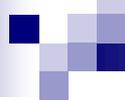


CSO Overview & Issues at NWRO

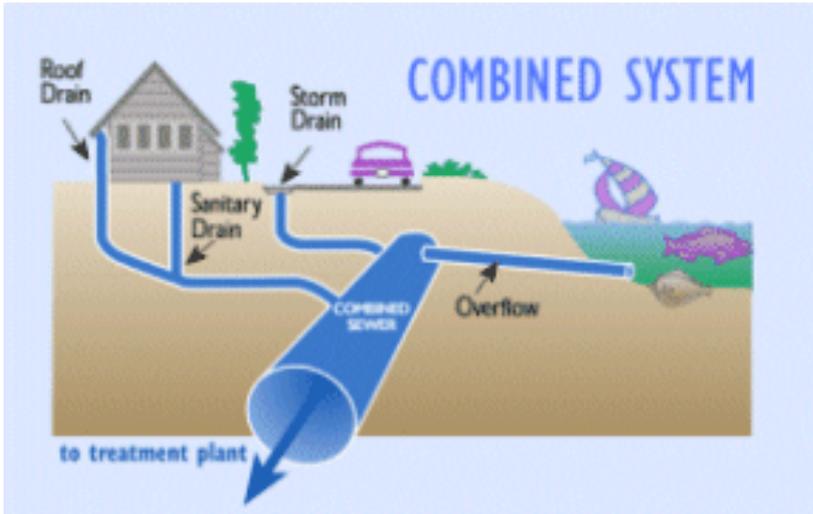
WQ PMT Meeting
Lacey, WA
December 7, 2010



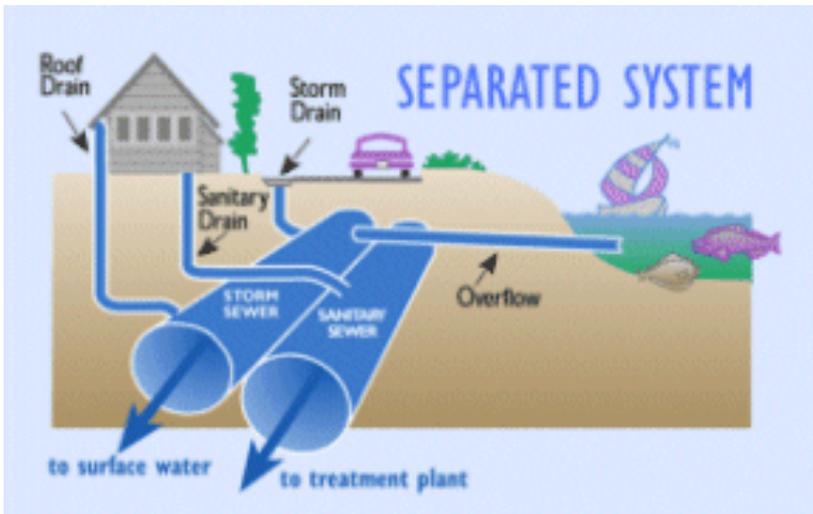
Presentation Outline

- Overview of CSOs
- CSO Regulatory Structure
 - Federal & State Laws and Rules
- Types of CSO Reduction Projects
 - “Gray” & “Green” Infrastructure
- King County’s & City of Seattle’s Systems – Permits, Reduction Plans, & Status
- EPA’s Field Investigation & Status Update
- Ecology’s Order for Seattle

What is a Combined Sewer Overflow?



- The combined sewer system (CSS) - sanitary drain and storm drain flows are transported to the treatment plant in the same pipe.
- The overflow acts as a relief valve when the sewer collection system is over capacity.
- A separate sewer system allows the stormwater only to flow directly to surface water. Only the sanitary sewage flows to the treatment plant.



