



## City of Spokane

### Wastewater Management



**Combined Sewer Overflow Annual Report – FY 2010  
NPDES Permit No. WA-002447-3**

**June 28, 2011**

City of Spokane  
Combined Sewer Overflow Annual Report – FY 2010  
**Wastewater Management Department**

**1. Introduction**

The City of Spokane's Combined Sewer System (CSS) is operated under two sets of regulations: The National Pollution Discharge Elimination System (NPDES) permit program, as authorized by the Clean Water Act (CWA) and administered by the Environmental Protection Agency (EPA) under Title 33 United States Code, Section 1251, and the Washington State Department of Ecology (DOE) Water Pollution Control Law under Chapter 90.48 Revised Code of Washington.

**Compliance with Nine Minimum Controls**

The EPA's Combined Sewer Overflow (CSO) Policy requires compliance with the Nine Minimum Controls, which is determined by the NPDES control authority, the DOE. The City's efforts to comply with these controls are described below.

1. *Proper operation and regular maintenance programs for the sewer system and the CSOs:*

In 2006, the City's Wastewater Management (WWM) Department developed and implemented its first municipal CSO Operations and Maintenance program (O&M Plan), with a revision in 2010. The goal of the plan is to protect water quality and reduce the discharge of pollutants via CSOs, into receiving waters. The plan includes names and contact information of responsible staff members with specific procedures clearly detailed; a list of the critical elements in the CSS: facilities (control tanks, CSO regulator structures, weirs, and so forth) included under this plan; frequency of routine inspections; wet and dry weather procedures; emergency notification procedures; and record keeping procedures.

2. *Maximum use of the collection system for storage:*

As part of the O&M Plan, WWM has a regular preventative inspection program to ensure that trapped sedimentation or debris is cleaned out of catch basins and pipes that would otherwise restrict proper flow. Visual and remote inspections by a WW Specialist or a CSO Instrument Technician are completed for each CSO structure twice a month. Repairs and necessary modifications are made to broken or malfunctioning pipes. Regulating devices are adjusted on a regular basis. In some cases, oversized pipes are used to help regulate flow.

3. *Review and modification of pretreatment requirements to assure CSO impacts are minimized:*

Proactive Pretreatment Program: The City routinely surveys existing and new businesses connected to its collection system. As a result of the continuous surveying, industries with the potential to adversely impact the treatment system are quickly identified and controlled.

4. *Maximization of flow to the publicly owned treatment works for treatment:*

The City routinely program includes pipe cleaning, infiltration & inflow reduction; routine inspections; adjustments to CSO regulator settings; manhole grouting; cured-in-place short line repairs, and full length cured-in-place pipe (CIPP) lining.

5. *Prohibition of CSOs during dry weather:*

The City has a proactive preventative CSO dry weather program as outlined in the O&M Plan. The plan includes visual and remote method inspections with specific procedures outlined; early warning and overflow alarm monitoring and response protocols; weir modifications; combined sewer system (CSS) mapping; crew training; and, public notification hotline (344-FISH) which is stenciled on a variety of public education materials and CSO sewage overflow notification signs at each CSO. Further, cross-training of other City departments such as Water & Hydroelectric Services, Streets, and the Fire Department are done in order to eliminate overflow from hydrant flushing as well as chlorine treatment for new pipes.

6. *Control of solid and floatable materials in CSOs:*

The control of solid and floatable materials is an inherent part of the City's O&M Plan. All existing and new construction catch basins have been modified with a 90 degree elbow bend that inhibits the flow of floatable and heavier solid materials to the system. This acts like a pretreatment system in which trash is pumped out by the system and oils are skimmed by maintenance crews.

7. *Pollution prevention:*

The City maintains a regular street sweeping schedule that aids in keeping additional trash and debris out of the CSS. Catch basins are pumped regularly as a preventative maintenance measure. In 2010, the City placed markers near curb drain inlets and basins to remind the public about where wastewater goes. There were three versions that read: "*Dump No Waste – Drains to River,*" "*Dump No Waste – Drains to Aquifer,*" and "*Only Rain Down the Drain.*" Each one also included a phone number to report dumping.

8. *Public notification to ensure that the public receives adequate notification of CSO occurrences and CSO impacts:*

Real time combined sewer overflow status updates can be viewed by the public on the department's website, <http://www.spokanewastewater.org>. The website includes the CSO number, location with map, and the date/time of the overflow event within the past 48 hours. It also informs the public and recreational visitors that Spokane River water activities should be avoided in these areas. When there is an overflow event, the City also notifies the Spokane Regional Health District in accordance with the O&M Plan.

