

PRELIMINARY FINAL

KING COUNTY DEPARTMENT OF NATURAL RESOURCES
YEAR 2000 CSO PLAN UPDATE PROJECT
SEDIMENT MANAGEMENT PROGRAM

SEDIMENT MANAGEMENT PLAN

**REVIEW/ANALYSIS OF PREVIOUS/CURRENT/FUTURE ACTIONS
& COORDINATION WITH RELATED PROJECTS**

*Task 4
Technical Memorandum*

Prepared by:

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December, 1998

The purpose of Task 4 was to review previous actions taken by King County to control CSOs to determine the effectiveness of these actions in reducing contaminated sediments, and to coordinate with current and future projects, plans and programs involving CSOs. This was accomplished by reviewing relevant documents and meeting with King County representatives from the following programs and projects.

- Water and Land Resources Division (WLRD)
- Denny/Lake Union Project
- Elliott Bay/Duwamish Restoration Panel (EBDRP)
- Regional Wastewater Services Plan (RWSP)
- Combined Sewer Overflow Water Quality Assessment (WQA)
- Industrial Waste Program (Industrial Waste)
- Combined Sewer Overflow (CSO) Program
- National Pollutant Discharge Elimination System (NPDES) Permits for treatment facilities and CSOs
- Inflow and Infiltration Program
- Total Maximum Daily Loads (TMDLs)

Other programs examined relevant to CSOs and sediment management included: NOAA Report on Sediment Contamination, EPA Report on Sediment Contamination and current work on Slip No. 4 in the Duwamish River. The results of this review and discussions with project managers are summarized in the following table.

<i>Program or Project</i>	<i>Program or Project Description</i>	<i>Relationship to Sediment Management</i>	<i>Lead Agency/ Contact</i>																												
Combined Sewer Overflow (CSO) Program	<p>Since the 1960's, King County has been conducting CSO control projects to improve water quality in the Seattle-King County area. The County first formalized its CSO Program with the development of its 1979 CSO Control Program. The Program was subsequently updated in 1988 to address State Department of Ecology requirements that were promulgated in January 1987. The 1988 CSO Control Plan identified projects and presented a schedule to meet state CSO regulations. The Program also included source control, frequency and volume reduction, and system planning.</p>	<p>Management of contaminated sediments off CSO outfalls is included under the CSO Program except for sediment remediation projects related to the NOAA Consent Decree.</p>	<p>King County – WTD Laura Wharton (206) 684-1238</p>																												
<i>Regional Wastewater Services Plan (RWSP)</i>	<p>The RWSP is a long-range plan for wastewater services in King County and adjacent areas. The RWSP is a long-range plan for wastewater services in King County and adjacent areas. The 1988 CSO Control Plan was updated as part of the RWSP effort.</p> <p>In the RWSP, King County's CSO control program is designed to reduce CSOs to an average of one overflow per outfall per year. Proposed CSO projects include CSO control facilities, storage tanks, on-site treatment, and connection and repair of old systems. The following lists CSO control projects included in the RWSP.</p> <table border="0" style="width: 100%;"> <tr> <td>Harbor – 1998</td> <td>Michigan – 2022</td> </tr> <tr> <td>Denny Way – 2006</td> <td>Brandon – 2022</td> </tr> <tr> <td>MLK - 2008</td> <td>Chelan – 2024</td> </tr> <tr> <td>Henderson – 2009</td> <td>Connecticut – 2026</td> </tr> <tr> <td>Norfolk – 2009</td> <td>King Street – 2026</td> </tr> <tr> <td>S. Magnolia – 2010</td> <td>Hanford – 2026</td> </tr> <tr> <td>SW Alaska – 2010</td> <td>8th Ave – 2027</td> </tr> <tr> <td>Murray – 2010</td> <td>W. Michigan – 2027</td> </tr> <tr> <td>Barton – 2011</td> <td>Terminal 115 – 2027</td> </tr> <tr> <td>North Beach – 2011</td> <td>3rd West – 2029</td> </tr> <tr> <td>University Montlake – 2015</td> <td>Ballard – 2029</td> </tr> <tr> <td>Hanford – 2017</td> <td>11th Ave - 2030</td> </tr> <tr> <td>West Point – 2018</td> <td></td> </tr> <tr> <td>Lander – 2019</td> <td></td> </tr> </table>	Harbor – 1998	Michigan – 2022	Denny Way – 2006	Brandon – 2022	MLK - 2008	Chelan – 2024	Henderson – 2009	Connecticut – 2026	Norfolk – 2009	King Street – 2026	S. Magnolia – 2010	Hanford – 2026	SW Alaska – 2010	8 th Ave – 2027	Murray – 2010	W. Michigan – 2027	Barton – 2011	Terminal 115 – 2027	North Beach – 2011	3 rd West – 2029	University Montlake – 2015	Ballard – 2029	Hanford – 2017	11 th Ave - 2030	West Point – 2018		Lander – 2019		<p>If CSOs are effectively reduced or eliminated, sediment quality around outfalls are expected to improve slightly or remain the same. As part of the planning effort, evaluations of existing sediment contamination and the possibility of recontamination, with and without CSO source control will be considered.</p>	<p>King County- WTD Laura Wharton (206) 684-1238</p>
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Summary Of King County Actions To Control CSOs And Sediment Contamination