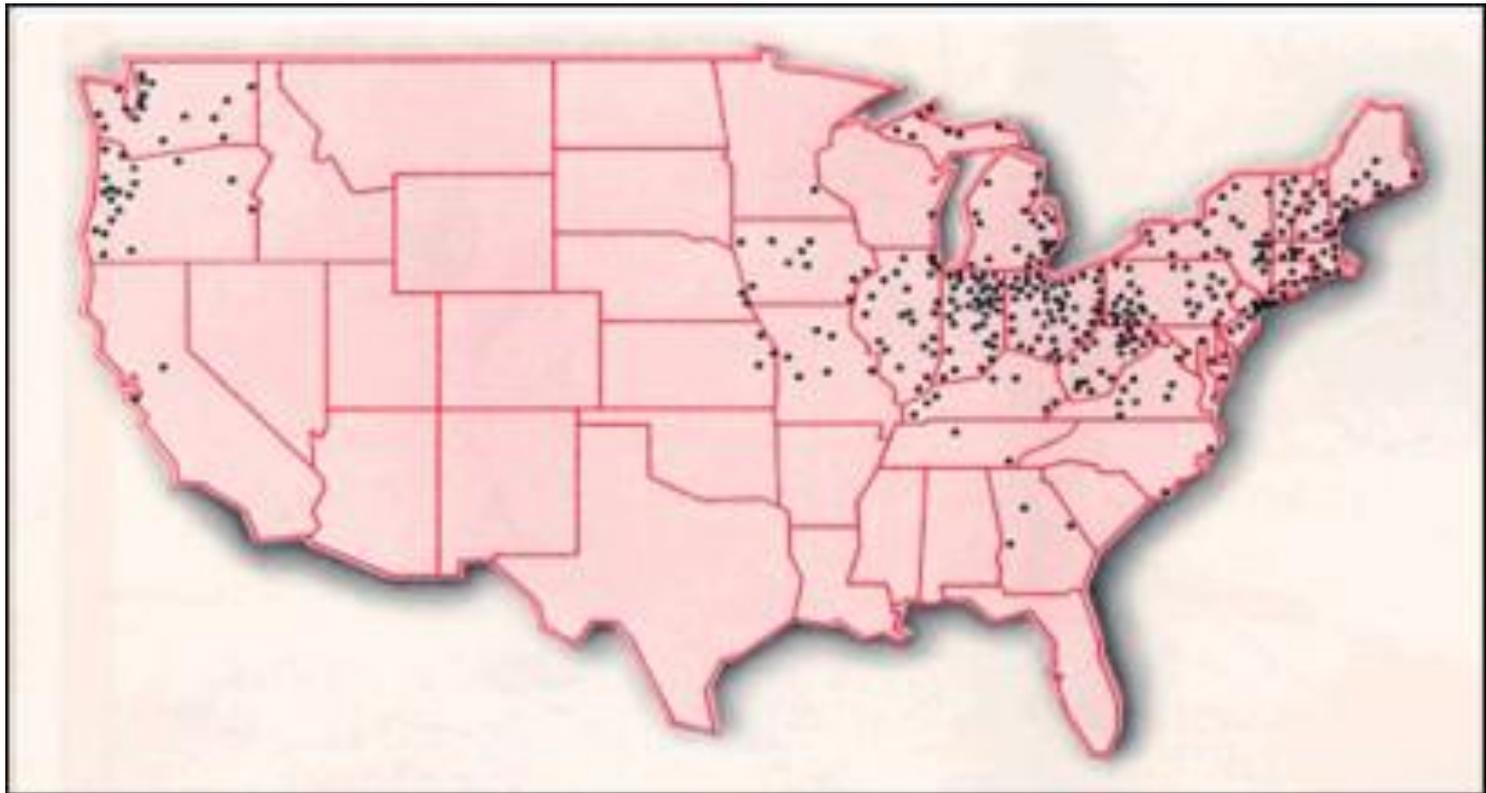
Why are CSOs a problem?

- EPA recognizes CSOs as a major source of water pollution.
- Untreated sewage is discharged to surface waters during wet weather events.
- Warning signs are to be posted near the discharge point.



