NYC Environmental Protection

CSTAG Meeting
Background Material

Gowanus Canal

11/03/11

Gowanus Canal RI Results: Basis For Action

Basis for Remedial Action at Gowanus Canal

- Human Health Risk Assessment Results
  - Lifetime Recreational User (Cumulative Risks >10^{-4})
  - Lifetime Recreational Angler (Cumulative Risks >10^{-4}; HI >1)
- Ecological Risk Assessment Results
  - Excess risks for ecological receptors

Human Health Risk Assessment Results

EPA's Risk Target: Cumulative Risks Exceed 10^{-4} or HI>1.0

Lifetime Recreational Scenario Cancer Risks > 10^{-4} ;HI < 1.0

COCs in Sediment (Risks>10^{-6})

- Arsenic
- Benz(a)anthracene
- Benzo(a)pyrene
- Benzo(b)fluoranthene
- Benzo(k)fluoranthene
- Dibenz(a,h)anthracene
- Indeno(1,2,3-c,d)pyrene

COCs in Surface Water (>10^{-6})

- Chromium
- Tetrachloroethylene

Recreational Angler Fish Ingestion Risks Exceed EPA's Target (10^{-4} ; HI>1.0)

COCs in Fish: PCBs, Arsenic, Benzo(a)pyrene, Dibenz(a,h)anthracene, Indeno(1,2,3-c,d)pyrene, Mercury

Ecological Risk Assessment Results

Ecological Risks Exceed EPA's Risk Targets

Receptors of Concern: Benthic Invertebrates, fish, birds

COCs in Sediment

Barium

Cadmium

Copper

Lead

Mercury

Nickel

Silver

Total PAHs

Total PCBs

COCs in Surface Water

Lead

Risk-Based PRGs

NYC Environmental Protection

Table 1: Human Health Risk-Based PRGs for COCs in Sediment Gowanus Canal

COC	Exposure Point Concentration Canal Sediments (mg/kg)	Calculated HI for All Pathways	Calculated Cancer Risk	PRG for 10-6 Risk (mg/kg)	PRG for 10-5 risk (mg/kg)	PRG for 10-4 risk	Maximum CSO Sediment Concentration (mg/kg)	Maximum Background Concentration (mg/kg)	Risks from CSO max value	Risks from Background max value
Recreational User Lifetime Exposure										
Arsenic	18	NA	1.3E-06	13.8	138.5	1,385.0	7.9	19.0	5.7E-07	1.4E-06
Benz(a)anthracene	127	NA	4.6E-05	2.8	27.6	276	1.3	1.2	4.7E-07	4.3E-07
Benzo(a)pyrene	107	NA	3.9E-04	0.3	2.7	27	1.3	0.9	4.7E-06	3.3E-06
Benzo(b)fluoranthene	113	NA	4.1E-05	2.8	27.6	276	4.5	1.4	1.6E-06	5.1E-07
Benzo(k)fluoranthene	65	NA	1.8E-06	27.6	276.0	2,760	1.5	0.8	5.4E-08	2.9E-08
Dibenz(a,h)anthracene	6	NA	2.2E-05	0.3	2.8	28	0.5	0.2	1.8E-07	6.7E-07
Indeno(1,2,3-c,d)pyrene	49	NA	1.9E-05	2.6	25.7	257	1.8	1.0	7.0E-07	3.9E-07
Cumulative Risks					**7.0E-05**				**9.9E-06**	**6.2E-06**

Table 2: Human Health Risk-Based PRGs in Surface Water Gowanus Canal

	EPC Canal Surface Water (ug/l)	Calculated HI for All Pathways	Calculated Cancer Risk	PRG for 10-6 Risk (ug/l)	PRG for 10-5 risk (ug/l)	PRG for 10-4 risk (ug/l)	Maximum CSO Surface Water Concentration (ug/l)	Maximum Background Concentration (ug/l)	Risks from CSO max value	Risks from Background max value
Recreational User Lifetime Exposure										
Chromium VI	16	NA	2.5E-06	6.4	64.0	756.0	7.9	19.0	1.2E-06	2.9E-06
Tetrachloroethylene	24	NA	3.6E-06	6.8	67.8	678	20.0	1.2	3.0E-06	1.9E-07
Cumulative Risks					**7.0E-05**				**4.2E-06**	**3.1E-06**

Comparsion of CSO Sediment Concentrations to Risk-Based Cleanup Values and Background Sediment Concentrations

Chemical of Concern	Maximum measured CSO sediment concentration (mg/kg) (1)			Human health risk-based cleanup value (mg/kg) (2)	Maximum background sediment concentration (mg/kg) (3)	Background statistical comparison (4)	Greater of background and risk-based cleanup value(mg/kg)	CSO Exceeds Background and risk-based cleanup value?
Receptor: Recreational User Lifetime Exposure								
Arsenic	7.9			138.5	19	Inadequate data	138.5	N
Benz(a)anthracene	1.3J			27.6	1.2	CSO=Bkgd	27.6	N
Benzo(a)pyrene	1.3J			2.7	0.9	CSO=Bkgd	2.7	N
Benzo(b)fluoranthene	4.5J			27.6	1.4	Inconclusive	27.6	N
Benzo(k)fluoranthene	1.5			276	0.8	CSO=Bkgd	276	N
Dibenz(a,h)anthracene	0.5J			2.8	<0.15	Inadequate data	2.8	N
Indeno(1,2,3-c,d)pyrene)	1.8J			2.6	1.0	Inconclusive	2.6	N

1-Taken from Table I-47A of RI Report; 2-Taken from Table 1, NYCDEP, 2011; 3-Taken from Table 4-4b of RI Report; 5-Results from Table 1, Louis Berger, 2011.

Comparsion of CSO Sediment Concentrations to Risk-Based Cleanup Values and Background Sediment Concentrations

NYC Environmental Protection

Chemical of Concern	Maximum measured CSO sediment concentration (mg/kg) (1)	Average measured CSO sediment concentration (mg/kg) (1)	Ecological risk-based cleanup value average concentration (mg/kg) (2)		Maximum background sediment concentration (mg/kg) (3)	Background statistical comparison (4)	Greater of background and risk-based cleanup value(mg/kg)	CSO Exceeds Background and risk-based cleanup value?
Receptor: Ecological								
Barium	368 (RH-037)	149	141		133	Hyp:CSO ≤ Bkgd :Inad Data	141	N
Cadmium	6.8 (RH-031)	2.0	2.6		6.3	Hyp: CSO ≤ Bkgd	6.3	N
Copper	614 (RH-031)*	318	188.6		242	CSO>Bkgd	242	Y
Lead	619 (RH-037)**	248	340		244	CSO>Bkgd	340	N
Mercury	1.0 (RH-037)	0.4	1.24		3.7	CSO≤Bkgd	3.7	N
Nickel	42.9 (RH-037, RH-031))	29	41.75		50	Hyp: CSO≤Bkgd	50	N
Silver	2.8 (OH-007)	1.6	4.1		9.5	CSO≤Bkgd	9.5	N
Total PAHs	17.8 (RH-031)	8.3	85.3		14.4	CSO≤Bkgd	85.3	N
Total PCBs	ND	ND	0.69		NR	Inadequate data	0.69	N

- Outlier at OH-007 (4540ppm)
- ** FD is wrong

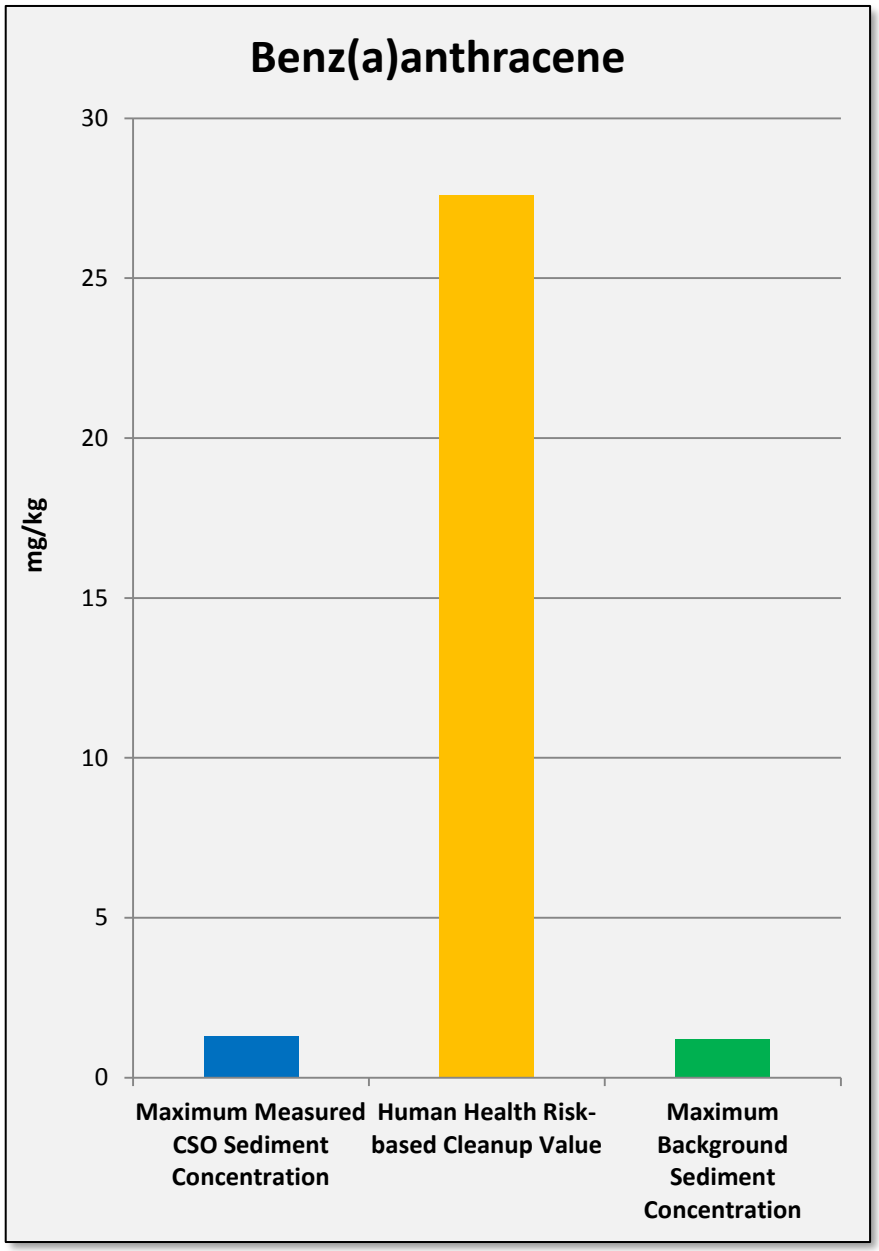
1-Taken from Table I-47A of RI Report; 2- Taken from Table 4-3 Science Collaborative, 2011; 3-Taken from Table 4-4b of RI Report; 4-Results from Table 1, Louis Berger, 2011.

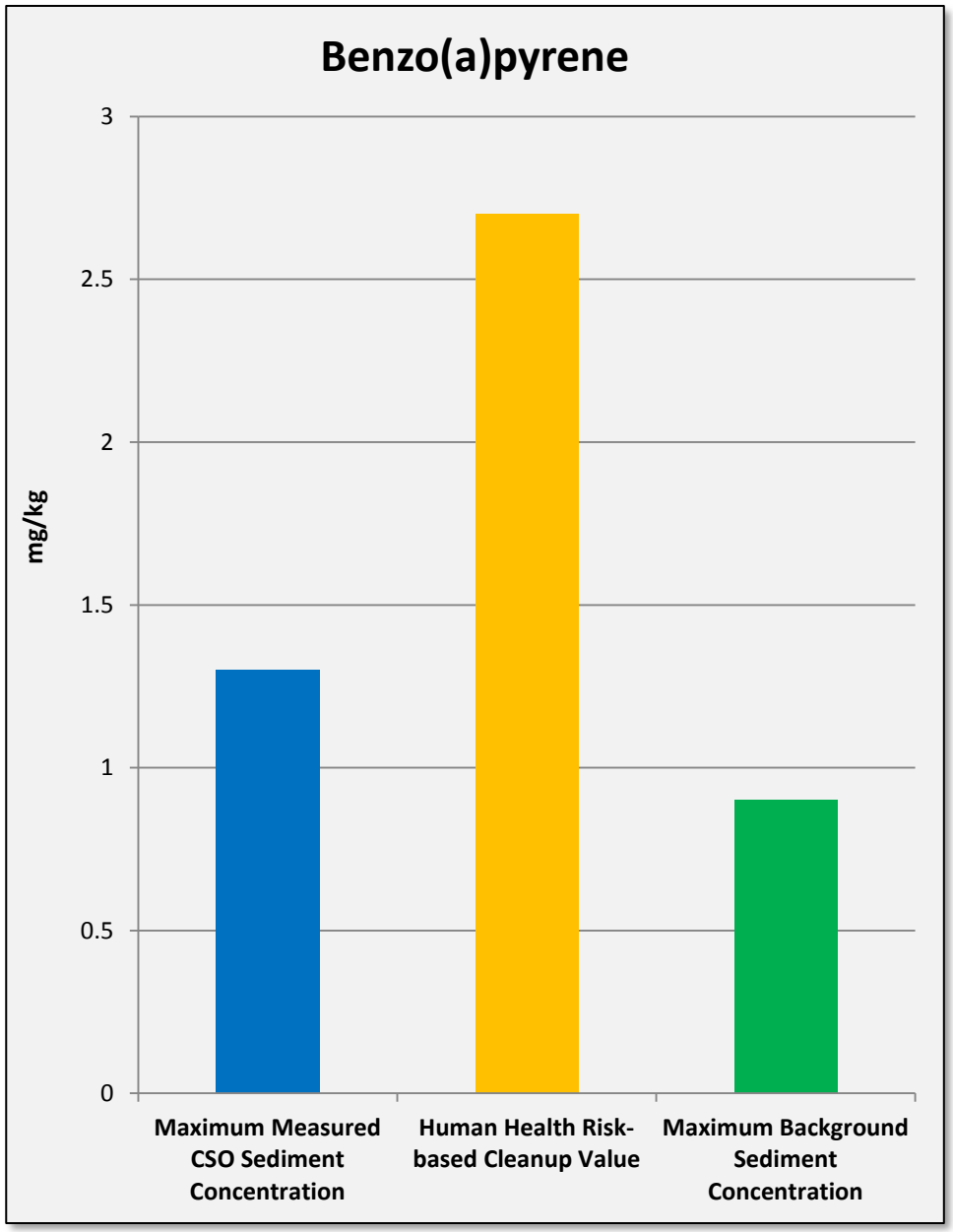
Comparison of CSO Water Concentrations to Risk-Based Cleanup Values and Background Surface Water Concentrations

Chemical of Concern	Maximum measured CSO Outfalls Water concentration (ug/l) (1)	Ecological risk-based cleanup value concentration (ug/l) (2)	Human health risk-based cleanup value (ug/l) (3)	Maximum background Surface water concentration (ug/l) (4)	Background statistical comparison (5)	Greater of background and risk-based cleanup value (ug/l)	CSO Exceeds Back-ground and risk-based cleanup value?
	Receptor: Ecological						
Lead, dissolved	6.8 (wet)	8.1	NA	10 (ND)	Data Inadequate	10 (ND)	N
	Receptor: Recreational User Lifetime Exposure						
Chromium +6, total	14.6 (wet)	NA	64	30.6 (dry)	CSO≤bkgd	64	N
Tetrachloroethylene	20 (wet)	NA	67.8	**5.1**	CSO>bkgd	67.8	N

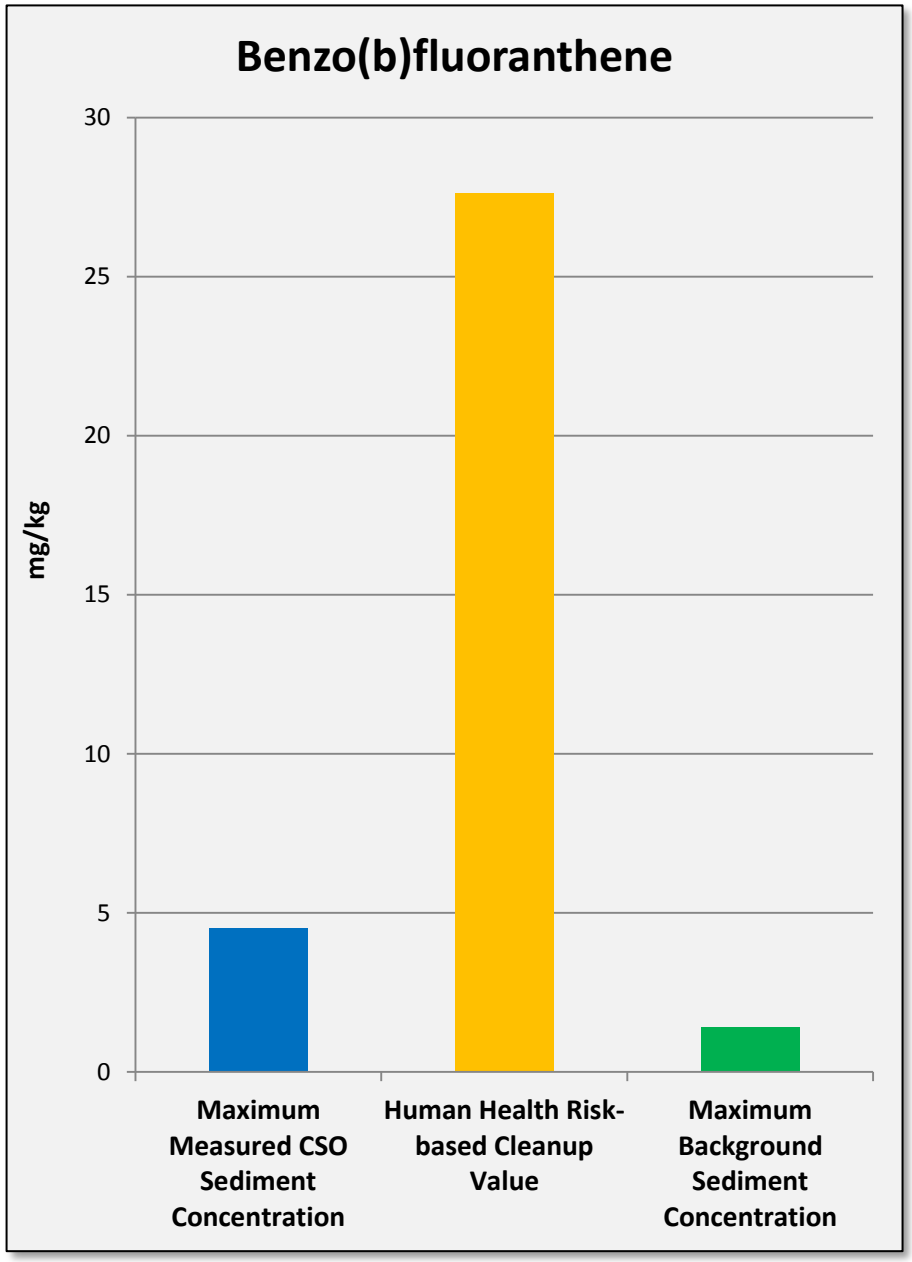
1-Taken from Table I-53a or I-49a of RI Report; 2- Taken from Table 4-3 Science Collaborative, 2011; 3-Taken from Table 2, NYCDEP, 2011; 4-Taken from Table 4-4b or 4-9b of RI Report; 5-Results from Table 1, Louis Berger, 2011.
ND-All results were non-detect.

