TABLES

Table 1. Inventory of Historical Land Uses around Minnesota Slip

Property Name	Date of Develop-ment	Beginning Date of Operation	Ending Date of Operation	Address
A.H. Thompson Planing Mill (Geo. Lautenschlager)	1872	1872	1890	7610 - 7614 Lake Ave.
Gowan-Lenning Brown Co. Grocery Wharf		1878	1935	525 S. Lake Ave.
Crowley-Brown Sandstone Wharf		1878	1895	
N. Grigon Shipyard, Shipbuilding and Repair Wharf	1880	1880	1895	
Northern Pacific No. 5 & No. 6	1883	1883	1950	Industrial Slip (E side) and Minnesota Slip (W side)
Scott & Holston Planing Mill	c. 1880	1884		1501 - 1520 Lake Ave.
St. Paul & Duluth Railroad Cos. Warehouse		1884		2nd Ave. W. & Waterfront (west side of Minnesota Slip)
Marquis De Mares- Cold Storage House	1884	1884		7607 Lake Avenue
Stone & Ordean Wholesale Grocery Warehouses	1884	1884	1940	1604 Lake Ave.; later 525 Lake Ave. S.
C. H. Graves & Co. Salt Lime Cement & Plaster Warehouses		1884	1924	1604-1706 Lake Ave.
Asa Dailey's Lumber Yard	c. 1885	1885	1890	
Marshall Wells Hardware Company and Dock	1889	1889	1950	301 or 325 Lake Ave. S.
Booth Fisheries Co. Fish & Merchandise Wharf	1894	1894	1940	20 W. Morse
Whitney Materials Co. Sand & Gravel Wharf	1895	1895	1940	15 Buchanan
Standard Salt & Cement Co. Wharf		1895	1960	237-245 Lake Ave.
White Line Transportation Co. Freight & Passenger Wharf		1895	1940	
Christiansen & Sons, Inc. Fish Wharf		1905	1935	20 W. Morse
Scandia Fish Co. Wharf		1908	1920	
City of Duluth Public Wharf		1910	1940	
Rust-Parker Co. Grocery Wharf		1911	1940	217-219 Lake Ave. S.
City of Duluth Public Wharf		1915	1940	
Christiansen & Sons		1927		20 W. Morse
Johnson, Sam & Sons, Fisheries		1927		19. W Morse
United States & Doninin Trans. Co.		1930		20 W Morse
Duluth Ice & Fuel Co.		1935		102 Buchanan
MacAskill-Monaghan Co.		1950	1960	227 Lake Ave. S.
Stone & Ordean Building	1884	1950	1960	1604 Lake Ave.; later 525 Lake Ave. S.
Jeno's Inc.	1884	1970	1970	1604 Lake Ave.; later 525 Lake Ave. S.

Table 2. Ranges of Contaminant Concentrations in Minnesota Slip (Schubauer-Berigan and Crane 1997; Crane *et al*. 1997; unpublished R-EMAP and MPCA data)

Contaminant	Concentration*
Total PAHs	5.7-320 mg/kg
PCBs	7.8-612 µg/kg
Mercury	0.075-1.6 mg/kg
Lead	31-280 mg/kg
Cadmium	2.6 mg/kg
Chromium	49.8 mg/kg
Copper	83.2 mg/kg
Nickel	30.7 mg/kg
Zinc	214 mg/kg
AVS	1.43-1.54 µmol/g
SEM**	5.36-7.59 µmol/g
Toxaphene	147-204 µg/kg
p,p'-DDD & o,p'-DDT	10 µg/kg
KCI-extractable ammonia	10.2-138 mg/kg
Other Parameters	
TOC	0.67-8.3%
Particle Size	
Sand	48.2-96.9%
Silt	2.0-40%

* Single values represent one measurement.

** Includes cadmium, copper, lead, nickel, and zinc.

Table 3. Description of Field Results

Site Location	Sampling Date (mo/d/yr)	Water Depth (m)	Soft Sediment Depth (m)	Sediment Sampler	Core Length (cm)	Core Section (cm)	Core Section Description
98-MNS-02	8/13/98	4.4	2.1	Livingston corer	52	0-15	dark brown sand and detritus, pudding-like texture, removed piece of clear plastic
						15-30	firmer texture and more sand than 0-15 cm segment, fibrous detritus, odor
						30-45	dark brown, firm sand, fibrous detritus, odor
98-MNS-03	8/13/98	4.6	2.35	Drop corer	N/A	0-5	brown, pudding-like texture, small amount of detritus
				Livingston corer	48	0-15	brown, pudding-like silt/sand, some detritus
						15-30	brown, firm sand, detritus, odor
						30-45	brown, very sandy and firm, some detritus, odor
98-MNS-04	8/13/98	N/A	N/A	Drop corer	N/A	0-5	sandy with a lot of fibrous detritus
MNS-99-01	9/22/99	5.2	0.6	Shipek grab	N/A	0-5	brown silt, firm pudding-like texture, small amount of detritus
MNS-99-01	9/28/99	5.3	0.6	Vibrocorer	66	0-15	silty, pudding-like consistency
						15-30	silty clay, firm pudding-like texture
						30-45	sandy
						45-60	dry sand
MNS-99-02	9/22/99	5.3	0.3	Shipek grab	N/A	0-5	brown, pudding-like silt/sand underlain by firm brown silt/sand
MNS-99-02	9/28/99	5.2	0.7	Vibrocorer	28	0-15	silt underlain by sand
						15-28	sand with wood pieces and a chunk of coal
MNS-99-03	9/22/99	5.0	1.3	Shipek grab	N/A	0-5	firm, black silt/sand, detritus (leaves/twigs) and oil, removed a candy wrapper and piece of wall paper

Table 3. Continued

Site Location	Sampling Date (mo/d/yr)	Water Depth (m)	Soft Sediment Depth (m)	Sediment Sampler	Core Length (cm)	Core Section (cm)	Core Section Description
MNS-99-03	9/29/99	4.9	2.3	Vibrocorer	140	0-15	silt, oil film, small amount of detritus
						15-30	silt, oil, some detritus
						30-45	silt/sand, detritus
						45-60	silt/sand, detritus, some oil, removed piece of plastic
						60-75	oily silt/sand, removed large chunk of wood
						75-90	oily, silt/sand, some detritus
						90-120	sand/silt, some oil and detritus
						120-140	sand/silt, some oil and wood chips
MNS-99-04	9/22/99	4.3	0.5	Shipek grab	N/A	0-5	dark brown sand/silt, some detritus (leaves) and oil
MNS-99-04	9/29/99	4.3	0.6	Vibrocorer	155	0-15	silt, firm pudding-like texture, detritus
						15-30	firm silt, some detritus
						30-45	firm silt, some detritus, removed pieces of metal
						45-60	firm sand/silt, dark color (possibly due to oil)
						60-75	soft sand/silt, oil
						75-90	sand/silt, oil, some detritus
						90-120	sand/silt, some detritus
						120-150	sand/silt, some detritus
MNS-99-04R	9/29/99	4.3	2.1	Vibrocorer	182	0-15	silt/sand, some detritus
						15-30	silt/sand, some detritus
						30-45	silt/sand with more sand on bottom
						45-60	silt/sand, some detritus, possible oil
						60-75	silt/sand, oil
						75-90	silt/sand, oil

Table 3. Continued

Site Location	Sampling Date (mo/d/yr)	Water Depth (m)	Soft Sediment Depth (m)	Sediment Sampler	Core Length (cm)	Core Section (cm)	Core Section Description
MNS-99-04R	9/29/99	4.3	2.1	Vibrocorer	182	90-120	silt/sand, oil, detritus
						120-150	silt/clay/sand, some detritus, oil
						150-180	silt/sand with a lot of detritus
MNS-99-05	9/22/99	4.4	0.5	Shipek grab	N/A	0-5	dark brown sand/silt, detritus, some oil, removed pieces of foil and plastic
MNS-99-06	9/22/99	3.2	0.5	Shipek grab	N/A	0-5	coarse sand and oil, removed twigs and pebbles
MNS-99-07	9/23/99	3.6	0.7	Livingston corer & drop corer	60	0-15	black, oily sand with odor
				Livingston corer		15-30	black, oily sand with odor, some detritus
						30-45	black sand with some oil and odor, very dry, small amount of detritus
						45-60	black sand
MNS-99-08	9/24/99	5.1	2.0	Livingston corer & drop corer	52	0-15	oily silt, some detritus, odor, gelatinous texture
				Livingston corer		15-30	firmer, oily silt underlain by sandier layer, removed small piece of plastic
						30-45	oily silt/sand, removed small pieces of foil and plastic
MNS-99-09	9/27/99	5.6	1.0	Livingston corer	58	0-15	silty, gelatinous upper layer with odor and oil film underlain by gritty sand and oil with detritus
MNS-99-10	9/27/99	5.6	0.7	Livingston corer	48	0-15	soupy silt underlain by firmer silt/sand, oil, odor
						15-30	firm silt/sand/clay
						30-45	firm sand/silt/clay, removed large rock and small wood chips

Table 3. Continued

Site Location	Sampling Date (mo/d/yr)	Water Depth (m)	Soft Sediment Depth (m)	Sediment Sampler	Core Length (cm)	Core Section (cm)	Core Section Description
MNS-99-11	9/28/99	4.6	0.6	Vibrocorer	53	0-15	soupy silt/sand
						15-30	soupy sand
						30-45	firmer sand, some oil, odor
MNS-99-12	9/28/99	5.3	0.5	Vibrocorer	38	0-15	silt, pudding-like consistency
						15-30	oily sand, small amount of detritus, removed several rocks
MNS-99-13	9/28/99	4.8	0.5	Vibrocorer	180	0-15	oily silt, firm pudding-like texture
						15-30	oily silt with a few wood fibers
						30-45	sand/silt, some oil, small amount of detritus
						45-60	sand/silt, some detritus
						60-75	sand, some detritus
						75-90	sand/silt with fine wood fibers
						90-120	sand, odor
						120-150	sand with wood fibers
MNS-99-13R	9/28/99	4.8	1.4	Vibrocorer	160	0-15	silt
						15-30	silt/sand, small amount of detritus
						30-45	silt/sand, some detritus, removed rock
						45-60	sand with wood fibers
						60-75	sand, some detritus
MNS-99-14	9/28/99	4.9	0.7	Vibrocorer	140	0-15	oily silt, firm pudding-like texture
						15-30	firm silt/clay
						30-45	sand/silt, some detritus
						45-60	grainy sand
						60-75	sand, oil, detritus
						75-90	sand, detritus
						90-120	dry sand

Table 3. Continued

Site Location	Sampling Date (mo/d/yr)	Water Depth (m)	Soft Sediment Depth (m)	Sediment Sampler	Core Length (cm)	Core Section (cm)	Core Section Description
MNS-99-15	9/29/99	4.5	2.7	Vibrocorer	215	0-15	firm silt, removed chunk of wood
						15-30	firm silt
						30-45	firm silt/sand
						45-60	firm sand/silt/clay, removed a few wood chunks
						60-75	silt/clay, oil, odor
						75-90	silt/clay, oil, odor
						90-120	silt/clay, oil, odor, wood fibers and small wood chips
						120-150	silt/clay, oil, odor
						150-180	sand/silt, oil, odor, wood fibers, removed large rubber band
						180-210	sand/silt, lots of wood fibers and detritus
MNS-99-16	9/29/99	6.7	0.6	Vibrocorer	58	0-15	silt/sand, some detritus
						15-30	sand, some detritus and wood chips
						30-45	silt underlain by sand, some detritus (wood fibers)
						45-58	sand, removed several rocks and large wood chips
MNS-99-17	9/29/99	4.8	1.6	Vibrocorer	183	0-15	silt/sand, some detritus
						15-30	silt
						30-45	sand/silt
						45-60	sand/silt/clay, some detritus
						60-75	dark brown silt/clay
						75-90	sand/silt, oil, odor
						90-120	sand/silt, oil, odor
						120-150	sand/silt, detritus
						150-180	sand, detritus, wood chips

Table 3. Continued

Site Location	Sampling Date (mo/d/yr)	Water Depth (m)	Soft Sediment Depth (m)	Sediment Sampler	Core Length (cm)	Core Section (cm)	Core Section Description
MNS-99-18	9/29/99	6.2	0.8	Vibrocorer	53	0-15	soupy silt, smooth, small amount of oil
						15-30	firm silt/clay with dark striations
						30-45	firm silt/clay/sand, smooth, odor

R = field replicate sample

Table 4. Geopositional Information for Sediment Samples Collected from Minnesota Slip During 1998 and 1999 (Using Map Datum NAD-83)