Where are CSO? Nationally

Combined sewer systems are remnants of the country's early infrastructure and so are typically found in older communities. Combined sewer systems serve roughly 772 communities containing about 40 million people.



State Profile

New York—Region 2

CSO Permits

74

Permitted CSO Outfalls

1,098

NPDES Authority/Water Quality Standards Authority

New York State Department of Environmental Conservation (NYSDEC)

Online Resources

www.dec.state.ny.us/
www.dec.state.ny.us/website/dow/index.html

○ CSO Communities

20 0 20 40 60 Miles



State Profile

Pennsylvania—Region 3

CSO Permits

155

Permitted CSO Outfalls

1,662

NPDES/Water Quality Standards Authority

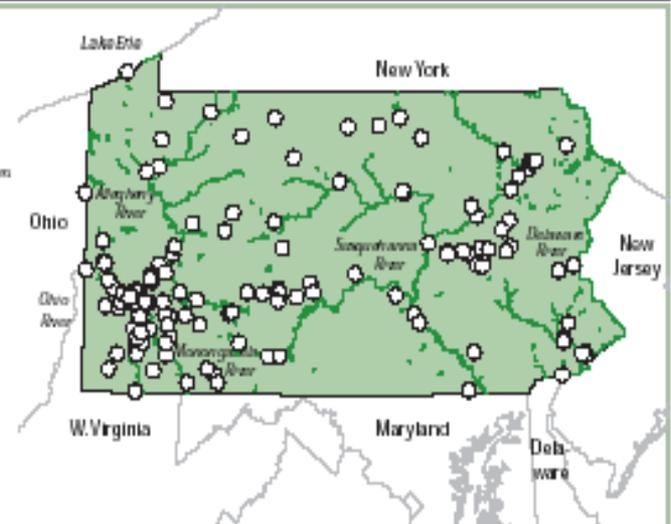
Pennsylvania Department of Environmental Protection (PADEP)

Online Resources

www.dep.state.pa.us/dep/deputate/watermgt/wsm/facts/fs2655.htm

20 0 20 40 60 Miles

○ CSO Permits



Where are CSOs in Washington?

State Profile

CSO Permits

11

Permitted CSO Outfalls

219

NPDES/Water Quality Standards Authority

Washington Department of Ecology (Ecology)