<p><i>Combined Sewer Overflow Water Quality Assessment (WQA)</i></p>	<p>The WQA examined potential risk to aquatic organisms, wildlife, and humans from overall environmental conditions surrounding CSOs and from CSO outfalls alone. Risk from contaminants of potential concern (COPCs) in marine sediments was evaluated as part of this study. Bioassays, benthic surveys and previous monitoring results were used to establish baseline conditions that were compared to sediment hazard quotients developed from SQS values and other parameters. Wildlife hazard quotients were developed for spotted sandpipers, river otters, bald eagle, and great blue herons from studies of surrogate species and existing data. Chemical exposure pathways from food ingestion, sediment ingestion and combined pathways were all evaluated. Risks were predicted to sandpipers from lead, copper, PCBs, and zinc in their food. In addition, lead posed a low risk to bald eagles and otters. Human cancer and non-cancer risk assessments from fish and shellfish ingestion were also conducted. PCBs and arsenic in fish posed health risks for humans consuming seafood about two times per month. Risks to aquatic life and wildlife from CSOs were determined to be minimal. Risks to humans from bacteria and pathogens in CSO discharges was considered to be small, however it was determined to be the most significant risk to humans from CSOs.</p>	<p>WQA identifies historical sediment contamination as a source of current water quality degradation. The WQA provides:</p> <ul style="list-style-type: none"> • select data on sediment contamination around CSOs; • a sense of the level of contaminants in the river and the contribution from sediments; • a selection process for COPCs; and • a risk assessment model to be used (or modified) as an evaluative tool. <p>WQA model will help answer: “If we turned off CSOs today, when will the river reach stability with natural recovery?” and “How much do we expect removal of CSOs to improve water quality?” However, no model currently measures sediment right in front of the outfall.</p> <p>Need to determine if additional sediment data is required to answer these questions.</p>	<p>King County – WTD Sydney Munger (206) 296-1970</p>
<p><i>Denny Way/Lake Union CSO Control Project</i></p>	<p>A site offshore of the Denny Regulator was remediated as a voluntary demonstration project and interim solution for improving sediment quality in Elliott Bay. In 1990, a three-foot cap was placed at the Denny Way CSO. As part of its CSO control program, King County is proposing to store and treat CSOs to control the Denny CSO and County and City CSOs to east and south Lake Union to one event per year per outfall. The existing CSO outfall will be extended from its current location to the eastern limit of the Denny Way cap, and a new outfall will be constructed to discharge treated flows from the new CSO control facility. This outfall will cross the Denny Way cap, and extend to a water depth of approximately 60 feet mean lower low water. It will terminate at the western limit of the Denny Way cap. A sediment chemical characterization was completed in September 1997. A Sampling and Analysis Plan was completed in February 1998. A Sediment Remediation Plan will be finalized in early 1999.</p> <p>Sediments removed during the outfall construction will be disposed of at an upland site. Demolition of the old outfall will also occur under the Denny Project and contaminated sediments removed during that construction will also be disposed of at an upland site. All areas will be backfilled with clean sediments as appropriate.</p>	<p>The Sediment Remediation Plan identifies areas of contaminated sediments offshore of the Denny CSO and proposed remediation methods. The schedule and alternative selection for these three sites will be determined as part of the Sediment Management Plan.</p>	<p>King County - WTD Judy Cochran (206) 684-1351</p>