Site Location	UTM15_X	UTM15_Y	Latitude	Longitude
98-MNS-02	568878	5181521.221553	46.78368	-92.09765
98-MNS-03	568902	5181477.301521	46.78328	-92.09734
MNS-99-01	568948	5181333.222391	46.78198	-92.09676
MNS-99-02	568934	5181394.281948	46.78253	-92.09693
MNS-99-03	568901	5181462.572241	46.78315	-92.09736
MNS-99-04	568898	5181507.563494	46.78356	-92.09739
MNS-99-04R	568898	5181507.563494	46.78356	-92.09739
MNS-99-05	568869	5181509.973739	46.78358	-92.09777
MNS-99-06	568863	5181495.512265	46.78345	-92.09785
MNS-99-07	568866	5181484.800063	46.78336	-92.09781
MNS-99-08	568889	5181436.595149	46.78292	-92.09752
MNS-99-09	568903	5181407.136591	46.78265	-92.09734
MNS-99-10	568928	5181356.253627	46.78219	-92.09702
MNS-99-11	568998	5181303.496028	46.78171	-92.09611
MNS-99-12	568956	5181391.603897	46.78251	-92.09665
MNS-99-13	568930	5181424.276116	46.7828	-92.09698
MNS-99-13R	568930	5181424.276116	46.7828	-92.09698
MNS-99-14	568914	5181434.988319	46.7829	-92.09719
MNS-99-15	568875	5181515.329841	46.78363	-92.09769
MNS-99-16	568968	5181283.142842	46.78153	-92.09651
MNS-99-17	568920	5181462.036631	46.78315	-92.09711
MNS-99-18	568960	5181367.233635	46.78229	-92.0966

R = field replicate sample

Table 5. Number of Sediment Samples and Field Replicates Included in each Sediment Core Section collected from Minnesota Slip during 1999

Core Section (cm)	Number of Samples Analyzed for Chemical/Physical Parameters											
	PAHs	PCBs	TOC	Particle Size	Lead	Zinc	Digestion	% Moisture	Mercury	Other Metals*	Ammonia	AVS/SEM
0-5	6	6	6	6	6	6	6	6	6	6	6	6
field replicate(s)	0	0	0	0	0	0	0	0	0	0	0	0
0-15	16	15	16	16	16	16	16	16	16			
field replicate(s)	2	2	2	2	2	2	2	2	2			
15-30	16		15	16	16	16	16	16	16			
field replicate(s)	2		2	2	2	2	2	2	2			
30-45	8		12	6	14	14	14	14	14			
field replicate(s)	1		2	1	2	2	2	2	2			
45-60	6		7	4	7	7	9	9	7			
field replicate(s)	1		2	1	2	2	2	2	2			
60-75	4		6	3	6	6	6	6	6			
field replicate(s)	0		1	0	2	2	2	2	1			
75-90	4		6	3	6	6	6	6	6			
field replicate(s)	0		0	0	1	1	1	1	0			
90-120	4		6	3	6	6	6	6	6			
field replicate(s)	0		0	0	1	1	1	1	0			
120-150	3		5	3	5	5	5	5	5			
field replicate(s)	0		0	0	1	1	1	1	0			
150-180	1		1	1	2	2	2	2	2			
field replicate(s)	0		0	0	0	0	0	0	0			
180-210	1		1	1	1	1	1	1	1			
field replicate(s)	0		0	0	0	0	0	0	0			
TOTAL NUMBER OF:												
SAMPLES	69	21	81	62	85	85	87	87	85	6	6	6
FIELD REPLICATES	6	2	9	6	13	13	13	13	9	0	0	0

*Cadmium, Chromium, Copper, Nickel, and Selenium

Table 6. Results of the 10-d *C. tentans* Sediment Toxicity Tests on Surficial Sediments (0-5 cm) from Minnesota Slip

Treatment	Mean Survival % (± SD)[a]	Mean Dry Weight Surviving Organism (mg; ± SD)[b,c]	Mean AFDW Per Surviving Organism (mg; ± SD)[c,d]
Control	71.4 ± 23.4	2.844 (± 0.503)	1.908 (± 0.402)
MNS-99-01	95.0 ± 5.3	2.525 (± 0.523)	1.925 (± 0.460)
MNS-99-02	89.4 ± 8.6	2.448 (± 0.457)	1.765 (± 0.348)
MNS-99-03	82.5 ± 14.9	2.424 (± 0.240)	1.711 (± 0.161)
MNS-99-04	82.9 ± 13.8	2.970 (± 0.421)	2.208 (± 0.319)
MNS-99-05	81.4 ± 9.0	2.559 (± 0.542)	1.819 (± 0.411)
MNS-99-06	81.4 ± 13.5	2.769 (± 0.423)	2.180 (± 0.360)

[a] Comparison of treatment survival to the control was completed by observation since control survival was less than in any of the treatments.
[b] dried at 81°C for >24 hours
[c] Dry weight and mean AFDW in the test treatments were not significantly reduced relative to the control.
[d] ashed at 550 ± 50 °C for 2 hours

SD = standard deviation
AFDW = ash free dry weight

Table 7. Mean Percentage Survival Results of the 28- to 42-d *H. azteca* Sediment Toxicity Tests on Surficial Sediments (0-5 cm) from Minnesota Slip

Treatment	28-d Mean % Survival (± SD)[a]	35-d Mean % Survival (± SD)[a]	42-d Mean % Survival (± SD)[a]
Control 1	84.2 (± 15.6)	80.0 (± 20.0)	77.5 (± 18.3)
Control 2	85.0 (± 12.4)	83.7 (± 14.1)	83.7 (± 14.1)
Control 3	88.3 (± 20.4)	93.8 (± 7.4)	91.3 ± (8.3)
Combined Controls 1-3[b]	85.8 (± 16.1)	85.8 (± 15.3)	84.2 (± 14.7)
MNS-99-01	93.3 (± 8.9)	92.5 (± 8.9)	90.0 (± 7.6)
MNS-99-02	85.8 (± 10.0)	80.0 (±12.0)	80.0 (± 12.0)
MNS-99-03[c]	19.2 (± 18.3)	13.8 (± 13.0)	13.8 (± 13.0)
Control 4[d]	77.5 (± 16.6)	65.0 (± 30.7)	63.8 (± 29.2)
Control 5[d]	70.0 (± 16.5)	66.2 (± 22.6)	65.0 (± 21.4)
Control 6	80.8 (± 17.8)	78.7 (± 18.1)	75.0 (± 17.7)
MNS-99-04	69.2 (± 16.8)	72.5 (± 18.3)	71.3 (± 17.3)
MNS-99-05[c]	24.2 (± 21.5)	25.0 (± 22.7)	25.0 (± 22.7)
MNS-99-06	75.0 (± 15.7)	77.5 (± 7.1)	77.5 (± 7.1)

[a] Day 28 mean survival is based on all 12 replicates; Days 35 and 42 survival are based on the remaining eight replicates.

[b] The Combined Controls 1-3 was used for statistical comparison to MNS-99-01, MNS-99-02, and MNS-99-03.

[c] Survival in MNS-99-03 and MNS-99-05 was significantly lower than in the respective controls at $\alpha = 0.05$.

[d] Controls 4 and 5 had less than 80% survival on day 28, and were therefore unacceptable. Only Control 6 was used for statistical comparison to MNS-99-04, MNS-99-05, and MNS-99-06.

SD = standard deviation

Table 8. Mean Dry Weight Results of the 28- to 42-d *H. azteca* Sediment Toxicity Tests on Surficial Sediments (0-5 cm) from Minnesota Slip

Treatment	28-d Mean Dry Weight (mg) (± SD)	42-d Mean Dry Weight (mg) (± SD)
Control 1	0.285 (± 0.062)	0.300 (± 0.048)
Control 2	0.332 (± 0.080)	0.296 (± 0.026)
Control 3	0.318 (± 0.034)	0.312 (± 0.40)
Combined Controls 1-3[a]	0.312 (± 0.060)	0.303 (± 0.038)
MNS-99-01	0.298 (± 0.053)	0.322 (± 0.087)
MNS-99-02	0.456 (± 0.226)	0.365 (± 0.034)
MNS-99-03	0.443 (± 0.097)	0.392 (± 0.131)
Control 4	0.364 (± 0.087)	0.374 (± 0.077)
Control 5	0.440 (± 0.262)	0.320 (± 0.044)
Control 6[b]	0.364 (± 0.071)	0.316 (± 0.087)
MNS-99-04	0.527 (± 0.192)	0.516 (± 0.079)
MNS-99-05	0.572 (± 0.332)	0.537 (± 0.086)
MNS-99-06	0.419 (± 0.187)	0.536 (± 0.030)

[a] The Combined Controls 1-3 were used for statistical comparison to MNS-99-01, MNS-99-02, and MNS-99-03.

[b] Controls 4 and 5 had less than 80% survival on day 28, and were therefore unacceptable. Only Control 6 was used for statistical comparison to MNS-99-04, MNS-99-05, and MNS-99-06.

SD = standard deviation

Table 9. Mean Reproduction Results of the 42-d *H. azteca* Sediment Toxicity Tests on Surficial Sediments (0-5 cm) from Minnesota Slip

Treatment	Total Number of Females Alive at Test Termination	Mean Reproduction (young/surviving female) (± SD)
Control 1	31	1.16 (± 0.70)
Control 2	40	1.50 (± 1.66)
Control 3	42	2.11 (± 1.43)
Combined Controls 1-3[a]	113	1.59 (± 1.33)
MNS-99-01	41	2.32 (± 1.30)
MNS-99-02	36	2.55 (± 1.11)
MNS-99-03	7	0.42 (± 0.80)
Control 4	19	2.77 (± 2.61)
Control 5	31	1.65 (±1.65)
Control 6[b]	38	0.80 (± 1.02)
MNS-99-04	28	2.27 (± 1.86)
MNS-99-05	13	1.30 (± 1.99)
MNS-99-06	34	3.73 (± 2.76)

[a] The Combined Controls 1-3 were used for statistical comparison to MNS-99-01, MNS-99-02, and MNS-99-03.

[b] Controls 4 and 5 had less than 80% survival on day 28, and were therefore unacceptable. Only Control 6 was used for statistical comparison to MNS-99-04, MNS-99-05, and MNS-99-06.

SD = standard deviation

Table 10. Particle Size Distribution of Sediments from Minnesota Slip. Particle Size Ranges are Given as Diameters in Microns (μm)

		Detailed Analysis								Simple Analysis			
		Percentages within Size Range (μm)								Percentages within Size Range (μm)			
Site Location	Depth (cm)	Sand & Gravel >53	Coarse Silt 53-20	Medium Silt 20-5	Fine Silt 5-2	Coarse Clay 2-0.2	Medium Clay 0.2-0.08	Fine Clay <0.08	Median Diameter* (μm)	Sand & Gravel >53	Silt 53-2	Clay 2-0	Surface Area cm^2/cm^3
MNS-99-01	0-5**	34.0	8.1	31.7	14.9	11.0	0.20	0.07	15	34.0	54.7	11.2	14161
MNS-99-02	0-5	18.8	10.1	41.2	19.2	10.3	0.08	0.16	9	18.8	70.6	10.6	16002
MNS-99-03	0-5**	39.4	19.8	29.4	6.6	4.7	0.03	0.00	28	39.4	55.9	4.7	6350
MNS-99-04	0-5	83.2	4.8	7.4	2.9	1.7	0.01	0.02	> 53 (430)	83.2	15.1	1.7	2540
MNS-99-05	0-5	35.6	23.5	31.2	5.1	4.6	0.00	0.00	28	35.6	59.8	4.6	6350
MNS-99-06	0-5	98.3	0.5	0.6	0.3	0.3	0.00	0.00	> 53 (520)	98.3	1.4	0.3	254
MNS-99-01	0-15**	33.0	10.3	33.1	12.9	10.7	0.10	0.03	15	33.0	56.2	10.8	12446
MNS-99-02	0-15	42.5	3.5	30.0	14.9	8.8	0.12	0.11	17	42.5	48.4	9.1	12700
MNS-99-03	0-15**	46.6	14.4	25.6	7.8	5.6	0.05	0.02	42	46.6	47.7	5.6	7239
MNS-99-04	0-15	63.0	9.9	17.0	6.4	3.6	0.04	0.07	> 53 (250)	63.0	33.3	3.7	6096
MNS-99-04R	0-15**	66.8	6.0	16.7	6.2	4.2	0.03	0.02	> 53 (290)	66.8	28.9	4.2	5334
MNS-99-07	0-15	90.5	3.3	3.4	2.0	0.8	0.00	0.00	> 53 (470)	90.5	8.7	0.8	1270
MNS-99-08	0-15**	42.5	17.9	24.4	9.2	5.9	0.03	0.03	36	42.5	51.6	6.0	7747
MNS-99-09	0-15**	68.3	3.7	14.2	8.6	5.2	0.02	0.00	> 53 (300)	68.3	26.4	5.3	5842
MNS-99-10	0-15	68.8	4.9	15.0	5.7	5.5	0.06	0.03	> 53 (310)	68.8	25.6	5.6	6350
MNS-99-11	0-15	95.0	1.1	1.7	1.3	0.9	0.01	0.01	> 53 (500)	95.0	4.1	1.0	1016
MNS-99-12	0-15**	35.1	4.3	30.4	16.8	13.3	0.09	0.03	13	35.1	51.4	13.4	14605
MNS-99-13	0-15	41.4	11.7	28.9	10.4	7.4	0.12	0.06	24	41.4	51.0	7.6	10160
MNS-99-13R	0-15	46.1	11.4	24.1	11.1	7.2	0.05	0.00	33	46.1	46.7	7.3	8636
MNS-99-14	0-15	65.0	8.8	16.6	6.4	3.3	0.00	0.00	> 53 (270)	65.0	31.8	3.3	4572
MNS-99-15	0-15**	34.3	13.0	33.2	12.5	7.0	0.06	0.00	19	34.3	58.7	7.0	9271
MNS-99-16	0-15	66.3	3.0	17.2	7.5	5.9	0.03	0.00	> 53 (280)	66.3	27.7	6.0	6604
MNS-99-17	0-15	57.9	9.9	18.1	7.9	6.0	0.09	0.04	> 53 (180)	57.9	36.0	6.1	7620
MNS-99-18	0-15	18.6	13.5	34.2	22.0	11.6	0.16	0.00	10	18.6	69.7	11.7	14224
MNS-99-01	15-30	55.2	7.1	23.6	8.3	5.6	0.04	0.00	> 53 (140)	55.2	39.1	5.7	7366
MNS-99-02	15-28	90.5	2.0	3.8	2.4	1.3	0.01	0.00	> 53 (480)	90.5	8.2	1.3	1778

