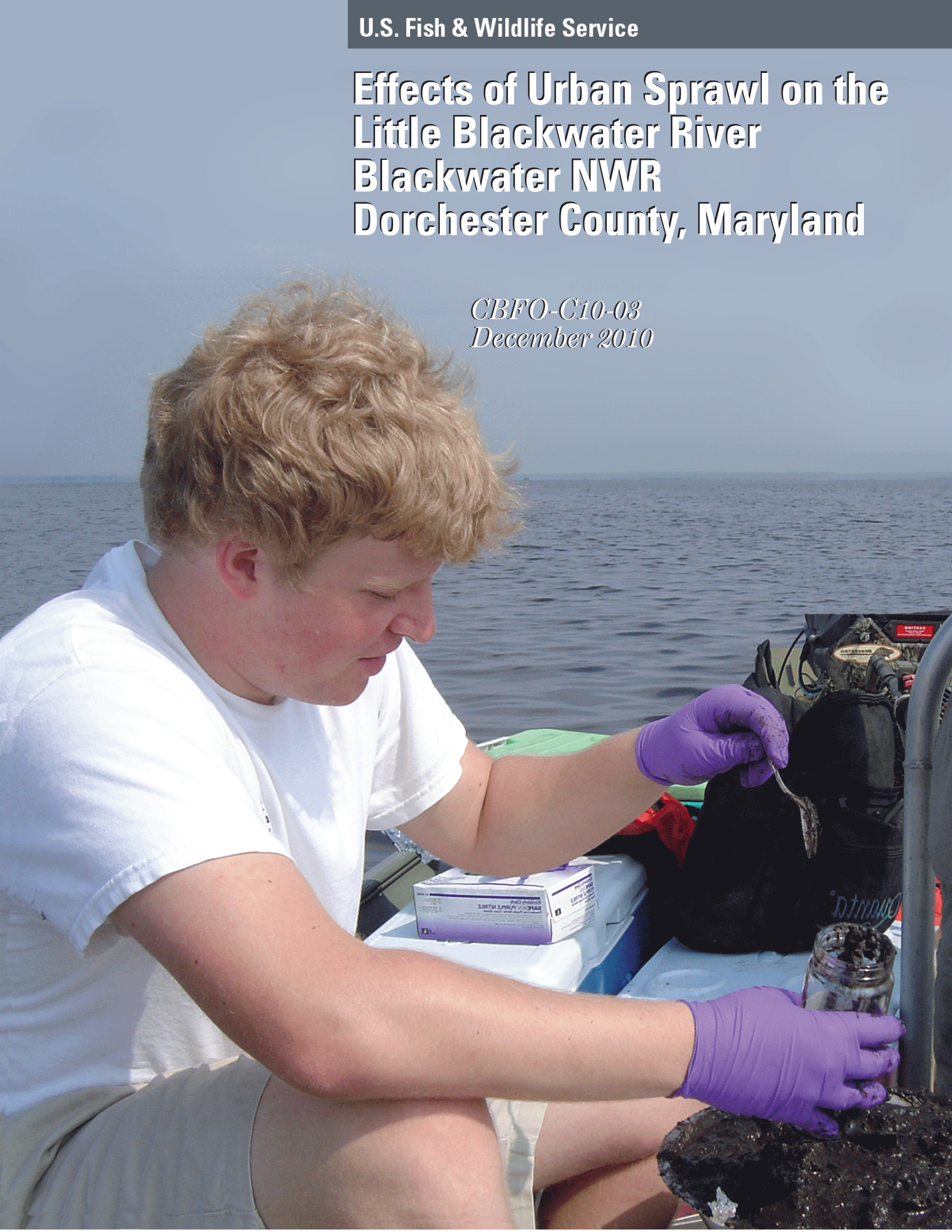
U.S. Fish & Wildlife Service

Effects of Urban Sprawl on the Little Blackwater River Blackwater NWR Dorchester County, Maryland

CBFO-C10-03
December 2010



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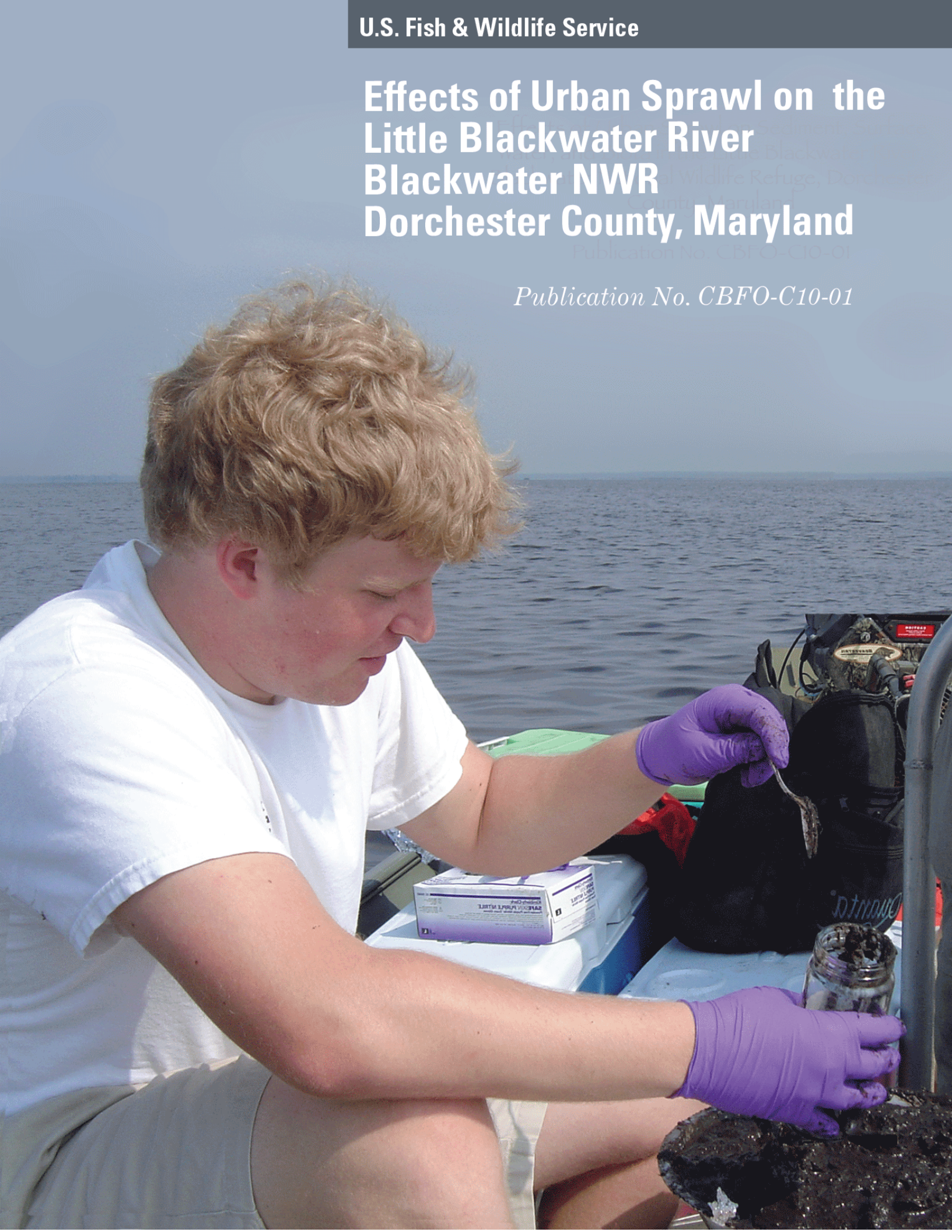
Publication No. CBFO-C10-01



Final Report

Effects of Urban Sprawl on Sediment, Surface Water, and Biota in the Little Blackwater River, Blackwater National Wildlife Refuge, Dorchester County, Maryland

Publication No. CBFO-C10-03

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September, 2010

EXECUTIVE SUMMARY

The Little Blackwater River drains a catchment area of approximately 11,229 hectares (27,748 acres). About 516 hectares (1,276 acres) in this watershed are currently developed for residential, commercial, and light industrial land use, while the remaining 10,713 hectares (26,472 acres) comprise a rural agricultural landscape, consisting of cropland, woodland, forested and marshy riparian areas, and tidal wetlands. The land surface is level, with frequent flooding due to poor drainage, low flow gradients, high water tables, and hydric soils. In recent years there has been extreme pressure to develop the Little Blackwater watershed. The City of Cambridge and Dorchester County are considering zoning and permitting of nearly 3,238 hectares (8,000 acres) for development in the next few years.

The Little Blackwater River drains directly into the Blackwater National Wildlife Refuge. The Blackwater National Wildlife Refuge was established in 1933 as a refuge for migratory waterfowl. The refuge includes more than 11,331 hectares (28,000 acres), composed mainly of rich tidal marsh characterized by fluctuating water levels and variable salinity. Blackwater National Wildlife Refuge is one of the chief wintering areas for Canada geese using the Atlantic Flyway. Geese number approximately 35,000 and ducks exceed 15,000 at the peak of fall migration, usually in November. Urbanization of the Little Blackwater River could have an effect on water and sediment quality and may adversely affect fish and wildlife resources on Blackwater National Wildlife Refuge.

We used the sediment Quality Triad approach to evaluate the potential impacts of the proposed development. The Sediment Quality Triad is a weight of evidence approach consisting of synoptically collected measures of sediment chemistry, benthic/fish community structure, and sediment toxicity. The study area included three sites upstream of the Blackwater Wildlife Refuge on the Little Blackwater River, three samples downstream on the Refuge and a reference site on Buttons Creek, an adjacent watershed that is comprised almost entirely of undeveloped forest and marsh.

In general, the Little Blackwater River watershed has had little impact from the contaminants evaluated in this study. Although the benthic community in this watershed is depressed, it is more likely a function of the physical characteristics of the shallow water system rather than an effect of contaminants.

In 2004, proposals were made to Dorchester County for the development of two separate parcels of approximately 1,000 acres each within the Little Blackwater watershed. Nearly 4,500 homes and a golf course were planned for a 1,100-acre site along the north tributary, and a mixed-use industrial park was proposed near the east tributary southeast of Cambridge. By 2007, most of the plans were either scaled back or abandoned. Because developmental pressures on this watershed were greatly diminished in 2006, the second year data was similar to the first, making this report a baseline study rather than a comparison of pre and post construction effects.

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ACKNOWLEDGEMENTS

This study was funded by the U.S. Fish and Wildlife Service, Division of Environmental Quality (Project ID: 5FN42). Special thanks to USFWS CBFO personnel Pete McGowan, who assisted with field work; Leslie Gerlich, who provided GIS support and support of Dixie Birch and the staff of the Blackwater National Wildlife Refuge.

INTRODUCTION

The Little Blackwater River drains a catchment area of approximately 11,229 hectares (27,748 acres). About 516 hectares (1,276 acres) in this watershed are currently developed for residential, commercial, and light industrial land use, while the remaining 10,713 hectares (26,472 acres) comprise a rural agricultural landscape, consisting of cropland, woodland, forested and marshy riparian areas, and tidal wetlands. The land surface is level, with frequent flooding due to poor drainage, low flow gradients, high water tables, and hydric soils. In recent years there has been extreme pressure to develop the Little Blackwater watershed. The City of Cambridge and Dorchester County are considering zoning and permitting of nearly 3,238 hectares (8,000 acres) for development in the next few years (Guy, 2005).

When residential, commercial, and/or industrial development occurs, it is accompanied by a significant change in hydrological cycles (Barnes *et al*, 2001). Urban development brings an increase in impervious surface and a reduction in natural lands. During rain events, pollutants, such as heavy metals and polynuclear aromatic hydrocarbons (PAHs), are washed from impervious surfaces. In addition, lawns, gardens, and grassy areas flush sediment, pesticides and nutrients (Clark, 1985; Novotny and Chesters, 1981; Whipple, 1977). Together these pollutants are carried down gradient and are often deposited in streams and rivers.

Metals are naturally occurring elements in most streams. In urban areas, there is additional loading from construction materials and industrial areas. This excess loading may be significant enough to have adverse effects on aquatic life. In a study of runoff in Provo, Utah, Gray (2004) demonstrated a direct correlation with urbanization and increased concentrations of dissolved copper, lead, and zinc along with a decrease in conductivity and dissolved oxygen after storm events. The rapid increase in metals along with the decrease in conductivity and dissolved oxygen were directly reflected by decreased abundance and total species diversity in the macroinvertebrate community.

PAHs are a group of chemicals that are formed during the incomplete combustion of organic substances. PAHs are found in medicines, dyes, plastics, pesticides, asphalt roads, crude oil, coal, creosote, and roofing tar (Research Triangle Institute, 1995). Elevated PAHs in streams and rivers can adversely affect the biotic diversity and abundance in these systems. In addition, elevated PAHs have been shown to cause tumors in some fish species (Pinkney *et al.,* 2001). As part of the National Water Quality Assessment Program, the U.S. Geological Survey(USGS) followed trends in PAHs over sixty years at 10 sites throughout the United States. Van Metre *et al*. (2000) concluded that trends in PAH concentrations in developed watersheds are increasing and the increase is directly linked to urban sprawl.

Pesticides are used in the urban setting to control weeds and insects on lawns and in gardens. Pesticides are also used in mosquito control and pet shampoos. Home use accounts for approximately 25 percent of the total pesticide use in the United States (Aspelin, 1998). Hoffman *et al.* (2000) compared eight urban streams across the United States, analyzing 75 insecticides and herbicides. The herbicides most commonly detected in urban streams were prometon, simazine, atrazine, tebuthiuron, and metolochlor. The most common insecticides were carbaryl,

diazinon, chlorpyrifos, and malathion. Hoffman *et al*. 2000 suggests that the biological diversity and abundance in these streams may be impaired by these pesticides.

Increased amounts of nutrients come from the over fertilization of lawns and domestic animal waste**.** Thirty-eight percent of the homeowners in Maryland routinely fertilize their lawns and thirty-one percent apply pesticide two to four times a year (Schueler, 1995). Over fertilization causes excess nutrients to be washed from lawns and into nearby streams. Schueler (2000) found that as many as sixty percent of dog owners in Maryland do not clean up after their dogs on a routine basis. These sources of nutrients flow over impervious surfaces into storm sewers and ultimately into streams and rivers. These effects were easily seen in thirty-seven watersheds across United States measured by Schueler (1995). During and immediately after storm events, nitrates and phosphorus concentrations peaked, sometimes doubling, just downstream of residential developments.

Yoder and Rankin (1996) studied 110 sites within Ohio watersheds. More than forty percent of the suburban sites in this study were impaired, with many reflecting the impact of new developments for housing and commercial use. The impairments are described as chemical and biological with elevated levels of metals, PAHs, pesticides, nutrients, and alterations in other water quality parameters (*i.e.* conductivity, temperature, pH, dissolved oxygen) causing a decreased benthic invertebrate population and fish community.

Once a stream is impaired it may take decades to restore. Harding *et al.* (1998) looked at the diversity of twenty-four watersheds in the Little Tennessee and French Board River. The diversity was compared to both historic and current use. This study found that past land use activity may result in long term modifications to and reductions in aquatic diversity, regardless of reforestation of riparian zones.

The Little Blackwater River drains directly into the Blackwater National Wildlife Refuge (BNWR). The BNWR was established in 1933 as a refuge for migratory waterfowl. The refuge includes more than 11,331 hectares (28,000 acres), composed mainly of rich tidal marsh characterized by fluctuating water levels and variable salinity. Originally established for migratory birds, primarily ducks and geese, BNWR is one of the chief wintering areas for Canada geese using the Atlantic Flyway. Geese number approximately 35,000 and ducks exceed 15,000 at the peak of fall migration, usually in November. (U.S. Fish and Wildlife Service, 2005). Urbanization of the Little Blackwater River could have an effect on water and sediment quality and may adversely affect fish and wildlife resources on BNWR.

The Sediment Quality Triad (SQT) or triad is a weight of evidence approach consisting of synoptically collected measures of sediment/water chemistry, benthic/fish community structure, and sediment toxicity. SQT has been successfully applied in the Chesapeake Bay (e.g., Baltimore Harbor, Anacostia River) and nationwide (e.g., Puget Sound, San Francisco Bay, Gulf of Mexico) to characterize ambient conditions in freshwater, estuarine, and marine systems (e.g., Long and Chapman 1985, Chapman *et al*., 1987, McGee *et al*., 1999, Schlekat *et al*., 1994). The combination of potential cause (chemistry) and effect (biology) measurements makes the Triad one of the most complete and powerful tools available to determine the extent and significance of pollution-induced degradation. Although water column contaminant levels are useful to

distinguish among sources (new inputs versus historic contamination) and loadings of contaminants, they are temporally and spatially quite patchy, potentially confounding our ability to characterize the potential for toxicant related impact. Therefore, the focus of this approach is on the sedimentary environment. Sediments accumulate and integrate toxic chemical from multiple sources over time. Determination of sediment quality is essential to determine trends in toxic contaminants.

The primary objective of this study was to use the SQT, water quality sampling, and fish abundance and diversity data to evaluate changes to BNWR from the upstream development on the Little Blackwater River. In 2004, proposals were made to Dorchester County for the development of two separate parcels of approximately 1,000 acres each within the Little Blackwater watershed. Nearly 4,500 homes and a golf course were planned for a 1,100-acre site along the north tributary, and a mixed-use industrial park was proposed near the east tributary southeast of Cambridge. By 2007, most of the plans were either scaled back or abandoned. The second year data was similar to the first, making this report a baseline study rather than a comparison of pre and post construction effects.

In addition to the SQT, we analyzed water column contaminant levels. The water column was analyzed to determine immediate sources and concentrations of contaminants at a site, and serve as some indication of contaminant loading rates.

Fish sampling and condition factor were collected to provide a more complete picture of the aquatic system. Although benthic invertebrate diversity and abundance is extremely sensitive to shifts in environmental quality, the fish community and condition factor in conjunction with the benthic invertebrate diversity is a better estimate of larger scale impacts than the benthic community by itself (Guy, 2005).

MATERIALS AND METHODS

Study Areas

The study area included three sites upstream of the BNWR. The first upstream sample (BNWR01) was on the East Branch of the Little Blackwater River. This sample is upstream and out of the influence of the proposed development. Although this sample is downstream of other proposed developments, we did not expect to be influenced this site becauses development was not supposed to start within the timeframe of this project. The second upstream sample (BNWR02) was just downstream of the proposed development near the proposed USGS Gaging Station. This station was chosen to capture the direct downstream impact of the proposed development. The third upstream sample (BNWR03) was adjacent to a hog farm with waste lagoons. This station was chosen to capture conditions around another potential pollution source that may be affecting the watershed.

In addition to the upstream samples, we collected four samples on the refuge. One sample (BNWR04) was located above the Wallace Drive Bridge at the refuge boundary on the Little Blackwater River. Another sample (BNWR05) was located near the confluence of the Little Blackwater River and Blackwater River. A reference sample (BNWR06) was located in Coulson

Pond in the Blackwater River out of the influence of possible contaminants. An additional reference sample (BNWR07) was located on Buttons Creek. Buttons Creek was chosen as a reference sample because the stream characteristics are similar to East Branch and the USGS Station. The Coulson Pond Station was chosen because of its similarity to the BNRW02 and the hog farm sample sites. The stations and rationale are summarized in Table 1 and approximate locations are identified on Figure 1.

Sediment Collection

The protocols for sediment sample collection, handling, storage, and laboratory analyses are similar to those described in the Quality Assurance Project Plan (QAPP) that was developed for the Sediment Quality Triad projects in the Chesapeake Bay watershed (USFWS, 1999). In brief, petite ponar composite grabs were taken at each site to achieve the desired quantity of sediment necessary to complete chemistry sampling and toxicity tests. Once enough sediment was collected it was homogenized, split, and placed into appropriate sample containers for chemistry or toxicity testing. All samples were stored at $4^{o}C$ with the appropriate chain of custody and did not exceed recommended holding times.

Benthic Community Analysis

Sampling and analysis was consistent with methods used in the Long-Term Benthic Monitoring Program in Maryland, described in USFWS (1999). In brief, a petite ponar grab sample (0.023 m^2) were taken at each station for benthic macroinvertebrate community analysis, sieved through a 500 µm mesh, and preserved in 10% buffered formalin containing rose bengal. Samples were delivered to University of Maryland Wye Research and Education Center for sorting, taxonomic identification, and calculation of the Benthic Index of Biotic Integrity (B-IBI).

Fish Community Analysis

Fish collection was done with a Fyke net over a 24 hour period. All fish were removed, species and number were identified, and length (fork & tail) and weight were gathered from ten individual fish per species. Abnormalities were noted and described for each fish.

Table 1. Summary of the BNWR proposed Sediment Quality Triad sample location and rationale.

Sample designation	Sample Site	Rationale
BNWR01	Eastern Branch of the Little Blackwater River	This site is upstream of the proposed development
BNWR02	Adjacent to the USGS gaging station on the main stem of the Little Blackwater River	This site is just downstream of the proposed Egypt Road development.
BNWR03	Adjacent to hog farm on the Little Blackwater River downstream of USGS gaging station	This sample site captures a possible upstream source for contaminants to the BNWR.
BNWR04	Upstream BNWR boundary on the Little Blackwater River	This is the most upstream refuge location and most likely place to see the first impacts of contaminants from off refuge.
BNWR05	Near the confluence of the Little Blackwater River and the Blackwater River	This site will provide insight into contaminants and the effects that may be reaching the Blackwater River.
BNWR06	In Coulson Pond on the Blackwater River.	This site will serve as a reference and has similar stream characteristics as BNWR03, BNWR04 and BNWR05.
BNWR07	In Buttons Creek	This site will serve as a reference and has similar stream characteristics as BNWR01 and BNWR02

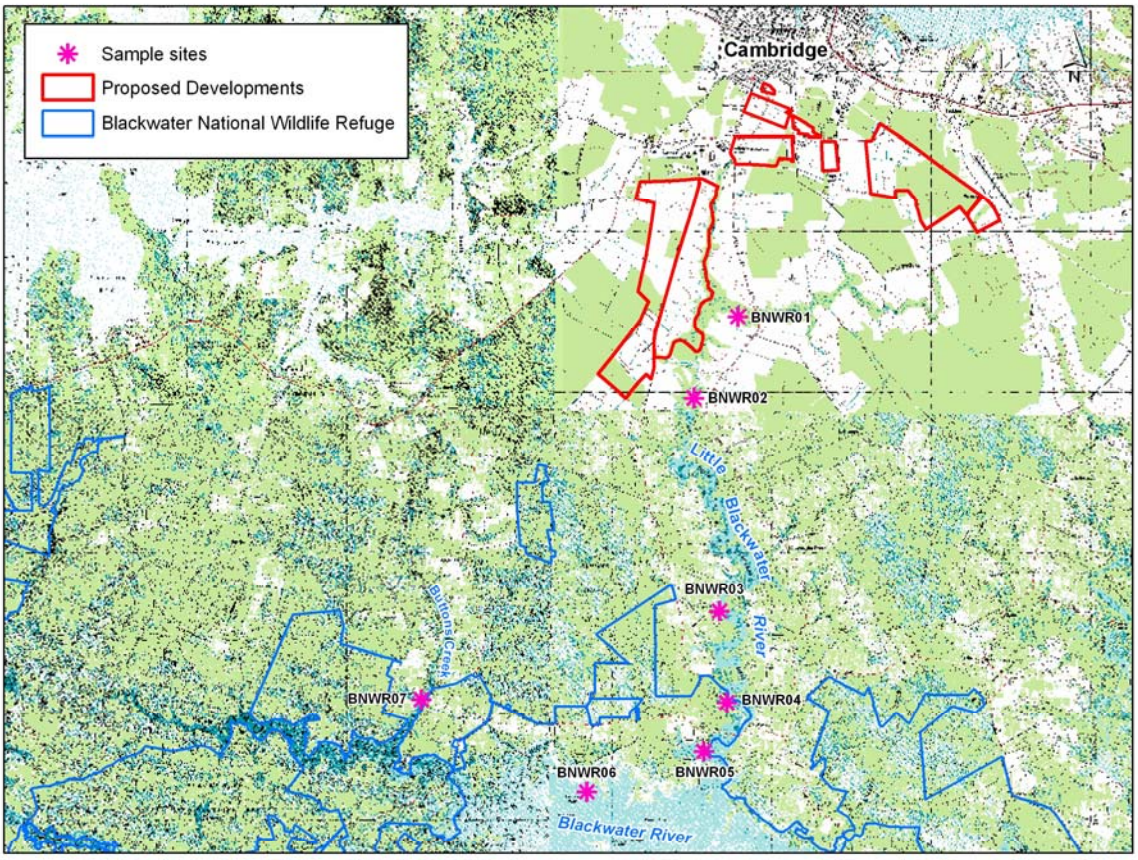

Figure 1. Sediment Quality Triad Sampling Locations
Blackwater National Wildlife Refuge

0 1.25 2.5 5 Kilometers

Map Created May 2005

Sediment Toxicity Tests

Sediment toxicity was assessed at all stations using the U.S. EPA 10-d *Hyalella azteca* whole sediment toxicity test method with survival and growth as endpoints (U.S. EPA, 2000). *H. azteca* for these tests were purchased from Chesapeake Cultures in Hayes, Va. This test method is summarized in Table 2. Overlying water for the *H. azteca* test was a 95/5 mix of freshwater and estuarine water to attain a conductivity of approximately 2,400 µmhos. All sediments were also assessed with a 10 day *L. plumulosus* test with survival and growth as endpoints. This test is similar to the U.S. EPA 10-d *H. azteca* survival and growth test described above with the exception of using an estuarine species, estuarine water renewals and ground tetramin as the food source. *L. plumulosus* were from cultures maintained at the WREC. This new *L. plumulosus* test method is summarized in Table 3. Overlying water for the *L. plumulosus* test was filtered estuarine water diluted to 5‰. The 10-d *L. plumulosus* test is a short-term chronic test similar to the chronic U.S. EPA 28-d *L. plumulosus* whole sediment toxicity test method except that it is only 10 days long and therefore has no reproduction endpoint (U.S. EPA/U.S. ACE, 2001). Experience with the *L. plumulosus* 28-day test in the past has shown a high variability in the reproduction endpoint and thus a limited ability to distinguish toxic sediments using this endpoint. This has led to the development of a 10 day *L. plumulosus* test with survival and growth as endpoints. Results from developmental work with the new10-d *L. plumulosus* test indicate that it as sensitive as the 28-d *L. plumulosus* test in detecting toxicity of sediment samples based on results from a dilution series of a toxic sediment containing a wide range of environmental contaminates from Baltimore Harbor, MD (Ziegler and Fisher, 2006).

Table 2. Test conditions for 10-d whole sediment toxicity test with *Hyalella azteca*.

1. Test type	Whole sediment, static renewal of overlying water
2. Temperature	23 ± 1°C
3. Overlying water	95:5 well/filtered estuarine water mix to attain a conductivity of approximately 2,400 µmhos
4. Renewal of overlying water	2 volume additions/d
5. Light	Wide-spectrum fluorescent lights, 100 to 1000 lux
6. Photoperiod	16:8 (L/D)
7. Test chamber	300 mL lip-less beaker with screened hole for water renewal (Randomly assigned on test table)
8. Sediment volume	100 ml
9. Overlying water volume	175 ml
10. Size and life stage of amphipods	7- to 14-d old; size sorted on nested 710 and 500 µm mesh sieves
11. Number of organisms/replicate	10 (Randomly assigned to test replicates)
12. Number of replicates	8
13. Feeding	1.0 ml YCT daily
14. Aeration	none
15. Water quality	Alkalinity, hardness, and total ammonia at beginning and end of test. Temperature, D.O., and pH daily. Porewater ammonia in dummy beaker at test initiation.
16. Test duration	10 d
17. Endpoints	Survival and growth (mg/ind)
18. Performance criteria	Control survival ≥ 80% Measurable growth in control amphipods

Table 3. Test conditions for 10-d whole sediment toxicity test with *Leptocheirus plumulosus*.

1. Test type	Whole sediment, static renewal of overlying water
2. Temperature	25 ± 1°C
3. Overlying water	Filtered Wye River water diluted to 5 ppt
4. Renewal of overlying water	2 volume additions/d
5. Light	Wide-spectrum fluorescent lights, 100 to 1000 lux
6. Photoperiod	16:8 (L/D)
7. Test chamber	300 mL lip-less beaker with screened hole for water renewal (Randomly assigned on test table)
8. Sediment volume	100 ml
9. Overlying water volume	175 ml
10. Size and life stage of amphipods	neonates; size sorted on nested 710 and 500 :m mesh sieves
11. Number of organisms/replicate	10 (Randomly assigned to test replicates)
12. Number of replicates	8
13. Feeding	Daily - TetraMin (ground and sieved to 250 μm)
14. Aeration	none
15. Water quality	Salinity, pH and total ammonia at beginning and end of test. Temperature and D.O. daily. Pore water ammonia in dummy beaker at test initiation.
16. Test duration	10 d
17. Endpoints	Survival and growth (mg/ind)
18. Performance criteria	Control survival ≥ 80% Measurable growth in control amphipods

Sediment and water physico-chemical characterization

Sediments was analyzed for PCBs PAHs, Organo Chlorine Pesticides (OCs), grain size, and total trace metals (Cd, Cu, Cr, Ni, Pb, Zn, As, Fe, Al and Hg). In addition, acid volatile sulfides and simultaneous extracted metals (SEM; Cd, Cu, Cr, Ni, Pb, Zn) will be analyzed in sediments. Trace metals will be analyzed in filtered water samples. All sediment analytical methods are similar to those described in the QAPP that was developed for the SQT project (USFWS, 1999). Sample analysis will be contracted through the U.S. Fish and Wildlife Service's Analytical Control Facility.

Data analysis

Data analysis will be similar to the procedures described in USFWS (1999) and the benthic macroinvertebrate and fish communities analysis is consistent with Maryland Biological Stream survey Index of Biological Integrity (MDDNR (1998)). Procedures for the analysis of sediment toxicity test data are presented in USEPA (2000). In addition, mean sediment quality guidelines and ambient water quality criteria will be used to summarize chemical data and establish relationships among chemical and biological endpoints (McGee *et al*., 1999; Long *et al*., 1998, EPA, 2009). These benchmarks are summarized in table 4 and 5 respectively

Table 4. Sediment benchmarks.

Sediment Benchmarks			
Substance	**Consensus-Based PEC**	**ERM**	**PEL**
Metals (in mg/kg dw)			
Arsenic	33	70	41.6
Cadmium	4.98	9.6	4.21
Chromium	111	370	160
Copper	149	270	108
Lead	128	218	112
Mercury	1.06	0.71	0.7
Nickel	48.6	51.6	42.8
Zinc	459	410	271
PAHs (in µg/kg dw)			
Anthracene	845	1100	245
Fluorene	536	540	144
Naphthalene	561	2100	391
Phenanthrene	1170	1500	544
Benz[a]anthracene	1050	1600	694
Benzo(a)pryene	1450	1600	763
Chrysene	1290	2800	846
Fluoranthene	2230	5100	1494
Pyrene	1520	2600	1398
Total PAHs	22800	44792	16770
Total PCBs	676	180	189
OC pesticides (in µg/kg dw)			
Chlorodane	17.6	NA	4.79
Dieldrin	61.8	NA	4.3
Sum DDD	28	NA	NA
Sum DDE	31.3	NA	NA
Sum DDT	62.9	NA	NA
Total DDTs	572	NA	51.7
Endrin	207	NA	NA
Heptachlor Epoxide	16	NA	NA
Lindane (gamma-BHC)	4.99	NA	0.99

Table 5. Ambient Water Quality Criteria. (from U.S. EPA 2009)

Substance	Fresh water acute	Fresh water chronic	Salt water acute	Salt water chronic
Metals (in ug/L)				
Arsenic	340[A,B,C]	150[A,B,C]	69[A,B,E]	36[A,B,E]
Cadmium	2.0[B,C,D,E]	0.25[C,D,E]	40[B,E]	8.8[B,E]
Chromium(III)	570d[B,C,D]	74[B,C,D]		
Chromium(VI)	16[B,C]	11[B,C]	1,100[B,E]	50[B,E]
Copper			4.8[B,F,G]	3.1 [B,F,G]
Lead	65[B,D,E,I]	2.5[B,D,E,I]	210[B,E]	8.1[B,E]
Mercury	1.4[B,C,J]	0.77[B,C,J]	1.8[B,K,J]	0.94[B,J,K]
Nickel	470[B,C,D]	52[B,C,D]	74[B,E]	8.2[B,E]
Selenium		5[L]	290[B,E,M]	71[B,E,M]
Silver	3.2[B,D,N]		1.9[B,N]	
Zinc	120[B,C,D]	120[B,C,D]	90[B,M]	81[B,M]
Cyanide	22[C,O]	5.2[C,O]	1[E,N]	1[E,N]
PAHs (in µg/kL)				
Acrolein	3	3		
Pentachlorophenol	19[C,H]	15[C,H]	13[E]	7.9[E]
Aldrin	3[N]		1.3[N]	
gamma BHC (Lindane)	0.95[C]		0.16[N]	
OC pesticides (in µg/L)				
Chlorodane	2.4[N]	0.0043[N,P]	0.09[N]	0.004[N,P]
Dieldrin	0.24[C]	0.056[C,Q]	0.71[N]	0.0019[N,P]
alpha-Endosulfan	0.22[N,R]	0.056[N,R]	0.034[N,R]	0.0087[N,R]
beta-Endosulfan	0.22[N,R]	0.056[N,R]	0.034[N,R]	0.0087[N,R]
4,4' DDT	1.1[N,S]	0.001[N,P,S]	0.13[N,S]	0.001[N,P,S]
Endrin	0.086[C]	0.036[C,Q]	0.037[N]	0.0023[N,P]
Heptachlor	0.52[N]	0.0038[N,P]	0.053[N]	0.0036[N,P]
Heptachlor Epoxide	0.52[N,T]	0.0038[N,P,T]	0.053[N,T]	0.0036[N,P,T]
Toxaphene	0.73	0.0002[P]	0.21	0.0002[P]
NPPs (ug/L)				
Aluminum pH 6.5-9.0	750[U,V]	87[U,V,W]		
Chloride	86000[U]	230000[U]		
Chlorine	19	11	13	7.5
Chloropyrifos	0.083[U]	0.041[U]	0.011[U]	0.0056[U]
Demeton		0.1[X]		0.1[X]
Guthion		0.01[X]		0.01[X]
Iron		1000[X]		
Malathion		0.1[X]		0.1[X]
Methoxychlor		0.03[X]		0.03[X]
Mirex		0.001[X]		0.001[X]
Nonylphenol	28	28	7	7
Diazinon	0.17	0.17	0.82	0.82
Parthion	0.065[Y]	0.013[Y]		
Sulfide-Hydrogen Sulfide		2[X]	2[X]	
Tributylin (TBT)	0.46[Z]	0.072[Z]	0.42[Z]	0.0074[Z]

Footnotes

[A] This recommended water quality criterion was derived from data for arsenic (III), but is applied here to total arsenic, which might imply that arsenic (III) and arsenic (V) are equally toxic to aquatic life and that their toxicities are additive. In the arsenic criteria document (PDF) (74 pp., 3.2 MB) (EPA 440/5-84-033, January 1985), Species Mean Acute Values are given for both arsenic (III) and arsenic (V) for one species for five species and the ratios for the SMAVs for each species range from 0.6 to 1.7. Chronic values are available for both arsenic (III) and arsenic (V) for one species; for the feathered minnow, the chronic value for arsenic (V) is 0.29 times the chronic value for arsenic (III). No data are know to be available concerning whether the toxicities of the forms of arsenic to aquatic organism are additive.

[B] Freshwater and saltwater criteria for metals are expressed in terms of the dissolved metals in the water column. The recommended water quality criteria value was calculated by using the previous 304(a) aquatic life criteria expressed in terms of total recoverable metal, and multiplying it by a conversion factor (CF). The term "Conversion Factor" (CF) represents the recommended conversion factor for converting a metal criterion expressed as the total recoverable fraction in the water column to a criterion expressed as the dissolved fraction in the water column. (Conversion Factors for saltwater CCCs are not currently available. Conversion factors derived for saltwater CMCs have been used for both saltwater CMCs and CCCs). See "," (49 pp., 3MB) October 1, 1993, by Martin G. Prothro, Acting Assistant Administrator for Water, available from the Water Resource Center and 40 CFR§ 131.36(b)(1). Conversion factors applied in the table can be found in Appendix A to the Preamble-Conversion Factors for Dissolved Metals. Office of Water Policy and Technical Guidance on Interpretation and Implementation of Aquatic Life Metals Criteria (PDF)

[C] This recommended criterion is based on a 304(a) aquatic life criterion that was issued in the 1995 Updates: Water Quality Criteria Documents for the Protection of Aquatic Life in Ambient Water , (EPA 820-B96-001, September 1996). This value was derived using the GLI Guidelines (60 FR 15393- 15399, March 23, 1995; 40CFR132 Appendix A); the difference between the 1985 Guidelines and the GLI Guidelines are explained on page iv of the 1995 Updates. None of the decisions concerning the derivation of this criterion were affected by any considerations that are specific to the Great Lakes.

[D] The freshwater criterion for this metal is expressed as a function of hardness (mg/L) in the water column. The value given here corresponds to a hardness of 100 mg/L. Criteria values for other hardness may be calculated from the following: CMC (dissolved) = exp $\{m_A [\ln(\text{hardness})] + b_A\}$ (CF) or, CCC (dissolved) = exp$\{m_c[\ln(\text{hardness})] + b_C\}$ (CF) and the parameters specified in Appendix B-Parameters for calculating Freshewater Dissolved Metals Criteria That Are Hardiness-Dependent.

[E] This water quality criterion is based on 304(a) aquatic life criterion that was derived using the 1985 Guidelines (PDF) (104pp., 3.3 MB) (*Guidelines for Deriving Numerical National Water Quality Criteria for the Protection of Aquatic Organisms and Their Uses,* PB85-227049, January 1985) and was issued in one of the following criteria documents: Arsenic (PDF) (74 pp., 3.2MB) (EPA 440/5-84-033), Cadmium (EPA 822-R-01-001), Chromium (EPA 440/5-84-029), Copper (PDF) (150pp., 6.2 MB) (EPA 440/5-84-031), Cyanide (PDF) (67pp., 2.7 MB) (EPA 440/5-84-028), Lead (EPA 440/5-84-027), Nickel (EPA 440/5-86-004), Pentachlorophenol (EPA 440/5-86-009), Toxaphene (EPA 440/5-86-006), Zinc (EPA 440/5-87-003).

[F] When the concentration of dissolved organic carbon is elevated, copper is substantially less toxic and use of Water-Effect Ratios might be appropriate.

[G] This recommended water quality criterion was derived in Ambient Water Quality Criteria Saltwater Copper Addendum (Draft, April 14, 1995) and was promulgated in the Interim final National Toxics Rule (60 FR 22228-222237, May 4, 1995).

[H] Freshwater aquatic life values for pentachlorophenol are expressed as a function of pH, and are calculated as follows: CMC = exp(1.005(pH)-4.869); CCC = exp(1.005(pH)-5.134). Values displayed in table correspond to a pH of 7.8.

[I] EPA is actively working on this criterion and so this recommended water quality criterion may change substantially in the near future.

[J] This recommended water quality criterion was derived from data for inorganic mercury (II), but is applied here to total mercury. If a substantial portion of the mercury in the water column is methylmercury, this criterion will probably be under protective. In addition, even though inorganic mercury is converted to methylmercury and methylmercury bioaccumulates to a great extent, this criterion does not account for uptake via the food chain because sufficient data were not available when the criterion was derived.

[K] This recommended water quality criterion was derived on page 43 of the mercury criteria document (PDF) (144 pp, 6.4 MB) (EPA 440/5-84-026, January 1985). The saltwater CCC of 0.025 ug/L given on page 23 of the criteria document is based on the Final Residue Value procedure in the 1985 Guidelines. Since the publication of the Great Lakes Aquatic Life Criteria Guidelines in 1995 (60 FR 15393-15399, March 23, 1995), the Agency no longer uses the Final Residue Value procedure for deriving CCCs for new or revised 304(a) aquatic life criteria.

[L] This recommended water quality criterion for selenium is expressed in terms of total recoverable metal in the water column. It is scientifically acceptable to use the conversion factor (0.996- CMC or 0.922- CCC) that was used in the GLI to convert this to a value that is expressed in terms of dissolved metal.

[M] The selenium criteria document (EPA 440/5-87-006, September 1987) provides that if selenium is as toxic to saltwater fishes in the field as it is to freshwater fishes in the field, the status of the fish community should be monitored whenever the concentration of selenium exceeds 5.0 g/L in salt water because the saltwater CCC does not take into account uptake via the food chain.

[N] This Criterion is based on 304(a) aquatic life criterion issued in 1980, and was issued in one of the following documents: Aldrin/Dieldrin (PDF) (153 pp, 7.3 MB) (EPA 440/5-80-019), Chlordane (PDF) (68 pp, 3.1 MB) (EPA 440/5-80-027), DDT (PDF) (175 pp, 8.3 MB) (EPA 440/5-80-038), Endosulfan (PDF) (155 pp, 7.3 MB) (EPA 440/5-80-046), Endrin (PDF) (103 pp, 4.6 MB) (EPA 440/5-80-047), Heptachlor (PDF) (114 pp, 5.4 MB) (EPA 440/5-80-052), Hexachlorocyclohexane (PDF) (109 pp, 4.8 MB) (EPA 440/5-80-054), Silver (EPA 440/5-80-071). The Minimum

Data Requirements and derivation procedures were different in the 1980 Guidelines than in the 1985 Guidelines (PDF) (104 pp, 3.3 MB) . For example, a "CMC" derived using the 1980 Guidelines was derived to be used as an instantaneous maximum. If assessment is to be done using an averaging period, the values given should be divided by 2 to obtain a value that is more comparable to a CMC derived using the 1985 Guidelines.

[O] This recommended water quality criterion is expressed as g free cyanide (as CN)/L.

[P] This criterion is based on a 304(a) aquatic life criterion issued in 1980 or 1986, and was issued in one of the following documents: Aldrin/Dieldrin (PDF) (153 pp, 7.3 MB) (EPA 440/5-80-019), Chlordane (PDF) (68 pp, 3.1 MB) (EPA 440/5-80-027), DDT (PDF) (175 pp, 8.3 MB) (EPA 440/5-80-038), Endrin (PDF) (103 pp, 4.6 MB) (EPA 440/5-80-047), Heptachlor (PDF) (114 pp, 5.4 MB) (EPA 440/5-80-052), Polychlorinated biphenyls (EPA 440/5-80-068), Toxaphene (EPA 440/5-86-006). This CCC is currently based on the Final Residue Value (FRV) procedure. Since the publication of the Great Lakes Aquatic Life Criteria Guidelines in 1995 (60 FR 15393-15399, March 23, 1995), the Agency no longer uses the Final Residue Value procedure for deriving CCCs for new or revised 304(a) aquatic life criteria. Therefore, the Agency anticipates that future revisions of this CCC will not be based on the FRV procedure.

[Q] The derivation of the CCC for this pollutant (Endrin) did not consider exposure through the diet, which is probably important for aquatic life occupying upper trophic levels.

[R] This value was derived from data for endosulfan and is most appropriately applied to the sum of alpha-endosulfan and beta-endosulfan.

[S] This criterion applies to DDT and its metabolites (i.e., the total concentration of DDT and its metabolites should not exceed this value).

[T] This value was derived from data for heptachlor and the criteria document provides insufficient data to estimate the relative toxicities of heptachlor and heptachlor epoxide.

[U] This value is based on a 304(a) aquatic life criterion that was derived using the 1985 Guidelines (Guidelines for Deriving Numerical National Water Quality Criteria for the Protection of Aquatic Organisms and Their Uses, PB85-227049, January 1985) and was issued in one of the following criteria documents: Aluminum (EPA 440/5-86-008); Chloride (EPA 440/5-88-001); Chloropyrifos (EPA 440/5-86-005).

[V] This value for aluminum is expressed in terms of total recoverable metal in the water column.

[W] There are three major reasons why the use of Water-Effect Ratios might be appropriate.

[X] The derivation of this value is presented in the Red Book (EPA 440/9-76-023, July, 1976).

[Y] This value is based on a 304(a) aquatic life criterion that was issued in the 1995 Updates: Water Quality Criteria Documents for the Protection of Aquatic Life in Ambient Water (EPA 820-B-96-001). This value was derived using the GLI Guidelines (60 FR 15393-15399, March 23, 1995; 40CFR132 Appendix A); the differences between the 1985 Guidelines and the GLI Guidelines are explained on page iv of the 1995 Updates. No decision concerning this criterion was affected by any considerations that are specific to the Great Lakes.

[Z] EPA announced the availability of a draft updated tributyltin (TBT) document on August 7, 1997 (62 FR 42554). The Agency has reevaluated this document and anticipates releasing an updated document for public comment in the near future.

RESULTS AND DISCUSSION

Water and Sediment Chemistry

Water and sediment chemistry are presented in Appendix A. In general, results were similar between year 1 and year 2. Most of the chemicals analyzed in water were below selected Ambient Water Quality Criteria (AWQC) benchmarks in one or both years, with the exception of silver, lead, alpha chlorodane, gamma chlorodane, heptachlor epoxide, dieldren, and mirex. Although silver, lead, alpha chlorodane, gamma chlorodane, heptachlor epoxide, dieldren, and mirex exceeded the selected benchmark, all except lead exceeded the selected benchmark because the method detection limit was greater than the AWQC. In 2006, lead slightly exceeded the freshwater chronic AWQC of 2.1 at BNWR02 and BNWR03 with readings of 2.64 and 2.6 respectively. In year 2, all lead levels were below AWQC. All sediment samples were below the selected benchmarks both years

Sediment Toxicity

None of the sediments collected in 2006 or 2007 were toxic based on the results of these 10-d tests with *Hyalella azteca* and *Leptocheirus plumulosus*. Thus, it does not appear that toxics are of concern to benthic organisms at these stations in the little Blackwater River or Buttons Creek. Complete results and analysis of the sediment toxicity test are presented in Appendix B**.**

Benthic Invertebrate Community

Results from the sampling in 2006 indicated that the benthic fauna at the seven stations sampled did not display healthy community characteristics. No molluscs or large polychaete were collected from any of the stations sampled leading to low biomass at all stations. Only one station (BNWR06) had amphipod and isopod crustaceans which is another indicator of a healthy benthic community as well as important prey items for fish and crabs. The dominant taxa were generally all pollution indicative in the oligochaete, polychaete, and chironomid taxonomic groups. The major factor contributing to the poor IBI scores in 2006 was thought to be salinity fluctuations in areas that swing between tidal fresh to mesohaline. In addition, localized low DO resulting from the decaying marsh material could have been a factor.

The 2007 results indicated an even more degraded community at these stations. Six of the seven benthic samples collected did not contain a single organism. All of the azoic stations were located in the tidal fresh/oligohaline areas. The lack of even pollution tolerant oligochaete worms and chironomid larva indicates that these stations may have been subjected to extended periods of anoxic waters. The one station with organisms, BNWR06, had some salt intrusion based on the presence of estuarine species, i.e., *Edotea triloba* (isopod), *Gammarus daiberi* (amphipod), *Almyracuma proximoculi* (cumacid), *Eteone heteropoda* and *Streblospio benedicti* (polychaete). The B-IBI score of 1.4 (severely degraded) at this station was the same as when sampled in 2006. The lack of abundance, biomass, and equilibrium-type organisms (i.e., clams and polychaetes) led to a metric score of one for all five metrics scored in the B-IBI.. Complete results and analysis of the benthic community are presented in Appendix B**.**

Fish Communities

Seven sites were sampled in 2006 (1 fyke net per site, 24 hour sets) and five sites were sampled in 2007, for a total of 288 sampling hours. Equipment failure (boat engine) in 2007 resulted in sampling not occurring on two of the intended sites (BNWR05 and BNWR06). Collections over the two year period included 22 vertebrate species, encompassing 1,889 individual animals. 272 individuals were collected in 2007, and 1,617 were collected in 2006. The difference in total species abundance between years was attributed to large numbers of white perch and brown bullhead being collected in 2006. 2007 samples included three species not observed in 2006; goldfish, white catfish, and largemouth bass. Complete results and analysis of the fish community are presented in Appendix C**.**

CONCLUSION

In general the Little Blackwater River watershed has had little impact from contaminants evaluated in this study. Although the benthic community in this watershed is depressed, it is more likely a function of the physical characteristics of the shallow water system rather than an effect of contaminants evaluated in this study.

This study was intended to evaluate the impacts of urbanization on water and sediment in the Little Blackwater River watershed. In addition to the effects on water and sediment quality, we intended to evaluate the change in sediment toxicity, as well as benthic and fish community as development replaced forest and farm fields in this watershed. Between 2006 and 2007 sampling, the United States entered a severe economic recession in which most of the major development across the nation slowed or stopped. There was little or no development changes in the Little Blackwater River watershed over the course of this study. Therefore, instead of using this study as an evaluation of urbanization impacts on the Little Blackwater River watershed, it will serve as two years of baseline data in which future urban impacts can be compared.

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Appendix A
Sediment and water chemistry data: Year 1 (2006) and Year 2 (2007).

2006 Water Chemistry.

Real time Water Quality Data from Sediment and Benthic sampling events Year 1 (2006)								
Station	Date	Depth	Temperature	D.O.	% D.O.	Conductivity	pH	Sal
		(m)	(˚C)	(ppm)	saturation	(mmhos/cm)		(ppt)
BNWR01	7/11/2006	2	27.51	4.29	46.3	0.176	6.26	0.09
BNWR02	7/11/2006	1.2	29.45	8.54	98.1	0.32	6.52	0.15
BNWR03	7/11/2006	<1	30.86	12.06	158.7	1.268	8.14	0.63
BNWR04	7/11/2006	<1	30.69	12.93	177	7.1	8.94	4
BNWR05	7/11/2006	<1	30.66	11.85	161.8	8.44	8.67	4.7
BNWR06	7/12/2006	<1	28.68	10.25	105.4	10.25	6.75	5.8
BNWR07	7/12/2006	<1	32.76	6.66	92.7	2.4	6.76	1.24

Metals Yr 1 (2006) Filtered Water Results in µg/L							
Station ID	BNWR01	BNWR02	BNWR03	BNWR04	BNWR05	BNWR06	BNWR07
Ag	10[a]	10[a]	10[a]	10[a]	10[a]	10[a]	10[a]
Al	**270**	**718**	**1370**	**347**	**1160**	**829**	**1390**
As	0.05	0.05	0.05	0.1	0.1	0.1	0.05
B	**40**	**50**	**150**	**546**	**675**	**817**	**192**
Ba	**37**	**38**	**29**	**64**	**76**	**88**	**84**
Be	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Ca	**10300**	**9200**	**13500**	**55000**	**66800**	**79900**	**19700**
Cd	**0.03**	**0.03**	**0.04**	0.04	**0.05**	**0.04**	**0.05**
Co	5	5	5	5	5	5	5
Cr	5	5	5	5	5	5	5
Cu	5	5	5	5	5	5	5
Fe	10	10	10	10	10	10	10
Hg	0.03	0.03	0.03	0.03	0.03	0.03	0.03
K	**7670**	**8680**	**16200**	**57700**	**69500**	**83100**	**21600**
Mg	**4650**	**7540**	**26300**	**151000**	**187000**	**227000**	**47000**
Mn	**302**	**231**	**242**	**294**	**299**	**186**	**270**
Mo	10	10	10	10	10	10	10
Na	**15600**	**37300**	**181000**	**1260000**	**1580000**	**1960000**	**372000**
Ni	5	5	5	5	5	5	5
P	**1170**	**811**	**822**	**446**	**422**	**269**	**529**
Pb	**0.82**	2.64[b]	2.6[b]	**1.08**	**2.06**	**1.86**	**2.31**
S	**2300**	**4200**	**14500**	**98900**	**127000**	**154000**	**19400**
Se	**0.3**	**0.3**	**0.2**	0.2	0.2	0.2	**0.2**
Si	**4820**	**3810**	**3510**	**1560**	**2320**	**1400**	**3600**
Sr	**49.9**	**61.7**	**164**	**941**	**1160**	**1430**	**275**
Ti	5	**7**	**14**	5	**12**	**8**	**9**
V	10	10	10	10	10	10	10
Zn	2	**5**	**6**	2	**5**	**4**	**7**

numbers in bold are detected, numbers underlined exceed AWQC, [a] = exceeds acute freshwater Ambient Water Quality Criteria benchmark (EPA, 2009), [b] = exceeds chronic freshwater Ambient Water Quality Criteria.

Aromatics Yr 1 (2006) Water Results in µg/L							
Station ID	BNWR01	BNWR02	BNWR03	BNWR04	BNWR05	BNWR06	BNWR07
1,6,7-Trimethyl-naphthalene	0.00476	0.00475	0.00472	0.00474	0.00471	0.00476	0.00476
1-methylnaphthalene	0.00476	0.00475	0.00472	0.00474	0.00471	0.00476	0.00476
1-methylphenanthrene	0.00476	0.00475	0.00472	0.00474	0.00471	0.00476	0.00476
2,6-dimethylnaphthalene	0.00476	0.00475	0.00472	0.00474	0.00471	0.00476	0.00476
2-methylnaphthalene	0.00476	0.00475	0.00472	0.00474	0.00471	0.00476	0.00476
acenaphthalene	0.00476	0.00475	0.00472	0.00474	0.00471	0.00476	0.00476
acenaphthene	0.00476	0.00475	0.00472	0.00474	0.00471	0.00476	0.0059
anthracene	0.00476	0.00475	0.00472	0.00474	0.00471	0.00476	0.00476
Benzo(a)anthracene	0.00476	0.00475	0.00472	0.00474	0.00471	0.00476	0.00476
benzo(a)pyrene	0.00476	0.00475	0.00472	0.00474	0.00471	0.00476	0.00476
benzo(b)fluoranthene	0.00476	0.00475	0.00472	0.00474	0.00471	0.00476	0.00476
benzo(e)pyrene	0.00476	0.00475	0.00472	0.00474	0.00471	0.00476	0.00476
benzo(g,h,i)perylene	0.00476	0.00475	0.00472	0.00474	0.00471	0.00476	0.00476
benzo(k)fluoranthene	0.00476	0.00475	0.00472	0.00474	0.00471	0.00476	0.00476
biphenyl	0.00476	0.00475	0.00472	0.00474	0.00471	0.00476	0.00476
C1-chrysenes	0.00476	0.00475	0.00472	0.00474	0.00471	0.00476	0.00476
C1-dibenzothiophenes	0.00476	0.00475	0.00472	0.00474	0.00471	0.00476	0.00476
C1-Fluoranthenes & Pyrenes	0.00476	0.00475	0.00472	0.00474	0.00471	0.00476	0.00476
C1-fluorenes	0.00476	0.00475	0.00472	0.00474	0.00471	0.00476	0.00476
C1-naphthalenes	0.00476	0.00475	0.00472	0.00474	0.00471	0.00476	0.00476
C1-Phenanthrenes & Anthracenes	0.00476	0.00475	0.00472	0.00474	0.00471	0.00476	0.00476
C2-chrysenes	0.00476	0.00475	0.00472	0.00474	0.00471	0.00476	0.00476
C2-dibenzothiophenes	0.00476	0.00475	0.00472	0.00474	0.00471	0.00476	0.00476
C2-fluorenes	0.00476	0.00475	0.00472	0.00474	0.00471	0.00476	0.00476
C2-naphthalenes	0.00476	0.00475	0.00472	0.00474	0.00471	0.00476	0.00476
C2-Phenanthrenes & Anthracenes	0.00476	0.00475	0.00472	0.00474	0.00471	0.00476	0.00476
C3-chrysenes	0.00476	0.00475	0.00472	0.00474	0.00471	0.00476	0.00476
C3-dibenzothiophenes	0.00476	0.00475	0.00472	0.00474	0.00471	0.00476	0.00476
C3-fluorenes	0.00476	0.00475	0.00472	0.00474	0.00471	0.00476	0.00476
C3-naphthalenes	0.00476	0.00475	0.00472	0.00474	0.00471	0.00476	0.00476
C3-Phenanthrenes & Anthracenes	0.00476	0.00475	0.00472	0.00474	0.00471	0.00476	0.00476
C4-chrysenes	0.00476	0.00475	0.00472	0.00474	0.00471	0.00476	0.00476
C4-naphthalenes	0.00476	0.00475	0.00472	0.00474	0.00471	0.00476	0.00476
C4-Phenanthrenes & Anthracenes	0.00476	0.00475	0.00472	0.00474	0.00471	0.00476	0.00476
chrysene	0.00476	0.00475	0.00472	0.00474	0.00471	0.00476	0.00476
Dibenz(a,h)anthracene	0.00476	0.00475	0.00472	0.00474	0.00471	0.00476	0.00476
dibenzothiophene	0.00476	0.00475	0.00472	0.00474	0.00471	0.00476	0.00476
fluoranthene	0.00476	0.00475	0.00472	0.00474	0.00471	0.00476	0.00476
fluorene	0.00476	0.00475	0.00472	0.00474	0.00471	0.00476	0.00476
indeno(1,2,3-cd)pyrene	0.00476	0.00475	0.00472	0.00474	0.00471	0.00476	0.00476
naphthalene	0.00621	0.00475	0.00472	0.00474	0.00471	0.00476	0.00476
perylene	0.00476	0.00475	0.00472	0.00474	0.00471	0.00476	0.00476
phenanthrene	0.00476	0.00475	0.00556	0.00655	0.00471	0.00476	0.00476
pyrene	0.00476	0.00475	0.00472	0.00474	0.00471	0.00476	0.00476
numbers bolded denote detected samples, numbers underlined exceed AWQC.							

Organochlorines Yr 1 (2006) Water Results in µg/L							
Station ID	BNWR01	BNWR02	BNWR03	BNWR04	BNWR05	BNWR06	BNWR07
Aldrin	0.00238	0.00238	0.00236	0.00237	0.00235	0.00238	0.00238
alpha BHC	0.00238	0.00238	0.00236	0.00237	0.00235	0.00238	0.00238
alpha chlordane	0.00238	0.00238	0.00236	0.00237	0.00235	0.00238	0.00238
beta BHC	0.00238	0.00238	0.00236	0.00237	0.00235	0.00238	0.00238
cis-nonachlor	0.00238	0.00238	0.00236	0.00237	0.00235	0.00238	0.00238
delta BHC	0.00238	0.00238	0.00236	0.00237	0.00235	0.00238	0.00238
dieldrin	0.00238	0.00238	0.00236	0.00237	0.00235	0.00238	0.00238
endosulfan II	0.00238	0.00238	0.00236	0.00237	0.00235	0.00238	0.00238
endrin	0.00238	0.00238	0.00236	0.00237	0.00235	0.00238	0.00238
gamma BHC	0.00238	0.00238	0.00236	0.00237	0.00235	0.00238	0.00238
gamma chlordane	0.00238	0.00238	0.00236	0.00237	0.00235	0.00238	0.00238
HCB	0.00238	0.00238	0.00236	0.00237	0.00235	0.00238	0.00238
Heptachlor	0.00238	0.00238	0.00236	0.00237	0.00235	0.00238	0.00238
heptachlor epoxide	0.00238	0.00238	0.00236	0.00237	0.00235	0.00238	0.00238
mirex	0.00238[a]	0.00238[a]	0.00236[a]	0.00237[a]	0.00235[a]	0.00238[a]	0.00238[a]
o,p'-DDD	0.00238	0.00238	0.00236	0.00237	0.00235	0.00238	0.00238
o,p'-DDE	0.00238	0.00238	0.00236	0.00237	0.00235	0.00238	0.00238
o,p'-DDT	0.00238	0.00238	0.00236	0.00237	0.00235	0.00238	0.00238
oxychlordane	0.00238	0.00238	0.00236	0.00237	0.00235	0.00238	0.00238
p,p'-DDD	0.00238	0.00238	0.00236	0.00237	0.00235	0.00238	0.00238
p,p'-DDE	0.00238	0.00238	0.00236	0.00237	0.00235	0.00238	0.00238
p,p'-DDT	0.00238	0.00238	0.00236	0.00237	0.00235	0.00238	0.00238
PCB-1242	0.119	0.119	0.118	0.118	0.118	0.119	0.119
PCB-1248	0.119	0.119	0.118	0.118	0.118	0.119	0.119
PCB-1254	0.119	0.119	0.118	0.118	0.118	0.119	0.119
PCB-1260	0.119	0.119	0.118	0.118	0.118	0.119	0.119
PCB-1268	0.119	0.119	0.118	0.118	0.118	0.119	0.119
PCB-TOTAL	0.119	0.119	0.118	0.118	0.118	0.119	0.119
pentachloro-anisole	0.00238	0.00238	0.00236	0.00237	0.00235	0.00238	0.00238
toxaphene	0.119	0.119	0.118	0.118	0.118	0.119	0.119
trans-nonachlor	0.00238	0.00238	0.00236	0.00237	0.00235	0.00238	0.00238

numbers bolded denote detected samlpes, numbers underlined exceed AWQC, [a] = exceeds acute freshwater Ambient Water Quality Criteria benchmark (EPA, 2009).