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<p><i>NPDES Permits for Renton, West Point and associated CSOs</i></p>	<p>The National Pollutant Discharge Elimination System (NPDES) permit program regulates direct discharges of Industrial process wastewaters, and stormwaters to surface waters of the state. The Department of Ecology has delegated authority to administer the NPDES program in Washington State. Individual NPDES permits for King County’s municipal wastewater treatment plants provide detailed information on effluent limitations process whole effluent, CSO control, sediment management and more Ecology regulates municipal stormwater under a general permit program known as “the Baseline General Permit for the Control of Municipal Stormwater.”</p> <p>King County is required, under conditions of its NPDES permits, to develop a plan monitoring marine sediments in the vicinity of its wastewater treatment plant and CSOs outfalls. In 1995, King County submitted its Sediment Baseline Monitoring Plan outlining which facilities and CSOs it would monitor from 1995 to 1997. Since 1998 King County submits an annual Sediment Sampling & Analysis Plan to Ecology detailing which sites will be monitored for that particular year. Information obtained through these monitoring efforts is reported to Ecology every year, and is included in the Annual CSO report, the 5-Year CSO Updates and as part of the County’s annual <i>Marine Water Quality Status Reports</i>.</p> <p>Required CSO activities are re-evaluated every 5 years during permit renewal. If sediment management is incorporated into CSO planning, SMP projects and reporting would need to be consistent with the permit cycle and included in all reports to Ecology.</p>	<p>Regulatory requirements for maintenance and improvement of marine sediment quality.</p> <p>The sediment standards have a section on source control to achieve sediment standards and this is administered through the NPDES permit.</p>	<p>King County - WTD Karen Huber (206) 684-1246</p>
<p><i>Total Maximum Daily Loads (TMDLs)</i></p>	<p>In 1991 environmental groups sued EPA over lack of progress on Washington’s TMDLs (the suit was amended in 1994). EPA settled with the litigants and signed a memorandum of agreement (MOA) with Ecology in October 1997 outlining a plan for Ecology to complete all of the required TMDLs over a 15-year period ending in 2013. If Washington State does not complete the TMDLs, according to the MOA schedule, or if the submitted TMDLs are not approved by EPA, deemed not approvable by EPA, EPA will take steps “deemed appropriate”, which may include taking the lead on TMDL development.</p> <p>Through the Department of Ecology’s Needs Assessment for the Cedar-Green Water Quality Management Area, Ecology, along with local stakeholders, determined establishment of TMDLs for sediments in the</p>	<p>The standards for sediment cleanup are determined on a case-by-case basis. The TMDL wasteload and load allocation process may result in setting effluent quality standards for discharge from County CSOs. TMDLs for sediments could influence sediment monitoring under NPDES permits.</p>	<p>Ecology/King County Pam Elardo (206) 689-3699</p> <p>King County- WTD Karen Huber (206) 684-1246</p>