Table 10. Continued

Site Location	Depth (cm)	Detailed Analysis: Sand & Gravel >53	Coarse Silt 53-20	Medium Silt 20-5	Fine Silt 5-2	Coarse Clay 2-0.2	Medium Clay 0.2-0.08	Fine Clay <0.08	Median Diameter* (µm)	Simple Analysis: Sand & Gravel >53	Silt 53-2	Clay 2-0	Surface Area cm^2/cm^3
		Percentages within Size Range (µm)								Percentages within Size Range (µm)			
MNS-99-03	15-30	66.7	8.0	15.4	5.6	4.1	0.03	0.10	> 53 (290)	66.7	29.1	4.2	6350
MNS-99-04	15-30**	51.4	10.0	25.0	8.7	4.9	0.02	0.00	> 53 (80)	51.4	43.7	4.9	6350
MNS-99-04R	15-30	67.3	5.5	17.8	5.6	3.8	0.04	0.03	> 53 (290)	67.3	28.9	3.9	5334
MNS-99-07	15-30	87.6	3.3	5.8	1.9	1.4	0.01	0.00	> 53 (460)	87.6	11.1	1.4	1778
MNS-99-08	15-30	37.3	20.5	28.1	8.3	5.8	0.06	0.00	28	37.3	56.9	5.8	7874
MNS-99-09	15-30	69.9	6.6	15.6	4.8	3.0	0.03	0.03	> 53 (320)	69.9	27.0	3.1	4826
MNS-99-10	15-30	41.1	5.2	31.9	11.2	10.4	0.12	0.12	16	41.1	48.3	10.6	13462
MNS-99-11	15-30	96.6	0.7	1.2	0.9	0.6	0.00	0.01	> 53 (510)	96.6	2.8	0.6	762
MNS-99-12***	15-30**	83.0	0.9	7.4	4.6	4.0	0.03	0.00	> 53 (430)	83.0	13.0	4.0	3979
MNS-99-13	15-30	47.2	14.8	21.9	9.7	6.2	0.06	0.05	46	47.2	46.5	6.3	8636
MNS-99-13R	15-30	77.0	2.3	11.1	5.2	4.2	0.06	0.05	> 53 (380)	77.0	18.6	4.3	5334
MNS-99-14	15-30	30.2	18.7	31.6	11.2	8.2	0.07	0.00	19	30.2	61.5	8.2	9906
MNS-99-15	15-30	55.6	13.5	19.6	7.7	3.6	0.04	0.00	> 53 (150)	55.6	40.8	3.6	5588
MNS-99-16	15-30	85.5	1.8	6.6	3.4	2.7	0.03	0.00	> 53 (440)	85.5	11.8	2.7	3048
MNS-99-17	15-30**	41.0	10.6	29.0	12.3	6.9	0.06	0.03	23	41.0	52.0	7.0	9271
MNS-99-18	15-30	15.6	6.8	52.1	13.0	12.3	0.17	0.00	9	15.6	71.9	12.5	14986
MNS-99-03	30-45	47.2	12.6	25.0	9.0	6.2	0.00	0.00	43	47.2	46.6	6.2	7874
MNS-99-04	30-45	36.0	12.0	31.1	12.6	8.3	0.06	0.00	19	36.0	55.7	8.3	9906
MNS-99-04R	30-45	60.2	7.3	19.8	7.6	5.0	0.04	0.12	> 53 (210)	60.2	34.7	5.2	7620
MNS-99-13	30-45	80.8	1.9	12.1	2.9	2.2	0.06	0.02	> 53 (410)	80.8	16.9	2.3	3810
MNS-99-14	30-45	61.8	7.0	18.9	7.9	4.3	0.07	0.08	> 53 (230)	61.8	33.8	4.4	7366
MNS-99-15	30-45	63.1	9.8	16.6	6.8	3.7	0.00	0.00	> 53 (250)	63.1	33.2	3.7	5080
MNS-99-17	30-45	59.8	8.4	18.8	8.5	4.5	0.08	0.00	> 53 (210)	59.8	35.7	4.6	6096
MNS-99-03	45-60	41.0	9.4	28.3	12.8	8.4	0.06	0.00	21	41.0	50.5	8.4	10414
MNS-99-04	45-60	61.3	8.7	17.4	8.0	4.4	0.07	0.08	> 53 (230)	61.3	34.2	4.5	7366
MNS-99-04R	45-60	48.0	5.9	25.6	12.4	8.0	0.10	0.00	27	48.0	43.9	8.1	9652

Table 10. Continued

Site ID	Depth (cm)	Detailed Analysis: Sand & Gravel >53	Coarse Silt 53-20	Medium Silt 20-5	Fine Silt 5-2	Coarse Clay 2-0.2	Medium Clay 0.2-0.08	Fine Clay <0.08	Median Diameter* (μm)	Simple Analysis: Sand & Gravel >53	Silt 53-2	Clay 2-0	Surface Area cm^2/cm^3
		Percentages within Size Range (μm)								Percentages within Size Range (μm)			
MNS-99-15	45-60	30.5	10.9	35.0	14.7	8.8	0.14	0.00	14	30.5	60.6	8.9	11430
MNS-99-17	45-60**	42.7	7.8	25.6	13.2	10.5	0.14	0.06	21	42.7	46.6	10.7	12319
MNS-99-03	60-75	41.0	6.0	31.5	12.6	8.7	0.12	0.06	18	41.0	50.1	8.8	11430
MNS-99-04	60-75	55.9	7.7	24.5	7.6	4.2	0.09	0.00	> 53 (150)	55.9	39.8	4.3	6096
MNS-99-15	60-75	29.3	16.6	36.2	10.5	7.3	0.07	0.00	18	29.3	63.4	7.3	9144
MNS-99-03	75-90	33.7	5.2	34.4	16.7	9.9	0.07	0.00	14	33.7	56.4	10.0	11430
MNS-99-04	75-90	63.1	4.7	20.6	7.2	4.3	0.08	0.07	> 53 (250)	63.1	32.4	4.5	7112
MNS-99-15	75-90	20.4	21.5	37.9	14.5	5.6	0.08	0.08	15	20.4	73.9	5.7	10668
MNS-99-03	90-120	55.8	3.8	21.6	12.6	6.2	0.09	0.04	> 53 (150)	55.8	37.9	6.4	8890
MNS-99-04	90-120	66.7	3.6	16.7	7.9	5.0	0.10	0.13	> 53 (290)	66.7	28.1	5.2	8382
MNS-99-15	90-120	54.0	10.9	23.4	7.0	4.5	0.09	0.09	> 53 (120)	54.0	41.3	4.7	7874
MNS-99-03	120-140**	54.8	1.9	23.3	11.6	8.2	0.14	0.00	> 53 (130)	54.8	36.8	8.4	9779
MNS-99-04	120-150**	52.8	5.6	22.2	11.1	8.1	0.09	0.00	> 53 (100)	52.8	39.0	8.2	9271
MNS-99-15	120-150	39.8	9.9	30.8	12.8	6.5	0.12	0.06	20	39.8	53.5	6.7	10414
MNS-99-15	150-180	36.7	13.3	28.2	11.8	9.7	0.13	0.19	20	36.7	53.2	10.1	13462
MNS-99-15	180-210**	46.6	2.9	28.8	13.0	8.5	0.16	0.05	24	46.6	44.7	8.8	11938

* When the median diameter is >53 microns, an estimate in parentheses is provided by assuming the largest particle diameter is 1000 microns.
** Average of analytical duplicates.
*** Separate sample preparation was required to remove large material.

R = field replicate sample

Table 11. Sediment Quality Data for Surficial (0-5 cm) Sediments Collected from MNS-99-01 through MNS-99-06. Values in Bold Itallics Exceed the Corresponding Level I SQT Value

Site Location	Core Section (cm)	TOC (%)	Ammonia Nitrogen (mg/kg dry wt.)	Total Metals (mg/kg dry wt.)							
				Cadmium*	Chromium	Copper	Lead	Mercury	Nickel	Selenium	Zinc
MNS-99-01	0-5	4.8	68	***2.5***	***43***	***72***	***110***	***0.25***	***32***	0.15	***270***
MNS-99-02	0-5	4.8	71.4	***2.5***	***51***	***92***	***120***	***0.25***	***38***	0.05	***350***
MNS-99-03	0-5	4.8	70.4	***2.5***	42	***94***	***100***	0.14	***31***	0.05	***300***
MNS-99-04	0-5	3.6	32.7	***2.5***	28	***47***	***62***	0.07	21	0.05	***170***
MNS-99-05	0-5	5.4	62.9	***2.5***	***45***	***99***	***110***	0.16	***33***	0.05	***320***
MNS-99-06	0-5	0.71	7.77	***2.5***	19	22	10	0.016	19	0.05	85
Level I SQT				0.99	43	32	36	0.18	23		120
Level II SQT				5	110	150	130	1.1	49		460

TOC = total organic carbon
SQT = sediment quality target (Crane *et al*. 2000)

* Cadmium concentrations represent one-half the reporting level specified by the Minnesota Department of Health. The interpretation of these values, in reference to the corresponding Level I SQT value, should be made with caution.

Table 11. Continued

Site Location	Core Section (cm)	T. PCBs (µg/kg) (dry wt.)	AVS (µmole/g dry wt.)	SEM (mg/kg dry wt.)						Total SEM (µmole/g) (dry wt.)	Total SEM - AVS (µmole/g) (dry wt.)
				Cadmium	Copper	Lead	Mercury	Nickel	Zinc		
MNS-99-01	0-5	***187***	5.15	1.1	49	126	0.027	9.3	206	4.71	-0.44
MNS-99-02	0-5	***123***	1.72	0.81	42	109	0.019	7.2	176	4.02	2.3
MNS-99-03*	0-5	***186***	2.30	1.45	99	168	0.036	14	346	7.91	5.6
MNS-99-04	0-5	***63.4***	1.03	0.32	44	54	0.02	6.6	121	2.92	1.9
MNS-99-05	0-5	***183***	2.06	1.4	102	181	0.039	15	375	8.47	6.4
MNS-99-06	0-5	29.9	0.245	0.21	15	16	0.008	102	56	2.92	2.7
Level I SQT		60									
Level II SQT		680									

*average of analytical duplicates for AVS and SEM

AVS = acid volatile sulfide
SEM = simultaneously extractable metals
SQT = sediment quality target (Crane *et al*. 2000)

Table 12. Summary of Results of Sediment Samples Analyzed for PAH Compounds in Minnesota Slip. PAH Concentrations in Bold Italics Exceed the Level I SQTs, Whereas Shaded Values Exceed the Level II SQTs

