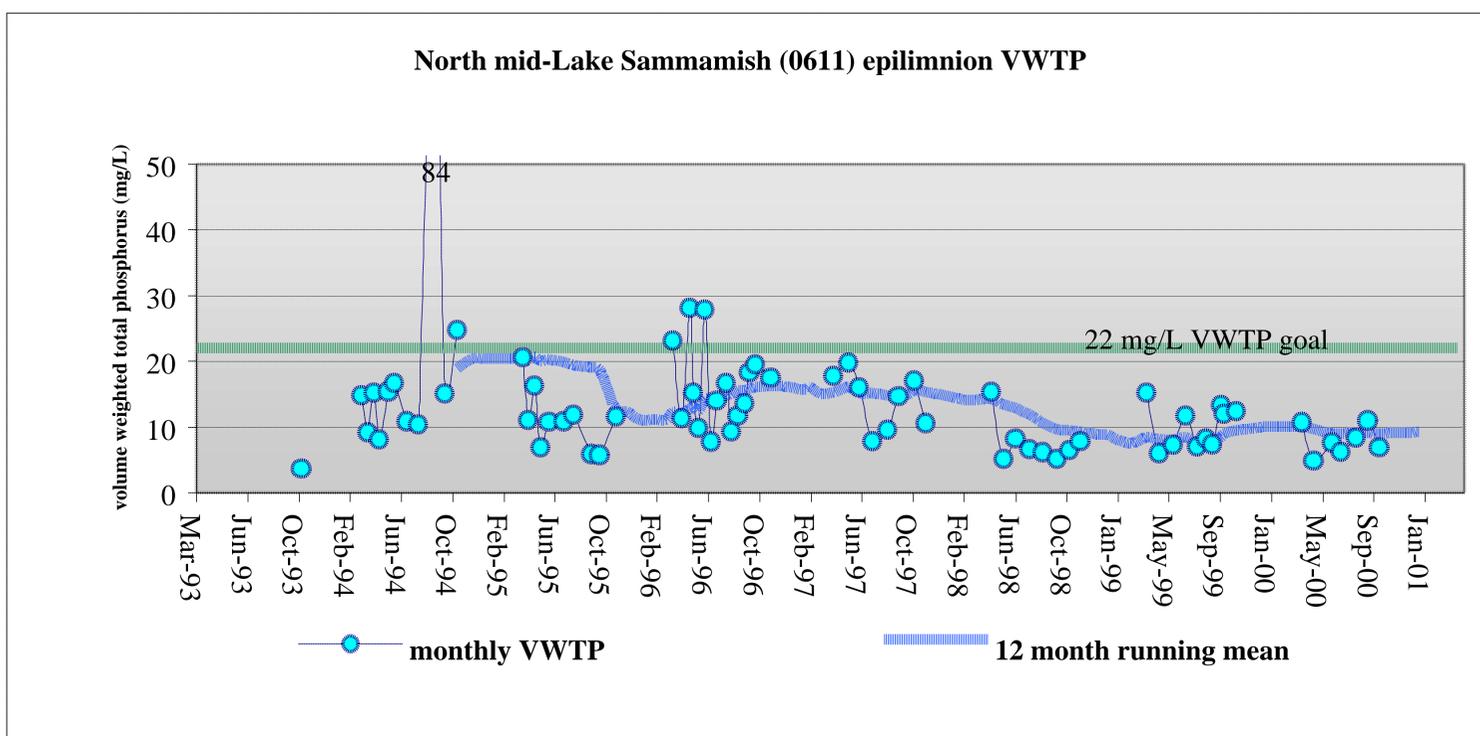
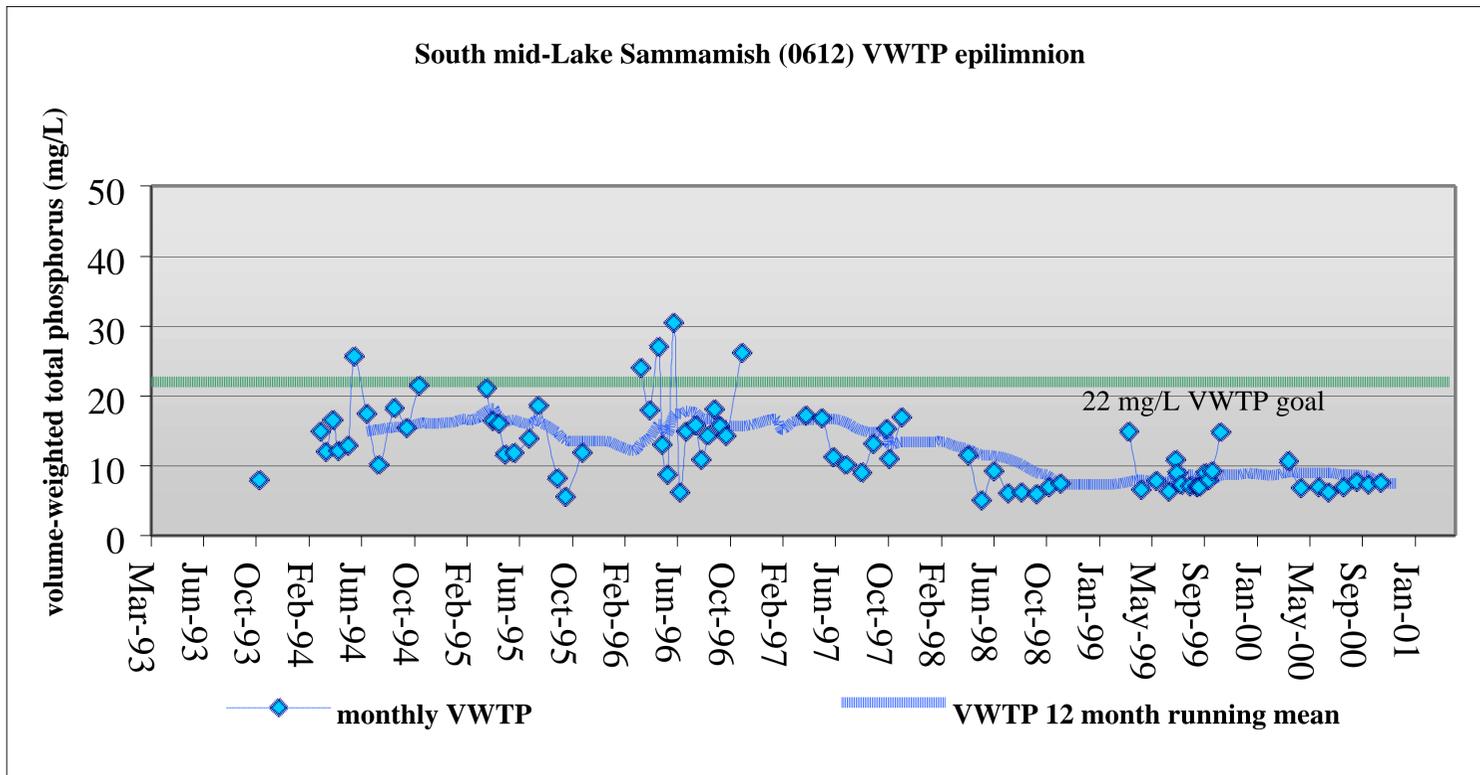