2007 Water Chemistry.

Real time Water Quality Data from Sediment and Benthic sampling events Year 2 (2007)								
Station	Date	Depth	Temperature	D.O.	% D.O.	Conductivity	pH	Sal
		(m)	(˚C)	(ppm)	saturation	(mmhos/cm)		(ppt)
BNWR01	7/10/2007	1.7	31.13	4.3	57.8	0.49	6.3	0.24
BNWR02	7/10/2007	<1	32.02	5.79	NA	1.46	6.92	0.77
BNWR03	7/10/2007	<1	33.51	9.6	145.8	7.07	9.33	3.91
BNWR04	7/10/2007	<1	32.44	6.97	103	12.94	7.89	7.48
BNWR05	7/11/2007	<1	29.09	4.25	57.6	12.85	7.25	7.39
BNWR06	7/11/2007	<1	28.21	4.56	63.2	13.23	7.03	7.61
BNWR07	7/11/2007	<1	32.71	10.14	143.7	6.89	7.71	3.8

Metals Yr 2 (2007) Filtered Water Results in μg/L							
Station ID	BNWR01	BNWR02	BNWR03	BNWR04	BNWR05	BNWR06	BNWR07
Ag	10[a]	10[a]	10[a]	10[a]	10[a]	10[a]	10[a]
Al	10	10	10	10	10	10	10
As	**1.59**	**1.83**	**3.72**	**3.09**	**3.2**	**3.19**	**2.65**
B	**60**	**127**	**511**	**980**	**989**	**1020**	**532**
Ba	**14**	**36**	**100**	**96**	**105**	**105**	**193**
Be	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Ca	**12000**	**18600**	**54900**	**95600**	**97000**	**99300**	**56400**
Cd	0.01	0.01	0.01	0.02	0.02	0.02	0.01
Co	5	5	5	5	5	5	5
Cr	5	5	5	5	5	5	5
Cu	5	5	5	5	5	5	5
Fe	**120**	10	30	10	10	10	10
Hg	0.03	0.03	0.03	0.03	0.03	0.03	0.03
K	**8400**	**13600**	**47100**	**85400**	**87500**	**89100**	**46100**
Mg	**7830**	**23200**	**126000**	**259000**	**261000**	**272000**	**130000**
Mn	2	2	2	2	2	2	2
Mo	10	10	10	10	10	10	10
Na							
Ni	5	5	5	5	5	5	5
P	**205**	**132**	**260**	50	50	50	50
Pb	0.02	**0.04**	**0.06**	**0.06**	**0.05**	**0.05**	0.02
S	**4100**	**11400**	**95200**	**208000**	**208000**	**217000**	**97500**
Se	**0.11**	**0.18**	**0.33**	**0.46**	**0.43**	**0.56**	**0.42**
Si							
Sr	**62.7**	**147**	**839**	**1700**	**1710**	**1770**	**876**
Ti	5	5	5	5	5	5	5
V	10	10	10	10	10	10	10
Zn	2	2	2	2	2	2	2

numbers in bold are detected, numbers underlined exceed AWQC, [a] = exceeds acute freshwater Ambient Water Quality Criteria benchmark (EPA, 2009).

Aromatics Yr 2 (2007) Water Results in µg/L							
Station ID	BNWR01	BNWR02	BNWR03	BNMR04	BNWR05	BNWR06	BNWR07
1,6,7-Trimethyl-naphthalene	0.05	0.05	0.05	0.05	0.05	0.05	0.05
1-methylnaphthalene	0.05	0.05	0.05	0.05	0.05	0.05	0.05
1-methylphenanthrene	0.05	0.05	0.05	0.05	0.05	0.05	0.05
2,6-dimethylnaphthalene	0.05	0.05	0.05	0.05	0.05	0.05	0.05
2-methylnaphthalene	0.05	0.05	0.05	0.05	0.05	0.05	0.05
acenaphthalene	0.05	0.05	0.05	0.05	0.05	0.05	0.05
acenaphthene	0.05	0.05	0.05	0.05	0.05	0.05	0.05
anthracene	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Benzo(a)anthracene	0.05	0.05	0.05	0.05	0.05	0.05	0.05
benzo(a)pyrene	0.05	0.05	0.05	0.05	0.05	0.05	0.05
benzo(b)fluoranthene	0.05	0.05	0.05	0.05	0.05	0.05	0.05
benzo(e)pyrene	0.05	0.05	0.05	0.05	0.05	0.05	0.05
benzo(g,h,i)perylene	0.05	0.05	0.05	0.05	0.19	0.07	0.14
benzo(k)fluoranthene	0.05	0.05	0.05	0.05	0.05	0.05	0.05
biphenyl	0.05	0.05	0.05	0.05	0.05	0.05	0.05
C1-chrysenes	**0.1**	**0.7**	**0.7**	0.5	0.5	0.5	0.5
C1-dibenzothiophenes	0.5	0.5	0.5	0.5	0.5	0.5	0.5
C1-Fluoranthenes & Pyrenes	0.5	0.5	0.5	0.5	0.5	0.5	0.5
C1-fluorenes	0.5	0.5	0.5	0.5	0.5	0.5	0.5
C1-naphthalenes	0.5	0.5	0.5	0.5	0.5	0.5	0.5
C1-phenanthrenes	0.5	0.5	0.5	0.5	0.5	0.5	0.5
C2-chrysenes	0.5	0.5	0.5	0.5	0.5	0.5	0.5
C2-dibenzothiophenes	0.5	0.5	0.5	0.5	0.5	0.5	0.5
C2-fluorenes	0.5	0.5	0.5	0.5	0.5	0.5	0.5
C2-naphthalenes	0.5	0.5	0.5	0.5	0.5	0.5	0.5
C2-phenanthrenes	0.5	0.5	0.5	0.5	0.5	0.5	0.5
C3-chrysenes	0.5	0.5	0.5	0.5	0.5	0.5	0.5
C3-dibenzothiophenes	0.5	0.5	0.5	0.5	0.5	0.5	0.5
C3-fluorenes	0.5	0.5	0.5	0.5	0.5	0.5	0.5
C3-naphthalenes	0.5	0.5	0.5	0.5	0.5	0.5	0.5
C3-phenanthrenes	0.5	0.5	0.5	0.5	0.5	0.5	0.5
C4-chrysenes	0.5	0.5	0.5	0.5	0.5	0.5	0.5
C4-naphthalenes	0.5	0.5	0.5	0.5	0.5	0.5	0.5
C4-phenanthrenes	0.5	0.5	0.5	0.5	0.5	0.5	0.5
chrysene	0.1	0.07	0.07	0.05	0.05	0.05	0.05
Dibenz(a,h)anthracene	**0.06**	0.05	0.05	0.05	0.07	0.05	**0.07**
dibenzothiophene	0.05	0.05	0.05	0.05	0.05	0.05	0.05
fluoranthene	0.05	0.05	0.05	0.05	0.05	0.05	0.05
fluorene	0.05	0.05	0.05	0.05	0.05	0.05	0.05
indeno(1,2,3-cd)pyrene	**0.06**	0.05	**0.06**	**0.06**	0.07	0.05	**0.56**
naphthalene	0.05	0.05	0.05	**0.06**	0.05	0.05	0.05
perylene	**0.08**	**0.07**	**0.1**	**0.09**	**0.1**	**0.06**	**0.2**
phenanthrene	**0.06**	0.05	0.05	0.05	0.05	0.05	0.05
pyrene	0.05	0.05	0.05	0.05	0.05	0.05	0.05
numbers in bold are detected, numbers underlined exceed AWQC.							

Organochlorines Yr 2 (2007) Water Results in µg/L							
	BNWR01	BNWR02	BNWR03	BNMR04	BNWR05	BNWR06	BNWR07
alpha BHC	0.02	0.02	0.02	0.02	0.02	0.02	0.02
alpha chlordane	0.02[a]	0.02[a]	0.02[a]	0.02[a]	0.02[a]	0.02[a]	0.02[a]
beta BHC	0.02	0.02	0.02	0.02	0.02	0.02	0.02
cis-nonachlor	0.02	0.02	0.02	0.02	0.02	0.02	0.02
delta BHC	0.02	0.02	0.02	0.02	0.02	0.02	0.02
dieldrin	0.02[a]	0.02[a]	0.02[a]	0.02[a]	0.02[a]	0.02[a]	0.02[a]
endrin	0.02	0.02	0.02	0.02	0.02	0.02	0.02
gamma BHC	0.02	0.02	0.02	0.02	0.02	0.02	0.02
gamma chlordane	0.02[a]	0.02[a]	0.02[a]	0.02[a]	0.02[a]	0.02[a]	0.02[a]
HCB	0.02	0.02	0.02	0.02	0.02	0.02	0.02
heptachlor epoxide	0.02[a]	0.02[a]	0.02[a]	0.02[a]	0.02[a]	0.02[a]	0.02[a]
mirex	0.02[a]	0.02[a]	0.02[a]	0.02[a]	0.02[a]	0.02[a]	0.02[a]
o,p'-DDD	0.02	0.02	0.02	0.02	0.02	0.02	0.02
o,p'-DDE	0.02	0.02	0.02	0.02	0.02	0.02	0.02
o,p'-DDT	0.02	0.02	0.02	0.02	0.02	0.02	0.02
oxychlordane	0.02	0.02	0.02	0.02	0.02	0.02	0.02
p,p'-DDD	0.02	0.02	0.02	0.02	0.02	0.02	0.02
p,p'-DDE	0.02	0.02	0.02	0.02	0.02	0.02	0.02
p,p'-DDT	0.02	0.02	0.02	0.02	0.02	0.02	0.02
PCB-1242	0.1	0.1	0.1	0.1	0.1	0.1	0.1
PCB-1248	0.1	0.1	0.1	0.1	0.1	0.1	0.1
PCB-1254	0.1	0.1	0.1	0.1	0.1	0.1	0.1
PCB-1260	0.1	0.1	0.1	0.1	0.1	0.1	0.1
PCB-TOTAL	0.1	0.1	0.1	0.1	0.1	0.1	0.1
toxaphene	1	1	1	1	1	1	1
trans-nonachlor	0.02	0.02	0.02	0.02	0.02	0.02	0.02

numbers bolded are dected, numbers underlined exceed AWQC, [a] = exceeds chronic freshwater Ambient Water Quality Criteria benchmark (EPA, 2009).

2006 Sediment Chemistry.

Physical properties and acid volitile sulfidde (AVS) concentrations in sediment samples Year 1 (2006)				
	% Moisture	Grain Size-Clay	Grain Size-Sand	AVS
Sample	Percent Result	Percent Result	Percent Result	Percent Result
Units	percent	percent	percent	ppb
BNWR01	86.9	54.9	16.3	541000
BNWR02	84.7	33.6	21	205000
BNWR03	84.1	56.6	12	160000
BNWR04	86.6	57.3	17.3	611000
BNWR05	89.3	22.5	19.8	1040000
BNWR06	87.6	30.8	8.6	624000
BNWR07	83.4	44.4	47.8	217000

Simultaneously extracted metals to Acid volitile sulfide ratio in sediment samples Year 1 (2006)														
Station	Date	AVS	Cd	SEM/AVS	Cu	SEM/AVS	Cr	SEM/AVS	Ni	SEM/AVS	Pb	SEM/AVS	Zn	SEM/AVS
		ppb dry weight	ppb dry weight		ppb dry weight		ppb dry weight		ppb dry weight		ppb dry weight		ppb dry weight	
BNWR01	7/11/2006	541000	518	9.57E-04	17100	3.16E-02	21100	3.90E-02	21600	3.99E-02	28500	5.27E-02	156000	2.88E-01
BNWR02	7/11/2006	205000	408	1.99E-03	16600	8.10E-02	22200	1.08E-01	22300	1.09E-01	26100	1.27E-01	132000	6.44E-01
BNWR03	7/11/2006	160000	337	2.11E-03	13700	8.56E-02	18500	1.16E-01	24900	1.56E-01	23100	1.44E-01	109000	6.81E-01
BNWR04	7/11/2006	611000	236	3.86E-04	14800	2.42E-02	17800	2.91E-02	16600	2.72E-02	21500	3.52E-02	70800	1.16E-01
BNWR05	7/11/2006	1040000	254	2.44E-04	14100	1.36E-02	18100	1.74E-02	16800	1.62E-02	22800	2.19E-02	732000	7.04E-01
BNWR06	7/12/2006	624000	230	3.69E-04	9070	1.45E-02	11300	1.81E-02	13500	2.16E-02	17900	2.87E-02	60500	9.70E-02
BNWR07	7/12/2006	217000	523	2.41E-03	11900	5.48E-02	12400	5.71E-02	19400	8.94E-02	19800	9.12E-02	99000	4.56E-01

Metals Yr 1 (2006) Sediment Results in µg/kg dw							
Station ID	BNWR01	BNWR02	BNWR03	BNWR04	BNWR05	BNWR06	BNWR07
Ag	194	194	191	191	195	196	189
Al	**22400000**	**23700000**	**18900000**	**16500000**	**17100000**	**9380000**	**14600000**
As	**97.1**	**96.9**	**95.7**	**95.4**	**97.4**	**97.9**	**94.3**
B	1940	1940	**4670**	**12000**	**13900**	**27300**	4360
Ba	**48600**	**50200**	**21300**	**27300**	**25200**	**20700**	**33300**
Be	**48.6**	**48.5**	**47.8**	**47.7**	**48.7**	**48.9**	**47.1**
Ca	**4150000**	**4240000**	**3570000**	**4090000**	**4970000**	**5210000**	**3870000**
Cd	**38.9**	**38.8**	**38.3**	**38.2**	**38.9**	**39.2**	**37.7**
Co	**21100**	**19500**	**24000**	**10700**	**7890**	**9270**	**17900**
Cr	**21100**	**22200**	**18500**	**17800**	**18100**	**11300**	**12400**
Cu	**17100**	**16600**	**13700**	**14800**	**14100**	**9070**	**11900**
Fe	**16100000**	**20300000**	**22400000**	**17500000**	**15900000**	**16200000**	**13400000**
Hg	**147**	**96.7**	**123**	**97.1**	**95.3**	**116**	**102**
Mg	**2190000**	**2600000**	**3970000**	**5260000**	**6360000**	**6140000**	**3620000**
Mn	**341000**	**304000**	**246000**	**265000**	**264000**	**206000**	**142000**
Mo	970	970	**1240**	**1600**	**1040**	**1650**	940
Ni	**21600**	**22300**	**24900**	**16600**	**16800**	**13500**	**19400**
P	**1320000**	**1460000**	**736000**	**670000**	**802000**	**616000**	**755000**
Pb	**28500**	**26100**	**23100**	**21500**	**22800**	**17900**	**19800**
S	**9900000**	**15300000**	**33200000**	**28100000**	**26700000**	**33900000**	**21500000**
Se	**763**	**817**	**918**	**824**	**822**	**845**	**946**
Sr	**32600**	**35200**	**48900**	**61800**	**75300**	**82400**	**52700**
Ti	**14000**	**23600**	**47800**	**50300**	**33200**	**52700**	**15500**
V	**29400**	**24600**	**23300**	**21500**	**20300**	**17100**	**19300**
Zn	**194**	**194**	**191**	**191**	**195**	**196**	**189**
numbers bolded are detected, numbers underlined exceed AWQC.							

Sediment Aromatics Yr1 (2006) Sediment Results in µg/kg dw							
Station ID	BNWR01	BNWR02	BNWR03	BNWR04	BNWR05	BNWR06	BNWR07
1,6,7-Trimethyl-naphthalene	11.5	7.54	10.1	10.7	11	10.8	11
1-methylnaphthalene	11.5	**10.2**	**13.8**	**28.7**	**47.3**	**46.1**	11
1-methylphenanthrene	11.5	7.54	**15**	**69.1**	**21.4**	**18.3**	11
2,6-dimethylnaphthalene	**17.4**	**13.3**	**25**	**18.4**	**19.9**	10.8	11
2-methylnaphthalene	11.5	**12.8**	**24.2**	**55.3**	**71.8**	**63.5**	11
acenaphthalene	11.5	7.54	10.1	**62.2**	**25.6**	**11.2**	11
acenaphthene	11.5	7.54	10.1	**14.9**	11	**11.4**	11
anthracene	**12.1**	**10.4**	**20.5**	**107**	**51.9**	**38.5**	11
Benzo(a)anthracene	**29.4**	**15.5**	**31**	**399**	**83.8**	**54.2**	11
benzo(a)pyrene	**38.9**	**18**	**25.1**	**318**	**68.3**	**32.9**	**11.9**
benzo(b)fluoranthene	**122**	**58.6**	**99.2**	**626**	**170**	**105**	**53.1**
benzo(e)pyrene	**50.2**	**24.6**	**36**	**244**	**61.8**	**40.4**	**20**
benzo(g,h,i)perylene	**39.9**	**22.5**	**31.1**	**172**	**29.4**	**14.6**	**19**
benzo(k)fluoranthene	**23.2**	**13**	**18.7**	**129**	**36.5**	**26**	**11.9**
biphenyl	11.5	7.54	10.1	**17.9**	**15**	10.8	11
C1-chrysenes	**155**	**45.8**	**64.1**	**236**	**62.7**	**41.2**	**97.7**
C1-dibenzothiophenes	11.5	7.54	**12.2**	**28.2**	11	10.8	11
C1-Fluoranthenes & Pyrenes	**86.7**	**34**	**61.5**	**303**	**63.7**	**58.9**	**57**
C1-fluorenes	**23.7**	**19.2**	**40.7**	**88.7**	**65.3**	**81.8**	**16.3**
C1-naphthalenes	**17.6**	**22.9**	**38**	**84**	**119**	**110**	**20.1**
C1-Phenanthrenes & Anthracenes	**29.9**	**18.8**	**48.3**	**219**	**57.9**	**55.1**	**12.3**
C2-chrysenes	**73.7**	**36.3**	**60.6**	**105**	**49.3**	**45.8**	**22.5**
C2-dibenzothiophenes	**12.9**	7.54	10.1	**24.1**	11	10.8	11
C2-fluorenes	**21.9**	**15.9**	**28.3**	**53.7**	**27.6**	**35.4**	**11.6**
C2-naphthalenes	**48.8**	**91.2**	**76.9**	**85.7**	**128**	**172**	**73.1**
C2-Phenanthrenes & Anthracenes	**22.8**	**13.6**	**29**	**133**	**27.3**	**26.6**	11
C3-chrysenes	**21.3**	**17.7**	**21.3**	**43.5**	**12.4**	**15.1**	11
C3-dibenzothiophenes	**18.3**	**8.99**	10.1	**12.3**	11	10.8	11
C3-fluorenes	**18.6**	**12.7**	**26**	**50.9**	**22.4**	**34.5**	11
C3-naphthalenes	**49.8**	**76.4**	**61.9**	**110**	**93.7**	**187**	**87.3**
C3-Phenanthrenes & Anthracenes	**13.2**	**9.55**	**16.6**	**56.4**	**15.2**	**14.5**	11
C4-chrysenes	**24.5**	**7.54**	**18.5**	**30.7**	**33.3**	**26.3**	**24.4**
C4-naphthalenes	**73.9**	**126**	**127**	**237**	**172**	**550**	**143**
C4-Phenanthrenes & Anthracenes	**39**	**22.8**	**26.4**	**108**	**24.1**	**22.8**	**29.4**
chrysene	**58.2**	**25.8**	**41**	**402**	**76.6**	**62.2**	**18.6**
Dibenz(a,h)anthracene	11.5	7.54	10.1	46.7	11	10.8	11
dibenzothiophene	11.5	7.54	**14.9**	**29.3**	**18.1**	17	11
fluoranthene	**83.5**	**44.9**	**152**	**973**	**209**	**257**	**37.7**
fluorene	**12.3**	**13.8**	**62.7**	**85.1**	**70.1**	**70.1**	**13**
indeno(1,2,3-cd)pyrene	**49.9**	**25.6**	**33.8**	**232**	**43.2**	**23.9**	**20.2**
naphthalene	11.5	**10.8**	**25.7**	**86**	**43.3**	**48.8**	11
perylene	**696**	**450**	**877**	**342**	**86.8**	**111**	**835**
phenanthrene	**37.4**	**26.8**	**83.1**	**380**	**188**	**164**	**12.4**
pyrene	**71.9**	**36.4**	**105**	**769**	**138**	**169**	**27.6**
numbers in bold are detected, numbers underlined exceed AWQC.							

Organochlorines Yr 1 (2006) Sediments Results in µg/kg dw							
Station ID	BNWR01	BNWR02	BNWR03	BNWR04	BNWR05	BNWR06	BNWR07
Aldrin	0.191	0.126	**1.02**	**3.01**	**1.3**	**1.28**	0.185
alpha BHC	**0.466**	**0.288**	**0.379**	**0.305**	**0.458**	**0.465**	**0.303**
alpha chlordane	**1.34**	**0.212**	**0.982**	**0.37**	**0.599**	**0.723**	**6.3**
beta BHC	0.191	0.126	0.17	**0.276**	**0.266**	0.181	**0.517**
cis-nonachlor	**1.23**	**0.409**	**0.757**	**0.377**	**0.237**	**0.354**	**4.04**
delta BHC	0.191	**0.141**	0.17	0.178	0.183	0.181	0.183
dieldrin	**1.56**	**0.777**	**2.17**	**0.348**	0.183	**0.465**	**3.38**
endosulfan II	0.191	0.126	0.17	0.178	0.183	0.181	0.183
endrin	**0.617**	0.126	**0.252**	**0.261**	**0.717**	**0.229**	**0.31**
gamma BHC	0.191	0.126	0.17	**0.203**	0.183	0.181	0.183
gamma chlordane	**1.01**	**0.237**	**0.982**	**0.218**	**0.318**	**0.369**	**6.6**
HCB	0.191	0.126	0.17	0.178	0.183	**0.185**	0.183
Heptachlor	0.191	**0.172**	0.17	0.178	**0.288**	**0.332**	0.183
heptachlor epoxide	0.191	0.126	0.17	0.178	0.183	0.181	0.183
mirex	0.191	0.126	0.17	0.178	0.183	0.181	0.183
o,p'-DDD	**0.538**	**0.237**	**0.344**	**1.64**	**0.843**	**0.561**	**1.06**
o,p'-DDE	**0.229**	0.126	0.17	**0.181**	0.2	0.181	**0.495**
o,p'-DDT	0.191	0.126	0.17	0.178	0.183	0.181	0.183
oxychlordane	0.191	0.126	0.17	0.178	0.183	0.181	0.183
p,p'-DDD	**2.2**	**0.823**	**1.42**	**1.3**	**1.32**	**1.64**	**2.56**
p,p'-DDE	**3.73**	**1.33**	**1.76**	**1.17**	**1.02**	**1.2**	**1.57**
p,p'-DDT	**2.26**	**0.288**	**0.673**	**1.39**	**0.495**	**0.502**	**0.54**
PCB-1242	**20.4**	**6.56**	**11**	**7.55**	**11.7**	**13**	**11.6**
PCB-1248	3.83	2.51	3.39	3.57	3.66	3.63	3.66
PCB-1254	**6.26**	**5.74**	**12.6**	**18.9**	**23.4**	**26.1**	3.66
PCB-1260	**4.7**	**4.1**	**7.89**	**11.3**	**3.89**	**4.34**	**27.1**
PCB-1268	3.83	2.51	3.39	3.57	3.66	3.63	3.66
PCB-TOTAL	**31.6**	**16.2**	**31.6**	**37.7**	**39.2**	**43.5**	**38.4**
pentachloro-anisole	**0.253**	0.126	0.17	0.178	**0.244**	**0.244**	**0.222**
toxaphene	3.83	2.51	3.39	3.57	3.66	3.63	3.66
trans-nonachlor	0.191	0.126	0.17	0.178	0.183	0.181	**2.82**
numbers in bold detected, numbers underlines exceed AWQC.							

2007 Sediment Chemistry.

Physical porperties and acid volitile sulfide (AVS) concentrations in sediment samples Year 2 (2007)				
	% Moisture	Grain Size-Clay	Grain Size-Sand	AVS
Sample	Percent Result	Percent Result	Percent Result	Percent Result
Units	percent	percent	percent	ppb
BNWR01	87.4	75.6	4.7	268000
BNWR02	86.5	15.4	0.2	130000
BNWR03	85.4	63.3	3.2	183000
BNWR04	86.2	56.8	5.4	213000
BNWR05	88.8	50.7	2.3	922000
BNWR06	86.4	32.7	2.4	385000
BNWR07	85.6	6.5	2.3	36000

Simultaneously extracted metals to Acid volitile sulfide ratio in sediment samples Year 2 (2007)														
Station	Date	AVS	Cd	SEM/AVS	Cu	SEM/AVS	Cr	SEM/AVS	Ni	SEM/AVS	Pb	SEM/AVS	Zn	SEM/AVS
		ppb dry weight	ppb dry weight		ppb dry weight		ppb dry weight		ppb dry weight		ppb dry weight		ppb dry weight	
BNWR01	7/10/2007	268000	580	2.16E-03	21700	8.10E-02	26900	1.00E-01	26600	9.93E-02	33300	1.24E-01	192000	7.16E-01
BNWR02	7/10/2007	130000	418	3.22E-03	17000	1.31E-01	20000	1.54E-01	22800	1.75E-01	29200	2.25E-01	141000	1.08E+00
BNWR03	7/10/2007	183000	291	1.59E-03	13700	7.49E-02	16700	9.13E-02	23900	1.31E-01	21300	1.16E-01	102000	5.57E-01
BNWR04	7/10/2007	213000	238	1.12E-03	12700	5.96E-02	16000	7.51E-02	15200	7.14E-02	21900	1.03E-01	76500	3.59E-01
BNWR05	7/11/2007	922000	236	2.56E-04	12600	1.37E-02	17400	1.89E-02	16000	1.74E-02	20800	2.26E-02	69000	7.48E-02
BNWR06	7/11/2007	385000	257	6.68E-04	9540	2.48E-02	12500	3.25E-02	13800	3.58E-02	19400	5.04E-02	62100	1.61E-01
BNWR07	7/11/2007	36000	603	1.68E-02	15400	4.28E-01	11500	3.19E-01	27100	7.53E-01	18400	5.11E-01	128000	3.56E+00

Metals Yr 2 (2007) Sediment Results in µg/kg dw							
Station ID	BNWR01	BNWR02	BNWR03	BNWR04	BNWR05	BNWR06	BNWR07
Ag	196	196	191	**242**	192	192	197
Al	**980**	**980**	**950**	**980**	**960**	**960**	**990**
As	**98**	**98.2**	**95.5**	**98**	**96.2**	**96.2**	**98.5**
B	**1960**	**1960**	**1910**	**1960**	**1920**	**1920**	**1970**
Ba	**47700**	**37200**	**19700**	**19100**	**29100**	**24800**	**21300**
Be	**1840**	**1520**	**1500**	**1080**	**1150**	**963**	**1790**
Ca	**5120000**	**5250000**	**4360000**	**4280000**	**5250000**	**5030000**	**6020000**
Cd	**580**	**418**	**291**	**238**	**236**	**257**	**603**
Co	**26900**	**22400**	**23500**	**8430**	**8150**	**8780**	**31000**
Cr	**26900**	**20000**	**16700**	**16000**	**17400**	**12500**	**11500**
Cu	**196**	**196**	**191**	**196**	**192**	**192**	**197**
Fe	**20100000**	**21100000**	**23200000**	**17000000**	**16300000**	**14900000**	**15000000**
Hg	**123**	**107**	**110**	**80**	**73**	**79.5**	**106**
K	**1420000**	**1080000**	**1270000**	**1560000**	**1950000**	**1520000**	**926000**
Mg	**2850000**	**2680000**	**4810000**	**5200000**	**6850000**	**5960000**	**5100000**
Mn	**395000**	**323000**	**294000**	**232000**	**224000**	**190000**	**213000**
Mo	980	980	**1430**	**1070**	**1340**	1650	990
Na							
Ni	**26600**	**22800**	**23900**	**15200**	**16000**	**13800**	**27100**
P	**1600000**	**1520000**	**742000**	**692000**	**760000**	**577000**	**907000**
Pb	**33300**	**29200**	**21300**	**21900**	**20800**	**19400**	**18400**
S	**10700000**	**14600000**	**31700000**	**23100000**	**24300000**	**24900000**	**24000000**
Se	**1070**	**830**	**937**	**778**	**929**	**1000**	**884**
Si							
Sr	**39400**	**40900**	**60300**	**61500**	**80200**	**76300**	**74100**
Ti	**26000**	**24800**	**45200**	**25900**	**45300**	**56400**	**13800**
V	**35800**	**25000**	**20800**	**16300**	**19700**	**17600**	**19400**
Zn	**192000**	**141000**	**102000**	**76500**	**69000**	**62100**	**128000**
numbers in bold detected, numbers underlined exceed AWQC.							

Aromatics Yr2 (2007) Sediment Results in µg/L							
Station ID	BNWR01	BNWR02	BNWR03	BNWR04	BNWR05	BNWR06	BNWR07
1,6,7-Trimethyl-naphthalene	5	5	5	5	5	5	5
1-methylnaphthalene	5	5	5	5	5	5	5
1-methylphenanthrene	5	5	**6**	**13**	**10**	**8**	5
2,6-dimethylnaphthalene	**9**	**6**	5	**7**	**8**	5	5
2-methylnaphthalene	5	5	5	5	5	5	5
acenaphthalene	5	5	5	5	5	5	5
acenaphthene	**6**	5	**8**	5	5	**8**	5
anthracene	5	5	5	18	10	12	5
Benzo(a)anthracene	**24**	**10**	**10**	**61**	**19**	**23**	**24**
benzo(a)pyrene	**39**	**49**	**17**	**87**	**51**	**19**	**7**
benzo(b)fluoranthene	**63**	**34**	**21**	**95**	**26**	**27**	**18**
benzo(e)pyrene	**47**	**19**	**15**	**54**	**27**	**21**	**8**
benzo(g,h,i)perylene	**38**	**27**	**28**	**20**	**12**	**22**	**11**
benzo(k)fluoranthene	**58**	**21**	**7**	**62**	**41**	**16**	5
biphenyl	5	5	5	5	**7**	5	5
C1-chrysenes	**120**	**65**	10	**20**	10	10	**66**
C1-dibenzothiophenes	10	10	10	10	10	10	10
C1-Fluoranthenes & Pyrenes	**49**	**19**	**16**	**56**	**25**	10	**15**
C1-fluorenes	10	10	**11**	10	10	10	10
C1-naphthalenes	10	10	10	10	10	10	10
C1-phenanthrenes	**40**	10	**24**	**63**	**32**	**36**	10
C2-chrysenes	**46**	**28**	10	**23**	**19**	10	10
C2-dibenzothiophenes	10	10	10	10	10	10	10
C2-fluorenes	10	10	10	10	10	10	10
C2-naphthalenes	**22**	10	**14**	**16**	**20**	**12**	**13**
C2-phenanthrenes	**33**	10	**24**	**56**	**24**	**31**	10
C3-chrysenes	10	10	10	10	10	10	10
C3-dibenzothiophenes	10	10	10	10	10	10	10
C3-fluorenes	10	10	10	10	10	10	10
C3-naphthalenes	**17**	**22**	**56**	**35**	**20**	**13**	**29**
C3-phenanthrenes	**47**	**23**	**11**	**26**	**25**	**13**	**23**
C4-chrysenes	10	10	10	10	10	10	10
C4-naphthalenes	**43**	**40**	**47**	**42**	**47**	**40**	**49**
C4-phenanthrenes	10	10	10	10	10	10	10
chrysene	**38**	**7**	**20**	**71**	**24**	**33**	**21**
Dibenz(a,h)anthracene	**6**	**9**	5	**23**	**14**	**8**	**6**
dibenzothiophene	**10**	**14**	5	**14**	5	**7**	**15**
fluoranthene	**50**	**27**	**47**	**170**	**75**	**86**	**28**
fluorene	**6**	5	**14**	**18**	**14**	**12**	**9**
indeno(1,2,3-cd)pyrene	**40**	**20**	**17**	**60**	**24**	**21**	**11**
naphthalene	**7**	**7**	**7**	10	10	**9**	**6**
perylene	**770**	**240**	**330**	**84**	**68**	**40**	**430**
phenanthrene	**30**	**17**	**25**	**62**	**42**	**33**	**25**
pyrene	**47**	**22**	**35**	**120**	**53**	**63**	**21**
numbers in bold are detected, numbers underlined exceed AWQC.							

Organochlorines Yr 2 (2007) Sediment Results in µg/kg dw							
Station ID	BNWR01	BNWR02	BNWR03	BNWR04	BNWR05	BNWR06	BNWR07
alpha BHC	2	2	2	2	2	2	2
alpha chlordane	**3**	2	2	2	2	2	**4**
beta BHC	2	2	2	2	2	2	2
cis-nonachlor	2	2	2	2	2	2	2
delta BHC	2	2	2	2	2	2	2
delta BHC	2	2	2	2	2	2	2
delta BHC	0.252	0.286	0.308	0.306	0.292	0.238	0.314
dieldrin	3	2	2	2	2	2	2
endrin	2	2	2	2	2	2	2
gamma BHC	2	2	2	2	2	2	2
gamma chlordane	2	2	2	2	2	2	6
HCB	2	2	2	2	2	2	2
heptachlor epoxide	2	2	2	2	2	2	2
mirex	2	2	2	2	2	2	2
o,p'-DDD	2	2	2	2	2	2	2
o,p'-DDE	2	2	2	2	2	2	2
o,p'-DDT	2	2	2	2	2	2	2
oxychlordane	2	2	2	2	2	2	2
p,p'-DDD	3	3	2	3	3	4	4
p,p'-DDE	6	2	2	2	2	2	2
p,p'-DDT	2	2	2	2	2	2	2
PCB-1242	10	10	10	10	10	10	10
PCB-1248	10	10	10	10	10	10	10
PCB-1254	10	10	10	10	10	10	10
PCB-1260	10	10	10	10	10	10	10
PCB-TOTAL	10	10	10	10	10	10	10
toxaphene	50	50	50	50	50	50	50
trans-nonachlor	2	2	2	2	2	2	3
numbers in bold are detected, numbers underlined exceed AWQC.							

Appendix B

Leptocheirus plumulosus and _Hyalella azteca_ sediment toxicity tests and benthic community structure-Index of Biological Integrity (B-IBI) analyses of samples from the Little Blackwater River: Year 1 (2006) and Year 2 (2007).

FINAL REPORT

Leptocheirus plumulosus and *Hyalella azteca* Sediment Toxicity Tests on and B-IBI Analyses of Samples from the Little Blackwater River – 2006/2007

In Support of USFWS Study:

Effects of Urban Sprawl on Sediment Surface Water and Biota in the Little Blackwater River, Blackwater National Wildlife Refuge, Dorchester County, Maryland

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December 2008

FOREWARD

The purpose of this study was to provide sediment toxicity and Benthic Community Structure (B-IBI) information on sediment samples from the Little Blackwater River watershed. The sample sites were selected by the United States Fish and Wildlife Service (USFWS), Chesapeake Bay Field Office. Sediments were collected from seven sites in the Little Blackwater River watershed: BNWR 01, 02, 03, 04, 05, 06 and 07. Samples were collected and tested during the summers of 2006 and 2007. The sediment toxicity and B-IBI results presented in this report are part of a larger USFWS project entitled, "Effects of Urban Sprawl on Sediment Surface Water and Biota in the Little Blackwater River, Blackwater National Wildlife Refuge, Dorchester County, Maryland." Christopher Guy and Dixie Birch were project coordinators from USFWS. The toxicity data covered in this report are from toxicity studies conducted at the University of Maryland Wye Research and Education Center (WREC) under the direction of Dr. Daniel J. Fisher. All sediment samples were tested using both 10-d *Hyalella azteca* and 10-d *Leptocheirus plumulosus* toxicity tests that measured survival and growth as endpoints. The B-IBI data presented in this report were provided by Versar, Inc. through a subcontract with WREC.

ABSTRACT

The goal of this study was to provide sediment toxicity and Benthic Community Structure (B-IBI) information on sediment samples from the Little Blackwater River watershed. The sample sites were selected by the United States Fish and Wildlife Service (USFWS), Chesapeake Bay Field Office. Sediments were collected from seven sites in the Little Blackwater River watershed: BNWR 01, 02, 03, 04, 05, 06 and 07. Samples were collected and tested during the summers of 2006 and 2007. The U.S. Environmental Protection Agency (U.S. EPA) whole sediment *Hyalella azteca* 10-d survival and growth test and a *Leptocheirus plumulosus* 10-d survival and growth test developed at the Wye Research and Education Center were used to determine toxicity. The Benthic Index of Biotic Integrity (B-IBI) developed for application to benthic communities of the Chesapeake Bay was used to evaluate benthic community health in the Little Blackwater River.

Performance criteria for survival and growth were obtained from all toxicity tests. None of the sediments collected in 2006 or 2007 were toxic based on the results of these 10-d tests with *Hyalella azteca* and *Leptocheirus plumulosus*. Thus, it does not appear that toxics are of concern to benthic organisms at these stations. In contrast to the toxicity data, B-IBI analysis gave a bleak view of the health of the benthic community in the Little Blackwater River. Results from the sampling in 2006 indicated that the benthic fauna at the seven stations sampled did not display healthy community characteristics. No molluscs or large polychaete were collected from any of the stations sampled leading to low biomass at all stations. Only one station (Station 6) had amphipod and isopod crustaceans which is another indicator of a healthy benthic community as well as important prey items for fish and crabs. The dominant taxa were generally all pollution indicative in the oligochaete, polychaete, and chironomid taxonomic groups. The major factor contributing to the poor IBI scores in 2006 was thought to be salinity fluctuations in areas that swing between tidal fresh to mesohaline. In addition, localized low DO resulting from the decaying marsh material could have been a factor.

B-IBI analysis for 2007 indicated an even more degraded community at these stations. Six of the seven benthic samples collected did not contain a single organism. All of the azoic stations were located in the tidal fresh/oligohaline areas. The lack of even pollution tolerant oligochaete worms and chironomid larva indicates that these stations were subjected to extended periods of anoxic waters. The one station with organisms, Station 6, had some salt intrusion based on the presence of estuarine species, i.e., *Edotea triloba* (isopod), *Gammarus daiberi* (amphipod), *Almyracuma proximoculi* (cumacid), *Eteone heteropoda* and *Streblospio benedicti* (polychaete). The B-IBI score of 1.4 (Severely degraded) at this station was the same as when sampled in 2006. The lack of abundance, biomass, and equilibrium-type organisms (i.e., clams and polychaetes) led to a metric score of 1 for all 5 metrics scored in the B-IBI. Again, this is indicative of extended periods of hypoxic or anoxic waters in the area.

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Chapter 1

2006 Sediment Sampling
Toxicity of Sediments from the Little Blackwater River to *Hyalella azteca* and *Leptocheirus plumulosus*

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FOREWORD

The purpose of this study was to provide sediment toxicity information on sediment samples from the Little Blackwater River watershed. The sample sites were selected by the United States Fish and Wildlife Service (USFWS), Chesapeake Bay Field Office. Sediments were collected from seven sites in the Little Blackwater River watershed: BNWR 01, 02, 03, 04, 05, 06 and 07. Samples were collected in the summer of 2006. The sediment toxicity test results presented in this report are part of a larger USFWS project entitled, "Effects of Urban Sprawl on Sediment Surface Water and Biota in the Little Blackwater River, Blackwater National Wildlife Refuge, Dorchester County, Maryland." Christopher Guy and Dixie Birch were project coordinators from USFWS. The data covered in this report are from toxicity studies conducted at the University of Maryland Wye Research and Education Center under the direction of Dr. Daniel J. Fisher. All sediment samples were tested using both 10-d *Hyalella azteca* and 10-d *Leptocheirus plumulosus* toxicity tests that measured survival and growth as endpoints.

ABSTRACT

The goal of this study was to provide sediment toxicity information on sediment samples from the Little Blackwater River watershed. The sample sites were selected by the United States Fish and Wildlife Service (USFWS), Chesapeake Bay Field Office as part of a larger USFWS project entitled, "Effects of Urban Sprawl on Sediment Surface Water and Biota in the Little Blackwater River, Blackwater National Wildlife Refuge, Dorchester County, Maryland." Sediment were collected from seven sites in the Little Blackwater River watershed: BNWR 01, 02, 03, 04, 05, 06 and 07. The stations are upstream and downstream of a currently proposed development. Toxicity test results from samples collected in the summer of 2006 are presented in this report. The U.S. Environmental Protection Agency (U.S. EPA) whole sediment *Hyalella azteca* 10-d survival and growth test and a *Leptocheirus plumulosus* 10-d survival and growth test developed at the Wye Research and Education Center were used to determine toxicity

Performance criteria for survival and growth were obtained from all toxicity tests. None of the sediments were toxic based on the results of these 10-d tests with *Hyalella azteca* and *Leptocheirus plumulosus*. The *L. plumulosus* test results should be viewed with caution since we believe there was a physical stress on these tube building amphipods due to the type of sediment from these stations (stringy, decayed marsh). Future tests with these types of sediments will be conducted with a modified method that will fix and stain the sediments at the end of the test for more accurate counts of surviving amphipods.

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INTRODUCTION

The Sediment Quality Triad (Triad) has been successfully applied in the Chesapeake Bay and nation-wide (e.g., Baltimore Harbor, Anacostia River, Puget Sound, San Francisco Bay, Gulf of Mexico) to characterize ambient conditions in freshwater, estuarine and marine systems (e.g., Long and Chapman 1985; Chapman et al. 1987; Hall et al. 1991, 1992, 1994, 2000; McGee et al. 1999). This weight of evidence approach consists of complementary measures of sediment chemistry, benthic community structure and sediment toxicity. The combination of potential cause (chemistry) and effect (biology) measurements makes the Triad one of the most complete and powerful tools available to determine the extent and significance of pollution-induced degradation. Although water column contaminant levels are useful to distinguish among sources (i.e., new inputs versus historic contamination) and loadings of contaminants, they are temporally and spatially quite patchy, potentially confounding our ability to characterize the potential for toxicant related impact. Therefore, the focus of the Triad approach is on the sedimentary environment because sediments accumulate and integrate toxic chemical inputs from multiple sources over time; hence, determination of sediment quality is essential to determine trends in toxic contaminants. In order to obtain a direct measure of sediment toxicity, laboratory tests have been developed in which benthic organisms are exposed to sediments under controlled conditions (U.S. EPA, 2000; U.S. EPA/U.S. ACE, 2001). Sediment toxicity tests are effective tools in assessments of sediment quality, as they provide direct, quantifiable evidence of the biological consequences of contamination that can only be inferred from chemical or biological community analyses.

The University of Maryland Wye Research and Education Center (WREC) via a contract with the United States Fish and Wildlife Service (USFWS), Chesapeake Bay Field Office conducted an intensive sediment toxicity assessment of whole sediments from seven stations in the Little Blackwater River watershed. The toxicity data will be used as part of the Triad approach designed to measure the effects in sediments of urban sprawl on the Blackwater National Wildlife Refuge in Dorchester County, Md.

Whole sediment toxicity at all stations was assessed using a 10-d survival and growth test with the freshwater amphipod *Hyalella azteca*. In addition, a 10-d survival and growth test with the estuarine amphipod *Leptocheirus plumulosus* developed at WREC was also used to assess whole sediment toxicity because some of the stations had measurable salinity. These species were chosen because of their practical and ecological relevance and for the availability of U.S. Environmental Protection Agency (U.S. EPA) recommended test methods for assessing the toxicity of freshwater and marine/estuarine sediments (U.S. EPA, 2000; U.S. EPA/U.S. ACE, 2001). The U.S. EPA/U.S. ACE (2001) method is for a longer term (28 d) chronic method using *L. plumulosus*. Experience with the *L. plumulosus* 28-day test in the past has shown high variability in the reproduction endpoint and thus a limited ability to distinguish toxic sediments using this endpoint. This has led to development of a 10 day *L. plumulosus* test with survival and growth as endpoints. This new *L. plumulosus* test is similar to the U.S. EPA 10-d *H. azteca* survival and growth test (U.S. EPA, 2000) with the exception of estuarine water renewals and ground tetramin as the food source. In preliminary research, this 10-d test has proven to be of equal sensitivity as the 28 d chronic test with *L. plumulosus* (Ziegler and Fisher, 2006).

MATERIALS AND METHODS

Sample Stations

Seven stations in the Little Blackwater River watershed were sampled in this study: BNWR 01, 02, 03, 04, 05, 06 and 07. The stations are upstream and downstream of a currently proposed development. Actual station locations and descriptions are presented in the main report for the project. The station abbreviations, numbers, sediment collection dates and toxicity test dates for the two different amphipods are presented in Table 1. As can be seen in Table 1, all of the stations were tested in the summer of 2006.

Sample Collection, Handling, and Storage

The USFWS group collected sediments for this study with help from the WREC staff. The specific protocols for sediment collection, handling, storage, and for laboratory analyses were complementary to those described in the Quality Assurance Project Plan (QAPP) that was developed for Sediment Quality Triad projects in the Chesapeake Bay watershed (USFWS, 1999). Samples were collected at each site on July 11, 2006. In brief, samples were taken with a stainless steel petite ponar grab (0.023 m^2). Samples for sediment toxicity testing represent composites. At each site, the top 2 - 3 cm of several grabs were placed into a pre-cleaned stainless steel bowl and homogenized with a stainless steel spoon until uniform in color and texture. Once enough sediment was taken, sub samples were placed into separate pre-cleaned containers for sediment toxicological analyses and chemical analyses. Observations of sample acceptability, depth of penetration and qualitative characteristics (i.e., odor, color, etc) were recorded on field data sheets. Care was taken to avoid sediments in direct contact with the sides of the grab sampler. Collected sediments were kept on ice in the dark in coolers. All containers for chemical, biological and toxicological analyses were labeled with the date, type of sample, and location.

All toxicity samples were transported to the WREC on ice in coolers, out of direct sunlight. The samples were held at the WREC in refrigerators in the dark at 4EC until initiation of the toxicity tests. Sediments were not sieved prior to testing. Because of the possible presence of indigenous *L. plumulosus* at Chesapeake Bay sample sites, sediments are generally sieved through a 500 Φm mesh stainless steel sieve prior to starting a 10-d test test. Sieving is done to remove indigenous organisms that might interfere with the tests. The samples from this system were mostly old decaying marsh which could not be sieved. There were very little actual grainy sediments at any site.

At each site an additional sample was taken for Benthic Community Analysis (USFWS, 1999). In brief, a petite ponar grab (0.023 m^2) sample was taken at each station, sieved through a 500 µm mesh, and preserved in 10% buffered formalin containing rose bengal. These samples were delivered to the WREC along with the toxicity samples. The samples were then delivered by WREC staff to VERSAR, Inc. (9200 Rumsey Road , Columbia, MD 21045) for sorting, taxonomic identification and calculation of a Benthic Index of Biotic Intergrity (B-IBI) using the methods of Weisberg et al. (1997) and Alden et al. (2002). Results from the B-IBI analyses will be presented in a separate report.

Sediment Toxicity Tests

Sediment toxicity was assessed at all stations using the U.S. EPA 10-d *Hyalella azteca* whole sediment toxicity test method with survival and growth as endpoints (U.S. EPA, 2000). *H. azteca* for these tests were purchased from Chesapeake Cultures in Hayes, Va. This test method is summarized in Table 2. Overlying water for the *H. azteca* test was a 95/5 mix of freshwater and estuarine water to attain a conductivity of approximately 2,400 µmhos. All sediments were also assessed with a 10 day *L. plumulosus* test with survival and growth as endpoints. This test is similar to the U.S. EPA 10-d *H. azteca* survival and growth test described above with the exception of using an estuarine species, estuarine water renewals and ground tetramin as the food source. *L. plumulosus* were from cultures maintained at the WREC. This new *L. plumulosus* test method is summarized in Table 3. Overlying water for the *L. plumulosus* test was filtered estuarine water diluted to 5‰. The 10-d *L. plumulosus* test is a short-term chronic test similar to the chronic U.S. EPA 28-d *L. plumulosus* whole sediment toxicity test method except that it is only 10 days long and therefore has no reproduction endpoint (U.S. EPA/U.S. ACE, 2001). Experience with the *L. plumulosus* 28-day test in the past has shown a high variability in the reproduction endpoint and thus a limited ability to distinguish toxic sediments using this endpoint. This has led to the development at our lab of a 10 day *L. plumulosus* test with survival and growth as endpoints. Results from developmental work with the new10-d *L. plumulosus* test indicate that it as sensitive as the 28-d *L. plumulosus* test in detecting toxicity of sediment samples based on results from a dilution series of a toxic sediment containing a wide range of environmental contaminates from Baltimore Harbor, MD (Ziegler and Fisher, 2006).

Test start dates are shown in Table 1. Routine water chemistry was performed at the beginning of each renewal. Overlying ammonia was measured at the beginning and end of each test while pore water ammonia was measured in a dummy beaker at test initiation if sufficient pore water could be extracted from the sediments by centrifugation.

The endpoints of the tests for both species were survival in each replicate and average growth in each replicate (mg dry weight /individual at test conclusion). At the end of the tests, all replicate test beakers were sieved through a 500 Φm sieve to collect surviving adult organisms. Adult dry weight was determined by drying at 100EC for at least 24 h. Test acceptability criteria require 80% control survival and measurable control amphipod growth.

Data Analysis

Statistical procedures for the analysis of the test data are presented in U.S. EPA/ACE (2001). Proportion survival data were Arc Sine Square Root transformed before analysis. Alpha was 0.05 for all statistical tests. Data were assessed for normality and homogeneity of variance using the Chi-Square Test and the Bartlett's Test, respectively. All data were analyzed using a one-tailed test design to determine which sediments caused significant reductions from control endpoint data. If the data met the assumptions of normality and homogeneity of variance they were analyzed by analysis of variance (ANOVA). If ANOVA indicated a significant difference, post hoc comparisons between test sediment data and the control data were made using a Dunnett's Test. If the normality and/or homogeneity of variance assumptions were not met, the data were analyzed using a Steel's Many-One Rank Test. If there were unequal replicate sizes in a dataset that was normal and had homogeneous variance, a parametric ANOVA was used

followed by a Bonferroni's t-test to determine any differences from the control data. If there were unequal replicate sizes in a dataset that was not normal and/or had heterogeneous variance, a non parametric Wilcoxon Rank Sum test was used with a Bonferroni Adjustment to detect differences from control data. If a sediment sample caused a reduction in survival, it was not included in the analyses of the sublethal growth endpoint. Differences between day 0 and day10 control amphipod dry weights were tested using a simple *t*-test to determine if there was significant growth in the control amphipods during the test period.

RESULTS AND DISCUSSION

Water Quality

Measurements for water quality during the various tests are given in Tables 4 for the *H. azteca* test and TableB 5 for the *L. plumulosus* test. Pore water ammonia was relatively low in all test beakers, with a highest recorded value of 14 mg/L for any test sediment and 3.5 mg/L for any control sediment. Overlying ammonia was also low, with a highest recorded value of 4.68 mg/L for any test sediment and 0.82 mg/L for any control sediment. These values are well below the level of 60 mg/L in pore water that would be considered a problem by the U.S. EPA (U.S. EPA/ACE, 2001) for *L. plumulosus* and below levels thought to be toxic to *H. azteca* (U.S. EPA, 2000). The test sediment with the highest pore water and overlying ammonia concentrations was not toxic (BNWR 01). Values for pH were acceptable for all test and control sediments. No values for dissolved oxygen (DO) measured during the tests were below the acceptable level of 2.5 mg/L for *H. azteca* (U.S. EPA, 2000) or 3.6 mg/L for *L. plumulosus* (U.S. EPA/ACE, 2001). The lowest recorded DO in the both the *H. azteca* and *L. plumulosus* tests was 5.4 mg/L.

Sediment Toxicity Tests

Performance criteria of 80% amphipod survival in the *H. azteca* and *L. plumulosus* control treatments were obtained in both 10-d toxicity tests (Appendices A-1 and A-2). In addition, there was statistically significant amphipod growth in all control treatments of both tests. Control amphipods in the *H. azteca* test grew by 3.3 times while control amphipods in the *L. plumulosus* test grew by 3.5 times.

None of the sediment samples from the Little Blackwater River study collected in 2006 were toxic to *Hyalella azteca* (Table 6). There were no significant reductions from control treatments in these sediments for either survival or growth. Individual replicate data and mean data for all control and test endpoints for these sediment tests are found in Appendix A-1. Amphipods were mistakenly not loaded in replicate E of the control *H. azteca* test so data from this replicate was not included in the statistical analyses.

None of the sediments samples from the Little Blackwater River study collected in 2006 were toxic to *Leptocheirus plumulosus* (Table 6) but these results should be viewed with caution. It was obvious from the start of the test that these tube making amphipods did not like the decayed marsh sediments in general. There was very little actual grainy sediment in any sample for the amphipods to make tubes in. The sediments were primarily stringy decayed marsh. Therefore, there was a lot of variability in the replicates within each treatment, possibly due to the amount of actual grainy sediments distributed to each replicate (Appendix A-2). The

consistently low survival in all of these sediments indicates that there with the sediments that was affecting the amphipods, especially since the *H. azteca* did well in the same sediments. The *H. azteca* are surface dwellers and not tube builders and are therefore not so affected by the physical characteristics of the test sediments. Also, growth of the surviving *L. plumulosus* was excellent compared to the control growth indicating that there was little sublethal toxicity. In addition, it was very difficult to find the amphipods at the end of the test because of the sediment composition. The sediment would not pass through the 500 µm sieve used to collect the survivors. In the future we will modify our end-of-test methods for these types of sediments. We will save all of the test sediments from each replicate, preserve them in ethanol and rose bengal and pick them later to be sure we are getting the best count of the surviving amphipods.was a physical problem

CONCLUSION

Performance criteria for survival and growth were obtained from all toxicity tests. None of the sediments collected in 2006 were toxic based on the results of these 10-d tests with *Hyalella azteca* and *Leptocheirus plumulosus*. The *L. plumulosus* test results should be viewed with caution since we believe there was a physical stress on these tube building amphipods due to the type of sediment from these stations (stringy, decayed marsh). Future tests with these types of sediments will be conducted with a modified method that will fix and stain the sediments at the end of the test for more accurate counts of surviving amphipods.

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Table 1. Little Blackwater River station names and dates of sediment collection and toxicity tests.

Station Name	Sample Collection Date	10-d Toxicity Test Dates	
		Hyalella azteca	*Leptocheirus plumulosus*
BNWR 01	7/11/06	7/25/06 – 8/4/06	7/28/06 – 8/7/06
BNWR 02	7/11/06	7/25/06 – 8/4/06	7/28/06 – 8/7/06
BNWR 03	7/11/06	7/25/06 – 8/4/06	7/28/06 – 8/7/06
BNWR 04	7/11/06	7/25/06 – 8/4/06	7/28/06 – 8/7/06
BNWR 05	7/11/06	7/25/06 – 8/4/06	7/28/06 – 8/7/06
BNWR 06	7/11/06	7/25/06 – 8/4/06	7/28/06 – 8/7/06
BNWR 07	7/11/06	7/25/06 – 8/4/06	7/28/06 – 8/7/06

Table 2. Test conditions for 10-d whole sediment toxicity test with *Hyalella azteca*.

1. Test type	Whole sediment, static renewal of overlying water
2. Temperature	23 ± 1EC
3. Overlying water	95:5 well/filtered estuarine water mix to attain a conductivity of approximately 2,400 µmhos
4. Renewal of overlying water	2 volume additions/d
5. Light	Wide-spectrum fluorescent lights, 100 to 1000 lux
6. Photoperiod	16:8 (L/D)
7. Test chamber	300 mL lip-less beaker with screened hole for water renewal (Randomly assigned on test table)
8. Sediment volume	100 ml
9. Overlying water volume	175 ml
10. Size and life stage of amphipods	7- to 14-d old; size sorted on nested 710 and 500 µm mesh sieves
11. Number of organisms/replicate	10 (Randomly assigned to test replicates)
12. Number of replicates	8
13. Feeding	1.0 ml YCT daily
14. Aeration	none
15. Water quality	Alkalinity, hardness, and total ammonia at beginning and end of test. Temperature, D.O., and pH daily. Porewater ammonia in dummy beaker at test initiation.
16. Test duration	10 d
17. Endpoints	Survival and growth (mg/ind)
18. Performance criteria	Control survival ≥ 80% Measurable growth in control amphipods

Table 3. Test conditions for 10-d whole sediment toxicity test with *Leptocheirus plumulosus*.

1. Test type	Whole sediment, static renewal of overlying water
2. Temperature	25 ± 1EC
3. Overlying water	Filtered Wye River water diluted to 5 ppt
4. Renewal of overlying water	2 volume additions/d
5. Light	Wide-spectrum fluorescent lights, 100 to 1000 lux
6. Photoperiod	16:8 (L/D)
7. Test chamber	300 mL lip-less beaker with screened hole for water renewal (Randomly assigned on test table)
8. Sediment volume	100 ml
9. Overlying water volume	175 ml
10. Size and life stage of amphipods	neonates; size sorted on nested 710 and 500 :m mesh sieves
11. Number of organisms/replicate	10 (Randomly assigned to test replicates)
12. Number of replicates	8
13. Feeding	Daily - TetraMin (ground and sieved to 250 µm)
14. Aeration	none
15. Water quality	Salinity, pH and total ammonia at beginning and end of test. Temperature and D.O. daily. Pore water ammonia in dummy beaker at test initiation.
16. Test duration	10 d
17. Endpoints	Survival and growth (mg/ind)
18. Performance criteria	Control survival ≥ 80% Measurable growth in control amphipods

Table 4. Water chemistry summary for the 2006 Little Blackwater River 10-d amphipod *Hyalella azteca* sediment toxicity test [mean (S.D.) unless otherwise stated].

Station	DO mg/L	pH range	Temp °C	Conductivity µmhos	Alkalinity mg/L $CaCO_3$	Hardness mg/L $CaCO_3$	Ammonia (mg/L)		
							Overlying		Pore
							day	day	day 0
Control	7.0	7.38-8.04	23.4	2750 (212)	78 (18)	336 (34)	0.7	<0.2	3.5
BNWR	6.9	7.34-7.93	23.2	2700 (283)	88 (4)	336 (34)	3.5	<0.2	14.0
BNWR	6.8	7.33-7.93	23.2	2700 (283)	85 (7)	338 (37)	3.0	<0.2	13.0
BNWR	6.8	7.47-7.93	23.3	2750 (212)	88 (4)	332 (28)	1.1	<0.2	2.0
BNWR	6.7	7.42-7.93	23.4	2750 (212)	88 (4)	334 (31)	1.4	<0.2	6.0
BNWR	6.6	7.45-7.93	23.5	2750 (212)	83 (11)	322 (14)	1.5	<0.2	7.0
BNWR	6.6	7.48-7.93	23.2	2750 (212)	90 (0)	318 (9)	1.1	<0.2	4.0
BNWR	6.8	7.33-7.93	23.2	2700 (283)	85 (7)	332 (28)	2.3	<0.2	8.0

Table 5. Water chemistry summary for the 2006 Little Blackwater River *Leptocheirus plumulosus* sediment toxicity test [mean (S.D.) unless otherwise stated].