Online Resources

www.ecy.wa.gov/

www.ecy.wa.gov/programs/wq/wqhome.html

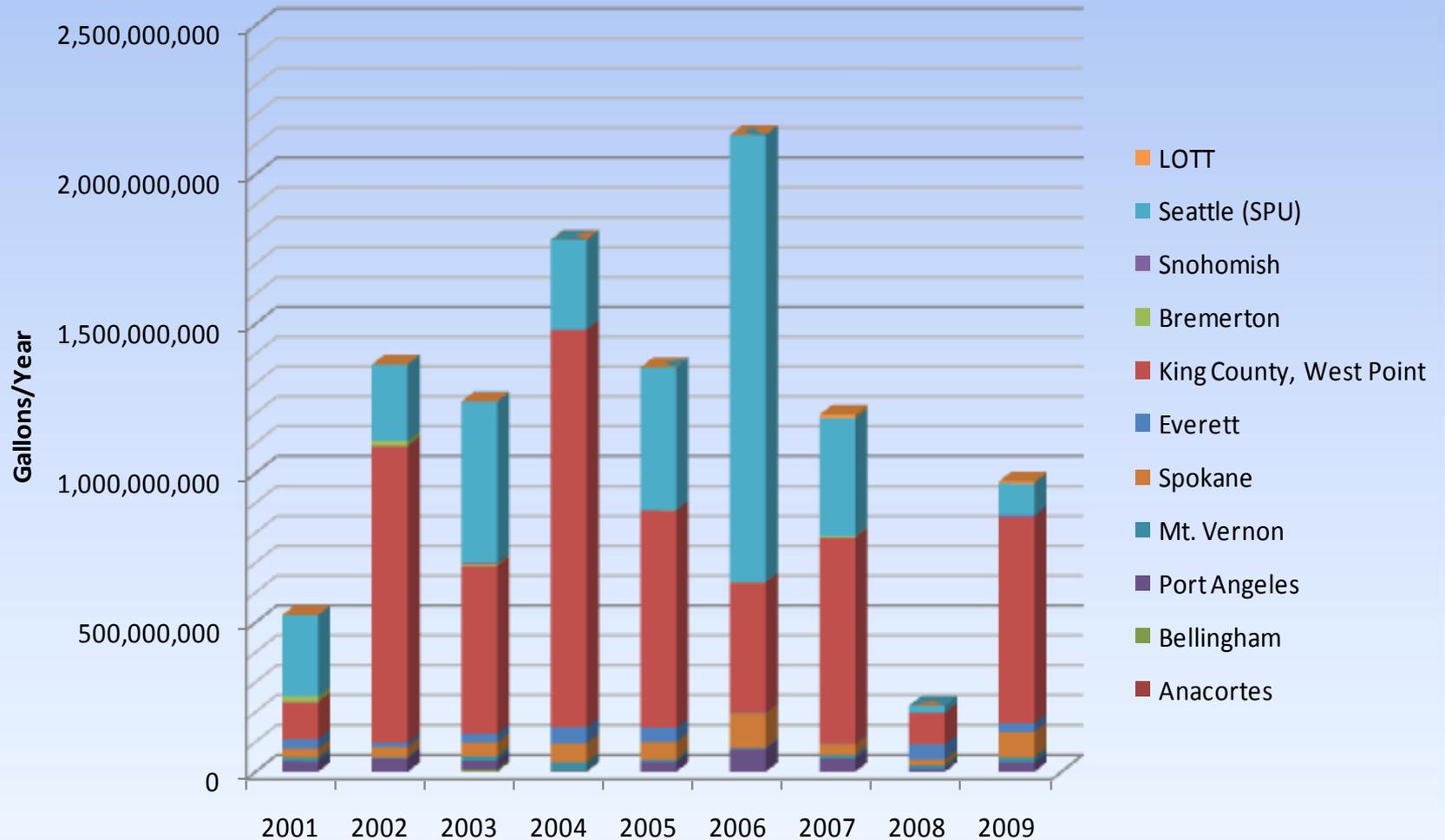
Washington—Region 10



Washington CSO Permits

Permit Number	Permittee	Number of CSO Outfalls	Number Controlled
WA-002025-7	Anacortes	3	2
WA-002449-0	Everett	13	0
WA-002918-1	KC – West Point	34	~15
WA-002928-9	Bremerton	16	16
WA-003168-2	Seattle	90	~45
WA-002374-4	Bellingham	2	2
WA-002407-4	Mt. Vernon	2	0
WA-002397-3	Port Angeles	4	0
WA-003706-1	LOTT	1	1
WA-002447-3	Spokane	22	3
	Total	189	

CSO Discharge for 11 CSO Permittees



CSOs in King Co.



- 65% of Washington's CSO outfalls are in King County.
- King County and City of Seattle CSO outfalls are in a relatively small geographic area.
- The NPDES Permits allow wet weather discharges of untreated sewage and stormwater from CSO outfalls listed in the permit to various receiving waters.

CSO Regulatory Structure

Washington vs. EPA

- WAC 173-245 dates to 1/27/1987
- CSO Reduction Plan Required
- Compliance = average on 1 discharge per year per outfall
- EPA CSO Policy 4/19/1994
- Policy Codified in Wet Weather Act 2000
- Nine Minimum Control
- Long Term Control Plan Implementation
- Compliance =
 - no more than 4-6 event per year for the system
 - or capture of 85%
 - or elimination of mass of pollutants to meet WQS.

Washington State CSO Law



■ RCW 90.48.480 Reduction of sewer overflows -- Plans -- Compliance schedule.