Site Location	Core Section (cm)	PAH Compounds (mg/kg dry wt.)																	
		2Metnap	Acene	Aceny	Anth	Bena	Benap	Benb	Bene	Beng	Benk	Chry	Diben	Flut	Fluo	Indp	Naph	Phen	Pyrn
98-MNS-02	0-5	***0.29***	***0.47***	***0.035***	***1.3***	***5.4***	***6.1***	4.2	5.1	5.8	3.7	***7***	***1.5***	***14***	***0.65***	4.7	***0.26***	***6.5***	***9.6***
98-MNS-03	0-5	***0.125***	***0.4***	***0.035***	***0.98***	***4.3***	***4.5***	3.1	3.9	4.2	3.4	***5.4***	***1.2***	***9.8***	***0.53***	3.5	0.125	***5.2***	***8.6***
98-MNS-04	0-5	***0.125***	***0.3***	***0.035***	***0.79***	***2.4***	***2.5***	1.7	2.1	2.4	1.6	***2.8***	***0.7***	***6.4***	***0.37***	2	0.125	***3.7***	***4.3***
MNS-99-01	0-5	***0.125***	***0.45***	***0.035***	***0.94***	***3.2***	***3***	2.2	2.5	3.1	1.4	***3.8***	***0.73***	***6.3***	***0.5***	3	0.125	***4.2***	***6.6***
MNS-99-02*	0-5	***0.125***	***0.275***	***0.035***	***0.705***	***3.05***	***3***	2.4	2.6	3.5	1.6	***3.6***	***0.80***	***5.6***	***0.34***	3.4	0.125	***3.4***	***6***
MNS-99-03	0-5	***0.125***	***0.35***	***0.035***	***0.89***	***3.2***	***3.1***	2.4	2.6	3.5	1.5	***3.7***	***0.86***	***6.3***	***0.39***	3.7	0.125	***4***	***5.7***
MNS-99-04	0-5	***0.67***	***1.5***	***0.035***	***2.2***	***5.6***	***4.1***	2.9	3	3.6	1.4	***6.6***	***0.85***	***12***	***1.5***	4	***0.82***	***13***	***12***
MNS-99-05	0-5	***0.125***	***0.36***	***0.035***	***0.94***	***3.5***	***3.2***	2.6	2.7	3.1	1.2	***4***	***0.76***	***6.7***	***0.44***	3.4	0.125	***4.1***	***6.1***
MNS-99-06	0-5	***0.125***	***0.84***	***0.035***	***1.2***	***4.3***	***3.2***	2.5	2.8	3.5	1.8	***4.3***	***0.63***	***13***	***0.69***	3.5	0.125	***9***	***8.2***
98-MNS-02	0-15	***0.26***	***0.45***	***0.035***	***1.2***	***5.2***	***5.6***	3.7	4.8	5	4.3	***6.4***	***1.5***	***12***	***0.65***	4.2	0.125	***5.7***	***10***
MNS-99-01	0-15	***0.125***	***0.3***	***0.035***	***0.76***	***2.8***	***2.8***	2.1	2.2	2.3	1.4	***3.2***	***0.58***	***5.3***	***0.38***	2.1	0.125	***3.6***	***5.4***
MNS-99-02	0-15	***0.125***	***0.48***	***0.035***	***1.1***	***4.0***	***4.0***	3.2	3.2	3.8	1.6	***4.6***	***0.81***	***8.2***	***0.63***	3.6	***0.28***	***4.9***	***7.1***
MNS-99-03*	0-15	***0.125***	***0.51***	***0.035***	***1.15***	***4.15***	***4.0***	3.3	3.3	4.0	1.6	***4.5***	***0.96***	***8.6***	***0.64***	3.8	0.125	***6.3***	***8.7***
MNS-99-04*	0-15	***0.485***	***0.95***	***0.035***	***2.05***	***5.95***	***5.35***	4.2	4.2	5.1	1.8	***6.0***	***1.4***	***13***	***1.2***	5.2	***0.625***	***11.2***	***14***
MNS-99-04R	0-15	***0.125***	***0.6***	***0.035***	***1.5***	***5.3***	***4.8***	3.5	3.7	3.9	2.2	***5.7***	***1***	***11***	***0.71***	3.7	***0.26***	***8.1***	***9.5***
mean (04)	0-15	***0.305***	***0.775***	***0.035***	***1.78***	***5.62***	***5.08***	3.8	4.0	4.5	2.02	***5.82***	***1.22***	***12***	***0.93***	4.4	***0.442***	***9.6***	***11.8***
RPD (04)	0-15	118 %	45.2 %	0 %	31.0 %	11.6 %	10.8 %	18.2 %	12.6 %	26.7 %	17.3 %	4.3 %	36.7 %	16.7 %	47.3 %	33.7 %	82.5 %	32.1 %	38.3 %
MNS-99-07	0-15	***0.125***	***0.13***	***0.035***	***0.46***	***1.4***	***1.3***	0.94	1	1.3	0.66	***1.7***	***0.22***	***3.2***	***0.18***	1.3	0.125	***2.1***	***2.8***
MNS-99-08	0-15	***0.125***	***0.46***	***0.035***	***1***	***3.7***	***3.9***	3	3.1	3.7	1.8	***4.3***	***0.74***	***8.5***	***0.58***	3.6	0.125	***5.5***	***7***
MNS-99-09	0-15	***0.125***	***0.19***	***0.035***	***0.42***	***1.6***	***1.7***	1.3	1.6	1.6	0.67	***2.9***	***0.4***	***3.3***	***0.23***	1.5	0.125	***2.1***	***2.9***
MNS-99-10	0-15	***0.26***	***0.59***	***0.078***	***1.2***	***3.4***	***3.5***	2.5	2.6	3.2	1.4	***3.7***	***0.74***	***8.8***	***0.7***	3.1	0.26	***5.9***	***6.8***
MNS-99-11	0-15	***0.125***	***0.095***	***0.035***	***0.24***	***0.66***	***0.67***	0.48	0.49	0.59	0.29	***0.73***	***0.16***	***1.6***	***0.13***	0.58	0.125	***1.2***	***1.3***
MNS-99-12	0-15	***0.33***	***0.92***	***0.073***	***2.1***	***5.7***	***5.5***	4.1	4.3	4.4	2.5	***6.6***	***1.1***	***13***	***1.2***	4.1	***0.43***	***9.1***	***13***

Table 12. Continued

Site Location	Core Section (cm)	PAH Compounds (mg/kg dry wt.)																
		2Metnap	Acene	Aceny	Anth	Bena	Benap	Benb	Bene	Beng	Benk	Chry	Diben	Flut	Fluo	Indp	Naph	Phen	Pyrn
MNS-99-13	0-15	***0.125***	***0.7***	***0.11***	***2.1***	***5.9***	***5.3***	3.9	4.1	4.7	2.3	***6***	***1.1***	***11***	***0.91***	4.7	0.125	***6.8***	***8***
MNS-99-13R	0-15	***0.125***	***0.71***	***0.089***	***1.6***	***4.9***	***4.7***	3.6	3.8	4.7	1.9	***5.3***	***1.2***	***9.1***	***0.86***	4.6	0.125	***6.8***	***10***
mean (13)	0-15	***0.125***	***0.705***	***0.10***	***1.85***	***5.4***	***5***	3.8	4.0	4.7	2.1	***5.6***	***1.2***	***10.0***	***0.88***	4.6	0.125	***6.8***	***9***
RPD (13)	0-15	0 %	1.4 %	21.1 %	27.0 %	18.5 %	12 %	8 %	7.6 %	0 %	19.0 %	12.4 %	0.1 %	18.9 %	5.6 %	2.2 %	0 %	0 %	22.2 %
MNS-99-14	0-15	***0.125***	***0.41***	***0.035***	***1.0***	***3.7***	***3.5***	2.7	2.9	3.6	1.7	***3.8***	***0.91***	***6.8***	***0.5***	3.5	0.125	***4.9***	***7.5***
MNS-99-15*	0-15	***0.192***	***0.44***	***0.035***	***1.0***	***4.2***	***4.0***	3.4	3.4	3.2	1.8	***5.0***	***0.84***	***9.3***	***0.56***	3.1	0.125	***5.6***	***7.8***
MNS-99-16	0-15	***0.39***	***0.53***	***0.13***	***1.1***	***3***	***2.9***	2.1	2.2	2.2	1.2	***3.5***	***0.62***	***6.4***	***0.77***	2.1	***0.28***	***4.8***	***5.9***
MNS-99-17*	0-15	***0.125***	***0.52***	***0.035***	***1.2***	***3.6***	***3.6***	2.7	2.9	3.6	1.7	***3.8***	***0.92***	***9.2***	***0.63***	3.6	0.125	***5.6***	***9.8***
MNS-99-18	0-15	***0.125***	***0.37***	***0.07***	***0.95***	***3.5***	***3.9***	3.1	3.2	3.7	1.6	***4.1***	***1***	***7.7***	***0.47***	3.9	0.125	***4.7***	***7.3***
98-MNS-02	15-30	***0.31***	***0.41***	***0.035***	***0.99***	***3.8***	***3.9***	2.8	3.3	3.3	2.6	***4.5***	***0.98***	***8.7***	***0.58***	2.8	0.125	***4.9***	***7.5***
98-MNS-03	15-30	***0.42***	***0.59***	***0.035***	***1.5***	***5.1***	***5.1***	3.6	4.2	4.9	2.8	***6.1***	***1.3***	***11***	***0.79***	4	***0.4***	***6.6***	***9.1***
MNS-99-01	15-30	***0.27***	***0.54***	***0.076***	***1.3***	***4.2***	***4.1***	3	3.1	3.2	1.8	***5.1***	***0.82***	***9.2***	***0.7***	2.9	***0.38***	***5.6***	***8.8***
MNS-99-02	15-28	***0.125***	***0.64***	***0.035***	***1.4***	***2.9***	***2.8***	1.9	2	2.2	1.2	***3***	***0.48***	***6.7***	***0.82***	2.2	***0.39***	***5.6***	***4.9***
MNS-99-03	15-30	***0.125***	***0.64***	***0.035***	***1.4***	***4.3***	***4.1***	3.1	3.3	4.1	1.9	***4.7***	***1***	***8.9***	***0.76***	4	0.125	***6.6***	***8.8***
MNS-99-04	15-30	***0.125***	***0.39***	***0.035***	***0.98***	***3.2***	***3.2***	2.5	2.5	3.3	1.5	***3.7***	***0.86***	***7.2***	***0.5***	3.3	0.125	***4.7***	***8***
MNS-99-04R	15-30	***0.29***	***0.42***	***0.035***	***1***	***3.4***	***3.2***	2.4	2.5	2.7	1.4	***3.9***	***0.69***	***7.2***	***0.54***	2.6	0.125	***5.4***	***6.9***
mean (04)	15-30	***0.208***	***0.40***	***0.035***	***0.99***	***3.3***	***3.2***	2.4	2.5	3	1.4	***3.8***	***0.78***	***7.2***	***0.52***	3.0	0.125	***5.0***	***7.45***
RPD (04)	15-30	79.5%	7.4 %	0 %	2.0 %	6.1 %	0 %	4.1 %	0 %	20 %	6.9 %	5.3 %	21.9 %	0 %	7.7 %	23.7 %	0 %	13.9 %	14.8 %
MNS-99-07	15-30	***0.125***	***0.94***	***0.035***	***1.7***	***5.2***	***4.5***	3.4	3.6	4.8	2.1	***5.4***	***0.89***	***13***	***0.86***	4.8	***0.26***	***9.8***	***11***
MNS-99-08*	15-30	***0.525***	***1.02***	***0.035***	***2***	***5.6***	***5.0***	3.7	3.9	5.0	1.8	***5.6***	***0.98***	***12.5***	***1.2***	5	***0.525***	***10.4***	***11.5***
MNS-99-09	15-30	***0.125***	***0.31***	***0.035***	***0.62***	***1.8***	***1.9***	1.3	1.4	1.6	0.81	***1.9***	***0.39***	***4***	***0.39***	1.6	0.125	***3.2***	***3.4***
MNS-99-10	15-30	***0.34***	***0.6***	***0.2***	***1.4***	***4.7***	***4.6***	3.3	3.6	4.3	2.2	***5.1***	***1***	***12***	***0.77***	4.1	***0.32***	***6.1***	***10***
MNS-99-11*	15-30	***0.125***	***0.096***	***0.035***	***0.27***	***0.74***	***0.69***	0.49	0.51	0.49	0.34	***0.82***	***0.12***	***1.8***	***0.12***	0.44	0.125	***1.2***	***1.8***
MNS-99-12	15-30	***0.125***	***1.1***	***0.035***	***2.1***	***5***	***4.2***	3.2	3.2	3.5	1.5	***4.9***	***0.76***	***10***	***1.2***	3.5	***0.35***	***6.8***	***7.4***
MNS-99-13	15-30	***0.37***	***0.89***	***0.11***	***1.9***	***6.3***	***5.7***	4.4	4.4	4.9	2.1	***6.4***	***1.1***	***11***	***1.1***	5.1	***0.43***	***6.4***	***8.3***
MNS-99-13R	15-30	***1.2***	***4.9***	***0.091***	***6.4***	***12***	***10***	7.4	7	6.9	4.9	***12***	***1.9***	***30***	***5***	7.1	***2.7***	***39***	***31***
mean (13)	15-30	***0.785***	***2.9***	***0.10***	***4.2***	***9.2***	***7.8***	5.9	5.7	5.9	3.5	***9.2***	***1.5***	***20.5***	***3.0***	6.1	***1.56***	***22.7***	***19.6***
RPD (13)	15-30	105 %	138 %	18.9 %	108 %	62.3 %	54.8 %	50.8 %	45.6 %	33.9 %	80 %	60.9 %	53.3 %	92.7 %	128 %	32.8 %	145 %	144 %	116 %
MNS-99-14	15-30	***0.26***	***0.56***	***0.11***	***1.6***	***5.5***	***5.2***	4.1	4.3	5.1	2.1	***5.7***	***1.3***	***11***	***0.77***	5	0.125	***6.9***	***11***