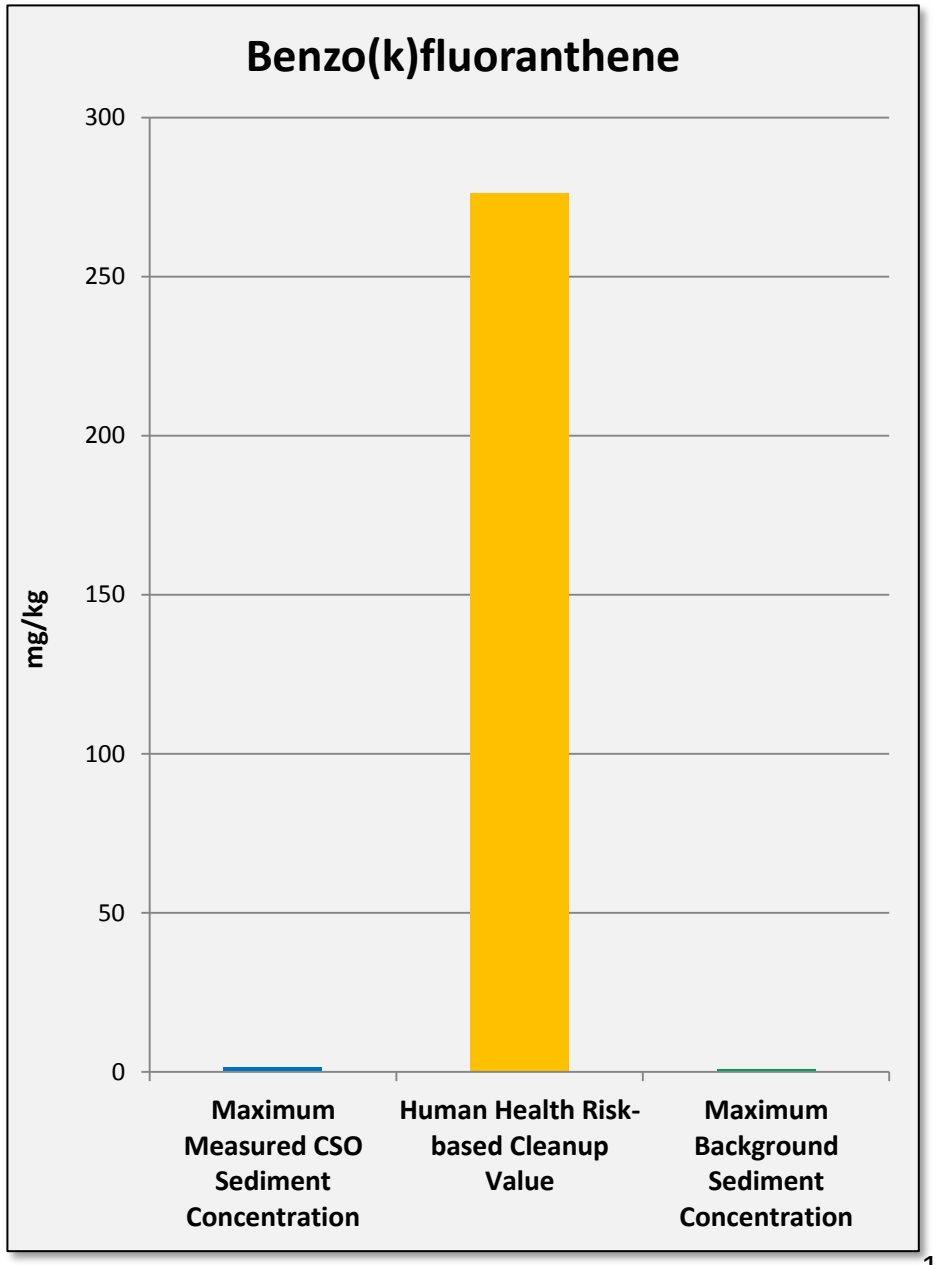
Comparison of Maximum Measured CSO Sediment Concentrations, to Human Health Risk-based Cleanup Values, and Maximum Background Sediment Concentrations



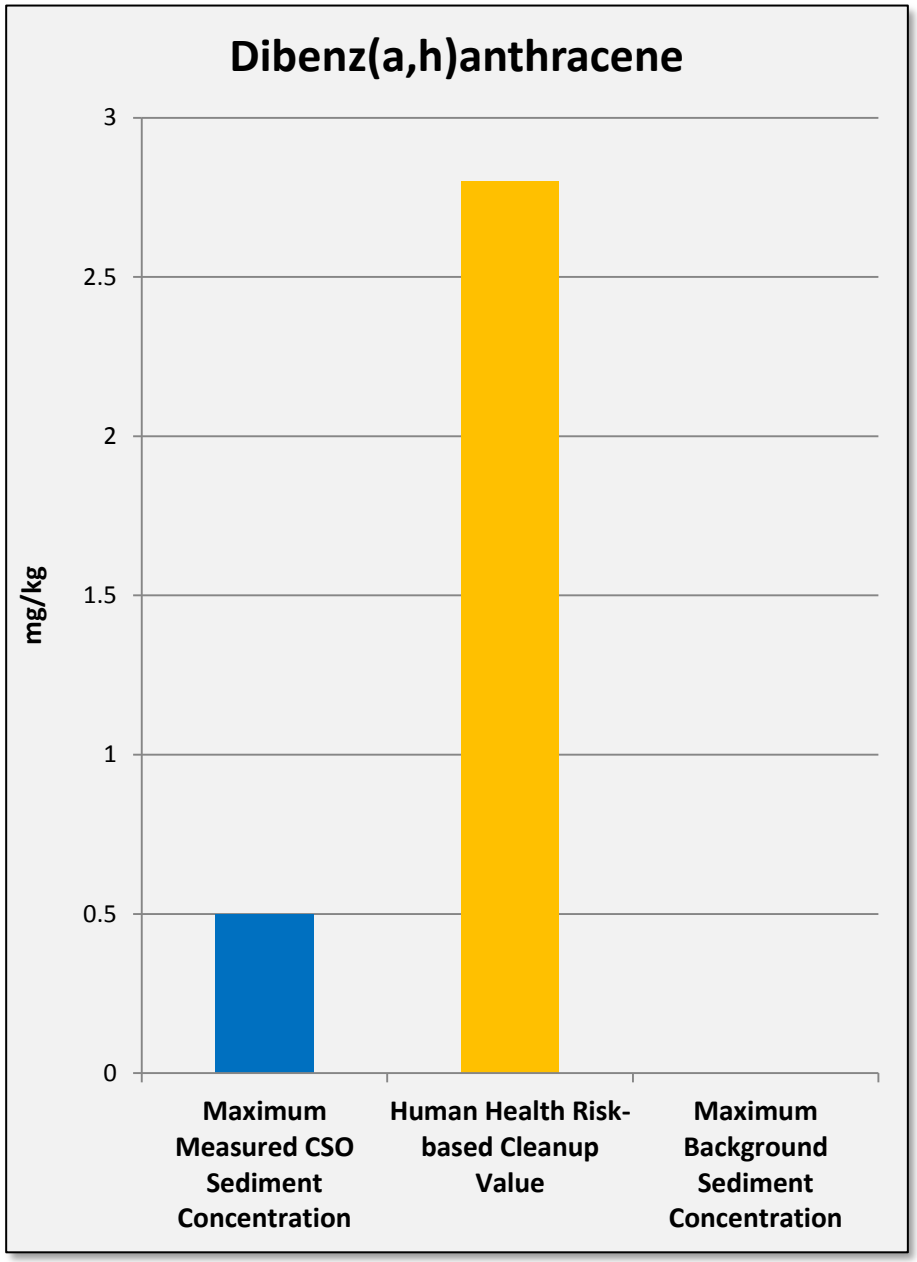


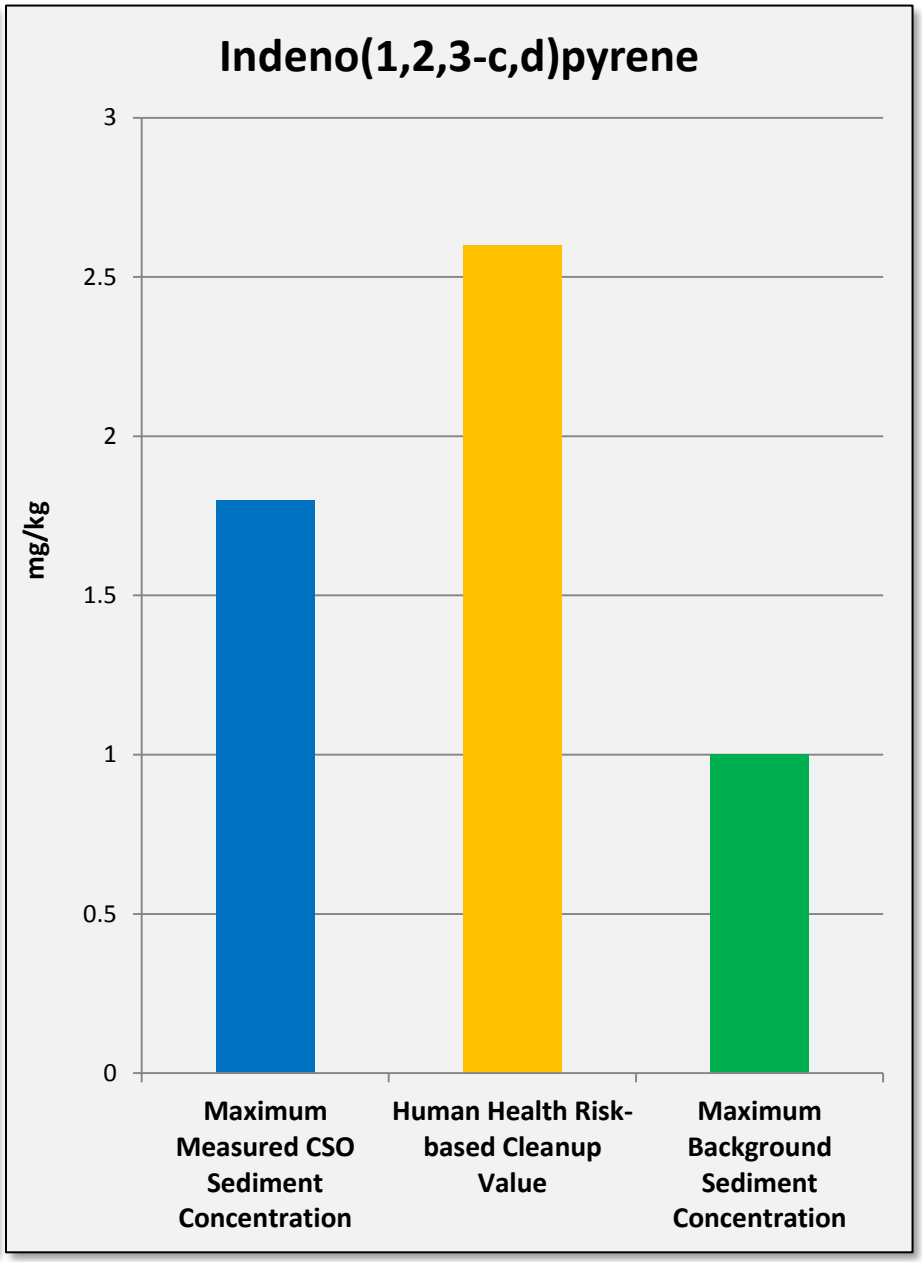
Comparison of Maximum Measured CSO Sediment Concentrations, to Human Health Risk-based Cleanup Values, and Maximum Background Sediment Concentrations



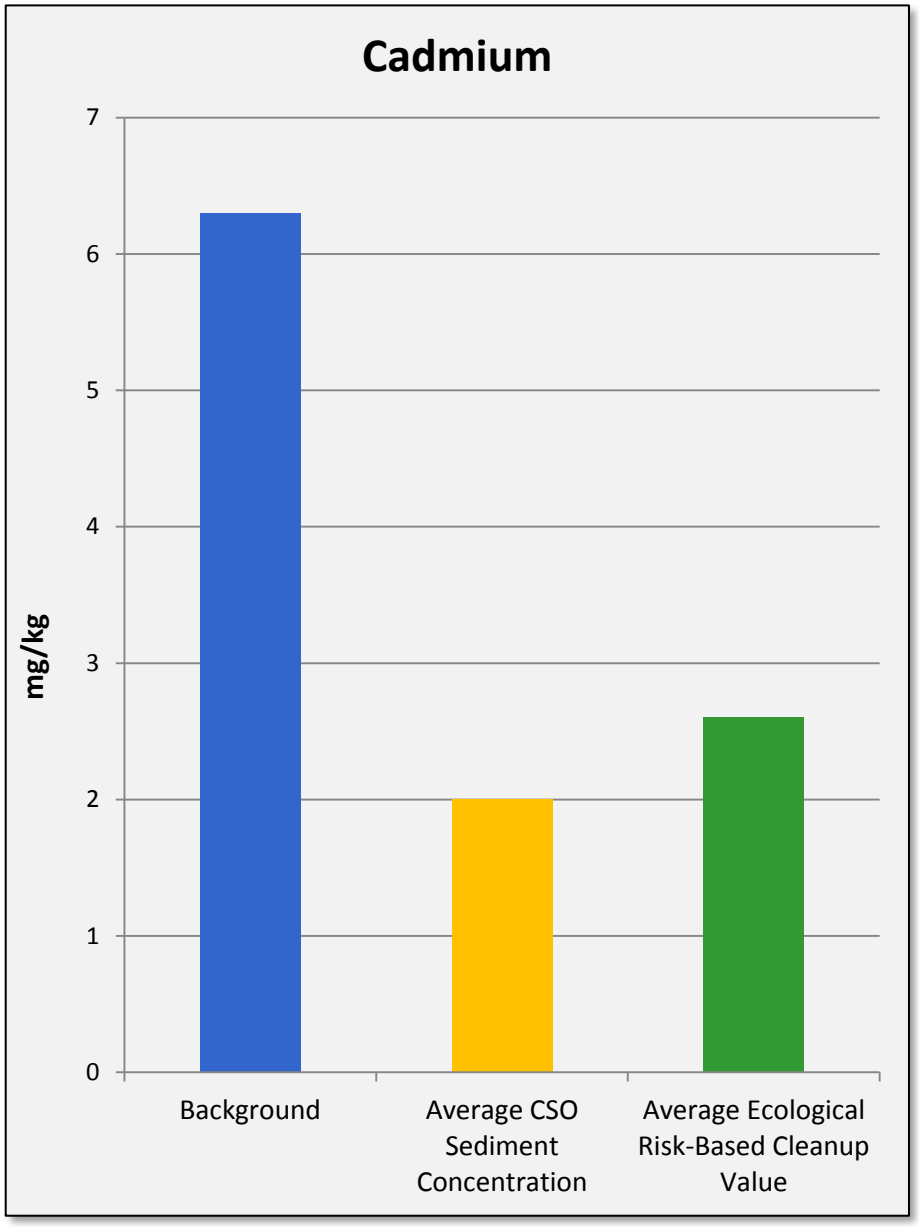


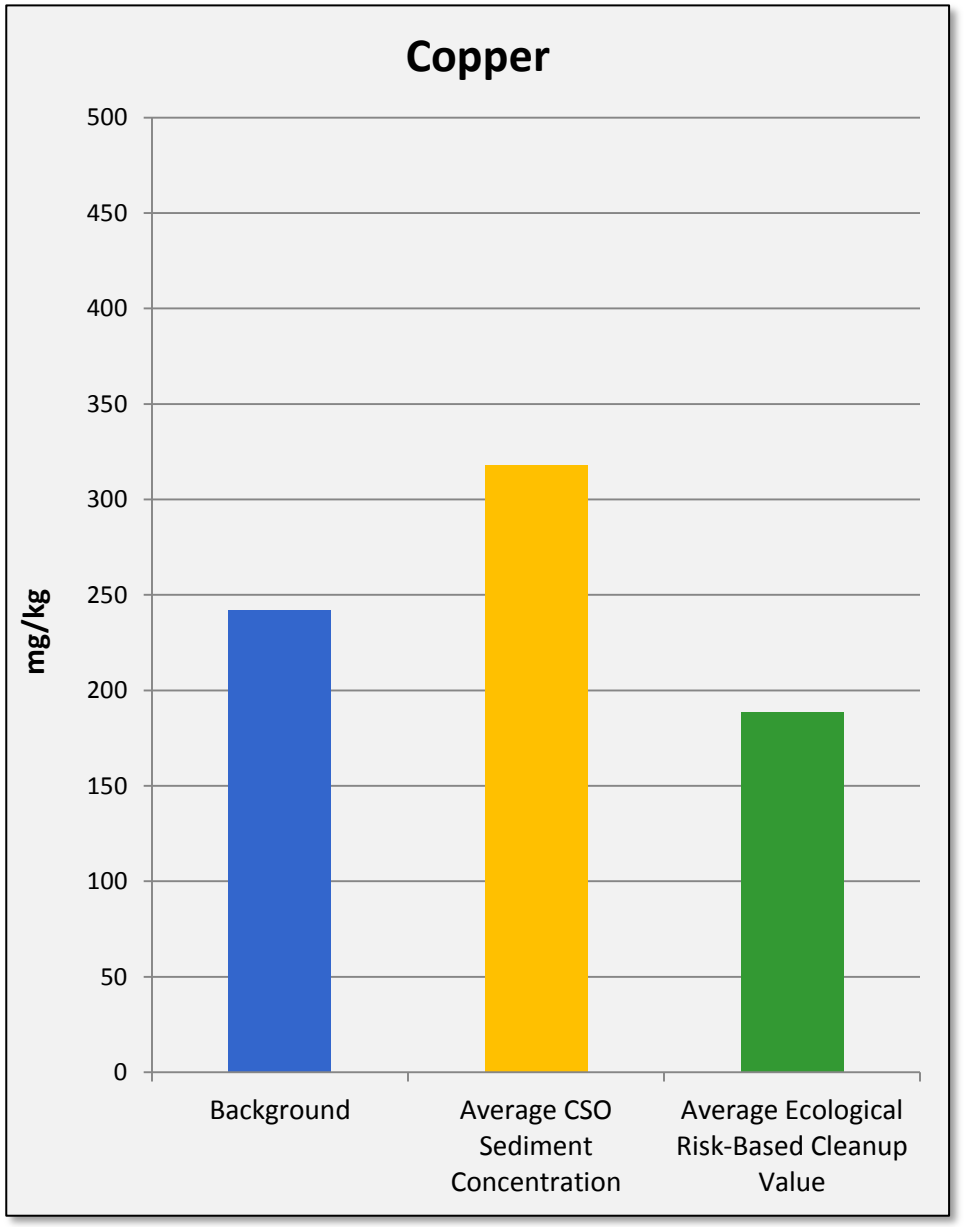
Comparison of Maximum Measured CSO Sediment Concentrations, to Human Health Risk-based Cleanup Values, and Maximum Background Sediment Concentrations