Figure 2. Monthly epilimnion VWTP concentrations for north and south lake are indicated by the dashed lines for 0612 (diamonds) and 0611 (circles). No epilimnion data is shown for the winter period when the lake is not stratified. The solid line is a 12-month VWTP running mean for the epilimnion. A running 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 $\geq 4.0\text{m}$). The north and south summer mean chlorophyll-*a* concentrations for 1998 (2.3 mg/m³ and 2.5 mg/m³) were less than the chlorophyll-*a* goal 2.8 mg/m³, 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

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. 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 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

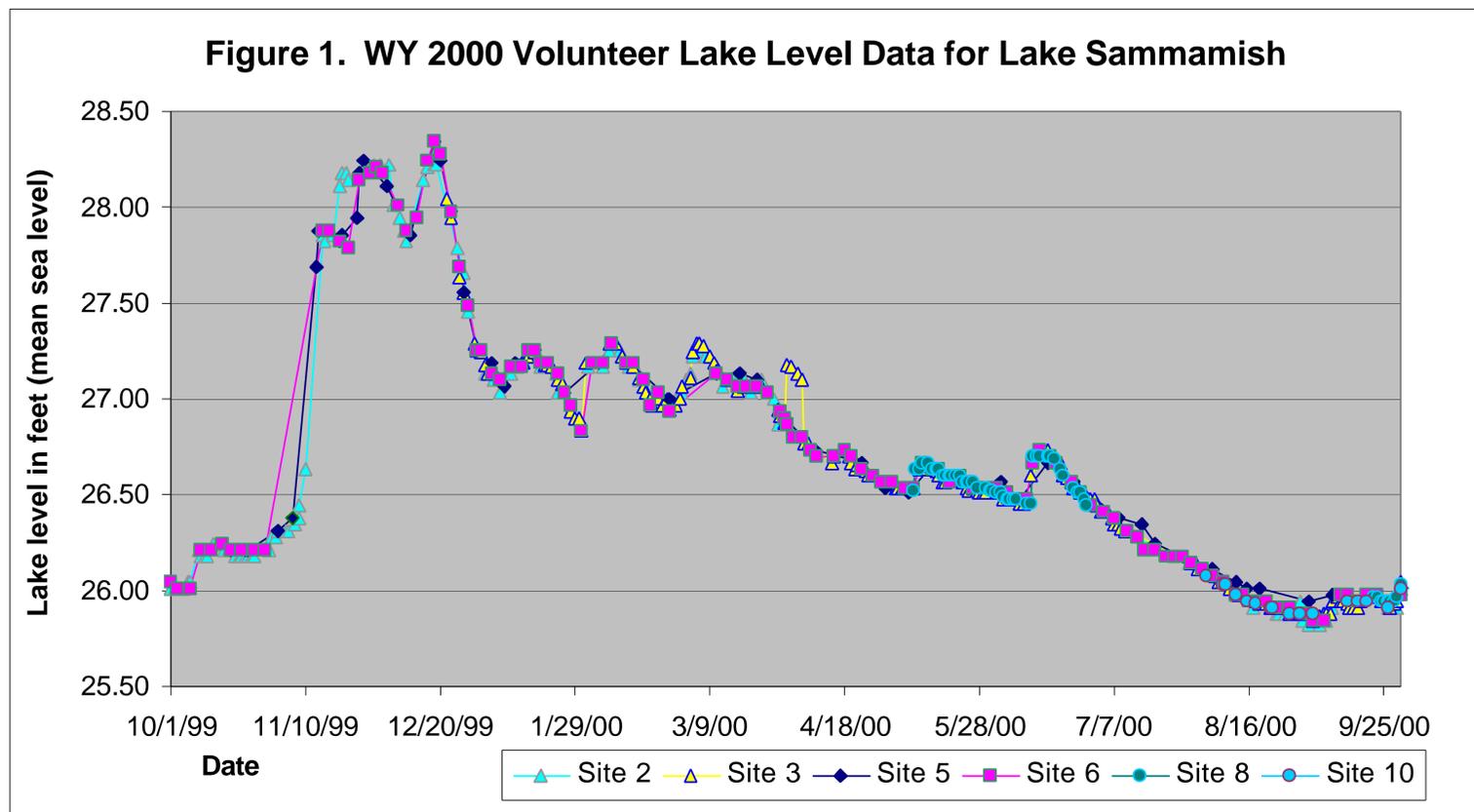
epilimnion and photic zone. These conditions likely resulted in the low VWTP measured in the lake and the corresponding low primary productivity and lack of a fall algal bloom.