Summary Of King County Actions To Control CSOs And Sediment Contamination

<p><i>Total Maximum Daily Loads (TMDLs)</i> <i>(continued)</i></p>	<p>Duwamish River/Elliott Bay and Lake Union and the Ship Canal as a high priority.¹</p> <p>A joint WLRD and WTD group addressing King County’s potential participation in developing TMDLs has met over the past year to discuss opportunities to incorporate TMDLs work into existing King County projects. In July 1998, the group recommended to that King County assume technical leadership for County TMDLs. As a result, the County has hired a staff person from Ecology to assist in developing TMDLs. The group prioritized sediment TMDLs for the Duwamish and Elliott Bay and for Lake Union and the Ship Canal to be the first priority.</p>		
<p>Inflow and Infiltration (I/I) Program</p>	<p>Inflow (stormwater entering the sewer system from roofs, manhole covers, and catch basins) and infiltration (stormwater and groundwater entering the sewer system from defective pipes and pipe joints) comprises 75% of the peak wastewater flow in the separated portion of the regional collection system, 95% of which enters through collection systems owned by local sewer agencies. These local collection systems are linked to King County treatment facilities and can affect CSOs in those parts of the regional collection system tributary to the West Point Treatment Plant. King County is about to embark on a cooperative long-term regional I/I control program with all 32 local service providers tributary to the regional wastewater treatment and conveyance system. This \$31 million program will define where I/I is coming from, determine the cost effectiveness of I/I removal and develop mechanisms to reduce current and future I/I levels. Findings and recommendations from this work will be available late in 2003.</p>	<p>Relationship of I/I program to sediment management is limited. I/I is not a significant source of sediments and what sediments are generated are fairly benign unless they are being generated from a commercial/industrial area. These sources are managed through King County’s Industrial Waste and Local Hazardous Waste Management Programs. I/I sources impacting sediment quality are groundwater, drainage from roofs, drainage from roadways, and storm drains.</p>	<p>King County - WTD Gunars Sreibers (206) 684-2113</p>
<p>Elliott Bay/Duwamish Restoration Program (EBDRP)</p>	<p>EBDRP was initiated as a result of a Natural Resource Damage Assessment lawsuit by NOAA (<i>United States et. al. v. City of Seattle and the Municipality of Metropolitan Seattle</i>, Case 90-395) to recover damages for injury to resources caused by contaminants in storm drains and CSOs. A Consent Decree was agreed to by the City of Seattle and King County (as Metro) which allocates money for the cleanup of CSO sites identified through the EBDRP. In 1992, a technical working group to EBDRP identified 24 potential sediment remediation sites associated with King County and City of Seattle CSOs and storm drains. Of these 24 sites, four were selected for further investigation and cleanup studies and work plans were developed. In addition, a number of cleanup projects have been started and others completed.</p>	<p>Guiding program in evaluating cleanup activities related to the lawsuit in Elliott Bay and the Duwamish River. Provides immunity from third party lawsuits under CERCLA. Does not provide immunity from third party lawsuits under MTCA.</p>	<p>King County – WLRD Bob Swartz, Panel Rep and Chair Sediment Work Group (206) 296-8246</p> <p>Pat Romberg (206) 296-8251</p>

¹ The Department of Ecology is still discussing the prioritization and time line for development of sediment TMDLs.

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<p><i>Pier 53-55 Sediment Capping Project</i></p>	<p>The Pier 53-55 Sediment Capping Project is an EBDPR project and covers 4.5 acres and involves two different types of sediment remediation. A 3-ft thick cap covering approximately 2.9 acres was placed on the portion of the site lying in relatively deep water. High levels of PCBs, mercury, cadmium, silver, LPAHs and PAHs were identified. The Pier 53/55 site was remediated with a sediment cap in 1992. Monitoring was conducted in 1992, 1993, and 1996.</p>	<p>The first King County CSO site remediated under the NOAA lawsuit. Provides a case study for thick capping and enhanced natural recovery. Provides basic information on sediment contamination from CSOs.</p>	<p>City of Seattle, SPU Cheryl Paston (206) 684-4609</p> <p>EBDRP Panel Project Coordinator not yet assigned.</p>
<p><i>Norfolk Sediment Remediation Project</i></p>	<p>The Norfolk Sediment Remediation Project is an EDBRP project and will be completed in February/March 1999. Overall area to be remediated is approximately 400 by 125 feet. The boundary for remediation is being set by PCBs to the non-detect level. Current modeling suggests that about 30% of the area will be recontaminated by phthalates. A source control investigation for phthalates will be started during current remediation activities for PCBs.</p> <p>The scope of work has been completed for the first phase of a Phthalate Source Control Study. The study will be completed by mid 1999 and will provide direction on additional work to be done at this site.</p>	<p>One of a number of King County CSO sites being remediated as part of the NOAA lawsuit. Source Control Study may provide insight into phthalate contamination of sediments. Will provide basic information on sediment contamination and recontamination from potential CSOs.</p>	<p>King County – WLRD Priscilla Hackney (206) 684-1791</p> <p>Pat Romberg (206) 296-8251</p> <p>EDBRP Panel Project Coordinator Glen St. Amant, The Muckleshoot Tribe.</p>
<p><i>Duwamish/Diagonal Sediment Remediation Project</i></p>	<p>The Duwamish/Diagonal Sediment Remediation Project is an EBDPR project that is part way through developing a clean up plan. A site assessment and a cleanup alternative evaluation were completed last year, and the cleanup area determined. The cleanup area was divided into north and south areas. However, only the north area will be cleaned up under the Consent Decree². Recontamination by phthalates has been predicted to be a problem at this site. The boundary for remediation has been set by phthalate contamination. The team is currently looking for a model or recontamination prediction method to use at this site. The team is waiting for the consent decree to provide more funds to complete the necessary steps. This could take up to a year before contract documents are issued.</p>	<p>This site is one of a number of King County CSO sites being remediated as part of the NOAA lawsuit. Provides case study for phthalate cleanup methods and basic information on sediment contamination or recontamination from CSOs.</p>	<p>King County – WLRD Priscilla Hackney (206) 684-1791</p> <p>Pat Romberg (206) 296-8251</p> <p>EBDRP Panel Project Coordinator not yet assigned.</p>
<p><i>Elliott Bay Central Seattle Waterfront Cleanup Study</i></p>	<p>Sediment cores and bioassay samples were collected and analyzed in the summer and fall of 1996. Due to projected shortfalls in the sediment planning and design budget, the Seattle Waterfront Cleanup project was put on indefinite hold in January 1997. Accordingly, evaluation of the data was limited to routine quality assurance/quality control. Discussions regarding options for resuming the project continued through 1997.</p>	<p>This site is one of the four sites identified for remediation as part of the NOAA lawsuit.</p>	<p>City of Seattle, SPU Cheryl Paston (206) 684-4609</p> <p>EBDRP Panel Project Coordinator not yet assigned</p>