The department of ecology shall work with local governments to develop reasonable plans and compliance schedules for the greatest reasonable reduction of combined sewer overflows. The plan shall address various options, including construction of storage tanks for sewage and separation of sewage and stormwater transport systems. The compliance schedule shall be designed to **achieve the greatest reasonable reduction of combined sewer overflows at the earliest possible date**. The plans and compliance schedules shall be completed by January 1, 1988. A compliance schedule shall be a condition of any waste discharge permit issued or renewed after January 1, 1988.





Chapter 173-245 WAC

- Defines “The greatest reasonable reduction” to be control of each CSO such that the **average of one untreated discharge may occur per year.**
- CSO Treatment provide “**Primary Treatment**” defined at 50% removal of total suspended solids and discharge less than 0.3 ml/l/hr of settable solids.

Permitting Requirements dictated by WAC 173-245

- **CSO Reduction Plan (approval required by Jan. 1, 1988)**
 - Documentation of CSO Activity
 - Analysis of control and treatment alternatives
 - Analysis of selected control and treatment projects
 - Priority Ranking (of projects)
 - Municipalities shall propose a schedule for achievement of the “greatest reasonable reduction”
- **CSO Annual Report**
 - Detail past year’s frequency and volume
 - Explains the previous year’s reduction projects
 - Lists projects planned for next year
- **CSO Reduction Plan Amendment**
 - Assess effectiveness for CSO reduction plan to date
 - Re-evaluate project priority ranking
 - List projects to be accomplished over next 5 years
 - SPU & KC have used CSO RPA as a way to re-define program!

EPA Permitting Strategy for CSOs

EPA Combined Sewer Overflow Policy (dated April 19, 1994)

Objectives for Permittees

NINE MINIMUM CONTROLS (NMC)

LONG-TERM CONTROL PLAN (LTCP)

Permitting

Phase 1: Demonstrate NMC, Develop LTCP

Phase 2: Implement LTCP



Wet Weather Water Quality Act of 2000

Codifies EPA's 1994 policy

Authorized Funding - \$1.5 billion total in FY 2002/2003,

Other requirements of EPA to provide Guidance and Report to Congress

Nine Minimum Controls



1. Proper operation and regular maintenance programs for the sewer system and CSO outfalls.
2. Maximum use of the collection system for storage.
3. Review and modification of pretreatment requirements to ensure that CSO impacts are minimized.
4. Maximization of flow to the POTW for treatment.
5. Elimination of CSOs during dry weather.
6. Control of solid and floatable materials in CSOs
7. Pollution prevention programs to reduce contamination in CSOs.
8. Public notification to ensure that the public receives adequate notification of CSO occurrences and CSO impacts.
9. Monitoring to effectively characterize CSO impacts and the efficacy of CSO controls.

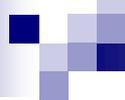
Elements - Long Term Control Plan

- Characterization, Monitoring and Modeling of the Combined System
- Public Participation
- Consideration of Sensitive Areas
- Evaluation of Alternatives
- Cost/Performance Considerations
- Operational Plans
- Maximizing Treatment at Existing POTWs
- Implementation Schedule
- Post-Construction Monitoring



3 Conventional Types of CSO Control Strategies

- **Separate** sanitary from storm pipes
- Construct **storage** in tunnels to store flows until after storm events and then convey to WWTP for treatment
- Provide satellite CSO **treatment** facilities (Screening, primary treatment, and disinfection)



Green Stormwater Infrastructure (GSI)

■ Benefits

- Reduction in Total volume of Combined flows
- WQ Benefit
- Energy Savings from decreased pumping and treatment costs
- Increased awareness about stormwater impacts
- Increased green space (aesthetics, habitat)