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 citizen groups nor County policies are responsible for the weather, the water quality improvements seen in the summers of 1998, 1999, and 2000 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 Program – This program was integrated into the King County forestry program and will continue to be implemented by the County’s Department of Natural Resources, Resource Lands Section, and the Department of Development and Environmental Services. The regulatory (65 percent forest retention on all rural zoned lands) and incentive (both the current use taxation and education) elements of the program are being implemented by a King County forester. In 2000, two workshops were held for forest owners to enroll in timber taxation programs. At this time, the total number of acres enrolled in the year 2000 is not available.
2. Non-point Source Control Program – The emphasis for this program was the completion of several educational tools, including a water steward’s manual, the Sammamish Swing [copy included in the Appendix of the 1999 report], a lakeside living video, and the shoreline stewardship demonstration project. All copies in the first printing of the Sammamish Swing were distributed and it was reprinted in 2000. The distribution of these educational materials throughout the watershed is being led by two non-profit community groups, Save Lake Sammamish and the Pomegranate Center. Traditional planting events, workshops, and the Issaquah Salmon Days emphasis on the whys and wherefores of phosphorus as a pollutant also continued. Newspaper coverage of the Lake and its condition occurred intermittently throughout the year.

3. Regulatory Compliance and Enforcement – the King County Erosion Control program continued with dedicated inspectors. [See page 13 for more information.] 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 2000.
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 superceded 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. In 2000, a contractor was selected, and the study will be initiated in early 2001.
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). In 2000 the program continued to work towards acquiring additional parcels. 2.5 acres on Issaquah Creek were donated to the County and another contracted for purchase (this deal actually closed, at the seller's request, on 1-2-01).

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. Three of the eight capital projects identified as short term actions—Valley Growers Nursery, Sunset Quarry, and Weowna Creek, —were constructed or completed during 1997 or 1998. The Issaquah State Hatchery project design 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 update of the County's Surface Water Design Manual (SWDM), adopted in September of 1998, continued to be implemented through 2000. User support, in the form of classes and a user help line, were effective in helping design engineers understand and properly apply Manual requirements. Implementation seems to be going smoothly.

Changes to the SWDM to better achieve equivalency with the Ecology Manual were proposed in a letter of December 30, 1999 to Megan White. Ecology has not yet responded to this letter because their staff resources are currently focused on updating their Stormwater Management Manual for Western Washington and drafting of the next NPDES Phase I permit. Consequently, these changes proposed in the above-mentioned letter have not yet been promulgated in public rule. The above proposed changes are now slated to be combined with other changes to address the ESA 4(d) Rule that became effective in January. These changes are all being incorporated into an ESA package of ordinances scheduled for transmittal to Council in December of this year. A draft of these ordinances and related public rules is scheduled to be available for public review in April or May.

In addition to Manual implementation, programmatic actions have been approved in the 2001 budget to better achieve equivalency. These include additional staff for source control inspections of sites with recently issued permits and additional staff for sub-basin studies of urban areas to identify project needs for addressing post-1975 impacts to beneficial uses. Work to scope and implement these new programs was begun in 2000 and continues in 2001.

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, 2000 to December 31, 2000, King County lost 723 acres to annexations. Information about the specific recent and proposed annexations and incorporations is shown on a map included in the Appendix.

In 2000, King County lost over \$158,000 in surface water management fee revenues to annexations. King County expects to lose an additional estimated \$80,000 in 2001 to annexations. No incorporations occurred in 2000 and none are expected in 2001.

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 2000 was \$47,174,312. Actual spending for 2000 was \$47,372,812--a slight decrease of 3.7% from 1999. The adopted budget for 2001 by the County Council was \$48,802,951--an increase of 3.5%.

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 12/31/01)	WORK PROGRAM	INSPECTION TOTALS			
			2000			
RESIDENTIAL						
2-Year Bond	95	2-Year M/D Bond Inspections	272			
Residential R/D	1390	Inspections	986			
		Special Use Permits	37			
Total	1,485	New Facilities Inventoried	68			
COMMERCIAL						
M/F Comm incl City	1127	Inspections	1396			
NPDES Facilities (conveyance-only)	458	NPDES Inspections	6			
Total	1,585	New Facilities Inventoried	37			

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

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.

INVESTIGATION TYPE	CARRY OVER	NEW (in '00)	CLOSED (in '00)	OPEN
COMPLAINTS★ (quick response)	26	119	109	36
REVIEWS☆ (more complex response)	129	78	48	159
SITE CONSULTATIONS☆ (for businesses)	198	22	36	184
ENFORCEMENTS☆ (violations issued)	22	8	5	25
INSPECTIONS ☆(permit-driven inspections, not needing a full site consultation)	0	13	13	0

★**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 is based in the King County Department of Development and Environmental Services. The program for permitted sites has four positions allocated to it, three of which were filled in 2000. An additional four (4) Site Development Specialists are assigned to cover non-permitted activity, particularly 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, we have set up a Small Works program for sites that remain non-compliant. Under this program, the County has let contracts for erosion and sedimentation control contractors for sites remaining non-compliant after enforcement action is initiated. 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. However, 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 2000.] The program still provides services in the Lake Sammamish Drainage basin, but with the incorporation of the City of Sammamish and annexations by Issaquah, these services are limited to activities permitted by DDES prior to incorporations and annexations. Additionally, the program provides training for the City of Sammamish residential inspectors and inspection services as requested by the City under the interlocal agreement governing the incorporation. In addition to ESC enforcement, the program implements the 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 2000. For the year, a total of about 2753 separate inspections were conducted at construction sites that were not possible in earlier years with only one inspector and limited coverage area. 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 conducted in 2000 focused builders' attention on better erosion control practices. In addition, the DDES web page offering additional information to builders (<http://www.metrokc.gov/ddes/> –from the hot topics, choose *Erosion Control and the ESA*) was revised and updated in September, prior to the wet season.