Table 12. Continued

Site Location	Core Section (cm)	PAH Compounds (mg/kg dry wt.)																	
		2Metnap	Acene	Aceny	Anth	Bena	Benap	Benb	Bene	Beng	Benk	Chry	Diben	Flut	Fluo	Indp	Naph	Phen	Pyrn
MNS-99-15	15-30	***0.26***	***0.6***	***0.035***	***1.3***	***4.1***	***3.8***	2.8	2.9	2.7	1.6	***4.5***	***0.74***	***8.2***	***0.72***	2.7	***0.25***	***6.5***	***7.8***
MNS-99-16	15-30	***0.33***	***0.57***	***0.035***	***1.3***	***3.5***	***3.2***	2	2.3	2.2	1.4	***3.5***	***0.6***	***7.1***	***0.76***	2.1	***0.29***	***5.6***	***6.5***
MNS-99-17	15-30	***0.3***	***0.58***	***0.035***	***1.3***	***4.5***	***4.3***	3.2	3.3	4.3	2.1	***4.8***	***1.1***	***11***	***0.7***	4.5	***0.29***	***7.6***	***12***
MNS-99-18	15-30	***0.125***	***0.39***	***0.075***	***0.93***	***3.5***	***3.9***	3	3.2	3.7	1.5	***4.1***	***0.98***	***7.3***	***0.5***	3.7	0.125	***4.6***	***7.5***
98-MNS-02	30-45	***1.6***	***3.5***	***0.072***	***5.4***	***12***	***9.7***	6.2	7.3	7.1	5	***12***	***2.3***	***27***	***4.3***	6.1	***1.8***	***25***	***22***
98-MNS-03	30-45	***0.44***	***0.72***	***0.035***	***1.7***	***5.1***	***5.1***	3.7	4.2	4.9	2.5	***5.9***	***1.4***	***12***	***0.92***	3.9	***0.38***	***7***	***8.9***
MNS-99-03	30-45	***0.37***	***0.81***	***0.035***	***1.6***	***5.1***	***4.6***	3.6	3.7	4.1	1.8	***5.3***	***1.2***	***9.9***	***0.88***	4.4	***0.37***	***8.3***	***11***
MNS-99-04	30-45	***0.32***	***0.7***	***0.089***	***2***	***6.3***	***5.7***	4.4	4.5	4.5	2.2	***7.2***	***1.3***	***14***	***0.93***	4.2	***0.3***	***8.7***	***12***
MNS-99-04R	30-45	***0.125***	***0.46***	***0.035***	***1***	***3.7***	***3.6***	2.8	2.9	2.9	1.4	***4.2***	***0.74***	***7.7***	***0.57***	2.8	0.125	***5.1***	***7.5***
mean (04)	30-45	***0.223***	***0.58***	***0.062***	***1.5***	***5***	***4.6***	3.6	3.7	3.7	1.8	***5.7***	***1.0***	***10.8***	***0.75***	3.5	***0.212***	***6.9***	***9.8***
RPD (04)	30-45	87.6 %	41.4 %	87.1 %	66.7 %	52 %	45.2 %	44.4 %	43.2 %	43.2 %	44.4 %	52.6 %	54.9 %	58.1%	48.0 %	40.0 %	82.4 %	52.2 %	46.2 %
MNS-99-08	30-45	***0.4***	***0.87***	***0.11***	***1.8***	***6.1***	***5.8***	4.3	4.6	5.3	2.1	***6.4***	***1***	***12***	***1***	5.2	***0.38***	***7.4***	***9.2***
MNS-99-09	30-45	***0.125***	***0.65***	***0.035***	***1.3***	***2.9***	***2.8***	2	2.1	2.5	1.3	***3.2***	***0.65***	***7.9***	***0.92***	2.5	***0.3***	***6.9***	***5.4***
MNS-99-13	30-45	***0.34***	***0.68***	***0.15***	***1.8***	***4***	***3.6***	2.5	2.6	2.8	1.6	***4***	***0.76***	***12***	***1.4***	2.8	***0.36***	***9.9***	***8.6***
MNS-99-14	30-45	***6***	***19***	***0.17***	***32***	***45***	***40***	27	27	34	15	***40***	***8.3***	***100***	***19***	33	***15***	***130***	***110***
MNS-99-15	30-45	***0.28***	***0.74***	***0.035***	***1.8***	***5.4***	***4.6***	3.6	3.5	3.1	1.5	***5.6***	***1***	***12***	***0.95***	3.1	***0.3***	***8.6***	***10***
MNS-99-17	30-45	***0.32***	***0.62***	***0.079***	***1.5***	***4.6***	***4.5***	3.3	3.5	4.3	2.1	***5***	***1.1***	***11***	***0.76***	4.5	***0.29***	***7***	***13***
MNS-99-03	45-60	***0.46***	***1.1***	***0.15***	***2.4***	***7.7***	***7.5***	6.2	6.3	7.8	3.4	***9***	***2***	***16***	***1.3***	8.1	***0.46***	***12***	***18***
MNS-99-04	45-60	***3.1***	***9.6***	***0.16***	***19***	***29***	***24***	16	16	15	11	***30***	***4.6***	***62***	***12***	16	***4.7***	***80***	***59***
MNS-99-04R	45-60	***4.5***	***14***	***0.28***	***26***	***38***	***33***	24	21	20	14	***38***	***6.2***	***85***	***18***	21	***9***	***100***	***80***
mean (04)	45-60	***3.8***	***11.8***	***0.22***	***22.5***	***33.5***	***28.5***	20	18.5	17.5	12.5	***34***	***5.4***	***73.5***	***15***	18.5	***6.8***	***90***	***69.5***
RPD (04)	45-60	36.8 %	37.3 %	54.5 %	31.1 %	26.9 %	31.6 %	40.0 %	27.0 %	28.6 %	24.0 %	23.5%	29.6 %	31.3 %	40.0 %	27.0 %	62.8 %	22.2 %	30.2 %
MNS-99-13*	45-60	***0.228***	***0.96***	***0.056***	***2***	***4.5***	***4.2***	2.8	2.8	3.2	1.6	***4.4***	***0.78***	***13.5***	***1.3***	3.2	***0.382***	***12.5***	***10.3***
MNS-99-14	45-60	***0.125***	***0.46***	***0.035***	***1***	***3***	***2.8***	1.9	2.2	2.6	1.3	***2.9***	***0.7***	***6.5***	***0.6***	2.6	***0.27***	***5.2***	***6.6***
MNS-99-15	45-60	***0.59***	***1.1***	***0.25***	***2.9***	***9.1***	***8.6***	6.6	7	5.7	2.8	***11***	***2***	***20***	***1.5***	5.7	***0.62***	***14***	***18***
MNS-99-17	45-60	***0.34***	***0.96***	***0.16***	***2.7***	***7.5***	***7.6***	6.4	6.5	8	3.6	***9.1***	***2***	***17***	***1.2***	8	***0.29***	***12***	***19***

Table 12. Continued

Site Location	Core Section (cm)	PAH Compounds (mg/kg dry wt.)																
		2Metnap	Acene	Aceny	Anth	Bena	Benap	Benb	Bene	Beng	Benk	Chry	Diben	Flut	Fluo	Indp	Naph	Phen	Pyrn
MNS-99-03	60-75	***0.42***	***0.93***	***0.15***	***2.3***	***6.4***	***6.3***	5	5.1	5.4	2.1	***7.2***	***1.7***	***14***	***1.2***	5.5	***0.46***	***10***	***16***
MNS-99-04	60-75	***15***	***37***	***0.38***	***57***	***78***	***51***	32	31	26	26	***78***	***9***	***200***	***39***	27	***25***	***280***	***190***
MNS-99-15	60-75	***0.58***	***1.4***	***0.36***	***3.7***	***12***	***11***	8	8.6	6.6	3	***13***	***2.3***	***27***	***2***	6.5	***0.54***	***18***	***23***
MNS-99-17	60-75	***0.86***	***2.2***	***0.28***	***4.7***	***10***	***11***	8.7	8.6	10	4.7	***12***	***2.6***	***26***	***2.7***	11	***1.1***	***21***	***26***
MNS-99-03	75-90	***0.47***	***0.66***	***0.13***	***1.5***	***4.6***	***4.4***	3.2	3.6	3.5	1.8	***4.9***	***1***	***9.5***	***0.84***	3.5	***0.45***	***6.3***	***10***
MNS-99-04	75-90	***8.8***	***32***	***0.34***	***75***	***91***	***62***	40	40	34	30	***84***	***11***	***240***	***41***	37	***13***	***300***	***230***
MNS-99-15	75-90	***0.77***	***0.98***	***0.26***	***2.5***	***7.6***	***7.3***	5.4	5.6	4.1	1.9	***9***	***1.4***	***17***	***1.4***	4.1	***0.65***	***10***	***15***
MNS-99-17	75-90	***0.89***	***2.3***	***0.17***	***5.2***	***12***	***11***	7.6	7.9	9.7	5.2	***12***	***2.4***	***27***	***2.9***	9.6	***1.3***	***26***	***29***
MNS-99-03	90-120	***0.51***	***0.88***	***0.13***	***2.1***	***5.9***	***5.3***	4	4.1	3.9	1.6	***5.9***	***1.2***	***11***	***1.1***	4.2	***0.61***	***9.8***	***13***
MNS-99-04*	90-120	***10***	***19***	***0.42***	***28.5***	***53.5***	***47***	31.5	32.5	28.5	20.5	***53.5***	***8.2***	***140***	***23.5***	29.5	***17***	***170***	***120***
MNS-99-15	90-120	***0.96***	***2***	***0.23***	***5.6***	***10***	***9.1***	6.8	6.7	4.3	1.1	***11***	***1.7***	***23***	***2.9***	4.5	***0.84***	***23***	***21***
MNS-99-17	90-120	***0.89***	***1.7***	***0.2***	***3.7***	***8.8***	***8.3***	5.7	6.6	6.9	4.2	***9.7***	***2.2***	***18***	***2.1***	7.1	***1***	***17***	***21***
MNS-99-03	120-140	***1.6***	***3.2***	***0.13***	***6.3***	***10***	***8.5***	6	6.2	5	3.9	***10***	***1.7***	***19***	***4.2***	5.5	***2.2***	***24***	***23***
MNS-99-04	120-150	***2.6***	***6.8***	***0.14***	***13***	***24***	***20***	14	24	12	9.4	***25***	***6.7***	***46***	***8.9***	12	***3.3***	***56***	***44***
MNS-99-15	120-150	***0.95***	***1.5***	***0.2***	***3.7***	***9.4***	***8.7***	6.9	6.8	4.9	0.68	***11***	***1.6***	***19***	***2.1***	4.9	***0.9***	***16***	***19***
MNS-99-15	150-180	***2.3***	***6.2***	***2.2***	***23***	***38***	***31***	20	21	19	15	***36***	***1.7***	***72***	***13***	19	***1.4***	***77***	***64***
MNS-99-15	180-210	***1.4***	***2.9***	***0.14***	***6.1***	***17***	***15***	11	12	11	6.6	***18***	***2.9***	***32***	***3.3***	11	***1.8***	***29***	***38***
Level I SQT		0.02	0.0067	0.0059	0.057	0.11	0.15					0.17	0.033	0.42	0.077		0.18	0.2	0.2
Level II SQT		0.2	0.089	0.13	0.85	1.1	1.5					1.3	0.14	2.2	0.54		0.56	1.2	1.5

* average of analytical duplicates

R = field replicate sample
RPD = relative percent difference
SQT = sediment quality target (Crane *et al*. 2000)

Table 12. Continued

PAH Codes:

2Metnap = 2-Methylnaphthalene	Bena = Benz[a]anthracene	Beng = Benzo[g,h,I]perylene	Flut = Fluoranthene	Phen = Phenanthrene
Acene = Acenapthene	Benap = Benzo[a]pyrene	Benk = Benzo[k]fluoranthene	Fluo = Fluorene	Pyrn = Pyrene
Aceny = Acenapthylene	Benb = Benzo[b&j]fluoranthene	Chry = Chrysene	Indp = Indeno[1,2,3-cd]pyrene	
Anth = Anthracene	Bene = Benzo[e]pyrene	Diben = Dibenzo[a,h]anthracene	Naph = Naphthalene	

Table 13. Percentage Composition of PAH Compounds Comprising the LMW and HMW PAHs in Minnesota Slip