Station	DO mg/L	pH range	Temp °C	Salinity (‰)	Ammonia (mg/L)		
					Overlying		Porewater
					day 0	day 10	day 0
Control	6.6 (0.34)	7.41-8.40	24.5 (0.45)	5.0 (0)	1.0	0.2	3.5
BNWR 01	6.6 (0.44)	7.12-7.64	24.4 (0.36)	5.0 (0)	3.5	0.5	14.0
BNWR 02	6.7 (0.52)	7.24-7.60	24.1 (0.53)	5.0 (0)	3.5	0.3	13.0
BNWR 03	6.7 (0.56)	7.29-7.76	24.2 (0.49)	5.0 (0)	1.0	0.3	2.0
BNWR 04	6.6 (0.53)	7.50-7.92	24.3 (0.44)	5.0 (0)	1.6	0.4	6.0
BNWR 05	6.5 (0.64)	7.47-7.87	24.2 (0.55)	5.0 (0)	1.8	0.4	7.0
BNWR 06	6.5 (0.59)	7.22-7.93	24.1 (0.54)	5.0 (0)	1.1	0.2	4.0
BNWR 07	6.6 (0.54)	7.39-7.89	24.1 (0.53)	5.0 (0)	2.4	0.2	8.0

Table 6. Summary of results from the 2006 Little Blackwater River sediment toxicity tests. Shaded areas are endpoint values that were significantly less than control values for that specific test (α = 0.05).

	Hyalella azteca		*Leptocheirus plumulosus*	
	Survival	Growth	Survival	Growth
Station	%	(mg)	%	(mg)
Control	84.3	0.23	85.0	0.14
BNWR 01	91.3	0.24	52.5	0.24
BNWR 02	95.0	0.23	55.0	0.15
BNWR 03	96.3	0.23	52.5	0.16
BNWR 04	92.5	0.24	56.3	0.17
BNWR 05	95.0	0.24	52.5	0.23
BNWR 06	90.0	0.25	43.8	0.26
BNWR 07	97.5	0.25	50.0	0.16

APPENDICES

A-1. 2006 Little Blackwater River amphipod *Hyalella azteca* 10 day survival and growth sediment toxicity test results (7/25-8/4/06). An * indicates a treatment significantly < the control (= 0.05).

Treatment REP	# Surviving amphipods	~ Rep. dry wt. (mg)	~ Treatment % Survival (SD)	~ Treatment mg. dry wt. (SD)
Control A	10	0.29	84.3 (15.12)	0.23 (0.042)
Control B	8	0.25		
Control C	9	0.20		
Control D	7	0.25		
Control E	-[1]	-[1]		
Control F	6	0.26		
Control G	9	0.20		
Control H	10	0.18		
BNWR 01 A	10	0.24	91.3 (11.26)	0.24 (0.032)
BNWR 01 B	10	0.20		
BNWR 01 C	9	0.25		
BNWR 01 D	10	0.22		
BNWR 01 E	9	0.21		
BNWR 01 F	7	0.29		
BNWR 01 G	8	0.27		
BNWR 01 H	10	0.21		
BNWR 02 A	9	0.25	95.0 (5.35)	0.23 (0.017)
BNWR 02 B	9	0.20		
BNWR 02 C	9	0.24		
BNWR 02 D	11	0.23		
BNWR 02 E	10	0.21		
BNWR 02 F	9	0.25		
BNWR 02 G	10	0.23		
BNWR 02 H	10	0.25		
BNWR 03 A	9	0.23	96.3 (5.18)	0.23 (0.006)
BNWR 03 B	9	0.24		
BNWR 03 C	10	0.22		
BNWR 03 D	10	0.23		
BNWR 03 E	10	0.22		
BNWR 03 F	9	0.22		
BNWR 03 G	10	0.22		
BNWR 03 H	10	0.23		

A-1. Continued

Treatment REP	# Surviving amphipods	~ Rep. dry wt. (mg)	~. Treatment % Survival (SD)	~. Treatment mg. dry wt. (SD)
BNWR 04 A	10	0.28	92.5 (10.35)	0.24 (0.021)
BNWR 04 B	8	0.22		
BNWR 04 C	10	0.26		
BNWR 04 D	10	0.25		
BNWR 04 E	10	0.24		
BNWR 04 F	8	0.23		
BNWR 04 G	10	0.24		
BNWR 04 H	8	0.21		
BNWR 05 A	10	0.23	95.0 (5.35)	0.24 (0.014)
BNWR 05 B	10	0.23		
BNWR 05 C	10	0.25		
BNWR 05 D	9	0.25		
BNWR 05 E	10	0.26		
BNWR 05 F	9	0.23		
BNWR 05 G	9	0.27		
BNWR 05 H	9	0.24		
BNWR 06 A	9	0.15	90.0 (7.56)	0.25 (0.046)
BNWR 06 B	9	0.30		
BNWR 06 C	9	0.28		
BNWR 06 D	10	0.26		
BNWR 06 E	8	0.26		
BNWR 06 F	8	0.27		
BNWR 06 G	9	0.27		
BNWR 06 H	11	0.21		
BNWR 07 A	10	0.28	97.5 (4.63)	0.25 (0.022)
BNWR 07 B	11	0.23		
BNWR 07 C	10	0.25		
BNWR 07 D	9	0.28		
BNWR 07 E	9	0.23		
BNWR 07 F	10	0.24		
BNWR 07 G	10	0.26		
BNWR 07 H	10	0.26		

A-1. Continued

Treatment REP	# Surviving amphipods	~ Rep. dry wt. (mg)	~ Treatment % Survival (SD)	~ Treatment mg. dry wt. (SD)
Day 0 amphipod A[2]	20	0.07		
Day 0 amphipod B	20	0.06		
Day 0 amphipod C	20	0.07		0.07 (0.003)
Day 0 amphipod D	20	0.07		
Day 0 amphipod E	20	0.07		

[1]Amphipods were not loaded into this replicate beaker.

[2]These are the dry weights of the test amphipods at day 0 used to determine if there was measurable growth in the control amphipods as compared to the control amphipod weights at day 10.

A-2. 2006 Little Blackwater River amphipod *Leptocheirus plumulosus* 10 day survival and growth sediment toxicity test results (7/28-8/7/06). An * indicates a treatment significantly < the control (= 0.05).

Treatment REP	# Surviving amphipods	~ Rep. dry wt. (mg)	~ Treatment % Survival (SD)	~ Treatment mg. dry wt. (SD)
Control A	8	0.12	85.0 (15.12)	0.14 (0.045)
Control B	10	0.10		
Control C	10	0.22		
Control D	8	0.15		
Control E	6	0.16		
Control F	10	0.11		
Control G	7	0.19		
Control H	9	0.10		
BNWR 01 A	8	0.27	52.5 (29.64)	0.24 (0.080)
BNWR 01 B	4	0.13		
BNWR 01 C	2	0.32		
BNWR 01 D	7	0.14		
BNWR 01 E	10	0.21		
BNWR 01 F	3	0.34		
BNWR 01 G	2	0.22		
BNWR 01 H	6	0.30		
BNWR 02 A	4	0.13	55.0 (30.24)	0.15 (0.044)
BNWR 02 B	5	0.18		
BNWR 02 C	7	0.13		
BNWR 02 D	1	0.19		
BNWR 02 E	7	0.21		
BNWR 02 F	2	0.08		
BNWR 02 G	9	0.12		
BNWR 02 H	9	0.13		
BNWR 03 A	5	0.27	52.5 (16.69)	0.16 (0.081)
BNWR 03 B	3	0.11		
BNWR 03 C	5	0.17		
BNWR 03 D	4	0.11		
BNWR 03 E	8	0.21		
BNWR 03 F	4	0.27		
BNWR 03 G	6	0.09		
BNWR 03 H	7	0.06		

A-2. Continued

Treatment REP	# Surviving amphipods	~ Rep. dry wt. (mg)	~. Treatment % Survival (SD)	~. Treatment mg. dry wt. (SD)
BNWR 04 A	9	0.13	56.3 (33.35)	0.17 (0.047)
BNWR 04 B	1	0.14		
BNWR 04 C	5	0.17		
BNWR 04 D	1	0.12		
BNWR 04 E	6	0.27		
BNWR 04 F	5	0.19		
BNWR 04 G	9	0.17		
BNWR 04 H	9	0.14		
BNWR 05 A	7	0.13	52.5 (16.69)	0.23 (0.127)
BNWR 05 B	5	0.13		
BNWR 05 C	6	0.19		
BNWR 05 D	4	0.18		
BNWR 05 E	2	0.51		
BNWR 05 F	5	0.24		
BNWR 05 G	6	0.13		
BNWR 05 H	7	0.28		
BNWR 06 A	1	0.40	43.8 (34.62)	0.26 (0.119)
BNWR 06 B	10	0.37		
BNWR 06 C	1	0.05		
BNWR 06 D	1	0.33		
BNWR 06 E	3	0.19		
BNWR 06 F	5	0.27		
BNWR 06 G	8	0.15		
BNWR 06 H	6	0.28		
BNWR 07 A	6	0.35	50.0 (27.26)	0.16 (0.113)
BNWR 07 B	5	0.11		
BNWR 07 C	3	0.16		
BNWR 07 D	6	0.27		
BNWR 07 E	4	0.08		
BNWR 07 F	7	0.10		
BNWR 07 G	0	0.00		
BNWR 07 H	9	0.22		

A-2. Continued

Treatment REP	# Surviving amphipods	~ Rep. dry wt. (mg)	~ Treatment % Survival (SD)	~ Treatment mg. dry wt. (SD)
Day 0 amphipod A[2]	10	0.05		
Day 0 amphipod B	10	0.03		
Day 0 amphipod C	10	0.04		0.04 (0.008)
Day 0 amphipod D	10	0.04		
Day 0 amphipod E	10	0.03		

[1]Amphipods were not loaded into this replicate beaker.

[2]These are the dry weights of the test amphipods at day 0 used to determine if there was measurable growth in the control amphipods as compared to the control amphipod weights at day 10.

Chapter 2

2006 B-IBI Data from Versar for Samples from Little Blackwater River

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December 30, 2008

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INTRODUCTION

Versar Inc., processed macrobenthic samples collected with a petite ponar from seven sites within the from the Little Blackwater River watershed. These samples were collected by the United States Fish and Wildlife Service (USFWS), Chesapeake Bay Field Office as part of a larger USFWS project entitled, "Effects of Urban Sprawl on Sediment Surface Water and Biota in the Little Blackwater River, Blackwater National Wildlife Refuge, Dorchester County, Maryland." Benthic data collected from the stations are presented and discussed based on the Benthic Index of Biotic Integrity (B-IBI), which was developed for application to benthic communities of the Chesapeake Bay (Weisberg et al. 1997, Alden et al. 2002). The B-IBI is used by the Chesapeake Bay Monitoring Program to characterize bay-wide benthic community condition and assess the health of the Bay. Results of the benthic community characterization will be used to assist the USFWS in the interpretation of sediment contaminant and toxicity tests also conducted at the stations.

METHODS

Laboratory Methods

Laboratory methods followed the standard procedures employed for the Long-Term Benthic Monitoring Program (Llansó et al. 2005). In short, macrobenthic organisms were sorted from detritus under dissecting microscopes, identified to the lowest practical taxonomic level (most often species), and counted. Oligochaete worms and chironomid larva were mounted on microscope slides and examined under a compound microscope for genus and species identification. Each taxon was dried to a constant weight at 60 °C, ashed in a muffle furnace at 500 °C for 4 hours, and weighed again to obtain species-specific, ash-free dry weight.

Benthic Index of Biotic Integrity (B-IBI) Calculation

The B-IBI is a multiple-attribute index developed to identify the degree to which a benthic assemblage meets the Chesapeake Bay Program's Benthic Community Restoration Goals. The B-IBI provides a means for comparing relative condition of benthic invertebrate assemblages across habitat types. It also provides a validated mechanism for integrating several benthic community attributes indicative of habitat "health" into a single number that measures overall benthic community condition.

The B-IBI formula is habitat specific for salinity and sediment type. For this study all stations were assigned to the low mesohaline salinity range (between 5.0 and 12.0 ppt), which is consistent with the long-term average of salinities within Baltimore Harbor (Llansó et al. 2005). For this salinity habitat, the B-IBI does not have a different metric thresholds based on sediment type so differentiation between sand and mud sediments was not necessary (Weisberg et al.

(1997). The thresholds and formula for a low mesohaline habitat was calculated using the methods described in Weisberg et al. (1997) and updated by Alden et al. (2002).

The B-IBI is scaled from 1 to 5, and sites with values of 3 or more are considered to meet the Restoration Goals. The index is calculated by scoring each of several metrics as either 5, 3, or 1 depending on whether the value of the metric at a site approximates, deviates slightly from, or deviates strongly from values found at the best reference sites in similar habitats, and then averaging these scores across metrics to obtain a single score for a sampling site.

The criteria for assigning these single numeric scores a designation of "health" are provided in Weisberg et al. 1997. In summary, benthic community condition is classified into four levels of "health" based on the B-IBI. Values less than or equal to 2 are classified as severely degraded; values from 2 to 2.6 are classified as degraded; values greater than 2.6 but less than 3.0 are classified as marginal; and values of 3.0 or more are classified as meeting the goals. Values in the marginal category do not meet the Restoration Goals, but they differ from the goals within the range of measurement error (Alden et al 2002).

Reporting

All taxa identified and weighed for each station are listed in the station datasheets. Although epifauna taxa were sorted and identified from the samples, all taxa marked with Epi. are considered epifauna and are excluded from the data before calculating the B-IBI. At the bottom of each station table, the number of species, total abundance, and total biomass with and without the epifaunal taxa are presented.

In the middle of each station's appendix table is a list of metrics that were used in the B-IBI calculations for the low mesohaline habitat type. Not all metrics presented in the station printout are scored for this habitat type but the metric value is provided for informational purposes. If a score is not listed for a specific metric value then it is not scored for a low mesohaline habitat. Additionally, if certain species used in a metric calculation were not present in the sample, resulting in a 0 for the metric, the metric was not scored. If a true score of 0 was calculated, however, than the metric was scored.

SUMMARY OF B-IBI DATA

Overall, Lisa Scott indicated that the benthic fauna at the seven stations sampled did not display healthy community characteristics. No molluscs or large polychaete were collected from any of the stations sampled leading to low biomass at all stations. Only one station (Station 6) had amphipod and isopod crustaceans which is another indicator of a healthy benthic community as well as important prey items for fish and crabs. The dominant taxa were generally all pollution indicative in the oligochaete, polychaete, and chironomid taxonomic groups.

Lisa Scott has seen samples like these from marsh areas within the Patuxent River. Abundance of oligochaetes, in particular, are very patchy in these areas. She thinks that one of two factors may be the cause, especially since the sediments themselves were not toxic. The major factor contributing to the poor IBI scores may be that salinity fluctuations in areas that

swing between tidal fresh to mesohaline. Another factor could be localized low DO resulting from the decaying marsh material.

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Station: BNWR 01		
Habitat: Tidal Freshwater	Date: 2006	Gear: Young Grab

BENTHIC INDEX OF BIOTIC INTEGRITY

B-IBI Score: 1.00	Condition: Severely Degr.		# Attributes Scored: 4		
	Value	Score		Value	Score
Shannon-Wiener Index	0.00		Pollution Indicative Spp. Abundance(%)	100.00	
Abundance (#/m2)	136	1	Pollution Indicative Spp. Biomass(%)	100.00	
Biomass (g/m2)	0.02		Pollution Sensitive Spp. Abundance(%)	0.00	
Carnivore-Omnivore Abundance(%)	0.00		Pollution Sensitive Spp. Biomass(%)	0.00	
Deep Deposit Feeder Abundance(%)	100.00	1	TF Pollution Indicative Spp. Abundance(%)	100.00	1
Tolerance Score	9.80	1	Oligo Pollution Indicative Spp. Abundance(%)	100.00	
Limnodrilus Abundance(%)	100.00		Oligo Pollution Sensitive Spp. Abundance(%)	0.00	
			Tanypodinae/Chironomidae Abundance Ratio	0.00	

BENTHIC ABUNDANCE (per sq. meter)

TAXA	Abundance (#/m2)	Biomass (g/m2)
Oligochaeta		0.01591
Tubificidae imm. without capilliform cha	136	0.00114
Total Abundance w/ Epi.	136	
Total Abundance w/o Epi.	136	
Number of Taxa w/ Epi.	1	
Number of Taxa w/o Epi.	1	
Total Biomass w/ Epi.		0.01705
Total Biomass w/o Epi.		0.01705

Most degraded station sampled of the 7. No diversity, extremely low abundance and biomass,

B-IBI = 1.0 (Severely degraded).

Station: BNWR 02		
Habitat: Tidal Freshwater	Date: 2006	Gear: Young Grab

BENTHIC INDEX OF BIOTIC INTEGRITY

B-IBI Score: 1.50	Condition: Severely Degr.		# Attributes Scored: 4		
	Value	Score		Value	Score
Shannon-Wiener Index	2.36		Pollution Indicative Spp. Abundance(%)	75.00	
Abundance (#/m2)	273	1	Pollution Indicative Spp. Biomass(%)	46.15	
Biomass (g/m2)	0.01		Pollution Sensitive Spp. Abundance(%)	0.00	
Carnivore-Omnivore Abundance(%)	16.67		Pollution Sensitive Spp. Biomass(%)	0.00	
Deep Deposit Feeder Abundance(%)	83.33	1	TF Pollution Indicative Spp. Abundance(%)	50.00	3
Tolerance Score	9.42	1	Oligo Pollution Indicative Spp. Abundance(%)	75.00	
Limnodrilus Abundance(%)	50.00		Oligo Pollution Sensitive Spp. Abundance(%)	0.00	
			Tanypodinae/Chironomidae Abundance Ratio	50.00	

BENTHIC ABUNDANCE (per sq. meter)

TAXA	Abundance (#/m2)	Biomass (g/m2)
Chironomus spp.	23	0.00114
Coelotanypus spp.	23	0.00227
Dero spp.	68	0.00114
Limnodrilus hoffmeisteri	45	0.00114
Oligochaeta		0.00682
Quistadrilus multisetosus	23	0.00114
Tubificidae imm. without capilliform cha	91	0.00114
Total Abundance w/ Epi.	273	
Total Abundance w/o Epi.	273	
Number of Taxa w/ Epi.	5	
Number of Taxa w/o Epi.	5	
Total Biomass w/ Epi.		0.01477
Total Biomass w/o Epi.		0.01477

Extremely low abundance and biomass, 5 distinct taxa but only within generally recognized pollution-indicative groups Chironomidae (*Chironomus* and *Coelotanypus*) and Oligochaeta (*Dero, Limnodrilus,* and *Quistadrilus*)

B-IBI = 1.5 (Severely degraded).

BLACKWATER 2006 BENTHIC COMMUNITY AND B-IBI SCORES

Station: BNWR 03		
Habitat: Oligohaline	Date: 2006	Gear: Young Grab

BENTHIC INDEX OF BIOTIC INTEGRITY

B-IBI Score: 3.00	Condition: Meets Goal	# Attributes Scored: 6

	Value	Score		Value	Score
Shannon-Wiener Index	1.02		Pollution Indicative Spp. Abundance(%)	98.59	
Abundance (#/m2)	1614	5	Pollution Indicative Spp. Biomass(%)	100.00	
Biomass (g/m2)	0.09		Pollution Sensitive Spp. Abundance(%)	0.00	
Carnivore-Omnivore Abundance(%)	73.24	5	Pollution Sensitive Spp. Biomass(%)	0.00	
Deep Deposit Feeder Abundance(%)	1.41		TF Pollution Indicative Spp. Abundance(%)	0.00	
Tolerance Score	9.80	1	Oligo Pollution Indicative Spp. Abundance(%)	98.59	1
Limnodrilus Abundance(%)	0.00		Oligo Pollution Sensitive Spp. Abundance(%)	0.00	1
Tanypodinae/Chironomidae Abundance Ratio	1.92	5			

BENTHIC ABUNDANCE (per sq. meter)

TAXA	Abundance (#/m2)	Biomass (g/m2)
Chironomidae		0.08182
Chironomus spp.	1159	0.00114
Dero spp.	23	
Streblospio benedicti	409	0.00227
Tanypus spp.	23	0.00114
Total Abundance w/ Epi.	1614	
Total Abundance w/o Epi.	1614	
Number of Taxa w/ Epi.	4	
Number of Taxa w/o Epi.	4	
Total Biomass w/ Epi.		0.08636
Total Biomass w/o Epi.		0.08636

Salinity recorded at time of sampling put this station in the oligohaline habitat category. Some signs of salinity influence with the presence of the polychaete *Streblospio benedicti*. Because of the difference in scoring for this habitat, the presence of high numbers of pollution-indicative *Chironomus* led to counteractive scoring in the 6 metrics resulting in a B-IBI score of 3.0 (meets goal). Care should be taken in assuming this site is a quality site based on the B-IBI score because of the lack of diversity and high numbers of the pollution-indicative species *Chironomus* and polychaete *Streblospio*.

B-IBI = 3.0 (Meets goal).

BLACKWATER 2006 BENTHIC COMMUNITY AND B-IBI SCORES

Station: BNWR 04		
Habitat: Oligohaline	Date: 2006	Gear: Young Grab

BENTHIC INDEX OF BIOTIC INTEGRITY

B-IBI Score: 3.00	Condition: Meets Goal	# Attributes Scored: 6

	Value	Score		Value	Score
Shannon-Wiener Index	0.95		Pollution Indicative Spp. Abundance(%)	92.86	
Abundance (#/m2)	318	3	Pollution Indicative Spp. Biomass(%)	83.33	
Biomass (g/m2)	0.01		Pollution Sensitive Spp. Abundance(%)	0.00	
Carnivore-Omnivore Abundance(%)	21.43	3	Pollution Sensitive Spp. Biomass(%)	0.00	
Deep Deposit Feeder Abundance(%)	0.00		TF Pollution Indicative Spp. Abundance(%)	0.00	
Tolerance Score	8.77	3	Oligo Pollution Indicative Spp. Abundance(%)	92.86	3
Limnodrilus Abundance(%)	0.00		Oligo Pollution Sensitive Spp. Abundance(%)	0.00	1
			Tanypodinae/Chironomidae Abundance Ratio	0.00	5

BENTHIC ABUNDANCE (per sq. meter)

TAXA	Abundance (#/m2)	Biomass (g/m2)
Chironomus spp.	45	0.00114
Streblospio benedicti	250	0.00455
Tanytarsus spp.	23	0.00114
Total Abundance w/ Epi.	318	
Total Abundance w/o Epi.	318	
Number of Taxa w/ Epi.	3	
Number of Taxa w/o Epi.	3	
Total Biomass w/ Epi.		0.00682
Total Biomass w/o Epi.		0.00682

Again, salinity recorded at time of sampling put this station in the oligohaline habitat category. Some signs of salinity influence with the presence of the polychaete *Streblospio benedicti*. Because of the 3.00 B-IBI metric scoring for this station it is classified as "meets goal" but again care must be taken if assuming this site is of good quality. Diversity, abundance, and biomass are low for this site but both diversity and biomass are not scored for this habitat. Also, even though the abundance metric scored as a 3 using this habitat's threshold, in all other habitats 318/m^2 is scored as a 1.

B-IBI = 3.0 (Meets goal).

Station: BNWR 05		
Habitat: Oligohaline	Date: 2006	Gear: Young Grab

BENTHIC INDEX OF BIOTIC INTEGRITY

B-IBI Score: 2.33	Condition: Degraded	# Attributes Scored: 6

	Value	Score		Value	Score
Shannon-Wiener Index	1.50		Pollution Indicative Spp. Abundance(%)	75.00	
Abundance (#/m2)	182	3	Pollution Indicative Spp. Biomass(%)	75.00	
Biomass (g/m2)	0.00		Pollution Sensitive Spp. Abundance(%)	0.00	
Carnivore-Omnivore Abundance(%)	75.00	5	Pollution Sensitive Spp. Biomass(%)	0.00	
Deep Deposit Feeder Abundance(%)	0.00		TF Pollution Indicative Spp. Abundance(%)	0.00	
Tolerance Score	9.63	1	Oligo Pollution Indicative Spp. Abundance(%)	100.00	1
Limnodrilus Abundance(%)	0.00		Oligo Pollution Sensitive Spp. Abundance(%)	0.00	1
			Tanypodinae/Chironomidae Abundance Ratio	33.33	3

BENTHIC ABUNDANCE (per sq. meter)

TAXA	Abundance (#/m2)	Biomass (g/m2)
Chironomus spp.	91	0.00114
Procladius spp.	45	0.00114
Streblospio benedicti	45	0.00227
Total Abundance w/ Epi.	182	
Total Abundance w/o Epi.	182	
Number of Taxa w/ Epi.	3	
Number of Taxa w/o Epi.	3	
Total Biomass w/ Epi.		0.00455
Total Biomass w/o Epi.		0.00455

The benthic community collected at this station was very similar to Station 4 with the exception of the presence of the chironomid *Procladius* instead of *Tanytarsus* at Station 4. The difference in this one chironomid species led to a lower scoring for the tolerance score, pollution indicative abundance, and Tanypodinae/chironomid ratio. As a result, this station had a B-IBI score of 2.33 (degraded). Again abundance, diversity, and biomass were all low at this station.

B-IBI = 2.33 (Degraded).

Station: BNWR 06

Habitat: Low Mesohaline | Date: 2006 | Gear: Young Grab

BENTHIC INDEX OF BIOTIC INTEGRITY

B-IBI Score: 1.40 | Condition: Severely Degr. | # Attributes Scored: 5

	Value	Score		Value	Score
Shannon-Wiener Index	1.63	1	Pollution Indicative Spp. Abundance(%)	84.31	1
Abundance (#/m2)	1159	3	Pollution Indicative Spp. Biomass(%)	95.00	
Biomass (g/m2)	0.02	1	Pollution Sensitive Spp. Abundance(%)	0.00	
Carnivore-Omnivore Abundance(%)	41.18		Pollution Sensitive Spp. Biomass(%)	0.00	1
Deep Deposit Feeder Abundance(%)	0.00		TF Pollution Indicative Spp. Abundance(%)	0.00	
Tolerance Score	8.03		Oligo Pollution Indicative Spp. Abundance(%)	84.31	
Limnodrilus Abundance(%)	0.00		Oligo Pollution Sensitive Spp. Abundance(%)	0.00	
			Tanypodinae/Chironomidae Abundance Ratio	0.00	

BENTHIC ABUNDANCE (per sq. meter)

TAXA	Abundance (#/m2)	Biomass (g/m2)
Chironomus spp.	136	0.00114
Edotea triloba (Epi)	68	0.00455
Eteone heteropoda	159	0.00909
Gammarus daiberi (Epi)	205	0.01364
Streblospio benedicti	682	0.01136
Tanytarsus spp.	182	0.00114
Total Abundance w/ Epi.	1432	
Total Abundance w/o Epi.	1159	
Number of Taxa w/ Epi.	6	
Number of Taxa w/o Epi.	4	
Total Biomass w/ Epi.		0.04091
Total Biomass w/o Epi.		0.02273

This station had a salinity measurement at the time of sampling that places it into the low mesohaline habitat range. There were additional signs of salinity intrusion with the presence of the polychaete *Streblospio benedicti*, the amphipod *Gammarus daiberi*, and the isopod *Edotea triloba*. Low diversity and biomass led to this station having a B-IBI score of 1.4 (severely degraded).

B-IBI = 1.4 (Severely degraded).

BLACKWATER 2006 BENTHIC COMMUNITY AND B-IBI SCORES

Station: BNWR 07		
Habitat: Oligohaline	Date: 2006	Gear: Young Grab

BENTHIC INDEX OF BIOTIC INTEGRITY

B-IBI Score: 3.67	Condition: Meets Goal	# Attributes Scored: 6

	Value	Score		Value	Score
Shannon-Wiener Index	1.88		Pollution Indicative Spp. Abundance(%)	5.77	
Abundance (#/m2)	1182	5	Pollution Indicative Spp. Biomass(%)	22.22	
Biomass (g/m2)	0.01		Pollution Sensitive Spp. Abundance(%)	0.00	
Carnivore-Omnivore Abundance(%)	23.08	3	Pollution Sensitive Spp. Biomass(%)	0.00	
Deep Deposit Feeder Abundance(%)	76.92		TF Pollution Indicative Spp. Abundance(%)	0.00	
Tolerance Score	7.80	3	Oligo Pollution Indicative Spp. Abundance(%)	5.77	5
Limnodrilus Abundance(%)	0.00		Oligo Pollution Sensitive Spp. Abundance(%)	0.00	1
			Tanypodinae/Chironomidae Abundance Ratio	9.09	5

BENTHIC ABUNDANCE (per sq. meter)

TAXA	Abundance (#/m2)	Biomass (g/m2)
Ceratopogonidae	23	0.00114
Chironomus spp.	45	0.00114
Dero spp.	227	0.00114
Dicrotendipes spp.	91	0.00114
Oligochaeta		0.00227
Pristina osborni	682	0.00114
Tanypus spp.	23	0.00114
Tanytarsus spp.	91	0.00114
Total Abundance w/ Epi.	1182	
Total Abundance w/o Epi.	1182	
Number of Taxa w/ Epi.	7	
Number of Taxa w/o Epi.	7	
Total Biomass w/ Epi.		0.01023
Total Biomass w/o Epi.		0.01023

Although salinity at the time of sampling put this station in the oligohaline habitat for B-IBI scoring, no sign of salinity intrusion was evident by the benthic community present. All of the species collected from the site were either freshwater oligochaetes or dipteran larva in the Chironomidae or Ceratopogonidae family. Using oligohaline metric scoring this site had a B-IBI of 3.67 (meets goal). Even if this station was scored using tidal freshwater thresholds, it would still be classified as “meets goal”. Based on the B-IBI this station was the best of all 7 stations sampled in terms of benthic community, it had the most species richness (7 species) and good abundance spread among the species.

B-IBI = 3.67 (Meets goal).

Chapter 3

2007 Sediment Sampling
Toxicity of Sediments from the Little Blackwater River to *Hyalella azteca* and *Leptocheirus plumulosus*

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FOREWORD

The purpose of this study was to provide sediment toxicity information on sediment samples from the Little Blackwater River watershed. The sample sites were selected by the United States Fish and Wildlife Service (USFWS), Chesapeake Bay Field Office. Sediments were collected from seven sites in the Little Blackwater River watershed: BNWR 01, 02, 03, 04, 05, 06 and 07. Samples were collected in the summer of 2007. These are the same sites that were tested for toxicity in 2006 for the first year of this project (Fisher et al., 2007). The sediment toxicity test results presented in this report are part of a larger USFWS project entitled, "Effects of Urban Sprawl on Sediment Surface Water and Biota in the Little Blackwater River, Blackwater National Wildlife Refuge, Dorchester County, Maryland." Christopher Guy and Dixie Birch were project coordinators from USFWS. The data covered in this report are from toxicity studies conducted at the University of Maryland Wye Research and Education Center under the direction of Dr. Daniel J. Fisher. All sediment samples were tested using both 10-d *Hyalella azteca* and 10-d *Leptocheirus plumulosus* toxicity tests that measured survival and growth as endpoints.

ABSTRACT

The goal of this study was to provide sediment toxicity information on sediment samples from the Little Blackwater River watershed. The sample sites were selected by the United States Fish and Wildlife Service (USFWS), Chesapeake Bay Field Office as part of a larger USFWS project entitled, "Effects of Urban Sprawl on Sediment Surface Water and Biota in the Little Blackwater River, Blackwater National Wildlife Refuge, Dorchester County, Maryland." Sediment were collected from seven sites in the Little Blackwater River watershed: BNWR 01, 02, 03, 04, 05, 06 and 07. The stations are upstream and downstream of a development proposed at that time. Toxicity test results from samples collected in the summer of 2007 are presented in this report. The U.S. Environmental Protection Agency (U.S. EPA) whole sediment *Hyalella azteca* 10-d survival and growth test and a *Leptocheirus plumulosus* 10-d survival and growth test developed at the Wye Research and Education Center were used to determine toxicity. Performance criteria for survival and growth were obtained from all toxicity tests. None of the sediments collected in 2007 were toxic based on the results of these 10-d tests with *Hyalella azteca* and *Leptocheirus plumulosus*.

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INTRODUCTION

The Sediment Quality Triad (Triad) has been successfully applied in the Chesapeake Bay and nation-wide (e.g., Baltimore Harbor, Anacostia River, Puget Sound, San Francisco Bay, Gulf of Mexico) to characterize ambient conditions in freshwater, estuarine and marine systems (e.g., Long and Chapman 1985; Chapman et al. 1987; Hall et al. 1991, 1992, 1994, 2000; McGee et al. 1999). This weight of evidence approach consists of complementary measures of sediment chemistry, benthic community structure and sediment toxicity. The combination of potential cause (chemistry) and effect (biology) measurements makes the Triad one of the most complete and powerful tools available to determine the extent and significance of pollution-induced degradation. Although water column contaminant levels are useful to distinguish among sources (i.e., new inputs versus historic contamination) and loadings of contaminants, they are temporally and spatially quite patchy, potentially confounding our ability to characterize the potential for toxicant related impact. Therefore, the focus of the Triad approach is on the sedimentary environment because sediments accumulate and integrate toxic chemical inputs from multiple sources over time; hence, determination of sediment quality is essential to determine trends in toxic contaminants. In order to obtain a direct measure of sediment toxicity, laboratory tests have been developed in which benthic organisms are exposed to sediments under controlled conditions (U.S. EPA, 2000; U.S. EPA/U.S. ACE, 2001). Sediment toxicity tests are effective tools in assessments of sediment quality, as they provide direct, quantifiable evidence of the biological consequences of contamination that can only be inferred from chemical or biological community analyses.

The University of Maryland Wye Research and Education Center (WREC) via a contract with the United States Fish and Wildlife Service (USFWS), Chesapeake Bay Field Office conducted an intensive sediment toxicity assessment of whole sediments from seven stations in the Little Blackwater River watershed. The toxicity data will be used as part of the Triad approach designed to measure the effects in sediments of urban sprawl on the Blackwater National Wildlife Refuge in Dorchester County, Md.

Whole sediment toxicity at all stations was assessed using a 10-d survival and growth test with the freshwater amphipod *Hyalella azteca*. In addition, a 10-d survival and growth test with the estuarine amphipod *Leptocheirus plumulosus* developed at WREC was also used to assess whole sediment toxicity because some of the stations had measurable salinity. The same test species and methods were used in the 2006 toxicity tests for the first year of this project (Fisher et al., 2007). These species were chosen because of their practical and ecological relevance and for the availability of U.S. Environmental Protection Agency (U.S. EPA) recommended test methods for assessing the toxicity of freshwater and marine/estuarine sediments (U.S. EPA, 2000; U.S. EPA/U.S. ACE, 2001). The U.S. EPA/U.S. ACE (2001) method is for a longer term (28 d) chronic method using *L. plumulosus*. Experience with the *L. plumulosus* 28-day test in the past has shown high variability in the reproduction endpoint and thus a limited ability to distinguish toxic sediments using this endpoint. This has led to development of a 10 day *L. plumulosus* test with survival and growth as endpoints. This new *L. plumulosus* test is similar to the U.S. EPA 10-d *H. azteca* survival and growth test (U.S. EPA, 2000) with the exception of estuarine water renewals and ground tetramin as the food source. In preliminary research, this

10-d test has proven to be of equal sensitivity as the 28 d chronic test with *L. plumulosus* (Ziegler and Fisher, 2006).

MATERIALS AND METHODS

Sample Stations

Seven stations in the Little Blackwater River watershed were sampled in this study: BNWR 01, 02, 03, 04, 05, 06 and 07. The stations are upstream and downstream of a proposed development. The same stations were tested that were tested in the first year of the project (Fisher et al., 2007). Actual station locations and descriptions are presented in the main report for the project. The station abbreviations, numbers, sediment collection dates and toxicity test dates for the two different amphipods are presented in Table 1. As can be seen in Table 1, all of the stations were tested in the summer of 2007.

Sample Collection, Handling, and Storage

The USFWS group collected sediments for this study. The specific protocols for sediment collection, handling, storage, and for laboratory analyses were complementary to those described in the Quality Assurance Project Plan (QAPP) that was developed for Sediment Quality Triad projects in the Chesapeake Bay watershed (USFWS, 1999). Samples were collected at the sites on July 11 and 12, 2007. In brief, samples were taken with a stainless steel petite ponar grab (0.023 m^2). Sediment toxicity samples from each site were composited. At each site, the top 2 - 3 cm of several grabs were placed into a pre-cleaned stainless steel bowl and homogenized with a stainless steel spoon until uniform in color and texture. Once enough sediment was taken, sub samples were placed into separate pre-cleaned containers for sediment toxicological analyses and chemical analyses. Observations of sample acceptability, depth of penetration and qualitative characteristics (i.e., odor, color, etc) were recorded on field data sheets. Care was taken to avoid sediments in direct contact with the sides of the grab sampler. Collected sediments were kept on ice in the dark in coolers. All containers for chemical, biological and toxicological analyses were labeled with the date, type of sample, and location.

All toxicity samples were transported to the WREC on ice in coolers, out of direct sunlight. The samples were held at the WREC in refrigerators in the dark at 4EC until initiation of the toxicity tests. Sediments were not sieved prior to testing. Because of the possible presence of indigenous *L. plumulosus* at Chesapeake Bay sample sites, sediments are generally sieved through a 500 Φm mesh stainless steel sieve prior to starting a 10-d test test. Sieving is done to remove indigenous organisms that might interfere with the tests. The samples from this system were mostly old decaying marsh which could not be sieved. There were very little actual grainy sediments at any site.

At each site an additional sample was taken for Benthic Community Analysis (USFWS, 1999). In brief, a petite ponar grab (0.023 m^2) sample was taken at each station, sieved through a 500 µm mesh, and preserved in 10% buffered formalin containing rose bengal. These samples were delivered to the WREC along with the toxicity samples. The samples were then delivered by WREC staff to VERSAR, Inc. (9200 Rumsey Road , Columbia, MD 21045) for sorting, taxonomic identification and calculation of a Benthic Index of Biotic Intergrity (B-IBI) using the

methods of Weisberg et al. (1997) and Alden et al. (2002). Results from the B-IBI analyses will be presented in a separate report.

Sediment Toxicity Tests

Sediment toxicity was assessed at all stations using the U.S. EPA 10-d *Hyalella azteca* whole sediment toxicity test method with survival and growth as endpoints (U.S. EPA, 2000). *H. azteca* for these tests were purchased from Chesapeake Cultures in Hayes, Va. This test method is summarized in Table 2. Overlying water for the *H. azteca* test was a 95/5 mix of freshwater and estuarine water to attain a conductivity of approximately 2,400 µmhos. All sediments were also assessed with a 10 day *L. plumulosus* test with survival and growth as endpoints. This test is similar to the U.S. EPA 10-d *H. azteca* survival and growth test described above with the exception of using an estuarine species, estuarine water renewals and ground tetramin as the food source. *L. plumulosus* were from cultures maintained at the WREC. This new *L. plumulosus* test method is summarized in Table 3. Overlying water for the *L. plumulosus* test was filtered estuarine water diluted to 5‰. The 10-d *L. plumulosus* test is a short-term chronic test similar to the chronic U.S. EPA 28-d *L. plumulosus* whole sediment toxicity test method except that it is only 10 days long and therefore has no reproduction endpoint (U.S. EPA/U.S. ACE, 2001). Experience with the *L. plumulosus* 28-day test in the past has shown a high variability in the reproduction endpoint and thus a limited ability to distinguish toxic sediments using this endpoint. This has led to the development at our lab of a 10 day *L. plumulosus* test with survival and growth as endpoints. Results from developmental work with the new10-d *L. plumulosus* test indicate that it as sensitive as the 28-d *L. plumulosus* test in detecting toxicity of sediment samples based on results from a dilution series of a toxic sediment containing a wide range of environmental contaminates from Baltimore Harbor, MD (Ziegler and Fisher, 2006).

Test start dates are shown in Table 1. Routine water chemistry was performed at the beginning of each renewal. Overlying ammonia was measured at the beginning and end of each test while pore water ammonia was measured in a dummy beaker at test initiation if sufficient pore water could be extracted from the sediments by centrifugation.

The endpoints of the tests for both species were survival in each replicate and average growth in each replicate (mg dry weight /individual at test conclusion). At the end of the tests, all replicate test beakers were sieved through a 500 Φm sieve to collect surviving adult organisms. Adult dry weight was determined by drying at 100EC for at least 24 h. Test acceptability criteria require ∃80% control survival and measurable control amphipod growth.

Data Analysis

Statistical procedures for the analysis of the test data are presented in U.S. EPA/ACE (2001). Proportion survival data were Arc Sine Square Root transformed before analysis. Alpha was 0.05 for all statistical tests. Data were assessed for normality and homogeneity of variance using the Chi-Square Test and the Bartlett's Test, respectively. All data were analyzed using a one-tailed test design to determine which sediments caused significant reductions from control endpoint data. If the data met the assumptions of normality and homogeneity of variance they were analyzed by analysis of variance (ANOVA). If ANOVA indicated a significant difference, post hoc comparisons between test sediment data and the control data were made using a Dunnett's Test. If the normality and/or homogeneity of variance assumptions were not met, the

data were analyzed using a Steel's Many-One Rank Test. If there were unequal replicate sizes in a dataset that was normal and had homogeneous variance, a parametric ANOVA was used followed by a Bonferroni's t-test to determine any differences from the control data. If there were unequal replicate sizes in a dataset that was not normal and/or had heterogeneous variance, a non parametric Wilcoxon Rank Sum test was used with a Bonferroni Adjustment to detect differences from control data. If a sediment sample caused a reduction in survival, it was not included in the analyses of the sublethal growth endpoint. Differences between day 0 and day10 control amphipod dry weights were tested using a simple *t*-test to determine if there was significant growth in the control amphipods during the test period.

RESULTS AND DISCUSSION

Water Quality

Measurements for water quality during the various tests are given in Tables 4 for the *H. azteca* test and Table 5 for the *L. plumulosus* test. Pore water ammonia was relatively low in all test beakers, with a highest recorded value of 18.2 mg/L for any test sediment and 9.0 mg/L for any control sediment. Overlying ammonia was also low, with a highest recorded value of 3.5 mg/L for any test sediment and 1.0 mg/L for any control sediment. These values are well below the level of 60 mg/L in pore water that would be considered a problem by the U.S. EPA (U.S. EPA/ACE, 2001) for *L. plumulosus* and below levels thought to be toxic to *H. azteca* (U.S. EPA, 2000). The test sediment with the highest pore water and overlying ammonia concentrations was not toxic (BNWR 01). Values for pH were acceptable for all test and control sediments. No values for dissolved oxygen (DO) measured during the tests were below the acceptable level of 2.5 mg/L for *H. azteca* (U.S. EPA, 2000) or 3.6 mg/L for *L. plumulosus* (U.S. EPA/ACE, 2001). The lowest recorded DOs in the *H. azteca* and *L. plumulosus* tests were 4.4 mg/L and 4.0 mg/L, respectively.

Sediment Toxicity Tests

Performance criteria of ∃80% amphipod survival in the *H. azteca* and *L. plumulosus* control treatments were obtained in both 10-d toxicity tests (Appendices A-1 and A-2). In addition, there was statistically significant amphipod growth in all control treatments of both 10-d tests. Control amphipods in the *H. azteca* test grew by 2.4 times while control amphipods in the *L. plumulosus* test grew by 5.5 times.

None of the sediment samples from the Little Blackwater River study collected in 2007 were toxic to *Hyalella azteca* (Table 6). There were no significant reductions from control treatments in these sediments for either survival or growth. Individual replicate data and mean data for all control and test endpoints for these sediment tests are found in Appendix A-1.

None of the sediments samples from the Little Blackwater River study collected in 2007 were toxic to *Leptocheirus plumulosus* (Table 6). There were no significant reductions from control treatments in these sediments for either survival or growth. Individual replicate data and mean data for all control and test endpoints for these sediment tests are found in Appendix A-2.

CONCLUSION

Performance criteria for survival and growth were obtained from all toxicity tests. None of the sediments collected in 2007 were toxic based on the results of these 10-d tests with *Hyalella azteca* and *Leptocheirus plumulosus*.

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Table 1. Little Blackwater River station names and dates of sediment collection and toxicity tests for 2007.

Station Name	Sample Collection Dates	10-d Toxicity Test Dates	
		Hyalella azteca	*Leptocheirus plumulosus*
BNWR 01	7/11-12/07	7/17/07 – 7/27/07	7/17/07 – 7/27/07
BNWR 02	7/11-12/07	7/17/07 – 7/27/07	7/17/07 – 7/27/07
BNWR 03	7/11-12/07	7/17/07 – 7/27/07	7/17/07 – 7/27/07
BNWR 04	7/11-12/07	7/17/07 – 7/27/07	7/17/07 – 7/27/07
BNWR 05	7/11-12/07	7/17/07 – 7/27/07	7/17/07 – 7/27/07
BNWR 06	7/11-12/07	7/17/07 – 7/27/07	7/17/07 – 7/27/07
BNWR 07	7/11-12/07	7/17/07 – 7/27/07	7/17/07 – 7/27/07

Table 2. Test conditions for 10-d whole sediment toxicity test with *Hyalella azteca*.

1. Test type	Whole sediment, static renewal of overlying water
2. Temperature	23 ± 1EC
3. Overlying water	95:5 well/filtered estuarine water mix to attain a conductivity of approximately 2,400 µmhos
4. Renewal of overlying water	2 volume additions/d
5. Light	Wide-spectrum fluorescent lights, 100 to 1000 lux
6. Photoperiod	16:8 (L/D)
7. Test chamber	300 mL lip-less beaker with screened hole for water renewal (Randomly assigned on test table)
8. Sediment volume	100 ml
9. Overlying water volume	175 ml
10. Size and life stage of amphipods	7- to 14-d old; size sorted on nested 710 and 500 µm mesh sieves
11. Number of organisms/replicate	10 (Randomly assigned to test replicates)
12. Number of replicates	8
13. Feeding	1.0 ml YCT daily
14. Aeration	none
15. Water quality	Alkalinity, hardness, and total ammonia at beginning and end of test. Temperature, D.O., and pH daily. Porewater ammonia in dummy beaker at test initiation.
16. Test duration	10 d
17. Endpoints	Survival and growth (mg/ind)
18. Performance criteria	Control survival ≥ 80% Measurable growth in control amphipods

Table 3. Test conditions for 10-d whole sediment toxicity test with *Leptocheirus plumulosus*.

1. Test type	Whole sediment, static renewal of overlying water
2. Temperature	25 ± 1EC
3. Overlying water	Filtered Wye River water diluted to 5 ppt
4. Renewal of overlying water	2 volume additions/d
5. Light	Wide-spectrum fluorescent lights, 100 to 1000 lux
6. Photoperiod	16:8 (L/D)
7. Test chamber	300 mL lip-less beaker with screened hole for water renewal (Randomly assigned on test table)
8. Sediment volume	100 ml
9. Overlying water volume	175 ml
10. Size and life stage of amphipods	neonates; size sorted on nested 710 and 500 :m mesh sieves
11. Number of organisms/replicate	10 (Randomly assigned to test replicates)
12. Number of replicates	8
13. Feeding	Daily - TetraMin (ground and sieved to 250 µm)
14. Aeration	none
15. Water quality	Salinity, pH and total ammonia at beginning and end of test. Temperature and D.O. daily. Pore water ammonia in dummy beaker at test initiation.
16. Test duration	10 d
17. Endpoints	Survival and growth (mg/ind)
18. Performance criteria	Control survival ≥ 80% Measurable growth in control amphipods

Table 4. Water chemistry summary for the 2007 Little Blackwater River 10-d amphipod *Hyalella azteca* sediment toxicity test [mean (S.D.) unless otherwise stated].

Test and Station	DO mg/L	pH range	Temp °C	Conductivity µmhos	Alkalinity mg/L $CaCO_3$	Hardness mg/L $CaCO_3$	Overlying Ammonia(mg/L)		Porewater (day 0)	
							day 0	day 10	Ammonia (mg/L)	pH
Control	7.4(0.75)	7.36-8.24	23.6(0.35)	2900(*)	*	248(*)	0.47	*	9	7.77
BNWR 01	6.0(0.60)	6.81-7.51	23.5(0.42)	2350(70.7)	78(3.5)	284(50.9)	4.42	0.71	2.52	6.51
BNWR 02	5.7(0.67)	6.83-7.44	23.5(0.44)	2350(70.7)	155(56.6)	296(45.3)	4.68	0.47	18.2	7.25
BNWR 03	6.1(0.93)	7.35-7.77	23.5(0.43)	2550(70.7)	128(3.5)	320(17.0)	0.92	0.55	9.9	7.29
BNWR 04	6.3(1.09)	7.40-7.85	23.5(0.34)	2500(141.4)	123(3.5)	308(28.3)	0.98	2.44	11	7.45
BNWR 05	6.5(1.01)	7.35-7.91	23.4(0.34)	2500(0.0)	118(3.5)	326(8.5)	1.04	1.01	8.1	7.51
BNWR 06	6.6(0.99)	7.52-7.92	23.4(0.32)	2550(70.7)	113(10.6)	304(5.7)	0.58	3.4	5.7	7.39
BNWR 07	6.2(1.13)	7.25-7.77	23.4(0.32)	2450(70.7)	103(17.7)	300(28.3)	0.91	2.3	8.2	7.31

Table 5. Water chemistry summary for the 2007 Little Blackwater River *Leptocheirus plumulosus* sediment toxicity test [mean (S.D.) unless otherwise stated].

Station	DO mg/L	pH range	Temp °C	Salinity (‰)	Overlying Ammonia (mg/L)		Porewater (day 0)	
					day 0	day 10	Ammonia (mg/L)	pH
Control	5.9(0.82)	7.00-7.96	24.6(0.36)	5.0(0.0)	0.82	0	9	7.77
BNWR 01	5.3(0.98)	6.98-7.54	24.6(0.42)	5.0(0.0)	4.36	0.87	25.2	6.51
BNWR 02	5.1(0.93)	7.04-7.62	24.6(0.40)	5.0(0.0)	1.42	0.38	18.2	7.25
BNWR 03	5.1(0.85)	7.34-7.85	24.6(0.45)	5.0(0.0)	1.55	0.36	9.9	7.29
BNWR 04	5.1(0.81)	7.39-7.89	24.5(0.42)	5.0(0.0)	1.69	0.36	11	7.45
BNWR 05	5.1(0.79)	7.44-7.94	24.5(0.42)	5.0(0.0)	0.99	0.43	8.1	7.51
BNWR 06	5.2(0.93)	7.45-8.00	24.5(0.46)	5.0(0.0)	0.75	0.17	5.7	7.39
BNWR 07	5.3(0.84)	7.24-7.88	24.5(0.44)	5.0(0.0)	1.86	0.59	8.2	7.31

Table 6. Summary of results from the 2007 Little Blackwater River sediment toxicity tests. Shaded areas are endpoint values that were significantly less than control values for that specific test (α = 0.05).

Station	*Hyalella azteca*		*Leptocheirus plumulosus*	
	Survival	Growth	Survival	Growth
	%	(mg)	%	(mg)
Control	97.5	0.19	91.3	0.33
BNWR 01	97.5	0.25	88.8	0.39
BNWR 02	97.5	0.27	96.3	0.40
BNWR 03	95.0	0.22	90.0	0.40
BNWR 04	92.5	0.23	92.5	0.44
BNWR 05	88.8	0.21	88.8	0.44
BNWR 06	93.8	0.22	83.8	0.38
BNWR 07	92.5	0.24	92.5	0.35

APPENDICES

A-1. 2007 Little Blackwater River amphipod *Hyalella azteca* 10 day survival and growth sediment toxicity test results (7/17-7/27/07). An * indicates a treatment significantly < the control (% = 0.05).

Treatment REP	# Surviving amphipods	0 Rep. dry wt. (mg)	0 Treatment % Survival (SD)	0 Treatment mg. dry wt. (SD)
Control A	10	0.22	97.5 (4.63)	0.19 (0.018)
Control B	10	0.18		
Control C	10	0.17		
Control D	9	0.18		
Control E	10	0.20		
Control F	11	0.20		
Control G	10	0.18		
Control H	9	0.21		
BNWR 01 A	10	0.26	97.5 (4.63)	0.25 (0.022)
BNWR 01 B	10	0.21		
BNWR 01 C	10	0.27		
BNWR 01 D	9	0.24		
BNWR 01 E	10	0.23		
BNWR 01 F	10	0.27		
BNWR 01 G	10	0.24		
BNWR 01 H	9	0.24		
BNWR 02 A	9	0.25	97.5 (4.63)	0.27 (0.019)
BNWR 02 B	10	0.29		
BNWR 02 C	10	0.27		
BNWR 02 D	10	0.29		
BNWR 02 E	9	0.29		
BNWR 02 F	10	0.27		
BNWR 02 G	10	0.30		
BNWR 02 H	10	0.24		
BNWR 03 A	9	0.21	95.0 (7.56)	0.22 (0.021)
BNWR 03 B	10	0.24		
BNWR 03 C	12	0.22		
BNWR 03 D	10	0.25		
BNWR 03 E	9	0.20		
BNWR 03 F	8	0.24		
BNWR 03 G	10	0.20		
BNWR 03 H	10	0.24		

A-1. Continued

Treatment REP	# Surviving amphipods	0 Rep. dry wt. (mg)	0 Treatment % Survival (SD)	0 Treatment mg. dry wt. (SD)
BNWR 04 A	10	0.18	92.5 (10.35)	0.23 (0.063)
BNWR 04 B	10	0.16		
BNWR 04 C	10	0.24		
BNWR 04 D	10	0.24		
BNWR 04 E	7	0.23		
BNWR 04 F	9	0.21		
BNWR 04 G	9	0.37		
BNWR 04 H	9	0.23		
BNWR 05 A	6	0.27	88.8 (13.56)	0.21 (0.034)
BNWR 05 B	10	0.21		
BNWR 05 C	9	0.20		
BNWR 05 D	9	0.18		
BNWR 05 E	10	0.25		
BNWR 05 F	9	0.22		
BNWR 05 G	8	0.23		
BNWR 05 H	10	0.17		
BNWR 06 A	10	0.21	93.8 (5.18)	0.22 (0.015)
BNWR 06 B	10	0.22		
BNWR 06 C	9	0.25		
BNWR 06 D	10	0.22		
BNWR 06 E	9	0.22		
BNWR 06 F	9	0.21		
BNWR 06 G	9	0.21		
BNWR 06 H	9	0.25		
BNWR 07 A	10	0.24	92.5 (10.35)	0.24 (0.025)
BNWR 07 B	10	0.25		
BNWR 07 C	10	0.21		
BNWR 07 D	10	0.19		
BNWR 07 E	10	0.25		
BNWR 07 F	8	0.25		
BNWR 07 G	8	0.26		
BNWR 07 H	8	0.27		

A-1. Continued

Treatment REP	# Surviving amphipods	0 Rep. dry wt. (mg)	0 Treatment % Survival (SD)	0 Treatment mg. dry wt. (SD)
Day 0 amphipod A[1]	10	0.09		
Day 0 amphipod B	10	0.05		
Day 0 amphipod C	10	0.11		0.08 (0.018)
Day 0 amphipod D	10	0.07		
Day 0 amphipod E	10	0.07		
Day 0 amphipod F	10	0.07		
Day 0 amphipod G	10	0.07		
Day 0 amphipod H	10	0.07		

[1]These are the dry weights of the test amphipods at day 0 used to determine if there was measurable growth in the control amphipods as compared to the control amphipod weights at day 10.

A-2. 2006 Little Blackwater River amphipod *Leptocheirus plumulosus* 10 day survival and growth sediment toxicity test results (7/17-7/27/07). An * indicates a treatment significantly < the control (% = 0.05).

Treatment REP	# Surviving amphipods	0 Rep. dry wt. (mg)	0 Treatment % Survival (SD)	0 Treatment mg. dry wt. (SD)
Control A	9	0.32	91.3 (6.41)	0.33 (0.061)
Control B	9	0.32		
Control C	9	0.26		
Control D	9	0.46		
Control E	10	0.30		
Control F	8	0.37		
Control G	10	0.31		
Control H	9	0.30		
BNWR 01 A	7	0.42	88.8 (9.91)	0.39 (0.042)
BNWR 01 B	10	0.38		
BNWR 01 C	9	0.40		
BNWR 01 D	9	0.45		
BNWR 01 E	9	0.40		
BNWR 01 F	9	0.31		
BNWR 01 G	10	0.38		
BNWR 01 H	8	0.39		
BNWR 02 A	9	0.46	96.3 (5.18)	0.40 (0.052)
BNWR 02 B	10	0.36		
BNWR 02 C	10	0.49		
BNWR 02 D	9	0.43		
BNWR 02 E	10	0.34		
BNWR 02 F	9	0.38		
BNWR 02 G	10	0.37		
BNWR 02 H	10	0.39		
BNWR 03 A	10	0.43	90.0 (9.26)	0.40 (0.061)
BNWR 03 B	9	0.33		
BNWR 03 C	9	0.35		
BNWR 03 D	10	0.39		
BNWR 03 E	7	0.50		
BNWR 03 F	9	0.35		
BNWR 03 G	9	0.47		
BNWR 03 H	9	0.41		

A-2. Continued

Treatment REP	# Surviving amphipods	0 Rep. dry wt. (mg)	0 Treatment % Survival (SD)	0 Treatment mg. dry wt. (SD)
BNWR 04 A	10	0.37	92.5 (8.86)	0.44 (0.050)
BNWR 04 B	8	0.38		
BNWR 04 C	10	0.47		
BNWR 04 D	9	0.48		
BNWR 04 E	10	0.39		
BNWR 04 F	10	0.49		
BNWR 04 G	9	0.49		
BNWR 04 H	8	0.42		
BNWR 05 A	9	0.47	88.8 (8.35)	0.44 (0.042)
BNWR 05 B	9	0.42		
BNWR 05 C	8	0.45		
BNWR 05 D	9	0.44		
BNWR 05 E	10	0.40		
BNWR 05 F	8	0.38		
BNWR 05 G	8	0.51		
BNWR 05 H	10	0.47		
BNWR 06 A	8	0.39	83.8 (9.16)	0.38 (0.031)
BNWR 06 B	7	0.34		
BNWR 06 C	9	0.41		
BNWR 06 D	9	0.41		
BNWR 06 E	8	0.40		
BNWR 06 F	10	0.34		
BNWR 06 G	8	0.40		
BNWR 06 H	8	0.35		
BNWR 07 A	10	0.35	92.5 (8.86)	0.35 (0.038)
BNWR 07 B	8	0.38		
BNWR 07 C	10	0.35		
BNWR 07 D	9	0.42		
BNWR 07 E	10	0.34		
BNWR 07 F	8	0.31		
BNWR 07 G	9	0.30		
BNWR 07 H	10	0.38		

A-2. Continued

Treatment REP	# Surviving amphipods	0 Rep. dry wt. (mg)	0 Treatment % Survival (SD)	0 Treatment mg. dry wt. (SD)
Day 0 amphipod A[1]	10	0.05		
Day 0 amphipod B	10	0.06		
Day 0 amphipod C	10	0.06		0.06 (0.012)
Day 0 amphipod D	10	0.06		
Day 0 amphipod E	10	0.07		
Day 0 amphipod F	10	0.08		
Day 0 amphipod G	10	0.04		
Day 0 amphipod H	10	0.06		

[1]These are the dry weights of the test amphipods at day 0 used to determine if there was measurable growth in the control amphipods as compared to the control amphipod weights at day 10.

Chapter 4

B-IBI Data Report from Versar, Inc for 2007 Samples from Little Blackwater River Study

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December 30, 2008

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INTRODUCTION

Versar Inc., processed macrobenthic samples collected with a petite ponar from seven sites within the from the Little Blackwater River watershed. These samples were collected by the United States Fish and Wildlife Service (USFWS), Chesapeake Bay Field Office as part of a larger USFWS project entitled, "Effects of Urban Sprawl on Sediment Surface Water and Biota in the Little Blackwater River, Blackwater National Wildlife Refuge, Dorchester County, Maryland." Benthic data collected from the stations are presented and discussed based on the Benthic Index of Biotic Integrity (B-IBI), which was developed for application to benthic communities of the Chesapeake Bay (Weisberg et al. 1997, Alden et al. 2002). The B-IBI is used by the Chesapeake Bay Monitoring Program to characterize bay-wide benthic community condition and assess the health of the Bay. Results of the benthic community characterization will be used to assist the USFWS in the interpretation of sediment contaminant and toxicity tests also conducted at the stations.

