

Calculation of the BSQV for Pompton Lake, NJ

BSQV = Bioaccumulation-based Sediment Quality Value
 Based on Ecological Receptors
 Using references from Onodaga Lake, NY

$$= \frac{\text{Target Hg Concentration in fish tissue}}{\text{BSAF}}$$

Pompton Lake Data

Surface Area Weighted Sediment Concentrations (mg/kg, dry wt)

Area outside Delta 9.2
 Area outside Delta incl. Channel 6.1

Whole body data
 1998 data 1998 data

BSAFs (kg sediment/kg fish tissue)	Area outside Delta	Area outside Delta incl. Channel
Small fish up to 21 cm	0.087	0.131
Large Fish (>21 cm)	0.219	0.330

Small fish inc. bluegill, largemouth bass, white perch & black crappie
 Lg fish inc. lgm. bass, w. perch, yellow perch, golden shiner & black crappie

BSAFs calculated as mean whole body Hg in fish divided by SWACs for two exposure scenarios

Piscivorous Wildlife = belted kingfisher, great blue heron, osprey, mink and river otter
 diet = 100% fish

Target Tissue Concentrations (mg/kg wet) **	NOAEL	LOAEL	Dietary Contribution %		MeHg	TRV (Avian) **
			Sm Fish	Lg Fish		
Belted Kingfisher	0.011	0.112	100	0	NOAEL=	0.0064
Great Blue Heron	0.035	0.345	33	67	LOAEL=	0.064
Osprey	0.032	0.318	10	90	MeHg	TRC (Mammalian) **
Mink	0.009	0.093	100	0	NOAEL=	0.0025
River Otter	0.014	0.136	40	60	LOAEL=	0.025

** From Onondaga Lake references

	Ave. Sediment Hg Conc based on Area outside Delta	Ave Hg sed conc based on area outside Delta incl. Channel	Ave. Sediment Hg Conc based on area outside Delta
BSQV = Target Sediment Concentrations (mg/kg dry wt)	based on NOAEL	based on LOAEL	based on LOAEL
Belted Kingfisher	0.13	0.86	1.29
Great Blue Heron	0.24	1.57	2.36
Osprey	0.17	1.11	1.67
Mink	0.10	0.71	1.07
River Otter	0.10	0.66	1.00

A BSQV value of 1.0 mg/kg dry wt is recommended to be protective of all piscivorous wildlife receptors that use Pompton Lake

Pompton Lake

Average Sediment Concentrations (ug/g or mg/kg, dry wt)

BSAF (Biota-Sediment Accumulation Factor)

=tot Hg in fish dw/total Hg in sediment, dry wt

					Species	All Small Fish (whole body)	All Large Fish (whole body)
Surface:					Year	1998	1998
Outside Delta	9.2	Value from RIR, 1/08			Area outside Delta (surf)	0.087	0.219
Outside Delta + Channel	6.1	GB estimate for area w/out delta			Area outside Delta + Channel	0.131	0.330
Northern (reference) end of lake	0.301	See Reference sheet					