9. *Monitoring to effectively characterize CSO impacts and the efficacy of CSO controls:*

WWM conducts river sampling following dry weather overflows (DWO), flow monitoring/telemetry at regulators for timely alarms and data for compliance, operation and performance of CSO facilities.

### **CSO Reduction Plan**

Washington Administrative Code (WAC) 173-245 requires each NPDES permittee to develop a CSO Long Term Control Plan (LTCP) with a goal of reducing CSO overflows to an average of no more than one discharge per year per outfall. This long term control plan establishes a schedule of compliance which will "achieve the greatest reasonable reduction of combined sewer overflows at the earliest possible date." (RCW 90.48.480)

In 1995, the City of Spokane began its CSO Long Term Control Plan to bring all CSO outfalls into compliance with the one discharge per year per outfall requirement by December 31, 2017. By the end of 2010, the City of Spokane has completed three CSO control facilities, performed nine CSO regulator weir modifications, and eliminated two CSO outfalls. In 2011, the City plans to construct four more control facilities, and eliminate two more outfalls.

## 2. CSO System Baseline Conditions

As of 2000, there were 24 permitted outfalls associated with the City of Spokane's combined sewer collection system. Today, there are 22 outfalls remaining. These are identified in the City's NPDES Permit No. WA-002447-3 and are listed as follows:

**Table 1: Outfalls listed in NPDES Permit No. WA-002447-3**

<b>OUTFALL NUMBER</b>	<b>OVERFLOW STRUCTURE DESCRIPTION</b>	<b>OUTFALL DESCRIPTION</b>
<b>Discharges to Spokane River (North Bank)</b>		
02	Hartley @ NW Blvd.	0.5 miles downstream of WWTP
03	Assembly @ NW Blvd Albi Assembly @ NW Blvd – Royal Ct	0.2 miles downstream of WWTP – <b>ELIMINATED (2004)</b> (now storm only)
06	Kiernan @ NW Blvd	0.25 miles upstream of WWTP
07	Columbia Circle @ NW Blvd	0.4 miles upstream of WWTP
10	Cochran @ Buckeye	At Downriver Bridge
12	Nora @ Pettet Dr	0.55 miles upstream of Bridge
14	Sherwood @ Summit	2.0 miles upstream of Bridge
15	Ohio @ Nettleton	2.5 miles upstream of Bridge
<b>Discharges to Spokane River (South Bank)</b>		
16	'A' @ Linton – Westgrove 'A' @ Linton – Geiger	1.45 miles downstream of Monroe St Dam
18	'A' @ Linton – Federal	<b>ELIMINATED (2007)</b>
<b>Discharges to Latah Creek</b>		
19	Seventh @ Cannon	At High Bridge (East Side)
20	S.Manito Relief Sewer	2.65 miles upstream of High Bridge
<b>Discharges to Spokane River (South Bank)</b>		
22	Main @ Oak	0.7 miles downstream of Monroe St Dam
<b>Discharges to Spokane River (North Bank)</b>		
23	Cedar @ Ide	0.3 miles downstream of Monroe St Dam
<b>Discharges to Spokane River (South Bank)</b>		
24	Cedar @ Riverside Cedar @ Riverside	0.3 miles downstream of Monroe St Dam
25	Cedar @ Main	0.3 miles downstream of Monroe St Dam
26	Lincoln @ Spokane Falls Blvd	At Monroe St Dam
33	Fifth @ Arthur Third @ Perry Third @ Arthur First @ Arthur	0.15 miles upstream of J. Keefe Bridge
34	Crestline @ Riverside	At Trent Bridge
38	Magnolia @ S. Riverton	0.15 miles upstream of Mission
39	Altamont @ S. Riverton	0.5 miles downstream of Greene
40	Regal @ S. Riverton	0.25 miles downstream of Greene
<b>Discharges to Spokane River (North Bank)</b>		
41	Rebecca @ Upriver Dr	0.5 miles upstream of Greene
<b>Discharges to Spokane River (South Bank)</b>		
42	Surro Dr	0.5 miles downstream of Upriver Dam

From 1983 to 1992, The City of Spokane completed nearly \$50 million in capital improvements to reduce combined sewer overflows to the Spokane River through the separation of the north side of town with new storm sewers. That project reduced combined sewer overflows from an average of 570 million gallons to an average of 79 million gallons. This represents a 491 million gallon, or an 86%, reduction of volume.