METHODS

Laboratory Methods

Laboratory methods followed the standard procedures employed for the Long-Term Benthic Monitoring Program (Llansó et al. 2005). In short, macrobenthic organisms were sorted from detritus under dissecting microscopes, identified to the lowest practical taxonomic level (most often species), and counted. Oligochaete worms and chironomid larva were mounted on microscope slides and examined under a compound microscope for genus and species identification. Each taxon was dried to a constant weight at 60 °C, ashed in a muffle furnace at 500 °C for 4 hours, and weighed again to obtain species-specific, ash-free dry weight.

Benthic Index of Biotic Integrity (B-IBI) Calculation

The B-IBI is a multiple-attribute index developed to identify the degree to which a benthic assemblage meets the Chesapeake Bay Program's Benthic Community Restoration Goals. The B-IBI provides a means for comparing relative condition of benthic invertebrate assemblages across habitat types. It also provides a validated mechanism for integrating several benthic community attributes indicative of habitat "health" into a single number that measures overall benthic community condition.

The B-IBI formula is habitat specific for salinity and sediment type. For this study all stations were assigned to the low mesohaline salinity range (between 5.0 and 12.0 ppt), which is consistent with the long-term average of salinities within Baltimore Harbor (Llansó et al. 2005). For this salinity habitat, the B-IBI does not have a different metric thresholds based on sediment type so differentiation between sand and mud sediments was not necessary (Weisberg et al. (1997). The thresholds and formula for a low mesohaline habitat was calculated using the methods described in Weisberg et al. (1997) and updated by Alden et al. (2002).

The B-IBI is scaled from 1 to 5, and sites with values of 3 or more are considered to meet the Restoration Goals. The index is calculated by scoring each of several metrics as either 5, 3, or 1 depending on whether the value of the metric at a site approximates, deviates slightly from, or deviates strongly from values found at the best reference sites in similar habitats, and then averaging these scores across metrics to obtain a single score for a sampling site.

The criteria for assigning these single numeric scores a designation of "health" are provided in Weisberg et al. 1997. In summary, benthic community condition is classified into four levels of "health" based on the B-IBI. Values less than or equal to 2 are classified as severely degraded; values from 2 to 2.6 are classified as degraded; values greater than 2.6 but less than 3.0 are classified as marginal; and values of 3.0 or more are classified as meeting the goals. Values in the marginal category do not meet the Restoration Goals, but they differ from the goals within the range of measurement error (Alden et al 2002).

Reporting

All taxa identified and weighed for each station are listed in the station datasheets. Although epifauna taxa were sorted and identified from the samples, all taxa marked with Epi. are considered epifauna and are excluded from the data before calculating the B-IBI. At the bottom of each station table, the number of species, total abundance, and total biomass with and without the epifaunal taxa are presented.

In the middle of each station's appendix table is a list of metrics that were used in the B-IBI calculations for the low mesohaline habitat type. Not all metrics presented in the station printout are scored for this habitat type but the metric value is provided for informational purposes. If a score is not listed for a specific metric value then it is not scored for a low mesohaline habitat. Additionally, if certain species used in a metric calculation were not present in the sample, resulting in a 0 for the metric, the metric was not scored. If a true score of 0 was calculated, however, than the metric was scored.

SUMMARY OF B-IBI DATA

As can be seen from the individual station data presented below, six of the seven samples collected did not contain a single organism. All of the azoic stations were located in the tidal fresh/oligohaline areas. The lack of even pollution tolerant oligochaete worms and chironomid larva, as were found in 2006 (Fisher, 2007), lead Lisa Scott to believe these stations were subjected to extended periods of anoxic waters. These pollution tolerant organisms are capable of rapid recruitment so the lack of any of them in the samples would also indicate that periods of low oxygen concentrations in the surrounding waters was still present during the time of sampling. Again, it will be interesting to compare water quality data at the time of sampling to see what the actual dissolved oxygen levels were at these stations.

The one station with organisms, Station 6, had some salt intrusion based on the presence of estuarine species, i.e., *Edotea triloba* (isopod), *Gammarus daiberi* (amphipod), *Almyracuma proximoculi* (cumacid), *Eteone heteropoda* and *Streblospio benedicti* (polychaete). As when sampled in 2006 (Fisher, 2007) this station failed the B-IBI with a score of 1.4. The lack of abundance, biomass, and equilibrium-type organisms (i.e., clams and polychaetes) led to a metric score of 1 for all 5 metrics scored in the B-IBI. Again, Lisa Scott would attribute this to extended periods of hypoxic or anoxic waters in the area.

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BLACKWATER 2007 BENTHIC SUMMARY

Station: BNWR 01		
Habitat: Tidal Freshwater	Date: 2007	Gear: Young Grab

BENTHIC INDEX OF BIOTIC INTEGRITY

B-IBI Score: 1.00 Condition: Severely Degraded # Attributes Scored: 4

	Value	Score		Value	Score
Shannon-Wiener Index	0		Pollution Indicative Spp. Abundance(%)	0	1
Abundance (#/m2)	0	1	Limnodrilus Abundance(%)	0	
Biomass (g/m2)	0		Tolerance Score	0	1
Carnivore-Omnivore Abundance(%)	0				
Deep Deposit Feeder Abundance(%)	0	1			

BENTHIC ABUNDANCE (per sq. meter)

TAXA	Abundance (#/m2)	Biomass (g/m2)
No organisms present	0	0
Total Abundance w/ Epi.	0	
Total Abundance w/o Epi.	0	
Number of Taxa w/ Epi.	0	
Number of Taxa w/o Epi.	0	
Total Biomass w/ Epi.		0
Total Biomass w/o Epi.		0

BLACKWATER 2007 BENTHIC SUMMARY

Station: BNWR 02		
Habitat: Tidal Freshwater	Date: 2007	Gear: Young Grab

BENTHIC INDEX OF BIOTIC INTEGRITY

B-IBI Score: 1.00 Condition: Severely Degraded # Attributes Scored: 4

	Value	Score		Value	Score
Shannon-Wiener Index	0		Pollution Indicative Spp. Abundance(%)	0	1
Abundance (#/m2)	0	1	Limnodrilus Abundance(%)	0	
Biomass (g/m2)	0		Tolerance Score	0	1
Carnivore-Omnivore Abundance(%)	0				
Deep Deposit Feeder Abundance(%)	0	1			

BENTHIC ABUNDANCE (per sq. meter)

TAXA	Abundance (#/m2)	Biomass (g/m2)
No organisms present	0	0
Total Abundance w/ Epi.	0	
Total Abundance w/o Epi.	0	
Number of Taxa w/ Epi.	0	
Number of Taxa w/o Epi.	0	
Total Biomass w/ Epi.		0
Total Biomass w/o Epi.		0

BLACKWATER 2007 BENTHIC SUMMARY

Station: BNWR 03		
Habitat: Oligohaline	Date: 2007	Gear: Young Grab

BENTHIC INDEX OF BIOTIC INTEGRITY

B-IBI Score: 1.00	Condition: Severely Degraded	# Attributes Scored: 6

	Value	Score		Value	Score
Shannon-Wiener Index	0		Pollution Indicative Spp. Abundance(%)	0	1
Abundance (#/m2)	0	1	Pollution Sensitive Spp. Abundance(%)	0	1
Biomass (g/m2)	0		Limnodrilus Abundance(%)	0	
Carnivore-Omnivore Abundance(%)	0	1	Tolerance Score	0	1
Deep Deposit Feeder Abundance(%)	0	1	Tanypodinae/Chironomidae Abundance Ratio	0	1

BENTHIC ABUNDANCE (per sq. meter)

TAXA	Abundance (#/m2)	Biomass (g/m2)
No organisms present	0	0
Total Abundance w/ Epi.	0	
Total Abundance w/o Epi.	0	
Number of Taxa w/ Epi.	0	
Number of Taxa w/o Epi.	0	
Total Biomass w/ Epi.		0
Total Biomass w/o Epi.		0

BLACKWATER 2007 BENTHIC SUMMARY

Station: BNWR 04		
Habitat: Oligohaline	Date: 2007	Gear: Young Grab

BENTHIC INDEX OF BIOTIC INTEGRITY

B-IBI Score: 1.00	Condition: Severely Degraded	# Attributes Scored: 6

	Value	Score		Value	Score
Shannon-Wiener Index	0		Pollution Indicative Spp. Abundance(%)	0	1
Abundance (#/m2)	0	1	Pollution Sensitive Spp. Abundance(%)	0	1
Biomass (g/m2)	0		Limnodrilus Abundance(%)	0	
Carnivore-Omnivore Abundance(%)	0	1	Tolerance Score	0	1
Deep Deposit Feeder Abundance(%)	0	1	Tanypodinae/Chironomidae Abundance Ratio	0	1

BENTHIC ABUNDANCE (per sq. meter)

TAXA	Abundance (#/m2)	Biomass (g/m2)
No organisms present	0	0
Total Abundance w/ Epi.	0	
Total Abundance w/o Epi.	0	
Number of Taxa w/ Epi.	0	
Number of Taxa w/o Epi.	0	
Total Biomass w/ Epi.		0
Total Biomass w/o Epi.		0

BLACKWATER 2007 BENTHIC SUMMARY

Station: BNWR 05		
Habitat: Oligohaline	Date: 2007	Gear: Young Grab

BENTHIC INDEX OF BIOTIC INTEGRITY

B-IBI Score: 1.00	Condition: Severely Degraded	# Attributes Scored: 6

	Value	Score		Value	Score
Shannon-Wiener Index	0		Pollution Indicative Spp. Abundance(%)	0	1
Abundance (#/m2)	0	1	Pollution Sensitive Spp. Abundance(%)	0	1
Biomass (g/m2)	0		Limnodrilus Abundance(%)	0	
Carnivore-Omnivore Abundance(%)	0	1	Tolerance Score	0	1
Deep Deposit Feeder Abundance(%)	0	1	Tanypodinae/Chironomidae Abundance Ratio	0	1

BENTHIC ABUNDANCE (per sq. meter)

TAXA	Abundance (#/m2)	Biomass (g/m2)
No organisms present	0	0
Total Abundance w/ Epi.	0	
Total Abundance w/o Epi.	0	
Number of Taxa w/ Epi.	0	
Number of Taxa w/o Epi.	0	
Total Biomass w/ Epi.		0
Total Biomass w/o Epi.		0

BLACKWATER 2007 BENTHIC SUMMARY

Station: BNWR 06		
Habitat: Low Mesohaline	Date: 2007	Gear: Young Grab

BENTHIC INDEX OF BIOTIC INTEGRITY

B-IBI Score: 1.40 Condition: Severely Degraded # Attributes Scored: 5

	Value	Score		Value	Score
Shannon-Wiener Index	1.93	3	Pollution Indicative Spp. Abundance(%)	83.33	1
Abundance (#/m2)	276	1	Pollution Sensitive Spp. Biomass(%)	0.00	1
Biomass (g/m2)	0.02	1			

BENTHIC ABUNDANCE (per sq. meter)

TAXA	Abundance (#/m2)	Biomass (g/m2)
Almyracuma proximoculi	23	0.00908
Ceratopogonidae	23	0.00227
Chironomus spp.	115	0.00227
Edotea triloba (Epi)	138	0.00908
Eteone heteropoda	46	0.00227
Gammarus daiberi (Epi)	69	0.00681
Streblospio benedicti	69	0.00227
Total Abundance w/ Epi.	483	
Total Abundance w/o Epi.	276	
Number of Taxa w/ Epi.	7	
Number of Taxa w/o Epi.	5	
Total Biomass w/ Epi.		0.03405
Total Biomass w/o Epi.		0.01816

BLACKWATER 2007 BENTHIC SUMMARY

Station: BNWR 07		
Habitat: Oligohaline	Date: 2007	Gear: Young Grab

BENTHIC INDEX OF BIOTIC INTEGRITY

B-IBI Score: 1.00 Condition: Severely Degraded # Attributes Scored: 6

	Value	Score		Value	Score
Shannon-Wiener Index	0		Pollution Indicative Spp. Abundance(%)	0	1
Abundance (#/m2)	0	1	Pollution Sensitive Spp. Abundance(%)	0	1
Biomass (g/m2)	0		Limnodrilus Abundance(%)	0	
Carnivore-Omnivore Abundance(%)	0	1	Tolerance Score	0	1
Deep Deposit Feeder Abundance(%)	0	1	Tanypodinae/Chironomidae Abundance Ratio	0	1

BENTHIC ABUNDANCE (per sq. meter)

TAXA	Abundance (#/m2)	Biomass (g/m2)
No organisms present	0	0
Total Abundance w/ Epi.	0	
Total Abundance w/o Epi.	0	
Number of Taxa w/ Epi.	0	
Number of Taxa w/o Epi.	0	
Total Biomass w/ Epi.		0
Total Biomass w/o Epi.		0

Appendix C

Fish community characterization: Year 1(2006) and Year 2 (2007).

FISH COMMUNITY CHARACTERIZATION

Prepared by:

John W. Gill

And

Joshua Newhard

U.S. Fish and Wildlife Service
Maryland Fishery Resources Office
Annapolis, MD

Background

In support of the Sediment Quality Triad (SQT) study conducted by the Chesapeake Bay Field Office (CBFO) at the request of Blackwater National Wildlife Refuge (BNWR), the Maryland Fishery Resources Office (MFRO) sampled fish populations within the study area. The purpose of these collections was to characterize fish community composition within the immediate vicinity of sediment and benthic sampling. Fish sampling occurred at the same locations, and during the same time and dates, as other SQT sampling.

Methods

A total of seven sites were sampled which included five sites on the Little Blackwater River, one site on Coulson Pond (also referred to as the Tower Site) on the Blackwater River, and one site on Buttons Creek. During each sampling event, salinity was measured using a YSI (Yellow Springs Instruments, Inc.) at each sampling location.

Fish, and non-targeted macroinvertebrates and herpetofauna, were collected using fyke nets (2.5 cm mesh, 15.2 m single lead line), which were set for approximately 24 hours. Nets were deployed with the lead line staked to an existing shoreline (marsh or upland edge), oriented perpendicular to the shoreline, with the cod end of the net staked channelward in deeper water. Prior to nets being deployed, a bullet float was placed in the cod end of each net to provide an air pocket. The air pocket prevented the inadvertent killing of non-targeted species, such as turtles. Fishing depths averaged 0.3 m to 1.2 m. When retrieving the net, each fish, crab, or turtle was identified to species, counted, and released. For each fish species encountered, 10 individuals were measured for total length (mm).

Results

Seven sites were sampled in 2006 (1 fyke net per site, 24 hour sets) and five sites were sampled in 2007, for a total of 288 sampling hours. Equipment failure (boat engine) in 2007 resulted in sampling not occurring on two of the intended sites (mouth of the Little Blackwater River and Coulson Pond). Collections over the two year period included 22 vertebrate species, encompassing 1,889 individual animals (Figures 1 and 2 – Total Species Abundance and individual sampling locations). 272 individuals were collected in 2007, and 1,617 were collected in 2006. The difference in total species abundance between years was attributed to large numbers of white perch and brown bullhead being collected in 2006. 2007 samples included three species not observed in 2006; goldfish, white catfish, and largemouth bass.

The five sites on the Little Blackwater River covered all salinity regimes occurring throughout the length of the river (e.g. range of 0-6 ppt). The salinity at the other two sites averaged around 6 ppt.

For baseline data considerations, length frequency distribution graphs were created for three abundant species, which included brown bullhead, white perch, and black crappie. This information is presented in Figures 3, by sampling location.

Discussion

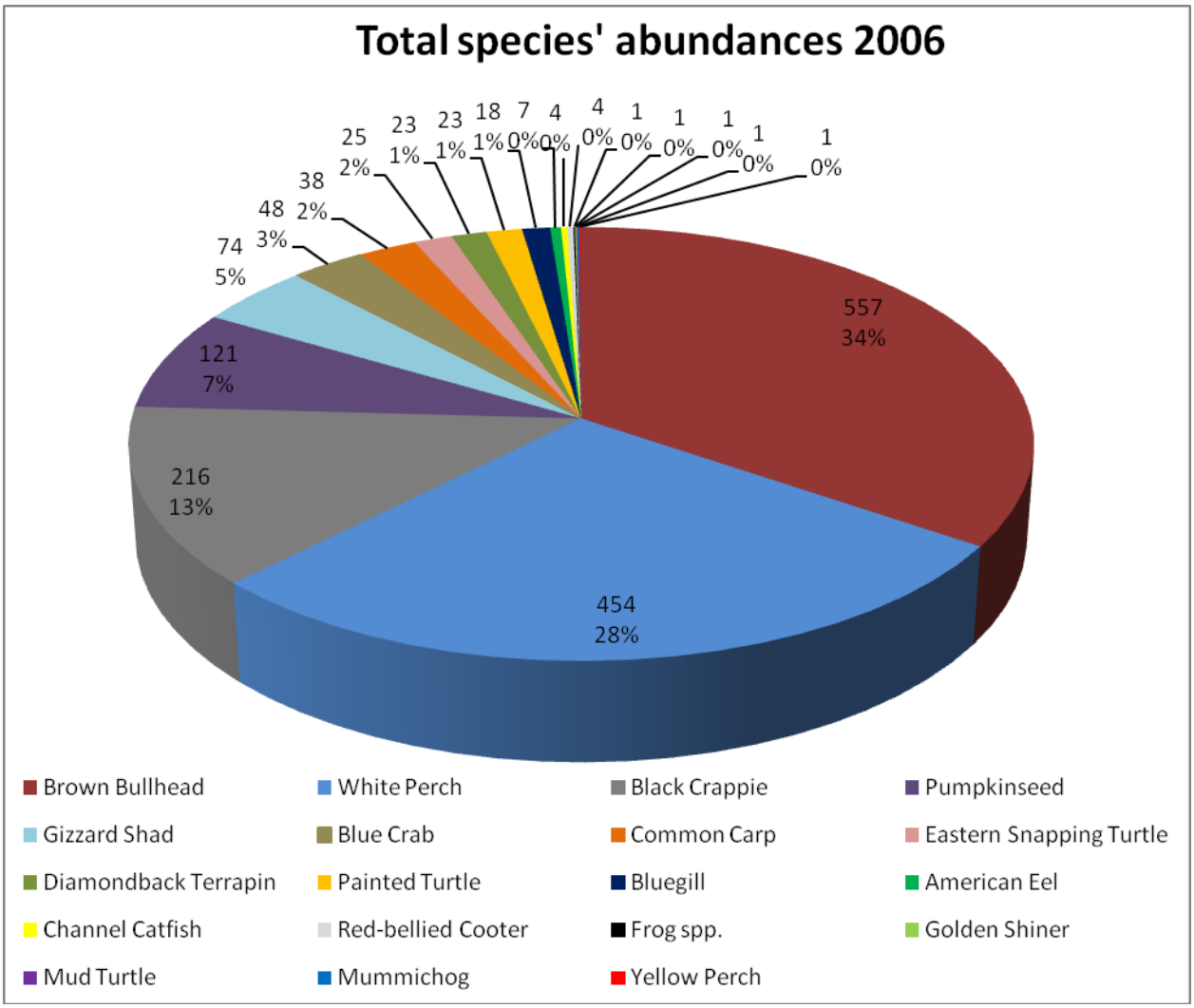
Referring to Figures 1 and 2, changes in species composition between sampling locations reflect the salinity regimes encountered during sampling. As an example, upriver sites within the Little Blackwater River were dominated by brown bullhead, black crappie, blue gill, and freshwater turtles. Lower Little Blackwater River locations (where salinity approaches 6 ppt) exhibited increases in numbers of pumpkinseed, white perch, blue crabs, and diamondbacked terrapins. Throughout the entire study area, brown bullhead, white perch, and black crappie occurred in the greatest numbers.

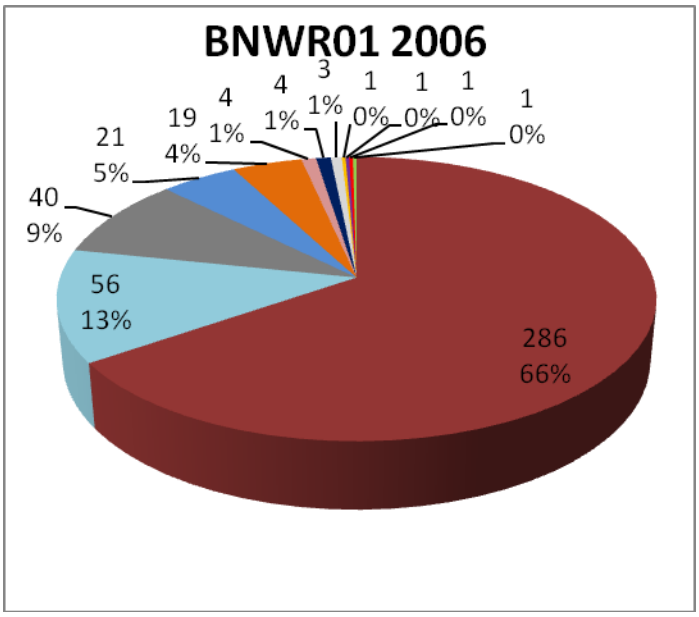
PHOTOS And FIGURES

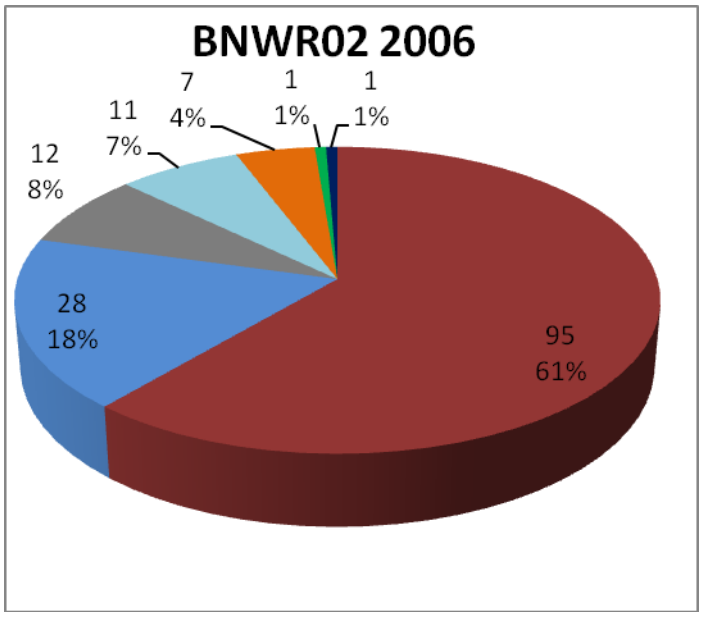
Photo 1: Fyke Net Shown on Land

Photo 2: Fyke Net Deployed in Water

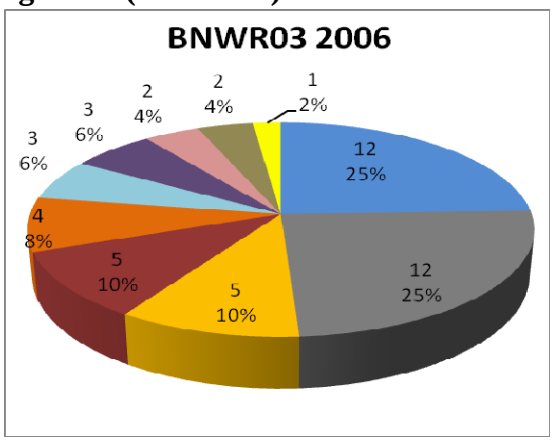
Figures 1

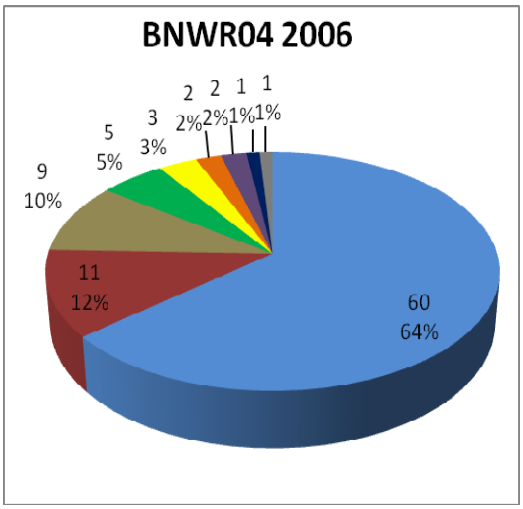

Total species' abundances 2006
557 34%
454 28%
216 13%
121 7%
74 5%
48 3%
38 2%
25 2%
23 1%
23 1%
18 1%
7 0%
4 0%
4 0%
1 0%
1 0%
1 0%
1 0%
1 0%
Brown Bullhead
White Perch
Black Crappie
Pumpkinseed
Gizzard Shad
Blue Crab
Common Carp
Eastern Snapping Turtle
Diamondback Terrapin
Painted Turtle
Bluegill
American Eel
Channel Catfish
Red-bellied Cooter
Frog spp.
Golden Shiner
Mud Turtle
Mummichog
Yellow Perch

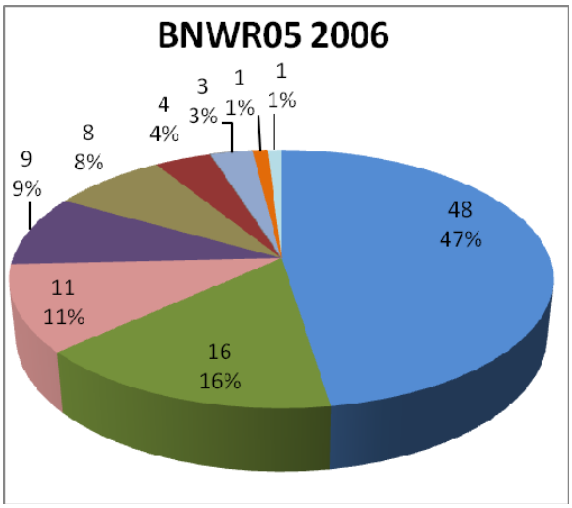

BNWR01 2006
286 66%
56 13%
40 9%
21 5%
19 4%
4 1%
4 1%
3 1%
1 0%
1 0%
1 0%
1 0%

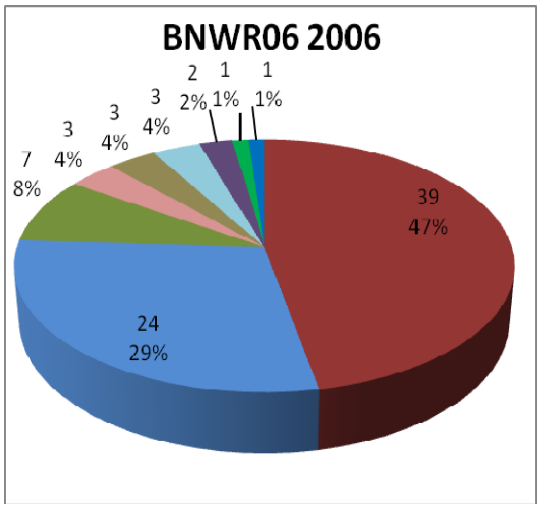

BNWR02 2006
95 61%
28 18%
12 8%
11 7%
7 4%
1 1%
1 1%

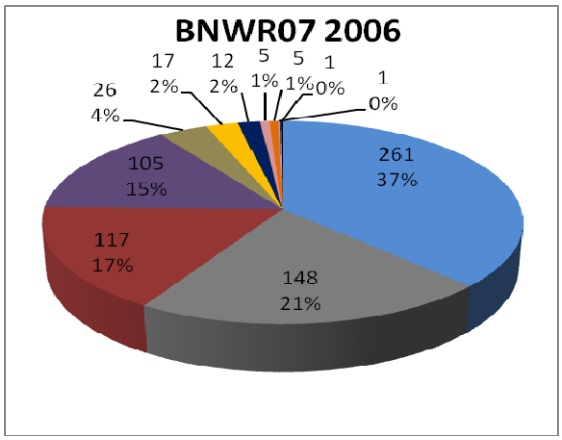
Figures 1 (continued)



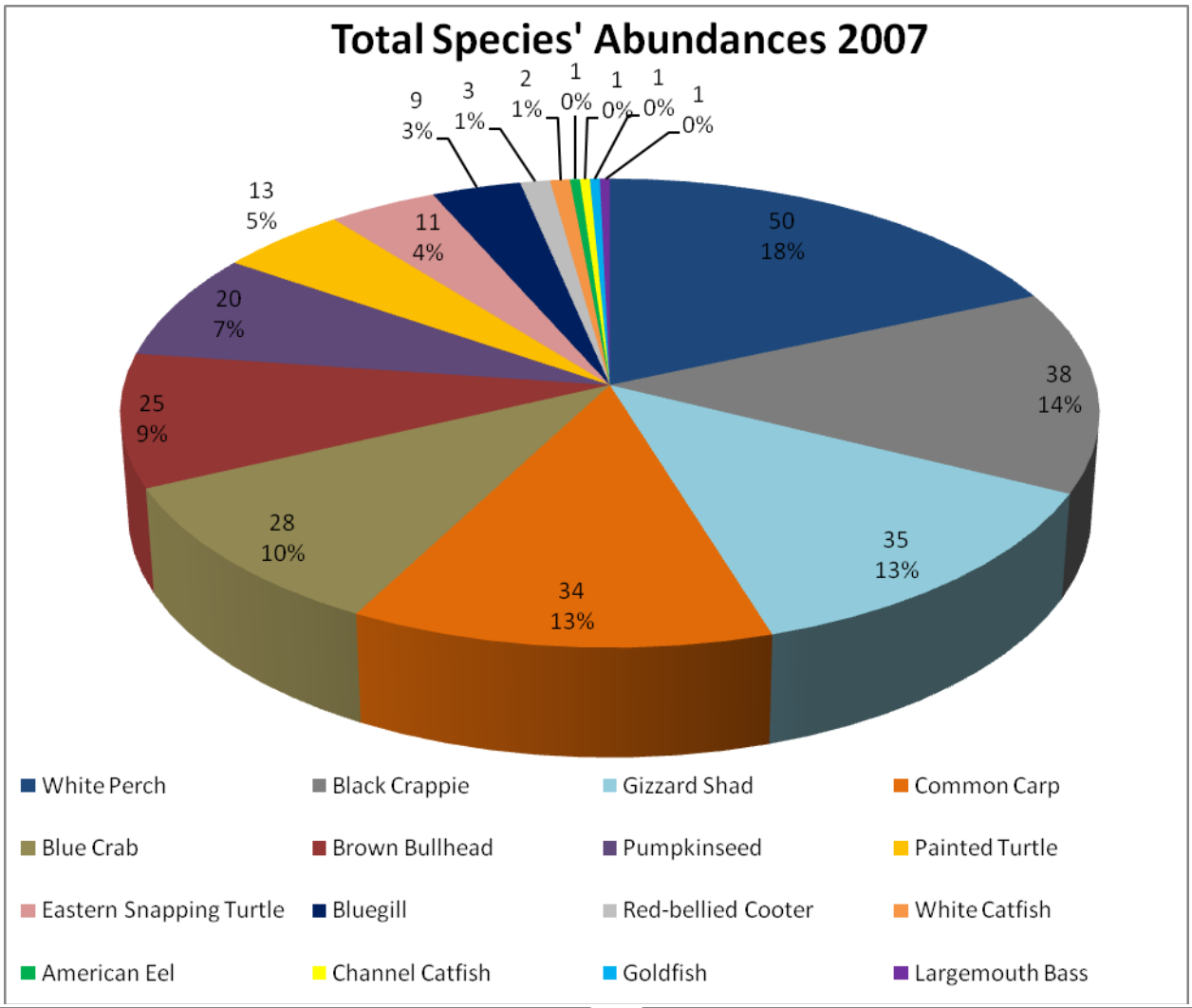


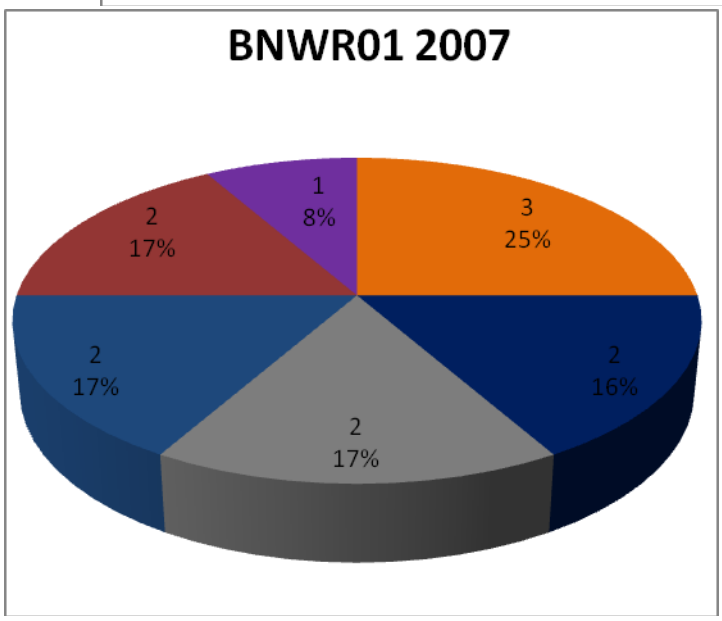


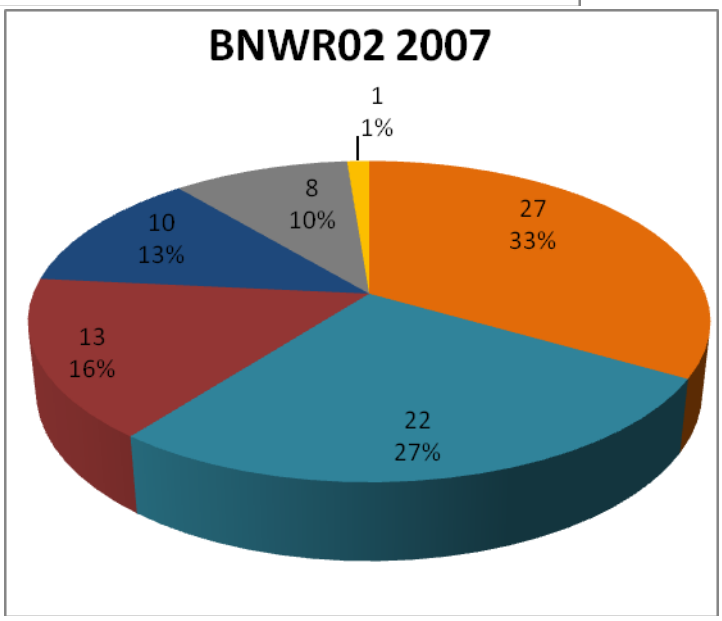




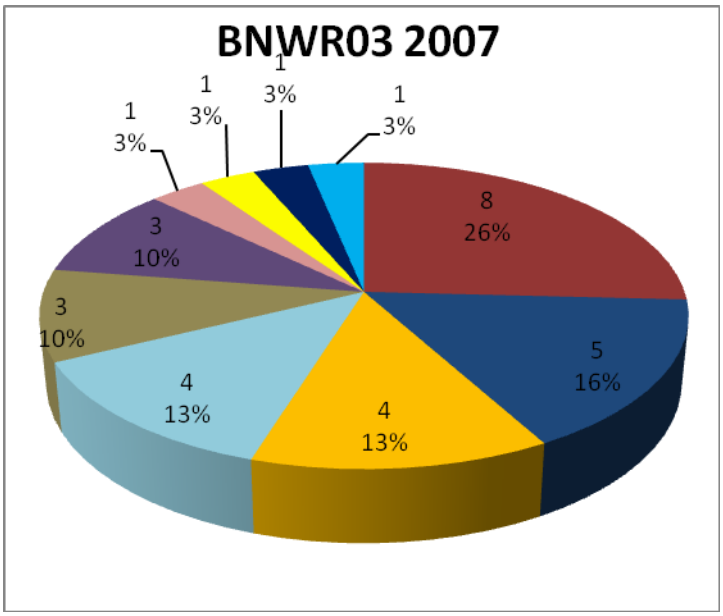
Figures 2

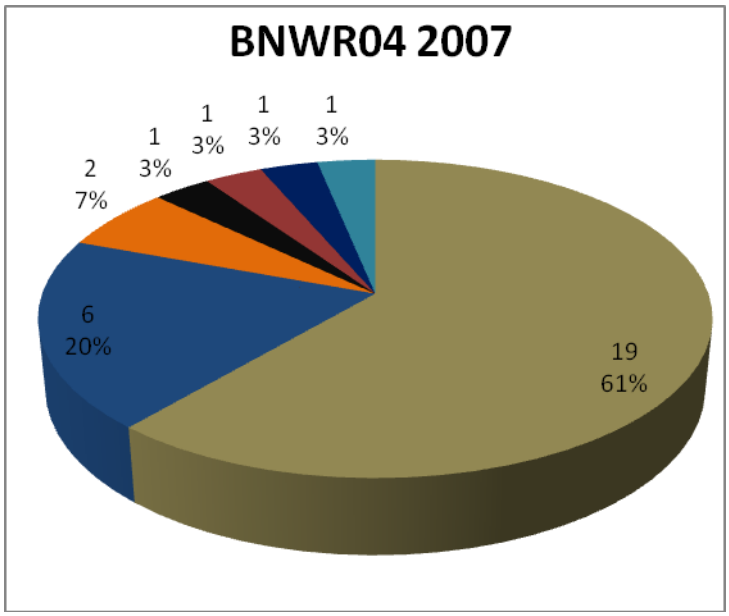

Total Species' Abundances 2007
50 18%
38 14%
35 13%
34 13%
28 10%
25 9%
20 7%
13 5%
11 4%
9 3%
3 1%
2 1%
1 0%
1 0%
1 0%
1 0%
White Perch
Black Crappie
Gizzard Shad
Common Carp
Blue Crab
Brown Bullhead
Pumpkinseed
Painted Turtle
Eastern Snapping Turtle
Bluegill
Red-bellied Cooter
White Catfish
American Eel
Channel Catfish
Goldfish
Largemouth Bass

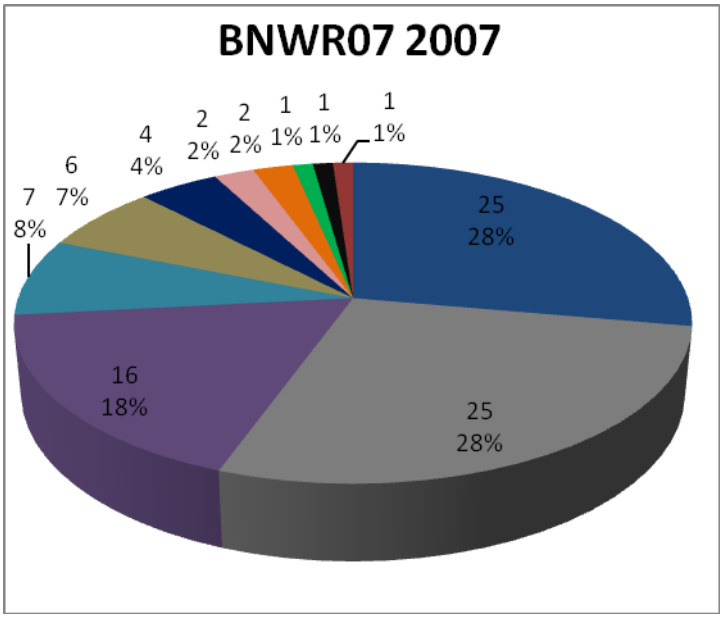

BNWR01 2007
3 25%
2 16%
2 17%
2 17%
2 17%
1 8%


BNWR02 2007
27 33%
22 27%
13 16%
10 13%
8 10%
1 1%

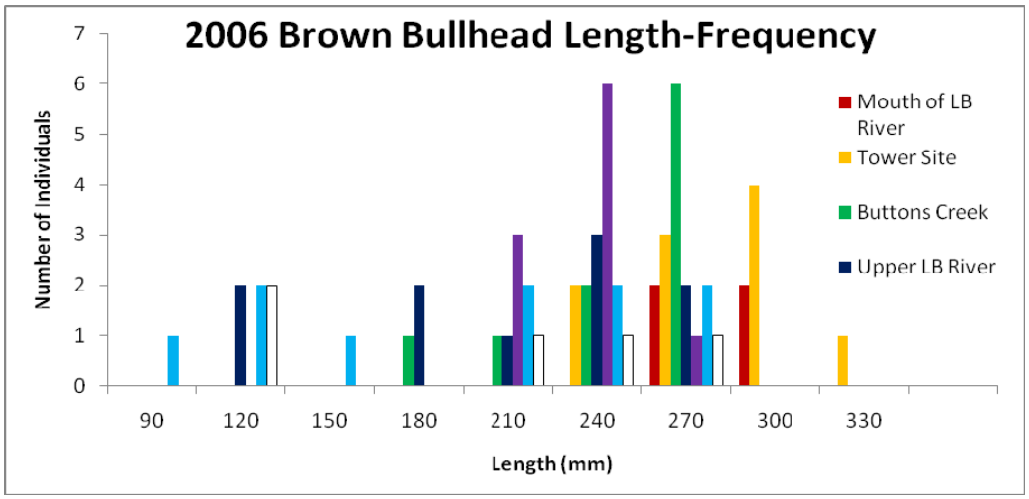
Figures 2 (continued)

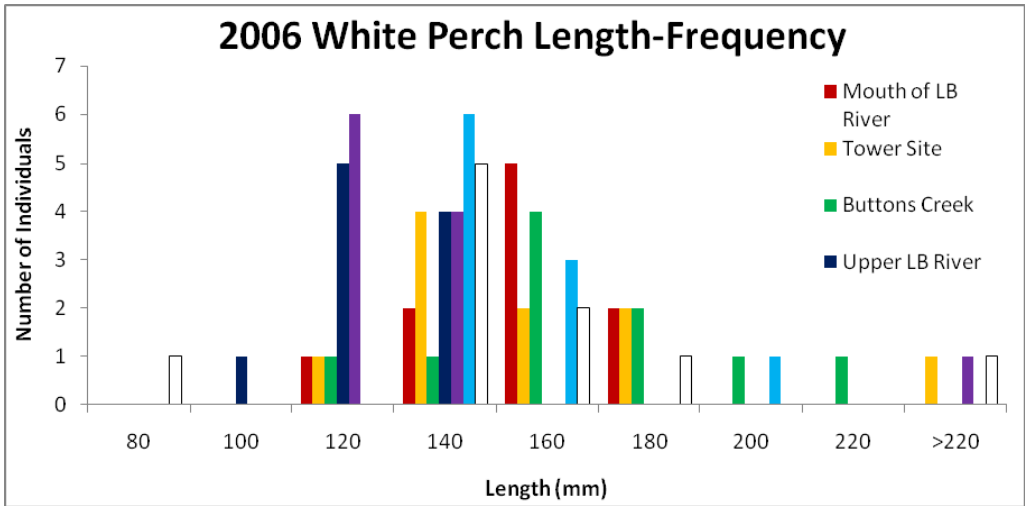


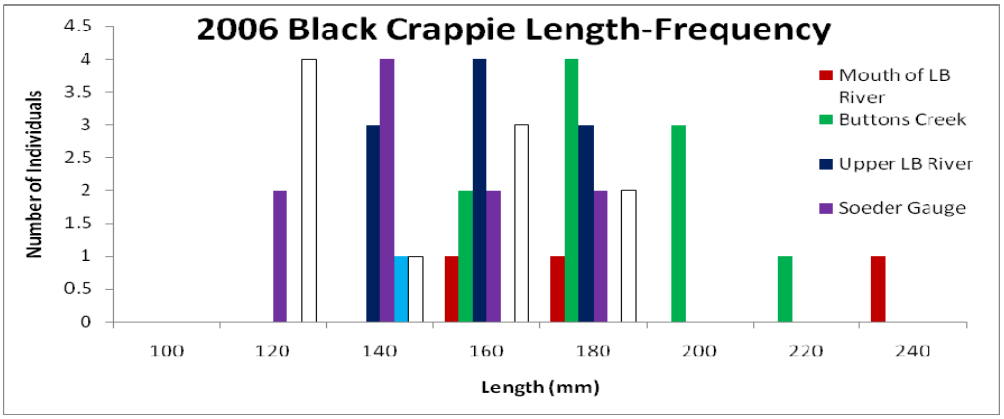




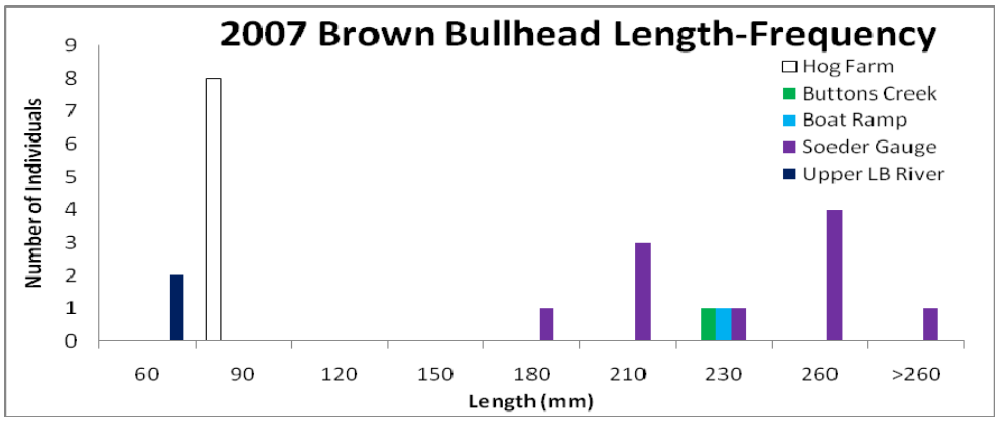
Figures 3

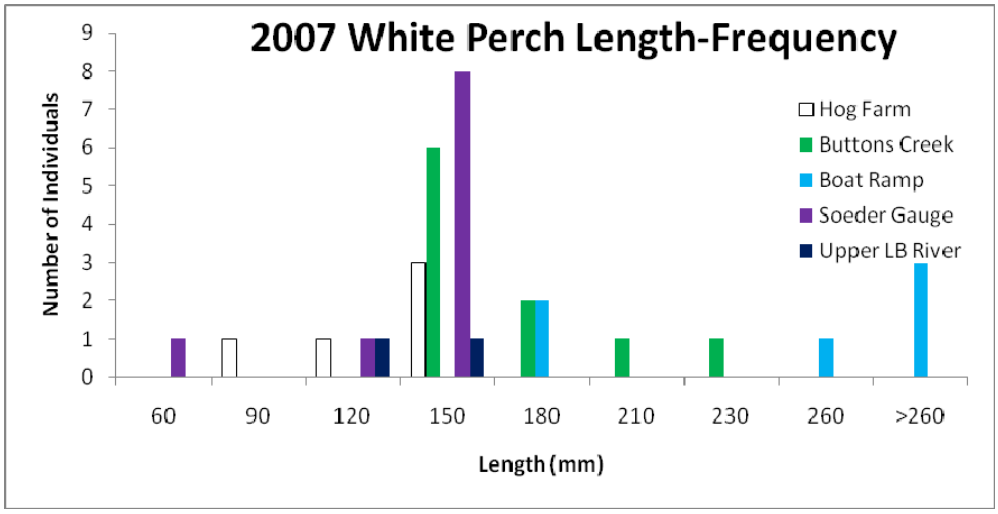

2006 Brown Bullhead Length-Frequency
Number of Individuals
0
1
2
3
4
5
6
7
90
120
150
180
210
240
270
300
330
Length (mm)
Mouth of LB River
Tower Site
Buttons Creek
Upper LB River

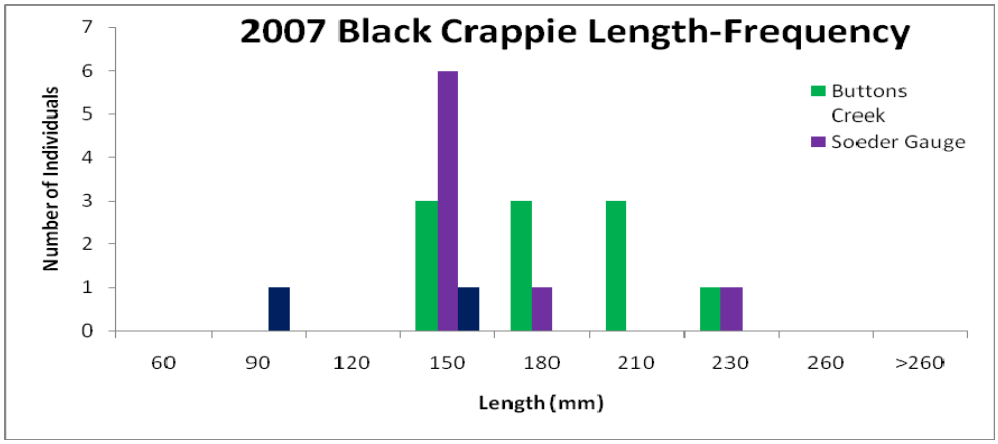

2006 White Perch Length-Frequency
Number of Individuals
0
1
2
3
4
5
6
7
80
100
120
140
160
180
200
220
>220
Length (mm)
Mouth of LB River
Tower Site
Buttons Creek
Upper LB River


2006 Black Crappie Length-Frequency
Number of Individuals
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
100
120
140
160
180
200
220
240
Length (mm)
Mouth of LB River
Buttons Creek
Upper LB River
Soeder Gauge

Figures 4


2007 Brown Bullhead Length-Frequency
Number of Individuals
0
1
2
3
4
5
6
7
8
9
60
90
120
150
180
210
230
260
>260
Length (mm)
Hog Farm
Buttons Creek
Boat Ramp
Soeder Gauge
Upper LB River


2007 White Perch Length-Frequency
Number of Individuals
0
1
2
3
4
5
6
7
8
9
60
90
120
150
180
210
230
260
>260
Length (mm)
Hog Farm
Buttons Creek
Boat Ramp
Soeder Gauge
Upper LB River


2007 Black Crappie Length-Frequency
Number of Individuals
0
1
2
3
4
5
6
7
60
90
120
150
180
210
230
260
>260
Length (mm)
Buttons Creek
Soeder Gauge

Appendix D

Analytical Control Facility report: Year 1 (2006) and Year 2 (2007).

2006

Analytical Results Report TOC

Page 2 - Chapter 1. : ECDMS Analytical Results Report 8/3/2010

Page 3 - Chapter 2. : Bulk Data

Page 4 - Chapter 4. : Contaminant Concentrations

Page 45 - Chapter 5. : Procedural Blanks

Page 53 - Chapter 7. : Spike Recoveries

Page 59 - Chapter 8. : Reference Materials

Page 65 - Chapter 9. : Laboratory Notes

Page 66 - Chapter 10. : QAQC Summary

Page 67 - Chapter 11. : QA/QC Anomalies

Page 82 - Chapter 12. : Analytical Methods

1. ECDMS Analytical Results Report 8/3/2010

Catalog Number	Purchase Order Number	Lab ID	Catalog Submitter	ECDMS User ID
5020122	04420-00-Y000	GERG	Guy, Chris - Annapolis, MD	rSafo

Catalog Title	Little Blackwater River Sediment Triad
Lab Name:	Geochemical and Environmental Research Group
DEQ Project ID:	5N42
DEQ Project Title	Effects of Urban Sprawl on Sediment, Surface Water, And Biota in the Little Blackwater River, Blackwater National Wildlife Refuge, Dorchester County, Maryland

Notes, Symbols and Abbreviations Used
Based on the report options selected the report should be printed in landscape mode
Notes, Symbols and Abbreviations Used The following may appear before a reported result (e.g. < 1234). < - Less than symbol indicates that the actual result is less than the reported detection limit. > - Greater than symbol indicates that the actual result is greater than the reported result.
All results are reported as 3 significant digits.
All results are reported as parts per billion (ppb), or percent, unless otherwise noted.