GSI– Types of Projects

- Roadside Rain Gardens
- Permeable Pavement (alleys)
- Downspout Disconnects

GSI – SPU Projects

- 2010
 - Ballard Roadside Rain Gardens and RainWise
- 2011
 - RainWise – Windermere, Montlake, N. Union Bay
 - Permeable Pavement – Ballard, Montlake
- 2012
 - RainWise – Interbay, Genesee, Henderson, Fremont/Wallingford
 - Rain Gardens – Ballard Phases 2-5
- 2014
 - Permeable Pavement – Ballard Phase 2



Seattle – SEA Street – 2000

http://www.cityofseattle.net/util/groups/public/@spu/@usm/documents/webcontent/01_010300.pdf

Permit Requirements for Seattle

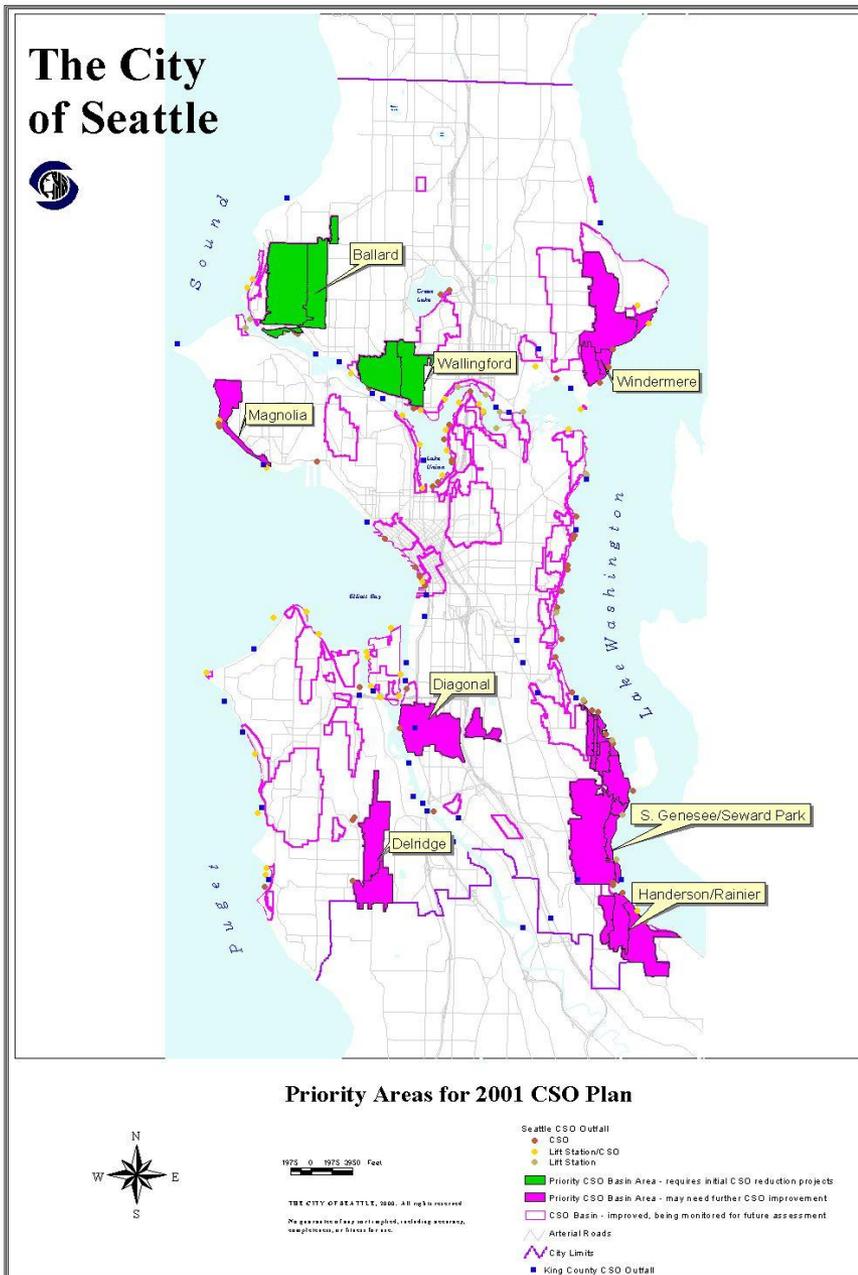
- 90 Authorized outfalls. No CSO Treat. Plants.
- Monitoring requirements: discharge location, time, duration, volume, precipitation, and storm duration
- Dry weather overflows prohibited
- Compliance Schedule: BMPs, Monitoring & Modeling, & Storage Projects
- NMC & Compliance Schedule
- Water-Quality Based Requirements for Controlled CSOs
 - PCMP
 - Sediment Monitoring