The 1979 CSO Abatement Plan and 1994 CSO Reduction Plan did not establish a combined sewer overflow baseline for frequency of occurrence or volume of discharge from each CSO regulator. Instead, the 1994 CSO Reduction Plan provided an average annual volume and frequency, which can be used as a benchmark to compare or evaluate the current outfall performance. The annual frequency and volume shown on Table 2 on the following page is based upon a simulation of actual rainfall data over a ten-year period (1979 thru 1988). Precipitation data was used to calibrate the model to the monitored flows recorded for the 1994 Plan. These values are footnoted to reflect elimination of regulators 3b, 16a and 18 and consolidation of 2 and 3c and of basins 16 and 18.

Today, the CSS is comprised of approximately 400 miles of sewers. The system now includes 26 of the previous 30 combined sewer overflow regulating structures which periodically overflow via 22 of the previous 24 outfalls listed in Table 1 on the previous page. Regulators that overflow to a common outfall are 24a and 24b; and 33a, 33b, 33c, and 33d.

The interceptor system has two pump stations located downstream of CSO regulators. Regulators 16 and 19 are located upstream from the Clarke Avenue pump station, and regulators 22b and 25 are located upstream of the Elm Street pump station.

The NPDES permit requires flow monitoring of each outfall to estimate the duration, frequency, and volume of the overflows. In addition to flow monitoring, the City collects rainfall data from 11 gauges distributed throughout the City and uses records from the Spokane International Airport, and Spokane Felts Field Airport, and the National Weather Service weather stations. Overflow and rainfall data are collected, analyzed, and archived for future reference. Some rain gauges are heated, which helps differentiate snow or snowmelt from rain.

**Table 2: Baseline Average Annual CSO Volumes and Frequencies<sup>1</sup>**

CSO No.	CSO Location	Annual Overflow Volume (MG) <sup>2</sup>	Annual Frequency of Overflows <sup>2</sup>
2	NW Blvd. @ Hartley	1.72 <sup>3</sup>	40 <sup>3</sup>
3b	NW Blvd. @ Assembly	0.00 <sup>3</sup>	1 <sup>3</sup>
3c	NW Blvd. @ Assembly	1.94 <sup>3</sup>	51 <sup>3</sup>
6	Kiernan @ NW Blvd.	14.12	34
7	Columbia Circle	0.81	13
10	Cochran @ Buckeye	0.27	7
12	Nora @ Pettet	9.65	35
14	Sherwood @ Summit	0.86	17
15	Nettleton @ Ohio	4.47	34
16a	“A” St. @ Linton	0.01	0
16b	“A” St. @ Linton	0.50	12
18	1 <sup>st</sup> St. @ “A” St.	0.00	1
19	Under FW Bridge	0.00	0
20	High Dr. near 33 <sup>rd</sup>	0.55	3
22	Main @ Oak St.	0.00	0
23	Cedar @ Ide	1.69	18
24a	Cedar @ Riverside	2.12	3
24b	Cedar @ Riverside	0.00	0
25	Cedar @ Main	0.35	19
26	Lincoln @ Spokane Falls	19.73	15
33a	5 <sup>th</sup> @ Arthur	0.00	0
33b	3 <sup>rd</sup> @ Perry	2.30	5
33c	3 <sup>rd</sup> @ Arthur	0.12	11
33d	1 <sup>st</sup> @ Arthur	2.03	42
34	Riverside @ Napa/Crestline	11.78	13
38	Magnolia @ S. Riverton	0.28	10
39	Altamont @ S. Riverton	1.06	34
40	Regal @ S. Riverton	1.45	32
41	Rebecca @ Upriver Dr.	0.52	11
42	Surro @ S. Riverton	0.31	7
<b>Total</b>		<b>78.64</b>	<b>467</b>