1. Integrity Report

Lab Receipt Date	08/15/2000	Lab Approval Date	08/15/2000

Catalog Problems
No problems reported
Problem Resolution

page: 2

2. Bulk Data

Sample Number	Sample Matrix	Percent Moisture
BNWR01sed	Sediments	87.4
BNWR02sed	Sediments	80.2
BNWR03sed	Sediments	85.7
BNWR04sed	Sediments	86.2
BNWR05sed	Sediments	86.5
BNWR06sed	Sediments	86.4
BNWR07sed	Sediments	86.5
BNWR01watO	Water	
BNWR02watO	Water	
BNWR03watO	Water	
BNWR04watO	Water	
BNWR05watO	Water	
BNWR06watO	Water	
BNWR07watO	Water	

4. Contaminant Concentrations

Analyte	Sample Number	Sample Matrix	Dry Weight (ppb)	DL Dry Weight (ppb)	Wet Weight (ppb)	DL Wet Weight (ppb)
1,2,3,4-Tetrachlorobenzene						
	BNWR01sed	Sediments	< 0.101	0.101	< 0.0242	0.0242
	BNWR02sed	Sediments	0.120	0.120	0.0250	0.0240
	BNWR03sed	Sediments	< 0.170	0.170	< 0.0242	0.0242
	BNWR04sed	Sediments	< 0.178	0.178	< 0.0240	0.0240
	BNWR05sed	Sediments	< 0.183	0.183	< 0.0248	0.0248
	BNWR06sed	Sediments	< 0.181	0.181	< 0.0240	0.0240
	BNWR07sed	Sediments	< 0.183	0.183	< 0.0248	0.0248
	BNWR01watO	Water			< 0.00238	0.00238
	BNWR02watO	Water			< 0.00238	0.00238
	BNWR03watO	Water			< 0.00230	0.00230
	BNWR04watO	Water			< 0.00237	0.00237
	BNWR05watO	Water			< 0.00235	0.00235
	BNWR06watO	Water			< 0.00238	0.00238
	BNWR07watO	Water			< 0.00238	0.00238
1,2,4,5-Tetrachlorobenzene						
	BNWR01sed	Sediments	2.10	0.101	0.200	0.0242
	BNWR02sed	Sediments	0.102	0.120	0.0320	0.0240
	BNWR03sed	Sediments	0.554	0.170	0.0700	0.0242
	BNWR04sed	Sediments	0.610	0.178	0.0850	0.0240
	BNWR05sed	Sediments	2.25	0.183	0.304	0.0248
	BNWR06sed	Sediments	< 0.181	0.181	< 0.0240	0.0240
	BNWR07sed	Sediments	0.628	0.183	0.0850	0.0248
	BNWR01watO	Water			< 0.00238	0.00238
	BNWR02watO	Water			< 0.00238	0.00238
	BNWR03watO	Water			< 0.00230	0.00230
	BNWR04watO	Water			< 0.00237	0.00237

page: 4

Analyte	Sample Number	Sample Matrix	Dry Weight (ppb)	DL Dry Weight (ppb)	Wet Weight (ppb)	DL Wet Weight (ppb)
	BNWR05watO	Water			< 0.00235	0.00235
	BNWR06watO	Water			< 0.00238	0.00238
	BNWR07watO	Water			< 0.00238	0.00238
1,6,7-Trimethyl-naphthalene						
	BNWR01sed	Sediments	< 11.5	11.5	< 1.45	1.45
	BNWR02sed	Sediments	< 7.54	7.54	< 1.40	1.40
	BNWR03sed	Sediments	< 10.1	10.1	< 1.45	1.45
	BNWR04sed	Sediments	< 10.7	10.7	< 1.48	1.48
	BNWR05sed	Sediments	< 11.0	11.0	< 1.40	1.40
	BNWR06sed	Sediments	< 10.8	10.8	< 1.47	1.47
	BNWR07sed	Sediments	< 11.0	11.0	< 1.40	1.40
	BNWR01watO	Water			< 0.00470	0.00470
	BNWR02watO	Water			< 0.00475	0.00475
	BNWR03watO	Water			< 0.00472	0.00472
	BNWR04watO	Water			< 0.00474	0.00474
	BNWR05watO	Water			< 0.00471	0.00471
	BNWR06watO	Water			< 0.00470	0.00470
	BNWR07watO	Water			< 0.00470	0.00470
1-methylnaphthalene						
	BNWR01sed	Sediments	< 11.5	11.5	< 1.45	1.45
	BNWR02sed	Sediments	10.2	7.54	2.01	1.40
	BNWR03sed	Sediments	13.8	10.1	1.07	1.45
	BNWR04sed	Sediments	28.7	10.7	3.00	1.48
	BNWR05sed	Sediments	47.3	11.0	6.30	1.40
	BNWR06sed	Sediments	40.1	10.8	6.27	1.47
	BNWR07sed	Sediments	< 11.0	11.0	< 1.40	1.40
	BNWR01watO	Water			< 0.00470	0.00470
	BNWR02watO	Water			< 0.00475	0.00475
	BNWR03watO	Water			< 0.00472	0.00472

page: 5

Analyte	Sample Number	Sample Matrix	Dry Weight (ppb)	DL Dry Weight (ppb)	Wet Weight (ppb)	DL Wet Weight (ppb)
	BNWR04watO	Water			< 0.00474	0.00474
	BNWR05watO	Water			< 0.00471	0.00471
	BNWR06watO	Water			< 0.00476	0.00476
	BNWR07watO	Water			< 0.00476	0.00476
1-methylphenanthrene						
	BNWR01sed	Sediments	< 11.5	11.5	< 1.45	1.45
	BNWR02sed	Sediments	< 7.54	7.54	< 1.40	1.40
	BNWR03sed	Sediments	15.0	10.1	2.15	1.45
	BNWR04sed	Sediments	60.1	10.7	9.54	1.48
	BNWR05sed	Sediments	21.4	11.0	2.80	1.40
	BNWR06sed	Sediments	18.3	10.8	2.40	1.47
	BNWR07sed	Sediments	< 11.0	11.0	< 1.40	1.40
	BNWR01watO	Water			< 0.00476	0.00476
	BNWR02watO	Water			< 0.00475	0.00475
	BNWR03watO	Water			< 0.00472	0.00472
	BNWR04watO	Water			< 0.00474	0.00474
	BNWR05watO	Water			< 0.00471	0.00471
	BNWR06watO	Water			< 0.00476	0.00476
	BNWR07watO	Water			< 0.00476	0.00476
2,6-dimethylnaphthalene						
	BNWR01sed	Sediments	17.4	11.5	2.10	1.45
	BNWR02sed	Sediments	13.3	7.54	2.03	1.40
	BNWR03sed	Sediments	25.0	10.1	3.58	1.45
	BNWR04sed	Sediments	18.4	10.7	2.54	1.48
	BNWR05sed	Sediments	10.0	11.0	2.68	1.40
	BNWR06sed	Sediments	< 10.8	10.8	< 1.47	1.47
	BNWR07sed	Sediments	< 11.0	11.0	< 1.40	1.40
	BNWR01watO	Water			< 0.00476	0.00476
	BNWR02watO	Water			< 0.00475	0.00475

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Analyte	Sample Number	Sample Matrix	Dry Weight (ppb)	DL Dry Weight (ppb)	Wet Weight (ppb)	DL Wet Weight (ppb)
	BNWR03watO	Water			< 0.00472	0.00472
	BNWR04watO	Water			< 0.00474	0.00474
	BNWR05watO	Water			< 0.00471	0.00471
	BNWR06watO	Water			< 0.00476	0.00476
	BNWR07watO	Water			< 0.00476	0.00476
2-methylnaphthalene						
	BNWR01sed	Sediments	< 11.5	11.5	< 1.45	1.45
	BNWR02sed	Sediments	12.8	7.54	2.53	1.49
	BNWR03sed	Sediments	24.2	10.1	3.46	1.45
	BNWR04sed	Sediments	55.3	10.7	7.63	1.48
	BNWR05sed	Sediments	71.8	11.0	9.69	1.49
	BNWR06sed	Sediments	63.5	10.8	8.63	1.47
	BNWR07sed	Sediments	< 11.0	11.0	< 1.49	1.49
	BNWR01watO	Water			< 0.00476	0.00476
	BNWR02watO	Water			< 0.00475	0.00475
	BNWR03watO	Water			< 0.00472	0.00472
	BNWR04watO	Water			< 0.00474	0.00474
	BNWR05watO	Water			< 0.00471	0.00471
	BNWR06watO	Water			< 0.00476	0.00476
	BNWR07watO	Water			< 0.00476	0.00476
Aldrin						
	BNWR01sed	Sediments	< 0.101	0.101	< 0.0242	0.0242
	BNWR02sed	Sediments	< 0.126	0.126	< 0.0249	0.0249
	BNWR03sed	Sediments	1.02	0.170	0.145	0.0242
	BNWR04sed	Sediments	3.01	0.178	0.415	0.0246
	BNWR05sed	Sediments	1.30	0.183	0.176	0.0248
	BNWR06sed	Sediments	1.26	0.181	0.174	0.0246
	BNWR07sed	Sediments	0.185	0.183	0.0250	0.0248
	BNWR01watO	Water			< 0.00238	0.00238

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Analyte	Sample Number	Sample Matrix	Dry Weight (ppb)	DL Dry Weight (ppb)	Wet Weight (ppb)	DL Wet Weight (ppb)
	BNWR02watO	Water			< 0.00238	0.00238
	BNWR03watO	Water			< 0.00236	0.00236
	BNWR04watO	Water			< 0.00237	0.00237
	BNWR05watO	Water			< 0.00235	0.00235
	BNWR06watO	Water			< 0.00238	0.00238
	BNWR07watO	Water			< 0.00238	0.00238
Benzo(a)anthracene						
	BNWR01sed	Sediments	29.4	11.5	3.70	1.45
	BNWR02sed	Sediments	15.5	7.54	3.07	1.49
	BNWR03sed	Sediments	31.0	10.1	4.43	1.45
	BNWR04sed	Sediments	399	10.7	55.1	1.48
	BNWR05sed	Sediments	83.8	11.0	11.3	1.49
	BNWR06sed	Sediments	54.2	10.8	7.37	1.47
	BNWR07sed	Sediments	< 11.0	11.0	< 1.49	1.49
	BNWR01watO	Water			< 0.00476	0.00476
	BNWR02watO	Water			< 0.00475	0.00475
	BNWR03watO	Water			< 0.00472	0.00472
	BNWR04watO	Water			< 0.00474	0.00474
	BNWR05watO	Water			< 0.00471	0.00471
	BNWR06watO	Water			< 0.00476	0.00476
	BNWR07watO	Water			< 0.00476	0.00476
C1-Fluoranthenes & Pyrenes						
	BNWR01sed	Sediments	86.7	11.5	10.9	1.45
	BNWR02sed	Sediments	34.0	7.54	6.74	1.49
	BNWR03sed	Sediments	61.5	10.1	8.80	1.45
	BNWR04sed	Sediments	303	10.7	41.8	1.48
	BNWR05sed	Sediments	63.7	11.0	8.60	1.49
	BNWR06sed	Sediments	58.9	10.8	8.01	1.47
	BNWR07sed	Sediments	57.0	11.0	7.69	1.49

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Analyte	Sample Number	Sample Matrix	Dry Weight (ppb)	DL Dry Weight (ppb)	Wet Weight (ppb)	DL Wet Weight (ppb)
	BNWR01watO	Water			< 0.00476	0.00476
	BNWR02watO	Water			< 0.00475	0.00475
	BNWR03watO	Water			< 0.00472	0.00472
	BNWR04watO	Water			< 0.00474	0.00474
	BNWR05watO	Water			< 0.00471	0.00471
	BNWR06watO	Water			< 0.00476	0.00476
	BNWR07watO	Water			< 0.00476	0.00476
C1-Phenanthrenes & Anthracenes						
	BNWR01sed	Sediments	29.9	11.5	3.77	1.45
	BNWR02sed	Sediments	18.8	7.54	3.73	1.49
	BNWR03sed	Sediments	48.3	10.1	6.90	1.45
	BNWR04sed	Sediments	219	10.7	30.3	1.48
	BNWR05sed	Sediments	57.9	11.0	7.82	1.49
	BNWR06sed	Sediments	55.1	10.8	7.50	1.47
	BNWR07sed	Sediments	12.3	11.0	1.66	1.49
	BNWR01watO	Water			< 0.00476	0.00476
	BNWR02watO	Water			< 0.00475	0.00475
	BNWR03watO	Water			< 0.00472	0.00472
	BNWR04watO	Water			< 0.00474	0.00474
	BNWR05watO	Water			< 0.00471	0.00471
	BNWR06watO	Water			< 0.00476	0.00476
	BNWR07watO	Water			< 0.00476	0.00476
C1-chrysenes						
	BNWR01sed	Sediments	155	11.5	19.5	1.45
	BNWR02sed	Sediments	45.8	7.54	9.07	1.49
	BNWR03sed	Sediments	64.1	10.1	9.16	1.45
	BNWR04sed	Sediments	236	10.7	32.5	1.48
	BNWR05sed	Sediments	62.7	11.0	8.47	1.49
	BNWR06sed	Sediments	41.2	10.8	5.61	1.47

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Analyte	Sample Number	Sample Matrix	Dry Weight (ppb)	DL Dry Weight (ppb)	Wet Weight (ppb)	DL Wet Weight (ppb)
	BNWR07sed	Sediments	07.7	11.0	13.2	1.40
	BNWR01watO	Water			< 0.00470	0.00470
	BNWR02watO	Water			< 0.00475	0.00475
	BNWR03watO	Water			< 0.00472	0.00472
	BNWR04watO	Water			< 0.00474	0.00474
	BNWR05watO	Water			< 0.00471	0.00471
	BNWR06watO	Water			< 0.00470	0.00470
	BNWR07watO	Water			< 0.00470	0.00470
C1-dibenzothiophenes						
	BNWR01sed	Sediments	< 11.5	11.5	< 1.45	1.45
	BNWR02sed	Sediments	< 7.54	7.54	< 1.40	1.40
	BNWR03sed	Sediments	12.2	10.1	1.75	1.45
	BNWR04sed	Sediments	28.2	10.7	3.80	1.48
	BNWR05sed	Sediments	< 11.0	11.0	< 1.40	1.40
	BNWR06sed	Sediments	< 10.8	10.8	< 1.47	1.47
	BNWR07sed	Sediments	< 11.0	11.0	< 1.40	1.40
	BNWR01watO	Water			< 0.00470	0.00470
	BNWR02watO	Water			< 0.00475	0.00475
	BNWR03watO	Water			< 0.00472	0.00472
	BNWR04watO	Water			< 0.00474	0.00474
	BNWR05watO	Water			< 0.00471	0.00471
	BNWR06watO	Water			< 0.00470	0.00470
	BNWR07watO	Water			< 0.00470	0.00470
C1-fluorenes						
	BNWR01sed	Sediments	23.7	11.5	2.08	1.45
	BNWR02sed	Sediments	19.2	7.54	3.80	1.40
	BNWR03sed	Sediments	40.7	10.1	5.82	1.45
	BNWR04sed	Sediments	88.7	10.7	12.2	1.48
	BNWR05sed	Sediments	65.3	11.0	8.82	1.40

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Analyte	Sample Number	Sample Matrix	Dry Weight (ppb)	DL Dry Weight (ppb)	Wet Weight (ppb)	DL Wet Weight (ppb)
	BNWR06sed	Sediments	81.8	10.8	11.1	1.47
	BNWR07sed	Sediments	16.3	11.0	2.20	1.49
	BNWR01watO	Water			< 0.00476	0.00476
	BNWR02watO	Water			< 0.00475	0.00475
	BNWR03watO	Water			< 0.00472	0.00472
	BNWR04watO	Water			< 0.00474	0.00474
	BNWR05watO	Water			< 0.00471	0.00471
	BNWR06watO	Water			< 0.00476	0.00476
	BNWR07watO	Water			< 0.00476	0.00476
C1-naphthalenes						
	BNWR01sed	Sediments	17.6	11.5	2.22	1.45
	BNWR02sed	Sediments	22.9	7.54	4.54	1.49
	BNWR03sed	Sediments	38.0	10.1	5.43	1.45
	BNWR04sed	Sediments	84.0	10.7	11.6	1.48
	BNWR05sed	Sediments	119	11.0	16.1	1.49
	BNWR06sed	Sediments	110.	10.8	14.9	1.47
	BNWR07sed	Sediments	20.1	11.0	2.72	1.49
	BNWR01watO	Water			< 0.00476	0.00476
	BNWR02watO	Water			< 0.00475	0.00475
	BNWR03watO	Water			< 0.00472	0.00472
	BNWR04watO	Water			< 0.00474	0.00474
	BNWR05watO	Water			< 0.00471	0.00471
	BNWR06watO	Water			< 0.00476	0.00476
	BNWR07watO	Water			< 0.00476	0.00476
C2-Phenanthrenes & Anthracenes						
	BNWR01sed	Sediments	22.8	11.5	2.87	1.45
	BNWR02sed	Sediments	13.6	7.54	2.69	1.49
	BNWR03sed	Sediments	29.0	10.1	4.14	1.45
	BNWR04sed	Sediments	133	10.7	18.3	1.48

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Analyte	Sample Number	Sample Matrix	Dry Weight (ppb)	DL Dry Weight (ppb)	Wet Weight (ppb)	DL Wet Weight (ppb)
	BNWR05sed	Sediments	27.3	11.0	3.60	1.40
	BNWR06sed	Sediments	26.6	10.8	3.62	1.47
	BNWR07sed	Sediments	< 11.0	11.0	< 1.40	1.40
	BNWR01watO	Water			< 0.00476	0.00476
	BNWR02watO	Water			< 0.00475	0.00475
	BNWR03watO	Water			< 0.00472	0.00472
	BNWR04watO	Water			< 0.00474	0.00474
	BNWR05watO	Water			< 0.00471	0.00471
	BNWR06watO	Water			< 0.00476	0.00476
	BNWR07watO	Water			< 0.00476	0.00476
C2-chrysenes						
	BNWR01sed	Sediments	73.7	11.5	9.29	1.45
	BNWR02sed	Sediments	36.3	7.54	7.18	1.49
	BNWR03sed	Sediments	60.6	10.1	8.67	1.45
	BNWR04sed	Sediments	105	10.7	14.5	1.48
	BNWR05sed	Sediments	49.3	11.0	6.66	1.40
	BNWR06sed	Sediments	45.8	10.8	6.23	1.47
	BNWR07sed	Sediments	22.5	11.0	3.04	1.49
	BNWR01watO	Water			< 0.00476	0.00476
	BNWR02watO	Water			< 0.00475	0.00475
	BNWR03watO	Water			< 0.00472	0.00472
	BNWR04watO	Water			< 0.00474	0.00474
	BNWR05watO	Water			< 0.00471	0.00471
	BNWR06watO	Water			< 0.00476	0.00476
	BNWR07watO	Water			< 0.00476	0.00476
C2-dibenzothiophenes						
	BNWR01sed	Sediments	12.9	11.5	1.62	1.45
	BNWR02sed	Sediments	< 7.54	7.54	< 1.49	1.49
	BNWR03sed	Sediments	< 10.1	10.1	< 1.45	1.45

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Analyte	Sample Number	Sample Matrix	Dry Weight (ppb)	DL Dry Weight (ppb)	Wet Weight (ppb)	DL Wet Weight (ppb)
	BNWR04sed	Sediments	24.1	10.7	3.32	1.48
	BNWR05sed	Sediments	< 11.0	11.0	< 1.40	1.40
	BNWR06sed	Sediments	< 10.8	10.8	< 1.47	1.47
	BNWR07sed	Sediments	< 11.0	11.0	< 1.40	1.40
	BNWR01watO	Water			< 0.00476	0.00476
	BNWR02watO	Water			< 0.00475	0.00475
	BNWR03watO	Water			< 0.00472	0.00472
	BNWR04watO	Water			< 0.00474	0.00474
	BNWR05watO	Water			< 0.00471	0.00471
	BNWR06watO	Water			< 0.00476	0.00476
	BNWR07watO	Water			< 0.00476	0.00476
C2-fluorenes						
	BNWR01sed	Sediments	21.0	11.5	2.76	1.45
	BNWR02sed	Sediments	15.0	7.54	3.14	1.40
	BNWR03sed	Sediments	28.3	10.1	4.04	1.45
	BNWR04sed	Sediments	53.7	10.7	7.41	1.48
	BNWR05sed	Sediments	27.6	11.0	3.72	1.40
	BNWR06sed	Sediments	35.4	10.8	4.82	1.47
	BNWR07sed	Sediments	11.6	11.0	1.56	1.40
	BNWR01watO	Water			< 0.00476	0.00476
	BNWR02watO	Water			< 0.00475	0.00475
	BNWR03watO	Water			< 0.00472	0.00472
	BNWR04watO	Water			< 0.00474	0.00474
	BNWR05watO	Water			< 0.00471	0.00471
	BNWR06watO	Water			< 0.00476	0.00476
	BNWR07watO	Water			< 0.00476	0.00476
C2-naphthalenes						
	BNWR01sed	Sediments	48.8	11.5	6.15	1.45
	BNWR02sed	Sediments	91.2	7.54	18.0	1.40

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Analyte	Sample Number	Sample Matrix	Dry Weight (ppb)	DL Dry Weight (ppb)	Wet Weight (ppb)	DL Wet Weight (ppb)
	BNWR03sed	Sediments	76.9	10.1	11.0	1.45
	BNWR04sed	Sediments	85.7	10.7	11.8	1.48
	BNWR05sed	Sediments	128	11.0	17.3	1.49
	BNWR06sed	Sediments	172	10.8	23.4	1.47
	BNWR07sed	Sediments	73.1	11.0	9.87	1.49
	BNWR01watO	Water			< 0.00476	0.00476
	BNWR02watO	Water			< 0.00475	0.00475
	BNWR03watO	Water			< 0.00472	0.00472
	BNWR04watO	Water			< 0.00474	0.00474
	BNWR05watO	Water			< 0.00471	0.00471
	BNWR06watO	Water			< 0.00476	0.00476
	BNWR07watO	Water			< 0.00476	0.00476
C3-Phenanthrenes & Anthracenes						
	BNWR01sed	Sediments	13.2	11.5	1.66	1.45
	BNWR02sed	Sediments	9.55	7.54	1.89	1.49
	BNWR03sed	Sediments	16.6	10.1	2.37	1.45
	BNWR04sed	Sediments	56.4	10.7	7.78	1.48
	BNWR05sed	Sediments	15.2	11.0	2.05	1.49
	BNWR06sed	Sediments	14.5	10.8	1.97	1.47
	BNWR07sed	Sediments	< 11.0	11.0	< 1.49	1.49
	BNWR01watO	Water			< 0.00476	0.00476
	BNWR02watO	Water			< 0.00475	0.00475
	BNWR03watO	Water			< 0.00472	0.00472
	BNWR04watO	Water			< 0.00474	0.00474
	BNWR05watO	Water			< 0.00471	0.00471
	BNWR06watO	Water			< 0.00476	0.00476
	BNWR07watO	Water			< 0.00476	0.00476
C3-chrysenes						
	BNWR01sed	Sediments	21.3	11.5	2.69	1.45

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Analyte	Sample Number	Sample Matrix	Dry Weight (ppb)	DL Dry Weight (ppb)	Wet Weight (ppb)	DL Wet Weight (ppb)
	BNWR02sed	Sediments	17.7	7.54	3.51	1.40
	BNWR03sed	Sediments	21.3	10.1	3.04	1.45
	BNWR04sed	Sediments	43.5	10.7	6.00	1.48
	BNWR05sed	Sediments	12.4	11.0	1.68	1.40
	BNWR06sed	Sediments	15.1	10.8	2.05	1.47
	BNWR07sed	Sediments	< 11.0	11.0	< 1.40	1.40
	BNWR01watO	Water			< 0.00476	0.00476
	BNWR02watO	Water			< 0.00475	0.00475
	BNWR03watO	Water			< 0.00472	0.00472
	BNWR04watO	Water			< 0.00474	0.00474
	BNWR05watO	Water			< 0.00471	0.00471
	BNWR06watO	Water			< 0.00476	0.00476
	BNWR07watO	Water			< 0.00476	0.00476
C3-dibenzothiophenes						
	BNWR01sed	Sediments	18.3	11.5	2.31	1.45
	BNWR02sed	Sediments	8.00	7.54	1.78	1.40
	BNWR03sed	Sediments	< 10.1	10.1	< 1.45	1.45
	BNWR04sed	Sediments	12.3	10.7	1.70	1.48
	BNWR05sed	Sediments	< 11.0	11.0	< 1.40	1.40
	BNWR06sed	Sediments	< 10.8	10.8	< 1.47	1.47
	BNWR07sed	Sediments	< 11.0	11.0	< 1.40	1.40
	BNWR01watO	Water			< 0.00476	0.00476
	BNWR02watO	Water			< 0.00475	0.00475
	BNWR03watO	Water			< 0.00472	0.00472
	BNWR04watO	Water			< 0.00474	0.00474
	BNWR05watO	Water			< 0.00471	0.00471
	BNWR06watO	Water			< 0.00476	0.00476
	BNWR07watO	Water			< 0.00476	0.00476
C3-fluorenes						

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Analyte	Sample Number	Sample Matrix	Dry Weight (ppb)	DL Dry Weight (ppb)	Wet Weight (ppb)	DL Wet Weight (ppb)
	BNWR01sed	Sediments	18.0	11.5	2.34	1.45
	BNWR02sed	Sediments	12.7	7.54	2.51	1.49
	BNWR03sed	Sediments	26.0	10.1	3.72	1.45
	BNWR04sed	Sediments	50.9	10.7	7.03	1.48
	BNWR05sed	Sediments	22.4	11.0	3.03	1.49
	BNWR06sed	Sediments	34.5	10.8	4.69	1.47
	BNWR07sed	Sediments	< 11.0	11.0	< 1.49	1.49
	BNWR01watO	Water			< 0.00476	0.00476
	BNWR02watO	Water			< 0.00475	0.00475
	BNWR03watO	Water			< 0.00472	0.00472
	BNWR04watO	Water			< 0.00474	0.00474
	BNWR05watO	Water			< 0.00471	0.00471
	BNWR06watO	Water			< 0.00476	0.00476
	BNWR07watO	Water			< 0.00476	0.00476
C3-naphthalenes						
	BNWR01sed	Sediments	49.8	11.5	6.28	1.45
	BNWR02sed	Sediments	76.4	7.54	15.1	1.49
	BNWR03sed	Sediments	61.9	10.1	8.85	1.45
	BNWR04sed	Sediments	110.	10.7	15.2	1.48
	BNWR05sed	Sediments	93.7	11.0	12.6	1.49
	BNWR06sed	Sediments	187	10.8	25.4	1.47
	BNWR07sed	Sediments	87.3	11.0	11.8	1.49
	BNWR01watO	Water			< 0.00476	0.00476
	BNWR02watO	Water			< 0.00475	0.00475
	BNWR03watO	Water			< 0.00472	0.00472
	BNWR04watO	Water			< 0.00474	0.00474
	BNWR05watO	Water			< 0.00471	0.00471
	BNWR06watO	Water			< 0.00476	0.00476
	BNWR07watO	Water			< 0.00476	0.00476

Analyte	Sample Number	Sample Matrix	Dry Weight (ppb)	DL Dry Weight (ppb)	Wet Weight (ppb)	DL Wet Weight (ppb)
C4-Phenanthrenes & Anthracenes						
	BNWR01sed	Sediments	39.0	11.5	4.91	1.45
	BNWR02sed	Sediments	22.8	7.54	4.52	1.49
	BNWR03sed	Sediments	26.4	10.1	3.77	1.45
	BNWR04sed	Sediments	108	10.7	14.9	1.48
	BNWR05sed	Sediments	24.1	11.0	3.26	1.49
	BNWR06sed	Sediments	22.8	10.8	3.10	1.47
	BNWR07sed	Sediments	29.4	11.0	3.97	1.49
	BNWR01watO	Water			< 0.00476	0.00476
	BNWR02watO	Water			< 0.00475	0.00475
	BNWR03watO	Water			< 0.00472	0.00472
	BNWR04watO	Water			< 0.00474	0.00474
	BNWR05watO	Water			< 0.00471	0.00471
	BNWR06watO	Water			< 0.00476	0.00476
	BNWR07watO	Water			< 0.00476	0.00476
C4-chrysenes						
	BNWR01sed	Sediments	24.5	11.5	3.09	1.45
	BNWR02sed	Sediments	< 7.54	7.54	< 1.49	1.49
	BNWR03sed	Sediments	18.5	10.1	2.64	1.45
	BNWR04sed	Sediments	30.7	10.7	4.24	1.48
	BNWR05sed	Sediments	33.3	11.0	4.49	1.49
	BNWR06sed	Sediments	26.3	10.8	3.58	1.47
	BNWR07sed	Sediments	24.4	11.0	3.30	1.49
	BNWR01watO	Water			< 0.00476	0.00476
	BNWR02watO	Water			< 0.00475	0.00475
	BNWR03watO	Water			< 0.00472	0.00472
	BNWR04watO	Water			< 0.00474	0.00474
	BNWR05watO	Water			< 0.00471	0.00471
	BNWR06watO	Water			< 0.00476	0.00476

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Analyte	Sample Number	Sample Matrix	Dry Weight (ppb)	DL Dry Weight (ppb)	Wet Weight (ppb)	DL Wet Weight (ppb)
C4-Phenanthrenes & Anthracenes						
	BNWR01sed	Sediments	39.0	11.5	4.91	1.45
	BNWR02sed	Sediments	22.8	7.54	4.52	1.49
	BNWR03sed	Sediments	26.4	10.1	3.77	1.45
	BNWR04sed	Sediments	108	10.7	14.9	1.48
	BNWR05sed	Sediments	24.1	11.0	3.26	1.49
	BNWR06sed	Sediments	22.8	10.8	3.10	1.47
	BNWR07sed	Sediments	29.4	11.0	3.97	1.49
	BNWR01watO	Water			< 0.00476	0.00476
	BNWR02watO	Water			< 0.00475	0.00475
	BNWR03watO	Water			< 0.00472	0.00472
	BNWR04watO	Water			< 0.00474	0.00474
	BNWR05watO	Water			< 0.00471	0.00471
	BNWR06watO	Water			< 0.00476	0.00476
	BNWR07watO	Water			< 0.00476	0.00476
C4-chrysenes						
	BNWR01sed	Sediments	24.5	11.5	3.09	1.45
	BNWR02sed	Sediments	< 7.54	7.54	< 1.49	1.49
	BNWR03sed	Sediments	18.5	10.1	2.64	1.45
	BNWR04sed	Sediments	30.7	10.7	4.24	1.48
	BNWR05sed	Sediments	33.3	11.0	4.49	1.49
	BNWR06sed	Sediments	26.3	10.8	3.58	1.47
	BNWR07sed	Sediments	24.4	11.0	3.30	1.49
	BNWR01watO	Water			< 0.00476	0.00476
	BNWR02watO	Water			< 0.00475	0.00475
	BNWR03watO	Water			< 0.00472	0.00472
	BNWR04watO	Water			< 0.00474	0.00474
	BNWR05watO	Water			< 0.00471	0.00471
	BNWR06watO	Water			< 0.00476	0.00476

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Analyte	Sample Number	Sample Matrix	Dry Weight (ppb)	DL Dry Weight (ppb)	Wet Weight (ppb)	DL Wet Weight (ppb)
	BNWR07watO	Water			< 0.00476	0.00476
C4-naphthalenes						
	BNWR01sed	Sediments	73.9	11.5	9.31	1.45
	BNWR02sed	Sediments	120	7.54	24.9	1.49
	BNWR03sed	Sediments	127	10.1	18.2	1.45
	BNWR04sed	Sediments	237	10.7	32.7	1.48
	BNWR05sed	Sediments	172	11.0	23.3	1.49
	BNWR06sed	Sediments	550.	10.8	74.7	1.47
	BNWR07sed	Sediments	143	11.0	19.3	1.49
	BNWR01watO	Water			< 0.00476	0.00476
	BNWR02watO	Water			< 0.00475	0.00475
	BNWR03watO	Water			< 0.00472	0.00472
	BNWR04watO	Water			< 0.00474	0.00474
	BNWR05watO	Water			< 0.00471	0.00471
	BNWR06watO	Water			< 0.00476	0.00476
	BNWR07watO	Water			< 0.00476	0.00476
Dibenz(a,h)anthracene						
	BNWR01sed	Sediments	< 11.5	11.5	< 1.45	1.45
	BNWR02sed	Sediments	< 7.54	7.54	< 1.49	1.49
	BNWR03sed	Sediments	< 10.1	10.1	< 1.45	1.45
	BNWR04sed	Sediments	40.7	10.7	6.45	1.48
	BNWR05sed	Sediments	< 11.0	11.0	< 1.49	1.49
	BNWR06sed	Sediments	< 10.8	10.8	< 1.47	1.47
	BNWR07sed	Sediments	< 11.0	11.0	< 1.49	1.49
	BNWR01watO	Water			< 0.00476	0.00476
	BNWR02watO	Water			< 0.00475	0.00475
	BNWR03watO	Water			< 0.00472	0.00472
	BNWR04watO	Water			< 0.00474	0.00474
	BNWR05watO	Water			< 0.00471	0.00471

Analyte	Sample Number	Sample Matrix	Dry Weight (ppb)	DL Dry Weight (ppb)	Wet Weight (ppb)	DL Wet Weight (ppb)
	BNWR06watO	Water			< 0.00476	0.00476
	BNWR07watO	Water			< 0.00476	0.00476
HCB						
	BNWR01sed	Sediments	< 0.101	0.101	< 0.0242	0.0242
	BNWR02sed	Sediments	< 0.126	0.126	< 0.0240	0.0240
	BNWR03sed	Sediments	< 0.170	0.170	< 0.0242	0.0242
	BNWR04sed	Sediments	< 0.178	0.178	< 0.0240	0.0240
	BNWR05sed	Sediments	< 0.183	0.183	< 0.0248	0.0248
	BNWR06sed	Sediments	0.185	0.181	0.0250	0.0240
	BNWR07sed	Sediments	< 0.183	0.183	< 0.0248	0.0248
	BNWR01watO	Water			< 0.00238	0.00238
	BNWR02watO	Water			< 0.00238	0.00238
	BNWR03watO	Water			< 0.00230	0.00230
	BNWR04watO	Water			< 0.00237	0.00237
	BNWR05watO	Water			< 0.00235	0.00235
	BNWR06watO	Water			< 0.00238	0.00238
	BNWR07watO	Water			< 0.00238	0.00238
Heptachlor						
	BNWR01sed	Sediments	< 0.101	0.101	< 0.0242	0.0242
	BNWR02sed	Sediments	0.172	0.126	0.0340	0.0240
	BNWR03sed	Sediments	< 0.170	0.170	< 0.0242	0.0242
	BNWR04sed	Sediments	< 0.178	0.178	< 0.0240	0.0240
	BNWR05sed	Sediments	0.288	0.183	0.0300	0.0248
	BNWR06sed	Sediments	0.332	0.181	0.0450	0.0240
	BNWR07sed	Sediments	< 0.183	0.183	< 0.0248	0.0248
	BNWR01watO	Water			< 0.00238	0.00238
	BNWR02watO	Water			< 0.00238	0.00238
	BNWR03watO	Water			< 0.00230	0.00230
	BNWR04watO	Water			< 0.00237	0.00237

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Analyte	Sample Number	Sample Matrix	Dry Weight (ppb)	DL Dry Weight (ppb)	Wet Weight (ppb)	DL Wet Weight (ppb)
	BNWR05watO	Water			< 0.00235	0.00235
	BNWR06watO	Water			< 0.00238	0.00238
	BNWR07watO	Water			< 0.00238	0.00238
PCB-1242						
	BNWR01sed	Sediments	20.4	3.83	2.58	0.484
	BNWR02sed	Sediments	6.50	2.51	1.30	0.408
	BNWR03sed	Sediments	11.0	3.30	1.57	0.484
	BNWR04sed	Sediments	7.55	3.57	1.04	0.402
	BNWR05sed	Sediments	11.7	3.00	1.58	0.405
	BNWR06sed	Sediments	13.0	3.63	1.77	0.401
	BNWR07sed	Sediments	11.6	3.00	1.57	0.405
	BNWR01watO	Water			< 0.110	0.110
	BNWR02watO	Water			< 0.110	0.110
	BNWR03watO	Water			< 0.118	0.118
	BNWR04watO	Water			< 0.118	0.118
	BNWR05watO	Water			< 0.118	0.118
	BNWR06watO	Water			< 0.110	0.110
	BNWR07watO	Water			< 0.110	0.110
PCB-1248						
	BNWR01sed	Sediments	< 3.83	3.83	< 0.484	0.484
	BNWR02sed	Sediments	< 2.51	2.51	< 0.408	0.408
	BNWR03sed	Sediments	< 3.30	3.30	< 0.484	0.484
	BNWR04sed	Sediments	< 3.57	3.57	< 0.402	0.402
	BNWR05sed	Sediments	< 3.00	3.00	< 0.405	0.405
	BNWR06sed	Sediments	< 3.63	3.63	< 0.401	0.401
	BNWR07sed	Sediments	< 3.00	3.00	< 0.405	0.405
	BNWR01watO	Water			< 0.110	0.110
	BNWR02watO	Water			< 0.110	0.110
	BNWR03watO	Water			< 0.118	0.118

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Analyte	Sample Number	Sample Matrix	Dry Weight (ppb)	DL Dry Weight (ppb)	Wet Weight (ppb)	DL Wet Weight (ppb)
	BNWR04watO	Water			< 0.118	0.118
	BNWR05watO	Water			< 0.118	0.118
	BNWR06watO	Water			< 0.110	0.110
	BNWR07watO	Water			< 0.110	0.110
PCB-1254						
	BNWR01sed	Sediments	6.20	3.83	0.792	0.484
	BNWR02sed	Sediments	5.74	2.51	1.14	0.408
	BNWR03sed	Sediments	12.6	3.30	1.80	0.484
	BNWR04sed	Sediments	18.0	3.57	2.60	0.402
	BNWR05sed	Sediments	23.4	3.66	3.16	0.405
	BNWR06sed	Sediments	26.1	3.63	3.53	0.401
	BNWR07sed	Sediments	< 3.66	3.66	< 0.405	0.405
	BNWR01watO	Water			< 0.110	0.110
	BNWR02watO	Water			< 0.110	0.110
	BNWR03watO	Water			< 0.118	0.118
	BNWR04watO	Water			< 0.118	0.118
	BNWR05watO	Water			< 0.118	0.118
	BNWR06watO	Water			< 0.110	0.110
	BNWR07watO	Water			< 0.110	0.110
PCB-1260						
	BNWR01sed	Sediments	4.70	3.83	0.594	0.484
	BNWR02sed	Sediments	4.10	2.51	0.812	0.408
	BNWR03sed	Sediments	7.80	3.30	1.12	0.484
	BNWR04sed	Sediments	11.3	3.57	1.56	0.402
	BNWR05sed	Sediments	3.80	3.66	0.527	0.405
	BNWR06sed	Sediments	4.34	3.63	0.588	0.401
	BNWR07sed	Sediments	27.1	3.66	3.66	0.405
	BNWR01watO	Water			< 0.110	0.110
	BNWR02watO	Water			< 0.110	0.110

Analyte	Sample Number	Sample Matrix	Dry Weight (ppb)	DL Dry Weight (ppb)	Wet Weight (ppb)	DL Wet Weight (ppb)
	BNWR03watO	Water			< 0.118	0.118
	BNWR04watO	Water			< 0.118	0.118
	BNWR05watO	Water			< 0.118	0.118
	BNWR06watO	Water			< 0.110	0.110
	BNWR07watO	Water			< 0.110	0.110
PCB-1268						
	BNWR01sed	Sediments	< 3.83	3.83	< 0.484	0.484
	BNWR02sed	Sediments	< 2.51	2.51	< 0.408	0.408
	BNWR03sed	Sediments	< 3.30	3.30	< 0.484	0.484
	BNWR04sed	Sediments	< 3.57	3.57	< 0.402	0.402
	BNWR05sed	Sediments	< 3.00	3.00	< 0.405	0.405
	BNWR06sed	Sediments	< 3.03	3.03	< 0.401	0.401
	BNWR07sed	Sediments	< 3.00	3.00	< 0.405	0.405
	BNWR01watO	Water			< 0.110	0.110
	BNWR02watO	Water			< 0.110	0.110
	BNWR03watO	Water			< 0.118	0.118
	BNWR04watO	Water			< 0.118	0.118
	BNWR05watO	Water			< 0.118	0.118
	BNWR06watO	Water			< 0.110	0.110
	BNWR07watO	Water			< 0.110	0.110
PCB-TOTAL						
	BNWR01sed	Sediments	31.0	3.83	4.00	0.484
	BNWR02sed	Sediments	16.2	2.51	3.20	0.408
	BNWR03sed	Sediments	31.0	3.30	4.50	0.484
	BNWR04sed	Sediments	37.7	3.57	5.20	0.402
	BNWR05sed	Sediments	39.2	3.00	5.30	0.405
	BNWR06sed	Sediments	43.5	3.03	5.00	0.401
	BNWR07sed	Sediments	38.4	3.00	5.20	0.405
	BNWR01watO	Water			< 0.110	0.110

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Analyte	Sample Number	Sample Matrix	Dry Weight (ppb)	DL Dry Weight (ppb)	Wet Weight (ppb)	DL Wet Weight (ppb)
	BNWR02watO	Water			< 0.110	0.110
	BNWR03watO	Water			< 0.118	0.118
	BNWR04watO	Water			< 0.118	0.118
	BNWR05watO	Water			< 0.118	0.118
	BNWR06watO	Water			< 0.110	0.110
	BNWR07watO	Water			< 0.110	0.110
acenaphthalene						
	BNWR01sed	Sediments	< 11.5	11.5	< 1.45	1.45
	BNWR02sed	Sediments	< 7.54	7.54	< 1.40	1.40
	BNWR03sed	Sediments	< 10.1	10.1	< 1.45	1.45
	BNWR04sed	Sediments	62.2	10.7	8.50	1.48
	BNWR05sed	Sediments	25.6	11.0	3.46	1.40
	BNWR06sed	Sediments	11.2	10.8	1.52	1.47
	BNWR07sed	Sediments	< 11.0	11.0	< 1.40	1.40
	BNWR01watO	Water			< 0.00476	0.00476
	BNWR02watO	Water			< 0.00475	0.00475
	BNWR03watO	Water			< 0.00472	0.00472
	BNWR04watO	Water			< 0.00474	0.00474
	BNWR05watO	Water			< 0.00471	0.00471
	BNWR06watO	Water			< 0.00476	0.00476
	BNWR07watO	Water			< 0.00476	0.00476
acenaphthene						
	BNWR01sed	Sediments	< 11.5	11.5	< 1.45	1.45
	BNWR02sed	Sediments	< 7.54	7.54	< 1.40	1.40
	BNWR03sed	Sediments	< 10.1	10.1	< 1.45	1.45
	BNWR04sed	Sediments	14.0	10.7	2.06	1.48
	BNWR05sed	Sediments	< 11.0	11.0	< 1.40	1.40
	BNWR06sed	Sediments	11.4	10.8	1.55	1.47
	BNWR07sed	Sediments	< 11.0	11.0	< 1.40	1.40

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Analyte	Sample Number	Sample Matrix	Dry Weight (ppb)	DL Dry Weight (ppb)	Wet Weight (ppb)	DL Wet Weight (ppb)
	BNWR01watO	Water			< 0.00476	0.00476
	BNWR02watO	Water			< 0.00475	0.00475
	BNWR03watO	Water			< 0.00472	0.00472
	BNWR04watO	Water			< 0.00474	0.00474
	BNWR05watO	Water			< 0.00471	0.00471
	BNWR06watO	Water			< 0.00476	0.00476
	BNWR07watO	Water			0.00500	0.00476
alpha BHC						
	BNWR01sed	Sediments	0.466	0.191	0.0500	0.0242
	BNWR02sed	Sediments	0.288	0.126	0.0570	0.0240
	BNWR03sed	Sediments	0.379	0.170	0.0540	0.0242
	BNWR04sed	Sediments	0.305	0.178	0.0420	0.0246
	BNWR05sed	Sediments	0.458	0.183	0.0620	0.0248
	BNWR06sed	Sediments	0.465	0.181	0.0630	0.0246
	BNWR07sed	Sediments	0.303	0.183	0.0410	0.0248
	BNWR01watO	Water			< 0.00238	0.00238
	BNWR02watO	Water			< 0.00238	0.00238
	BNWR03watO	Water			< 0.00236	0.00236
	BNWR04watO	Water			< 0.00237	0.00237
	BNWR05watO	Water			< 0.00235	0.00235
	BNWR06watO	Water			< 0.00238	0.00238
	BNWR07watO	Water			< 0.00238	0.00238
alpha chlordane						
	BNWR01sed	Sediments	1.34	0.191	0.160	0.0242
	BNWR02sed	Sediments	0.212	0.126	0.0420	0.0240
	BNWR03sed	Sediments	0.982	0.170	0.140	0.0242
	BNWR04sed	Sediments	0.370	0.178	0.0510	0.0246
	BNWR05sed	Sediments	0.500	0.183	0.0810	0.0248
	BNWR06sed	Sediments	0.723	0.181	0.0980	0.0246

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Analyte	Sample Number	Sample Matrix	Dry Weight (ppb)	DL Dry Weight (ppb)	Wet Weight (ppb)	DL Wet Weight (ppb)
	BNWR07sed	Sediments	0.30	0.183	0.852	0.0248
	BNWR01watO	Water			< 0.00238	0.00238
	BNWR02watO	Water			< 0.00238	0.00238
	BNWR03watO	Water			< 0.00230	0.00230
	BNWR04watO	Water			< 0.00237	0.00237
	BNWR05watO	Water			< 0.00235	0.00235
	BNWR06watO	Water			< 0.00238	0.00238
	BNWR07watO	Water			< 0.00238	0.00238
anthracene						
	BNWR01sed	Sediments	12.1	11.5	1.53	1.45
	BNWR02sed	Sediments	10.4	7.54	2.06	1.49
	BNWR03sed	Sediments	20.5	10.1	2.03	1.45
	BNWR04sed	Sediments	107	10.7	14.8	1.48
	BNWR05sed	Sediments	51.0	11.0	7.01	1.49
	BNWR06sed	Sediments	38.5	10.8	5.23	1.47
	BNWR07sed	Sediments	< 11.0	11.0	< 1.49	1.49
	BNWR01watO	Water			< 0.00476	0.00476
	BNWR02watO	Water			< 0.00475	0.00475
	BNWR03watO	Water			< 0.00472	0.00472
	BNWR04watO	Water			< 0.00474	0.00474
	BNWR05watO	Water			< 0.00471	0.00471
	BNWR06watO	Water			< 0.00476	0.00476
	BNWR07watO	Water			< 0.00476	0.00476
benzo(a)pyrene						
	BNWR01sed	Sediments	38.0	11.5	4.90	1.45
	BNWR02sed	Sediments	18.0	7.54	3.56	1.49
	BNWR03sed	Sediments	25.1	10.1	3.59	1.45
	BNWR04sed	Sediments	318	10.7	43.9	1.48
	BNWR05sed	Sediments	68.3	11.0	9.22	1.49

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Analyte	Sample Number	Sample Matrix	Dry Weight (ppb)	DL Dry Weight (ppb)	Wet Weight (ppb)	DL Wet Weight (ppb)
	BNWR06sed	Sediments	32.0	10.8	4.48	1.47
	BNWR07sed	Sediments	11.0	11.0	1.60	1.40
	BNWR01watO	Water			< 0.00476	0.00476
	BNWR02watO	Water			< 0.00475	0.00475
	BNWR03watO	Water			< 0.00472	0.00472
	BNWR04watO	Water			< 0.00474	0.00474
	BNWR05watO	Water			< 0.00471	0.00471
	BNWR06watO	Water			< 0.00476	0.00476
	BNWR07watO	Water			< 0.00476	0.00476
benzo(b)fluoranthene						
	BNWR01sed	Sediments	122	11.5	15.4	1.45
	BNWR02sed	Sediments	58.6	7.54	11.6	1.40
	BNWR03sed	Sediments	99.2	10.1	14.2	1.45
	BNWR04sed	Sediments	626	10.7	86.4	1.48
	BNWR05sed	Sediments	170.	11.0	23.0	1.40
	BNWR06sed	Sediments	105	10.8	14.2	1.47
	BNWR07sed	Sediments	53.1	11.0	7.17	1.40
	BNWR01watO	Water			< 0.00476	0.00476
	BNWR02watO	Water			< 0.00475	0.00475
	BNWR03watO	Water			< 0.00472	0.00472
	BNWR04watO	Water			< 0.00474	0.00474
	BNWR05watO	Water			< 0.00471	0.00471
	BNWR06watO	Water			< 0.00476	0.00476
	BNWR07watO	Water			< 0.00476	0.00476
benzo(e)pyrene						
	BNWR01sed	Sediments	50.2	11.5	6.32	1.45
	BNWR02sed	Sediments	24.6	7.54	4.87	1.40
	BNWR03sed	Sediments	36.0	10.1	5.15	1.45
	BNWR04sed	Sediments	244	10.7	33.6	1.48

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Analyte	Sample Number	Sample Matrix	Dry Weight (ppb)	DL Dry Weight (ppb)	Wet Weight (ppb)	DL Wet Weight (ppb)
	BNWR05sed	Sediments	61.8	11.0	8.34	1.40
	BNWR06sed	Sediments	40.4	10.8	5.40	1.47
	BNWR07sed	Sediments	20.0	11.0	2.70	1.40
	BNWR01watO	Water			< 0.00476	0.00476
	BNWR02watO	Water			< 0.00475	0.00475
	BNWR03watO	Water			< 0.00472	0.00472
	BNWR04watO	Water			< 0.00474	0.00474
	BNWR05watO	Water			< 0.00471	0.00471
	BNWR06watO	Water			< 0.00476	0.00476
	BNWR07watO	Water			< 0.00476	0.00476
benzo(g,h,i)perylene						
	BNWR01sed	Sediments	30.9	11.5	5.03	1.45
	BNWR02sed	Sediments	22.5	7.54	4.45	1.40
	BNWR03sed	Sediments	31.1	10.1	4.45	1.45
	BNWR04sed	Sediments	172	10.7	23.7	1.48
	BNWR05sed	Sediments	20.4	11.0	3.07	1.40
	BNWR06sed	Sediments	14.6	10.8	1.09	1.47
	BNWR07sed	Sediments	10.0	11.0	2.56	1.40
	BNWR01watO	Water			< 0.00476	0.00476
	BNWR02watO	Water			< 0.00475	0.00475
	BNWR03watO	Water			< 0.00472	0.00472
	BNWR04watO	Water			< 0.00474	0.00474
	BNWR05watO	Water			< 0.00471	0.00471
	BNWR06watO	Water			< 0.00476	0.00476
	BNWR07watO	Water			< 0.00476	0.00476
benzo(k)fluoranthene						
	BNWR01sed	Sediments	23.2	11.5	2.92	1.45
	BNWR02sed	Sediments	13.0	7.54	2.58	1.40
	BNWR03sed	Sediments	18.7	10.1	2.68	1.45

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Analyte	Sample Number	Sample Matrix	Dry Weight (ppb)	DL Dry Weight (ppb)	Wet Weight (ppb)	DL Wet Weight (ppb)
	BNWR04sed	Sediments	120	10.7	17.8	1.48
	BNWR05sed	Sediments	36.5	11.0	4.93	1.49
	BNWR06sed	Sediments	26.0	10.8	3.54	1.47
	BNWR07sed	Sediments	11.9	11.0	1.61	1.49
	BNWR01watO	Water			< 0.00476	0.00476
	BNWR02watO	Water			< 0.00475	0.00475
	BNWR03watO	Water			< 0.00472	0.00472
	BNWR04watO	Water			< 0.00474	0.00474
	BNWR05watO	Water			< 0.00471	0.00471
	BNWR06watO	Water			< 0.00476	0.00476
	BNWR07watO	Water			< 0.00476	0.00476
beta BHC						
	BNWR01sed	Sediments	< 0.191	0.191	< 0.0242	0.0242
	BNWR02sed	Sediments	< 0.126	0.126	< 0.0240	0.0240
	BNWR03sed	Sediments	< 0.170	0.170	< 0.0242	0.0242
	BNWR04sed	Sediments	0.276	0.178	0.0380	0.0246
	BNWR05sed	Sediments	0.266	0.183	0.0366	0.0248
	BNWR06sed	Sediments	< 0.181	0.181	< 0.0246	0.0246
	BNWR07sed	Sediments	0.517	0.183	0.0700	0.0248
	BNWR01watO	Water			< 0.00238	0.00238
	BNWR02watO	Water			< 0.00238	0.00238
	BNWR03watO	Water			< 0.00236	0.00236
	BNWR04watO	Water			< 0.00237	0.00237
	BNWR05watO	Water			< 0.00235	0.00235
	BNWR06watO	Water			< 0.00238	0.00238
	BNWR07watO	Water			< 0.00238	0.00238
biphenyl						
	BNWR01sed	Sediments	< 11.5	11.5	< 1.45	1.45
	BNWR02sed	Sediments	< 7.54	7.54	< 1.49	1.49

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Analyte	Sample Number	Sample Matrix	Dry Weight (ppb)	DL Dry Weight (ppb)	Wet Weight (ppb)	DL Wet Weight (ppb)
	BNWR03sed	Sediments	< 10.1	10.1	< 1.45	1.45
	BNWR04sed	Sediments	17.9	10.7	2.47	1.48
	BNWR05sed	Sediments	15.0	11.0	2.02	1.49
	BNWR06sed	Sediments	< 10.8	10.8	< 1.47	1.47
	BNWR07sed	Sediments	< 11.0	11.0	< 1.49	1.49
	BNWR01watO	Water			< 0.00476	0.00476
	BNWR02watO	Water			< 0.00475	0.00475
	BNWR03watO	Water			< 0.00472	0.00472
	BNWR04watO	Water			< 0.00474	0.00474
	BNWR05watO	Water			< 0.00471	0.00471
	BNWR06watO	Water			< 0.00476	0.00476
	BNWR07watO	Water			< 0.00476	0.00476
chlorpyrifos						
	BNWR01sed	Sediments	< 0.101	0.101	< 0.0242	0.0242
	BNWR02sed	Sediments	0.232	0.120	0.0400	0.0249
	BNWR03sed	Sediments	0.435	0.170	0.0620	0.0242
	BNWR04sed	Sediments	0.334	0.178	0.0400	0.0246
	BNWR05sed	Sediments	0.355	0.183	0.0480	0.0248
	BNWR06sed	Sediments	< 0.181	0.181	< 0.0246	0.0246
	BNWR07sed	Sediments	0.244	0.183	0.0330	0.0248
	BNWR01watO	Water			< 0.00238	0.00238
	BNWR02watO	Water			< 0.00238	0.00238
	BNWR03watO	Water			< 0.00236	0.00236
	BNWR04watO	Water			< 0.00237	0.00237
	BNWR05watO	Water			< 0.00235	0.00235
	BNWR06watO	Water			< 0.00238	0.00238
	BNWR07watO	Water			< 0.00238	0.00238
chrysene						
	BNWR01sed	Sediments	58.2	11.5	7.33	1.45

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Analyte	Sample Number	Sample Matrix	Dry Weight (ppb)	DL Dry Weight (ppb)	Wet Weight (ppb)	DL Wet Weight (ppb)
	BNWR02sed	Sediments	25.8	7.54	5.11	1.49
	BNWR03sed	Sediments	41.0	10.1	5.86	1.45
	BNWR04sed	Sediments	402	10.7	55.5	1.48
	BNWR05sed	Sediments	76.6	11.0	10.3	1.49
	BNWR06sed	Sediments	62.2	10.8	8.46	1.47
	BNWR07sed	Sediments	18.6	11.0	2.51	1.49
	BNWR01watO	Water			< 0.00476	0.00476
	BNWR02watO	Water			< 0.00475	0.00475
	BNWR03watO	Water			< 0.00472	0.00472
	BNWR04watO	Water			< 0.00474	0.00474
	BNWR05watO	Water			< 0.00471	0.00471
	BNWR06watO	Water			< 0.00476	0.00476
	BNWR07watO	Water			< 0.00476	0.00476
cis-nonachlor						
	BNWR01sed	Sediments	1.23	0.191	0.156	0.0242
	BNWR02sed	Sediments	0.409	0.126	0.0810	0.0249
	BNWR03sed	Sediments	0.757	0.170	0.108	0.0242
	BNWR04sed	Sediments	0.377	0.178	0.0520	0.0246
	BNWR05sed	Sediments	0.237	0.183	0.0320	0.0248
	BNWR06sed	Sediments	0.354	0.181	0.0480	0.0246
	BNWR07sed	Sediments	4.04	0.183	0.547	0.0248
	BNWR01watO	Water			< 0.00238	0.00238
	BNWR02watO	Water			< 0.00238	0.00238
	BNWR03watO	Water			< 0.00236	0.00236
	BNWR04watO	Water			< 0.00237	0.00237
	BNWR05watO	Water			< 0.00235	0.00235
	BNWR06watO	Water			< 0.00238	0.00238
	BNWR07watO	Water			< 0.00238	0.00238
delta BHC						

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Analyte	Sample Number	Sample Matrix	Dry Weight (ppb)	DL Dry Weight (ppb)	Wet Weight (ppb)	DL Wet Weight (ppb)
	BNWR01sed	Sediments	< 0.101	0.101	< 0.0242	0.0242
	BNWR02sed	Sediments	0.141	0.120	0.0280	0.0240
	BNWR03sed	Sediments	< 0.170	0.170	< 0.0242	0.0242
	BNWR04sed	Sediments	< 0.178	0.178	< 0.0240	0.0240
	BNWR05sed	Sediments	< 0.183	0.183	< 0.0248	0.0248
	BNWR06sed	Sediments	< 0.181	0.181	< 0.0240	0.0240
	BNWR07sed	Sediments	< 0.183	0.183	< 0.0248	0.0248
	BNWR01watO	Water			< 0.00238	0.00238
	BNWR02watO	Water			< 0.00238	0.00238
	BNWR03watO	Water			< 0.00236	0.00236
	BNWR04watO	Water			< 0.00237	0.00237
	BNWR05watO	Water			< 0.00235	0.00235
	BNWR06watO	Water			< 0.00238	0.00238
	BNWR07watO	Water			< 0.00238	0.00238
dibenzothiophene						
	BNWR01sed	Sediments	< 11.5	11.5	< 1.45	1.45
	BNWR02sed	Sediments	< 7.54	7.54	< 1.40	1.40
	BNWR03sed	Sediments	14.0	10.1	2.13	1.45
	BNWR04sed	Sediments	20.3	10.7	4.05	1.48
	BNWR05sed	Sediments	18.1	11.0	2.44	1.40
	BNWR06sed	Sediments	17.0	10.8	2.31	1.47
	BNWR07sed	Sediments	< 11.0	11.0	< 1.40	1.40
	BNWR01watO	Water			< 0.00476	0.00476
	BNWR02watO	Water			< 0.00475	0.00475
	BNWR03watO	Water			< 0.00472	0.00472
	BNWR04watO	Water			< 0.00474	0.00474
	BNWR05watO	Water			< 0.00471	0.00471
	BNWR06watO	Water			< 0.00476	0.00476
	BNWR07watO	Water			< 0.00476	0.00476

Analyte	Sample Number	Sample Matrix	Dry Weight (ppb)	DL Dry Weight (ppb)	Wet Weight (ppb)	DL Wet Weight (ppb)
dieldrin						
	BNWR01sed	Sediments	1.50	0.101	0.107	0.0242
	BNWR02sed	Sediments	0.777	0.120	0.154	0.0240
	BNWR03sed	Sediments	2.17	0.170	0.310	0.0242
	BNWR04sed	Sediments	0.348	0.178	0.0480	0.0240
	BNWR05sed	Sediments	< 0.183	0.183	< 0.0248	0.0248
	BNWR06sed	Sediments	0.405	0.181	0.0630	0.0240
	BNWR07sed	Sediments	3.38	0.183	0.457	0.0248
	BNWR01watO	Water			< 0.00238	0.00238
	BNWR02watO	Water			< 0.00238	0.00238
	BNWR03watO	Water			< 0.00230	0.00230
	BNWR04watO	Water			< 0.00237	0.00237
	BNWR05watO	Water			< 0.00235	0.00235
	BNWR06watO	Water			< 0.00238	0.00238
	BNWR07watO	Water			< 0.00238	0.00238
endosulfan II						
	BNWR01sed	Sediments	< 0.101	0.101	< 0.0242	0.0242
	BNWR02sed	Sediments	< 0.120	0.120	< 0.0240	0.0240
	BNWR03sed	Sediments	< 0.170	0.170	< 0.0242	0.0242
	BNWR04sed	Sediments	< 0.178	0.178	< 0.0240	0.0240
	BNWR05sed	Sediments	< 0.183	0.183	< 0.0248	0.0248
	BNWR06sed	Sediments	< 0.181	0.181	< 0.0240	0.0240
	BNWR07sed	Sediments	< 0.183	0.183	< 0.0248	0.0248
	BNWR01watO	Water			< 0.00238	0.00238
	BNWR02watO	Water			< 0.00238	0.00238
	BNWR03watO	Water			< 0.00230	0.00230
	BNWR04watO	Water			< 0.00237	0.00237
	BNWR05watO	Water			< 0.00235	0.00235
	BNWR06watO	Water			< 0.00238	0.00238

Analyte	Sample Number	Sample Matrix	Dry Weight (ppb)	DL Dry Weight (ppb)	Wet Weight (ppb)	DL Wet Weight (ppb)
	BNWR07watO	Water			< 0.00238	0.00238
endrin						
	BNWR01sed	Sediments	0.617	0.101	0.0780	0.0242
	BNWR02sed	Sediments	< 0.120	0.120	< 0.0240	0.0240
	BNWR03sed	Sediments	0.252	0.170	0.0300	0.0242
	BNWR04sed	Sediments	0.201	0.178	0.0300	0.0240
	BNWR05sed	Sediments	0.717	0.183	0.0970	0.0248
	BNWR06sed	Sediments	0.220	0.181	0.0310	0.0240
	BNWR07sed	Sediments	0.310	0.183	0.0420	0.0248
	BNWR01watO	Water			< 0.00238	0.00238
	BNWR02watO	Water			< 0.00238	0.00238
	BNWR03watO	Water			< 0.00236	0.00236
	BNWR04watO	Water			< 0.00237	0.00237
	BNWR05watO	Water			< 0.00235	0.00235
	BNWR06watO	Water			< 0.00238	0.00238
	BNWR07watO	Water			< 0.00238	0.00238
fluoranthene						
	BNWR01sed	Sediments	83.5	11.5	10.5	1.45
	BNWR02sed	Sediments	44.0	7.54	8.00	1.40
	BNWR03sed	Sediments	152	10.1	21.7	1.45
	BNWR04sed	Sediments	973	10.7	134	1.48
	BNWR05sed	Sediments	200	11.0	28.2	1.40
	BNWR06sed	Sediments	257	10.8	35.0	1.47
	BNWR07sed	Sediments	37.7	11.0	5.00	1.40
	BNWR01watO	Water			< 0.00476	0.00476
	BNWR02watO	Water			< 0.00475	0.00475
	BNWR03watO	Water			< 0.00472	0.00472
	BNWR04watO	Water			< 0.00474	0.00474
	BNWR05watO	Water			< 0.00471	0.00471

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Analyte	Sample Number	Sample Matrix	Dry Weight (ppb)	DL Dry Weight (ppb)	Wet Weight (ppb)	DL Wet Weight (ppb)
	BNWR06watO	Water			< 0.00470	0.00470
	BNWR07watO	Water			< 0.00470	0.00470
fluorene						
	BNWR01sed	Sediments	12.3	11.5	1.55	1.45
	BNWR02sed	Sediments	13.8	7.54	2.74	1.40
	BNWR03sed	Sediments	62.7	10.1	8.07	1.45
	BNWR04sed	Sediments	85.1	10.7	11.7	1.48
	BNWR05sed	Sediments	70.1	11.0	9.47	1.40
	BNWR06sed	Sediments	70.1	10.8	9.54	1.47
	BNWR07sed	Sediments	13.0	11.0	1.70	1.40
	BNWR01watO	Water			< 0.00470	0.00470
	BNWR02watO	Water			< 0.00475	0.00475
	BNWR03watO	Water			< 0.00472	0.00472
	BNWR04watO	Water			< 0.00474	0.00474
	BNWR05watO	Water			< 0.00471	0.00471
	BNWR06watO	Water			< 0.00470	0.00470
	BNWR07watO	Water			< 0.00470	0.00470
gamma BHC						
	BNWR01sed	Sediments	< 0.101	0.101	< 0.0242	0.0242
	BNWR02sed	Sediments	< 0.120	0.120	< 0.0240	0.0240
	BNWR03sed	Sediments	< 0.170	0.170	< 0.0242	0.0242
	BNWR04sed	Sediments	0.203	0.178	0.0280	0.0240
	BNWR05sed	Sediments	< 0.183	0.183	< 0.0248	0.0248
	BNWR06sed	Sediments	< 0.181	0.181	< 0.0240	0.0240
	BNWR07sed	Sediments	< 0.183	0.183	< 0.0248	0.0248
	BNWR01watO	Water			< 0.00238	0.00238
	BNWR02watO	Water			< 0.00238	0.00238
	BNWR03watO	Water			< 0.00230	0.00230
	BNWR04watO	Water			< 0.00237	0.00237

Analyte	Sample Number	Sample Matrix	Dry Weight (ppb)	DL Dry Weight (ppb)	Wet Weight (ppb)	DL Wet Weight (ppb)
	BNWR05watO	Water			< 0.00235	0.00235
	BNWR06watO	Water			< 0.00238	0.00238
	BNWR07watO	Water			< 0.00238	0.00238
gamma chlordane						
	BNWR01sed	Sediments	1.01	0.101	0.128	0.0242
	BNWR02sed	Sediments	0.237	0.120	0.0470	0.0240
	BNWR03sed	Sediments	0.082	0.170	0.140	0.0242
	BNWR04sed	Sediments	0.218	0.178	0.0300	0.0240
	BNWR05sed	Sediments	0.318	0.183	0.0430	0.0248
	BNWR06sed	Sediments	0.300	0.181	0.0500	0.0240
	BNWR07sed	Sediments	0.00	0.183	0.803	0.0248
	BNWR01watO	Water			< 0.00238	0.00238
	BNWR02watO	Water			< 0.00238	0.00238
	BNWR03watO	Water			< 0.00230	0.00230
	BNWR04watO	Water			< 0.00237	0.00237
	BNWR05watO	Water			< 0.00235	0.00235
	BNWR06watO	Water			< 0.00238	0.00238
	BNWR07watO	Water			< 0.00238	0.00238
heptachlor epoxide						
	BNWR01sed	Sediments	< 0.101	0.101	< 0.0242	0.0242
	BNWR02sed	Sediments	< 0.120	0.120	< 0.0240	0.0240
	BNWR03sed	Sediments	< 0.170	0.170	< 0.0242	0.0242
	BNWR04sed	Sediments	< 0.178	0.178	< 0.0240	0.0240
	BNWR05sed	Sediments	< 0.183	0.183	< 0.0248	0.0248
	BNWR06sed	Sediments	< 0.181	0.181	< 0.0240	0.0240
	BNWR07sed	Sediments	< 0.183	0.183	< 0.0248	0.0248
	BNWR01watO	Water			< 0.00238	0.00238
	BNWR02watO	Water			< 0.00238	0.00238
	BNWR03watO	Water			< 0.00230	0.00230