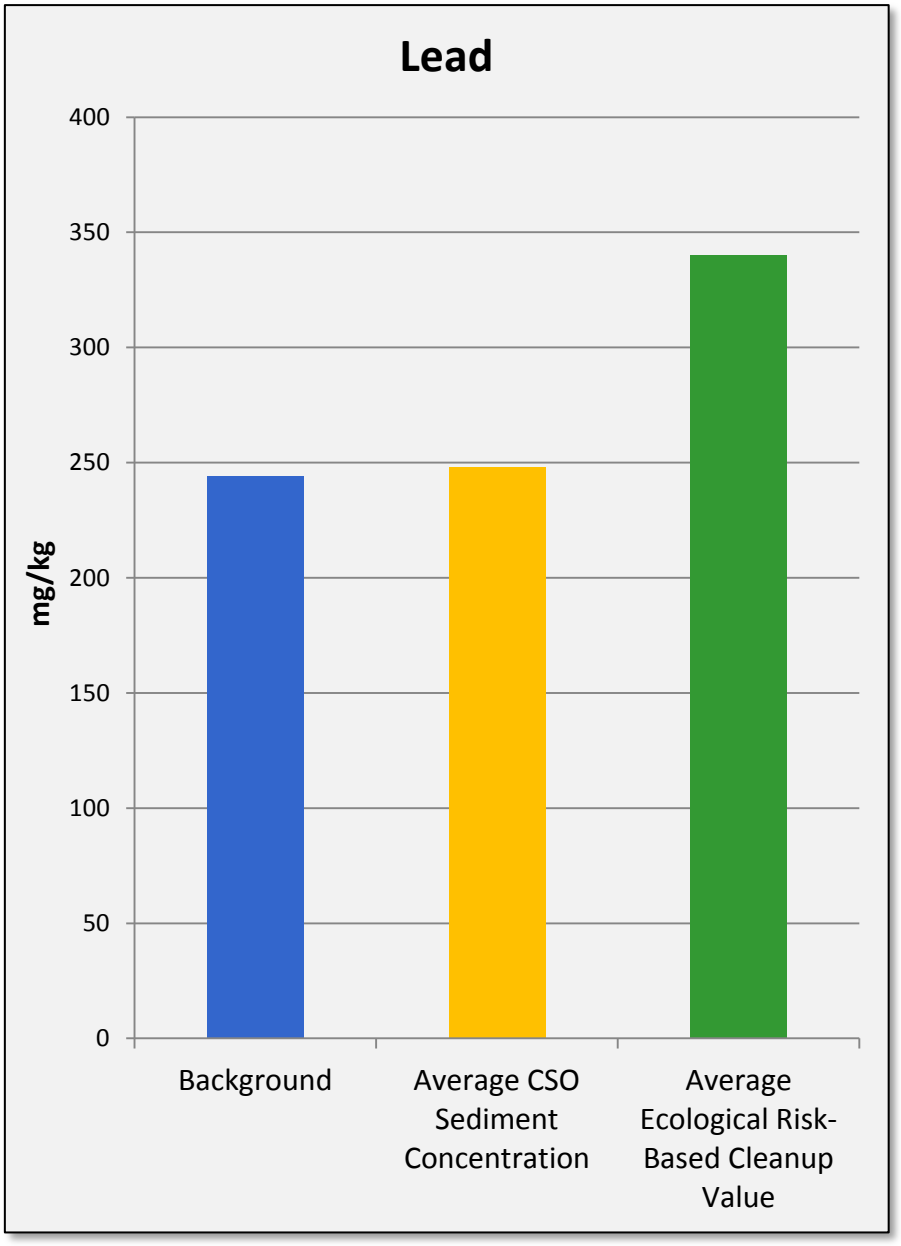


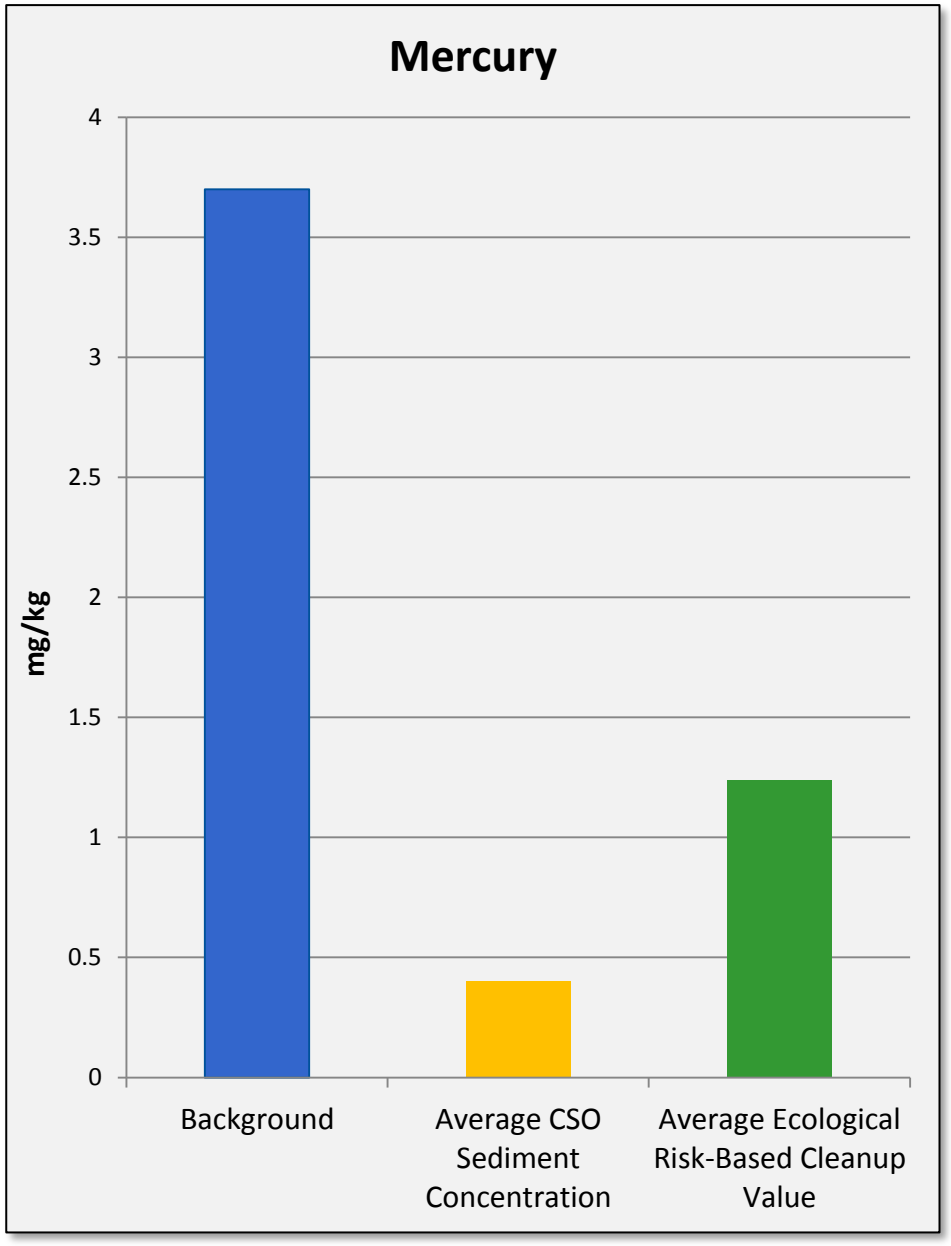
Comparison of Average CSO Sediment Concentrations with Average Risk-based Cleanup Values and Background for Ecological Contaminants of Concern



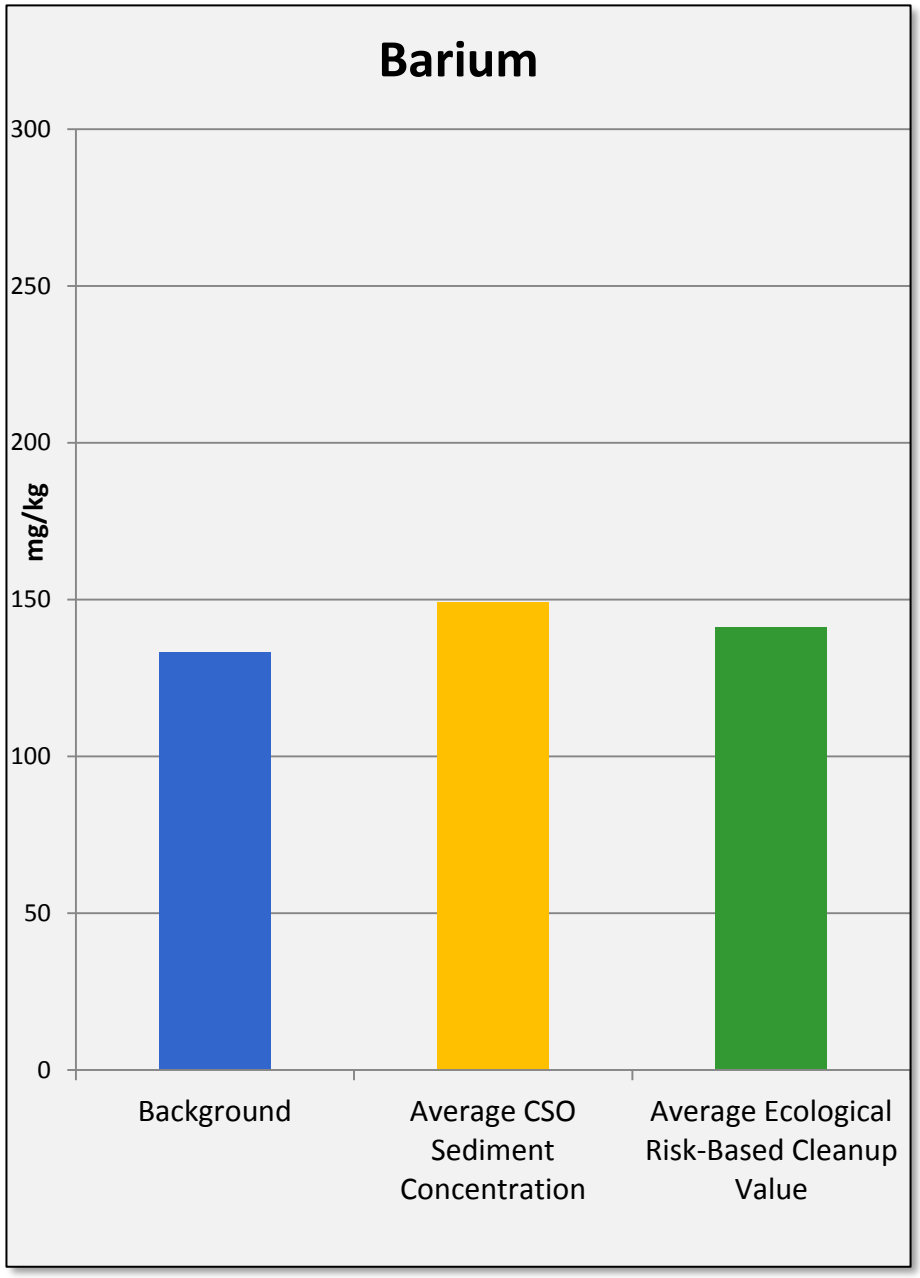


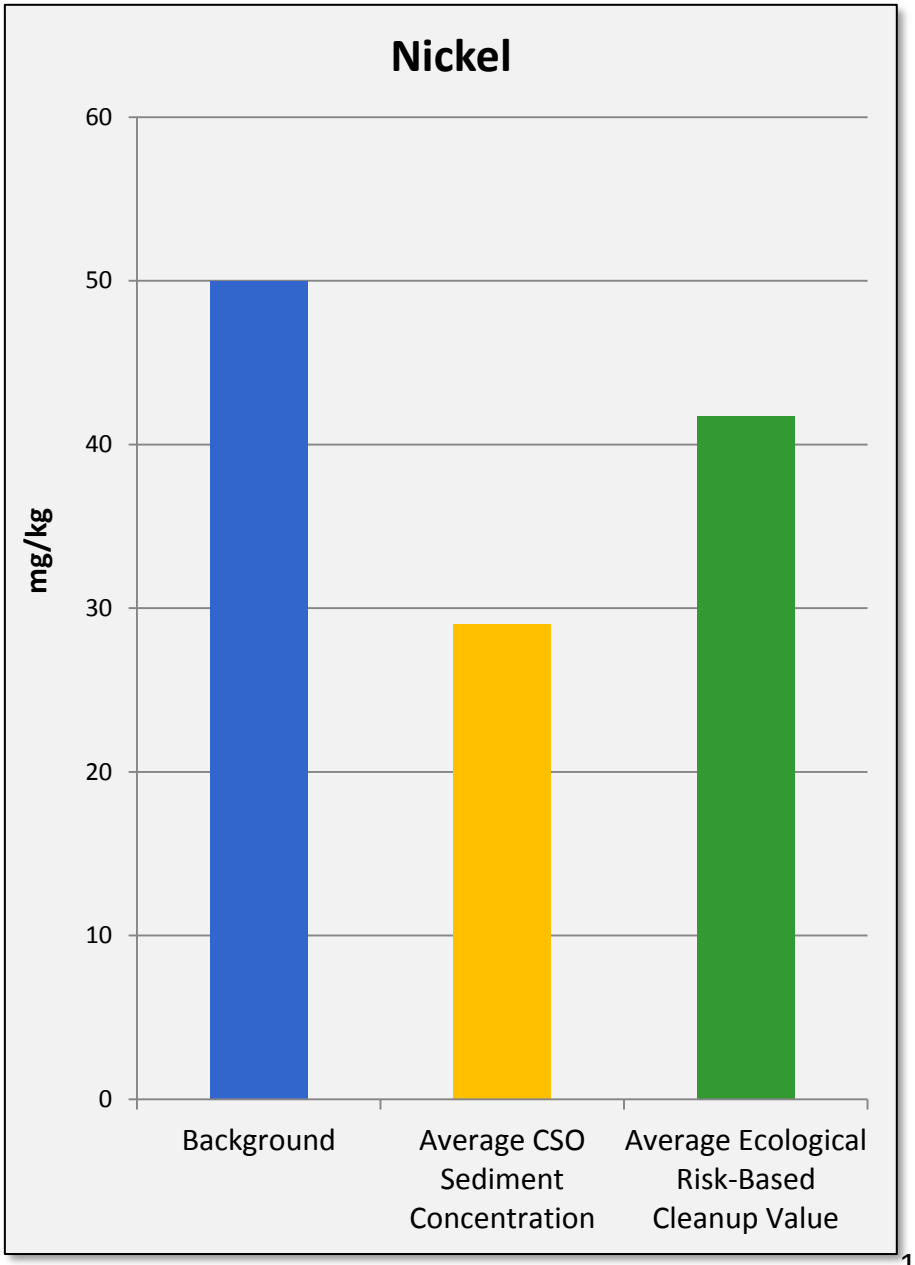
Comparison of Average CSO Sediment Concentrations with Average Risk-based Cleanup Values and Background for Ecological Contaminants of Concern