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 Drainage Manual (Appendices C & D), other regulations as they apply to water quality, and ESA issues for both permitted and non-permitted activities.

During 2000, the lead engineer of the ESC inspection program sat on the committee developing the County's new Site Alterations ordinance, which is currently before the County Council. The draft ordinance would increase the seasonal grading and clearing restrictions throughout the whole county, and tailor them better to specific sites.

Inspections & Consultations—Hazardous Waste

WLRD Hazardous Waste Management Program site investigators conducted 1674 site visits to businesses in 2000. All visits include at least a limited site assessment for water quality issues. A further 181 calls were referred to other agencies, primarily for surface and storm water issues. In addition, 990 telephone consultations regarding environmental issues were made with King County business and agency staff in 2000.

As a result of these visits, approximately 9380 pounds of hazardous waste is no longer going into storm drains and septic tanks. 89,400 pounds of hazardous waste is no longer going in the sewer. An additional 32,500 pounds of hazardous materials has been contained and covered, thus reducing the risk of release to the environment.

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 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, projects are ranked by effectiveness and feasibility. "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 perform 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.

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. ESU used 608 volunteers who worked 3,560 hours. In conjunction with WLR's Public Involvement staff, ESU held seven volunteer-staffed events throughout King County. Approximately 9,600 native plants were salvaged from development sites in 2000, of which approximately 4,000 plants were salvaged by participants in Naturescaping Workshops for re-establishing native vegetation and habitat in their yards. About 16,000 plants were replanted at 61 County 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 2000, ESU monitored 28 previously constructed projects. Twenty-two 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. Nine 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 planned to complete designs for 21 capital projects and construct 15 WLR-funded capital projects during 2000, at a cost of 2.7 million dollars, and plans to complete designs for 31 capital projects and construct 19 capital projects in 2001.

See page 33 for other on-the-ground restoration activities.

Road Maintenance Activities

The year 2000 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.

◆ **Natural Connections Television Program**

Approximately 93,000 viewers watched a second airing of the **Natural Connections** program, which debuted in 1999. Videotape availability was promoted and videotapes were distributed to teachers upon request. Workshops supporting resource conservation ethics messages contained in the video were presented in schools. During winter and spring more than 1,000 students in 44 science-based classrooms learned about the interconnectedness between individual actions and the environment. In the fall, two new workshops titled **Biodiversity in Our World** and **Soils for Salmon** were launched. The workshops linked resource conservation, recycling, and waste prevention with biodiversity and quality-of-life issues. A total of 21 workshops were presented, reaching 388 students in King County schools. Natural Connections received numerous prestigious awards, including 5 Emmy Awards and the UNESCO silver medal, awarded jointly by the United Nations and the New York Festival.

◆ **Volunteers Program**

About 1,300 volunteers **planted** 15,198 plants along local streams and rivers to prevent erosion, improve water quality and protect salmon rearing beds along the Sammamish River and at six other sites. Plantings were greatly enhanced by the work of volunteer team leaders, 29 of who were given leadership training on three evenings in the fall.

More than 300 people participated in four **native plant salvage** events, digging up a total of 5,600 native plants (over \$30,000 worth) from development sites to be used in future plantings. Nearly 700 citizens also participated in the **Habitat Partners Program**, removing invasives and provided other maintenance for a dozen restoration sites.

87 volunteers stenciled 265 **storm drains** and eight clean water **car washes** were held over the summer. Staff created new public education materials this year to enhance the program: car washers were given "salmon friendly car wash" signs and handouts for their customers explaining the car wash kit and its clean water benefits.

◆ **Grants Program**

The **Watershed Action Grants Program** was evaluated for effectiveness and was reconfigured to provide small grass roots community groups easier access to funding for education and restoration projects. In its first year, the new **Small Change for a Big Difference Grants Program** awarded \$8,000 to ten recipients, primarily schools and community groups. Funds (a maximum of \$1,000 per applicant) were used for water quality testing kits, newsletter distribution, educational events and small-scale restoration projects. (For more information about the grants program, visit the website at <http://dnr.metrokc.gov/wlr/pi/grants.htm>.) **WaterWorks**, a stewardship grants program that is helping communities protect and restore King County's water resources responded to requests above \$1,000. All grantees are required to enlist partners from the community, government and the private sector to get their projects completed. \$524,206 was awarded to 24 recipients.

Highlights of the WaterWorks grants program include **The Central District Business Improvement Association's** development and implementation of a maintenance class on storm drains for property owners within the CIDBIA boundaries. Sanitation workshops on how and where to dispose of various materials and the proper cleaning practices were also conducted. Youth participants from the **Wilderness Inner City Leadership Development** program educated Asian and Pacific Islander communities in the International District, Yesler Terrace, Beacon Hill and Rainier Valley on water pollution prevention. Residents were taught proper methods of disposing hazardous wastes at home, use of non-toxic alternatives and keeping pollutants off of lawns and impervious surfaces. A project titled, *Amphibian Use of Stormwater Control Ponds, and Neighborhood Education to Protect Water Quality* was completed by the **Save Habitat and Diversity of Wetlands** group. Amphibians were monitored as indicators of water quality in 50 stormwater ponds in Bear-Evans and East Lake Sammamish drainages. Neighborhood educational sessions and interpretive signage helped educate the community on the function of stormwater ponds, uses by wildlife and advised humans on protective measures, e.g., proper pet management and landscape practices.

◆ **Public Information and Education Programs**

Classroom water quality presentations reached more than 5,400 students at 66 schools in 15 districts. Staff presented an hour long, hands-on class about water quality, wastewater treatment and individual responsibility for a healthy environment.