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Analyte	Sample Number	Sample Matrix	Dry Weight (ppb)	DL Dry Weight (ppb)	Wet Weight (ppb)	DL Wet Weight (ppb)
	BNWR04watO	Water			< 0.00237	0.00237
	BNWR05watO	Water			< 0.00235	0.00235
	BNWR06watO	Water			< 0.00238	0.00238
	BNWR07watO	Water			< 0.00238	0.00238
indeno(1,2,3-cd)pyrene						
	BNWR01sed	Sediments	49.0	11.5	6.20	1.45
	BNWR02sed	Sediments	25.0	7.54	5.07	1.40
	BNWR03sed	Sediments	33.8	10.1	4.84	1.45
	BNWR04sed	Sediments	232	10.7	32.0	1.48
	BNWR05sed	Sediments	43.2	11.0	5.83	1.40
	BNWR06sed	Sediments	23.0	10.8	3.25	1.47
	BNWR07sed	Sediments	20.2	11.0	2.73	1.40
	BNWR01watO	Water			< 0.00476	0.00476
	BNWR02watO	Water			< 0.00475	0.00475
	BNWR03watO	Water			< 0.00472	0.00472
	BNWR04watO	Water			< 0.00474	0.00474
	BNWR05watO	Water			< 0.00471	0.00471
	BNWR06watO	Water			< 0.00476	0.00476
	BNWR07watO	Water			< 0.00476	0.00476
mirex						
	BNWR01sed	Sediments	< 0.101	0.101	< 0.0242	0.0242
	BNWR02sed	Sediments	< 0.120	0.120	< 0.0240	0.0240
	BNWR03sed	Sediments	< 0.170	0.170	< 0.0242	0.0242
	BNWR04sed	Sediments	< 0.178	0.178	< 0.0240	0.0240
	BNWR05sed	Sediments	< 0.183	0.183	< 0.0248	0.0248
	BNWR06sed	Sediments	< 0.181	0.181	< 0.0240	0.0240
	BNWR07sed	Sediments	< 0.183	0.183	< 0.0248	0.0248
	BNWR01watO	Water			< 0.00238	0.00238
	BNWR02watO	Water			< 0.00238	0.00238

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Analyte	Sample Number	Sample Matrix	Dry Weight (ppb)	DL Dry Weight (ppb)	Wet Weight (ppb)	DL Wet Weight (ppb)
	BNWR03watO	Water			< 0.00236	0.00236
	BNWR04watO	Water			< 0.00237	0.00237
	BNWR05watO	Water			< 0.00235	0.00235
	BNWR06watO	Water			< 0.00238	0.00238
	BNWR07watO	Water			< 0.00238	0.00238
naphthalene						
	BNWR01sed	Sediments	< 11.5	11.5	< 1.45	1.45
	BNWR02sed	Sediments	10.8	7.54	2.13	1.40
	BNWR03sed	Sediments	25.7	10.1	3.08	1.45
	BNWR04sed	Sediments	86.0	10.7	11.0	1.48
	BNWR05sed	Sediments	43.3	11.0	5.85	1.40
	BNWR06sed	Sediments	48.8	10.8	6.04	1.47
	BNWR07sed	Sediments	< 11.0	11.0	< 1.40	1.40
	BNWR01watO	Water			0.00621	0.00476
	BNWR02watO	Water			< 0.00475	0.00475
	BNWR03watO	Water			< 0.00472	0.00472
	BNWR04watO	Water			< 0.00474	0.00474
	BNWR05watO	Water			< 0.00471	0.00471
	BNWR06watO	Water			< 0.00476	0.00476
	BNWR07watO	Water			< 0.00476	0.00476
o,p'-DDD						
	BNWR01sed	Sediments	0.538	0.191	0.0680	0.0242
	BNWR02sed	Sediments	0.237	0.126	0.0470	0.0240
	BNWR03sed	Sediments	0.344	0.170	0.0400	0.0242
	BNWR04sed	Sediments	1.64	0.178	0.226	0.0246
	BNWR05sed	Sediments	0.843	0.183	0.114	0.0248
	BNWR06sed	Sediments	0.501	0.181	0.0700	0.0246
	BNWR07sed	Sediments	1.06	0.183	0.144	0.0248
	BNWR01watO	Water			< 0.00238	0.00238

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Analyte	Sample Number	Sample Matrix	Dry Weight (ppb)	DL Dry Weight (ppb)	Wet Weight (ppb)	DL Wet Weight (ppb)
	BNWR02watO	Water			< 0.00238	0.00238
	BNWR03watO	Water			< 0.00230	0.00230
	BNWR04watO	Water			< 0.00237	0.00237
	BNWR05watO	Water			< 0.00235	0.00235
	BNWR06watO	Water			< 0.00238	0.00238
	BNWR07watO	Water			< 0.00238	0.00238
o,p'-DDE						
	BNWR01sed	Sediments	0.220	0.101	0.0200	0.0242
	BNWR02sed	Sediments	< 0.120	0.120	< 0.0240	0.0240
	BNWR03sed	Sediments	< 0.170	0.170	< 0.0242	0.0242
	BNWR04sed	Sediments	0.181	0.178	0.0250	0.0240
	BNWR05sed	Sediments	0.200	0.183	0.0270	0.0248
	BNWR06sed	Sediments	< 0.181	0.181	< 0.0240	0.0240
	BNWR07sed	Sediments	0.405	0.183	0.0670	0.0248
	BNWR01watO	Water			< 0.00238	0.00238
	BNWR02watO	Water			< 0.00238	0.00238
	BNWR03watO	Water			< 0.00230	0.00230
	BNWR04watO	Water			< 0.00237	0.00237
	BNWR05watO	Water			< 0.00235	0.00235
	BNWR06watO	Water			< 0.00238	0.00238
	BNWR07watO	Water			< 0.00238	0.00238
o,p'-DDT						
	BNWR01sed	Sediments	< 0.101	0.101	< 0.0242	0.0242
	BNWR02sed	Sediments	< 0.120	0.120	< 0.0240	0.0240
	BNWR03sed	Sediments	< 0.170	0.170	< 0.0242	0.0242
	BNWR04sed	Sediments	< 0.178	0.178	< 0.0240	0.0240
	BNWR05sed	Sediments	< 0.183	0.183	< 0.0248	0.0248
	BNWR06sed	Sediments	< 0.181	0.181	< 0.0240	0.0240
	BNWR07sed	Sediments	< 0.183	0.183	< 0.0248	0.0248

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Analyte	Sample Number	Sample Matrix	Dry Weight (ppb)	DL Dry Weight (ppb)	Wet Weight (ppb)	DL Wet Weight (ppb)
	BNWR01watO	Water			< 0.00238	0.00238
	BNWR02watO	Water			< 0.00238	0.00238
	BNWR03watO	Water			< 0.00230	0.00230
	BNWR04watO	Water			< 0.00237	0.00237
	BNWR05watO	Water			< 0.00235	0.00235
	BNWR06watO	Water			< 0.00238	0.00238
	BNWR07watO	Water			< 0.00238	0.00238
oxychlordane						
	BNWR01sed	Sediments	< 0.101	0.101	< 0.0242	0.0242
	BNWR02sed	Sediments	< 0.120	0.120	< 0.0240	0.0240
	BNWR03sed	Sediments	< 0.170	0.170	< 0.0242	0.0242
	BNWR04sed	Sediments	< 0.178	0.178	< 0.0240	0.0240
	BNWR05sed	Sediments	< 0.183	0.183	< 0.0248	0.0248
	BNWR06sed	Sediments	< 0.181	0.181	< 0.0240	0.0240
	BNWR07sed	Sediments	< 0.183	0.183	< 0.0248	0.0248
	BNWR01watO	Water			< 0.00238	0.00238
	BNWR02watO	Water			< 0.00238	0.00238
	BNWR03watO	Water			< 0.00230	0.00230
	BNWR04watO	Water			< 0.00237	0.00237
	BNWR05watO	Water			< 0.00235	0.00235
	BNWR06watO	Water			< 0.00238	0.00238
	BNWR07watO	Water			< 0.00238	0.00238
p,p'-DDD						
	BNWR01sed	Sediments	2.20	0.101	0.278	0.0242
	BNWR02sed	Sediments	0.823	0.120	0.103	0.0240
	BNWR03sed	Sediments	1.42	0.170	0.202	0.0242
	BNWR04sed	Sediments	1.30	0.178	0.170	0.0240
	BNWR05sed	Sediments	1.32	0.183	0.170	0.0248
	BNWR06sed	Sediments	1.64	0.181	0.222	0.0240

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Analyte	Sample Number	Sample Matrix	Dry Weight (ppb)	DL Dry Weight (ppb)	Wet Weight (ppb)	DL Wet Weight (ppb)
	BNWR07sed	Sediments	2.50	0.183	0.340	0.0248
	BNWR01watO	Water			< 0.00238	0.00238
	BNWR02watO	Water			< 0.00238	0.00238
	BNWR03watO	Water			< 0.00230	0.00230
	BNWR04watO	Water			< 0.00237	0.00237
	BNWR05watO	Water			< 0.00235	0.00235
	BNWR06watO	Water			< 0.00238	0.00238
	BNWR07watO	Water			< 0.00238	0.00238
p,p'-DDE						
	BNWR01sed	Sediments	3.73	0.101	0.472	0.0242
	BNWR02sed	Sediments	1.33	0.120	0.204	0.0240
	BNWR03sed	Sediments	1.70	0.170	0.251	0.0242
	BNWR04sed	Sediments	1.17	0.178	0.101	0.0240
	BNWR05sed	Sediments	1.02	0.183	0.138	0.0248
	BNWR06sed	Sediments	1.20	0.181	0.102	0.0240
	BNWR07sed	Sediments	1.57	0.183	0.212	0.0248
	BNWR01watO	Water			< 0.00238	0.00238
	BNWR02watO	Water			< 0.00238	0.00238
	BNWR03watO	Water			< 0.00230	0.00230
	BNWR04watO	Water			< 0.00237	0.00237
	BNWR05watO	Water			< 0.00235	0.00235
	BNWR06watO	Water			< 0.00238	0.00238
	BNWR07watO	Water			< 0.00238	0.00238
p,p'-DDT						
	BNWR01sed	Sediments	2.20	0.101	0.280	0.0242
	BNWR02sed	Sediments	0.288	0.120	0.0570	0.0240
	BNWR03sed	Sediments	0.673	0.170	0.0000	0.0242
	BNWR04sed	Sediments	1.30	0.178	0.102	0.0240
	BNWR05sed	Sediments	0.405	0.183	0.0070	0.0248

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Analyte	Sample Number	Sample Matrix	Dry Weight (ppb)	DL Dry Weight (ppb)	Wet Weight (ppb)	DL Wet Weight (ppb)
	BNWR06sed	Sediments	0.502	0.181	0.0680	0.0240
	BNWR07sed	Sediments	0.540	0.183	0.0730	0.0248
	BNWR01watO	Water			< 0.00238	0.00238
	BNWR02watO	Water			< 0.00238	0.00238
	BNWR03watO	Water			< 0.00236	0.00236
	BNWR04watO	Water			< 0.00237	0.00237
	BNWR05watO	Water			< 0.00235	0.00235
	BNWR06watO	Water			< 0.00238	0.00238
	BNWR07watO	Water			< 0.00238	0.00238
pentachloro-anisole						
	BNWR01sed	Sediments	0.253	0.191	0.0320	0.0242
	BNWR02sed	Sediments	< 0.126	0.126	< 0.0240	0.0240
	BNWR03sed	Sediments	< 0.170	0.170	< 0.0242	0.0242
	BNWR04sed	Sediments	< 0.178	0.178	< 0.0240	0.0240
	BNWR05sed	Sediments	0.244	0.183	0.0330	0.0248
	BNWR06sed	Sediments	0.244	0.181	0.0330	0.0240
	BNWR07sed	Sediments	0.222	0.183	0.0300	0.0248
	BNWR01watO	Water			< 0.00238	0.00238
	BNWR02watO	Water			< 0.00238	0.00238
	BNWR03watO	Water			< 0.00236	0.00236
	BNWR04watO	Water			< 0.00237	0.00237
	BNWR05watO	Water			< 0.00235	0.00235
	BNWR06watO	Water			< 0.00238	0.00238
	BNWR07watO	Water			< 0.00238	0.00238
perylene						
	BNWR01sed	Sediments	690	11.5	87.0	1.45
	BNWR02sed	Sediments	450.	7.54	80.1	1.40
	BNWR03sed	Sediments	877	10.1	125	1.45
	BNWR04sed	Sediments	342	10.7	47.2	1.48

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Analyte	Sample Number	Sample Matrix	Dry Weight (ppb)	DL Dry Weight (ppb)	Wet Weight (ppb)	DL Wet Weight (ppb)
	BNWR05sed	Sediments	80.8	11.0	11.7	1.40
	BNWR06sed	Sediments	111	10.8	15.2	1.47
	BNWR07sed	Sediments	835	11.0	113	1.40
	BNWR01watO	Water			< 0.00470	0.00470
	BNWR02watO	Water			< 0.00475	0.00475
	BNWR03watO	Water			< 0.00472	0.00472
	BNWR04watO	Water			< 0.00474	0.00474
	BNWR05watO	Water			< 0.00471	0.00471
	BNWR06watO	Water			< 0.00470	0.00470
	BNWR07watO	Water			< 0.00470	0.00470
phenanthrene						
	BNWR01sed	Sediments	37.4	11.5	4.71	1.45
	BNWR02sed	Sediments	20.8	7.54	5.30	1.40
	BNWR03sed	Sediments	83.1	10.1	11.0	1.45
	BNWR04sed	Sediments	380.	10.7	52.5	1.48
	BNWR05sed	Sediments	188	11.0	25.3	1.40
	BNWR06sed	Sediments	164	10.8	22.2	1.47
	BNWR07sed	Sediments	12.4	11.0	1.67	1.40
	BNWR01watO	Water			< 0.00470	0.00470
	BNWR02watO	Water			< 0.00475	0.00475
	BNWR03watO	Water			0.00550	0.00472
	BNWR04watO	Water			0.00055	0.00474
	BNWR05watO	Water			< 0.00471	0.00471
	BNWR06watO	Water			< 0.00470	0.00470
	BNWR07watO	Water			< 0.00470	0.00470
pyrene						
	BNWR01sed	Sediments	71.0	11.5	9.66	1.45
	BNWR02sed	Sediments	30.4	7.54	7.20	1.40
	BNWR03sed	Sediments	105	10.1	15.1	1.45

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Analyte	Sample Number	Sample Matrix	Dry Weight (ppb)	DL Dry Weight (ppb)	Wet Weight (ppb)	DL Wet Weight (ppb)
	BNWR04sed	Sediments	700	10.7	100	1.48
	BNWR05sed	Sediments	136	11.0	18.7	1.49
	BNWR06sed	Sediments	160	10.8	23.0	1.47
	BNWR07sed	Sediments	27.0	11.0	3.72	1.49
	BNWR01watO	Water			< 0.00476	0.00476
	BNWR02watO	Water			< 0.00475	0.00475
	BNWR03watO	Water			< 0.00472	0.00472
	BNWR04watO	Water			< 0.00474	0.00474
	BNWR05watO	Water			< 0.00471	0.00471
	BNWR06watO	Water			< 0.00476	0.00476
	BNWR07watO	Water			< 0.00476	0.00476
toxaphene						
	BNWR01sed	Sediments	< 3.83	3.83	< 0.484	0.484
	BNWR02sed	Sediments	< 2.51	2.51	< 0.408	0.408
	BNWR03sed	Sediments	< 3.30	3.30	< 0.484	0.484
	BNWR04sed	Sediments	< 3.57	3.57	< 0.402	0.402
	BNWR05sed	Sediments	< 3.00	3.00	< 0.405	0.405
	BNWR06sed	Sediments	< 3.03	3.03	< 0.401	0.401
	BNWR07sed	Sediments	< 3.00	3.00	< 0.405	0.405
	BNWR01watO	Water			< 0.119	0.119
	BNWR02watO	Water			< 0.119	0.119
	BNWR03watO	Water			< 0.118	0.118
	BNWR04watO	Water			< 0.118	0.118
	BNWR05watO	Water			< 0.118	0.118
	BNWR06watO	Water			< 0.119	0.119
	BNWR07watO	Water			< 0.119	0.119
trans-nonachlor						
	BNWR01sed	Sediments	< 0.101	0.101	< 0.0242	0.0242
	BNWR02sed	Sediments	< 0.120	0.120	< 0.0240	0.0240

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Analyte	Sample Number	Sample Matrix	Dry Weight (ppb)	DL Dry Weight (ppb)	Wet Weight (ppb)	DL Wet Weight (ppb)
	BNWR03sed	Sediments	< 0.170	0.170	< 0.0242	0.0242
	BNWR04sed	Sediments	< 0.178	0.178	< 0.0240	0.0240
	BNWR05sed	Sediments	< 0.183	0.183	< 0.0248	0.0248
	BNWR06sed	Sediments	< 0.181	0.181	< 0.0240	0.0240
	BNWR07sed	Sediments	2.82	0.183	0.382	0.0248
	BNWR01watO	Water			< 0.00238	0.00238
	BNWR02watO	Water			< 0.00238	0.00238
	BNWR03watO	Water			< 0.00230	0.00230
	BNWR04watO	Water			< 0.00237	0.00237
	BNWR05watO	Water			< 0.00235	0.00235
	BNWR06watO	Water			< 0.00238	0.00238
	BNWR07watO	Water			< 0.00238	0.00238

5. Procedural Blanks

Analyte	Lab Sample Number	Lab Sample Matrix	Result Total UG	** BEC (ppb/%)	Basis
1,2,3,4-Tetrachlorobenzene					
	Q23007	Water	0.000	< 0.00500	Wet
	Q23100	Soil/Sediment	0.000	< 0.100	Dry
1,2,4,5-Tetrachlorobenzene					
	Q23007	Water	0.000	< 0.00500	Wet
	Q23100	Soil/Sediment	0.000	< 0.100	Dry
1,6,7-Trimethyl-naphthalene					
	Q23007	Water	0.000	< 0.0100	Wet
	Q23100	Soil/Sediment	0.000	< 0.00	Dry
1-methylnaphthalene					
	Q23007	Water	0.00000100	< 0.0100	Wet
	Q23100	Soil/Sediment	0.000	< 0.00	Dry
1-methylphenanthrene					
	Q23007	Water	0.000	< 0.0100	Wet
	Q23100	Soil/Sediment	0.000	< 0.00	Dry
2,6-dimethylnaphthalene					
	Q23007	Water	0.000	< 0.0100	Wet
	Q23100	Soil/Sediment	0.000	< 0.00	Dry
2-methylnaphthalene					
	Q23007	Water	0.00000100	< 0.0100	Wet
	Q23100	Soil/Sediment	0.000	< 0.00	Dry
Aldrin					
	Q23007	Water	0.000	< 0.00500	Wet
	Q23100	Soil/Sediment	0.000	< 0.100	Dry
Benzo(a)anthracene					
	Q23007	Water	0.000	< 0.0100	Wet
	Q23100	Soil/Sediment	0.000430	< 0.00	Dry
C1-Fluoranthenes & Pyrenes					
	Q23007	Water	0.000	< 0.0100	Wet
	Q23100	Soil/Sediment	0.000	< 0.00	Dry

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Analyte	Lab Sample Number	Lab Sample Matrix	Result Total UG	** BEC (ppb/%)	Basis
C1-Phenanthrenes & Anthracenes					
	Q23007	Water	0.000	< 0.0100	Wet
	Q23100	Soil/Sediment	0.000	< 0.00	Dry
C1-chrysenes					
	Q23007	Water	0.000	< 0.0100	Wet
	Q23100	Soil/Sediment	0.000	< 0.00	Dry
C1-dibenzothiophenes					
	Q23007	Water	0.000	< 0.0100	Wet
	Q23100	Soil/Sediment	0.000	< 0.00	Dry
C1-fluorenes					
	Q23007	Water	0.000	< 0.0100	Wet
	Q23100	Soil/Sediment	0.000	< 0.00	Dry
C1-naphthalenes					
	Q23007	Water	0.00000200	< 0.0100	Wet
	Q23100	Soil/Sediment	0.000	< 0.00	Dry
C2-Phenanthrenes & Anthracenes					
	Q23007	Water	0.000	< 0.0100	Wet
	Q23100	Soil/Sediment	0.000	< 0.00	Dry
C2-chrysenes					
	Q23007	Water	0.000	< 0.0100	Wet
	Q23100	Soil/Sediment	0.000	< 0.00	Dry
C2-dibenzothiophenes					
	Q23007	Water	0.000	< 0.0100	Wet
	Q23100	Soil/Sediment	0.000	< 0.00	Dry
C2-fluorenes					
	Q23007	Water	0.000	< 0.0100	Wet
	Q23100	Soil/Sediment	0.000	< 0.00	Dry
C2-naphthalenes					
	Q23007	Water	0.000	< 0.0100	Wet
	Q23100	Soil/Sediment	0.000	< 0.00	Dry
C3-Phenanthrenes & Anthracenes					
	Q23007	Water	0.000	< 0.0100	Wet
	Q23100	Soil/Sediment	0.000	< 0.00	Dry

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Analyte	Lab Sample Number	Lab Sample Matrix	Result Total UG	** BEC (ppb/%)	Basis
C3-chrysenes					
	Q23007	Water	0.000	< 0.0100	Wet
	Q23100	Soil/Sediment	0.000	< 0.00	Dry
C3-dibenzothiophenes					
	Q23007	Water	0.000	< 0.0100	Wet
	Q23100	Soil/Sediment	0.000	< 0.00	Dry
C3-fluorenes					
	Q23007	Water	0.000	< 0.0100	Wet
	Q23100	Soil/Sediment	0.000	< 0.00	Dry
C3-naphthalenes					
	Q23007	Water	0.000	< 0.0100	Wet
	Q23100	Soil/Sediment	0.000	< 0.00	Dry
C4-Phenanthrenes & Anthracenes					
	Q23007	Water	0.000	< 0.0100	Wet
	Q23100	Soil/Sediment	0.000	< 0.00	Dry
C4-chrysenes					
	Q23007	Water	0.000	< 0.0100	Wet
	Q23100	Soil/Sediment	0.000	< 0.00	Dry
C4-naphthalenes					
	Q23007	Water	0.000	< 0.0100	Wet
	Q23100	Soil/Sediment	0.000	< 0.00	Dry
Dibenz(a,h)anthracene					
	Q23007	Water	0.000	< 0.0100	Wet
	Q23100	Soil/Sediment	0.000	< 0.00	Dry
HCB					
	Q23007	Water	0.000	< 0.00500	Wet
	Q23100	Soil/Sediment	0.000	< 0.100	Dry
Heptachlor					
	Q23007	Water	0.000	< 0.00500	Wet
	Q23100	Soil/Sediment	0.000	< 0.100	Dry
PCB-1242					
	Q23007	Water	0.000	< 0.250	Wet
	Q23100	Soil/Sediment	0.000	< 2.00	Dry

Analyte	Lab Sample Number	Lab Sample Matrix	Result Total UG	** BEC (ppb/%)	Basis
PCB-1248					
	Q23007	Water	0.000	< 0.250	Wet
	Q23100	Soil/Sediment	0.000	< 2.00	Dry
PCB-1254					
	Q23007	Water	0.000	< 0.250	Wet
	Q23100	Soil/Sediment	0.000	< 2.00	Dry
PCB-1260					
	Q23007	Water	0.000	< 0.250	Wet
	Q23100	Soil/Sediment	0.000	< 2.00	Dry
PCB-1268					
	Q23007	Water	0.000	< 0.250	Wet
	Q23100	Soil/Sediment	0.000	< 2.00	Dry
PCB-TOTAL					
	Q23007	Water	0.000	< 0.250	Wet
	Q23100	Soil/Sediment	0.000	< 2.00	Dry
acenaphthalene					
	Q23007	Water	0.000	< 0.0100	Wet
	Q23100	Soil/Sediment	0.000	< 0.00	Dry
acenaphthene					
	Q23007	Water	0.000	< 0.0100	Wet
	Q23100	Soil/Sediment	0.000	< 0.00	Dry
alpha BHC					
	Q23007	Water	0.000	< 0.00500	Wet
	Q23100	Soil/Sediment	0.000	< 0.100	Dry
alpha chlordane					
	Q23007	Water	0.000	< 0.00500	Wet
	Q23100	Soil/Sediment	0.000	< 0.100	Dry
anthracene					
	Q23007	Water	0.000	< 0.0100	Wet
	Q23100	Soil/Sediment	0.000	< 0.00	Dry
benzo(a)pyrene					
	Q23007	Water	0.000	< 0.0100	Wet
	Q23100	Soil/Sediment	0.000	< 0.00	Dry

Analyte	Lab Sample Number	Lab Sample Matrix	Result Total UG	** BEC (ppb/%)	Basis
benzo(b)fluoranthene					
	Q23007	Water	0.000	< 0.0100	Wet
	Q23100	Soil/Sediment	0.000	< 0.00	Dry
benzo(e)pyrene					
	Q23007	Water	0.000	< 0.0100	Wet
	Q23100	Soil/Sediment	0.000	< 0.00	Dry
benzo(g,h,i)perylene					
	Q23007	Water	0.000	< 0.0100	Wet
	Q23100	Soil/Sediment	0.000	< 0.00	Dry
benzo(k)fluoranthene					
	Q23007	Water	0.000	< 0.0100	Wet
	Q23100	Soil/Sediment	0.000	< 0.00	Dry
beta BHC					
	Q23007	Water	0.000	< 0.00500	Wet
	Q23100	Soil/Sediment	0.000	< 0.100	Dry
biphenyl					
	Q23007	Water	0.00000100	< 0.0100	Wet
	Q23100	Soil/Sediment	0.000	< 0.00	Dry
chlorpyrifos					
	Q23007	Water	0.000	< 0.00500	Wet
	Q23100	Soil/Sediment	0.000	< 0.100	Dry
chrysene					
	Q23007	Water	0.000	< 0.0100	Wet
	Q23100	Soil/Sediment	0.000410	< 0.00	Dry
cis-nonachlor					
	Q23007	Water	0.000	< 0.00500	Wet
	Q23100	Soil/Sediment	0.000	< 0.100	Dry
delta BHC					
	Q23007	Water	0.000	< 0.00500	Wet
	Q23100	Soil/Sediment	0.000	< 0.100	Dry
dibenzothiophene					
	Q23007	Water	0.000	< 0.0100	Wet
	Q23100	Soil/Sediment	0.000	< 0.00	Dry

Analyte	Lab Sample Number	Lab Sample Matrix	Result Total UG	** BEC (ppb/%)	Basis
dieldrin					
	Q23007	Water	0.000	< 0.00500	Wet
	Q23100	Soil/Sediment	0.000	< 0.100	Dry
endosulfan II					
	Q23007	Water	0.000	< 0.00500	Wet
	Q23100	Soil/Sediment	0.000	< 0.100	Dry
endrin					
	Q23007	Water	0.000	< 0.00500	Wet
	Q23100	Soil/Sediment	0.000	< 0.100	Dry
fluoranthene					
	Q23007	Water	0.000	< 0.0100	Wet
	Q23100	Soil/Sediment	0.000	< 0.00	Dry
fluorene					
	Q23007	Water	0.000	< 0.0100	Wet
	Q23100	Soil/Sediment	0.000	< 0.00	Dry
gamma BHC					
	Q23007	Water	0.000	< 0.00500	Wet
	Q23100	Soil/Sediment	0.000	< 0.100	Dry
gamma chlordane					
	Q23007	Water	0.000	< 0.00500	Wet
	Q23100	Soil/Sediment	0.000	< 0.100	Dry
heptachlor epoxide					
	Q23007	Water	0.000	< 0.00500	Wet
	Q23100	Soil/Sediment	0.000	< 0.100	Dry
indeno(1,2,3-cd)pyrene					
	Q23007	Water	0.000	< 0.0100	Wet
	Q23100	Soil/Sediment	0.000	< 0.00	Dry
mirex					
	Q23007	Water	0.000	< 0.00500	Wet
	Q23100	Soil/Sediment	0.000	< 0.100	Dry
naphthalene					
	Q23007	Water	0.00000200	< 0.0100	Wet
	*Q23100	Soil/Sediment	0.000	< 0.00	Dry

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Analyte	Lab Sample Number	Lab Sample Matrix	Result Total UG	** BEC (ppb/%)	Basis
o,p'-DDD					
	Q23007	Water	0.000	< 0.00500	Wet
	Q23100	Soil/Sediment	0.000	< 0.100	Dry
o,p'-DDE					
	Q23007	Water	0.000	< 0.00500	Wet
	Q23100	Soil/Sediment	0.000	< 0.100	Dry
o,p'-DDT					
	Q23007	Water	0.000	< 0.00500	Wet
	Q23100	Soil/Sediment	0.000	< 0.100	Dry
oxychlordane					
	Q23007	Water	0.000	< 0.00500	Wet
	Q23100	Soil/Sediment	0.000	< 0.100	Dry
p,p'-DDD					
	Q23007	Water	0.000	< 0.00500	Wet
	Q23100	Soil/Sediment	0.000	< 0.100	Dry
p,p'-DDE					
	Q23007	Water	0.000	< 0.00500	Wet
	Q23100	Soil/Sediment	0.000	< 0.100	Dry
p,p'-DDT					
	Q23007	Water	0.000	< 0.00500	Wet
	Q23100	Soil/Sediment	0.000	< 0.100	Dry
pentachloro-anisole					
	Q23007	Water	0.000	< 0.00500	Wet
	Q23100	Soil/Sediment	0.000	< 0.100	Dry
perylene					
	Q23007	Water	0.000	< 0.0100	Wet
	Q23100	Soil/Sediment	0.000	< 0.00	Dry
phenanthrene					
	Q23007	Water	0.00000200	< 0.0100	Wet
	Q23100	Soil/Sediment	0.00021	< 0.00	Dry
pyrene					
	Q23007	Water	0.000	< 0.0100	Wet
	Q23100	Soil/Sediment	0.00503	< 0.00	Dry

Analyte	Lab Sample Number	Lab Sample Matrix	Result Total UG	** BEC (ppb/%)	Basis
toxaphene					
	Q23007	Water	0.000	< 0.250	Wet
	Q23100	Soil/Sediment	0.000	< 2.00	Dry
trans-nonachlor					
	Q23007	Water	0.000	< 0.00500	Wet
	Q23100	Soil/Sediment	0.000	< 0.100	Dry

* See "Laboratory Notes" section.** Blank Equivalent Concentration

7. Spike Recoveries

Analyte	Sample Number	**	Sample Matrix	Basis	Spike Level (ppb/%)	Amount Recovered (ppb/%)	*** Spike Background	Percent Recovery
1,2,3,4-Tetrachlorobenzene								
	Q23008	SB	Water	Wet	0.0200	0.0156		77.8
	Q23009	SB	Water	Wet	0.0200	0.0163		81.7
1,2,4,5-Tetrachlorobenzene								
	Q23008	SB	Water	Wet	0.0200	0.0193		96.5
	Q23009	SB	Water	Wet	0.0200	0.0204		102
1,6,7-Trimethyl-naphthalene								
	Q23008	SB	Water	Wet	0.0537	0.0488		91.0
	Q23009	SB	Water	Wet	0.0537	0.0500		93.2
1-methylnaphthalene								
	Q23008	SB	Water	Wet	0.0615	0.0582		94.6
	Q23009	SB	Water	Wet	0.0615	0.0593		96.5
1-methylphenanthrene								
	Q23008	SB	Water	Wet	0.0532	0.0540		101
	Q23009	SB	Water	Wet	0.0532	0.0533		100.
2,6-dimethylnaphthalene								
	Q23008	SB	Water	Wet	0.0622	0.0561		90.2
	Q23009	SB	Water	Wet	0.0622	0.0583		93.7
2-methylnaphthalene								
	Q23008	SB	Water	Wet	0.0577	0.0515		89.2
	Q23009	SB	Water	Wet	0.0577	0.0528		91.4
Aldrin								
	Q23008	SB	Water	Wet	0.0200	0.0152		76.0
	Q23009	SB	Water	Wet	0.0200	0.0159		79.3
Benzo(a)anthracene								
	Q23008	SB	Water	Wet	0.0504	0.0497		98.2
	Q23009	SB	Water	Wet	0.0504	0.0511		90.7
Dibenz(a,h)anthracene								
	Q23008	SB	Water	Wet	0.0394	0.00500		12.7

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Analyte	Sample Number	**	Sample Matrix	Basis	Spike Level (ppb/%)	Amount Recovered (ppb/%)	*** Spike Background	Percent Recovery
	Q23000	SB	Water	Wet	0.0304	0.00500		12.7
HCB								
	Q23006	SB	Water	Wet	0.0200	0.0167		83.0
	Q23000	SB	Water	Wet	0.0200	0.0178		88.0
Heptachlor								
	Q23006	SB	Water	Wet	0.0200	0.00250		12.5
	Q23000	SB	Water	Wet	0.0200	0.00250		12.5
acenaphthalene								
	Q23006	SB	Water	Wet	0.0774	0.0487		62.9
	Q23000	SB	Water	Wet	0.0774	0.0501		64.7
acenaphthene								
	Q23006	SB	Water	Wet	0.0021	0.0847		92.0
	Q23000	SB	Water	Wet	0.0021	0.0870		95.4
alpha BHC								
	Q23006	SB	Water	Wet	0.0200	0.0155		77.6
	Q23000	SB	Water	Wet	0.0200	0.0164		81.8
alpha chlordane								
	Q23006	SB	Water	Wet	0.0200	0.0181		90.6
	Q23000	SB	Water	Wet	0.0200	0.0187		93.6
anthracene								
	Q23006	SB	Water	Wet	0.0062	0.0322		47.3
	Q23000	SB	Water	Wet	0.0062	0.0338		49.6
benzo(a)pyrene								
	Q23006	SB	Water	Wet	0.0602	0.0499		82.3
	Q23000	SB	Water	Wet	0.0602	0.0510		84.8
benzo(b)fluoranthene								
	Q23006	SB	Water	Wet	0.0540	0.00500		9.15
	Q23000	SB	Water	Wet	0.0540	0.00500		9.15
benzo(e)pyrene								
	Q23006	SB	Water	Wet	0.0020	0.0066		106
	Q23000	SB	Water	Wet	0.0020	0.0834		133
benzo(g,h,i)perylene								

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Analyte	Sample Number	**	Sample Matrix	Basis	Spike Level (ppb/%)	Amount Recovered (ppb/%)	*** Spike Background	Percent Recovery
	Q23008	SB	Water	Wet	0.0517	0.0525		102
	Q23009	SB	Water	Wet	0.0517	0.0602		116
benzo(k)fluoranthene								
	Q23008	SB	Water	Wet	0.0533	0.00500		9.38
	Q23009	SB	Water	Wet	0.0533	0.00500		9.38
beta BHC								
	Q23008	SB	Water	Wet	0.0200	0.0173		86.6
	Q23009	SB	Water	Wet	0.0200	0.0190		95.0
biphenyl								
	Q23008	SB	Water	Wet	0.0643	0.0560		87.2
	Q23009	SB	Water	Wet	0.0643	0.0584		90.8
chlorpyrifos								
	Q23008	SB	Water	Wet	0.0227	0.00250		11.0
	Q23009	SB	Water	Wet	0.0227	0.00250		11.0
chrysene								
	Q23008	SB	Water	Wet	0.0580	0.0578		99.6
	Q23009	SB	Water	Wet	0.0580	0.0625		108
cis-nonachlor								
	Q23008	SB	Water	Wet	0.0200	0.0176		88.1
	Q23009	SB	Water	Wet	0.0200	0.0184		92.1
delta BHC								
	Q23008	SB	Water	Wet	0.0200	0.00852		42.6
	Q23009	SB	Water	Wet	0.0200	0.00882		44.1
dibenzothiophene								
	Q23008	SB	Water	Wet	0.0464	0.0424		91.2
	Q23009	SB	Water	Wet	0.0464	0.0433		93.3
dieldrin								
	Q23008	SB	Water	Wet	0.0200	0.00250		12.5
	Q23009	SB	Water	Wet	0.0200	0.00250		12.5
endosulfan II								
	Q23008	SB	Water	Wet	0.0200	0.00250		12.5
	Q23009	SB	Water	Wet	0.0200	0.00250		12.5

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Analyte	Sample Number	**	Sample Matrix	Basis	Spike Level (ppb/%)	Amount Recovered (ppb/%)	*** Spike Background	Percent Recovery
endrin								
	Q23008	SB	Water	Wet	0.0200	0.00250		12.5
	Q23009	SB	Water	Wet	0.0200	0.00250		12.5
fluoranthene								
	Q23008	SB	Water	Wet	0.0535	0.0530		100.
	Q23009	SB	Water	Wet	0.0535	0.0538		101
fluorene								
	Q23008	SB	Water	Wet	0.0070	0.0576		58.8
	Q23009	SB	Water	Wet	0.0070	0.0592		60.5
gamma BHC								
	Q23008	SB	Water	Wet	0.0200	0.0159		79.4
	Q23009	SB	Water	Wet	0.0200	0.0171		85.6
gamma chlordane								
	Q23008	SB	Water	Wet	0.0200	0.0178		89.2
	Q23009	SB	Water	Wet	0.0200	0.0185		92.4
heptachlor epoxide								
	Q23008	SB	Water	Wet	0.0200	0.00250		12.5
	Q23009	SB	Water	Wet	0.0200	0.00250		12.5
indeno(1,2,3-cd)pyrene								
	Q23008	SB	Water	Wet	0.0486	0.00500		10.3
	Q23009	SB	Water	Wet	0.0486	0.00500		10.3
mirex								
	Q23008	SB	Water	Wet	0.0200	0.0186		92.8
	Q23009	SB	Water	Wet	0.0200	0.0191		95.4
naphthalene								
	Q23008	SB	Water	Wet	0.0624	0.0607		97.4
	Q23009	SB	Water	Wet	0.0624	0.0607		97.3
o,p'-DDD								
	Q23008	SB	Water	Wet	0.0200	0.0202		101
	Q23009	SB	Water	Wet	0.0200	0.0226		113
o,p'-DDE								
	Q23008	SB	Water	Wet	0.0200	0.0188		94.2

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Analyte	Sample Number	**	Sample Matrix	Basis	Spike Level (ppb/%)	Amount Recovered (ppb/%)	*** Spike Background	Percent Recovery
	Q23000	SB	Water	Wet	0.0200	0.0202		101
o,p'-DDT								
	Q23006	SB	Water	Wet	0.0200	0.0161		80.4
	Q23000	SB	Water	Wet	0.0200	0.0174		86.8
oxychlordane								
	Q23006	SB	Water	Wet	0.0200	0.00603		30.2
	Q23000	SB	Water	Wet	0.0200	0.00669		33.4
p,p'-DDD								
	Q23006	SB	Water	Wet	0.0200	0.0230		115
	Q23000	SB	Water	Wet	0.0200	0.0236		118
p,p'-DDE								
	Q23006	SB	Water	Wet	0.0200	0.0190		94.0
	Q23000	SB	Water	Wet	0.0200	0.0208		104
p,p'-DDT								
	Q23006	SB	Water	Wet	0.0200	0.0200		100.
	Q23000	SB	Water	Wet	0.0200	0.0212		106
pentachloro-anisole								
	Q23006	SB	Water	Wet	0.0200	0.00250		12.5
	Q23000	SB	Water	Wet	0.0200	0.00250		12.5
perylene								
	Q23006	SB	Water	Wet	0.0420	0.0401		115
	Q23000	SB	Water	Wet	0.0420	0.0420		98.0
phenanthrene								
	Q23006	SB	Water	Wet	0.0565	0.0545		96.0
	Q23000	SB	Water	Wet	0.0565	0.0556		98.4
pyrene								
	Q23006	SB	Water	Wet	0.0533	0.0503		94.3
	Q23000	SB	Water	Wet	0.0533	0.0514		96.4
trans-nonachlor								
	Q23006	SB	Water	Wet	0.0200	0.0176		88.2
	Q23000	SB	Water	Wet	0.0200	0.0184		92.2

** SD = Spiked Duplicate Result; SB = Spike Blank Result*** For a spike to be a valid measure of method accuracy, this ratio must be

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higher than 1.0.

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8. Reference Materials

Analyte	Lab Sample Number	S.R.M. ID	Basis	Certified Reference Value	95% Confidence Interval	Result (ppb/%)	Percent Recovery
% Moisture							
	Q23100	NIST 1941b	Percent			0.000	
1,2,3,4-Tetrachlorobenzene							
	Q23100	NIST 1941b	Dry			3.62	
1,2,4,5-Tetrachlorobenzene							
	Q23100	NIST 1941b	Dry			8.82	
1,6,7-Trimethyl-naphthalene							
	Q23100	NIST 1941b	Dry	0.0255	0.0051	< 26.5	
1-methylnaphthalene							
	Q23100	NIST 1941b	Dry	0.127	0.014	752	592
1-methylphenanthrene							
	Q23100	NIST 1941b	Dry	0.0732	0.0050	75.3	103
2,6-dimethylnaphthalene							
	Q23100	NIST 1941b	Dry	0.0750	0.0045	107	141
2-methylnaphthalene							
	Q23100	NIST 1941b	Dry	0.276	0.053	1370	497
Aldrin							
	Q23100	NIST 1941b	Dry			3.53	
Benzo(a)anthracene							
	Q23100	NIST 1941b	Dry	0.335	0.025	300	92.1
C1-Fluoranthenes & Pyrenes							
	Q23100	NIST 1941b	Dry			292	
C1-Phenanthrenes & Anthracenes							
	Q23100	NIST 1941b	Dry			265	
C1-chrysenes							
	Q23100	NIST 1941b	Dry			297	
C1-dibenzothiophenes							
	Q23100	NIST 1941b	Dry			67.2	
C1-fluorenes							

Analyte	Lab Sample Number	S.R.M. ID	Basis	Certified Reference Value	95% Confidence Interval	Result (ppb/%)	Percent Recovery
	Q23100	NIST 1941b	Dry			180.	
C1-naphthalenes							
	Q23100	NIST 1941b	Dry			2120	
C2-Phenanthrenes & Anthracenes							
	Q23100	NIST 1941b	Dry			200.	
C2-chrysenes							
	Q23100	NIST 1941b	Dry			110.	
C2-dibenzothiophenes							
	Q23100	NIST 1941b	Dry			97.4	
C2-fluorenes							
	Q23100	NIST 1941b	Dry			137	
C2-naphthalenes							
	Q23100	NIST 1941b	Dry			2120	
C3-Phenanthrenes & Anthracenes							
	Q23100	NIST 1941b	Dry			128	
C3-chrysenes							
	Q23100	NIST 1941b	Dry			80.8	
C3-dibenzothiophenes							
	Q23100	NIST 1941b	Dry			78.0	
C3-fluorenes							
	Q23100	NIST 1941b	Dry			145	
C3-naphthalenes							
	Q23100	NIST 1941b	Dry			2070	
C4-Phenanthrenes & Anthracenes							
	Q23100	NIST 1941b	Dry			152	
C4-chrysenes							
	Q23100	NIST 1941b	Dry			50.1	
C4-naphthalenes							
	Q23100	NIST 1941b	Dry			1000	
Dibenz(a,h)anthracene							
	Q23100	NIST 1941b	Dry	0.053	0.01	73.0	138
HCB							

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Analyte	Lab Sample Number	S.R.M. ID	Basis	Certified Reference Value	95% Confidence Interval	Result (ppb/%)	Percent Recovery
	Q23100	NIST 1941b	Dry	0.00583	0.00038	8.00	137
Heptachlor							
	Q23100	NIST 1941b	Dry			2.22	
PCB-1242							
	Q23100	NIST 1941b	Dry			102	
PCB-1248							
	Q23100	NIST 1941b	Dry			< 8.85	
PCB-1254							
	Q23100	NIST 1941b	Dry			46.1	
PCB-1260							
	Q23100	NIST 1941b	Dry			36.9	
PCB-1268							
	Q23100	NIST 1941b	Dry			< 8.85	
PCB-TOTAL							
	Q23100	NIST 1941b	Dry			185	
acenaphthalene							
	Q23100	NIST 1941b	Dry	0.0533	0.0004	83.4	157
acenaphthene							
	Q23100	NIST 1941b	Dry	0.0384	0.0052	33.6	87.4
alpha BHC							
	Q23100	NIST 1941b	Dry			< 0.442	
alpha chlordane							
	Q23100	NIST 1941b	Dry	0.00085	0.00011	0.026	100
anthracene							
	Q23100	NIST 1941b	Dry	0.184	0.018	182	98.9
benzo(a)pyrene							
	Q23100	NIST 1941b	Dry	0.358	0.017	254	70.8
benzo(b)fluoranthene							
	Q23100	NIST 1941b	Dry	0.453	0.021	632	130
benzo(e)pyrene							
	Q23100	NIST 1941b	Dry	0.325	0.025	335	103
benzo(g,h,i)perylene							

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Analyte	Lab Sample Number	S.R.M. ID	Basis	Certified Reference Value	95% Confidence Interval	Result (ppb/%)	Percent Recovery
	Q23100	NIST 1941b	Dry	0.307	0.045	252	82.2
benzo(k)fluoranthene							
	Q23100	NIST 1941b	Dry	0.225	0.018	211	93.7
beta BHC							
	Q23100	NIST 1941b	Dry			< 0.442	
biphenyl							
	Q23100	NIST 1941b	Dry	0.074	0.008	58.1	78.5
chlorpyrifos							
	Q23100	NIST 1941b	Dry			< 0.442	
chrysene							
	Q23100	NIST 1941b	Dry	0.291	0.031	421	145
cis-nonachlor							
	Q23100	NIST 1941b	Dry	0.000378	0.000053	< 0.442	
delta BHC							
	Q23100	NIST 1941b	Dry			< 0.442	
dibenzothiophene							
	Q23100	NIST 1941b	Dry			53.3	
dieldrin							
	Q23100	NIST 1941b	Dry			< 0.442	
endosulfan II							
	Q23100	NIST 1941b	Dry			0.061	
endrin							
	Q23100	NIST 1941b	Dry			< 0.442	
fluoranthene							
	Q23100	NIST 1941b	Dry	0.051	0.05	050.	99.9
fluorene							
	Q23100	NIST 1941b	Dry	0.085	0.015	75.4	88.7
gamma BHC							
	Q23100	NIST 1941b	Dry			< 0.442	
gamma chlordane							
	Q23100	NIST 1941b	Dry	0.000500	0.000003	0.012	108
heptachlor epoxide							

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Analyte	Lab Sample Number	S.R.M. ID	Basis	Certified Reference Value	95% Confidence Interval	Result (ppb/%)	Percent Recovery
	Q23100	NIST 1941b	Dry			2.28	
indeno(1,2,3-cd)pyrene							
	Q23100	NIST 1941b	Dry	0.341	0.057	316	92.6
mirex							
	Q23100	NIST 1941b	Dry			< 0.442	
naphthalene							
	Q23100	NIST 1941b	Dry	0.848	0.005	876	103
o,p'-DDD							
	Q23100	NIST 1941b	Dry			3.15	
o,p'-DDE							
	Q23100	NIST 1941b	Dry	0.00038	0.00012	< 0.442	
o,p'-DDT							
	Q23100	NIST 1941b	Dry			< 0.442	
oxychlordane							
	Q23100	NIST 1941b	Dry			< 0.442	
p,p'-DDD							
	Q23100	NIST 1941b	Dry	0.00466	0.00046	3.06	65.6
p,p'-DDE							
	Q23100	NIST 1941b	Dry	0.00322	0.00028	3.92	122
p,p'-DDT							
	Q23100	NIST 1941b	Dry	0.00112	0.00042	1.85	166
pentachloro-anisole							
	Q23100	NIST 1941b	Dry			0.584	
perylene							
	Q23100	NIST 1941b	Dry	0.397	0.045	308	77.5
phenanthrene							
	Q23100	NIST 1941b	Dry	0.406	0.044	416	103
pyrene							
	Q23100	NIST 1941b	Dry	0.581	0.030	514	88.6
toxaphene							
	Q23100	NIST 1941b	Dry			< 8.85	
trans-nonachlor							

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Analyte	Lab Sample Number	S.R.M. ID	Basis	Certified Reference Value	95% Confidence Interval	Result (ppb/%)	Percent Recovery
	Q23100	NIST 1941b	Dry	0.000438	0.000073	< 0.442	

S.R.M Names

SRM ID	SRM Name
NIST 1941b	Marine Sediment

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9. Laboratory Notes

Analyte	Sample Number	Result Modifier
naphthalene		
	Q23100	QA SAMPLES FROM CATALOG 5030127

Code List

If appropriate, labs are instructed to use the following codes when entering laboratory notes. The labs may use one or more of the codes in each note displayed above.

Code	Comment
A	Values reported based on Aldrin response factor.
C	Sample possibly compromised due to improper handling / packaging.
D	Sample was deleted from the catalog by the submitter.
H	Due to sample characteristics it was difficult to obtain adequate sample homogeneity - precision was impacted.
I	Interferences occurred during analysis.
L	Sample compromised or destroyed during shipment - sample not analyzed.
M	Compound identity was confirmed by GC/MS.
N	Sample was not analyzed.
P	Sample destroyed during preparation at lab - sample not analyzed.
Q	Insufficient sample quantity to perform requested analysis.
R	Sample is highly decomposed - results may be impacted.
S	Sample was substituted by the submitter.
T	Retention time relative to Aldrin.
U	GC/MS identifies the unknown compound to be _____ (fill in analyte).
W	Insufficient sample quantity to perform duplicate / spike analyses.
Y	Sample was analyzed but results may be impacted (see 'C')

10. QAQC Summary

1. Procedural Blank Summary

Procedural Blank Summary of Blank Equivalent Concentration (BEC) Data

Within a lab sample matrix, there must be three or more Blank results for a given analyte in order to generate a report.

10.2. Duplicate Summary

Duplicate Summary of Relative Percent Difference (RPD) Data

Within a lab sample matrix and concentration range, there must be three or more Duplicate results for a given analyte in order to generate a report.

10.3. Spike Summary

Spike Summary of Percent Recovery (PR) Data

Within a lab sample matrix, there must be three or more Spike results for a given analyte in order to generate a report.

10.4. SRM Summary

Standard Reference Material Summary of Percent Recovery (PR) Data

Within an SRM ID, there must be three or more Recoveries for a given analyte in order to generate a report.

11. QA/QC Anomalies

1. Blank Frequency Anomalies

The required number of blank analyses were performed.

11.2. Duplicate Frequency Anomalies

The required number of duplicate sample analyses were performed with the following exceptions.					
Analyte	Lab Matrix	Number of Samples	Number of Duplicates	Frequency (%)	See QA/QC Note No.
1,2,3,4-Tetrachlorobenzene	Soil/Sediment	7	0	0	1
1,2,3,4-Tetrachlorobenzene	Water	7	0	0	2
1,2,4,5-Tetrachlorobenzene	Soil/Sediment	7	0	0	3
1,2,4,5-Tetrachlorobenzene	Water	7	0	0	4
1,6,7-Trimethyl-naphthalene	Soil/Sediment	7	0	0	5
1,6,7-Trimethyl-naphthalene	Water	7	0	0	6
1-methylnaphthalene	Soil/Sediment	7	0	0	7
1-methylnaphthalene	Water	7	0	0	8
1-methylphenanthrene	Soil/Sediment	7	0	0	9
1-methylphenanthrene	Water	7	0	0	10
2,6-dimethylnaphthalene	Soil/Sediment	7	0	0	11
2,6-dimethylnaphthalene	Water	7	0	0	12
2-	Soil/Sediment	7	0	0	13

The required number of duplicate sample analyses were performed with the following exceptions.					
Analyte	Lab Matrix	Number of Samples	Number of Duplicates	Frequency (%)	See QA/QC Note No.
methylnaphthalene					
2-methylnaphthalene	Water	7	0	0	14
acenaphthalene	Soil/Sediment	7	0	0	15
acenaphthalene	Water	7	0	0	16
acenaphthene	Soil/Sediment	7	0	0	17
acenaphthene	Water	7	0	0	18
Aldrin	Soil/Sediment	7	0	0	19
Aldrin	Water	7	0	0	20
alpha BHC	Soil/Sediment	7	0	0	21
alpha BHC	Water	7	0	0	22
alpha chlordane	Soil/Sediment	7	0	0	23
alpha chlordane	Water	7	0	0	24
anthracene	Soil/Sediment	7	0	0	25
anthracene	Water	7	0	0	26
Benzo(a)anthracene	Soil/Sediment	7	0	0	27
Benzo(a)anthracene	Water	7	0	0	28
benzo(a)pyrene	Soil/Sediment	7	0	0	29
benzo(a)pyrene	Water	7	0	0	30
benzo(b)fluoranthene	Soil/Sediment	7	0	0	31
benzo(b)fluoranthene	Water	7	0	0	32
benzo(e)pyrene	Soil/Sediment	7	0	0	33
benzo(e)pyrene	Water	7	0	0	34
benzo(g,h,i)perylene	Soil/Sediment	7	0	0	35
benzo(g,h,i)perylene	Water	7	0	0	36
benzo(k)fluoranthene	Soil/Sediment	7	0	0	37
benzo(k)fluoranthene	Water	7	0	0	38
beta BHC	Soil/Sediment	7	0	0	39

The required number of duplicate sample analyses were performed with the following exceptions.					
Analyte	Lab Matrix	Number of Samples	Number of Duplicates	Frequency (%)	See QA/QC Note No.
beta BHC	Water	7	0	0	40
biphenyl	Soil/Sediment	7	0	0	41
biphenyl	Water	7	0	0	42
C1-chrysenes	Soil/Sediment	7	0	0	43
C1-chrysenes	Water	7	0	0	44
C1-dibenzothiophenes	Soil/Sediment	7	0	0	45
C1-dibenzothiophenes	Water	7	0	0	46
C1-Fluoranthenes & Pyrenes	Soil/Sediment	7	0	0	47
C1-Fluoranthenes & Pyrenes	Water	7	0	0	48
C1-fluorenes	Soil/Sediment	7	0	0	49
C1-fluorenes	Water	7	0	0	50
C1-naphthalenes	Soil/Sediment	7	0	0	51
C1-naphthalenes	Water	7	0	0	52
C1-Phenanthrenes & Anthracenes	Soil/Sediment	7	0	0	53
C1-Phenanthrenes & Anthracenes	Water	7	0	0	54
C2-chrysenes	Soil/Sediment	7	0	0	55
C2-chrysenes	Water	7	0	0	56
C2-dibenzothiophenes	Soil/Sediment	7	0	0	57
C2-dibenzothiophenes	Water	7	0	0	58
C2-fluorenes	Soil/Sediment	7	0	0	59
C2-fluorenes	Water	7	0	0	60
C2-naphthalenes	Soil/Sediment	7	0	0	61
C2-naphthalenes	Water	7	0	0	62
C2-Phenanthrenes & Anthracenes	Soil/Sediment	7	0	0	63
C2-Phenanthrenes	Water	7	0	0	64

The required number of duplicate sample analyses were performed with the following exceptions.					
Analyte	Lab Matrix	Number of Samples	Number of Duplicates	Frequency (%)	See QA/QC Note No.
& Anthracenes					
C3-chrysenes	Soil/Sediment	7	0	0	65
C3-chrysenes	Water	7	0	0	66
C3-dibenzothiophenes	Soil/Sediment	7	0	0	67
C3-dibenzothiophenes	Water	7	0	0	68
C3-fluorenes	Soil/Sediment	7	0	0	69
C3-fluorenes	Water	7	0	0	70
C3-naphthalenes	Soil/Sediment	7	0	0	71
C3-naphthalenes	Water	7	0	0	72
C3-Phenanthrenes & Anthracenes	Soil/Sediment	7	0	0	73
C3-Phenanthrenes & Anthracenes	Water	7	0	0	74
C4-chrysenes	Soil/Sediment	7	0	0	75
C4-chrysenes	Water	7	0	0	76
C4-naphthalenes	Soil/Sediment	7	0	0	77
C4-naphthalenes	Water	7	0	0	78
C4-Phenanthrenes & Anthracenes	Soil/Sediment	7	0	0	79
C4-Phenanthrenes & Anthracenes	Water	7	0	0	80
chlorpyrifos	Soil/Sediment	7	0	0	81
chlorpyrifos	Water	7	0	0	82
chrysene	Soil/Sediment	7	0	0	83
chrysene	Water	7	0	0	84
cis-nonachlor	Soil/Sediment	7	0	0	85
cis-nonachlor	Water	7	0	0	86
delta BHC	Soil/Sediment	7	0	0	87
delta BHC	Water	7	0	0	88
Dibenz(a,h)anthracene	Soil/Sediment	7	0	0	89

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The required number of duplicate sample analyses were performed with the following exceptions.					
Analyte	Lab Matrix	Number of Samples	Number of Duplicates	Frequency (%)	See QA/QC Note No.
Dibenz(a,h)anthracene	Water	7	0	0	00
dibenzothiophene	Soil/Sediment	7	0	0	01
dibenzothiophene	Water	7	0	0	02
dieldrin	Soil/Sediment	7	0	0	03
dieldrin	Water	7	0	0	04
endosulfan II	Soil/Sediment	7	0	0	05
endosulfan II	Water	7	0	0	06
endrin	Soil/Sediment	7	0	0	07
endrin	Water	7	0	0	08
fluoranthene	Soil/Sediment	7	0	0	09
fluoranthene	Water	7	0	0	100
fluorene	Soil/Sediment	7	0	0	101
fluorene	Water	7	0	0	102
gamma BHC	Soil/Sediment	7	0	0	103
gamma BHC	Water	7	0	0	104
gamma chlordane	Soil/Sediment	7	0	0	105
gamma chlordane	Water	7	0	0	106
HCB	Soil/Sediment	7	0	0	107
HCB	Water	7	0	0	108
Heptachlor	Soil/Sediment	7	0	0	109
Heptachlor	Water	7	0	0	110
heptachlor epoxide	Soil/Sediment	7	0	0	111
heptachlor epoxide	Water	7	0	0	112
indeno(1,2,3-cd)pyrene	Soil/Sediment	7	0	0	113
indeno(1,2,3-cd)pyrene	Water	7	0	0	114
mirex	Soil/Sediment	7	0	0	115
mirex	Water	7	0	0	116
naphthalene	Soil/Sediment	7	0	0	117
naphthalene	Water	7	0	0	118

The required number of duplicate sample analyses were performed with the following exceptions.					
Analyte	Lab Matrix	Number of Samples	Number of Duplicates	Frequency (%)	See QA/QC Note No.
o,p'-DDD	Soil/Sediment	7	0	0	119
o,p'-DDD	Water	7	0	0	120
o,p'-DDE	Soil/Sediment	7	0	0	121
o,p'-DDE	Water	7	0	0	122
o,p'-DDT	Soil/Sediment	7	0	0	123
o,p'-DDT	Water	7	0	0	124
oxychlordane	Soil/Sediment	7	0	0	125
oxychlordane	Water	7	0	0	126
p,p'-DDD	Soil/Sediment	7	0	0	127
p,p'-DDD	Water	7	0	0	128
p,p'-DDE	Soil/Sediment	7	0	0	129
p,p'-DDE	Water	7	0	0	130
p,p'-DDT	Soil/Sediment	7	0	0	131
p,p'-DDT	Water	7	0	0	132
PCB-1242	Soil/Sediment	7	0	0	133
PCB-1242	Water	7	0	0	134
PCB-1248	Soil/Sediment	7	0	0	135
PCB-1248	Water	7	0	0	136
PCB-1254	Soil/Sediment	7	0	0	137
PCB-1254	Water	7	0	0	138
PCB-1260	Soil/Sediment	7	0	0	139
PCB-1260	Water	7	0	0	140
PCB-1268	Soil/Sediment	7	0	0	141
PCB-1268	Water	7	0	0	142
PCB-TOTAL	Soil/Sediment	7	0	0	143
PCB-TOTAL	Water	7	0	0	144
pentachloro-anisole	Soil/Sediment	7	0	0	145
pentachloro-anisole	Water	7	0	0	146
perylene	Soil/Sediment	7	0	0	147
perylene	Water	7	0	0	148
phenanthrene	Soil/Sediment	7	0	0	149
phenanthrene	Water	7	0	0	150

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The required number of duplicate sample analyses were performed with the following exceptions.					
Analyte	Lab Matrix	Number of Samples	Number of Duplicates	Frequency (%)	See QA/QC Note No.
pyrene	Soil/Sediment	7	0	0	151
pyrene	Water	7	0	0	152
toxaphene	Soil/Sediment	7	0	0	153
toxaphene	Water	7	0	0	154
trans-nonachlor	Soil/Sediment	7	0	0	155
trans-nonachlor	Water	7	0	0	156