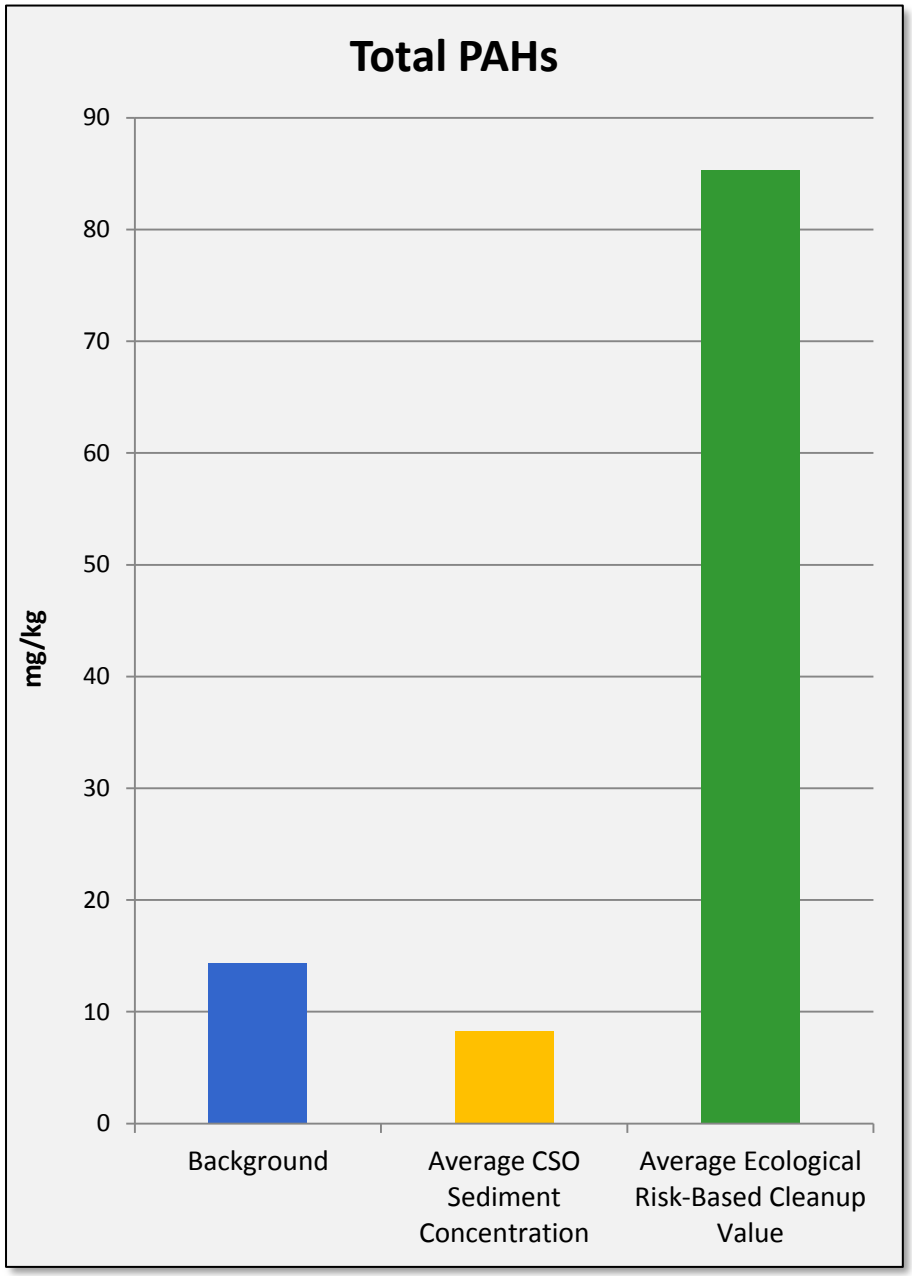


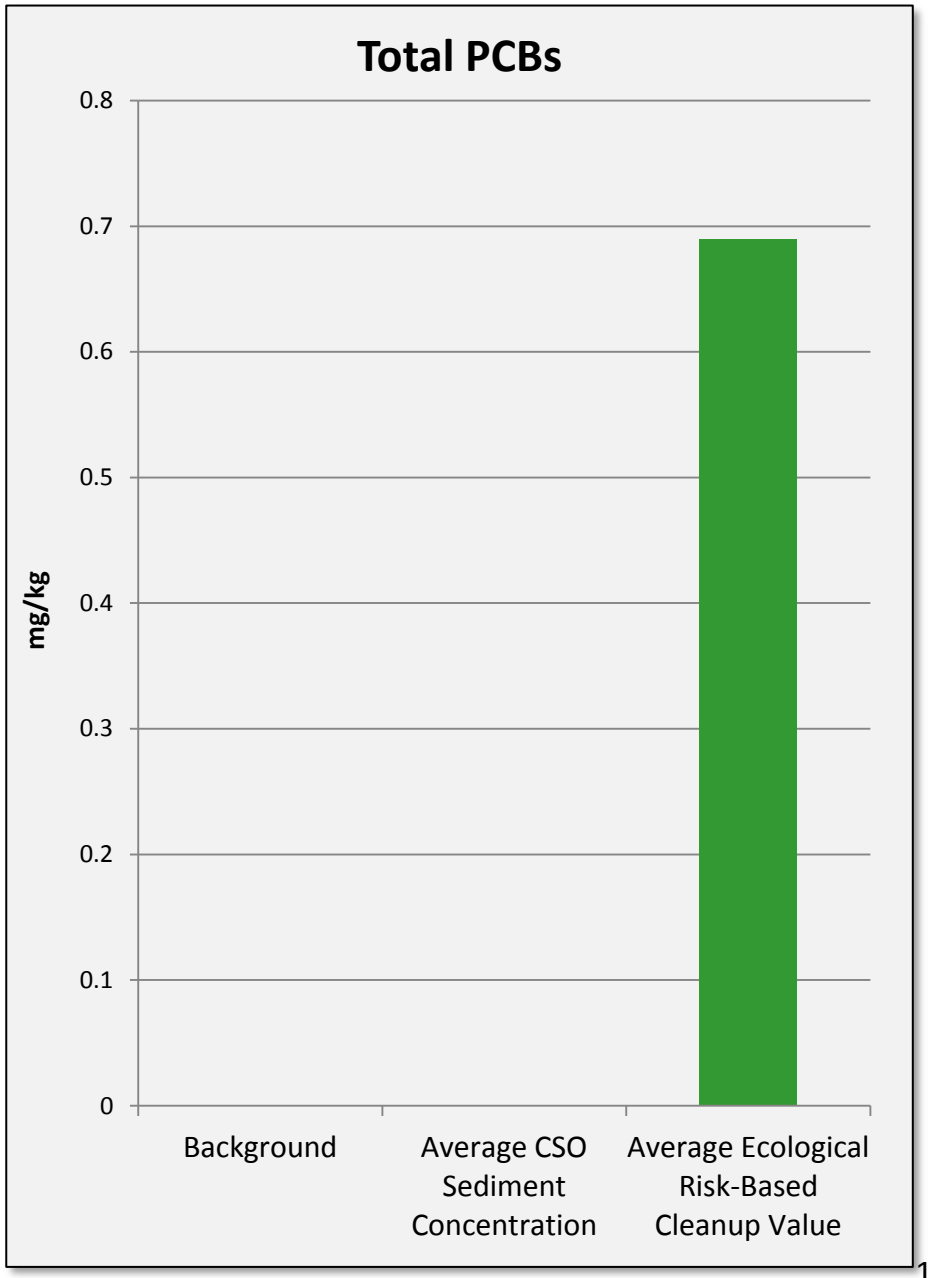
Comparison of Average CSO Sediment Concentrations with Average Risk-based Cleanup Values and Background for Ecological Contaminants of Concern





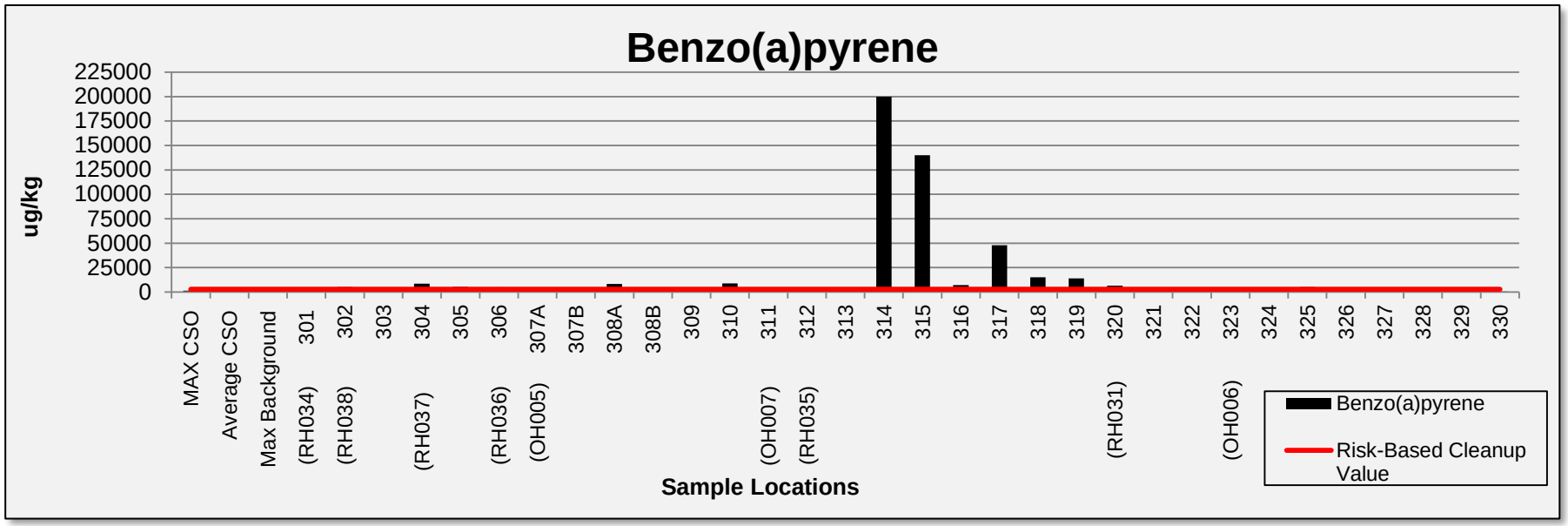
Comparison of Average CSO Sediment Concentrations with Average Risk-based Cleanup Values and Background for Ecological Contaminants of Concern

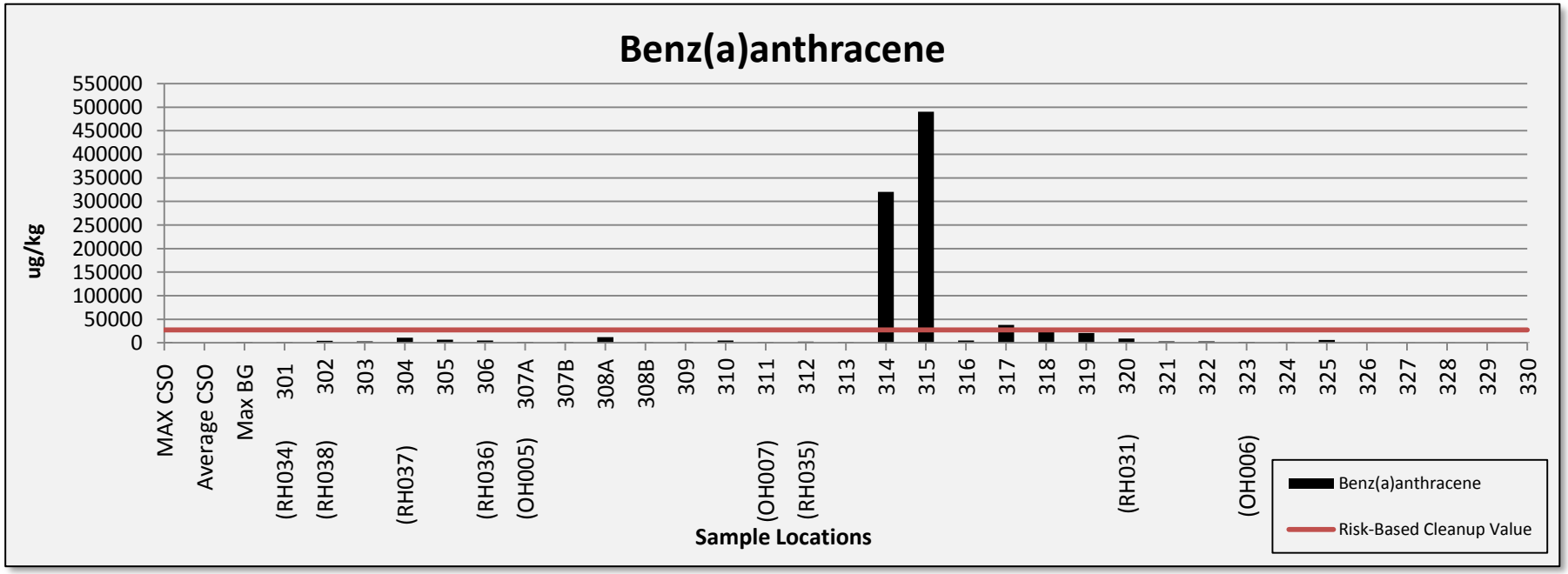




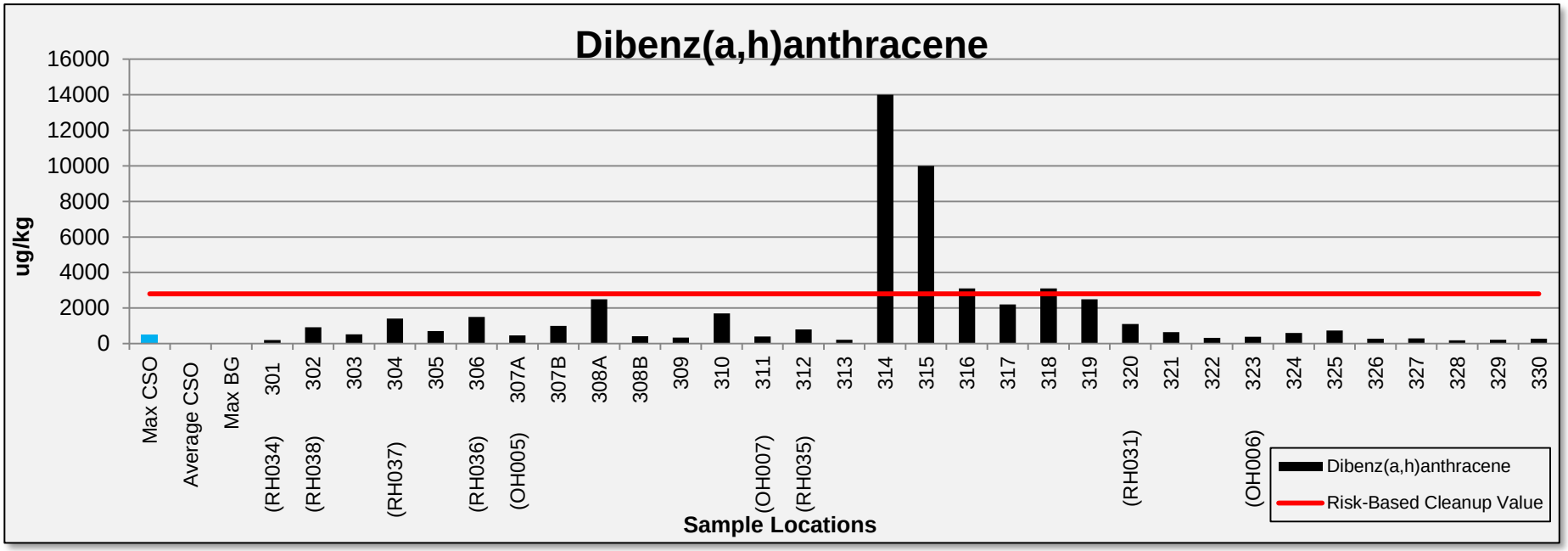
Sediment Sampling Locations (Canal and CSO)

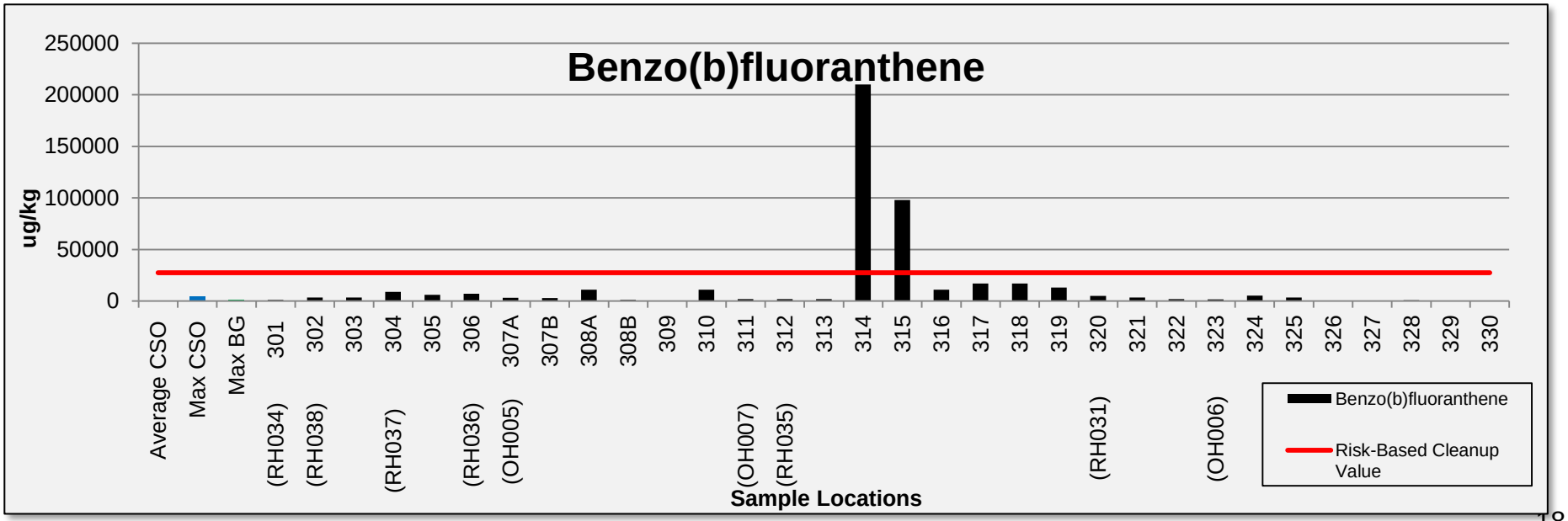
SVOC Concentrations in Surface Sediments versus Human Health Risk-Based Cleanup Value



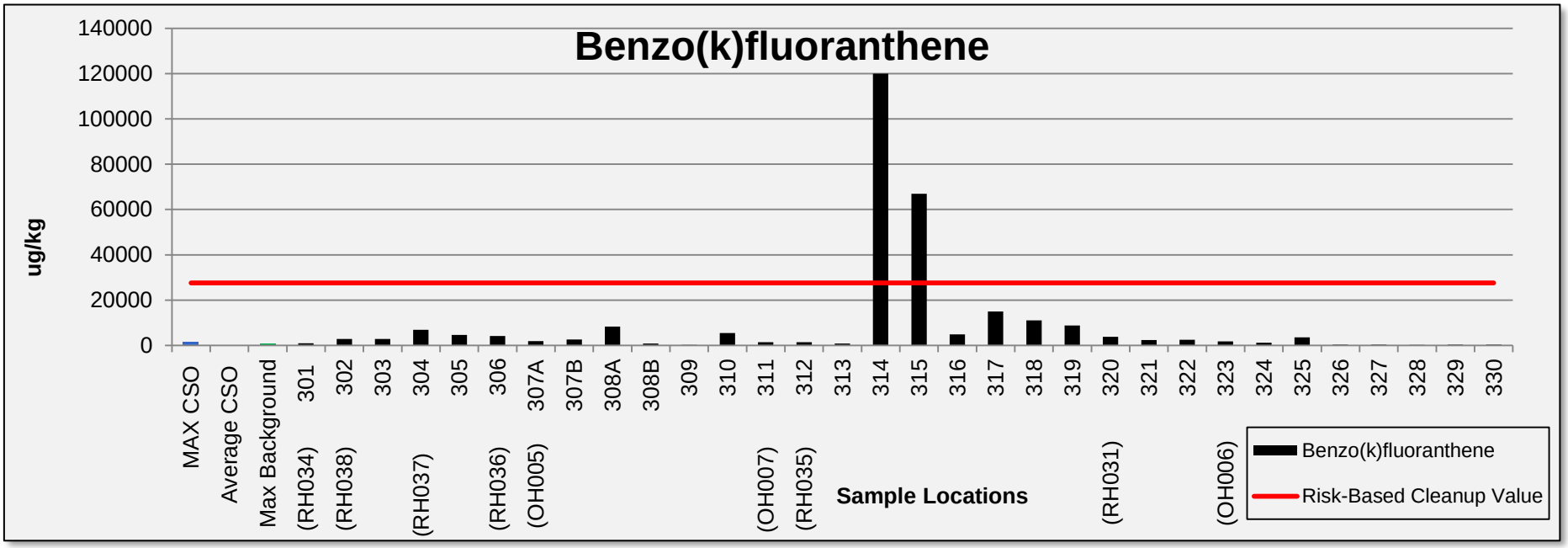


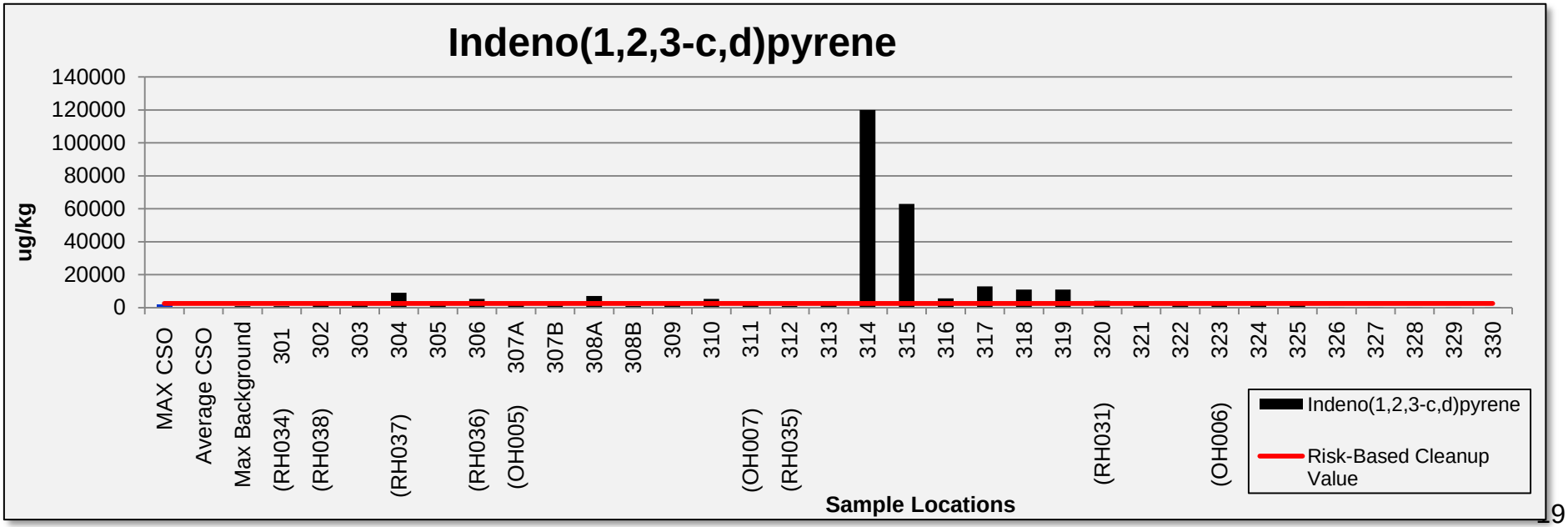
SVOC Concentrations in Surface Sediments versus Human Health Risk-Based Cleanup Value