1 From 1994 Combined Sewer Overflow Reduction Plan, City Project No. 13918, Table 7-1.

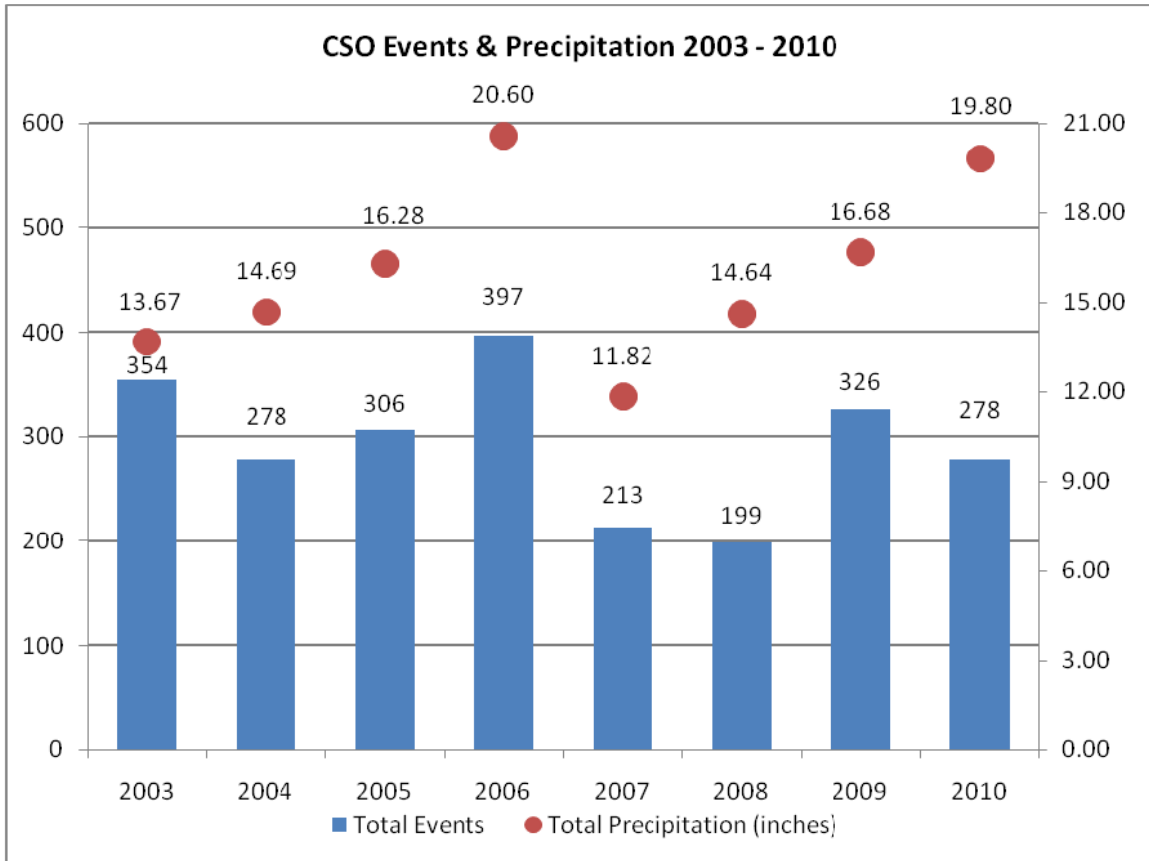
2 With Snow Melt.

3 CSO 2 & 3c flows are consolidated and regulated at CSO 2&3c Control Facility to overflow no more than once per year on average via Outfall 2. CSO 3b is physically eliminated.

4 CSO 16a, 16b & 18 flows are consolidated and regulated at CSO 16/18 Control Facility to overflow no more than once per year on average via Outfall 16b. Outfalls 16a and 18 are physically eliminated.