City of Seattle

■ 2001 Plan

- Control CSOs to an average of one untreated discharge per CSO site per year
- Develop a plan that is technically feasible and financially responsible
- Coordinate the CSO program with King County's & affected communities
- Changed end date from 2008 to 2020

■ Ranked areas as shown on map



SPU's CSO Reduction Plan Updates

■ 2005 Plan Update

- Major Revisions to project schedule and scope
- Ecology did not approve of this Plan
- End date - 2020

■ 2010 Plan Update

- Control CSOs to an average of one untreated discharge per CSO site per year
 - Approx. 50% of CSOs identified as “controlled”.
 - Defined project types and schedule for completion
 - Changed end date from 2020 to “2018-2025” for about 15 CSO basins!
- NWRO uncomfortable with moving end dates and no long-term enforceable mechanism.
 - To approve 2010 RPA & issue 2010 NPDES permit, ECY issued administrative order for all remaining CSOs to be under control by 2025.

Seattle – Progress to Date

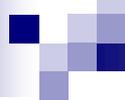
- Mostly monitoring projects vs. design or construction of storage or treatment projects
- Monitoring data completed – used to validate model for 4 future storage projects
- Flow control modifications – constructed Summer 2008 to current
- Windermere storage – ER approved October 2010. 2.05 MG Storage Tank. In Design now. Est. Cost \$45 M. Siting issues. 8+ year project
- Genesee & Henderson storage projects – Planning now.
- Implemented fats, oil, grease program to decrease number of dry weather overflows
- Increased O&M budget for cleaning and inspection and maintenance of hydro-brakes
- Upgrade SCADA monitoring system by 2008-2009.



City of Seattle

CSO Reduction Projects

- Various storage projects planned, Completion dates
- Windemere, 2014
- Genesee, 2016
- Henderson, 2016
- Duwamish, 2018
- Ballard, 2018-2025
- Fremont/Wallingford, 2018-2025



Requirements for King County – West Point Permit

- CSO Treatment Plants: Henderson, Carkeek, Alki, & Elliott West
- Effluent Limit Parameters: TSS, Settable solids, fecal coliform, total residual chlorine
- Dry weather overflows prohibited
- Track and report CSO events: date, volume, duration
- Incorporates Nine Minimum Controls
- Water-Quality Based Requirements for Controlled CSOs

Reducing CSOs in King County



- CSO volume has been reduced from a 1980-83 baseline of **2.3 billion gallons** to about **800 million gallons** per year on average.
- Developed CSO control projects to bring the remaining uncontrolled CSOs to the state requirement of one untreated discharge per year. These projects will be completed by **2030**. 50% remain uncontrolled.

KC – CSO Volume Ranking

CSO Outfall Name	Volume (gallons)
Lander St Regulator	355,927,868
University Regulator	61,898,794
King Street Regulator	56,238,166
Murray Street Pump Station	50,497,793
Hanford #1 Overflow	42,011,528
Hanford #2 Regulator	36,341,949
Brandon Street Regulator	24,149,925
Michigan Regulator (AKA S. Michigan Regulator)	12,434,895
3rd Ave W and Ewing St	10,578,307
East Ballard (AKA 11th Ave NW)	8,914,906
Montlake Overflow	8,716,113
Dexter Ave Regulator	8,124,651
Magnolia Overflow	6,061,884
Connecticut St. Regulator (AKA Kingdome)	3,544,686
Terminal 115 Overflow	1,146,469
Denny Way Regulator	953,306
North Beach Pump Station (inlet structure)	682,846
Ballard Siphon Regulator via Seattle Storm Drain	660,812
West Michigan (AKA SW Michigan St regulator)	474,681
Canal Street Overflow	418,355
North Beach Pump Station (wet well)	283,130
Barton Street Pump Station	157,392
	690,218,456