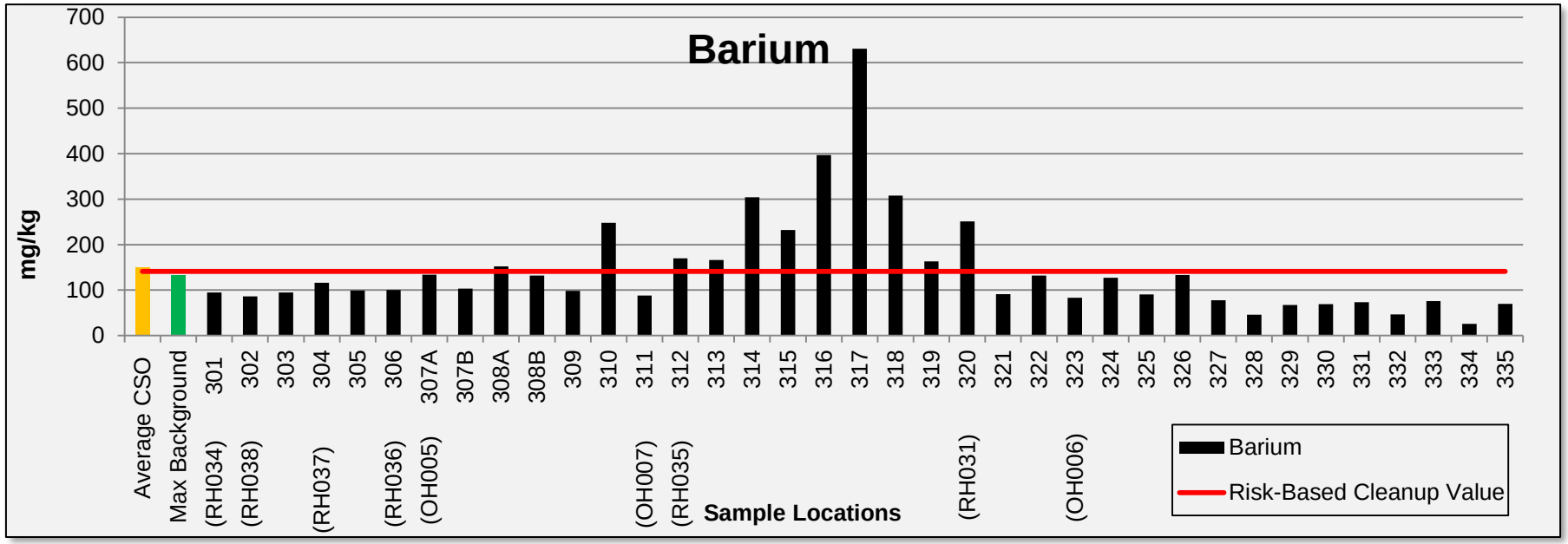


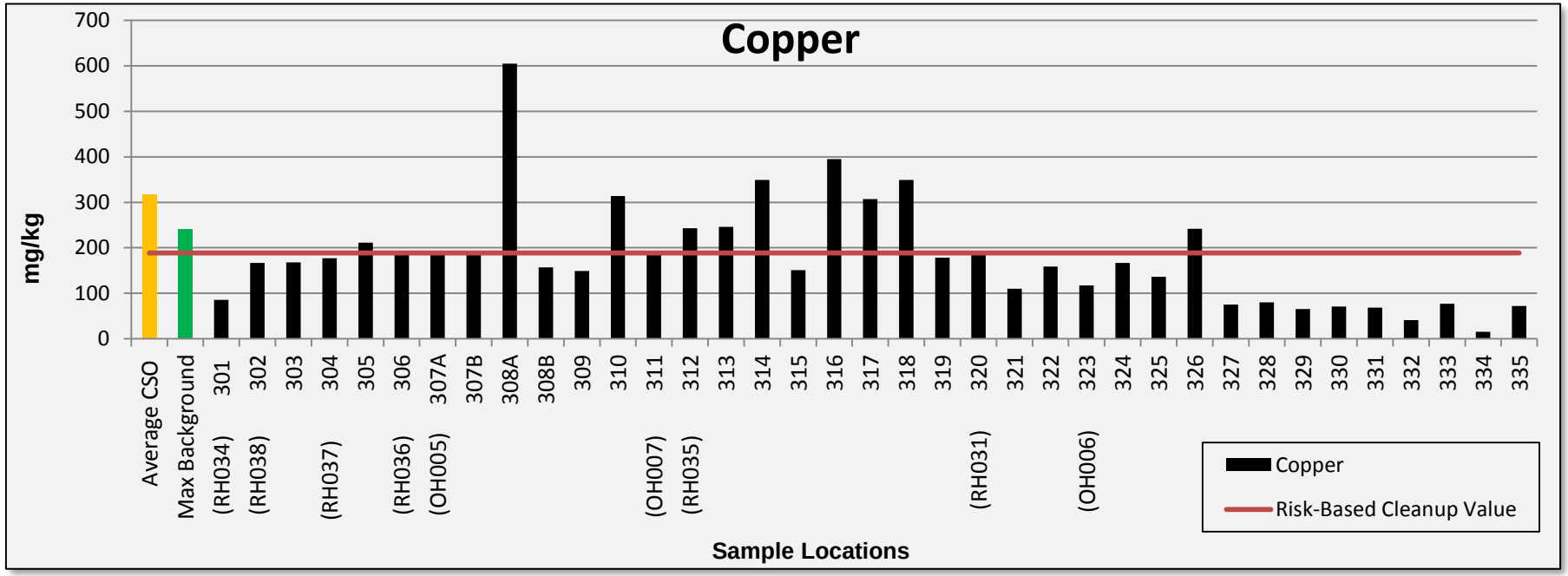
SVOC Concentrations in Surface Sediments versus Human Health Risk-Based Cleanup Value



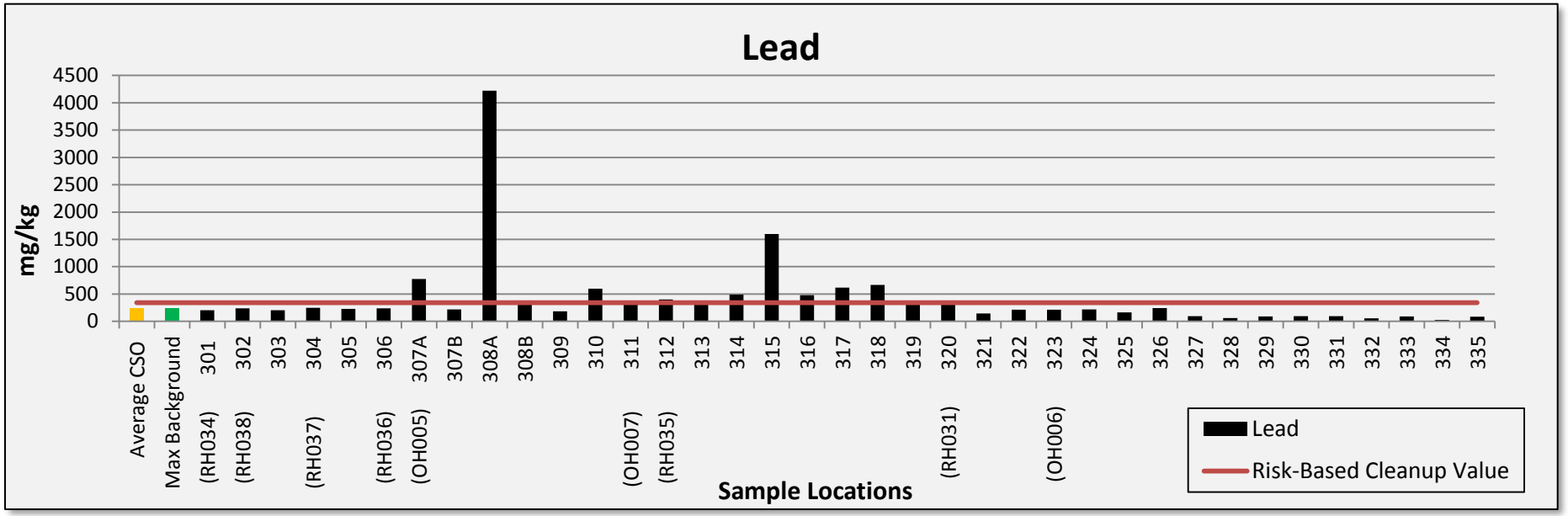


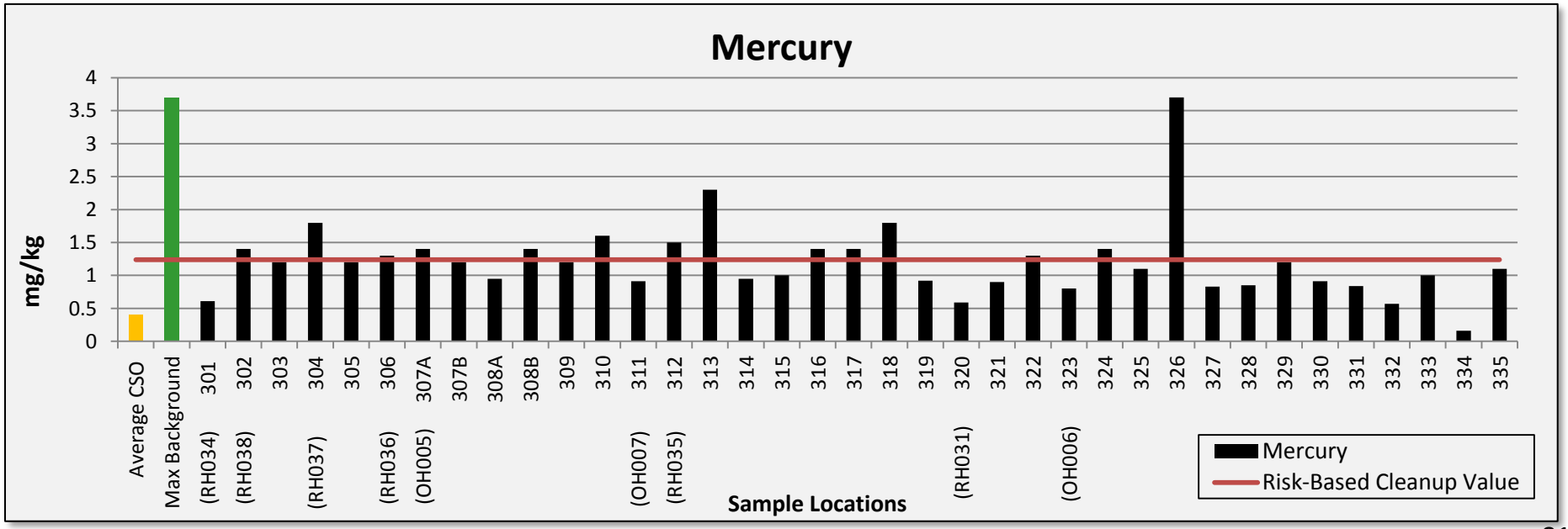
Metal Concentrations in Surface Sediment versus Ecological Risk Based Cleanup Value



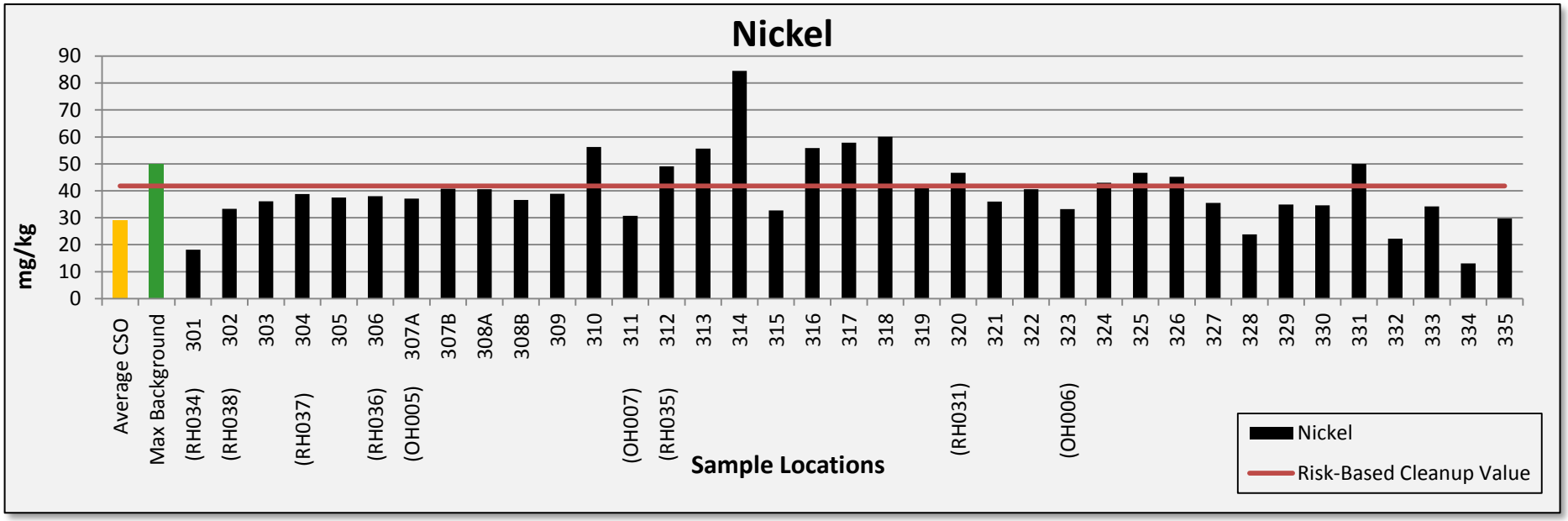


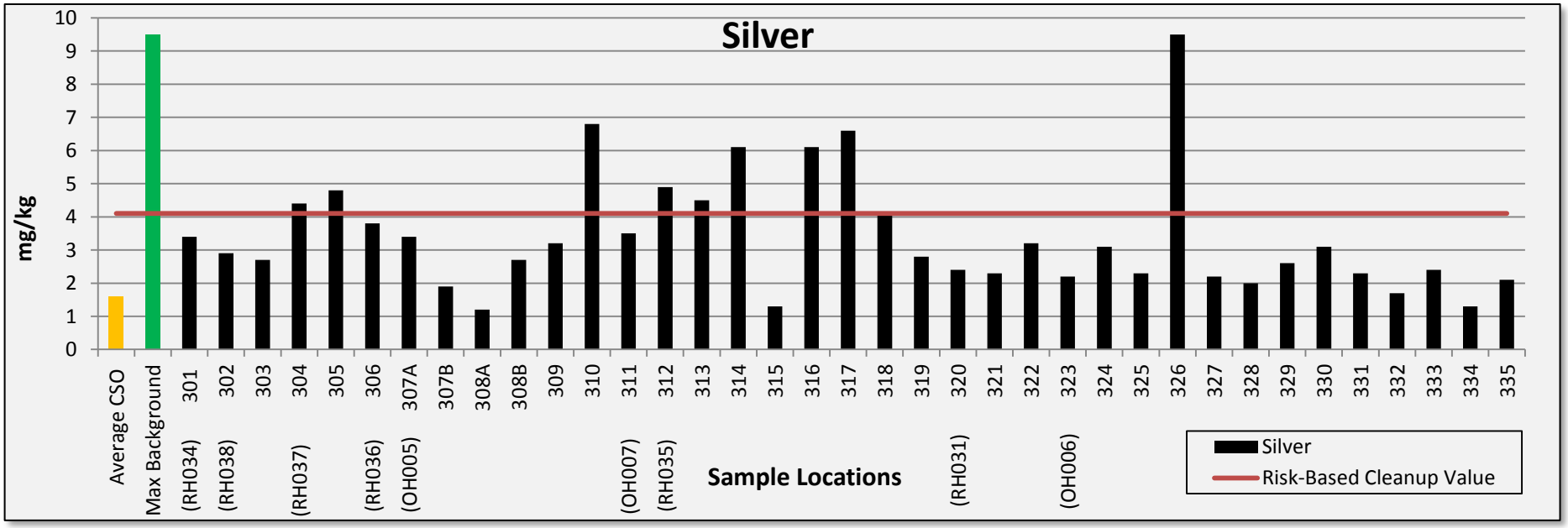
Metal Concentrations in Surface Sediment versus Ecological Risk Based Cleanup Value