Site Location	Core Section (cm)	Percentage of LMW PAHs (%)							Percentage of HMW PAHs (%)					
		2Metnap	Acene	Acene	Anth	Fluo	Naph	Phen	Bena	Benap	Chry	Diben	Flut	Pyrn
98-MNS-02	0-5	3.1	4.9	0.37	13.7	6.8	2.7	68.4	12.4	14.0	16.1	3.4	32.1	22.0
98-MNS-03	0-5	1.7	5.4	0.47	13.3	7.2	1.7	70.3	12.7	13.3	16.0	3.6	29.0	25.4
98-MNS-04	0-5	2.3	5.5	0.64	14.5	6.8	2.3	68.0	12.6	13.1	14.7	3.7	33.5	22.5
MNS-99-01	0-5	2.0	7.1	0.55	14.7	7.8	2.0	65.9	13.5	12.7	16.1	3.1	26.7	27.9
MNS-99-02*	0-5	2.5	5.6	0.71	14.2	6.8	2.5	67.7	13.9	13.6	16.4	3.7	25.2	27.3
MNS-99-03	0-5	2.1	5.9	0.59	15.0	6.6	2.1	67.6	14.0	13.6	16.2	3.8	27.6	24.9
MNS-99-04	0-5	3.4	7.6	0.18	11.2	7.6	4.2	65.9	13.6	10.0	16.0	2.1	29.2	29.2
MNS-99-05	0-5	2.0	5.9	0.57	15.3	7.2	2.0	66.9	14.4	13.2	16.5	3.1	27.6	25.1
MNS-99-06	0-5	1.0	7.0	0.29	10.0	5.7	1.0	74.9	12.8	9.5	12.8	1.9	38.7	24.4
98-MNS-02	0-15	3.1	5.3	0.42	14.3	7.7	1.5	67.7	12.8	13.8	15.7	3.7	29.5	24.6
MNS-99-01	0-15	2.3	5.6	0.66	14.3	7.1	2.3	67.6	13.9	13.9	15.9	2.9	26.4	26.9
MNS-99-02	0-15	1.7	6.4	0.46	14.6	8.3	3.7	64.9	13.9	13.9	16.0	2.8	28.6	24.7
MNS-99-03*	0-15	1.4	5.7	0.39	13.0	7.2	1.4	70.9	13.4	13.0	14.6	3.1	27.7	28.2
MNS-99-04 (mean)	0-15	2.2	5.6	0.25	12.8	6.7	3.2	69.4	13.6	12.2	14.0	3.0	28.9	28.3
MNS-99-07	0-15	4.0	4.1	1.11	14.6	5.7	4.0	66.6	13.2	12.2	16.0	2.1	30.1	26.4
MNS-99-08	0-15	1.6	5.9	0.45	12.8	7.4	1.6	70.3	13.1	13.9	15.3	2.6	30.2	24.9
MNS-99-09	0-15	3.9	5.9	1.09	13.0	7.1	3.9	65.1	12.5	13.3	22.7	3.1	25.8	22.7
MNS-99-10	0-15	2.9	6.6	0.87	13.4	7.8	2.9	65.6	12.6	13.0	13.7	2.7	32.7	25.2
MNS-99-11	0-15	6.4	4.9	1.79	12.3	6.7	6.4	61.5	12.9	13.1	14.3	3.1	31.3	25.4
MNS-99-12	0-15	2.3	6.5	0.52	14.8	8.5	3.0	64.3	12.7	12.2	14.7	2.4	29.0	29.0
MNS-99-13 (mean)	0-15	1.2	6.7	0.94	17.5	8.4	1.2	64.2	14.9	13.8	15.6	3.2	27.7	24.8
MNS-99-14	0-15	1.8	5.8	0.49	14.1	7.0	1.8	69.1	14.1	13.4	14.5	3.5	25.9	28.6
MNS-99-15*	0-15	2.4	5.6	0.44	13.1	7.0	1.6	69.9	13.6	12.8	16.2	2.7	29.8	25.0
MNS-99-16	0-15	4.9	6.6	1.63	13.8	9.6	3.5	60.0	13.4	13.0	15.7	2.8	28.7	26.4
MNS-99-17*	0-15	1.5	6.3	0.43	14.0	7.7	1.5	68.6	11.7	11.7	12.4	2.9	29.6	31.7
MNS-99-18	0-15	1.8	5.4	1.03	14.0	6.9	1.8	69.0	12.7	14.2	14.9	3.6	28.0	26.5
98-MNS-02	15-30	4.2	5.6	0.48	13.5	7.9	1.7	66.7	12.9	13.3	15.3	3.3	29.6	25.5
98-MNS-03	15-30	4.1	5.7	0.34	14.5	7.6	3.9	63.9	13.5	13.5	16.2	3.4	29.2	24.1
MNS-99-01	15-30	3.0	6.1	0.86	14.7	7.9	4.3	63.2	13.0	12.7	15.8	2.5	28.6	27.3
MNS-99-02	15-28	1.4	7.1	0.39	15.5	9.1	4.3	62.2	14.0	13.5	14.4	2.3	32.2	23.6
MNS-99-03	15-30	1.3	6.6	0.36	14.5	7.8	1.3	68.1	13.5	12.9	14.8	3.1	28.0	27.7

Table 13. Continued

Site Location	Core Section (cm)	Percentage of LMW PAHs (%)							Percentage of HMW PAHs (%)					
		2Metnap	Acene	Acene	Anth	Fluo	Naph	Phen	Bena	Benap	Chry	Diben	Flut	Pyrn
MNS-99-04 (mean)	15-30	2.8	5.5	0.48	13.5	7.1	1.7	68.9	12.8	12.4	14.8	3.0	28.0	29.0
MNS-99-07	15-30	0.9	6.9	0.26	12.4	6.3	1.9	71.4	13.0	11.3	13.5	2.2	32.5	27.5
MNS-99-08*	15-30	3.3	6.5	0.22	12.8	7.5	3.3	66.4	13.6	12.0	13.6	2.4	30.4	28.0
MNS-99-09	15-30	2.6	6.5	0.73	12.9	8.1	2.6	66.6	13.4	14.2	14.2	2.9	29.9	25.4
MNS-99-10	15-30	3.5	6.2	2.06	14.4	7.9	3.3	62.7	12.6	12.3	13.6	2.7	32.1	26.7
MNS-99-11*	15-30	6.5	5.0	1.82	14.0	6.5	6.5	59.7	12.6	11.6	13.8	2.1	30.4	29.5
MNS-99-12	15-30	1.1	9.4	0.30	17.9	10.2	3.0	58.1	15.5	13.0	15.2	2.4	31.0	22.9
MNS-99-13	15-30	3.3	7.9	0.98	17.0	9.8	3.8	57.1	16.2	14.7	16.5	2.8	28.4	21.4
MNS-99-13R	15-30	2.0	8.3	0.15	10.8	8.4	4.6	65.8	12.4	10.3	12.4	2.0	31.0	32.0
MNS-99-14	15-30	2.5	5.4	1.07	15.5	7.5	1.2	66.8	13.9	13.1	14.4	3.3	27.7	27.7
MNS-99-15	15-30	2.7	6.2	0.36	13.5	7.4	2.6	67.3	14.1	13.0	15.4	2.5	28.1	26.8
MNS-99-16	15-30	3.7	6.4	0.39	14.6	8.6	3.3	63.0	14.3	13.1	14.3	2.5	29.1	26.6
MNS-99-17	15-30	2.8	5.4	0.32	12.0	6.5	2.7	70.3	11.9	11.4	12.7	2.9	29.2	31.8
MNS-99-18	15-30	1.9	5.8	1.11	13.8	7.4	1.9	68.2	12.8	14.3	15.0	3.6	26.8	27.5
98-MNS-02	30-45	3.8	8.4	0.17	13.0	10.3	4.3	60.0	14.1	11.4	14.1	2.7	31.8	25.9
98-MNS-03	30-45	3.9	6.4	0.31	15.2	8.2	3.4	62.5	13.3	13.3	15.4	3.6	31.3	23.2
MNS-99-03	30-45	3.0	6.6	0.28	12.9	7.1	3.0	67.1	13.7	12.4	14.3	3.2	26.7	29.6
MNS-99-04	30-45	2.5	5.4	0.68	15.3	7.1	2.3	66.7	13.5	12.3	15.5	2.8	30.1	25.8
MNS-99-04R	30-45	1.7	6.2	0.47	13.5	7.7	1.7	68.8	13.5	13.1	15.3	2.7	28.1	27.3
MNS-99-08	30-45	3.3	7.3	0.92	15.1	8.4	3.2	61.9	15.1	14.3	15.8	2.5	29.6	22.7
MNS-99-09	30-45	1.2	6.4	0.34	12.7	9.0	2.9	67.4	12.7	12.3	14.0	2.8	34.6	23.6
MNS-99-13	30-45	2.3	4.6	1.03	12.3	9.6	2.5	67.7	12.1	10.9	12.1	2.3	36.4	26.1
MNS-99-14	30-45	2.7	8.6	0.08	14.5	8.6	6.8	58.8	13.1	11.7	11.7	2.4	29.1	32.0
MNS-99-15	30-45	2.2	5.8	0.28	14.2	7.5	2.4	67.7	14.0	11.9	14.5	2.6	31.1	25.9
MNS-99-17	30-45	3.0	5.9	0.75	14.2	7.2	2.7	66.2	11.7	11.5	12.8	2.8	28.1	33.2
MNS-99-03	45-60	2.6	6.2	0.84	13.4	7.3	2.6	67.2	12.8	12.5	15.0	3.3	26.6	29.9
MNS-99-04 (mean)	45-60	2.5	7.9	0.15	15.0	10.0	4.6	59.9	13.7	11.7	13.9	2.2	30.1	28.4
MNS-99-13*	45-60	1.3	5.5	0.32	11.5	7.5	2.2	71.7	12.0	11.0	11.7	2.1	35.9	27.4
MNS-99-14	45-60	1.6	6.0	0.46	13.0	7.8	3.5	67.6	13.3	12.4	12.9	3.1	28.9	29.3
MNS-99-15	45-60	2.8	5.2	1.19	13.8	7.2	3.0	66.8	13.2	12.5	16.0	2.9	29.1	26.2
MNS-99-17	45-60	1.9	5.4	0.91	15.3	6.8	1.6	68.0	12.1	12.2	14.6	3.2	27.3	30.5

Table 13. Continued

Site Location	Core Section (cm)	Percentage of LMW PAHs (%)							Percentage of HMW PAHs (%)					
		2Metnap	Acene	Acene	Anth	Fluo	Naph	Phen	Bena	Benap	Chry	Diben	Flut	Pyrn
MNS-99-03	60-75	2.7	6.0	0.97	14.9	7.8	3.0	64.7	12.4	12.2	14.0	3.3	27.1	31.0
MNS-99-04	60-75	3.3	8.2	0.08	12.6	8.6	5.5	61.8	12.9	8.4	12.9	1.5	33.0	31.4
MNS-99-15	60-75	2.2	5.3	1.35	13.9	7.5	2.0	67.7	13.6	12.5	14.7	2.6	30.6	26.0
MNS-99-17	60-75	2.6	6.7	0.85	14.3	8.2	3.3	63.9	11.4	12.6	13.7	3.0	29.7	29.7
MNS-99-03	75-90	4.5	6.4	1.26	14.5	8.1	4.3	60.9	13.4	12.8	14.2	2.9	27.6	29.1
MNS-99-04	75-90	1.9	6.8	0.07	16.0	8.7	2.8	63.8	12.7	8.6	11.7	1.5	33.4	32.0
MNS-99-15	75-90	4.6	5.9	1.57	15.1	8.5	3.9	60.4	13.3	12.7	15.7	2.4	29.7	26.2
MNS-99-17	75-90	2.3	5.9	0.44	13.4	7.5	3.4	67.1	12.8	11.8	12.8	2.6	28.9	31.0
MNS-99-03	90-120	3.4	5.8	0.86	13.9	7.3	4.0	64.8	13.9	12.5	13.9	2.8	26.0	30.7
MNS-99-04*	90-120	3.7	7.1	0.16	10.6	8.8	6.3	63.3	12.7	11.1	12.7	2.0	33.2	28.4
MNS-99-15	90-120	2.7	5.6	0.65	15.8	8.2	2.4	64.7	13.2	12.0	14.5	2.2	30.3	27.7
MNS-99-17	90-120	3.3	6.4	0.75	13.9	7.9	3.8	63.9	12.9	12.2	14.3	3.2	26.5	30.9
MNS-99-03	120-140	3.8	7.7	0.31	15.1	10.1	5.3	57.7	13.9	11.8	13.9	2.4	26.3	31.9
MNS-99-04	120-150	2.9	7.5	0.15	14.3	9.8	3.6	61.7	14.5	12.1	15.1	4.0	27.8	26.6
MNS-99-15	120-150	3.7	5.9	0.79	14.6	8.3	3.6	63.1	13.7	12.7	16.0	2.3	27.7	27.7
MNS-99-15	150-180	1.8	5.0	1.76	18.4	10.4	1.1	61.6	15.7	12.8	14.8	0.7	29.7	26.4
MNS-99-15	180-210	3.1	6.5	0.31	13.7	7.4	4.0	65.0	13.8	12.2	14.6	2.4	26.0	30.9
Mean		2.7	6.2	0.65	14.0	7.8	3.0	65.6	13.3	12.5	14.7	2.8	29.5	27.3
SD		1.1	1.0	0.45	1.5	1.0	1.3	3.6	0.9	1.2	1.5	0.6	2.5	2.7
CV		40.5	15.4	68.9	10.5	13.3	43.2	5.4	6.6	9.5	10.5	21.0	8.6	10.1
Range: Low		0.9	4.1	0.07	10.0	5.7	1.0	57.1	11.4	8.4	11.7	0.7	25.2	21.4
Range: High		6.5	9.4	2.06	18.4	10.4	6.8	74.9	16.2	14.7	22.7	4.0	38.7	33.2

Note: for replicate samples in which the RPD >50 % for total PAHs (13), the sample and replicate were treated as separate samples.