Focus on the Duwamish



- Superfund Clean Up
- Environmental Stakeholder Involvement

King County Long Term CSO Plans



- Priority 3 project completion range from 2017 to 2029 in present plans.
- KC currently re-prioritizing basins and will be reflected in 2012 CSO RPA.

Source

<http://dnr.metrokc.gov/wtd/cso/library/ProgramReview/2006/0604-CSOControlProgramReview.pdf>

King County – Progress To Date

- 4 CSO Storage/Treatment plants completed at Henderson, Carkeek, Alki, & Elliott West
- Real-Time, web-based public notification system linked with SPU's system -1st Quarter 2011
- 4 CSO Puget Sound Storage Projects currently in planning - Engineering Reports due 12/31/20

CSO Name	Proposed Project	Estimated Cost (million \$)
S. Magnolia	1.8 MG	10
N. Beach	0.23 MG	44
Murray	0.2 MG or GSI	45
Barton	1 MG or GSI	15

King County Real-time Notification

The purpose of this Web page is to give the public the opportunity to make decisions about the use of waterways during heavy rains. CSOs usually discharge in the winter between October and May. During the CSO discharge and for 48 hours following the discharge, water users near the CSO locations are at risk from exposure to bacteria in the water.

<http://www.kingcounty.gov/environment/wastewater/CSO/RealTime/SeattleOverview.aspx>

King County Combined Sewer Overflow (CSO) Locations

KING COUNTY CSO

-  CSO discharging
-  CSO discharged in last 48 hours
-  CSO not discharging
-  Real time data not available
-  CSO Treatment Plant/Facility
-  Wastewater Treatment Plant
-  Park



File Name: 0704CSOmap.ai wgab





EPA's Field Investigation

■ King County

- Inspection focused on Nine Minimum Controls—Jan 28-31, 2009
- EPA Issued Agreed Order - August 26, 2009

■ Seattle Public Utilities

- Inspection focused on Nine Minimum Controls—Mar 18-20, 2009
- EPA Issued Agreed Order - August 26, 2009

■ EPA's Next Steps

- EPA reviewing long term plans
- EPA working toward Consent Decree? Or Admin Order?

Ecology's Wet Weather Work Group

- Goals/Purpose:
 - Address issues and concerns raised by Permittees; especially regarding permit compliance
 - Achieve state-wide consistency for CSO Permits
 - Update permit shell – ensure state & EPA requirements are included
 - Identify long-term permitting strategy (for 'controlled' CSOs)
 - Discuss differences between State & EPA requirements; resolve as needed
 - Provide assistance to permit writers, as necessary
- Kevin Fitzpatrick – PMT Sponsor

Resources and Web links

- EPA CSO Homepage

http://cfpub.epa.gov/npdes/home.cfm?program_id=5

- CSO Control Policy, April 1994
- Wet Weather Act of 2000
- Various EPA Guidance Documents

- EPA Guidance for Permit Writers

<http://cfpub.epa.gov/npdes/cso/guidedocs.cfm>

- WAC 173-245

<http://apps.leg.wa.gov/WAC/default.aspx?cite=173-245>

- Ecology “Orange Book”, section C3.

<http://www.ecy.wa.gov/pubs/9837/start.pdf>

- Ecology “Permit Writer’s Manual”, section 3.4.

<http://www.ecy.wa.gov/pubs/92109.pdf>

- King County – CSO Page

<http://www.kingcounty.gov/environment/wastewater/cso.aspx>



Questions & Answers