11.3. Spike Frequency Anomalies

The required number of spike sample analyses were performed with the following exceptions.					
Analyte	Lab Matrix	Number of Samples	Number of Spikes	Frequency (%)	See QA/QC Note No.
1,2,3,4-Tetrachlorobenzene	Soil/Sediment	7	0	0	157
1,2,3,4-Tetrachlorobenzene	Water	7	0	0	158
1,2,4,5-Tetrachlorobenzene	Soil/Sediment	7	0	0	159
1,2,4,5-Tetrachlorobenzene	Water	7	0	0	160
1,6,7-Trimethyl-naphthalene	Soil/Sediment	7	0	0	161
1,6,7-Trimethyl-naphthalene	Water	7	0	0	162
1-methylnaphthalene	Soil/Sediment	7	0	0	163
1-methylnaphthalene	Water	7	0	0	164
1-methylphenanthrene	Soil/Sediment	7	0	0	165
1-methylphenanthrene	Water	7	0	0	166
2,6-dimethylnaphthalene	Soil/Sediment	7	0	0	167

The required number of spike sample analyses were performed with the following exceptions.					
Analyte	Lab Matrix	Number of Samples	Number of Spikes	Frequency (%)	See QA/QC Note No.
2,6-dimethylnaphthalene	Water	7	0	0	168
2-methylnaphthalene	Soil/Sediment	7	0	0	169
2-methylnaphthalene	Water	7	0	0	170
acenaphthalene	Soil/Sediment	7	0	0	171
acenaphthalene	Water	7	0	0	172
acenaphthene	Soil/Sediment	7	0	0	173
acenaphthene	Water	7	0	0	174
Aldrin	Soil/Sediment	7	0	0	175
Aldrin	Water	7	0	0	176
alpha BHC	Soil/Sediment	7	0	0	177
alpha BHC	Water	7	0	0	178
alpha chlordane	Soil/Sediment	7	0	0	179
alpha chlordane	Water	7	0	0	180
anthracene	Soil/Sediment	7	0	0	181
anthracene	Water	7	0	0	182
Benzo(a)anthracene	Soil/Sediment	7	0	0	183
Benzo(a)anthracene	Water	7	0	0	184
benzo(a)pyrene	Soil/Sediment	7	0	0	185
benzo(a)pyrene	Water	7	0	0	186
benzo(b)fluoranthene	Soil/Sediment	7	0	0	187
benzo(b)fluoranthene	Water	7	0	0	188
benzo(e)pyrene	Soil/Sediment	7	0	0	189
benzo(e)pyrene	Water	7	0	0	190
benzo(g,h,i)perylene	Soil/Sediment	7	0	0	191
benzo(g,h,i)perylene	Water	7	0	0	192
benzo(k)fluoranthene	Soil/Sediment	7	0	0	193
benzo(k)fluoranthen	Water	7	0	0	194

The required number of spike sample analyses were performed with the following exceptions.					
Analyte	Lab Matrix	Number of Samples	Number of Spikes	Frequency (%)	See QA/QC Note No.
e					
beta BHC	Soil/Sediment	7	0	0	105
beta BHC	Water	7	0	0	106
biphenyl	Soil/Sediment	7	0	0	107
biphenyl	Water	7	0	0	108
C1-chrysenes	Soil/Sediment	7	0	0	199
C1-chrysenes	Water	7	0	0	200
C1-dibenzothiophenes	Soil/Sediment	7	0	0	201
C1-dibenzothiophenes	Water	7	0	0	202
C1-Fluoranthenes & Pyrenes	Soil/Sediment	7	0	0	203
C1-Fluoranthenes & Pyrenes	Water	7	0	0	204
C1-fluorenes	Soil/Sediment	7	0	0	205
C1-fluorenes	Water	7	0	0	206
C1-naphthalenes	Soil/Sediment	7	0	0	207
C1-naphthalenes	Water	7	0	0	208
C1-Phenanthrenes & Anthracenes	Soil/Sediment	7	0	0	209
C1-Phenanthrenes & Anthracenes	Water	7	0	0	210
C2-chrysenes	Soil/Sediment	7	0	0	211
C2-chrysenes	Water	7	0	0	212
C2-dibenzothiophenes	Soil/Sediment	7	0	0	213
C2-dibenzothiophenes	Water	7	0	0	214
C2-fluorenes	Soil/Sediment	7	0	0	215
C2-fluorenes	Water	7	0	0	216
C2-naphthalenes	Soil/Sediment	7	0	0	217
C2-naphthalenes	Water	7	0	0	218

The required number of spike sample analyses were performed with the following exceptions.					
Analyte	Lab Matrix	Number of Samples	Number of Spikes	Frequency (%)	See QA/QC Note No.
C2-Phenanthrenes & Anthracenes	Soil/Sediment	7	0	0	219
C2-Phenanthrenes & Anthracenes	Water	7	0	0	220
C3-chrysenes	Soil/Sediment	7	0	0	221
C3-chrysenes	Water	7	0	0	222
C3-dibenzothiophenes	Soil/Sediment	7	0	0	223
C3-dibenzothiophenes	Water	7	0	0	224
C3-fluorenes	Soil/Sediment	7	0	0	225
C3-fluorenes	Water	7	0	0	226
C3-naphthalenes	Soil/Sediment	7	0	0	227
C3-naphthalenes	Water	7	0	0	228
C3-Phenanthrenes & Anthracenes	Soil/Sediment	7	0	0	229
C3-Phenanthrenes & Anthracenes	Water	7	0	0	230
C4-chrysenes	Soil/Sediment	7	0	0	231
C4-chrysenes	Water	7	0	0	232
C4-naphthalenes	Soil/Sediment	7	0	0	233
C4-naphthalenes	Water	7	0	0	234
C4-Phenanthrenes & Anthracenes	Soil/Sediment	7	0	0	235
C4-Phenanthrenes & Anthracenes	Water	7	0	0	236
chlorpyrifos	Soil/Sediment	7	0	0	237
chlorpyrifos	Water	7	0	0	238
chrysene	Soil/Sediment	7	0	0	239
chrysene	Water	7	0	0	240
cis-nonachlor	Soil/Sediment	7	0	0	241
cis-nonachlor	Water	7	0	0	242
delta BHC	Soil/Sediment	7	0	0	243

The required number of spike sample analyses were performed with the following exceptions.					
Analyte	Lab Matrix	Number of Samples	Number of Spikes	Frequency (%)	See QA/QC Note No.
delta BHC	Water	7	0	0	244
Dibenz(a,h)anthracene	Soil/Sediment	7	0	0	245
Dibenz(a,h)anthracene	Water	7	0	0	246
dibenzothiophene	Soil/Sediment	7	0	0	247
dibenzothiophene	Water	7	0	0	248
dieldrin	Soil/Sediment	7	0	0	249
dieldrin	Water	7	0	0	250
endosulfan II	Soil/Sediment	7	0	0	251
endosulfan II	Water	7	0	0	252
endrin	Soil/Sediment	7	0	0	253
endrin	Water	7	0	0	254
fluoranthene	Soil/Sediment	7	0	0	255
fluoranthene	Water	7	0	0	256
fluorene	Soil/Sediment	7	0	0	257
fluorene	Water	7	0	0	258
gamma BHC	Soil/Sediment	7	0	0	259
gamma BHC	Water	7	0	0	260
gamma chlordane	Soil/Sediment	7	0	0	261
gamma chlordane	Water	7	0	0	262
HCB	Soil/Sediment	7	0	0	263
HCB	Water	7	0	0	264
Heptachlor	Soil/Sediment	7	0	0	265
Heptachlor	Water	7	0	0	266
heptachlor epoxide	Soil/Sediment	7	0	0	267
heptachlor epoxide	Water	7	0	0	268
indeno(1,2,3-cd)pyrene	Soil/Sediment	7	0	0	269
indeno(1,2,3-cd)pyrene	Water	7	0	0	270
mirex	Soil/Sediment	7	0	0	271

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The required number of spike sample analyses were performed with the following exceptions.					
Analyte	Lab Matrix	Number of Samples	Number of Spikes	Frequency (%)	See QA/QC Note No.
mirex	Water	7	0	0	272
naphthalene	Soil/Sediment	7	0	0	273
naphthalene	Water	7	0	0	274
o,p'-DDD	Soil/Sediment	7	0	0	275
o,p'-DDD	Water	7	0	0	276
o,p'-DDE	Soil/Sediment	7	0	0	277
o,p'-DDE	Water	7	0	0	278
o,p'-DDT	Soil/Sediment	7	0	0	279
o,p'-DDT	Water	7	0	0	280
oxychlordane	Soil/Sediment	7	0	0	281
oxychlordane	Water	7	0	0	282
p,p'-DDD	Soil/Sediment	7	0	0	283
p,p'-DDD	Water	7	0	0	284
p,p'-DDE	Soil/Sediment	7	0	0	285
p,p'-DDE	Water	7	0	0	286
p,p'-DDT	Soil/Sediment	7	0	0	287
p,p'-DDT	Water	7	0	0	288
PCB-1242	Soil/Sediment	7	0	0	289
PCB-1242	Water	7	0	0	290
PCB-1248	Soil/Sediment	7	0	0	291
PCB-1248	Water	7	0	0	292
PCB-1254	Soil/Sediment	7	0	0	293
PCB-1254	Water	7	0	0	294
PCB-1260	Soil/Sediment	7	0	0	295
PCB-1260	Water	7	0	0	296
PCB-1268	Soil/Sediment	7	0	0	297
PCB-1268	Water	7	0	0	298
PCB-TOTAL	Soil/Sediment	7	0	0	299
PCB-TOTAL	Water	7	0	0	300
pentachloro-anisole	Soil/Sediment	7	0	0	301
pentachloro-anisole	Water	7	0	0	302
perylene	Soil/Sediment	7	0	0	303

The required number of spike sample analyses were performed with the following exceptions.					
Analyte	Lab Matrix	Number of Samples	Number of Spikes	Frequency (%)	See QA/QC Note No.
perylene	Water	7	0	0	304
phenanthrene	Soil/Sediment	7	0	0	305
phenanthrene	Water	7	0	0	306
pyrene	Soil/Sediment	7	0	0	307
pyrene	Water	7	0	0	308
toxaphene	Soil/Sediment	7	0	0	309
toxaphene	Water	7	0	0	310
trans-nonachlor	Soil/Sediment	7	0	0	311
trans-nonachlor	Water	7	0	0	312

11.4. Reference Material Frequency Anomalies

No Standard Reference Material data exists in this set of results; therefore, the anomaly test was not performed.

11.5. Mass Spec Frequency Anomalies

The required number of mass spec confirmations were performed with the following exceptions.				
Lab Matrix	Number of Analytes	Number of Confirmations	Frequency (%)	See QA/QC Note No.
Soil/Sediment	7	0	0	313

11.6. Limit of Detection Anomalies

Limits of Detection were within the contract requirements.

11.7. Blank Anomalies

Procedural Blank analyses were acceptable.

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11.8. Duplicate Anomalies

No duplicate data exists in this set of results; therefore, the anomaly test was not performed.

11.9. Spike Anomalies

All spike results were within normal limits with the following exceptions.								
Analyte	Sample Number	Lab Matrix	Sample Result ppm/%	LOD ppm/%	Spike Result ppm/%	Spike Level ppm/%	% Recovery	See QA/QC Note No.
**acenaphthalene	Q23006	Water		0.0000100	0.0000487	0.0000774	62.9	3000
**acenaphthalene	Q23009	Water		0.0000100	0.0000501	0.0000774	64.7	3001
**anthracene	Q23006	Water		0.0000100	0.0000322	0.0000682	47.3	3002
**anthracene	Q23009	Water		0.0000100	0.0000338	0.0000682	49.6	3003
**benzo(a)pyrene	Q23006	Water		0.0000100	0.0000409	0.0000602	62.3	3004
**benzo(a)pyrene	Q23009	Water		0.0000100	0.0000519	0.0000602	84.8	3005
**benzo(e)pyrene	Q23009	Water		0.0000100	0.0000834	0.0000626	133	3006
**fluorene	Q23006	Water		0.0000100	0.0000576	0.0000979	58.8	3007
**fluorene	Q23009	Water		0.0000100	0.0000592	0.0000979	60.5	3008

** = Spiked-Blank Results

11.10. S.R.M. Anomalies

All SRM results were within normal limits with the following exceptions.							
Analyte	S.R.M. ID	Certified Value	95% Confidence Interval	LOD (ppm/%)	Result (ppm/%)	% Recovery	See QA/QC Note No.
1-methylnaphthalene	NIST 1941b	0.127	0.0140	0.0265	0.752	592	314
2-methylnaphthalene	NIST 1941b	0.270	0.0530	0.0265	1.37	407	315
benzo(a)pyrene	NIST 1941b	0.358	0.0170	0.0265	0.254	70.8	316

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All SRM results were within normal limits with the following exceptions.							
Analyte	S.R.M. ID	Certified Value	95% Confidence Interval	LOD (ppm/%)	Result (ppm/%)	% Recovery	See QA/QC Note No.
benzo(b)fluoranthene	NIST 1941b	0.453	0.0210	0.0205	0.032	130	317
chrysene	NIST 1941b	0.201	0.0310	0.0205	0.421	145	318
HCB	NIST 1941b	0.00583	0.000380	0.000442	0.00800	137	310

S.R.M Names

SRM ID	SRM Name
NIST 1941b	Marine Sediment

11.11. QA/QC Notes

QA/QC Note Number and Comments
1-150. Due to the small number of samples, the duplicates for this catalog were analyzed in conjunction with Catalog 5030127. 157-312. Due to the small number of samples, the spike recoveries for this catalog were analyzed in conjunction with Catalog 5030127. 313. Since GC with mass spectral detection was used for analysis, it was unnecessary to perform mass spectral confirmation. The method used is acceptable. 314, 315, 317-319. Recovery of these analytes from the SRM was higher than the normal range. Results are considered to be biased high. 310. Recovery of these analytes from the SRM was lower than the normal range. Results are considered to be biased low. Judy Bischoff, Ph.D. Branch Chief, ACF 7-3-07 3,000 - 3,0xx: All spike anomalies with a reference number of 3,000 or greater were added on 5/0/2008. These anomalies were missed, due to a bug in ECDMS, when the results were originally processed. For more information contact ACF.

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12. Analytical Methods

Below are the analytical methods used by GERG to produce the results included in this report.

Method Codes:	003

Lab Matrix	Analyte
Soil/Sediment	% Moisture

Method Code: 003
LABORATORY: Geochemical & Environmental Research Group, Texas A&M % Dry Weight Approximately 1 gram of wet sample is weighed into a clean, labeled, preweighed 10 ml beaker. The beaker is placed in a forced air oven at approximately 75 degrees Celsius for 24 hours. The beaker with the dry sample is then weighed and the % dry weight is calculated by the formula: (wt. dry sample and beaker) - (wt. beaker) (100) _____ (wt. wet sample and beaker) - (wt. beaker)

Method Codes:	004

Lab Matrix	Analyte
Soil/Sediment	1,2,3,4-Tetrachlorobenzene
	1,2,4,5-Tetrachlorobenzene
	1,0,7-Trimethyl-naphthalene
	1-methylnaphthalene
	1-methylphenanthrene
	2,6-dimethylnaphthalene
	2-methylnaphthalene
	Aldrin

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Benzo(a)anthracene
C1-Fluoranthenes & Pyrenes
C1-Phenanthrenes & Anthracenes
C1-chrysenes
C1-dibenzothiophenes
C1-fluorenes
C1-naphthalenes
C2-Phenanthrenes & Anthracenes
C2-chrysenes
C2-dibenzothiophenes
C2-fluorenes
C2-naphthalenes
C3-Phenanthrenes & Anthracenes
C3-chrysenes
C3-dibenzothiophenes
C3-fluorenes
C3-naphthalenes
C4-Phenanthrenes & Anthracenes
C4-chrysenes
C4-naphthalenes
Dibenz(a,h)anthracene
HCB
Heptachlor
PCB-1242
PCB-1248
PCB-1254
PCB-1260
PCB-1268
PCB-TOTAL
acenaphthalene
acenaphthene
alpha BHC
alpha chlordane
anthracene

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benzo(a)pyrene
benzo(b)fluoranthene
benzo(e)pyrene
benzo(g,h,i)perylene
benzo(k)fluoranthene
beta BHC
biphenyl
chlorpyrifos
chrysene
cis-nonachlor
delta BHC
dibenzothiophene
dieldrin
endosulfan II
endrin
fluoranthene
fluorene
gamma BHC
gamma chlordane
heptachlor epoxide
indeno(1,2,3-cd)pyrene
mirex
naphthalene
o,p'-DDD
o,p'-DDE
o,p'-DDT
oxychlordane
p,p'-DDD
p,p'-DDE
p,p'-DDT
pentachloro-anisole
perylene
phenanthrene
pyrene

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toxaphene
trans-nonachlor

Method Code: 004

LABORATORY: Geochemical & Environmental Research Group, Texas A&M

Sediments Organic/Pesticide

The sediment samples were freeze-dried and extracted in a Soxhlet extraction apparatus. Briefly, the freeze-dried sediment samples were homogenized and a 10-gram sample was weighed into the extraction thimble. Surrogate standards and methylene chloride were added and the samples extracted for 12 hrs. The extracts were treated with copper to remove sulfur and were purified by silica/alumina column chromatography (MacLeod et al., 1985; Brooks et al., 1980) to isolate the aliphatic and aromatic/pesticide/PCB fractions.

The quantitative analyses were performed by capillary gas chromatography (CGC) with a flame ionization detector for aliphatic hydrocarbons, CGC with electron capture detector for pesticides and PCB's, and a mass spectrometer detector in the SIM mode for aromatic hydrocarbons (Wade et al., 1988).

There are specific cases where analytes requested for the pesticide and PCB analyses and are known to co-elute with other analytes in the normal CGC with electron capture. These include the pesticide Endosulfan I and the PCB congeners 114 and 157. In these cases, the samples will be analyzed by CGC with a mass spectrometer detector in the SIM mode.

References:

1. Brooks, J.M., T.L. Wade, E.L. Atlas, M.C. Kennicutt II, B.J. Presley, R.R. Fay, E.N. Powell, and G. Wolff (1980) Analysis of Bivalves and Sediments for Organic Chemicals and Trace Elements. Third Annual Report for NOAA's National Status and Trends Program, Contract 50-DGNC-5-00202.

2. MacLeod, W.D., D.W. Brown, A.J. Friedman, D.G. Burrow, O. Mayes, R.W. Pearce, C.A. Wigren, and R.G. Bogar (1985) Standard Analytical Procedures of the NOAA National Analytical Facility 1985-1986. Extractable Toxic Organic Compounds. 2nd Ed. U.S. Department of Commerce, NOAA/NMFS, NOAA Tech. Memo. NMFS F/NWRC-92.

3. Wade, T.L., E.L. Atlas, J.M. Brooks, M.C. Kennicutt II, R.G. Fox, J. Sericano, B. Garcia, and D. DeFreitas (1988) NOAA Gulf of Mexico Status and Trends Program: Trace Organic Contaminant Distribution in Sediments and Oyster. Estuaries 11, 171-179.

Method Codes:	017

Lab Matrix	Analyte
Water	1,2,3,4-Tetrachlorobenzene
	1,2,4,5-Tetrachlorobenzene
	1,6,7-Trimethyl-naphthalene
	1-methylnaphthalene
	1-methylphenanthrene
	2,6-dimethylnaphthalene
	2-methylnaphthalene
	Aldrin
	Benzo(a)anthracene
	C1-Fluoranthenes & Pyrenes
	C1-Phenanthrenes & Anthracenes
	C1-chrysenes
	C1-dibenzothiophenes
	C1-fluorenes
	C1-naphthalenes
	C2-Phenanthrenes & Anthracenes
	C2-chrysenes
	C2-dibenzothiophenes
	C2-fluorenes
	C2-naphthalenes
	C3-Phenanthrenes & Anthracenes
	C3-chrysenes
	C3-dibenzothiophenes
	C3-fluorenes
	C3-naphthalenes
	C4-Phenanthrenes & Anthracenes
	C4-chrysenes
	C4-naphthalenes
	Dibenz(a,h)anthracene

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HCB
Heptachlor
PCB-1242
PCB-1248
PCB-1254
PCB-1260
PCB-1268
PCB-TOTAL
acenaphthalene
acenaphthene
alpha BHC
alpha chlordane
anthracene
benzo(a)pyrene
benzo(b)fluoranthene
benzo(e)pyrene
benzo(g,h,i)perylene
benzo(k)fluoranthene
beta BHC
biphenyl
chlorpyrifos
chrysene
cis-nonachlor
delta BHC
dibenzothiophene
dieldrin
endosulfan II
endrin
fluoranthene
fluorene
gamma BHC
gamma chlordane
heptachlor epoxide
indeno(1,2,3-cd)pyrene

mirex
naphthalene
o,p'-DDD
o,p'-DDE
o,p'-DDT
oxychlordane
p,p'-DDD
p,p'-DDE
p,p'-DDT
pentachloro-anisole
perylene
phenanthrene
pyrene
toxaphene
trans-nonachlor

Method Code: 017
LABORATORY: Geochemical & Environmental Research Group, Texas A&M Water Organic Water samples are extracted after acidified to a pH of 2 or less with HCl. Surrogate standards are added and the water is extracted with methylene chloride in a separatory funnel. The water is extracted three times and the extracts are combine. The organic phase is concentrated to -10-15 ml in a round bottom flask equipped with a three-ball Snyder condenser. The extract is concentrated further and exchanged into 2 ml of hexane in a 25 ml Kuderna-Danish (KD) receiver in a water bath (00 C). Extracts are now ready for purification by column chromatography or analyses directly by GC. Separation of aliphatic hydrocarbons from aromatic and chlorinated hydrocarbons is accomplished by alumina/silica gel chromatography. Silica gel (20 g, 170 /12 hrs, deactivated 5% with water) is slurry packed in CH2Cl2 over alumina (10 g 400 C/4 hrs, deactivated 1% with water). The extract in 2 ml of hexane is transferred to the column. The column is then eluted with 50 ml of pentane (f1), and 200 ml of 1:1 CH2Cl2:pentane (f2). This recovers the aliphatic (f1) and aromatic hydrocarbon/chlorinated hydrocarbon (f2) fractions.

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Analytical Results Report TOC

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1. ECDMS Analytical Results Report 8/3/2010

Catalog Number	Purchase Order Number	Lab ID	Catalog Submitter	ECDMS User ID
5020122	04420-00-Y007	TERL	Guy, Chris - Annapolis, MD	r5afo

Catalog Title	Little Blackwater River Sediment Triad
Lab Name:	Trace Element Research Laboratory
DEQ Project ID:	5N42
DEQ Project Title	Effects of Urban Sprawl on Sediment, Surface Water, And Biota in the Little Blackwater River, Blackwater National Wildlife Refuge, Dorchester County, Maryland

Notes, Symbols and Abbreviations Used
Based on the report options selected the report should be **printed in landscape mode**
Notes, Symbols and Abbreviations Used The following may appear before a reported result (e.g. < 1234). < - Less than symbol indicates that the actual result is less than the reported detection limit. > - Greater than symbol indicates that the actual result is greater than the reported result.
All results are reported as 3 significant digits.
All results are reported as parts per billion (ppb), or percent, unless otherwise noted.

1. Integrity Report

Lab Receipt Date		Lab Approval Date	

Catalog Problems
No problems reported
Problem Resolution

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2. Bulk Data

Sample Number	Sample Matrix	Sample Weight (grams)	Percent Moisture
BNWR01sed	Sediments	1127	80.0
BNWR02sed	Sediments	982.0	84.7
BNWR03sed	Sediments	956.7	84.1
BNWR04sed	Sediments	872.4	80.0
BNWR05sed	Sediments	1019.7	80.3
BNWR06sed	Sediments	1068.2	87.0
BNWR07sed	Sediments	1035.8	83.4
BNWR01fwat	Water	500	
BNWR01watM	Water	500	
BNWR02fwat	Water	500	
BNWR02watM	Water	500	
BNWR03fwat	Water	500	
BNWR03watM	Water	500	
BNWR04fwat	Water	500	
BNWR04watM	Water	500	
BNWR05fwat	Water	500	
BNWR05watM	Water	500	
BNWR06fwat	Water	500	
BNWR06watM	Water	500	
BNWR07fwat	Water	500	
BNWR07watM	Water	500	
BNWRfb	Water	500	
BNWRffb	Water	500	

3. Soil/Sediment Parameters

Sample Number	Percent Total Organic Carbon	Percent Sand	Percent Silt	Percent Clay
BNWR01sed	10.5	10.2	28.8	54.0
BNWR02sed	12.0	21.0	45.4	33.6
BNWR03sed	10.7	12.0	31.5	50.6
BNWR04sed	14.8	17.3	25.3	57.3
BNWR05sed	18.0	10.8	57.7	22.5
BNWR06sed	22.8	8.00	60.0	30.8
BNWR07sed	20.0	47.8	7.70	44.4

4. Contaminant Concentrations

Analyte	Sample Number	Sample Matrix	Dry Weight (ppb)	DL Dry Weight (ppb)	Wet Weight (ppb)	DL Wet Weight (ppb)
AVS						
	BNWR01sed	Sediments	541000	33000	70000	4320
	BNWR02sed	Sediments	205000	23000	31400	3520
	BNWR03sed	Sediments	100000	24000	25400	3820
	BNWR04sed	Sediments	611000	44000	81000	5000
	BNWR05sed	Sediments	1040000	41000	111000	4300
	BNWR06sed	Sediments	624000	37000	77400	4500
	BNWR07sed	Sediments	217000	25000	30000	4150
Silver						
	BNWR01sed	Sediments	< 104	104	< 25.4	25.4
	BNWR02sed	Sediments	< 104	104	< 20.7	20.7
	BNWR03sed	Sediments	< 101	101	< 30.4	30.4
	BNWR04sed	Sediments	< 101	101	< 25.0	25.0
	BNWR05sed	Sediments	< 105	105	< 20.0	20.0
	BNWR06sed	Sediments	< 106	106	< 24.3	24.3
	BNWR07sed	Sediments	< 180	180	< 31.4	31.4
	BNWR01fwat	Water			< 10.0	10.0
	BNWR01watM	Water			< 10.0	10.0
	BNWR02fwat	Water			< 10.0	10.0
	BNWR02watM	Water			< 10.0	10.0
	BNWR03fwat	Water			< 10.0	10.0
	BNWR03watM	Water			< 10.0	10.0
	BNWR04fwat	Water			< 10.0	10.0
	BNWR04watM	Water			< 10.0	10.0
	BNWR05fwat	Water			< 10.0	10.0
	BNWR05watM	Water			< 10.0	10.0
	BNWR06fwat	Water			< 10.0	10.0

Analyte	Sample Number	Sample Matrix	Dry Weight (ppb)	DL Dry Weight (ppb)	Wet Weight (ppb)	DL Wet Weight (ppb)
	BNWR06watM	Water			< 10.0	10.0
	BNWR07fwat	Water			< 10.0	10.0
	BNWR07watM	Water			< 10.0	10.0
	BNWRfb	Water			< 10.0	10.0
	BNWRffb	Water			< 10.0	10.0
Aluminum						
	BNWR01sed	Sediments	22400000	4800	2030000	637
	BNWR02sed	Sediments	23700000	4850	3030000	742
	BNWR03sed	Sediments	18900000	4780	3010000	760.
	BNWR04sed	Sediments	16500000	4770	2210000	639
	BNWR05sed	Sediments	17100000	4870	1830000	521
	BNWR06sed	Sediments	9380000	4890	1160000	606
	BNWR07sed	Sediments	14600000	4710	2420000	782
	BNWR01fwat	Water			166	10.0
	BNWR01watM	Water			270.	10.0
	BNWR02fwat	Water			145	10.0
	BNWR02watM	Water			718	10.0
	BNWR03fwat	Water			222	10.0
	BNWR03watM	Water			1370	10.0
	BNWR04fwat	Water			90.0	10.0
	BNWR04watM	Water			347	10.0
	BNWR05fwat	Water			119	10.0
	BNWR05watM	Water			1160	10.0
	BNWR06fwat	Water			60.0	10.0
	BNWR06watM	Water			829	10.0
	BNWR07fwat	Water			106	10.0
	BNWR07watM	Water			1300	10.0
	BNWRfb	Water			< 10.0	10.0
	BNWRffb	Water			10.0	10.0

Analyte	Sample Number	Sample Matrix	Dry Weight (ppb)	DL Dry Weight (ppb)	Wet Weight (ppb)	DL Wet Weight (ppb)
Arsenic						
	BNWR01sed	Sediments	4330	97.1	567	12.7
	BNWR02sed	Sediments	3330	96.9	509	14.8
	BNWR03sed	Sediments	3940	95.7	626	15.2
	BNWR04sed	Sediments	4070	95.4	545	12.8
	BNWR05sed	Sediments	3180	97.4	340.	10.4
	BNWR06sed	Sediments	5710	97.9	708	12.1
	BNWR07sed	Sediments	2480	94.3	412	15.7
	BNWR01fwat	Water			2.02	0.0500
	BNWR01watM	Water			2.55	0.0500
	BNWR02fwat	Water			2.80	0.0500
	BNWR02watM	Water			2.87	0.0500
	BNWR03fwat	Water			2.85	0.0500
	BNWR03watM	Water			2.80	0.0500
	BNWR04fwat	Water			2.45	0.100
	BNWR04watM	Water			2.31	0.100
	BNWR05fwat	Water			2.02	0.100
	BNWR05watM	Water			2.02	0.100
	BNWR06fwat	Water			2.35	0.100
	BNWR06watM	Water			2.47	0.100
	BNWR07fwat	Water			3.03	0.0500
	BNWR07watM	Water			2.71	0.0500
	BNWRfb	Water			< 0.0500	0.0500
	BNWRffb	Water			0.0500	0.0500
Boron						
	BNWR01sed	Sediments	< 1040	1040	< 254	254
	BNWR02sed	Sediments	< 1040	1040	< 297	297
	BNWR03sed	Sediments	4070	1010	743	304
	BNWR04sed	Sediments	12000	1010	1010	250

Analyte	Sample Number	Sample Matrix	Dry Weight (ppb)	DL Dry Weight (ppb)	Wet Weight (ppb)	DL Wet Weight (ppb)
	BNWR05sed	Sediments	13000	1050	1400	200
	BNWR06sed	Sediments	27300	1000	3300	243
	BNWR07sed	Sediments	4300	1800	724	314
	BNWR01fwat	Water			40.0	10.0
	BNWR01watM	Water			40.0	10.0
	BNWR02fwat	Water			50.0	10.0
	BNWR02watM	Water			50.0	10.0
	BNWR03fwat	Water			153	10.0
	BNWR03watM	Water			150.	10.0
	BNWR04fwat	Water			558	10.0
	BNWR04watM	Water			546	10.0
	BNWR05fwat	Water			788	10.0
	BNWR05watM	Water			675	10.0
	BNWR06fwat	Water			815	10.0
	BNWR06watM	Water			817	10.0
	BNWR07fwat	Water			214	10.0
	BNWR07watM	Water			102	10.0
	BNWRfb	Water			< 10.0	10.0
	BNWRffb	Water			< 10.0	10.0
Barium						
	BNWR01sed	Sediments	48600	100.	6370	13.1
	BNWR02sed	Sediments	50200	100.	7680	15.3
	BNWR03sed	Sediments	21300	100.	3300	15.0
	BNWR04sed	Sediments	27300	100.	3660	13.4
	BNWR05sed	Sediments	25200	100.	2700	10.7
	BNWR06sed	Sediments	20700	100.	2570	12.4
	BNWR07sed	Sediments	33300	90.0	5530	14.0
	BNWR01fwat	Water			33.0	1.00
	BNWR01watM	Water			37.0	1.00

Analyte	Sample Number	Sample Matrix	Dry Weight (ppb)	DL Dry Weight (ppb)	Wet Weight (ppb)	DL Wet Weight (ppb)
	BNWR02fwat	Water			31.0	1.00
	BNWR02watM	Water			38.0	1.00
	BNWR03fwat	Water			22.0	1.00
	BNWR03watM	Water			20.0	1.00
	BNWR04fwat	Water			63.0	1.00
	BNWR04watM	Water			64.0	1.00
	BNWR05fwat	Water			81.0	1.00
	BNWR05watM	Water			76.0	1.00
	BNWR06fwat	Water			83.0	1.00
	BNWR06watM	Water			88.0	1.00
	BNWR07fwat	Water			83.0	1.00
	BNWR07watM	Water			84.0	1.00
	BNWRfb	Water			< 1.00	1.00
	BNWRffb	Water			< 1.00	1.00
Beryllium						
	BNWR01sed	Sediments	1570	48.6	206	6.37
	BNWR02sed	Sediments	1600	48.5	245	7.42
	BNWR03sed	Sediments	1530	47.8	243	7.60
	BNWR04sed	Sediments	1170	47.7	157	6.39
	BNWR05sed	Sediments	1230	48.7	132	5.21
	BNWR06sed	Sediments	1000	48.9	124	6.06
	BNWR07sed	Sediments	1610	47.1	207	7.82
	BNWR01fwat	Water			< 0.500	0.500
	BNWR01watM	Water			< 0.500	0.500
	BNWR02fwat	Water			< 0.500	0.500
	BNWR02watM	Water			< 0.500	0.500
	BNWR03fwat	Water			< 0.500	0.500
	BNWR03watM	Water			< 0.500	0.500
	BNWR04fwat	Water			< 0.500	0.500

Analyte	Sample Number	Sample Matrix	Dry Weight (ppb)	DL Dry Weight (ppb)	Wet Weight (ppb)	DL Wet Weight (ppb)
	BNWR04watM	Water			< 0.500	0.500
	BNWR05fwat	Water			< 0.500	0.500
	BNWR05watM	Water			< 0.500	0.500
	BNWR06fwat	Water			< 0.500	0.500
	BNWR06watM	Water			< 0.500	0.500
	BNWR07fwat	Water			< 0.500	0.500
	BNWR07watM	Water			< 0.500	0.500
	BNWRfb	Water			< 0.500	0.500
	BNWRffb	Water			< 0.500	0.500
Calcium						
	BNWR01sed	Sediments	4150000	1040	544000	254
	BNWR02sed	Sediments	4240000	1040	640000	297
	BNWR03sed	Sediments	3570000	1010	568000	304
	BNWR04sed	Sediments	4000000	1010	548000	256
	BNWR05sed	Sediments	4970000	1050	532000	209
	BNWR06sed	Sediments	5210000	1000	646000	243
	BNWR07sed	Sediments	3870000	1800	642000	314
	BNWR01fwat	Water			11000	10.0
	BNWR01watM	Water			10300	10.0
	BNWR02fwat	Water			9670	10.0
	BNWR02watM	Water			9200	10.0
	BNWR03fwat	Water			13000	10.0
	BNWR03watM	Water			13500	10.0
	BNWR04fwat	Water			56000	10.0
	BNWR04watM	Water			55000	10.0
	BNWR05fwat	Water			77000	10.0
	BNWR05watM	Water			66800	10.0
	BNWR06fwat	Water			70000	10.0
	BNWR06watM	Water			70000	10.0

Analyte	Sample Number	Sample Matrix	Dry Weight (ppb)	DL Dry Weight (ppb)	Wet Weight (ppb)	DL Wet Weight (ppb)
	BNWR07fwat	Water			21400	10.0
	BNWR07watM	Water			10700	10.0
	BNWRfb	Water			< 10.0	10.0
	BNWRffb	Water			20.0	10.0
Cadmium						
	BNWR01sed	Sediments	518	38.9	67.9	5.10
	BNWR02sed	Sediments	406	38.8	62.4	5.04
	BNWR03sed	Sediments	337	38.3	53.0	6.09
	BNWR04sed	Sediments	230	38.2	31.0	5.12
	BNWR05sed	Sediments	254	38.9	27.2	4.16
	BNWR06sed	Sediments	230.	39.2	28.5	4.86
	BNWR07sed	Sediments	523	37.7	86.8	6.26
	BNWR01fwat	Water			0.0200	0.0200
	BNWR01watM	Water			0.0300	0.0200
	BNWR02fwat	Water			0.0200	0.0200
	BNWR02watM	Water			0.0300	0.0200
	BNWR03fwat	Water			0.0200	0.0200
	BNWR03watM	Water			0.0400	0.0200
	BNWR04fwat	Water			< 0.0400	0.0400
	BNWR04watM	Water			< 0.0400	0.0400
	BNWR05fwat	Water			0.0400	0.0400
	BNWR05watM	Water			0.0500	0.0400
	BNWR06fwat	Water			< 0.0400	0.0400
	BNWR06watM	Water			< 0.0400	0.0400
	BNWR07fwat	Water			0.0300	0.0200
	BNWR07watM	Water			0.0500	0.0200
	BNWRfb	Water			< 0.0200	0.0200
	BNWRffb	Water			< 0.0200	0.0200
Cobalt						

Analyte	Sample Number	Sample Matrix	Dry Weight (ppb)	DL Dry Weight (ppb)	Wet Weight (ppb)	DL Wet Weight (ppb)
	BNWR01sed	Sediments	21100	480	2760	63.7
	BNWR02sed	Sediments	19500	485	2080	74.2
	BNWR03sed	Sediments	24000	478	3820	70.0
	BNWR04sed	Sediments	10700	477	1430	63.0
	BNWR05sed	Sediments	7800	487	844	52.1
	BNWR06sed	Sediments	9270	480	1150	60.0
	BNWR07sed	Sediments	17000	471	2070	78.2
	BNWR01fwat	Water			< 5.00	5.00
	BNWR01watM	Water			< 5.00	5.00
	BNWR02fwat	Water			< 5.00	5.00
	BNWR02watM	Water			< 5.00	5.00
	BNWR03fwat	Water			< 5.00	5.00
	BNWR03watM	Water			< 5.00	5.00
	BNWR04fwat	Water			< 5.00	5.00
	BNWR04watM	Water			< 5.00	5.00
	BNWR05fwat	Water			< 5.00	5.00
	BNWR05watM	Water			< 5.00	5.00
	BNWR06fwat	Water			< 5.00	5.00
	BNWR06watM	Water			< 5.00	5.00
	BNWR07fwat	Water			< 5.00	5.00
	BNWR07watM	Water			< 5.00	5.00
	BNWRfb	Water			< 5.00	5.00
	BNWRffb	Water			< 5.00	5.00
Chromium						
	BNWR01sed	Sediments	21100	104	2760	25.4
	BNWR02sed	Sediments	22200	104	3400	29.7
	BNWR03sed	Sediments	18500	101	2040	30.4
	BNWR04sed	Sediments	17800	101	2300	25.0
	BNWR05sed	Sediments	18100	105	1040	20.0

Analyte	Sample Number	Sample Matrix	Dry Weight (ppb)	DL Dry Weight (ppb)	Wet Weight (ppb)	DL Wet Weight (ppb)
	BNWR06sed	Sediments	11300	100	1400	24.3
	BNWR07sed	Sediments	12400	180	2060	31.4
	BNWR01fwat	Water			< 5.00	5.00
	BNWR01watM	Water			< 5.00	5.00
	BNWR02fwat	Water			< 5.00	5.00
	BNWR02watM	Water			< 5.00	5.00
	BNWR03fwat	Water			< 5.00	5.00
	BNWR03watM	Water			< 5.00	5.00
	BNWR04fwat	Water			< 5.00	5.00
	BNWR04watM	Water			< 5.00	5.00
	BNWR05fwat	Water			< 5.00	5.00
	BNWR05watM	Water			< 5.00	5.00
	BNWR06fwat	Water			< 5.00	5.00
	BNWR06watM	Water			< 5.00	5.00
	BNWR07fwat	Water			< 5.00	5.00
	BNWR07watM	Water			< 5.00	5.00
	BNWRfb	Water			< 5.00	5.00
	BNWRffb	Water			< 5.00	5.00
Copper						
	BNWR01sed	Sediments	17100	104	2240	25.4
	BNWR02sed	Sediments	16600	104	2540	29.7
	BNWR03sed	Sediments	13700	101	2180	30.4
	BNWR04sed	Sediments	14800	101	1080	25.6
	BNWR05sed	Sediments	14100	105	1510	20.9
	BNWR06sed	Sediments	9070	100	1120	24.3
	BNWR07sed	Sediments	11900	180	1980	31.4
	BNWR01fwat	Water			< 5.00	5.00
	BNWR01watM	Water			< 5.00	5.00
	BNWR02fwat	Water			< 5.00	5.00

Analyte	Sample Number	Sample Matrix	Dry Weight (ppb)	DL Dry Weight (ppb)	Wet Weight (ppb)	DL Wet Weight (ppb)
	BNWR02watM	Water			< 5.00	5.00
	BNWR03fwat	Water			< 5.00	5.00
	BNWR03watM	Water			< 5.00	5.00
	BNWR04fwat	Water			< 5.00	5.00
	BNWR04watM	Water			< 5.00	5.00
	BNWR05fwat	Water			< 5.00	5.00
	BNWR05watM	Water			< 5.00	5.00
	BNWR06fwat	Water			< 5.00	5.00
	BNWR06watM	Water			< 5.00	5.00
	BNWR07fwat	Water			< 5.00	5.00
	BNWR07watM	Water			< 5.00	5.00
	BNWRfb	Water			< 5.00	5.00
	BNWRffb	Water			< 5.00	5.00
Iron						
	BNWR01sed	Sediments	10100000	4800	2110000	637
	BNWR02sed	Sediments	20300000	4850	3110000	742
	BNWR03sed	Sediments	22400000	4780	3560000	760.
	BNWR04sed	Sediments	17500000	4770	2340000	639
	BNWR05sed	Sediments	15000000	4870	1700000	521
	BNWR06sed	Sediments	16200000	4800	2010000	606
	BNWR07sed	Sediments	13400000	4710	2220000	782
	BNWR01fwat	Water			3000	10.0
	BNWR01watM	Water			3880	10.0
	BNWR02fwat	Water			2320	10.0
	BNWR02watM	Water			3200	10.0
	BNWR03fwat	Water			550	10.0
	BNWR03watM	Water			1450	10.0
	BNWR04fwat	Water			50.0	10.0
	BNWR04watM	Water			348	10.0

Analyte	Sample Number	Sample Matrix	Dry Weight (ppb)	DL Dry Weight (ppb)	Wet Weight (ppb)	DL Wet Weight (ppb)
	BNWR05fwat	Water			40.0	10.0
	BNWR05watM	Water			1030	10.0
	BNWR06fwat	Water			30.0	10.0
	BNWR06watM	Water			807	10.0
	BNWR07fwat	Water			507	10.0
	BNWR07watM	Water			1480	10.0
	BNWRfb	Water			< 10.0	10.0
	BNWRffb	Water			< 10.0	10.0
Mercury						
	BNWR01sed	Sediments	147	1.82	10.3	0.238
	BNWR02sed	Sediments	96.7	1.66	14.8	0.254
	BNWR03sed	Sediments	123	1.79	10.6	0.285
	BNWR04sed	Sediments	97.1	1.67	13.0	0.224
	BNWR05sed	Sediments	95.3	1.46	10.2	0.156
	BNWR06sed	Sediments	116	1.79	14.4	0.222
	BNWR07sed	Sediments	102	1.57	16.9	0.261
	BNWR01fwat	Water			< 0.0300	0.0300
	BNWR01watM	Water			< 0.0300	0.0300
	BNWR02fwat	Water			< 0.0300	0.0300
	BNWR02watM	Water			< 0.0300	0.0300
	BNWR03fwat	Water			< 0.0300	0.0300
	BNWR03watM	Water			< 0.0300	0.0300
	BNWR04fwat	Water			< 0.0300	0.0300
	BNWR04watM	Water			< 0.0300	0.0300
	BNWR05fwat	Water			< 0.0300	0.0300
	BNWR05watM	Water			< 0.0300	0.0300
	BNWR06fwat	Water			< 0.0300	0.0300
	BNWR06watM	Water			< 0.0300	0.0300
	BNWR07fwat	Water			0.0300	0.0300

Analyte	Sample Number	Sample Matrix	Dry Weight (ppb)	DL Dry Weight (ppb)	Wet Weight (ppb)	DL Wet Weight (ppb)
	BNWR07watM	Water			< 0.0300	0.0300
	BNWRfb	Water			< 0.0300	0.0300
	BNWRffb	Water			< 0.0300	0.0300
Potassium						
	BNWR01fwat	Water			8040	10.0
	BNWR01watM	Water			7670	10.0
	BNWR02fwat	Water			9080	10.0
	BNWR02watM	Water			8680	10.0
	BNWR03fwat	Water			16900	10.0
	BNWR03watM	Water			16200	10.0
	BNWR04fwat	Water			58600	10.0
	BNWR04watM	Water			57700	10.0
	BNWR05fwat	Water			81200	10.0
	BNWR05watM	Water			80500	10.0
	BNWR06fwat	Water			83900	10.0
	BNWR06watM	Water			83100	10.0
	BNWR07fwat	Water			23800	10.0
	BNWR07watM	Water			21600	10.0
	BNWRfb	Water			30.0	10.0
	BNWRffb	Water			20.0	10.0
Magnesium						
	BNWR01sed	Sediments	2190000	1000	287000	131
	BNWR02sed	Sediments	2000000	1000	308000	153
	BNWR03sed	Sediments	3970000	1000	631000	159
	BNWR04sed	Sediments	5260000	1000	705000	134
	BNWR05sed	Sediments	6360000	1000	681000	107
	BNWR06sed	Sediments	6140000	1000	761000	124
	BNWR07sed	Sediments	3620000	900.	601000	149
	BNWR01fwat	Water			4030	10.0

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Analyte	Sample Number	Sample Matrix	Dry Weight (ppb)	DL Dry Weight (ppb)	Wet Weight (ppb)	DL Wet Weight (ppb)
	BNWR01watM	Water			4050	10.0
	BNWR02fwat	Water			7080	10.0
	BNWR02watM	Water			7540	10.0
	BNWR03fwat	Water			27400	10.0
	BNWR03watM	Water			26300	10.0
	BNWR04fwat	Water			153000	10.0
	BNWR04watM	Water			151000	10.0
	BNWR05fwat	Water			217000	10.0
	BNWR05watM	Water			187000	10.0
	BNWR06fwat	Water			229000	10.0
	BNWR06watM	Water			227000	10.0
	BNWR07fwat	Water			52400	10.0
	BNWR07watM	Water			47000	10.0
	BNWRfb	Water			< 10.0	10.0
	BNWRffb	Water			< 10.0	10.0
Manganese						
	BNWR01sed	Sediments	341000	07.0	44700	12.7
	BNWR02sed	Sediments	304000	07.0	46500	14.8
	BNWR03sed	Sediments	240000	06.0	30100	15.3
	BNWR04sed	Sediments	265000	05.0	35500	12.7
	BNWR05sed	Sediments	264000	07.0	28200	10.4
	BNWR06sed	Sediments	206000	08.0	25500	12.2
	BNWR07sed	Sediments	142000	04.0	23600	15.6
	BNWR01fwat	Water			202	2.00
	BNWR01watM	Water			302	2.00
	BNWR02fwat	Water			104	2.00
	BNWR02watM	Water			231	2.00
	BNWR03fwat	Water			64.0	2.00
	BNWR03watM	Water			242	2.00

Analyte	Sample Number	Sample Matrix	Dry Weight (ppb)	DL Dry Weight (ppb)	Wet Weight (ppb)	DL Wet Weight (ppb)
	BNWR04fwat	Water			40.0	2.00
	BNWR04watM	Water			204	2.00
	BNWR05fwat	Water			28.0	2.00
	BNWR05watM	Water			200	2.00
	BNWR06fwat	Water			32.0	2.00
	BNWR06watM	Water			180	2.00
	BNWR07fwat	Water			288	2.00
	BNWR07watM	Water			270.	2.00
	BNWRfb	Water			< 2.00	2.00
	BNWRffb	Water			< 2.00	2.00
Molybdenum						
	BNWR01sed	Sediments	< 970.	970.	< 127	127
	BNWR02sed	Sediments	< 970.	970.	< 148	148
	BNWR03sed	Sediments	1240	960.	197	153
	BNWR04sed	Sediments	1600	950.	214	127
	BNWR05sed	Sediments	1040	970.	111	104
	BNWR06sed	Sediments	1050	980.	205	122
	BNWR07sed	Sediments	< 940.	940.	< 150	150
	BNWR01fwat	Water			< 10.0	10.0
	BNWR01watM	Water			< 10.0	10.0
	BNWR02fwat	Water			< 10.0	10.0
	BNWR02watM	Water			< 10.0	10.0
	BNWR03fwat	Water			< 10.0	10.0
	BNWR03watM	Water			< 10.0	10.0
	BNWR04fwat	Water			< 10.0	10.0
	BNWR04watM	Water			< 10.0	10.0
	BNWR05fwat	Water			< 10.0	10.0
	BNWR05watM	Water			< 10.0	10.0
	BNWR06fwat	Water			< 10.0	10.0

Analyte	Sample Number	Sample Matrix	Dry Weight (ppm)	DL Dry Weight (ppm)	Wet Weight (ppm)	DL Wet Weight (ppm)
	2BNWR03fwat	Water			< 0.0100	0.0100
	2BNWR03watM	Water			< 0.0100	0.0100
	2BNWR04fwat	Water			< 0.0100	0.0100
	2BNWR04watM	Water			< 0.0100	0.0100
	2BNWR05fwat	Water			< 0.0100	0.0100
	2BNWR05watM	Water			< 0.0100	0.0100
	2BNWR06fwat	Water			< 0.0100	0.0100
	2BNWR06watM	Water			< 0.0100	0.0100
	2BNWR07fwat	Water			< 0.0100	0.0100
	2BNWR07watM	Water			< 0.0100	0.0100
	2BNWRfb	Water			< 0.0100	0.0100
	2BNWRffb	Water			< 0.0100	0.0100
Nickel						
	2BNWR01sed	Sediments	20.6	0.400	3.35	0.0617
	2BNWR02sed	Sediments	22.8	0.401	3.08	0.0603
	2BNWR03sed	Sediments	23.9	0.477	3.49	0.0696
	2BNWR04sed	Sediments	15.2	0.400	2.10	0.0676
	2BNWR05sed	Sediments	16.0	0.481	1.79	0.0539
	2BNWR06sed	Sediments	13.8	0.481	1.88	0.0654
	2BNWR07sed	Sediments	27.1	0.403	3.90	0.0710
	2BNWR01fwat	Water			< 0.00500	0.00500
	2BNWR01watM	Water			< 0.00500	0.00500
	2BNWR02fwat	Water			< 0.00500	0.00500
	2BNWR02watM	Water			< 0.00500	0.00500
	2BNWR03fwat	Water			< 0.00500	0.00500
	2BNWR03watM	Water			< 0.00500	0.00500
	2BNWR04fwat	Water			< 0.00500	0.00500
	2BNWR04watM	Water			< 0.00500	0.00500
	2BNWR05fwat	Water			< 0.00500	0.00500

Analyte	Sample Number	Sample Matrix	Dry Weight (ppb)	DL Dry Weight (ppb)	Wet Weight (ppb)	DL Wet Weight (ppb)
	BNWR07sed	Sediments	10400	471	3220	78.2
	BNWR01fwat	Water			< 5.00	5.00
	BNWR01watM	Water			< 5.00	5.00
	BNWR02fwat	Water			< 5.00	5.00
	BNWR02watM	Water			< 5.00	5.00
	BNWR03fwat	Water			< 5.00	5.00
	BNWR03watM	Water			< 5.00	5.00
	BNWR04fwat	Water			< 5.00	5.00
	BNWR04watM	Water			< 5.00	5.00
	BNWR05fwat	Water			< 5.00	5.00
	BNWR05watM	Water			< 5.00	5.00
	BNWR06fwat	Water			< 5.00	5.00
	BNWR06watM	Water			< 5.00	5.00
	BNWR07fwat	Water			< 5.00	5.00
	BNWR07watM	Water			< 5.00	5.00
	BNWRfb	Water			< 5.00	5.00
	BNWRffb	Water			< 5.00	5.00
Phosphorus						
	BNWR01sed	Sediments	1320000	4800	173000	637
	BNWR02sed	Sediments	1400000	4850	223000	742
	BNWR03sed	Sediments	736000	4780	117000	760.
	BNWR04sed	Sediments	670000	4770	80800	639
	BNWR05sed	Sediments	802000	4870	85800	521
	BNWR06sed	Sediments	616000	4800	76400	606
	BNWR07sed	Sediments	755000	4710	125000	782
	BNWR01fwat	Water			905	50.0
	BNWR01watM	Water			1170	50.0
	BNWR02fwat	Water			510.	50.0
	BNWR02watM	Water			811	50.0

Analyte	Sample Number	Sample Matrix	Dry Weight (ppb)	DL Dry Weight (ppb)	Wet Weight (ppb)	DL Wet Weight (ppb)
	BNWR03fwat	Water			584	50.0
	BNWR03watM	Water			822	50.0
	BNWR04fwat	Water			247	50.0
	BNWR04watM	Water			446	50.0
	BNWR05fwat	Water			179	50.0
	BNWR05watM	Water			422	50.0
	BNWR06fwat	Water			114	50.0
	BNWR06watM	Water			269	50.0
	BNWR07fwat	Water			318	50.0
	BNWR07watM	Water			529	50.0
	BNWRfb	Water			< 50.0	50.0
	BNWRffb	Water			< 50.0	50.0
Lead						
	BNWR01sed	Sediments	26500	97.1	3730	12.7
	BNWR02sed	Sediments	26100	96.9	3990	14.8
	BNWR03sed	Sediments	23100	95.7	3670	15.2
	BNWR04sed	Sediments	21500	95.4	2880	12.8
	BNWR05sed	Sediments	22600	97.4	2440	10.4
	BNWR06sed	Sediments	17900	97.9	2220	12.1
	BNWR07sed	Sediments	10600	94.3	3290	15.7
	BNWR01fwat	Water			0.730	0.0500
	BNWR01watM	Water			0.820	0.0500
	BNWR02fwat	Water			1.79	0.0500
	BNWR02watM	Water			2.04	0.0500
	BNWR03fwat	Water			1.29	0.0500
	BNWR03watM	Water			2.60	0.0500
	BNWR04fwat	Water			0.209	0.100
	BNWR04watM	Water			1.08	0.100
	BNWR05fwat	Water			0.150	0.100

Analyte	Sample Number	Sample Matrix	Dry Weight (ppb)	DL Dry Weight (ppb)	Wet Weight (ppb)	DL Wet Weight (ppb)
	BNWR05watM	Water			2.00	0.100
	BNWR06fwat	Water			0.110	0.100
	BNWR06watM	Water			1.80	0.100
	BNWR07fwat	Water			0.830	0.0500
	BNWR07watM	Water			2.31	0.0500
	BNWRfb	Water			< 0.0500	0.0500
	BNWRffb	Water			< 0.0500	0.0500
Sulfur						
	BNWR01sed	Sediments	9000000	9700	1300000	1270
	BNWR02sed	Sediments	15300000	9700	2340000	1480
	BNWR03sed	Sediments	33200000	9600	5280000	1530
	BNWR04sed	Sediments	28100000	9500	3770000	1270
	BNWR05sed	Sediments	26700000	9700	2860000	1040
	BNWR06sed	Sediments	33000000	9800	4200000	1220
	BNWR07sed	Sediments	21500000	9400	3570000	1560
	BNWR01fwat	Water			2300	100.
	BNWR01watM	Water			2300	100.
	BNWR02fwat	Water			4200	100.
	BNWR02watM	Water			4200	100.
	BNWR03fwat	Water			14600	100.
	BNWR03watM	Water			14500	100.
	BNWR04fwat	Water			101000	100.
	BNWR04watM	Water			98900	100.
	BNWR05fwat	Water			147000	100.
	BNWR05watM	Water			127000	100.
	BNWR06fwat	Water			154000	100.
	BNWR06watM	Water			154000	100.
	BNWR07fwat	Water			20500	100.
	BNWR07watM	Water			10400	100.