The "**Wheels to Water**" program, which provides free Metro bus transportation to water quality education sites throughout the County, began March 1 and brought 3,800 King County students to participate in hands-on restoration activities and educational programs at King County wastewater treatment plants, parks, and other sites.

King County's **Programs for Educators 2000-2001 School Year Edition** booklet was also published and distributed. It continues to serve as a valuable resource for environmental educators with update listings of action projects, classroom programs, curricula, field trips, grants, Internet resources, newsletters, teacher workshops and videos.

A total of 314 people attended three **Naturescaping workshops** around the County. Attendee learned how and why to use native plants in their home landscapes, keeping pesticides and fertilizers out of lakes, streams, rivers and marine waters.

The **Northwest Flower and Garden Show's** King County Department of Natural Resources (KCDNR) exhibit drew an estimated 730 citizens who sought information about environmental gardening techniques for the Northwest. 830 visitors visited the KCDNR booth at the **King County Fair** and found similar information. At **Issaquah Salmon Days** 50,000 people saw KCDNR's mascot, Bert the Salmon during the official parade. 55,000 people visited the hatchery area each of the 3 days. Many participated in a multi-agency game called **Gilliver's**

Travels. Kids were able to learn about salmon and show-off their knowledge of environmental topics. They netted some cool fish sunglasses in the process.

7,500 **Fish Tales** postcard packets were also handed out to citizens at various community events. The postcards take a historic look at this Northwest icon and barometer of watershed health in King County. The postcard packets were created to prompt citizens to make a connection with their local area lakes, rivers and streams. A video was also produced and aired on all regional civic television stations during the month of October. During the video, King County residents described how their quality of life would be affected if salmon became extinct. Citizens were invited to tell their stories about salmon by posting them on the County's website <http://dnr.metrokc.gov/fishtales/> or by calling 1-877-SALMON-9 toll-free.

A fall issue of **Downstream News** was sent to 10,000 readers -- volunteers, teachers, community groups, agency contacts and others. The issue featured volunteer activities, ESA updates and information on groundwater. Two issues of the **Farm & Forest** newsletter were produced and distributed. The September issue gave an update on the Livestock Management Ordinance, citing examples of Best Management Practices that are identified in the ordinance. The newsletter has a circulation of 1,000. Staff also updated and reprinted both **Streamside Savvy**, a guide for streamside homeowners, and **Going Native**, a step-by-step brochure on why and how to use native plants in your own landscape. The **Green Businesses Directory** was updated and continues to recognize leaders in habitat and water quality protection, industrial and hazardous waste reduction and recycling efforts.

Bert the Salmon (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 and salmon health. (More information on Bert is provided in the Hazardous Waste Management Program section below.)

Lake Stewardship Program

In 2000, the Lake Stewardship Program

- ◆ trained and supported citizen lake monitors on 46 small lakes to sample and record water quality and quantity information;
- ◆ conducted two workshops/tours focusing on lake-friendly landscaping and aquatic land restoration;
- ◆ published and distributed quarterly *Lake Steward* newsletter to approximately 2,285 lakeside residents, providing information on water quality protection and enhancement activities;
- ◆ provided technical assistance to 250 lakeside residents, addressing water pollution and protection activities; and
- ◆ enhanced its 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. The Natural Lawn Care Program, a cooperative effort with King County Department of Natural Resources, the City of Seattle and other local governments, uses 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 1999 the cartoon fish Bert the Salmon was created as a mascot for natural lawn care and other environmental messages. A telephone survey of 1,200 King County residents conducted in late 2000 found that one-third (32 percent) of King County residents had heard of Bert the Salmon, and they remembered what he said. Seventy-three percent of respondents were able to identify environmental messages they had heard from Bert the Salmon. Among the messages recalled: 32 percent mentioned improving water quality; 29 percent said don't overwater; 26 percent mentioned reducing pesticide use; and 24 percent said natural lawn care.

In 2000 the Natural Lawn Care Program produced and ran television advertisements, featuring Bert the Salmon, during Mariners baseball games. Total gross impressions (the number of people who might have seen the ad based on viewership) were 18,629,000. The program also created two media events featuring a natural lawn care "model neighborhood" in Renton. Residents in this small neighborhood were given tools and training to adopt lawn care practices that are more environmentally friendly. News stories on television, radio and newspapers from these events resulted in another 2,079,700 gross impressions.

The Natural Lawn Care Program seems to be having an impact on King County residents. The program has shown an increase in several measures in the monthly Soundstats survey of 400 King County residents. The first figure is April 1997 (baseline); the second is October 2000. These changes are great enough to be statistically meaningful, not just due to chance.

- ◆ Never use a weed-and-feed product: increase from 47 percent to 60 percent
- ◆ Don't care about weeds in their lawn: increase from 23 percent to 35 percent
- ◆ Leave grass clippings on their lawn "most of the time": increase from 28 percent to 41 percent
- ◆ Important that next mower purchased be a mulching mower: increase from 33 percent to 45 percent
- ◆ Never water lawn: increase from 18 percent to 34 percent

In order to do a more effective job reaching the public with messages about reducing pesticide use, the Hazardous Waste Program conducted a telephone survey in early 2000 about people's perceptions and beliefs related to pesticides. Some of the findings:

- ◆ A strong majority of King County residents are concerned about the impact of pesticides on people's health (77 percent very or somewhat concerned) and on the environment (66 percent).
- ◆ Women are more concerned than men about the impact of pesticides on people's health and the environment.

- ◆ Women are also more concerned than men about the risks pesticide use creates for people, animals, and the environment.
- ◆ When it comes to taking care of their lawn, residents seem to be more motivated by their desire to be good, responsible neighbors than by their own desire to have a well-maintained yard with few weeds.
- ◆ Nearly two-thirds of residents (62 percent) do *not* believe that they need to use bug and weed killer to maintain their lawn—they believe that they can have the same quality lawn without these products.
- ◆ Most residents think that dangerous pesticides are widely available (64 percent) and most—including pesticide users—also think it is difficult to tell which pesticides are dangerous and which might be safer (66 percent).