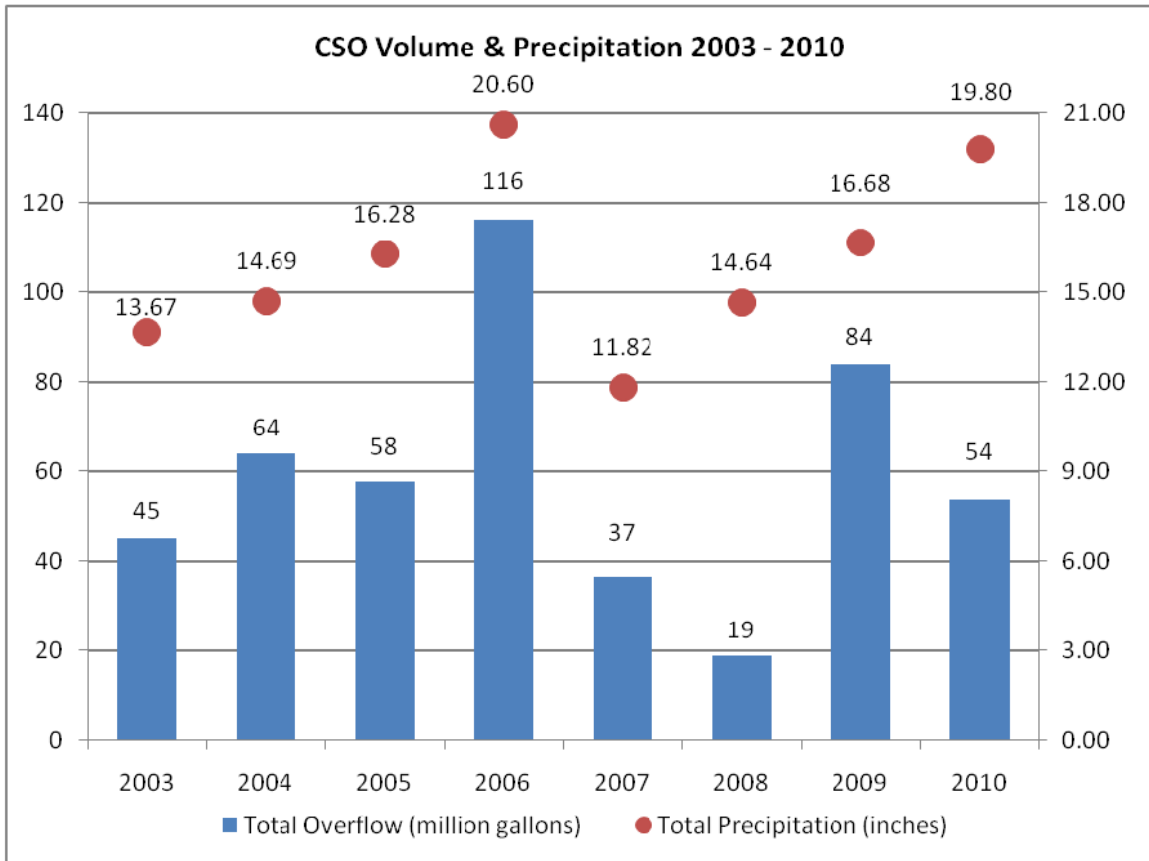
### 3. Historical Data

Chart 3: CSO Events and Precipitation from 2003 to 2010



As the City of Spokane's rainfall varies from year to year, the amount of rain and the variability in the intensity of rainstorms introduce a high degree of variability in the number of CSO overflows. As the City of Spokane has begun installing control facilities, the number of overflow events has generally been reduced. In recent years, there have been two unusually wet years; 2006 and 2010. In 2010, the annual rainfall is almost the amount in 2006, the the annual number of overflow events seems to indicate a reduction in overflow events.

**Chart 4: CSO Volume and Precipitation from 2003 to 2010**



As the City of Spokane’s rainfall varies from year to year, the amount of rain and the variability in the intensity of rainstorms introduce a high degree of variability in the volume of CSO overflows. In 2010, the annual rainfall was almost the amount in 2006, yet the volume of overflows was about half. The volume of overflows is expected to continue to be reduced as future system improvements are constructed.

#### 4. 2010 Combined Sewer Overflows Analysis

In accordance with the requirements of the City of Spokane’s NPDES Permit concerning combined sewer overflow discharges, summarized below are the frequencies, volumes and durations of CSO events recorded from January 1 through December 31, 2010. It is estimated that a **total of 54 million gallons** of combined sewage discharged to local receiving waters over these twelve months. These discharges were all associated with snowmelt and/or rain events and distributed across sixteen (16) of the 24 permitted CSO outfalls. Discharges at the nine (9) priority CSO regulator sites accounted for 81 percent of the total overflow volume measured. *Detailed information on individual CSO events is provided in Appendix “A” of this report.*