* average of analytical duplicates
LMW = low molecular weight PAHs
HMW = high molecular weight PAHs
R = field replicate sample
SD = standard deviation
CV = coefficient of variation

Table 13. Continued

PAH codes:

2Metnap = 2-Methylnaphthalene
Acene = Acenapthene
Aceny = Acenapthylene
Anth = Anthracene
Bena = Benz[a]anthracene
Benap = Benzo[a]pyrene
Chry = Chrysene
Diben = Dibenzo[a,h]anthracene
Flut = Fluoranthene
Fluo = Fluorene
Naph = Naphthalene
Phen = Phenanthrene
Pyrn = Pyrene

Table 14. Summary of LMW, HMW, and Total PAHs (Based on a Subset of 13 PAH Compounds) for Sediment Samples Collected from Minnesota Slip. Total PAH Concentrations in Bold Italics Exceed the Level I SQT, Whereas Shaded Values Exceed the Level II SQT

Site Location	Core Section (cm)	Total LMW PAHs (mg/kg dry wt.)	Total HMW PAHs (mg/kg dry wt.)	Total PAHs (13) (mg/kg dry wt.)
98-MNS-02	0-5	9.51	43.6	***53.1***
98-MNS-03	0-5	7.40	33.8	***41.2***
98-MNS-04	0-5	5.45	19.1	***24.5***
MNS-99-01	0-5	6.38	23.6	***30.0***
MNS-99-02*	0-5	4.95	22.0	***27.0***
MNS-99-03	0-5	5.92	22.9	***28.8***
MNS-99-04	0-5	19.7	41.2	***60.9***
MNS-99-05	0-5	6.13	24.3	***30.4***
MNS-99-06	0-5	12.0	33.6	***45.6***
98-MNS-02	0-15	8.42	40.7	***49.1***
MNS-99-01	0-15	5.33	20.1	***25.4***
MNS-99-02	0-15	7.55	28.7	***36.3***
MNS-99-03*	0-15	8.88	30.9	***39.7***
MNS-99-04*	0-15	16.5	45.7	***62.2***
MNS-99-04R	0-15	11.3	37.3	***48.6***
mean (04 & 04R)	0-15	13.9	41.5	***55.4***
RPD (04 & 04R)	0-15	37.1 %	20.2 %	24.5 %
MNS-99-07	0-15	3.16	10.6	***13.8***
MNS-99-08	0-15	7.83	28.1	***36.0***
MNS-99-09	0-15	3.23	12.8	***16.0***
MNS-99-10	0-15	8.99	26.9	***35.9***
MNS-99-11	0-15	1.95	5.12	***7.07***
MNS-99-12	0-15	14.2	44.9	***59.1***
MNS-99-13	0-15	10.9	37.3	***48.2***
MNS-99-13R	0-15	10.3	35.2	***45.5***
mean (13 & 13R)	0-15	10.6	36.3	***46.8***
RPD (13 & 13R)	0-15	5.3 %	5.8 %	5.7 %
MNS-99-14	0-15	7.10	26.2	***33.3***
MNS-99-15*	0-15	8.01	31.2	***39.2***
MNS-99-16	0-15	8	22.3	***30.3***
MNS-99-17*	0-15	8.24	31.1	***39.4***
MNS-99-18	0-15	6.81	27.5	***34.3***
98-MNS-02	15-30	7.35	29.4	***36.7***
98-MNS-03	15-30	10.3	37.7	***48.0***
MNS-99-01	15-30	8.87	32.2	***41.1***

Table 14. Continued

Site Location	Core Section (cm)	Total LMW PAHs (mg/kg dry wt.)	Total HMW PAHs (mg/kg dry wt.)	Total PAHs (13) (mg/kg dry wt.)
MNS-99-02	15-28	9.01	20.8	***29.8***
MNS-99-03	15-30	9.69	31.8	***41.5***
MNS-99-04	15-30	6.86	26.2	***33.0***
MNS-99-04R	15-30	7.81	25.3	***33.1***
mean (04 & 04R)	15-30	7.33	25.7	***33.1***
RPD (04 & 04R)	15-30	13.0 %	3.4 %	0.2 %
MNS-99-07	15-30	13.7	40.0	***53.7***
MNS-99-08*	15-30	15.7	41.1	***56.8***
MNS-99-09	15-30	4.81	13.4	***18.2***
MNS-99-10	15-30	9.73	37.4	***47.1***
MNS-99-11*	15-30	1.93	5.93	***7.86***
MNS-99-12	15-30	11.7	32.3	***44.0***
MNS-99-13	15-30	11.2	38.8	***50.0***
MNS-99-13R	15-30	59.3	96.9	***156***
mean (13 & 13R)	15-30	35.2	67.9	***103***
RPD (13 & 13R))	15-30	136 %	85.6 %	103 %
MNS-99-14	15-30	10.3	39.7	***50.0***
MNS-99-15	15-30	9.67	29.1	***38.8***
MNS-99-16	15-30	8.89	24.4	***33.3***
MNS-99-17	15-30	10.8	37.7	***48.5***
MNS-99-18	15-30	6.75	27.3	***34.0***
98-MNS-02	30-45	41.7	85	***127***
98-MNS-03	30-45	11.2	38.4	***49.6***
MNS-99-03	30-45	12.4	37.1	***49.5***
MNS-99-04	30-45	13.0	46.5	***59.5***
MNS-99-04R	30-45	7.42	27.4	***34.9***
mean (04 & 04R)	30-45	10.2	37.0	***47.2***
RPD (04 & 04R)	30-45	55.0 %	51.6 %	52.3 %
MNS-99-08	30-45	12.0	40.5	***52.5***
MNS-99-09	30-45	10.2	22.9	***33.1***
MNS-99-13	30-45	14.6	33.0	***47.6***
MNS-99-14	30-45	221	343	***564***
MNS-99-15	30-45	12.7	38.6	***51.3***
MNS-99-17	30-45	10.6	39.2	***49.8***
MNS-99-03	45-60	17.9	60.2	***78.1***
MNS-99-04	45-60	129	209	***337***
MNS-99-04R	45-60	172	280	***452***
mean (04 & 04R)	45-60	150	244	***395***
RPD (04 & 04R)	45-60	28.8 %	29.3 %	29.1 %

Table 14. Continued

Site Location	Core Section (cm)	Total LMW PAHs (mg/kg dry wt.)	Total HMW PAHs (mg/kg dry wt.)	Total PAHs (13) (mg/kg dry wt.)
MNS-99-13*	45-60	17.4	37.6	***55.1***
MNS-99-14	45-60	7.69	22.5	***30.2***
MNS-99-15	45-60	21.0	68.7	***89.7***
MNS-99-17	45-60	17.7	62.2	***79.9***
MNS-99-03	60-75	15.5	51.6	***67.1***
MNS-99-04	60-75	453	606	***1059***
MNS-99-15	60-75	26.6	88.3	***115***
MNS-99-17	60-75	32.8	87.6	***120***
MNS-99-03	75-90	10.4	34.4	***44.8***
MNS-99-04	75-90	470	718	***1188***
MNS-99-15	75-90	16.6	57.3	***73.9***
MNS-99-17	75-90	38.8	93.4	***132***
MNS-99-03	90-120	15.1	42.3	***57.4***
MNS-99-04*	90-120	268	422	***691***
MNS-99-15	90-120	35.5	75.8	***111***
MNS-99-17	90-120	26.6	68	***94.6***
MNS-99-03	120-140	41.6	72.2	***114***
MNS-99-04	120-150	90.7	166	***256***
MNS-99-15	120-150	25.4	68.7	***94.1***
MNS-99-15	150-180	125	243	***368***
MNS-99-15	180-210	44.6	123	***168***
Level I SQT				1.6
Level II SQT				23

* average of analytical duplicates

R = field replicate sample
RPD = relative percent difference
SQT = sediment quality target (Crane *et al*. 2000)

Low Molecular Weight (LMW) PAHs = Sum of 2-Methylnaphthalene, Acenapthene, Acenapthylene, Anthracene, Fluorene, Napthalene, and Phenanthrene
High Molecular Weight (HMW) PAHs = Sum of Benz[a]anthracene, Benzo[a]pyrene, Chrysene, Dibenzo[a,h,]anthracene, Fluoranthene, and Pyrene
Total PAHs = the sum of the 13 PAH compounds comprising the LMW and HMW PAHs

Table 15. Ratio of LMW or HMW PAHs to Total PAHs (Based on a Subset of 13 PAHs) in Sediments from Minnesota Slip

Site Location	Core Section (cm)	Ratio of LMW to T. PAHs (13) (%)	Ratio of HMW to T. PAHs (13) (%)
98-MNS-02	0-5	17.9	82.1
98-MNS-03	0-5	18.0	82.0
98-MNS-04	0-5	22.2	77.8
MNS-99-01	0-5	21.2	78.8
MNS-99-02*	0-5	18.4	81.6
MNS-99-03	0-5	20.6	79.4
MNS-99-04	0-5	32.4	67.6
MNS-99-05	0-5	20.2	79.8
MNS-99-06	0-5	26.3	73.7
98-MNS-02	0-15	17.1	82.9
MNS-99-01	0-15	21.0	79.0
MNS-99-02	0-15	20.8	79.2
MNS-99-03*	0-15	22.3	77.7
MNS-99-04 (mean)	0-15	25.1	74.9
MNS-99-07	0-15	22.9	77.1
MNS-99-08	0-15	21.8	78.2
MNS-99-09	0-15	20.1	79.9
MNS-99-10	0-15	25.0	75.0
MNS-99-11	0-15	27.6	72.4
MNS-99-12	0-15	24.0	76.0
MNS-99-13 (mean)	0-15	22.6	77.4
MNS-99-14	0-15	21.3	78.7
MNS-99-15*	0-15	20.4	79.6
MNS-99-16	0-15	26.4	73.6
MNS-99-17*	0-15	20.9	79.1
MNS-99-18	0-15	19.8	80.2
98-MNS-02	15-30	20.0	80.0
98-MNS-03	15-30	21.5	78.5
MNS-99-01	15-30	21.6	78.4
MNS-99-02	15-28	30.2	69.8
MNS-99-03	15-30	23.3	76.7
MNS-99-04 (mean)	15-30	22.2	77.8
MNS-99-07	15-30	25.5	74.5
MNS-99-08*	15-30	27.6	72.4
MNS-99-09	15-30	26.4	73.6
MNS-99-10	15-30	20.6	79.4
MNS-99-11*	15-30	24.5	75.5
MNS-99-12	15-30	26.6	73.4
MNS-99-13	15-30	22.4	77.6
MNS-99-13R	15-30	38.0	62.0
MNS-99-14	15-30	20.6	79.4
MNS-99-15	15-30	24.9	75.1

Table 15. Continued

Site Location	Core Section (cm)	Ratio of LMW to T. PAHs (13) (%)	Ratio of HMW to T. PAHs (13) (%)
MNS-99-16	15-30	26.7	73.3
MNS-99-17	15-30	22.3	77.7
MNS-99-18	15-30	19.8	80.2
98-MNS-02	30-45	32.9	67.1
98-MNS-03	30-45	22.6	77.4
MNS-99-03	30-45	25.0	75.0
MNS-99-04	30-45	21.9	78.1
MNS-99-04R	30-45	21.3	78.7
MNS-99-08	30-45	22.8	77.2
MNS-99-09	30-45	30.9	69.1
MNS-99-13	30-45	30.7	69.3
MNS-99-14	30-45	39.2	60.8
MNS-99-15	30-45	24.8	75.2
MNS-99-17	30-45	21.2	78.8
MNS-99-03	45-60	22.9	77.1
MNS-99-04 (mean)	45-60	38.1	61.9
MNS-99-13*	45-60	31.7	68.3
MNS-99-14	45-60	25.5	74.5
MNS-99-15	45-60	23.4	76.6
MNS-99-17	45-60	22.1	77.9
MNS-99-03	60-75	23.1	76.9
MNS-99-04	60-75	42.8	57.2
MNS-99-15	60-75	23.1	76.9
MNS-99-17	60-75	27.3	72.7
MNS-99-03	75-90	23.1	76.9
MNS-99-04	75-90	39.6	60.4
MNS-99-15	75-90	22.4	77.6
MNS-99-17	75-90	29.3	70.7
MNS-99-03	90-120	26.3	73.7
MNS-99-04*	90-120	38.9	61.1
MNS-99-15	90-120	31.9	68.1
MNS-99-17	90-120	28.1	71.9
MNS-99-03	120-140	36.6	63.4
MNS-99-04	120-150	35.4	64.6
MNS-99-15	120-150	27.0	73.0
MNS-99-15	150-180	34.0	66.0
MNS-99-15	180-210	26.6	73.4
Mean		25.5	74.5
SD		5.8	5.8
CV		22.6	7.7
Range: Low		17.1	57.2
Range: High		42.8	82.9

Table 15. Continued

Note: for replicate samples in which the RPD >50 % for T. PAHs (13), the sample and replicate were treated as separate samples.