² King County Department of Natural Resources, 1998. "Water Quality Status Report for Marine Waters, 1996." Pages 3-12
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Summary Of King County Actions To Control CSOs And Sediment Contamination

<p>Endangered Species Act (ESA) – Habitat Conservation Plan (HCP)</p>	<p>Due to the probable listing of the Chinook Salmon on the Endangered Species List, King County is preparing an HCP for its wastewater treatment facilities. The HCP will include CSO outfalls and associated contaminated sediments. The HCP is expected to be completed in December 2001.</p>	<p>Currently the relationship between contaminated sediments in place, contaminated sediment cleanup and salmonids is unclear. If a negative relationship is established there is potential to develop “early-out” sediment remediation projects under ESA with the City.</p> <p>The National Marine Fisheries has shown contaminated sediments to impair immune systems of young salmon.</p>	<p>King County - WTD Shirley Marroquin (206) 684-1173</p>
<p>Industrial Waste Program</p>	<p>King County’s Industrial Waste Program regulates local businesses that discharge industrial wastewater to King County’s sewage treatment plants. The Program issues several types of discharge approvals based on the volume of wastewater discharged, the nature of the business, the characteristics of the wastewater, and the potential risk to the treatment plant. A permit is generally required if a facility discharges more than 25,000 gallons a day. Discharge authorizations, discharge letters and verbal approvals are also issued to facilities discharging lesser amounts of wastewater.</p> <p>Monitoring information on heavy metals, cyanides, and organic pollutants collected by the Industrial Waste Program is available electronically³. This information is also published in the <i>Industrial Waste Program Annual Pretreatment Report</i>.</p>	<p>Source Control to prevent recontamination and to assess future contamination.</p> <p>Help in identifying industrial sources of contamination.</p> <p>Suggested approach to evaluating recontamination at specific CSO sites: take the list of COPCs for sediment quality to the Industrial Waste Program and see how many of those are linked to industrial dischargers as a primary source. Then see if the current discharge levels would recontaminate the site. If they would, determine what would happen if the discharge levels were reduced.</p>	<p>King County – WLRD Elsie Hulsizer (206) 689-3010</p>
<p>Local Hazardous Waste Management Program</p>	<p>The Local Hazardous Waste Management Program addresses waste produced by households and small businesses. The program is an intensive effort to reduce and properly manage waste through education, collection and technical assistance.</p> <p>The Small Business Services section works with small quantity generators (SQGs) who produce less than 220 pounds of hazardous waste each month. Program services help these businesses comply with regulations and reduce waste. This program has a large database of small generators that can be sorted by address.</p>	<p>Source Control to prevent recontamination and assess future contamination.</p> <p>Help in identifying industrial sources of contamination.</p>	<p>King County – WLRD Ray Carveth (206) 689-3053</p>

³ The program samples all facilities with waste discharge permits twice a year.
SMP Task 4