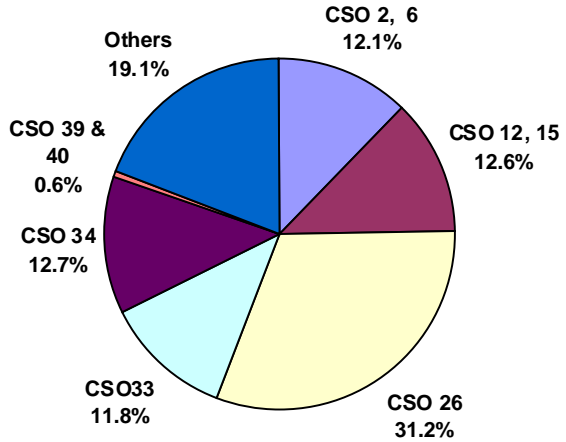
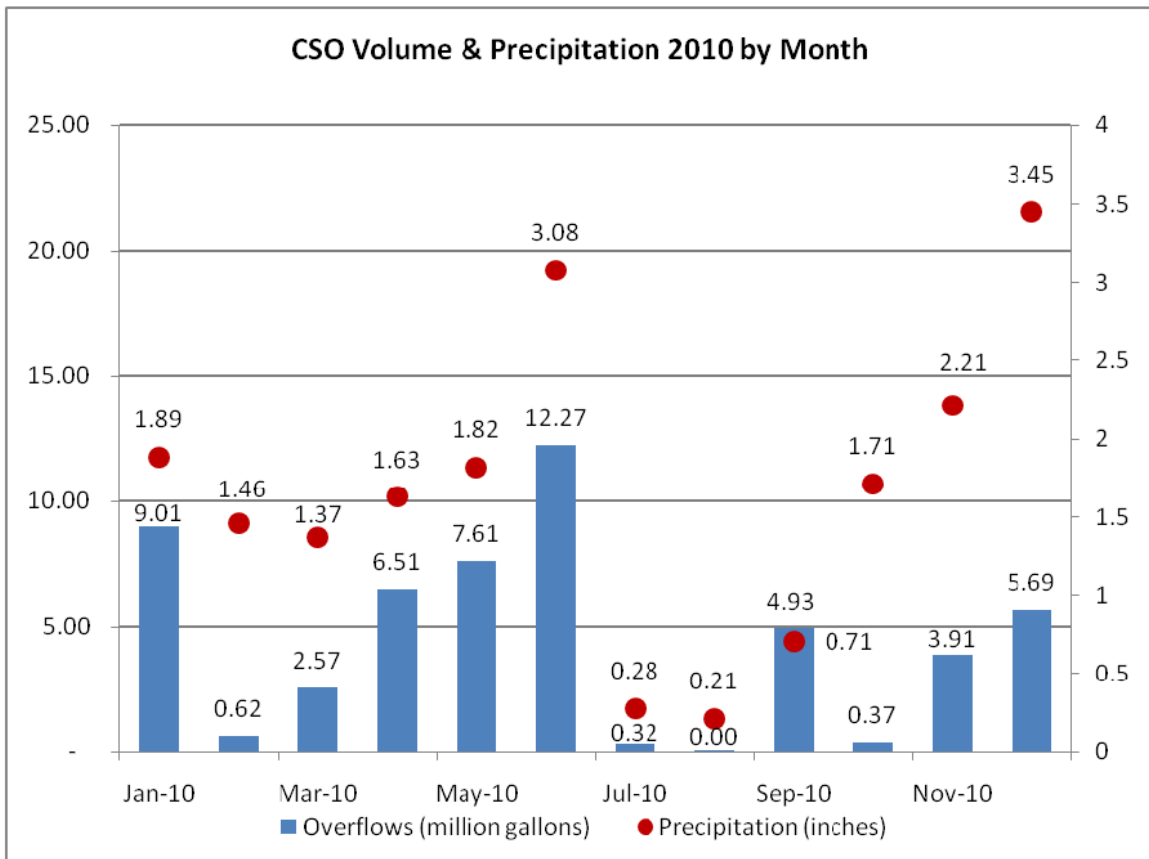


Chart 5: CSO Volume and Precipitation by month for 2010



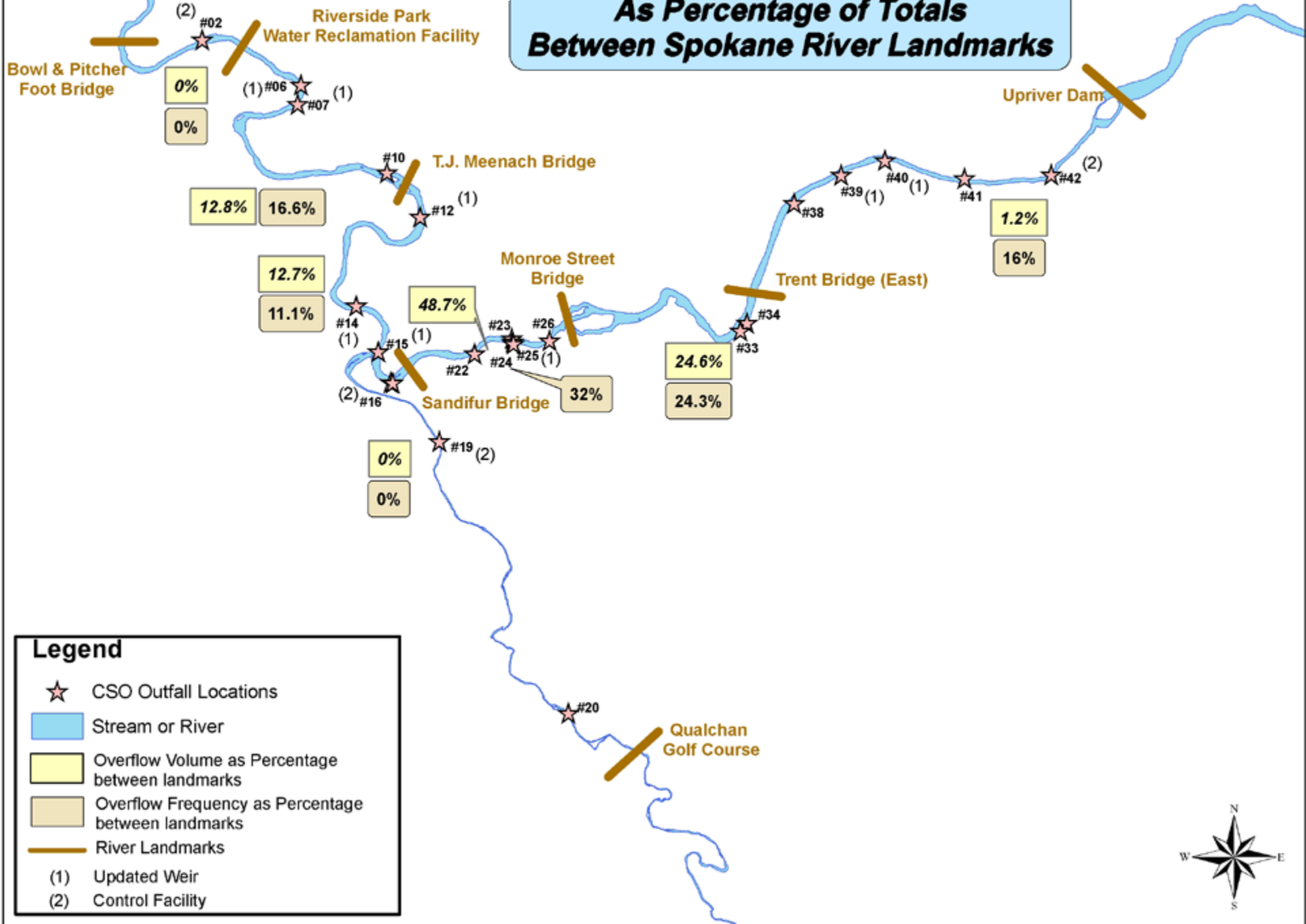
**Table 6: Summary of Monitored CSO Frequencies & Volumes for 2010**