The Hazardous Waste Program worked with 11 suburban cities to mail postcards based on the survey results 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. The first postcard focused on the health of children and pets, the second on threats to water quality, and the third on the advantages of birds and beneficial insects. Each postcard included a web site and phone number for more information. About 115,000 each of three postcards were mailed, for a total reach of about 345,000 residents.

The program measured the results of the postcards in a few different ways. A special web site page set up to track the project received 196 hits, and a telephone line received 70 calls. A follow-up telephone survey of 300 residents did not show much change on most items. However, an upward trend was seen in the questions related to concern about personal use of pesticides. When asked, *Please tell me how concerned you personally are about the impact of your use of pesticides (such as bug or weed killers) on . . .* increases were seen in people's concern about the impacts on salmon and other fish; on family health; on birds, wildlife and pets; and on water quality. The increases ranged from 6 percent for water quality to 12 percent for birds, wildlife and pets. Given the sample sizes of the two surveys, these results may fall within the error range. However, the postcards specifically targeted the perceptions in these questions, and it is the only section of the survey where an increase of more than four percentage points was seen.

The Hazardous Waste Program has been working with the Washington Association of Landscape Professionals 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 2000 the first full field test was completed, and the advanced endorsement was approved by the certification governing body at the Associated Landscape Contractors of America conference. This means that the endorsement is a national model that may be adopted elsewhere in the United States.

Groundwater Program

After hiring an educational coordinator in February of 2000, the program began. With assistance from various educational persons and programs in the King County area, we developed a 2-unit classroom presentation for elementary schools. Information about this presentation was listed in the 2000-2001 *King County Programs for Educators* and circulated by the Puget Sound Educational Service District office.

In the classroom demonstration, the water cycle is taught or reviewed with an interactive children's skit using various props (clouds-cotton covered hat, sun-child with gold sunglasses and golden wand, etc.). Groundwater conservation and contamination is shown through the use of a plastic container of rocks, that is "polluted" with Kool-aid (weed 'n' feed), Karo syrup (oil), food coloring (bug be gone), etc. The polluted water is pumped showing, very visually, the results of pollution and drawdown. Students assess and inventory the water uses in and around their homes and return with behavior changes to protect and conserve this resource.

During the fall and winter of 2000, the classroom presentation was made in 5 school districts to 10 elementary schools resulting in approximately 1,000 student contacts. Teacher comments in evaluating the presentations included: "Very valuable info. Fits well with our curriculum," "The hands on and props (water cycle) part of the lesson seemed to be memorable," "My students were especially impressed with the tubs where water was extracted to show contamination" and "Having homework was good. The kids love connecting something they learn in school to their home environment."

The Groundwater Program was also represented at the Northshore School District Watershed Festival, Water Festival 2000 (Green River Community College) and the Mountains to Sound Greenway teacher's workshop.

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).

A volunteer group was developed through the WSU Extension Agency's Water Land Stewardship Program.

King County Park System

The King County Park System manages 22,000 acres of land with many of these properties protecting salmon habitat and thus water quality. Public education about stewardship through the System's Interpretive Programs Office is a high priority. Public programming highlights for 2000 include:

◆ **Stream Connection (School Program)**

The Stream Connection program continued to attract large numbers of classes. Focusing on salmon and water quality, the program involved 1,727 students in 75 programs. Primary field sites are county parks near Renton, Woodinville and Carnation in the Snoqualmie Valley.

◆ **Interpretive Programs (Public Programs)**

A partnership with the King County Library System brought 7 programs on salmon and 2 programs on macroinvertebrates ("Stream Bug Exploration") to county libraries. Two "Cycling for Salmon" programs were offered on the Cedar River Regional Trail as participants learned about and viewed salmon from their bicycles. One program ("You're the Water Scientist") specifically focused on testing water quality at two county parks. Other programs included "Birth of a Wetland," Pond Dipping, "and Searchin' for Salmon." Total program attendance for 18 programs was 405 people (adults and children).

◆ **Cedar River Salmon Journey**

In 2000, 628 visitors 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. New volunteer naturalists trained totaled 12 with 19 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**

Center for Streamside Studies 4 employees (1 day each)

Washington Native Plant Society Steward Program 1 employee (80 hrs each)

King County Road Services ESA and Best Management practices 50 employees (4 hrs each)

Stream and Wetland training for Maintenance Division Staff 95 employees (4 hrs each)

Amphibian Survey training 3 employees (1day each)

Amphibian training with Klaus Richter 30 employees (8 hrs each)

Forest Stewardship training 2 employees (1 quarter each)

Land Use and Fine Sediment University of Washington 1 employee (1 day)

Aquatic Conservation and Adaptive Management in King County 1 employee (1 day)

Amphibian Funnel Trap training with Klaus Richter 8 employees (8 hrs each)

Integrated Pest Management 8 employees (2 days each)

US Army Corp of Engineers Permit training 7 Employees (1day each)

Pesticide Pre-License and Re-Certifications, 22 employees (1 day each, plus additional time for Pre-Licenses)

The Maintenance and Facilities Division expanded the Resource Program by bringing in three Resource Specialists to help with restoration projects and resource issues on open space/natural area managed properties, many of which have water quality issues. Resource specialists are

similar to Basin Stewards, and assist the five Resource Coordinators on restoration projects and other resource issues in our open spaces and natural lands.

A BMP Manual for maintenance practices was completed as a guideline for staff to incorporate environmentally sensitive methods when maintaining parks. Training on amended priorities will take place in 2001 for all Maintenance Staff.