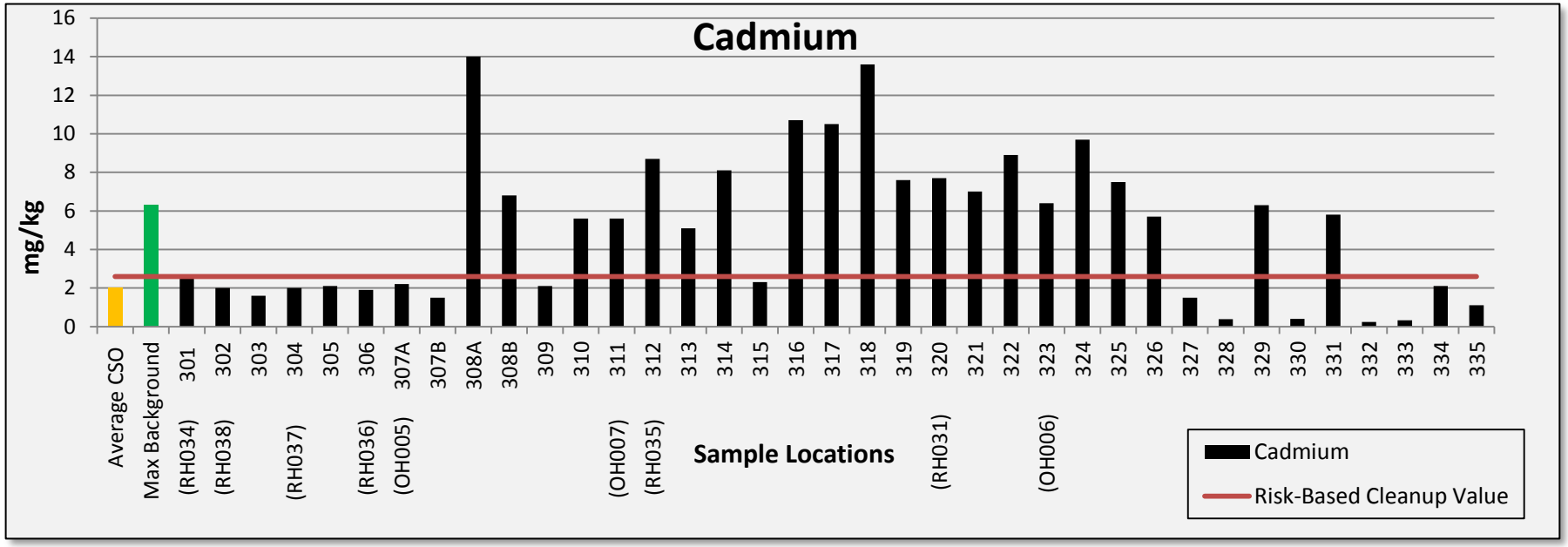


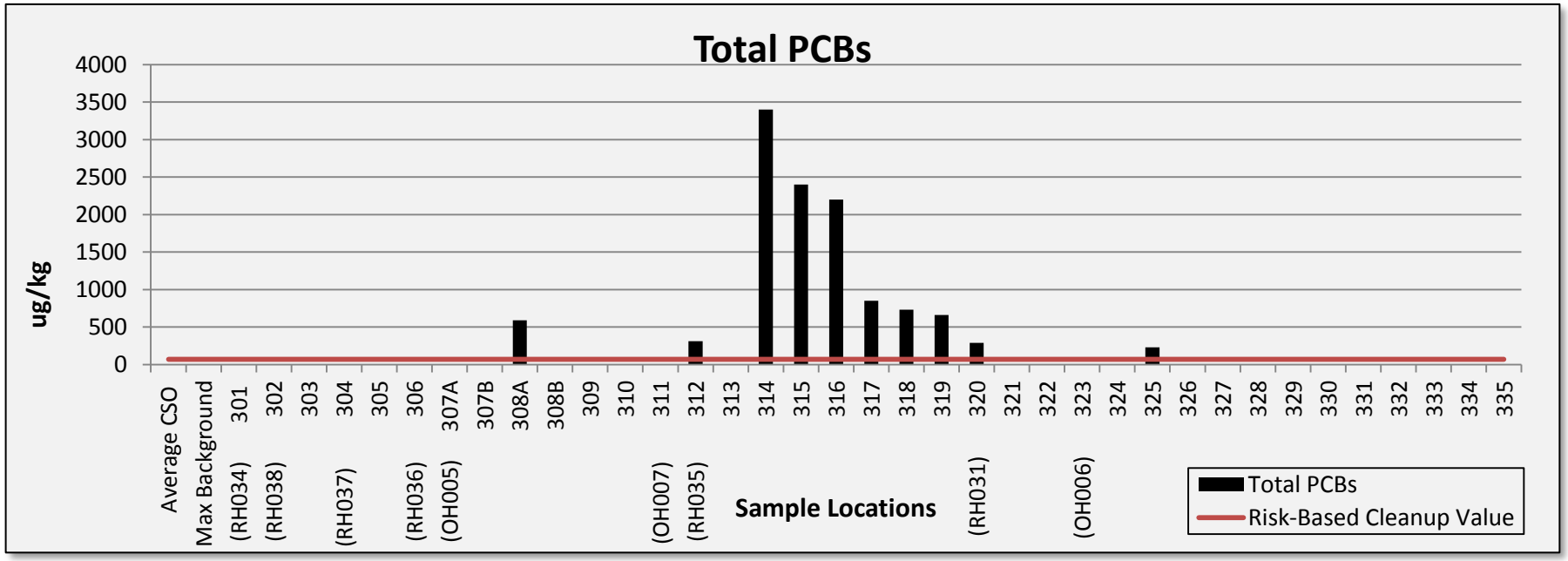
Metal Concentrations in Surface Sediment versus Human Health Risk-Based Cleanup Value





Metal and Total PCB Concentrations in Surface Sediment versus Ecological Risk Based Cleanup Value

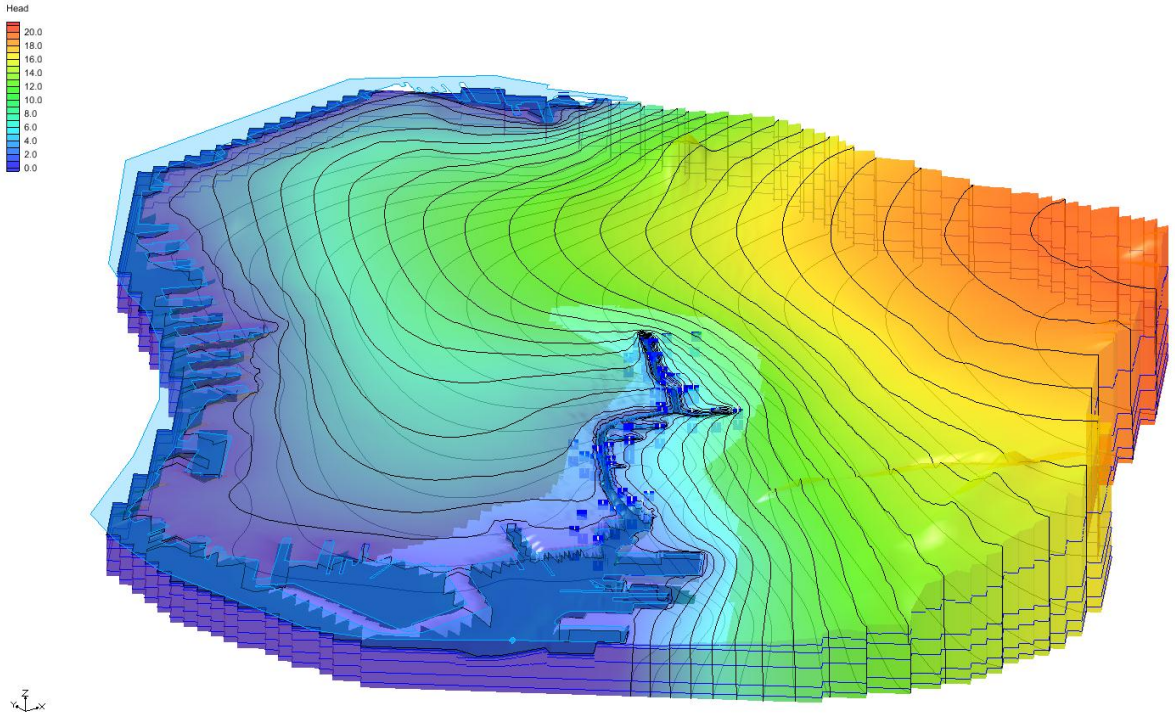




Conceptual Site Model

Groundwater Flow Model Development

- Based on site information and USGS publications
- Agrees well with USGS head and flow data
- The calibrated discharge to Gowanus Canal is about 2.1 ft^3/sec (USGS pre-development estimate is 2.5 ft^3/sec)
- Model indicates about 75% of the flow to Gowanus Canal is through the sediment and 25% of flow is through the banks



Preliminary Estimates of PAH Loads from NAPL to Sediment Bottom

Analyte	Mean GW Concentration (ug/L)	Potential Annual Loads from GW (Kg/yr)	Mean CSO Aqueous Concentration (ug/L)	CSO Loads (kg/yr)	CSO Loads (kg/yr) after CSO Order Upgrades 45% Reduction in CSO Discharge
Acenaphthene	946	1,750	0.67	0.96	0.53
Acenaphthylene	1,020	1,900	0.2	0.28	0.16
Anthracene	156	300	0.2	0.29	0.16
Benzo(a)anthracene	5.1	10	0.25	0.36	0.20
Benzo(a)pyrene	1.2	2*(1.2* *)	0.25	0.36	0.20
Benzo(b)fluoranthene	0.7	1	0.35	0.5	0.27
Benzo(g,h,i)perylene	0.4	1	0.39	0.55	0.30
Benzo(k)fluoranthene	0.2	0.4	0.23	0.33	0.18
Chrysene	3	6	0.26	0.37	0.20
Dibenz(a,h)anthracene	9	17	0.24	0.34	0.19
Fluoranthene	34	65	0.34	0.48	0.26
Fluorene	429	800	0.29	0.41	0.23
Indeno(1,2,3-cd)pyrene	0.44	1	0.35	0.5	0.28
Naphthalene	26,925	50,500* (7,500**)	4	5.7	3.1
Phenanthrene	412	770* (110* *)	0.48	0.69	0.38
Pyrene	53	100	0.38	0.55	0.30

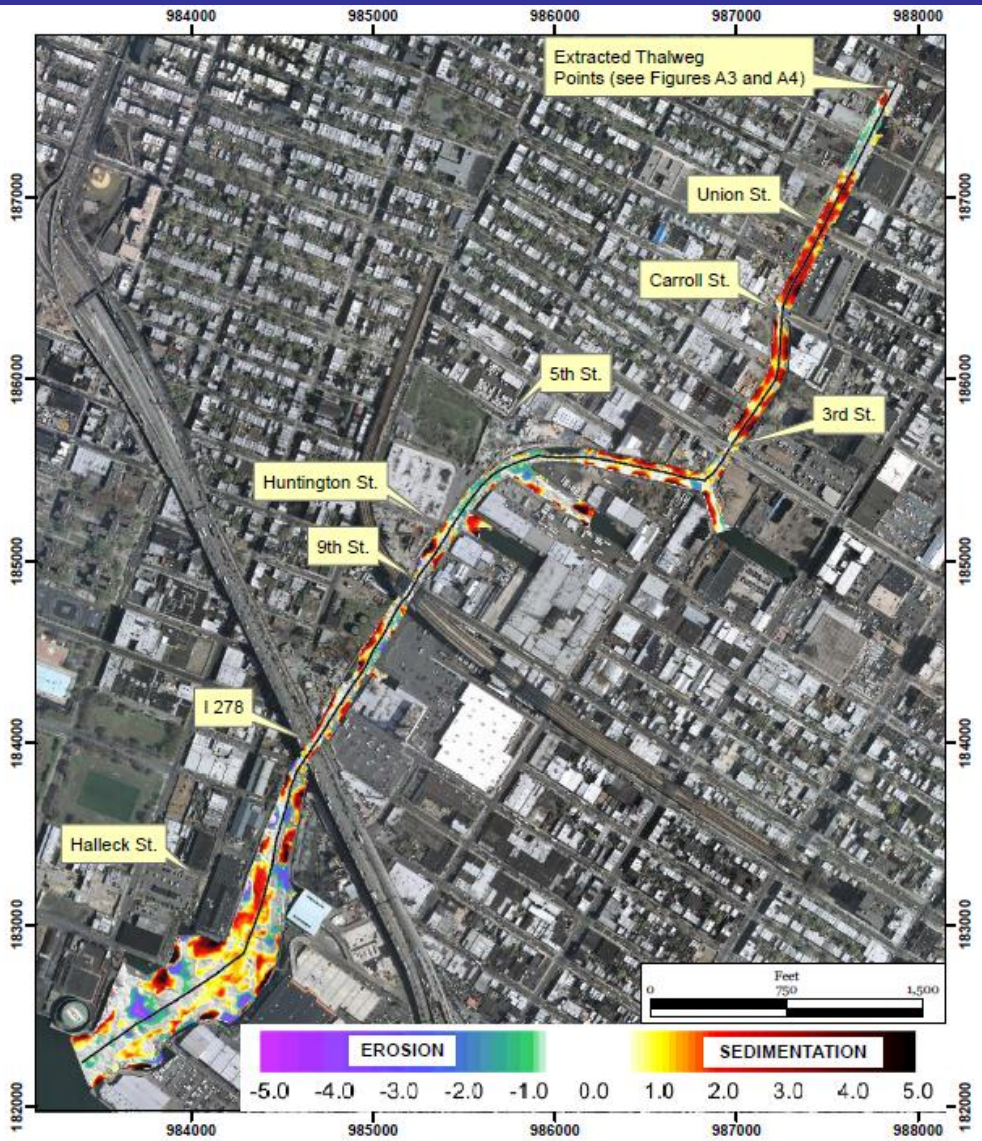
* - Based on effective solubility of NAPL

** - Based on results of SEAM3D groundwater contaminant fate and transport model

Preliminary Upper Bound Estimates of Metals Load from Groundwater to Sediment Bottom

Analyte	Mean GW Concentration, ug/l	Potential Annual Loads from GW (Kg/yr)	Mean CSO Aqueous Concentration (ug/L)	CSO Loads (kg/yr)	CSO Loads (kg/yr) -Post CSO Order Upgrades 45% Reduction in CSO Discharge
Arsenic	9.1	17.6	3	2.9	2.4
Barium	308	598	59	56	46
Cadmium	0.7	1.4	1	0.8	0.7
Chromium, Total	4.9	9.5	4	4	3.3
Copper	21.7	42	58	55	46
Lead	9.6	19	67	63	52
Mercury	0.097	0.2	0.1	0.10	0.08
Nickel	10.2	20	6	6	5
Silver	0.73	1.4	0.7	0.7	0.6

Change in Elevation from 2003 to 2010 – EPA RI Report



CR
www.crenvironmental.com

Bathymetric Surface Model Comparison -
June 2003 and January 2010 Survey Data
Gowanus Canal Brooklyn, New York

NOTES:
1) Survey data collected by CR Environmental, Inc.
of East Falmouth, Massachusetts on June 25, 2003 and January 5, 2010.
2) Grid: NY State Plane (LI), NAD83, US Foot.
3) Elevation differences less than +/- 0.6 feet are transparent.
These values are within the combined RMS error range for the two surveys.

Figure A2

Calculation of Net Solids Deposition

Change in Elevation from June 2003 to January 2010 (6.6 years)

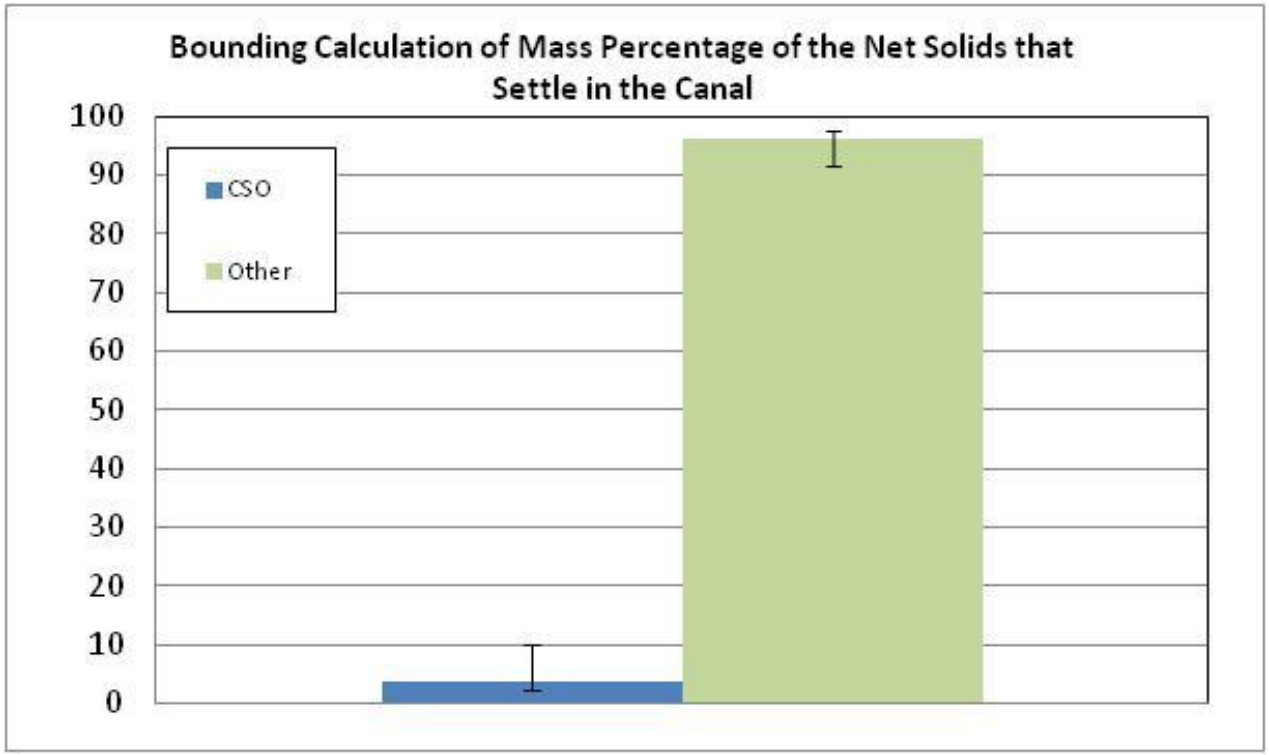
	Deposition	Erosion	Net (Deposition - Erosion)	Uncertainty**
Volume (cy)	41,000	14,000	27,000	15,200
Rate (cy/yr)	6,200	2,100	4,100	2,300
Mass (kg/yr)*	3.8x10^6	1.3x10^6	2.5x10^6	1.4x10^6

* Mass was calculated using a solid specific density of 0.8 g/cc

** Uncertainty was calculated using areas where the change in elevation from June 2003 to January 2010 was within 0.6 feet.

Note: Data from EPA Bathymetry study has been requested in order to refine the analysis.