<b>CSO OUTFALL</b>	<b>UPSTREAM REGULATOR ID<sup>2</sup></b>	<b>MONITORED CSO VOLUME (gallons)</b>	<b>MONITORED CSO FREQUENCY (Occurrences)</b>	<b>MONITORED CSO DURATION (minutes)</b>
02	<b>02</b>	0	0	0
06	<b>06</b>	6,525,510	30	5,805
07	07	317,243	11	555
10	10	46,360	13	1,425
12	<b>12</b>	6,820,303	33	6,235
14	14	32,443	1	40
15	<b>15</b>	4,671	2	25
16	16	0	0	0
19	19	0	0	0
20	20	0	0	0
22	22B	0	0	0
23	23	1,000,536	16	1,850
24	24A	7,937,787	26	6,360
	24B	23,429	12	4,980
	Total <sup>3</sup> :	7,961,216	28	
25	25	417,829	20	1,345
26	<b>26</b>	16,822,379	30	4,800
33	33A	18,501	15	1,625
	33B	5,995,917	12	495
	33C	9,787	10	470
	<b>33D</b>	393,638	25	3,025
	Total <sup>3</sup> :	6,377,843	25	
34	<b>34</b>	6,837,958	17	2,210
38	38	36,783	16	2,530
39	<b>39</b>	88,821	8	1,890
40	<b>40</b>	31,280	6	220
41	41	499,216	22	8,750
42	42	0	0	0
<b>TOTAL:</b>		<b>53,820,391</b>	<b>278</b>	

1. Tabulated information compiled from flow monitoring data collected between January 2010 and December 2010.
2. Nine (9) priority flow monitoring sites identified in **BOLDFACE** type. CSO 3C was formerly a priority site, but is now associated with CSO Outfall 2.
3. Frequency reflects any simultaneous overflows from multiple regulators to a common outfall.

Chart 7:

# CSO Overflow Volumes & Frequency As Percentage of Totals Between Spokane River Landmarks



## Legend

- ☆ CSO Outfall Locations
- Stream or River
- Overflow Volume as Percentage between landmarks
- Overflow Frequency as Percentage between landmarks
- River Landmarks
- (1) Updated Weir
- (2) Control Facility



## **5. Dry Weather Overflows (See Appendix B)**

Seven dry weather overflows occurred in 2010 as follows: CSO 40 (February 8); CSO 10 (April 9); CSO 38 (May 17); CSO 41 (June 19); CSO 6 (July 7); CSO 24A (July 15); and CSO 12 (August 30).

The event at CSO 40 was estimated at 2,360 gallons and was caused by a root mass growing between the regulator and interceptor that caused a backup into the weir. The event at CSO 41 was estimated at 37, 246 gallons, and was caused by a multi-day storm that had a partial blockage that cleared itself. The event at CSO12 was estimated at 1,500 gallons and was caused by flows from draining the Cannon Park pool. This event did not cross the top of the regulator weir, but leaked around the ends of the weir stop logs.