FISH SAMPLES

All ANSP & DSRT Data	Species	Year	Fillet (F) or Whole Body (WB)	Field Total Length (cm)	Measured Whole Body Hg Conc (mg/kg wet wt)	Estimated Whole Body Hg Conc (mg/kg DRY wt)*	Ave whole body Hg by species & size (mg/kg, dry wt)
Pompton Lake - Delta area YOY	bluegill	1998	WB	4.2-6.1	0.16	0.80	
Pompton Lake - Delta area	bluegill	1998	WB	10.2-11.5	0.19	0.95	
Pompton Lake - Delta area	bluegill	1998	WB	16.7-19.0	0.18	0.90	0.88
Pompton Lake - Delta area	yellow perch	1998	WB	21.7-25.5	0.44	2.20	2.20
Pompton Lake - Delta area	Black Crappie	1998	WB	14.5-16.0	0.15	0.75	0.75
Pompton Lake - Delta area	Black Crappie	1998	WB	22.3-26.2	0.37	1.85	1.85
Pompton Lake - Delta area	White Perch	1998	WB	8.5-9.6	0.11	0.55	
Pompton Lake - Delta area	White Perch	1998	WB	16.0-17.4	0.14	0.70	0.63
Pompton Lake - Delta area	White Perch	1998	WB	22.4-23.6	0.25	1.25	1.25
Pompton Lake - Delta area	Largemouth Bas	1998	WB	17.3-20.4	0.20	1.00	1.00
Pompton Lake - Delta area	Largemouth Bas	1998	WB	34.5	0.27	1.35	
Pompton Lake - Delta area	Largemouth Bas	1998	WB	38.7	0.47	2.35	
Pompton Lake - Delta area	Largemouth Bas	1998	WB	48.2	1.10	5.50	
Pompton Lake - Delta area	Largemouth Bas	1998	WB	50.8	1.20	6.00	3.80
Pompton Lake - Delta area [C]	Pumpkinseed	1998	WB	11.0-13.2	0.166	0.83	
Pompton Lake - Delta area [C]	Pumpkinseed	1998	WB	11.1-12.7	0.226	1.13	
Pompton Lake - Delta area [C]	Pumpkinseed	1998	WB	11.3-13.4	0.095	0.48	0.81
Pompton Lake - Delta area [C]	Golden Shiner	1998	WB	25.1-25.5	0.1952	0.98	0.976
Pompton Lake - Delta area [C] YOY	Golden Shiner	1998	WB	8.3-9.0	0.177	0.89	
Pompton Lake - Delta area [C]	Golden Shiner	1998	WB	15.1-16.4	0.106	0.53	0.71
[C] = composite sample						*Assumes 20% solids	

POMPTON LAKE SEDIMENT MERCURY CONCENTRATIONS			
Reference area of Pompton Lake	Hg in surface sediment (mg/kg)		
3 values from Exponent 1999	0.310		
	0.215		
	0.384		
SD	0.085		
Ave	0.303		
2 sd on mean =	0.472		
2005 data from reference area:	0.233	J	
ug/g, dry wt.	0.279	J	
top 1 cm of sediment	0.408	J	
	0.275	J	
ALL DATA			
SD	0.073		
Ave	0.301		
2 sd on mean =	0.446		

Calculation of the BSQV for Onondaga Lake, NY

Using references from Onodaga Lake, NY

BSQV = Bioaccumulation-based Sediment Quality Value
Based on Ecological Receptors

$$= \frac{\text{Target Hg Concentration in fish tissue}}{\text{BSAF}}$$

Onondaga Lake Data

Small Fish (3-18 cm tot length) 0.27 mg/kg wet wt Hg (inc banded killifish, brook silverside, sunfish juv, juv w. perch & juv gizzard shad)
Large Fish (18-60 cm tot length) 0.68 mg/kg wet wt Hg (inc sm bass, lg bass, walleye, w. perch, also bluegill, gizzard shad, carp, br bullhead & ch catfish)
Converted fillet to whole body x 0.7 factor

Surface area weighted average concentration (SWACs)

Littoral zone = 3.5 mg/kg dry wt

Entire Lake = 2.9 mg/kg dry wt (exposure assumed 67% profundal zone and 33% littoral zone)

BSAFs (kg sediment/kg fish tissue)	Littoral Zone	Entire Lake	Mean
Small fish	0.077	0.093	0.085
Large Fish	0.194	0.235	0.215

BSAFs calculated as mean whole body Hg in fish divided by SWACs for two exposure scenarios

Piscivorous Wildlife = belted kingfisher, great blue heron, osprey, mink and river otter

diet = 100% fish

Target Tissue Concentrations (mg/kg wet)	NOAEL	LOAEL		Dietary Contribution %	
				Sm Fish	Lg Fish
Belted Kingfisher	0.011	0.112		100	0
Great Blue Heron	0.035	0.345		33	67
Osprey	0.032	0.318		10	90
Mink	0.009	0.093		100	0
River Otter	0.014	0.136	0.14 = PRG	40	60

BSQV = Target Sediment Concentrations (mg/kg wet)	based on NOAEL	based on LOAEL
Belted Kingfisher	0.13	1.32
Great Blue Heron	0.2	2
Osprey	0.16	1.57
Mink	0.11	1.09
River Otter	0.08	0.83

Selected a BSQV of 0.8 mg/kg dry wt to be protective of all piscivorous wildlife receptors that use Onondaga Lake