Bounding Calculation of Mass Percentage of Net Solids that Settle in the Canal



Bounding calculation assumes that all CSO solids settle in the Canal

CSO Consent Order with NYSDEC

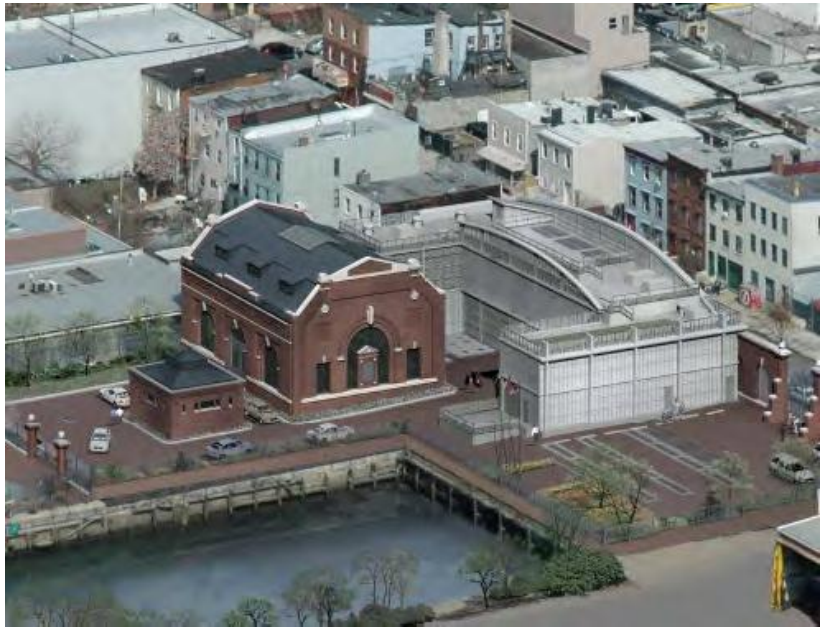
DEP's CSO Reduction Plan for Compliance with CWA

CSO Controls

- Gowanus Facilties Upgrade ($140,000,000)
- Gowanus Pump Station Upgrades
- Flushing Tunnel Upgrades
- Construction scheduled to be complete September 2013

Odor/Aesthetic Improvements

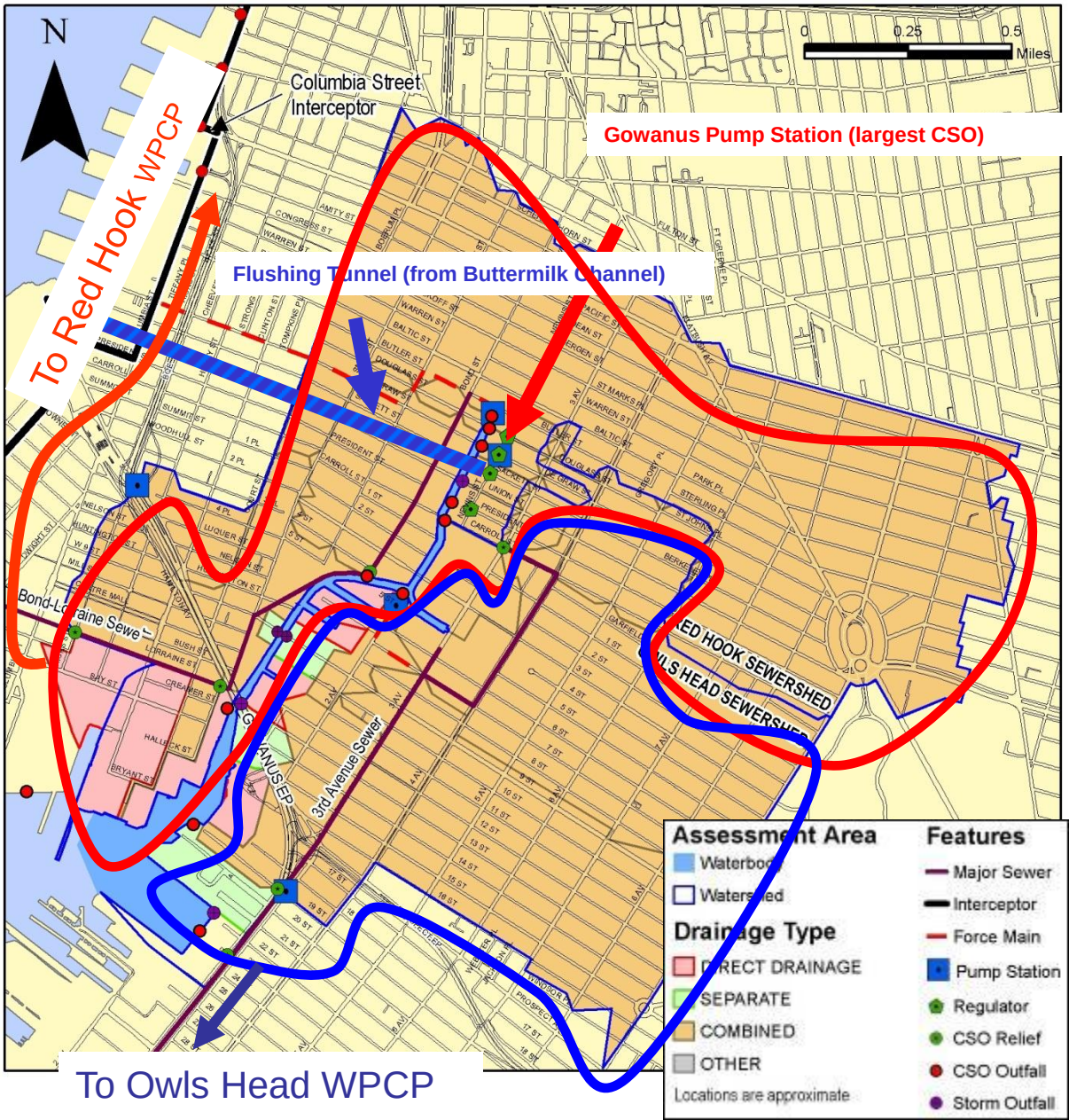
- Environmental Dredging = ($20,000,000)



Proposed Post-Upgrade Rendering of the Gowanus Facilities

Understanding the Watershed

- Entirely urbanized sewershed
- No continuous fresh inputs
- 1,759 Acres
  - 92% Combined (1,613 acres)
  - 8% Stormwater (146 acres)
- 2 WPCP service areas
  - Red Hook WPCP
  - Owls Head WPCP
- Pumping stations
- 11 CSO outfalls
- 4 storm sewer outfalls
- 300 +/- MG (typical year)
  - CSO: ~70%
  - Stormwater: ~30%
- ~ 200 other piped discharges



Pumping Station Upgrade

- Upgrade will reduce CSO discharges by 34%, significantly reduce floatables discharges at head end and odors from Pumping Station
- Improvements include:
  - Increase pumping capacity from 20 to 30 MGD
  - New superstructure to enclose all process areas
  - Screening device to remove floatables from CSO discharges
  - Addition of grinders to process increased screenings and send to WWTP (no storage on-site)
  - Restore force main through Flushing Tunnel to relocate discharge to Columbia St Interceptor

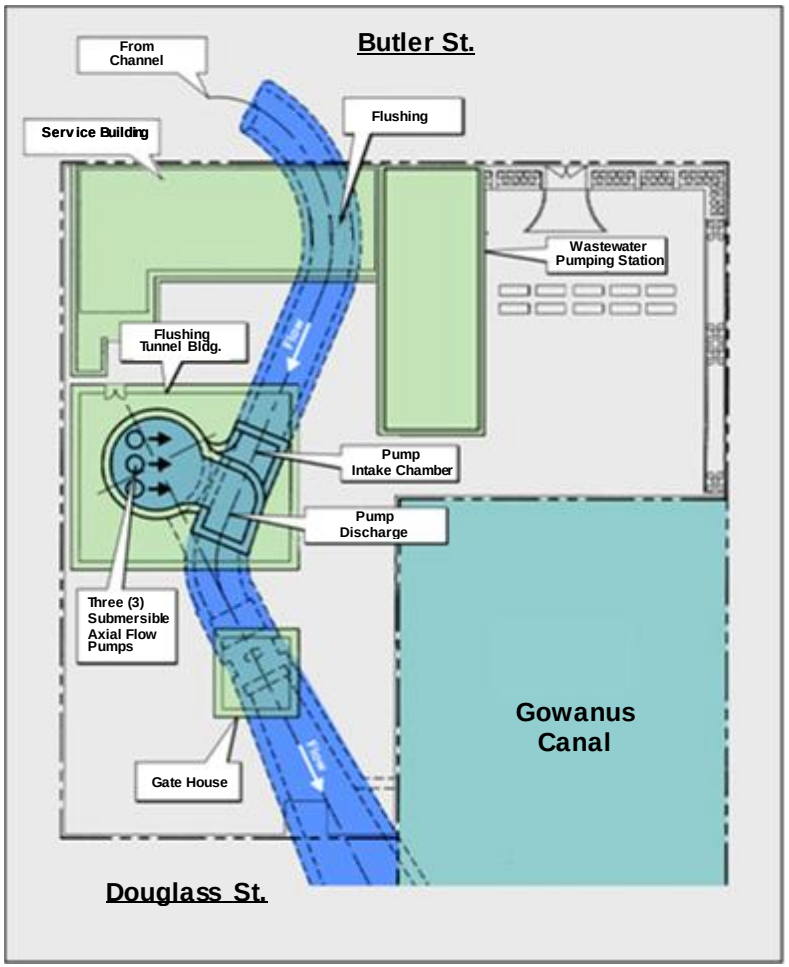


Table 7-5. Gowanus Canal Discharge Summary for Baseline and Water Quality Improvement Plan Conditions[1,2]

Outfall	Baseline Condition			Water Quality Improvement Plan Condition		
	Discharge Volume (MG)	Percentage of CSO or Stormwater Volume	Number of Wet-Weather Events[3]	Discharge Volume (MG)	Percentage of CSO or Stormwater Volume	Number of Wet-Weather Events[3]
Combined Sewer						
RH-034	121	32.1	56	127	50.7	35
RH-035	111	29.5	75	3	1.4	12
OH-007	69	18.4	47	69	27.7	47
RH-031	35	9.4	33	11	4.2	17
OH-024	23	6.2	35	23	9.4	35
OH-006	13	3.3	33	13	5.0	33
RH-036	1.6	0.4	21	1,6	0.6	20
RH-038	0.9	0.2	18	0.9	0.4	15
OH-005	0.7	0.2	5	0.7	0.3	5
RH-037	0.5	0.1	16	0.5	0.2	16
RH-033	0.2	0.1	14	0.2	0.1	14
Total CSO	377	100	75	250	100	47
Storm Sewer						
OH-601	10	13.8	66	10	13.8	66
RH-032	1.5	2.1	38	1.5	2.1	38
OH-008	0.1	0.2	10	0.4	0.5	10
OH-602	0.1	0.2	3	0.1	0.2	3
Overland Runoff	62	83.8	79	62	83.5	79
Total Stormwater	74	100	79	75	100	79
Total	452	NA	NA	325	NA	NA

[1] Simulated conditions reflect design precipitation record (JFK, 1988) and sanitary flows projected for year 2045 (Red Hook WPCP: 40 MGD, Owls Head WPCP: 115 MGD)
[2] Totals may not sum precisely due to rounding.
[3] Reflects minimum modeled flow of 0.01 MGD per 5-minute interval and minimum 12-hr inter-event time.

Flushing Tunnel Improvements

- Upgrade will increase flow through tunnel, improve dissolved oxygen and coliform levels, and minimize shutdowns during repair and maintenance
- Improvements include:
  - Interim oxygen transfer system to maintain DO levels and reduce odors
  - 3 vertical, submersible, axial flow pumps
  - Standard equipment for replacement and parts
- Estimated flows:
  - Peak of 252 MGD at high tide (30% increase)
  - Average Daily Flow of 215 MGD (40% increase)
  - No shut down at low tide
  - Peak of 175 MGD at low tide

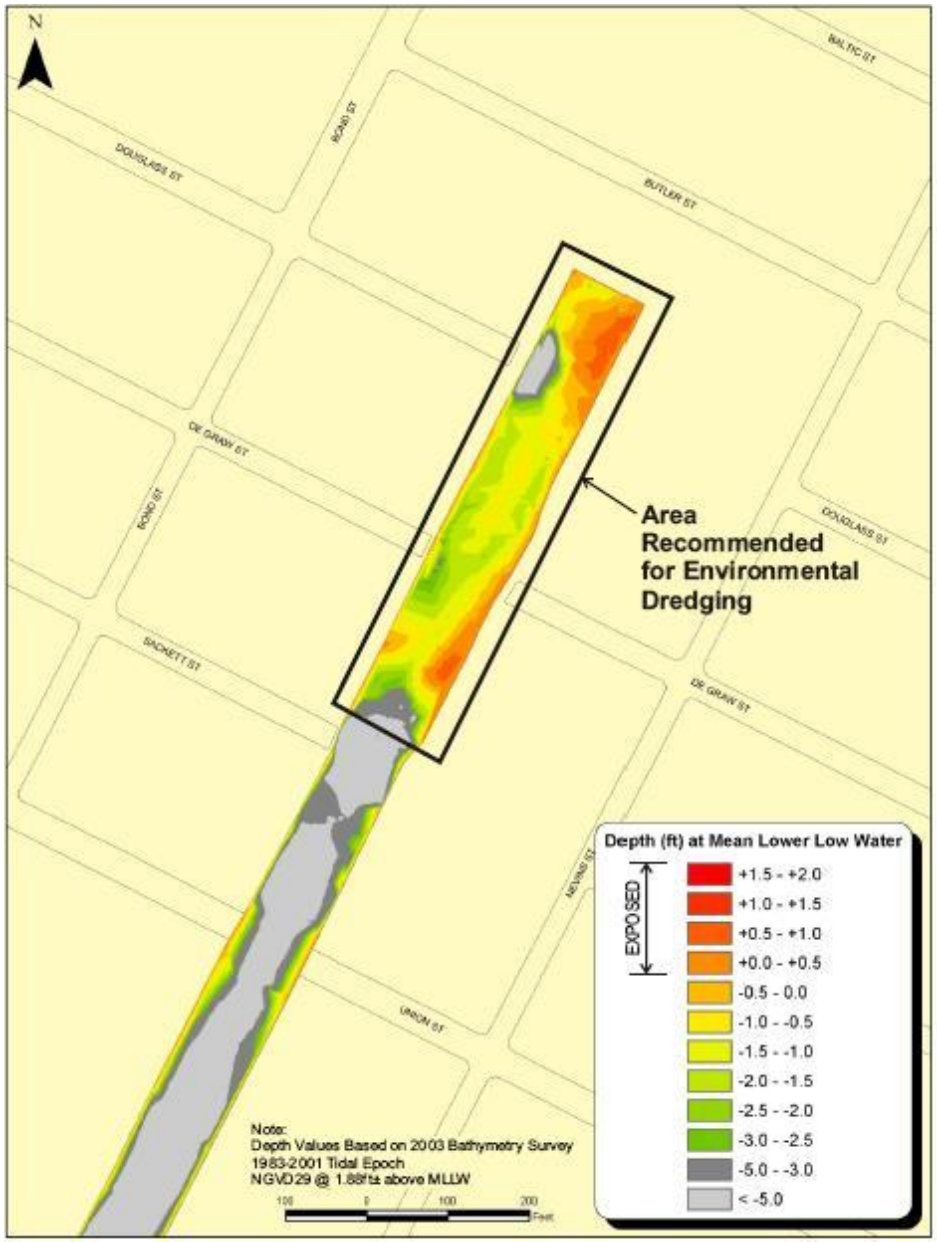
Projected Benefits

- 34% reduction of CSO volume
  - 37% corresponding reduction in sediment
- Improve dissolved oxygen levels
  - Allow for fish propagation 93% of time
  - Remaining physical limitations due to anthropogenic conditions such as high bulkheads, turning basins, etc.
- Potential to attain secondary contact standards for bacteria
  - Bacteria standards currently do not apply in Canal
  - Substantial reduction: projected to meet secondary contact standards
- 78% reduction of floatables
  - Through CSO reduction and screening at Gowanus Pumping Station
  - Address remaining floatables with waterbody skimming
- Post-construction monitoring to provide relevant data and determine extent of improvements

Environmental Dredging

Odors/Aesthetic Improvements

- Dredge sediments to 3 ft below MLLW
- Approximately 750 ft (head of Canal to Sackett St)
- Eliminate exposed sediments and associated odors
- Approximately 10,000 cubic yards to be removed
- Permit application to be submitted February 2012
- Dredging to start within 3 years of permit approval

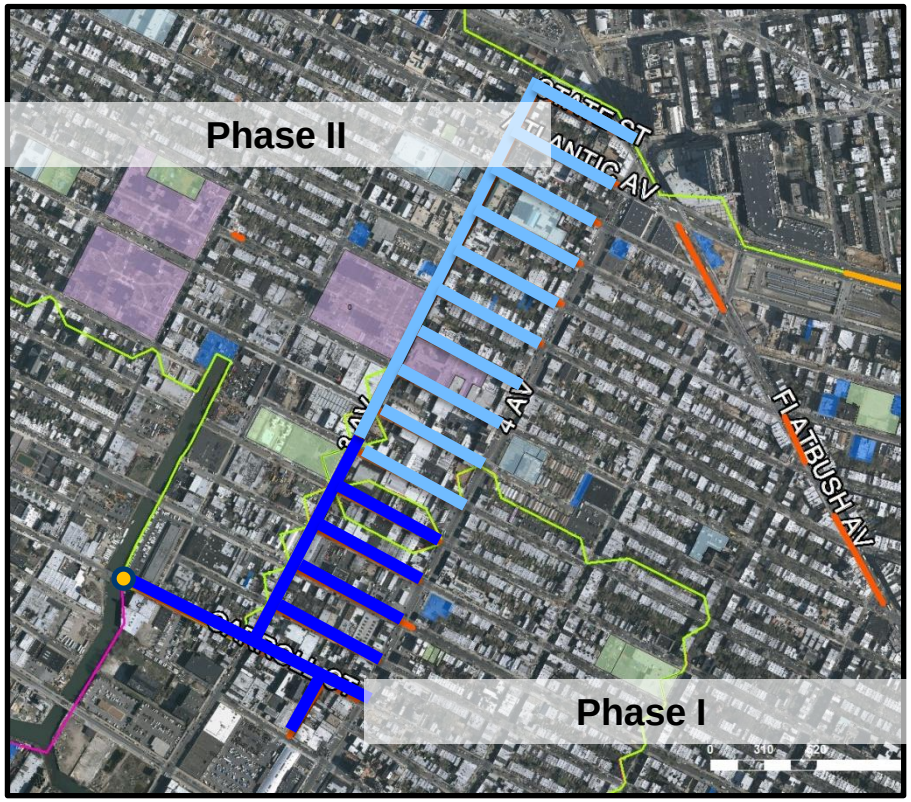


Additional Ongoing CSO Controls

Alternative	Date	Notes	Costs	% CSO Reduction
High level Sewer Separation	Phase I FY13 Phase 2 FY20	Captures 50% of drainage area (96 acre) of street runoff. New storm outfall at Carroll St	$20,000,000	5 %
Sewer Maintenance	2011, year to date 2004	37,355 linear ft of 4th Ave sewer cleaned; 724 yd^3 of silt, debris, grease removed 110,000 yd^3 of silt, debris, grease removed in Bond-Lorraine sewer	$ 685,000	
Interceptor Maintenance	2010-2012	Owl's Head and Red Hook Interceptor inspections. Completed 90% of total linear ft (16,530) for Red Hook. Inspected 2,200ft of 14,000ft in Owl's Head. On-going	$ 148,000	
IPP Program	1987	Reduction of metals influx		
Green Infrastructure	2011-forward	Downtown Brooklyn Traffic Calming/ community grants/EBP grant/future budget allocations	$ 1,000,000 +	11%
Total			$ 21,853,000 +	16%
Total Reduction in CSOs		Plant Upgrades+HLSS+GI From 377MG to 207MG	$181,853,000+	45% 170MG

High Level Storm Sewers (HLSS)