The event at CSO 6 was estimated at 15,394 gallons and was caused by a partial blockage coincident with the overflow from the Shadle water tower caused by a faulty shutoff switch. The event at CSO 24A was estimated at 848 gallons and was caused by a water main break at 20<sup>th</sup> & Lincoln due to street construction activity.

The event at CSO 10 was estimated at 321 gallons and was caused by hydrant flushing maintenance by the water department. The event at CSO 38 was estimated at 202 gallons and was caused by upstream sewer maintenance activity causing intermittent excess flow.

## **6. Settlement Agreement**

The City of Spokane and the Sierra Club entered into a Settlement Agreement in 2008 regarding dry weather overflows. The elements of the Agreement are nearly completed. Pursuant to the Agreement, eleven CSO regulators prone to dry weather were to be modified. The 11<sup>th</sup> regulator is being addressed by a project awarded for construction in late 2010. Also, improving CSO-related training and maintenance procedures and enhancing public information and notification were undertaken. Information has been added to the City's website and major river access points for the public and warning flags are deployed at major river access points if a dry weather overflow occurs. The CSO O&M Plan has been updated, additional precautions during maintenance have been established, and training is ongoing.

**Table 8: CSO Control Projects Completed in 2010**

<b>CSO NPDES BASIN NO.</b>	<b>LOCATION OF IMPROVEMENT</b>	<b>WATER BODY</b>	<b>DESCRIPTION</b>
<b>19</b>	7 <sup>th</sup> @ Inland Empire Way	Spokane River	Construct weir modifications and storage volume to attain compliance.
<b>39</b>	Altamont @ South Riverton	Spokane River	Construct weir modifications for improved dry weather control.
<b>40</b>	Regal @ South Riverton	Spokane River	Construct weir modifications for improved dry weather control.

**Table 9: CSO Control Projects Scheduled for 2011**

<b>CSO NPDES BASIN NO.</b>	<b>LOCATION OF IMPROVEMENT</b>	<b>WATER BODY</b>	<b>DESCRIPTION</b>
<b>10</b>	Buckeye @ Nettleton	Spokane River	Construction of 137,000 gallon control facility. Estimated cost: \$1,017,000.
<b>38/39/40</b>	Magnolia and Altamont @ S. Riverton	Spokane River	Construction of two control facilities totaling 365,000 gallons. Eliminate CSO Outfalls 39 and 40. Estimated cost: \$5,990,000
<b>41</b>	Rebecca @ Upriver Dr.	Spokane River	Construction of 451,000 gallon control facility. Estimated cost: \$6,320,000
<b>33</b>	33-2 (33D) 1 <sup>st</sup> Ave. @ Arthur	Spokane River	Construction of 480,000 gallon control facility. Estimated cost: \$ 6,122,000

## **Appendix “A”**

Detailed CSO Event Information  
Monthly Reports  
January through December 2010  
(FY 2010 Report)

Monthly Reports are available online at:  
<http://www.spokanewastewater.org/csupdate.aspx>

# **Appendix “B”**

Maintenance Summary

January through December, 2010  
(FY 2010 Report)

(Three pages)

Maint\_Overflow2010

<b>CSO</b>	<b>Date</b>	<b>Overflow (Gallons)</b>	<b>Duration (Minutes)</b>	<b>Comments</b>		
<b>40</b>	02/08/2010	2,360	60	Root mass growing between regulator and interceptor		
<b>41</b>	06/19/2010	37,246	1,060	Multi-day storm partial blockage		
<b>12</b>	08/30/2010	1,500	180	Draining Canon park pool; water leaked through weir ends		
<b>Totals</b>	<b>3</b>	41,106	1,300			

Maint\_Overflow2010

<b>CSO</b>	<b>Date</b>	<b>Overflow (Gallons)</b>	<b>Duration (Minutes)</b>	<b>Activity</b>			
<b>10</b>	04/09/2011	321	15	Hydrant flushing by water Department			
<b>38</b>	05/17/2011	202	30	Upstream sewer cleaning			
<b>Totals</b>	<b>2</b>	523	45				

Water Main Breaks

CSO	Date	Overflow (Gallons)	Duration (Minutes)	Activity					
6	07/07/2010	15,394	25	Partial blockage combined with Shadle water tower overflow					
24A	07/15/2010	848	25	Water main break at 20th & Loncoln due to street construction					
<b>Totals</b>	<b>2</b>	16,242	50						