* average of analytical duplicates

LMW = low molecular weight PAHs
HMW = high molecular weight PAHs
R = field replicate sample
SD = standard deviation
CV = coefficient of variation
RPD = relative percent difference

Table 16. Mean PEC-Q Values for Sediment Samples Collected from Minnesota Slip

Site Location	Core Section (cm)	Mean PEC-Q
98-MNS-02	0-5	1.6
98-MNS-03	0-5	1.3
98-MNS-04	0-5	0.66
MNS-99-01	0-5	0.72
MNS-99-02	0-5	0.68
MNS-99-03	0-5	0.71
MNS-99-04	0-5	1.1
MNS-99-05	0-5	0.75
MNS-99-06	0-5	0.76
98-MNS-02	0-15	1.8
98-MNS-03	0-15	0.86
MNS-99-01	0-15	0.73
MNS-99-02	0-15	1.0
MNS-99-03	0-15	0.97
MNS-99-04 (mean)	0-15	1.1
MNS-99-07	0-15	0.31
MNS-99-08	0-15	0.96
MNS-99-09	0-15	1.1
MNS-99-10	0-15	0.93
MNS-99-11	0-15	0.15
MNS-99-12	0-15	1.6
MNS-99-13 (mean)	0-15	1.3
MNS-99-14	0-15	0.98
MNS-99-15	0-15	0.97
MNS-99-16	0-15	0.82
MNS-99-17	0-15	1.2
MNS-99-18	0-15	0.97
98-MNS-02	15-30	1.3
98-MNS-03	15-30	1.6
MNS-99-01	15-30	1.5
MNS-99-02	15-28	0.86
MNS-99-03	15-30	1.7
MNS-99-04 (mean)	15-30	1.2
MNS-99-07	15-30	1.4
MNS-99-08	15-30	1.9

Table 16. Continued

Site Location	Core Section (cm)	Mean PEC-Q
MNS-99-09	15-30	2.2
MNS-99-10	15-30	1.9
MNS-99-11	15-30	0.26
MNS-99-12	15-30	1.3
MNS-99-13	15-30	1.8
MNS-99-13R	15-30	3.8
MNS-99-14	15-30	2.4
MNS-99-15	15-30	1.3
MNS-99-16	15-30	0.97
MNS-99-17	15-30	1.5
MNS-99-18	15-30	1.5
98-MNS-02	30-45	3.5
98-MNS-03	30-45	2.2
MNS-99-01	30-45	0.73
MNS-99-03	30-45	2.2
MNS-99-04	30-45	2.4
MNS-99-04R	30-45	1.3
MNS-99-07	30-45	0.35
MNS-99-08	30-45	2.2
MNS-99-09	30-45	1.4
MNS-99-10	30-45	1.5
MNS-99-11	30-45	0.62
MNS-99-13 (mean)	30-45	1.4
MNS-99-14	30-45	12.9
MNS-99-15	30-45	1.8
MNS-99-16	30-45	0.35
MNS-99-17	30-45	1.9
MNS-99-18	30-45	2.4
MNS-99-01	45-60	0.28
MNS-99-03	45-60	2.9
MNS-99-04 (mean)	45-60	9.4
MNS-99-09	45-58	1.7
MNS-99-13 (mean)	45-60	1.5
MNS-99-14	45-60	0.96
MNS-99-15	45-60	3.0
MNS-99-16	45-58	0.21
MNS-99-17	45-60	3.1

Table 16. Continued

Site Location	Core Section (cm)	Mean PEC-Q
MNS-99-03	60-75	2.4
MNS-99-04 (mean)	60-75	24.0
MNS-99-13 (mean)	60-75	0.69
MNS-99-14	60-75	0.85
MNS-99-15	60-75	3.6
MNS-99-17	60-75	3.7
MNS-99-03	75-90	1.7
MNS-99-04 (mean)	75-90	26.9
MNS-99-13	75-90	0.85
MNS-99-14	75-90	0.73
MNS-99-15	75-90	2.5
MNS-99-17	75-90	3.7
MNS-99-03	90-120	1.9
MNS-99-04 (mean)	90-120	15.9
MNS-99-13	90-120	0.80
MNS-99-14	90-120	1.2
MNS-99-15	90-120	3.9
MNS-99-17	90-120	2.7
MNS-99-03	120-140	3.3
MNS-99-04 (mean)	120-150	6.7
MNS-99-13	120-150	0.69
MNS-99-15	120-150	3.2
MNS-99-17	120-150	1.7
MNS-99-15	150-180	9.1
MNS-99-17	150-180	3.4
MNS-99-15	180-210	4.5

Note: The mean PEC-Q value for MNS-99-13 & 13R (15-30 cm), and MNS-99-04 & 04R (30-45 cm) was not used because the RPD for PAHs was >50% for most individual PAH compounds and for total PAHs (13) for these samples.

PEC-Q = probable effect concentration quotient
RPD = relative percent difference

Table 17. Percentage Composition of PAHs in Slip C, Duluth Harbor. Results are Based on 34 Samples Collected from 15 cm Depth Segments (Down to 60 cm) in Slip C (Crane 1999a)

Summary Parameter	Ratio of LMW to Total PAHs (13) (%)	Ratio of HMW to Total PAHs (13) (%)	Percentage Composition of LMW PAHs (%)							Percentage Composition of HMW PAHs (%)					
			2Metnap	Acene	Aceny	Anth	Fluo	Naph	Phen	Bena	Benap	Chry	Diben	Flut	Pyrn
Mean	28.0	72.0	5.8	6.6	1.9	12.9	9.3	5.3	58.4	12	12.5	14.7	1.8	33.8	25.3
SD	4.3	4.3	2	1.5	0.7	2	1.7	1.5	3.7	2.4	1.4	1.6	0.4	1.7	1.8
CV	15.4	6	35.5	23	37.2	15.7	18.4	28.9	6.4	19.7	10.8	10.8	25.2	4.9	7.1
Range: Low	20.6	59	2.7	4.6	0.5	8.7	7.2	2.4	49.6	7.6	9.5	11.2	1.2	31.4	22.5
Range: High	41	79.4	11.5	11.3	3.4	17.7	14.4	8.2	64.7	16.6	14.5	17.6	3.7	39.1	28.7

LMW = low molecular weight PAHs
HMW = high molecular weight PAHs
SD = standard deviation
CV = coefficient of variation

PAH Codes:

2Metnap = 2-Methylnaphthalene
Acene = Acenapthene
Aceny = Acenapthylene
Anth = Anthracene
Bena = Benz[a]anthracene
Benap = Benzo[a]pyrene
Chry = Chrysene
Diben = Dibenzo[a,h]anthracene
Flut = Fluoranthene
Fluo = Fluorene
Naph = Naphthalene
Phen = Phenanthrene
Pyrn = Pyrene

Table 18. Summary of Sediment Toxicity Test Results, Compared to the Test Control, and Mean PEC-Q Values for Surficial Sediments Collected from Minnesota Slip

Site Location	Core Section (cm)	Mean PEC-Q*	10-day *C. tentans* Tests		28-42 day *H. azteca* Tests		
			Survival	Growth	Survival	Growth	Reproduction
MNS-99-01	0-5	0.72	NT	NT	NT	NT	NT
MNS-99-02	0-5	0.68	NT	NT	NT	NT	NT
MNS-99-03	0-5	0.71	NT	NT	T	--	--
MNS-99-04	0-5	1.1	NT	NT	NT	NT	NT
MNS-99-05	0-5	0.75	NT**	NT	T	--	--
MNS-99-06	0-5	0.76	NT	NT	NT	NT	NT

* for each sample, the only contaminant of concern to exceed its corresponding PEC value was total PAHs.
**survival in MNS-99-05 was significantly reduced when compared to MNS-99-01.

NT = not toxic
T = toxic at $\alpha = 0.05$

Table 19. Distribution of Mean PEC-Qs for Selected Areas in the St. Louis River AOC

Area	n	Average	Standard Deviation	Minimum	10th percentile	Median	90th percentile	Maximum
Interlake/Duluth Tar Superfund Site	15	8.8	19.1	0.251	0.544	1.27	14	72.9
Entire SLRAOC, excluding Minnesota Slip	165	1.2	6.4	0.00948	0.0403	0.182	0.794	72.9
Entire SLRAOC, including Minnesota Slip	198	1.1	5.9	0.00948	0.0433	0.2595	1.22	72.9
Minnesota Slip[a]	33	1.0	0.4	0.15	0.68	0.982	1.41	1.78
Howards Bay	10	0.43	0.19	0.0648	0.0648	0.4965	0.629	0.693
WLSSD and Coffee and Miller Creek area	15	0.42	0.15	0.245	0.3	0.381	0.46	0.794
1994 Sediment Survey (Minnesota Slip excluded)	36	0.33	0.24	0.0211	0.0872	0.2915	0.547	1.22

[a] Data included 29 surficial sediment samples from this survey plus 4 previously collected samples that were included in the St. Louis River matching sediment chemistry and toxicity database.

PEC-Q = probable effect concentration quotient
SLRAOC = St. Louis River Area of Concern
WLSSD = Western Lake Superior Sanitary District

Table 20. Distribution of Mean PEC-Qs that also Included Mercury for Selected Areas in the St. Louis River AOC[a]

Area	n	Average	Standard Deviation	Minimum	10th percentile	Median	90th percentile	Maximum
Interlake/Duluth Tar Superfund Site	15	8.8	19.1	0.242	0.51	1.27	14.07	72.85
Entire SLRAOC, excluding Minnesota Slip	165	1.2	6.4	0.00842	0.0393	0.186	0.796	72.85
Entire SLRAOC, including Minnesota Slip	198	1.1	5.9	0.00842	0.0414	0.2735	1.1	72.85
Minnesota Slip[b]	33	0.94	0.3	0.144	0.634	0.893	1.4	1.63
WLSSD and Coffee and Miller Creek area	15	0.48	0.20	0.245	0.321	0.424	0.582	1.00
Howards Bay	10	0.43	0.20	0.0681	0.0681	0.481	0.671	0.691
1994 Sediment Survey (Minnesota Slip excluded)	36	0.36	0.23	0.0211	0.125	0.330	0.582	1.00

[a] Although a reliable PEC value for mercury is not available to include in the mean PEC-Q (MacDonald *et al.* 2000a), mercury is an important chemical of potential concern in the St. Louis River AOC. For this table, mercury was included in the calculation of mean PEC-Qs to assess whether substantial changes in the distribution of mean PEC-Qs would occur for selected areas in the St. Louis River AOC.

[b] Data included 29 surficial sediment samples from this survey plus 4 previously collected samples that were included in the St. Louis River matching sediment chemistry and toxicity database.

PEC-Q = probable effect concentration quotient
SLRAOC = St. Louis River Area of Concern
WLSSD = Western Lake Superior Sanitary District

Table 21. Distribution of mean PEC-Qs for selected Great Lake AOCs

Area[a]	n	Average	Standard Deviation	Minimum	10th percentile	Median	90th percentile	Maximum
Indiana Harbor AOC[b]	821	54	867.4	0.000636	0.123	2.49	25.2	23800
Sheboygan Harbor AOC	23	16	77.9	0.0559	0.0767	0.256	0.391	374
Maumee River AOC	25	9.1	40.4	0.189	0.286	0.363	2.61	203
St. Mary's River AOC	38	5.4	11.1	0.0412	0.0829	0.743	14.2	52.4
Waukegan Harbor AOC	23	2.8	1.4	0.267	0.615	2.85	4.01	5.25
St. Louis River AOC[c]	165	1.2	6.4	0.00948	0.0403	0.182	0.794	72.9
Cuyahoga River AOC	21	1.0	0.7	0.505	0.506	0.88	1.51	3.93
Minnesota Slip[d]	29	0.98	0.4	0.15	0.659	0.97	1.4	1.78
Oswego River AOC	22	0.95	0.9	0.0196	0.0469	0.9855	1.79	1.79
St. Clair River AOC	44	0.47	1.0	0.054	0.0713	0.1505	0.906	6.46

[a] AOCs were selected based on availability of data on ≥ 20 sediment samples in MESL's matching sediment chemistry and toxicity database.
[b] These quotients did not include not detected substances that had detection limits greater than the corresponding PEC value (i.e., conservative estimate of mean PEC-Q).
[c] Not including Minnesota Slip.
[d] Data included 29 surficial sediment samples from this survey.

PEC-Q = probable effect concentration quotient
AOC = Area of Concern

Table 22. Summary of FIELDS Mass and Volume Calculations for Minnesota Slip Sediments with Total PAH (13) Concentrations Greater than 23 mg/kg Dry Weight

Depth Interval* (cm)	Minimum Concentration (mg/kg)	Maximum Concentration (mg/kg)	Density (lb/yd^3)	Volume (yd^3)	Mass (lbs)
0-15	23.0	58.9	3257	2364	288
15-30	23.0	102.2	3257	2563	344

* The most reliable output from FIELDS corresponded to sediment sections in which PAH data were available for the entire slip. Thus, volume and mass estimates were not given for deeper, more contaminated sections of Minnesota Slip for which PAH data were only available for the inner portion of the slip.

Table 23. Summary of FIELDS Volume Calculations for Minnesota Slip Sediments with Mean PEC-Qs Exceeding 0.6

Depth Interval* (cm)	Minimum Mean PEC-Q	Maximum Mean PEC-Q	Density (lb/yd^3)	Volume (yd^3)
0-15	0.6	1.8	3257	2424
15-30	0.6	2.8	3257	2745
30-45	0.6	12.8	3257	2542
45-60	0.6	9.5	3257	1921

* The most reliable output from FIELDS corresponded to sediment sections in which sediment chemistry data were available for the entire slip. Thus, volume estimates were not given for deeper, more contaminated sections of Minnesota Slip for which sediment chemistry data were only available for the inner portion of the slip.

PEC-Q = probable effect concentration quotient