Department of Development and Environmental Services

In 1999, DDES Environmental Education (EE) outreach staff trained permit applicants, realtors and appraisers on the Sensitive Areas Code, addressed the benefits of the country lifestyle to rural property owners and realtors, and informed DDES customers of inter-jurisdictional regulatory changes that have occurred as a result of ESA. DDES EE staff have stimulated dialog with business owners about the listing, gathered their input, and have spread the word about changes in regulations. Altering shorelines and clearing and grading regulations are among the many topics covered. Foresters, farmers, and livestock owners are beginning to understand the implications of the chinook listing and how it ultimately affects the way they must conduct business in the future.

DDES Environmental Education staff helped inform the business community about the regulatory implications of the new Surface Water Design Manual and facilitated the link between business and WLRD Drainage Services for the implementation of the SWDM. DDES educators also conducted many field trips for staff from Roads Maintenance, Parks Maintenance, the King County Assessors, and Environmental Health focussing on how to identify sensitive areas. The field trips included a discussion of the rationale behind stormwater regulations.

Integrated Pest Management

The King County government has completed the first year of implementation of an Executive Order on Integrated Pest Management (IPM). County Executive Ron Sims issued the IPM Executive Order in November, 1999, requiring that all departments develop and implement IPM programs for their own internal operations and also requiring the phase-out of use of certain "most hazardous" pesticides by June 30, 2000.

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 impacts of management methods on the environment and public health. Various county departments have been employing some IPM practices for years, such as the Parks System, Roads Services Division and Noxious Weed Program.

The King County IPM policy and Executive Order were developed as part of the county's response to the listing of local populations of Chinook salmon as threatened under the Endangered Species Act (ESA). Pesticide use is one of many factors that may be affecting salmon decline.

The county government has made good progress in the last year in implementing the Executive Order. Some highlights are:

Reduction in pesticide use

In 1999 King County used 8,800 pounds (more than four tons) of pesticides in its operations, 87% of which were in the “most hazardous” (Tier 1) category targeted for phase-out. *Overall, the total use of pesticides decreased 51 percent from 1999 to 2000.* The use of Tier 1 products decreased 61 percent, while use of Tier 2 products increased by 22 percent as employees shifted somewhat to less-hazardous chemicals.

County staff achieved this reduction in pesticide use through significant changes in management practices. For example:

- They increased the use of such mechanical tools as flame weeders and string weeders, and did more hand weeding.
- Substantially larger amounts of mulch were laid down for weed suppression.
- They actively explored alternative methods, practices and products.
- They developed a tolerance for a greater number of weeds in the landscape—although this prompted an increase in complaints from a public accustomed to a more manicured look.

Many of these options were found to be more labor intensive; it takes longer to hand weed or use a mechanical mower than to broadcast-spray a herbicide.

Pesticide disposal

Many county departments cleaned out pesticides that they would not need or would no longer be able to use. These departments took advantage of a free pesticide collection and disposal event offered by the Washington State Department of Agriculture. Over 2,800 pounds of products such as Diazinon, Dursban, and weed-and-feed products were removed from storage in county facilities. County employees saved thousands of dollars in disposal costs by taking advantage of this free state service.

Some of the other activities that took place in implementing the Executive Order include:

- ◆ An IPM Steering Committee was formed to communicate, coordinate and provide guidance for implementation. It is composed of staff from a number of different county departments and divisions with a role in managing landscapes.
- ◆ An e-mail Info-Share was created to share expertise, solve problems, announce events and otherwise communicate.
- ◆ A new web site (www.metrokc.gov/hazwaste/ipm) contains a wealth of program information.
- ◆ Staff researched and provided information on local training opportunities. The county also provided limited financial assistance for development of two local IPM seminars and for three county staff to attend training.

- ◆ Various departments used product demonstrations to assess the effectiveness of various weed management tools, such as a steam weeder, flame weeder and “weed wrench.”
- ◆ The IPM Steering Committee recommended changes in contract language for contractors working on county property. The county hopes this will reduce pesticide use over time as contracts are renewed.
- ◆ The Executive Order called for phase-out of “Tier 1” pesticides, those considered to pose the greatest hazard to human health and the environment. An exception process reviewed requests for exceptions to the phase-out and allowed continued use of some Tier 1 products for noxious weed and wasp control.

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 1996-2000 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 1999-2000, 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 <http://splash2.metrokc.gov/wlr/waterres/lakes/bacteria.htm>

Data from the beach monitoring program was used by the SKCPHD to identify potential public health problems. Juanita Beach (King County parks) and Meydenbauer Beach (City of Bellevue) on Lake Washington were closed to swimming one or more weeks in 1999, until monitoring showed bacterial counts back in an acceptable range. Bacterial sources were primarily goose feces, determined by RNA analysis at the University of Washington. This information was used to improve maintenance practices at the parks that contributed to the improved water quality in the public swimming areas. The City of Bellevue investigated Meydenbauer Beach, with

background data from the KC Major Lakes Program and laboratory support from the KC Environmental Laboratory. This data is also being used in the long-term park planning efforts. . Currently, a joint program is being developed by 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 2000, the BMEP annual monitoring activities came face to face with the many obstacles and permit requirements of the Endangered Species Act (ESA). While most of our monitoring activities continued as planned and projected for 2000, several monitoring programs were altered, challenged, or discontinued due to unforeseen obstacles.

King County's Water and Land Resources Division's habitat assessments, which have been performed annually since 1997 on Bear and Soos Creeks and the Cedar River tributaries, were postponed for the year because of a property access issue. King County's property access policies were challenged by a property owner who did not want County scientists accessing and assessing his land. This issue was presented to a task force for remedy with all forays onto private lands 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. Disappointingly, a data gap has been established for the year.