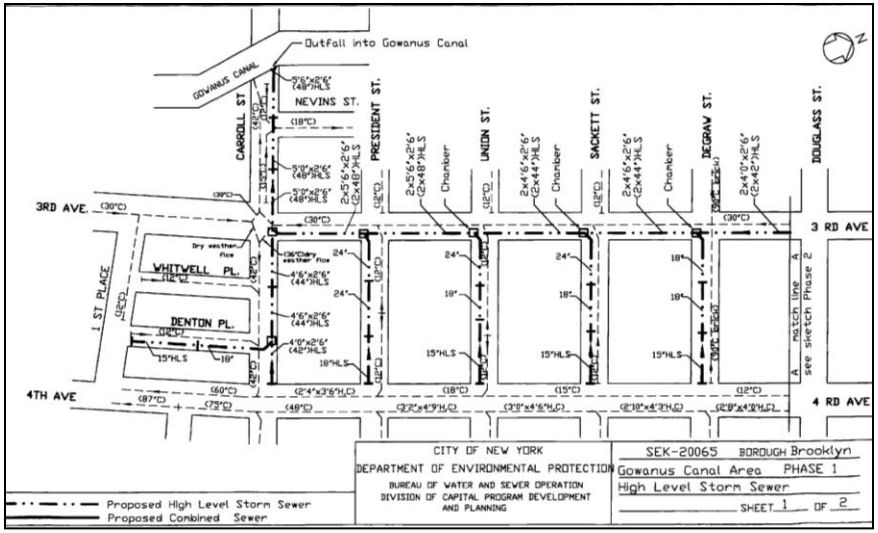
- Redirect existing catch basin flow from combined sewer to new HLSS
- Primary benefit includes reductions in street flooding
- Provides more capacity in the existing system including downstream interceptors
- Completed hydraulic analysis to determine feasibility for “Carroll Street Outfall” and CSO volume reduction of approximately 5% projected with modeling

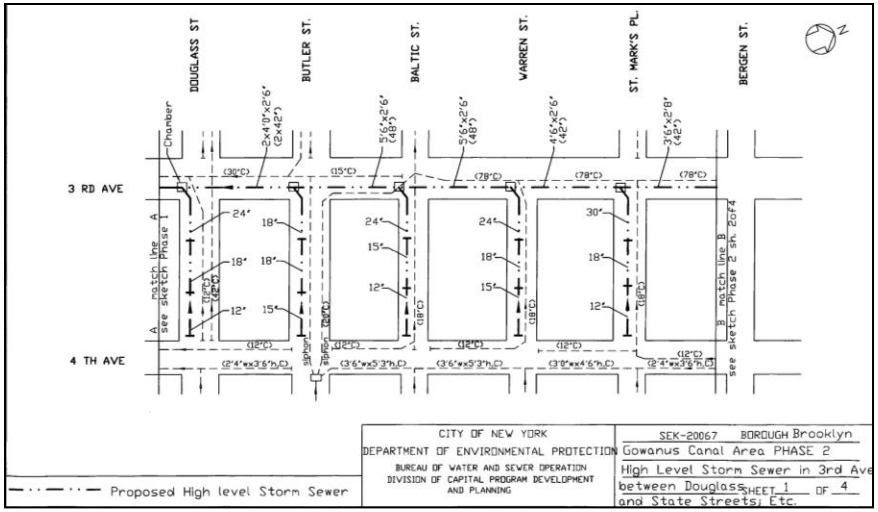


High Level Storm Sewers (HLSS)

Carroll Street Outfall Amended Drainage Plan includes:

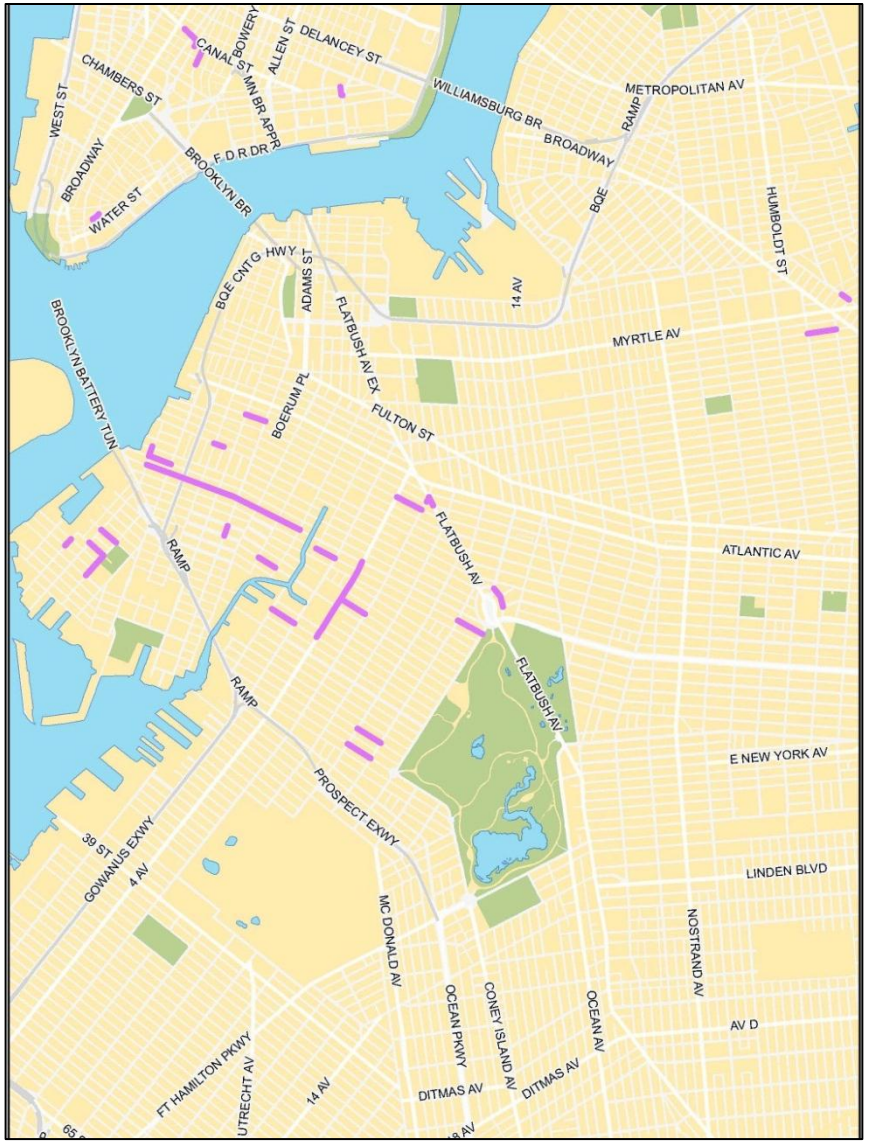
- HLSS to capture 50% of drainage area runoff
- 96-acre area bounded by 1st Pl, 4th Ave, State St, 3rd Ave
- A new storm outfall would be located at Carroll St
- Phase I design expected in FY12, and construction in FY13
- Phase II design expected in FY19 and construction in FY20





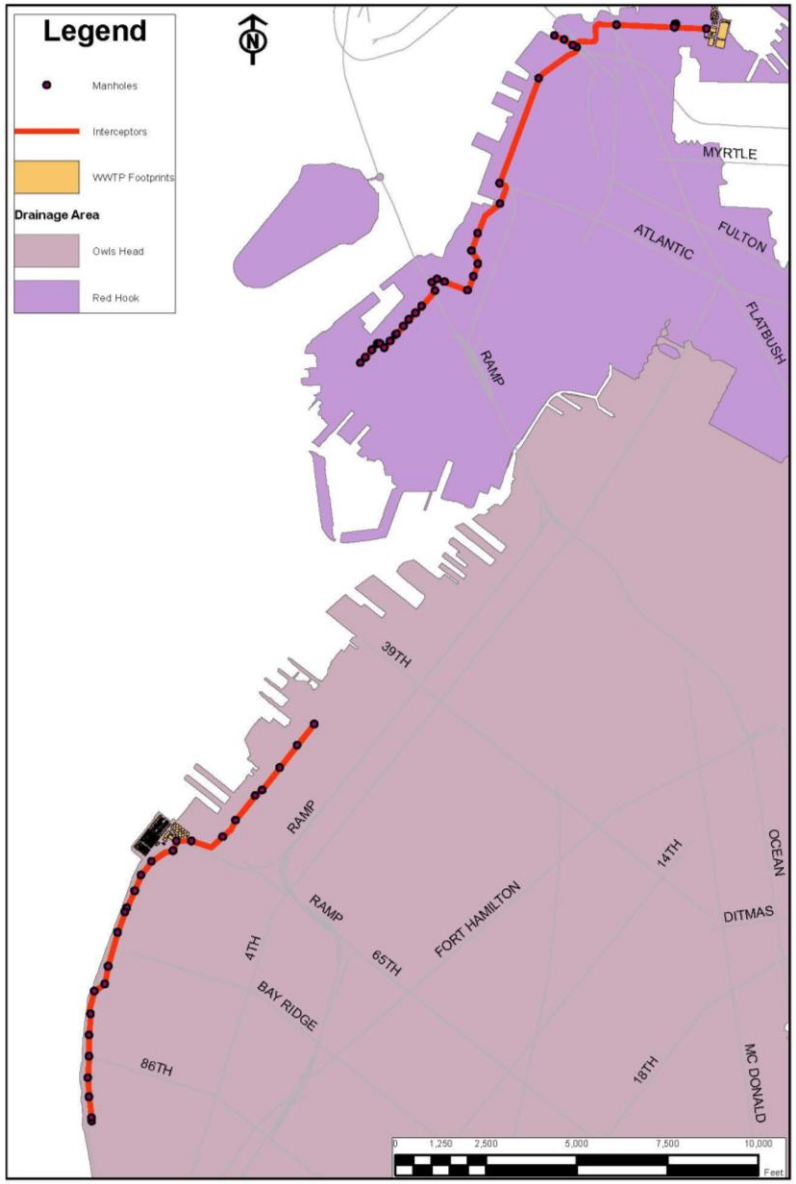
System Optimization: Sewers

- 4th Ave activities for 2011 calendar year, to date:
  - Over 37,355 linear feet of sewers cleaned in response to complaints
  - 724 cubic yards of silt, grease, and debris removed
- Bond-Lorraine sewer cleaned in 2004:
  - 110,000 cubic yards removed from Bond Lorraine Street Sewer from Bond and 4th Streets to Lorraine and Court Streets



System Optimization: Interceptors

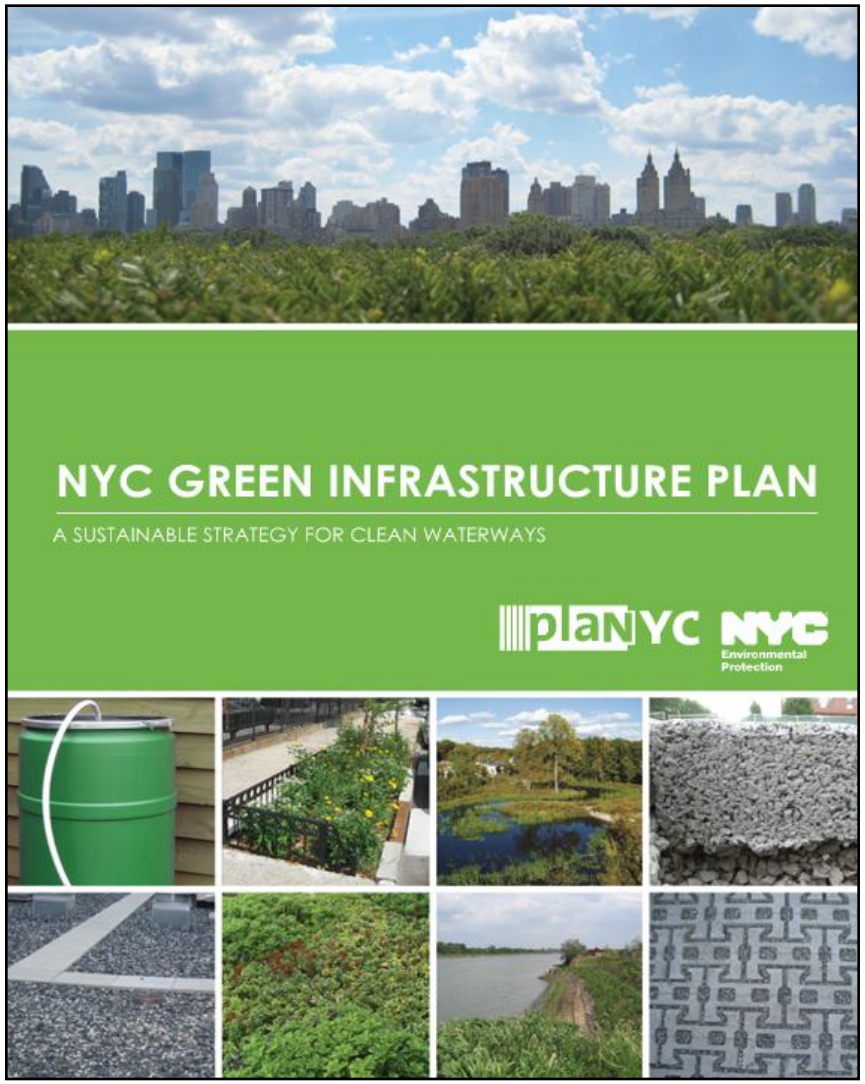
- In 2010, launched two-year program to systematically clean the City's interceptors
- Two new vactor trucks were purchased (cost $450K each)
- Current program statistics for Gowanus Canal:
  - 90% of a total of 16,530 linear ft in Red Hook drainage area inspected
  - Inspection in Owls Head drainage area started and 2,200 ft of 14,000 ft surveyed to date



Industrial Pretreatment Program

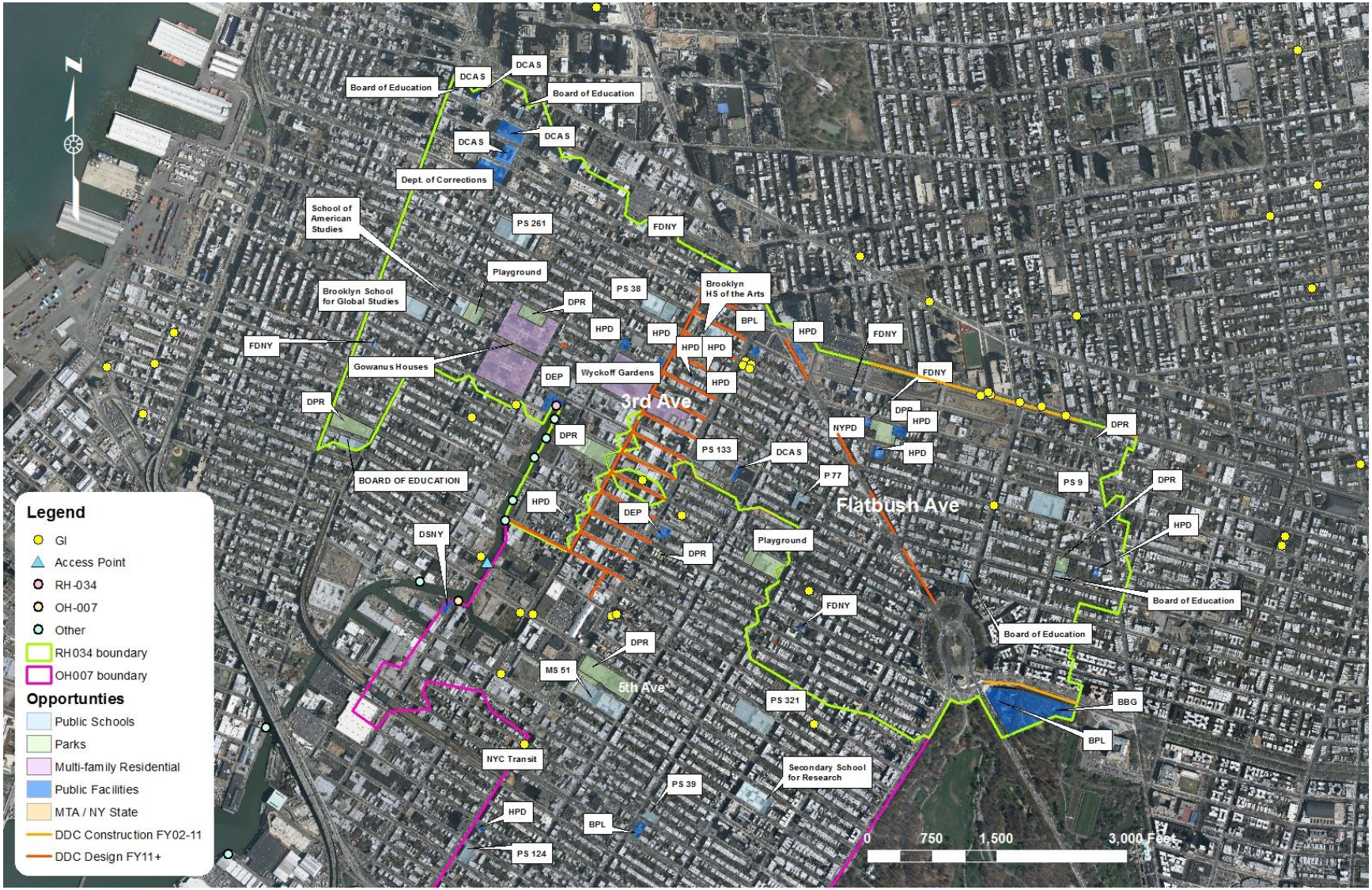
- Established in 1987 to control the introduction of toxic substances into public sewers that are tributary to WWTPs
- In 1992, DEP added a corrosion inhibitor (orthophosphate) to reduce leaching of lead
- Significant reduction of other metals due to:
  - Industries/businesses moving out of NYC or going out of business (currently, industries contribute less than 3% of the metals to the plant influent citywide)
  - Majority of metals in plant influent are from plumbing pipes/ fixtures
- Regulates discharge from 9 Significant Industrial Users in Red Hook and Owls Head drainage areas

NYC Green Infrastructure Plan



- Green infrastructure goal: Control runoff from 10% of impervious surfaces through green infrastructure and other source controls
- To implement, DEP created:
  - An interagency Green Infrastructure Task Force to design and build stormwater controls into planned roadway reconstructions and other publicly funded projects
  - The Green Infrastructure Steering Committee to promote partnerships with numerous community and civic groups and other stakeholders to support and steward green infrastructure
- Annual Report on green infrastructure implementation will be released in October 2011

Ongoing Opportunities Analyses



Existing green infrastructure and publicly-owned properties within RH-034 and OH-007 drainage areas.

Additional Water Quality Improvements

Long Term Control Plan Alternative	Flow Reduction (MG/Yr)	Present Worth Cost (Million Dollars)	Cost Estimate Basis	Notes
		Capital		
Second Avenue Pump Station	14	30	WWFP cost curves	Will be further evaluated during LTCP
Gowanus Wet Weather Pump Station	58	50	WWFP cost curves	Will be further evaluated during LTCP
OH-007 sediment trap cleaning and structural evaluation	NA	0.75	Planning level cost estimate	• Clean requires confined space entry, construction of bulkheads and is beyond the scope of DEP's sewer cleaning contracts. • Work must be handled through a capital contract requiring development of bid documents and contractor procurement.
Long Term Control Plan Due 2015				

Summary

Chemical Data Indicate CSOs are not Impacting Gowanus Canal beyond Risk-Based or background Cleanup Values.

Modeling Results Indicate CSOs are a Minor Source of COC Contamination in Canal. Groundwater is a Significantly Greater Ongoing Source of COCs in Gowanus Canal.

Analyses Indicate CSOs are not the Primary Source of Sediments in Canal.

Additional Analysis/Modeling are necessary to confirm these preliminary results. This will require Bathymetric data and GW Model Data from Public Place.

Current CSO Reduction Plans Project a 45% Reduction of CSOs. Further CSO Reductions Will be Effected in the Long Term Control Plan due in 2015.