King County's Fish Surveys were also affected by the property access issue. Since 1996, King County scientists have performed walking and floating surveys to count spawning salmonids in Bear and Issaquah Creeks and in the Cedar River Tributaries. Year 2000 saw a change in this procedure. Surveys were performed in Issaquah Creek and the Cedar River tributaries, but Bear Creek was not surveyed. Funding reallocations and property access issues were the reason. Fish surveys were begun at a variety of locations in the Puget Sound Nearshore environment. Scientists, in response to ERA monitoring needs, are evaluating the juvenile salmonid use of the nearshore habitats. This program will continue in 2001.

Hydrologic Monitoring continued as planned in King County for 2000. 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 2001.

Land Use and Land Cover assessments were slated to begin in 2000 but have been postponed until 2001 for contractual reasons. King County is partnering with the University of Washington to provide state of the art satellite imaging of King County lands. An RFP was delayed for this contract and the process of data acquisition will begin in 2001.

Benthic Macroinvertebrate Monitoring continued on track in 2000. King County Water and Land Resources Division sampled sites in Bear and Issaquah Creeks, the Cedar River Tributaries, and partnered with a non-profit to begin sampling on Vashon Island and in the Des

Moines Creek watershed. May Creek was sampled in 2000 instead of Soos Creek. Both Soos and May will be sampled in 2001.

Water Quality Monitoring continued as projected in 2000. County scientists will continue to monitor water quality in 2001.

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, monitoring one site in the Sammamish plateau and another potential site near Swamp Creek in 2000. Wetland monitoring continued at the Urban Planned Development (UPD) in Bear and Swamp creek systems. Wetland Monitoring activities have also expanded to include grass surveys, bird surveys, and amphibian surveys.

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

During 2000 King County continued our efforts to develop watershed-based, multi-stakeholder, multi-jurisdictional salmon recovery and conservation plans in Water Resource Inventory Areas (WRIAs) around King County in response to Endangered Species Act (ESA) listings for Puget Sound chinook and bull trout. As part of our watershed coordination efforts, King County and our regional partners have developed 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 a 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.

The ILA is the culmination of several months of discussion among elected officials and senior staff from local governments throughout King County WRIAs. The ILA was developed by elected officials from several jurisdictions within the county, and submitted to the Watershed Forums—consisting of elected officials from King County, Snohomish County, and other local governments from throughout the Snoqualmie, Lake Washington/Cedar/Sammamish, and Green-

Duwamish watersheds—for review, modification, and approval. As of March 2001, the ILA has been approved by 5 of 6 jurisdictions in the Snoqualmie basin (the Town of Skykomish has elected not to participate); 24 of 31 jurisdictions in WRIA 8 (the remaining 7 jurisdictions are still considering participation); and 15 of 16 jurisdictions in WRIA 9 (the City of Federal Way is considering participation).

Watershed Forums

The inter-jurisdictional Watershed Forums, described in the County's SWMP, were active during 2000 and continued to support water quality, flood control, and habitat restoration activities such as the development of watershed-wide erosion control standards, acquisition of key habitat sites, and volunteer planting events. In accordance with the ILA described above, these watershed forums will be integrated in 2001 into WRIA-based Forums (including representatives from nearshore cities). During 2001 the WRIA Forums will decide on whether to continue sub-forums at the sub-WRIA scale.

The WRIA Steering Committees continue their efforts to develop long-term salmon conservation plans and implement habitat projects through the Salmon Recovery Funding Board and other funding sources. Under the ILA, the relationship between the Steering Committees (composed of multiple stakeholders in addition to local governments) and the WRIA Forums will be analogous to Planning Commissions making recommendations to a City Council. The WRIA Forums may approve or remand the recommended plan, but may not unilaterally alter Steering Committee recommendations.

Relationship with the Tri-County Process

The WRIA planning efforts described above are part of King County's efforts to implement the WRIA planning element of the Tri-County Endangered Species Act Response, described in more detail at <http://www.salmoninfo.org/tricounty/tcplan.htm>. As described in the 2000 report, the Tri-County effort proposes several proposed programs that could be part of a Section 4(d) rule under the ESA, such as a 14-element stormwater management program, a nine-element regional road management program (including a regional forum for discussion, coordination, and adaptive management of road maintenance activities), and a riparian management zone (including a no-touch buffer around streams, lakes, and wetlands). At this time the Tri-County effort will not be part of the 4(d) rule, but is instead proposed as a "model" program for jurisdictions to consider as part of their ESA compliance strategy. While the exact status of the Tri-County proposal is not determined, King County is moving forward with the implementation of the proposed elements.

Basin Planning

Finally, King County continues its implementation of the six basin plans developed in the late-1980s and early-1990s, including capital improvements, enforcement of regulatory changes, and an ongoing basin stewardship program. More information on the status of these efforts can be found in the Appendix.

On-the-Ground Habitat Restoration Activities

The King County Department of Natural Resources has several groups that perform on-the-ground restoration aimed at salmon recovery and water quality improvement. One, the **Habitat Restoration Team**, was discussed in the County's SWMP under the name of Jobs for the Environment.

The Habitat Restoration Team was originally funded solely through Jobs for the Environment grants from the Washington Department of Natural Resources. Since 1997 the crew of up to five displaced timber and fisheries workers have used approximately \$635,000 in grants to: a) remove dozens of fish migration barriers such as culverts; b) install dozens of instream habitat features such as control weirs and large woody debris; and c) improve riparian zones by removing hundreds of acres of invasive plant species, planting hundreds of thousands of native trees and shrubs, and building thousands of feet of fencing to keep livestock out of streams. The Jobs for the Environment program has not yet been renewed by either the Salmon Recovery Funding Board or the Washington legislature for future funding cycles. As Jobs for the Environment funding has diminished, the Habitat Restoration Team has acquired projects from other King County departments (e.g., Roads and Parks) as well as outside jurisdictions requiring on-the-ground laborers for habitat restoration. However, a cessation of state grant funds would greatly reduce King County's ability to perform on-the-ground habitat restoration.

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.