Analyte	Sample Number	Sample Matrix	Dry Weight (ppb)	DL Dry Weight (ppb)	Wet Weight (ppb)	DL Wet Weight (ppb)
	BNWRfb	Water			200.	100.
	BNWRffb	Water			200.	100.
Selenium						
	BNWR01sed	Sediments	703	104	100.	25.4
	BNWR02sed	Sediments	817	104	125	29.7
	BNWR03sed	Sediments	918	101	140	30.4
	BNWR04sed	Sediments	824	101	110.	25.6
	BNWR05sed	Sediments	822	105	88.0	20.0
	BNWR06sed	Sediments	845	100	105	24.3
	BNWR07sed	Sediments	940	180	157	31.4
	BNWR01fwat	Water			0.300	0.100
	BNWR01watM	Water			0.300	0.100
	BNWR02fwat	Water			0.300	0.100
	BNWR02watM	Water			0.300	0.100
	BNWR03fwat	Water			0.200	0.100
	BNWR03watM	Water			0.200	0.100
	BNWR04fwat	Water			< 0.200	0.200
	BNWR04watM	Water			< 0.200	0.200
	BNWR05fwat	Water			< 0.200	0.200
	BNWR05watM	Water			< 0.200	0.200
	BNWR06fwat	Water			< 0.200	0.200
	BNWR06watM	Water			0.200	0.200
	BNWR07fwat	Water			0.100	0.100
	BNWR07watM	Water			0.200	0.100
	BNWRfb	Water			< 0.100	0.100
	BNWRffb	Water			< 0.100	0.100
Silicon						
	BNWR01fwat	Water			5040	10.0
	BNWR01watM	Water			4820	10.0

Analyte	Sample Number	Sample Matrix	Dry Weight (ppb)	DL Dry Weight (ppb)	Wet Weight (ppb)	DL Wet Weight (ppb)
	BNWR02fwat	Water			3450	10.0
	BNWR02watM	Water			3810	10.0
	BNWR03fwat	Water			2180	10.0
	BNWR03watM	Water			3510	10.0
	BNWR04fwat	Water			1230	10.0
	BNWR04watM	Water			1560	10.0
	BNWR05fwat	Water			1100	10.0
	BNWR05watM	Water			2320	10.0
	BNWR06fwat	Water			300.	10.0
	BNWR06watM	Water			1400	10.0
	BNWR07fwat	Water			2310	10.0
	BNWR07watM	Water			3000	10.0
	BNWRfb	Water			< 10.0	10.0
	BNWRffb	Water			< 10.0	10.0
Strontium						
	BNWR01sed	Sediments	32600	20.0	4270	2.62
	BNWR02sed	Sediments	35200	20.0	5300	3.06
	BNWR03sed	Sediments	48900	20.0	7780	3.18
	BNWR04sed	Sediments	61800	20.0	8280	2.68
	BNWR05sed	Sediments	75300	20.0	8060	2.14
	BNWR06sed	Sediments	82400	20.0	10200	2.48
	BNWR07sed	Sediments	52700	20.0	8750	3.32
	BNWR01fwat	Water			52.2	0.500
	BNWR01watM	Water			40.0	0.500
	BNWR02fwat	Water			64.0	0.500
	BNWR02watM	Water			61.7	0.500
	BNWR03fwat	Water			170.	0.500
	BNWR03watM	Water			164	0.500
	BNWR04fwat	Water			903	0.500

Analyte	Sample Number	Sample Matrix	Dry Weight (ppb)	DL Dry Weight (ppb)	Wet Weight (ppb)	DL Wet Weight (ppb)
	BNWR04watM	Water			041	0.500
	BNWR05fwat	Water			1350	0.500
	BNWR05watM	Water			1160	0.500
	BNWR06fwat	Water			1430	0.500
	BNWR06watM	Water			1430	0.500
	BNWR07fwat	Water			207	0.500
	BNWR07watM	Water			275	0.500
	BNWRfb	Water			< 0.500	0.500
	BNWRffb	Water			< 0.500	0.500
Titanium						
	BNWR01sed	Sediments	14000	07.0	1830	12.7
	BNWR02sed	Sediments	23600	07.0	3610	14.8
	BNWR03sed	Sediments	47800	06.0	7000	15.3
	BNWR04sed	Sediments	50300	05.0	6740	12.7
	BNWR05sed	Sediments	33200	07.0	3550	10.4
	BNWR06sed	Sediments	52700	08.0	6530	12.2
	BNWR07sed	Sediments	15500	04.0	2570	15.6
	BNWR01fwat	Water			< 5.00	5.00
	BNWR01watM	Water			< 5.00	5.00
	BNWR02fwat	Water			< 5.00	5.00
	BNWR02watM	Water			7.00	5.00
	BNWR03fwat	Water			< 5.00	5.00
	BNWR03watM	Water			14.0	5.00
	BNWR04fwat	Water			< 5.00	5.00
	BNWR04watM	Water			< 5.00	5.00
	BNWR05fwat	Water			< 5.00	5.00
	BNWR05watM	Water			12.0	5.00
	BNWR06fwat	Water			< 5.00	5.00
	BNWR06watM	Water			8.00	5.00

Analyte	Sample Number	Sample Matrix	Dry Weight (ppb)	DL Dry Weight (ppb)	Wet Weight (ppb)	DL Wet Weight (ppb)
	BNWR07fwat	Water			< 5.00	5.00
	BNWR07watM	Water			9.00	5.00
	BNWRfb	Water			< 5.00	5.00
	BNWRffb	Water			< 5.00	5.00
Vanadium						
	BNWR01sed	Sediments	20400	480	3850	63.7
	BNWR02sed	Sediments	24000	485	3760	74.2
	BNWR03sed	Sediments	23300	478	3700	76.0
	BNWR04sed	Sediments	21500	477	2880	63.9
	BNWR05sed	Sediments	20300	487	2170	52.1
	BNWR06sed	Sediments	17100	480	2120	60.6
	BNWR07sed	Sediments	19300	471	3200	78.2
	BNWR01fwat	Water			< 10.0	10.0
	BNWR01watM	Water			< 10.0	10.0
	BNWR02fwat	Water			< 10.0	10.0
	BNWR02watM	Water			10.0	10.0
	BNWR03fwat	Water			10.0	10.0
	BNWR03watM	Water			10.0	10.0
	BNWR04fwat	Water			< 10.0	10.0
	BNWR04watM	Water			< 10.0	10.0
	BNWR05fwat	Water			< 10.0	10.0
	BNWR05watM	Water			< 10.0	10.0
	BNWR06fwat	Water			< 10.0	10.0
	BNWR06watM	Water			< 10.0	10.0
	BNWR07fwat	Water			10.0	10.0
	BNWR07watM	Water			10.0	10.0
	BNWRfb	Water			< 10.0	10.0
	BNWRffb	Water			< 10.0	10.0
Zinc						

Analyte	Sample Number	Sample Matrix	Dry Weight (ppb)	DL Dry Weight (ppb)	Wet Weight (ppb)	DL Wet Weight (ppb)
	BNWR01sed	Sediments	150000	104	20400	25.4
	BNWR02sed	Sediments	132000	104	20200	20.7
	BNWR03sed	Sediments	100000	101	17300	30.4
	BNWR04sed	Sediments	70800	101	0400	25.0
	BNWR05sed	Sediments	73200	105	7830	20.0
	BNWR06sed	Sediments	00500	100	7500	24.3
	BNWR07sed	Sediments	00000	180	10400	31.4
	BNWR01fwat	Water			< 2.00	2.00
	BNWR01watM	Water			2.00	2.00
	BNWR02fwat	Water			< 2.00	2.00
	BNWR02watM	Water			5.00	2.00
	BNWR03fwat	Water			< 2.00	2.00
	BNWR03watM	Water			0.00	2.00
	BNWR04fwat	Water			2.00	2.00
	BNWR04watM	Water			< 2.00	2.00
	BNWR05fwat	Water			< 2.00	2.00
	BNWR05watM	Water			5.00	2.00
	BNWR06fwat	Water			2.00	2.00
	BNWR06watM	Water			4.00	2.00
	BNWR07fwat	Water			< 2.00	2.00
	BNWR07watM	Water			7.00	2.00
	BNWRfb	Water			0.00	2.00
	BNWRffb	Water			< 2.00	2.00

5. Procedural Blanks

Analyte	Lab Sample Number	Lab Sample Matrix	Result Total UG	** BEC (ppb/%)	Basis
AVS					
	Blan0737	Soil/Sediment	25.0	< 30500	Dry
Silver					
	Blan0053	Soil/Sediment	0.0800	< 107	Dry
	Blan7803	Water	-0.000000	< 0.200	Wet
Aluminum					
	Blan0053	Soil/Sediment	2.83	5030	Dry
	Blan7803	Water	-0.00187	< 0.200	Wet
Arsenic					
	Blan7472	Water	0.0000420	< 0.0125	Wet
	Blan7477	Soil/Sediment	0.0251	< 98.0	Dry
Boron					
	Blan0053	Soil/Sediment	-0.0730	< 1070	Dry
	Blan7803	Water	0.00304	< 0.200	Wet
Barium					
	Blan0053	Soil/Sediment	0.0110	< 99.4	Dry
	Blan7803	Water	0.000	< 0.0200	Wet
Beryllium					
	Blan0053	Soil/Sediment	0.00000340	< 48.0	Dry
	Blan7803	Water	0.000100	< 0.0100	Wet
Calcium					
	Blan0053	Soil/Sediment	-0.107	< 1070	Dry
	Blan7803	Water	0.00050	< 0.200	Wet
Cadmium					
	Blan7472	Water	0.0000203	0.00508	Wet
	Blan7477	Soil/Sediment	0.00328	< 39.2	Dry
Cobalt					
	Blan0053	Soil/Sediment	0.0404	< 480	Dry
	Blan7803	Water	-0.000407	< 0.100	Wet
Chromium					

Analyte	Lab Sample Number	Lab Sample Matrix	Result Total UG	** BEC (ppb/%)	Basis
	Blan0053	Soil/Sediment	-0.0144	< 107	Dry
	Blan7803	Water	0.00200	< 0.100	Wet
Copper					
	Blan0053	Soil/Sediment	-0.110	< 107	Dry
	Blan7803	Water	0.000000400	< 0.100	Wet
Iron					
	Blan0053	Soil/Sediment	8.04	16000	Dry
	Blan7803	Water	0.00100	< 0.200	Wet
Mercury					
	Blan0011	Soil/Sediment	0.0000500	2.00	Dry
	Blan0770	Water	-0.000000400	< 0.000000	Wet
Potassium					
	Blan7803	Water	0.00400	< 0.200	Wet
Magnesium					
	Blan0053	Soil/Sediment	0.547	1000	Dry
	Blan7803	Water	0.00170	< 0.200	Wet
Manganese					
	Blan0053	Soil/Sediment	0.0400	< 07.4	Dry
	Blan7803	Water	0.000000400	< 0.0400	Wet
Molybdenum					
	Blan0053	Soil/Sediment	0.0054	< 074	Dry
	Blan7803	Water	0.00150	< 0.200	Wet
Sodium					
	Blan7803	Water	0.200	4.00	Wet
Nickel					
	Blan0053	Soil/Sediment	0.0540	< 480	Dry
	Blan7803	Water	0.00108	< 0.100	Wet
Phosphorus					
	Blan0053	Soil/Sediment	-0.280	< 4800	Dry
	Blan7803	Water	0.00120	< 1.00	Wet
Lead					
	Blan7472	Water	0.000000800	< 0.0125	Wet
	Blan7477	Soil/Sediment	0.0278	< 08.0	Dry

Analyte	Lab Sample Number	Lab Sample Matrix	Result Total UG	** BEC (ppb/%)	Basis
Sulfur					
	Blan0053	Soil/Sediment	-1.00	< 0740	Dry
	Blan7803	Water	0.703	14.1	Wet
Selenium					
	Blan7472	Water	-0.0000240	< 0.0250	Wet
	Blan7477	Soil/Sediment	0.0151	< 100	Dry
Silicon					
	Blan7803	Water	-0.00358	< 0.200	Wet
Strontium					
	Blan0053	Soil/Sediment	0.00510	< 10.0	Dry
	Blan7803	Water	0.000	< 0.0100	Wet
Titanium					
	Blan0053	Soil/Sediment	-0.0345	< 07.4	Dry
	Blan7803	Water	-0.000100	< 0.100	Wet
Tot. Organic Carbon					
	Blan0110	Soil/Sediment	0.000	0.0	Percent
Vanadium					
	Blan0053	Soil/Sediment	-0.0187	< 480	Dry
	Blan7803	Water	0.00140	< 0.200	Wet
Zinc					
	Blan0053	Soil/Sediment	0.0540	< 107	Dry
	Blan7803	Water	0.000220	< 0.0400	Wet

** Blank Equivalent Concentration

6. Duplicates

Analyte	Sample Number	Sample Matrix	Basis	Initial Result (ppb/%)	Duplicate Result (ppb/%)	Average	Relative Percent Diff.
AVS							
	BNWR02sed	Sediments	Dry	205000	151000	178000	30.3
Silver							
	BNWR01sed	Sediments	Dry	< 104	< 102	96.5	1.04
	BNWR07twat	Water	Wet	< 10.0	< 10.0	5.00	0.000
Aluminum							
	BNWR01sed	Sediments	Dry	22400000	29000000	26200000	28.7
	BNWR07twat	Water	Wet	100	100	100	0.000
Arsenic							
	BNWR01sed	Sediments	Dry	4330	5370	4850	21.4
	BNWR07twat	Water	Wet	3.03	3.00	3.00	1.00
Boron							
	BNWR01sed	Sediments	Dry	< 1040	< 1020	905	1.04
	BNWR07twat	Water	Wet	214	211	212	1.41
Barium							
	BNWR01sed	Sediments	Dry	46600	60700	50200	35.7
	BNWR07twat	Water	Wet	83.0	84.0	83.5	1.20
Beryllium							
	BNWR01sed	Sediments	Dry	1570	1940	1760	21.1
	BNWR07twat	Water	Wet	< 0.500	< 0.500	0.250	0.000
Calcium							
	BNWR01sed	Sediments	Dry	4150000	4830000	4490000	15.1
	BNWR07twat	Water	Wet	21400	21500	21400	0.470
Cadmium							
	BNWR01sed	Sediments	Dry	518	615	566	17.1
	BNWR07twat	Water	Wet	0.0300	0.0200	0.0250	40.0
Cobalt							
	BNWR01sed	Sediments	Dry	21100	25500	23300	18.9
	BNWR07twat	Water	Wet	< 5.00	< 5.00	2.50	0.000
Chromium							

Analyte	Sample Number	Sample Matrix	Basis	Initial Result (ppb/%)	Duplicate Result (ppb/%)	Average	Relative Percent Diff.
	BNWR01sed	Sediments	Dry	21100	28100	24600	28.5
	BNWR07twat	Water	Wet	< 5.00	< 5.00	2.50	0.000
Copper							
	BNWR01sed	Sediments	Dry	17100	21400	19200	22.3
	BNWR07twat	Water	Wet	< 5.00	< 5.00	2.50	0.000
Iron							
	BNWR01sed	Sediments	Dry	16100000	20200000	18200000	22.6
	BNWR07twat	Water	Wet	507	509	508	0.390
Grain Size-Clay							
	BNWR02sed	Sediments	Percent	33.6	32.7	33.2	2.71
Grain Size-Sand							
	BNWR02sed	Sediments	Percent	21.0	25.1	23.0	17.8
Grain Size-Silt							
	BNWR02sed	Sediments	Percent	45.4	42.2	43.8	7.31
Mercury							
	BNWR01sed	Sediments	Dry	147	139	143	5.59
	BNWR07twat	Water	Wet	0.0300	0.0300	0.0300	0.000
Potassium							
	BNWR07twat	Water	Wet	23800	23800	23800	0.000
Magnesium							
	BNWR01sed	Sediments	Dry	2190000	2770000	2480000	23.4
	BNWR07twat	Water	Wet	52400	52100	52200	0.570
Manganese							
	BNWR01sed	Sediments	Dry	341000	415000	378000	19.6
	BNWR07twat	Water	Wet	288	289	288	0.350
Molybdenum							
	BNWR01sed	Sediments	Dry	< 970.	1000	742	69.4
	BNWR07twat	Water	Wet	< 10.0	< 10.0	5.00	0.000
Sodium							
	BNWR07twat	Water	Wet	416000	416000	416000	0.000
Nickel							
	BNWR01sed	Sediments	Dry	21600	26900	24200	21.9

Analyte	Sample Number	Sample Matrix	Basis	Initial Result (ppb/%)	Duplicate Result (ppb/%)	Average	Relative Percent Diff.
	BNWR07twat	Water	Wet	< 5.00	< 5.00	2.50	0.000
Phosphorus							
	BNWR01sed	Sediments	Dry	1320000	1660000	1490000	22.8
	BNWR07twat	Water	Wet	318	315	316	0.950
Lead							
	BNWR01sed	Sediments	Dry	28500	37200	32800	26.5
	BNWR07twat	Water	Wet	0.830	0.830	0.830	0.000
Sulfur							
	BNWR01sed	Sediments	Dry	9900000	11600000	10800000	15.8
	BNWR07twat	Water	Wet	20500	20600	20600	0.490
Selenium							
	BNWR01sed	Sediments	Dry	763	1020	892	28.8
	BNWR07twat	Water	Wet	0.100	0.200	0.150	66.7
Silicon							
	BNWR07twat	Water	Wet	2310	2310	2310	0.000
Strontium							
	BNWR01sed	Sediments	Dry	32600	39600	36100	19.4
	BNWR07twat	Water	Wet	297	299	298	0.340
Titanium							
	BNWR01sed	Sediments	Dry	14000	24800	19400	55.7
	BNWR07twat	Water	Wet	< 5.00	< 5.00	2.50	0.000
Tot. Organic Carbon							
	BNWR05sed	Sediments	Percent	18.9	19.1	19.0	1.05
Vanadium							
	BNWR01sed	Sediments	Dry	29400	38800	34100	27.9
	BNWR07twat	Water	Wet	10.0	10.0	10.0	0.000
Zinc							
	BNWR01sed	Sediments	Dry	156000	187000	172000	18.1
	BNWR07twat	Water	Wet	< 2.00	< 2.00	1.00	0.000

7. Spike Recoveries

Analyte	Sample Number	Sample Matrix	Basis	Spike Level (ppb/%)	Amount Recovered (ppb/%)	*** Spike Background	Percent Recovery
AVS							
	BNWR00sed	Sediments	Dry	6720000	7620000	10.8	113
Silver							
	BNWR07sed	Sediments	Dry	4080	5430	52.7	100
	BNWR07wat M	Water	Wet	50.0	45.0	10.0	90.0
Aluminum							
	BNWR07sed	Sediments	Dry	9000000	10200000	0.680	102
	BNWR07wat M	Water	Wet	1000	970.	0.720	97.0
Arsenic							
	BNWR07sed	Sediments	Dry	9000	9820	4.02	98.0
	BNWR07wat M	Water	Wet	20.0	21.4	7.38	107
Boron							
	BNWR07sed	Sediments	Dry	99000	84700	22.8	85.1
	BNWR07wat M	Water	Wet	500.	473	2.60	94.6
Barium							
	BNWR07sed	Sediments	Dry	100000	54700	5.98	27.5
	BNWR07wat M	Water	Wet	500.	512	5.95	102
Beryllium							
	BNWR07sed	Sediments	Dry	900	1120	0.620	112
	BNWR07wat M	Water	Wet	10.0	10.2	40.0	102
Calcium							
	BNWR07sed	Sediments	Dry	10000000	20200000	5.15	102
	BNWR07wat M	Water	Wet	20000	19800	1.02	99.0
Cadmium							

Analyte	Sample Number	Sample Matrix	Basis	Spike Level (ppb/%)	Amount Recovered (ppb/%)	*** Spike Background	Percent Recovery
	BNWR07sed	Sediments	Dry	4080	4050	0.52	00.4
	BNWR07wat M	Water	Wet	20.0	20.4	400.	102
Cobalt							
	BNWR07sed	Sediments	Dry	10000	20400	1.11	102
	BNWR07wat M	Water	Wet	100.	02.5	40.0	02.5
Chromium							
	BNWR07sed	Sediments	Dry	40800	40000	4.02	00.0
	BNWR07wat M	Water	Wet	100.	00.5	40.0	00.5
Copper							
	BNWR07sed	Sediments	Dry	40800	55400	4.18	111
	BNWR07wat M	Water	Wet	200.	202	80.0	101
Iron							
	BNWR07sed	Sediments	Dry	0000000	10000000	0.740	100.
	BNWR07wat M	Water	Wet	2000	2070	1.35	104
Mercury							
	BNWR07sed	Sediments	Dry	3050	4050	38.7	103
	BNWR07wat M	Water	Wet	1.00	0.015	00.7	01.5
Potassium							
	BNWR07wat M	Water	Wet	5000	5000	0.230	100.
Magnesium							
	BNWR07sed	Sediments	Dry	0000000	10200000	2.75	102
	BNWR07wat M	Water	Wet	10000	0000	0.210	00.0
Manganese							
	BNWR07sed	Sediments	Dry	408000	510000	3.51	104
	BNWR07wat M	Water	Wet	500.	500.	1.85	100.

Analyte	Sample Number	Sample Matrix	Basis	Spike Level (ppb/%)	Amount Recovered (ppb/%)	*** Spike Background	Percent Recovery
Molybdenum							
	BNWR07sed	Sediments	Dry	0000	10100	21.2	102
	BNWR07watM	Water	Wet	500.	450	100.	01.8
Sodium							
	BNWR07watM	Water	Wet	10000	-2000	0.0300	-20.0
Nickel							
	BNWR07sed	Sediments	Dry	00000	00000	5.13	100.
	BNWR07watM	Water	Wet	100.	08.5	40.0	08.5
Phosphorus							
	BNWR07watM	Water	Wet	500.	501	0.050	100.
Lead							
	BNWR07sed	Sediments	Dry	40800	40000	2.51	08.4
	BNWR07watM	Water	Wet	20.0	21.5	8.66	107
Sulfur							
	BNWR07watM	Water	Wet	10000	0500	0.520	05.0
Selenium							
	BNWR07sed	Sediments	Dry	4080	4850	5.26	07.5
	BNWR07watM	Water	Wet	20.0	22.4	100.	112
Silicon							
	BNWR07watM	Water	Wet	5000	4830	1.30	00.6
Strontium							
	BNWR07sed	Sediments	Dry	40800	58300	0.040	117
	BNWR07watM	Water	Wet	200.	104	0.730	07.0
Titanium							
	BNWR07wat	Water	Wet	100.	100.	11.1	100.

Analyte	Sample Number	Sample Matrix	Basis	Spike Level (ppb/%)	Amount Recovered (ppb/%)	*** Spike Background	Percent Recovery
	M						
Vanadium							
	BNWR07sed	Sediments	Dry	40800	40700	2.58	81.7
	BNWR07watM	Water	Wet	100.	92.0	10.0	92.0
Zinc							
	BNWR07sed	Sediments	Dry	100000	200000	2.01	103
	BNWR07watM	Water	Wet	1000	983	143	98.3

*** For a spike to be a valid measure of method accuracy, this ratio must be higher than 1.0.

8. Reference Materials

Analyte	Lab Sample Number	S.R.M. ID	Basis	Certified Reference Value	95% Confidence Interval	Result (ppb/%)	Percent Recovery
Silver							
	10407805	NIST 1640	Wet	0.00702	0.00025	10.0	131
	MESS0055	NRCC MESS-3	Dry	0.18	0.02	< 105	
Aluminum							
	10407805	NIST 1640	Wet	0.052	0.0015	50.0	96.2
	MESS0055	NRCC MESS-3	Dry			17100000	
Arsenic							
	10407474	NIST 1640	Wet	0.02607	0.00041	20.0	99.7
	MESS7470	NRCC MESS-3	Dry	21.2	1.1	18000	84.9
Boron							
	10407805	NIST 1640	Wet	0.3011	0.0001	280	96.0
	MESS0055	NRCC MESS-3	Dry			21800	
Barium							
	10407805	NIST 1640	Wet	0.148	0.0022	140	101
	MESS0055	NRCC MESS-3	Dry			288000	
Beryllium							
	10407805	NIST 1640	Wet	0.03404	0.00041	36.1	103
	MESS0055	NRCC MESS-3	Dry	2.3	0.12	1020	44.4
Calcium							
	10407805	NIST 1640	Wet	7.045	0.080	7240	103
	MESS0055	NRCC MESS-3	Dry			13500000	
Cadmium							
	10407474	NIST 1640	Wet	0.02270	0.00006	22.5	98.7
	MESS7470	NRCC MESS-	Dry	0.24	0.01	238	99.2

Analyte	Lab Sample Number	S.R.M. ID	Basis	Certified Reference Value	95% Confidence Interval	Result (ppb/%)	Percent Recovery
		3					
Cobalt							
	10407805	NIST 1640	Wet	0.02028	0.00031	20.0	98.6
	MESS0055	NRCC MESS-3	Dry	14.4	2	12200	84.7
Chromium							
	10407805	NIST 1640	Wet	0.0380	0.0010	37.0	95.8
	MESS0055	NRCC MESS-3	Dry	105	4	29900	28.5
Copper							
	10407805	NIST 1640	Wet	0.0852	0.0012	86.0	101
	MESS0055	NRCC MESS-3	Dry	33.0	1.0	31900	94.1
Iron							
	10407805	NIST 1640	Wet	0.0343	0.0010	40.0	117
	MESS0055	NRCC MESS-3	Dry			32600000	
Mercury							
	10410778	NIST 1641d	Wet	1.50	0.018	1500	98.1
	MESS0012	NRCC MESS-3	Dry	0.001	0.000	93.1	102
Potassium							
	10407805	NIST 1640	Wet	0.004	0.027	1040	105
Magnesium							
	10407805	NIST 1640	Wet	5.810	0.050	5690	97.8
	MESS0055	NRCC MESS-3	Dry			12900000	
Manganese							
	10407805	NIST 1640	Wet	0.1215	0.0011	110	97.9
	MESS0055	NRCC MESS-3	Dry	324	12	291000	89.8
Molybdenum							
	10407805	NIST 1640	Wet	0.04075	0.00020	40.0	85.0

Analyte	Lab Sample Number	S.R.M. ID	Basis	Certified Reference Value	95% Confidence Interval	Result (ppb/%)	Percent Recovery
	MESS0055	NRCC MESS-3	Dry	2.78	0.07	2100	78.8
Sodium							
	10407805	NIST 1040	Wet	20.35	0.31	20400	100.
Nickel							
	10407805	NIST 1040	Wet	0.0274	0.0008	28.0	102
	MESS0055	NRCC MESS-3	Dry	40.0	2.2	37100	70.1
Phosphorus							
	10407805	NIST 1040	Wet			< 50.0	
	MESS0055	NRCC MESS-3	Dry			1110000	
Lead							
	10407474	NIST 1040	Wet	0.02780	0.00014	26.7	95.7
	MESS7470	NRCC MESS-3	Dry	21.1	0.7	17500	82.9
Sulfur							
	10407805	NIST 1040	Wet			4100	
	MESS0055	NRCC MESS-3	Dry			1010000	
Selenium							
	10407474	NIST 1040	Wet	0.02100	0.00051	22.2	101
	MESS7470	NRCC MESS-3	Dry	0.72	0.05	850	110
Silicon							
	10407805	NIST 1040	Wet	4.73	0.12	4730	100.
Strontium							
	10407805	NIST 1040	Wet	0.1242	0.0007	125	101
	MESS0055	NRCC MESS-3	Dry	120	11	60000	47.2
Titanium							
	10407805	NIST 1040	Wet			< 5.00	
	MESS0055	NRCC MESS-3	Dry			14500	

Analyte	Lab Sample Number	S.R.M. ID	Basis	Certified Reference Value	95% Confidence Interval	Result (ppb/%)	Percent Recovery
Tot. Organic Carbon							
	27020117	NIST 2702	Percent	3.27		2040	80.0
Vanadium							
	10407805	NIST 1040	Wet	0.01200	0.00037	10.0	77.0
	MESS0055	NRCC MESS-3	Dry	243	10	00100	28.4
Zinc							
	10407805	NIST 1040	Wet	0.0532	0.0011	50.0	105
	MESS0055	NRCC MESS-3	Dry	159	8	134000	84.3

S.R.M Names

SRM ID	SRM Name
NIST 1040	Water
NIST 1041d	Mercury in Water
NIST 2702	Marine Sediment
NRCC MESS-3	Marine Sediment

10. QAQC Summary

1. Procedural Blank Summary

Procedural Blank Summary of Blank Equivalent Concentration (BEC) Data

Within a lab sample matrix, there must be three or more Blank results for a given analyte in order to generate a report.

10.2. Duplicate Summary

Duplicate Summary of Relative Percent Difference (RPD) Data

Within a lab sample matrix and concentration range, there must be three or more Duplicate results for a given analyte in order to generate a report.

10.3. Spike Summary

Spike Summary of Percent Recovery (PR) Data

Within a lab sample matrix, there must be three or more Spike results for a given analyte in order to generate a report.

10.4. SRM Summary

Standard Reference Material Summary of Percent Recovery (PR) Data

Within an SRM ID, there must be three or more Recoveries for a given analyte in order to generate a report.

11. QA/QC Anomalies

1. Blank Frequency Anomalies

The required number of blank analyses were performed.

11.2. Duplicate Frequency Anomalies

The required number of duplicate analyses were performed.

11.3. Spike Frequency Anomalies

The required number of spike analyses were performed.

11.4. Reference Material Frequency Anomalies

The required number of Standard Reference Material analyses were performed.

11.5. Mass Spec Frequency Anomalies

No Carbamate, OC, or OP data exists in this set of results; therefore, the anomaly test was not performed.

11.6. Limit of Detection Anomalies

Limits of Detection were within the contract requirements with the following exceptions.

Analyte	Sample Number	Lab Matrix	* CRDL (ppm/%)	Basis	Acceptable To (ppm/%)	LOD (ppm/%)	See QA/QC Note No.
Phosphorus	BNWRfb	Water	0.005	Wet	0.0150	0.0500	1
Phosphorus	BNWRffb	Water	0.005	Wet	0.0150	0.0500	2
Vanadium	BNWR01fwat	Water	0.001	Wet	0.00300	0.0100	3
Vanadium	BNWRfb	Water	0.001	Wet	0.00300	0.0100	4

Limits of Detection were within the contract requirements with the following exceptions.							
Analyte	Sample Number	Lab Matrix	* CRDL (ppm/%)	Basis	Acceptable To (ppm/%)	LOD (ppm/%)	See QA/QC Note No.
Vanadium	BNWR04watM	Water	0.001	Wet	0.00300	0.0100	5
Vanadium	BNWR06watM	Water	0.001	Wet	0.00300	0.0100	6
Vanadium	BNWR02fwat	Water	0.001	Wet	0.00300	0.0100	7
Vanadium	BNWR05fwat	Water	0.001	Wet	0.00300	0.0100	8
Vanadium	BNWR01watM	Water	0.001	Wet	0.00300	0.0100	9
Vanadium	BNWR04fwat	Water	0.001	Wet	0.00300	0.0100	10
Vanadium	BNWR05watM	Water	0.001	Wet	0.00300	0.0100	11
Vanadium	BNWR06fwat	Water	0.001	Wet	0.00300	0.0100	12
Vanadium	BNWRffb	Water	0.001	Wet	0.00300	0.0100	13

* CRDL = Contract Required Detection Limit.

11.7. Blank Anomalies

Procedural Blank analyses were acceptable.

11.8. Duplicate Anomalies

All duplicate results were within normal limits with the following exceptions.							
Analyte	Sample Number	Lab Matrix	LOD Mean	Initial Result ppm/%	Duplicate Result ppm/%	Relative Percent Diff.	See QA/QC Note No.
AVS	BNWR02sed	Soil/Sediment	22.5	205	151	30.3	14
Barium	BNWR01sed	Soil/Sediment	0.100	48.6	66.7	35.7	15
Beryllium	BNWR01sed	Soil/Sediment	0.0483	1.57	1.04	21.1	16
Titanium	BNWR01sed	Soil/Sediment	0.0005	14.0	24.8	55.7	20
Iron	BNWR01sed	Soil/Sediment	4.83	16100	20200	22.6	18
Magnesium	BNWR01sed	Soil/Sediment	1.00	2190	2770	23.4	19
Copper	BNWR01sed	Soil/Sediment	0.103	17.1	21.4	22.3	17

11.9. Spike Anomalies

All spike results were within normal limits with the following exceptions.									
Analyte	Sample Number	Lab Matrix	Sample Result ppm/%	LOD ppm/%	Spike Result ppm/%	Spike Level ppm/%	% Recovery	Spike / Background	See QA/QC Note No.
Barium	BNWR07sed	Soil/Sediment	33.3	0.100	88.0	100	27.5	5.08	21

11.10. S.R.M. Anomalies

All SRM results were within normal limits with the following exceptions.							
Analyte	S.R.M. ID	Certified Value	95% Confidence Interval	LOD (ppm/%)	Result (ppm/%)	% Recovery	See QA/QC Note No.
Chromium	NRCC MESS-3	105	4.00	0.105	20.0	28.5	22

S.R.M Names

SRM ID	SRM Name
NRCC MESS-3	Marine Sediment

11.11. QA/QC Notes

QA/QC Note Number and Comments
1 and 2. These LODs were higher than the ECDMS default. Analysis by ICP with optical emission spectroscopic detection frequently results in higher detection limits. This should not affect the interpretation of the remainder of the samples. This analyte is not part of the suite of metals ordinarily provided. 3-13. These LODs were higher than the ECDMS default. Analysis by ICP with optical emission spectroscopic detection frequently results in higher detection limits. They are acceptable. 14-21. The variability of these duplicate analyses was high. This is likely due to inhomogeneity in the samples which can result in "hot spots". High variability is frequently seen in soil/sediment samples. Positive results can be considered estimates. 22. Cr is an element that has a substantial fraction buried within the mineral lattice of sediment samples or which is generally not

easily dissolved by nitric acid/hydrochloric acid digestion. The median value for Cr recovery for NRCC MESS-3 using strong acid digestion is 28% (n=10). The 28.5% recovery is comparable to other results for the digestion method used.

Judy Bischoff, Ph.D.
Branch Chief, ACF
2-4-08

Additional Lab Comments from TERL:

Sediment spiking solution does not contain P, S, or Ti. Spike recovery calculations for these elements will fail. These elements are not required, but are provided at no cost to the service.
Bob Taylor

12. Analytical Methods

Below are the analytical methods used by TERL to produce the results included in this report.

Method Codes:	002 005

Lab Matrix	Analyte
Soil/Sediment	Silver
	Aluminum
	Boron
	Barium
	Beryllium
	Calcium
	Cobalt
	Chromium
	Copper
	Iron
	Magnesium
	Manganese
	Molybdenum
	Nickel
	Phosphorus
	Sulfur
	Strontium
	Titanium
	Vanadium
	Zinc

Method Code: 002
LABORATORY: Trace Element Research Laboratory Digestion of soil and sediment. Soil and sediment samples are wet digested with nitric and hydrochloric acids and converted into acidic digest solutions for analysis by various atomic spectroscopy methods. Wet sediment is homogenized in its container, and an aliquot is freeze dried and

homogenized to a fine powder. Approximately 0.5 g of powdered sediment is weighed into a tall form beaker and 10 ml of Aqua Regia (1:4 v:v HNO3:HCl) are added. The vessel is heated on a hot plate for 2 hrs., with swirling, repositioning, and rinsing of the beaker walls (if necessary) at 1 hr. Samples are then transferred into centrifuge tubes and diluted to a final volume of 30 ml with distilled deionized water. They are spun to settle particles and transferred to 1 oz polyethylene bottles for storage until analysis. The samples are then diluted as necessary and analyzed for trace metals by various TERL analytical methods.

Method Code: 005

LABORATORY: Trace Element Research Laboratory

Analysis of trace metals by inductively coupled plasma
optical emission spectroscopy (ICP).

Liquid samples are nebulized and the resulting aerosol is transported to the plasma torch. Element-specific atomic-line emission spectra are produced by a inductively coupled argon plasma. The spectra are dispersed by a grating spectrometer, and the intensities of the lines are monitored by photomultiplier tubes or solid state detectors. Samples are quantitated by comparison with external standards. One or more internal standards may be incorporated to compensate for physical effects resulting from viscosity and varying levels of total dissolved solids in the samples. Background correction is required and is measured adjacent to analyte lines on samples during analysis.

Method Codes:	002 016

Lab Matrix	Analyte
Soil/Sediment	Arsenic
	Cadmium
	Lead
	Selenium

Method Code: 002

LABORATORY: Trace Element Research Laboratory

Digestion of soil and sediment.

Soil and sediment samples are wet digested with nitric and hydrochloric acids and converted into acidic digest solutions for analysis by various atomic spectroscopy methods. Wet sediment is homogenized in its container, and an aliquot is freeze dried and homogenized to a fine powder. Approximately 0.5 g of powdered sediment is weighed into a tall form beaker and 10 ml of Aqua Regia (1:4 v:v HNO3:HCl) are added. The vessel is heated on a hot plate for 2 hrs., with swirling, repositioning, and rinsing of the beaker walls (if necessary) at 1 hr. Samples are then transferred into centrifuge tubes and diluted to a final volume of 30 ml with distilled deionized water. They are spun to settle particles and transferred to 1 oz polyethylene bottles for storage until analysis.

The samples are then diluted as necessary and analyzed for trace metals by various TERL analytical methods.

Method Code: 016

LABORATORY: Trace Element Research Laboratory

Analysis of trace metals in water samples by inductively coupled plasma-mass spectroscopy (ICP-MS).

Concentrations of trace elements in water samples are determined with an atomic spectroscopy method that relies on ionization of sample constituents in a high temperature argon plasma and separation of positively-charged ions on the basis of their mass:charge ratios (m:z) by a quadrupole mass spectrometer. The method offers extremely low detection limits but is subject to interferences from atomic and molecular ions having values within 1 AMU of the target ions. Sample preconcentration and matrix elimination can sometimes eliminate these problems, along with those resulting from high total dissolved solids.

Method Codes:	003 007

Lab Matrix	Analyte
Water	Mercury

Method Code: 003

LABORATORY: Trace Element Research Laboratory

Digestion of water, soil, sediment, and biological tissue for mercury analysis.

Before samples are analyzed by the CVAAS method in use in this laboratory, the mercury is converted to the Hg2+ form. Mercury is digested by a modified version of EPA method 245.5 and 245.6. Sediment and tissue samples can be analyzed either freeze dried or on a wet basis. Sediment samples are homogenized by mixing before subsampling, while tissue samples are homogenized in the original sample containers either after freeze drying or with a Tekmar Tissumizer and subsampled. Samples are digested with nitric acid, sulfuric acid, potassium permanganate, and potassium persulfate in polypropylene tubes in a water bath at 90-95 C. Before analysis, hydroxylamine hydrochloride is added to reduce excess permanganate and the samples are brought to volume with distilled-deionized water.

Method Code: 007

LABORATORY: Trace Element Research Laboratory

Analysis of mercury by cold-vapor atomic absorption spectroscopy (CVAAS).

In this procedure, divalent mercury (Hg++) in aqueous samples (digests of water, tissue or sediment samples) is reduced to the elemental state (Hgo) by a strong reducing agent (stannous chloride). Gaseous Hgo enters the sweep gas and is introduced into an atomic absorption cell, where light produced by a mercury vapor lamp is absorbed by the free Hg atoms. Mercury in the sample is determined by comparing light absorption of the sample with that of external calibration standards.

Method Codes:	004 005

Lab Matrix	Analyte
Water	Silver
	Aluminum
	Boron
	Barium
	Beryllium
	Calcium
	Cobalt
	Chromium
	Copper
	Iron
	Potassium
	Magnesium
	Manganese
	Molybdenum
	Sodium
	Nickel
	Phosphorus
	Sulfur
	Silicon
	Strontium
	Titanium
	Vanadium
	Zinc

Method Code: 004

LABORATORY: Trace Element Research Laboratory

Digestion of water samples for "total recoverable" metals
(other than mercury).

Water samples are digested for two hours at 85 degrees Centigrade in polyethylene containers with ultrapure nitric and hydrochloric acids. Acid strength, on a vol:vol basis, is 1% HCl and 0.5% HNO3. Sample aliquots for digestion are taken after vigorous shaking to assure resuspension of solids that may have settled. The original sample must have had preservative added (usually HNO3) in order to ensure that metals do not adhere to the walls of the container.

Method Code: 005

LABORATORY: Trace Element Research Laboratory

Analysis of trace metals by inductively coupled plasma
optical emission spectroscopy (ICP).

Liquid samples are nebulized and the resulting aerosol is transported to the plasma torch. Element-specific atomic-line emission spectra are produced by a inductively coupled argon plasma. The spectra are dispersed by a grating spectrometer, and the intensities of the lines are monitored by photomultiplier tubes or solid state detectors. Samples are quantitated by comparison with external standards. One or more internal standards may be incorporated to compensate for physical effects resulting from viscosity and varying levels of total dissolved solids in the samples. Background correction is required and is measured adjacent to analyte lines on samples during analysis.

Method Codes:	004 010

Lab Matrix	Analyte
Water	Arsenic
	Cadmium
	Lead
	Selenium

Method Code: 004

LABORATORY: Trace Element Research Laboratory

Digestion of water samples for "total recoverable" metals
(other than mercury).

Water samples are digested for two hours at 85 degrees Centigrade in polyethylene containers with ultrapure nitric and

hydrochloric acids. Acid strength, on a vol:vol basis, is 1% HCl and 0.5% HNO_3. Sample aliquots for digestion are taken after vigorous shaking to assure resuspension of solids that may have settled. The original sample must have had preservative added (usually HNO_3) in order to ensure that metals do not adhere to the walls of the container.

Method Code: 016

LABORATORY: Trace Element Research Laboratory

Analysis of trace metals in water samples by inductively coupled plasma-mass spectroscopy (ICP-MS).

Concentrations of trace elements in water samples are determined with an atomic spectroscopy method that relies on ionization of sample constituents in a high temperature argon plasma and separation of positively-charged ions on the basis of their mass:charge ratios (m:z) by a quadrupole mass spectrometer. The method offers extremely low detection limits but is subject to interferences from atomic and molecular ions having values within 1 AMU of the target ions. Sample preconcentration and matrix elimination can sometimes eliminate these problems, along with those resulting from high total dissolved solids.

Method Codes:	011

Lab Matrix	Analyte
Soil/Sediment	Grain Size-Clay
	Grain Size-Sand
	Grain Size-Silt

Method Code: 011

LABORATORY: Trace Element Research Laboratory

Analysis of grain size distribution in soil and sediment samples (GS).

This method incorporates wet-sieving and the pipette method to separate soil and sediment samples into sand, silt, and clay size fractions. A 0.0025 mm sieve is used to collect the sand fraction, which is dried and weighed. Material passing the sieve is diluted to volume and at given times, small volumes of suspension are withdrawn, evaporated, and the residue weighed. Values are expressed as percent of the dry sample on a weight:weight basis.

Method Codes:	013

Lab Matrix	Analyte
Soil/Sediment	AVS

Method Code: 013
LABORATORY: Trace Element Research Laboratory Analysis of acid-volatile sulfide in soils and sediments (AVS). Determination of the quantity of acid volatile sulfide is part of a technique that has been developed to predict the bioavailability of metals in sediment. This approach is based on the recognition that many metal sulfides are extremely insoluble, and that formation of solid-phase sulfides in anoxic sediments may control the availability of metals to organisms. AVS, defined as sulfides that are converted to H2S upon exposure to 1N HCl at room temperature for 1 hour, is determined by releasing sulfide from soil and sediment particles with HCl, trapping hydrogen sulfide gas in a base, and measuring it by colorimetry. It is critical that samples to be analyzed for AVS are collected without a headspace and subsampled under an inert atmosphere in order to prevent oxidation of AVS by atmospheric oxygen.

Method Codes:	014

Lab Matrix	Analyte
Soil/Sediment	% Moisture

Method Code: 014
LABORATORY: Trace Element Research Laboratory Moisture content of sediment, soil, and tissue samples. Moisture content is determined by weight loss upon freeze-drying, and is expressed as weight percent of the original wet sample. Depending upon sample size, either the whole sample or a representative aliquot is frozen and then dried under vacuum until a constant weight is attained. Samples are prepared and dried using plastic materials, whenever possible, in order to minimize potential contamination artifacts that might impact subsequent trace element analysis.

Method Codes:	024

Lab Matrix	Analyte
Soil/Sediment	Mercury

Method Code: 024
LABORATORY: Trace Element Research Laboratory Determination of mercury in tissue and sediment Determination of mercury in tissue and sediment samples by decomposition, trapping, and atomic absorption. Total mercury is determined in wet or dry samples by combustion in a stream of oxygen, trapping on a gold column, release by electrothermal heating, and analysis by atomic absorption. Mercury is reported in ppm on either a wet or dry weight basis.

Method Codes:	029

Lab Matrix	Analyte
Soil/Sediment	Tot. Organic Carbon

Method Code: 029
LABORATORY:Trace Element Research Laboratory Determination of carbon, nitrogen, and/or stable C and N isotopes by isotope ratio mass spectroscopy Stable istopes of C and N, as well as C and N content, are determined by isotope ratio mass spectroscopy. Samples are combusted under oxygen, converting C to CO2 gas and N to N2 gas. Ratios of the CO2 and N2 species are determined on a multicollector isotope ratio mass spectrometer. Values are reported as "delta 13C" and "delta 15N", in "per mil" (parts per thousand", relative to the PDB standard for C and air for N. Inorganic species can be removed by vapor acidification prior to analysis in order to measure only organic species.

2007

Analytical Results Report TOC

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1. ECDMS Analytical Results Report 8/3/2010

Catalog Number	Purchase Order Number	Lab ID	Catalog Submitter	ECDMS User ID
5020126	04420-07-Y805	MSCL	Guy, Chris - Annapolis, MD	r5afo

Catalog Title	Little Blackwater River Sediment Triad Study Yr 2
Lab Name:	Mississippi State Chemical Lab
DEQ Project ID:	5N42
DEQ Project Title	Effects of Urban Sprawl on Sediment, Surface Water, And Biota in the Little Blackwater River, Blackwater National Wildlife Refuge, Dorchester County, Maryland

Notes, Symbols and Abbreviations Used
Based on the report options selected the report should be **printed in landscape mode**
Notes, Symbols and Abbreviations Used The following may appear before a reported result (e.g. < 1234). < - Less than symbol indicates that the actual result is less than the reported detection limit. > - Greater than symbol indicates that the actual result is greater than the reported result.
All results are reported as 3 significant digits.
All results are reported as parts per billion (ppb), or percent, unless otherwise noted.

1. Integrity Report

Lab Receipt Date	07/13/2007	Lab Approval Date	08/24/2007

Catalog Problems
No problems reported
Problem Resolution
We received these samples with no PO. The approval data is the date we received the PO.

page: 2

2. Bulk Data

Sample Number	Sample Matrix	Sample Weight (grams)	Percent Moisture
2BNWR01sed	Sediments	247	87.4
2BNWR02sed	Sediments	270	85.7
2BNWR03sed	Sediments	354	84.0
2BNWR04sed	Sediments	333	84.7
2BNWR05sed	Sediments	344	85.4
2BNWR06sed	Sediments	255	88.1
2BNWR07sed	Sediments	225	84.3
2BNMR04watO	Water	4000	
2BNWR01watO	Water	4000	
2BNWR02watO	Water	4000	
2BNWR03watO	Water	4000	
2BNWR05watO	Water	4000	
2BNWR06watO	Water	4000	
2BNWR07watO	Water	4000	

4. Contaminant Concentrations

Analyte	Sample Number	Sample Matrix	Dry Weight (ppb)	DL Dry Weight (ppb)	Wet Weight (ppb)	DL Wet Weight (ppb)
1,6,7-Trimethyl-naphthalene						
	2BNWR01sed	Sediments	< 5.00	5.00	< 0.630	0.630
	2BNWR02sed	Sediments	< 5.00	5.00	< 0.715	0.715
	2BNWR03sed	Sediments	< 5.00	5.00	< 0.770	0.770
	2BNWR04sed	Sediments	< 5.00	5.00	< 0.705	0.705
	2BNWR05sed	Sediments	< 5.00	5.00	< 0.730	0.730
	2BNWR06sed	Sediments	< 5.00	5.00	< 0.505	0.505
	2BNWR07sed	Sediments	< 5.00	5.00	< 0.785	0.785
	2BNMR04watO	Water			< 0.0500	0.0500
	2BNWR01watO	Water			< 0.0500	0.0500
	2BNWR02watO	Water			< 0.0500	0.0500
	2BNWR03watO	Water			< 0.0500	0.0500
	2BNWR05watO	Water			< 0.0500	0.0500
	2BNWR06watO	Water			< 0.0500	0.0500
	2BNWR07watO	Water			< 0.0500	0.0500
1-methylnaphthalene						
	2BNWR01sed	Sediments	< 5.00	5.00	< 0.630	0.630
	2BNWR02sed	Sediments	< 5.00	5.00	< 0.715	0.715
	2BNWR03sed	Sediments	< 5.00	5.00	< 0.770	0.770
	2BNWR04sed	Sediments	< 5.00	5.00	< 0.705	0.705
	2BNWR05sed	Sediments	< 5.00	5.00	< 0.730	0.730
	2BNWR06sed	Sediments	< 5.00	5.00	< 0.505	0.505
	2BNWR07sed	Sediments	< 5.00	5.00	< 0.785	0.785
	2BNMR04watO	Water			< 0.0500	0.0500
	2BNWR01watO	Water			< 0.0500	0.0500
	2BNWR02watO	Water			< 0.0500	0.0500
	2BNWR03watO	Water			< 0.0500	0.0500

Analyte	Sample Number	Sample Matrix	Dry Weight (ppb)	DL Dry Weight (ppb)	Wet Weight (ppb)	DL Wet Weight (ppb)
	2BNWR05watO	Water			< 0.0500	0.0500
	2BNWR06watO	Water			< 0.0500	0.0500
	2BNWR07watO	Water			< 0.0500	0.0500
1-methylphenanthrene						
	2BNWR01sed	Sediments	< 5.00	5.00	< 0.630	0.630
	2BNWR02sed	Sediments	< 5.00	5.00	< 0.715	0.715
	2BNWR03sed	Sediments	6.00	5.00	0.924	0.770
	2BNWR04sed	Sediments	13.0	5.00	1.90	0.765
	2BNWR05sed	Sediments	10.0	5.00	1.46	0.730
	2BNWR06sed	Sediments	8.00	5.00	0.952	0.505
	2BNWR07sed	Sediments	< 5.00	5.00	< 0.785	0.785
	2BNMR04watO	Water			< 0.0500	0.0500
	2BNWR01watO	Water			< 0.0500	0.0500
	2BNWR02watO	Water			< 0.0500	0.0500
	2BNWR03watO	Water			< 0.0500	0.0500
	2BNWR05watO	Water			< 0.0500	0.0500
	2BNWR06watO	Water			< 0.0500	0.0500
	2BNWR07watO	Water			< 0.0500	0.0500
2,6-dimethylnaphthalene						
	2BNWR01sed	Sediments	9.00	5.00	1.13	0.630
	2BNWR02sed	Sediments	6.00	5.00	0.858	0.715
	2BNWR03sed	Sediments	< 5.00	5.00	< 0.770	0.770
	2BNWR04sed	Sediments	7.00	5.00	1.07	0.765
	2BNWR05sed	Sediments	8.00	5.00	1.17	0.730
	2BNWR06sed	Sediments	< 5.00	5.00	< 0.505	0.505
	2BNWR07sed	Sediments	< 5.00	5.00	< 0.785	0.785
	2BNMR04watO	Water			< 0.0500	0.0500
	2BNWR01watO	Water			< 0.0500	0.0500
	2BNWR02watO	Water			< 0.0500	0.0500

Analyte	Sample Number	Sample Matrix	Dry Weight (ppb)	DL Dry Weight (ppb)	Wet Weight (ppb)	DL Wet Weight (ppb)
	2BNWR03watO	Water			< 0.0500	0.0500
	2BNWR05watO	Water			< 0.0500	0.0500
	2BNWR06watO	Water			< 0.0500	0.0500
	2BNWR07watO	Water			< 0.0500	0.0500
2-methylnaphthalene						
	2BNWR01sed	Sediments	5.00	5.00	0.630	0.630
	2BNWR02sed	Sediments	< 5.00	5.00	< 0.715	0.715
	2BNWR03sed	Sediments	< 5.00	5.00	< 0.770	0.770
	2BNWR04sed	Sediments	< 5.00	5.00	< 0.765	0.765
	2BNWR05sed	Sediments	5.00	5.00	0.730	0.730
	2BNWR06sed	Sediments	< 5.00	5.00	< 0.505	0.505
	2BNWR07sed	Sediments	< 5.00	5.00	< 0.785	0.785
	2BNMR04watO	Water			< 0.0500	0.0500
	2BNWR01watO	Water			< 0.0500	0.0500
	2BNWR02watO	Water			< 0.0500	0.0500
	2BNWR03watO	Water			< 0.0500	0.0500
	2BNWR05watO	Water			< 0.0500	0.0500
	2BNWR06watO	Water			< 0.0500	0.0500
	2BNWR07watO	Water			< 0.0500	0.0500
Benzo(a)anthracene						
	2BNWR01sed	Sediments	24.0	5.00	3.02	0.630
	2BNWR02sed	Sediments	10.0	5.00	1.43	0.715
	2BNWR03sed	Sediments	10.0	5.00	1.54	0.770
	2BNWR04sed	Sediments	61.0	5.00	9.33	0.765
	2BNWR05sed	Sediments	19.0	5.00	2.77	0.730
	2BNWR06sed	Sediments	23.0	5.00	2.74	0.505
	2BNWR07sed	Sediments	24.0	5.00	3.77	0.785
	2BNMR04watO	Water			< 0.0500	0.0500
	2BNWR01watO	Water			< 0.0500	0.0500

Analyte	Sample Number	Sample Matrix	Dry Weight (ppb)	DL Dry Weight (ppb)	Wet Weight (ppb)	DL Wet Weight (ppb)
	2BNWR02watO	Water			< 0.0500	0.0500
	2BNWR03watO	Water			< 0.0500	0.0500
	2BNWR05watO	Water			< 0.0500	0.0500
	2BNWR06watO	Water			< 0.0500	0.0500
	2BNWR07watO	Water			< 0.0500	0.0500
C1-Fluoranthenes & Pyrenes						
	2BNWR01sed	Sediments	40.0	10.0	6.17	1.26
	2BNWR02sed	Sediments	19.0	10.0	2.72	1.43
	2BNWR03sed	Sediments	16.0	10.0	2.46	1.54
	2BNWR04sed	Sediments	56.0	10.0	8.57	1.53
	2BNWR05sed	Sediments	25.0	10.0	3.05	1.46
	2BNWR06sed	Sediments	< 10.0	10.0	< 1.19	1.19
	2BNWR07sed	Sediments	15.0	10.0	2.30	1.57
	2BNMR04watO	Water			< 0.500	0.500
	2BNWR01watO	Water			< 0.500	0.500
	2BNWR02watO	Water			< 0.500	0.500
	2BNWR03watO	Water			< 0.500	0.500
	2BNWR05watO	Water			< 0.500	0.500
	2BNWR06watO	Water			< 0.500	0.500
	2BNWR07watO	Water			< 0.500	0.500
C1-chrysenes						
	2BNWR01sed	Sediments	120.	10.0	15.1	1.26
	2BNWR02sed	Sediments	65.0	10.0	9.30	1.43
	2BNWR03sed	Sediments	< 10.0	10.0	< 1.54	1.54
	2BNWR04sed	Sediments	20.0	10.0	3.06	1.53
	2BNWR05sed	Sediments	< 10.0	10.0	< 1.46	1.46
	2BNWR06sed	Sediments	< 10.0	10.0	< 1.19	1.19
	2BNWR07sed	Sediments	66.0	10.0	10.4	1.57
	2BNMR04watO	Water			< 0.500	0.500

Analyte	Sample Number	Sample Matrix	Dry Weight (ppb)	DL Dry Weight (ppb)	Wet Weight (ppb)	DL Wet Weight (ppb)
	2BNWR01watO	Water			< 0.500	0.500
	2BNWR02watO	Water			< 0.500	0.500
	2BNWR03watO	Water			< 0.500	0.500
	2BNWR05watO	Water			< 0.500	0.500
	2BNWR06watO	Water			< 0.500	0.500
	2BNWR07watO	Water			< 0.500	0.500
C1-dibenzothiophenes						
	2BNWR01sed	Sediments	< 10.0	10.0	< 1.20	1.20
	2BNWR02sed	Sediments	< 10.0	10.0	< 1.43	1.43
	2BNWR03sed	Sediments	< 10.0	10.0	< 1.54	1.54
	2BNWR04sed	Sediments	< 10.0	10.0	< 1.53	1.53
	2BNWR05sed	Sediments	< 10.0	10.0	< 1.40	1.40
	2BNWR06sed	Sediments	< 10.0	10.0	< 1.10	1.10
	2BNWR07sed	Sediments	< 10.0	10.0	< 1.57	1.57
	2BNMR04watO	Water			< 0.500	0.500
	2BNWR01watO	Water			< 0.500	0.500
	2BNWR02watO	Water			< 0.500	0.500
	2BNWR03watO	Water			< 0.500	0.500
	2BNWR05watO	Water			< 0.500	0.500
	2BNWR06watO	Water			< 0.500	0.500
	2BNWR07watO	Water			< 0.500	0.500
C1-fluorenes						
	2BNWR01sed	Sediments	< 10.0	10.0	< 1.20	1.20
	2BNWR02sed	Sediments	< 10.0	10.0	< 1.43	1.43
	2BNWR03sed	Sediments	11.0	10.0	1.00	1.54
	2BNWR04sed	Sediments	< 10.0	10.0	< 1.53	1.53
	2BNWR05sed	Sediments	< 10.0	10.0	< 1.40	1.40
	2BNWR06sed	Sediments	< 10.0	10.0	< 1.10	1.10
	2BNWR07sed	Sediments	< 10.0	10.0	< 1.57	1.57

Analyte	Sample Number	Sample Matrix	Dry Weight (ppb)	DL Dry Weight (ppb)	Wet Weight (ppb)	DL Wet Weight (ppb)
	2BNMR04watO	Water			< 0.500	0.500
	2BNWR01watO	Water			< 0.500	0.500
	2BNWR02watO	Water			< 0.500	0.500
	2BNWR03watO	Water			< 0.500	0.500
	2BNWR05watO	Water			< 0.500	0.500
	2BNWR06watO	Water			< 0.500	0.500
	2BNWR07watO	Water			< 0.500	0.500
C1-naphthalenes						
	2BNWR01sed	Sediments	< 10.0	10.0	< 1.26	1.26
	2BNWR02sed	Sediments	< 10.0	10.0	< 1.43	1.43
	2BNWR03sed	Sediments	< 10.0	10.0	< 1.54	1.54
	2BNWR04sed	Sediments	< 10.0	10.0	< 1.53	1.53
	2BNWR05sed	Sediments	< 10.0	10.0	< 1.40	1.40
	2BNWR06sed	Sediments	< 10.0	10.0	< 1.10	1.10
	2BNWR07sed	Sediments	< 10.0	10.0	< 1.57	1.57
	2BNMR04watO	Water			< 0.500	0.500
	2BNWR01watO	Water			< 0.500	0.500
	2BNWR02watO	Water			< 0.500	0.500
	2BNWR03watO	Water			< 0.500	0.500
	2BNWR05watO	Water			< 0.500	0.500
	2BNWR06watO	Water			< 0.500	0.500
	2BNWR07watO	Water			< 0.500	0.500
C1-phenanthrenes						
	2BNWR01sed	Sediments	40.0	10.0	5.04	1.26
	2BNWR02sed	Sediments	< 10.0	10.0	< 1.43	1.43
	2BNWR03sed	Sediments	24.0	10.0	3.70	1.54
	2BNWR04sed	Sediments	63.0	10.0	9.04	1.53
	2BNWR05sed	Sediments	32.0	10.0	4.07	1.40
	2BNWR06sed	Sediments	30.0	10.0	4.28	1.10

Analyte	Sample Number	Sample Matrix	Dry Weight (ppb)	DL Dry Weight (ppb)	Wet Weight (ppb)	DL Wet Weight (ppb)
	2BNWR07sed	Sediments	< 10.0	10.0	< 1.57	1.57
	2BNMR04watO	Water			< 0.500	0.500
	2BNWR01watO	Water			< 0.500	0.500
	2BNWR02watO	Water			< 0.500	0.500
	2BNWR03watO	Water			< 0.500	0.500
	2BNWR05watO	Water			< 0.500	0.500
	2BNWR06watO	Water			< 0.500	0.500
	2BNWR07watO	Water			< 0.500	0.500
C2-chrysenes						
	2BNWR01sed	Sediments	40.0	10.0	5.80	1.20
	2BNWR02sed	Sediments	26.0	10.0	4.00	1.43
	2BNWR03sed	Sediments	< 10.0	10.0	< 1.54	1.54
	2BNWR04sed	Sediments	23.0	10.0	3.52	1.53
	2BNWR05sed	Sediments	19.0	10.0	2.77	1.40
	2BNWR06sed	Sediments	10.0	10.0	1.10	1.10
	2BNWR07sed	Sediments	< 10.0	10.0	< 1.57	1.57
	2BNMR04watO	Water			< 0.500	0.500
	2BNWR01watO	Water			< 0.500	0.500
	2BNWR02watO	Water			< 0.500	0.500
	2BNWR03watO	Water			< 0.500	0.500
	2BNWR05watO	Water			< 0.500	0.500
	2BNWR06watO	Water			< 0.500	0.500
	2BNWR07watO	Water			< 0.500	0.500
C2-dibenzothiophenes						
	2BNWR01sed	Sediments	< 10.0	10.0	< 1.20	1.20
	2BNWR02sed	Sediments	< 10.0	10.0	< 1.43	1.43
	2BNWR03sed	Sediments	< 10.0	10.0	< 1.54	1.54
	2BNWR04sed	Sediments	< 10.0	10.0	< 1.53	1.53
	2BNWR05sed	Sediments	< 10.0	10.0	< 1.40	1.40

Analyte	Sample Number	Sample Matrix	Dry Weight (ppb)	DL Dry Weight (ppb)	Wet Weight (ppb)	DL Wet Weight (ppb)
	2BNWR06sed	Sediments	< 10.0	10.0	< 1.10	1.10
	2BNWR07sed	Sediments	< 10.0	10.0	< 1.57	1.57
	2BNMR04watO	Water			< 0.500	0.500
	2BNWR01watO	Water			< 0.500	0.500
	2BNWR02watO	Water			< 0.500	0.500
	2BNWR03watO	Water			< 0.500	0.500
	2BNWR05watO	Water			< 0.500	0.500
	2BNWR06watO	Water			< 0.500	0.500
	2BNWR07watO	Water			< 0.500	0.500
C2-fluorenes						
	2BNWR01sed	Sediments	< 10.0	10.0	< 1.20	1.20
	2BNWR02sed	Sediments	< 10.0	10.0	< 1.43	1.43
	2BNWR03sed	Sediments	< 10.0	10.0	< 1.54	1.54
	2BNWR04sed	Sediments	< 10.0	10.0	< 1.53	1.53
	2BNWR05sed	Sediments	< 10.0	10.0	< 1.40	1.40
	2BNWR06sed	Sediments	< 10.0	10.0	< 1.10	1.10
	2BNWR07sed	Sediments	< 10.0	10.0	< 1.57	1.57
	2BNMR04watO	Water			< 0.500	0.500
	2BNWR01watO	Water			< 0.500	0.500
	2BNWR02watO	Water			< 0.500	0.500
	2BNWR03watO	Water			< 0.500	0.500
	2BNWR05watO	Water			< 0.500	0.500
	2BNWR06watO	Water			< 0.500	0.500
	2BNWR07watO	Water			< 0.500	0.500
C2-naphthalenes						
	2BNWR01sed	Sediments	22.0	10.0	2.77	1.20
	2BNWR02sed	Sediments	10.0	10.0	1.43	1.43
	2BNWR03sed	Sediments	14.0	10.0	2.10	1.54
	2BNWR04sed	Sediments	10.0	10.0	2.45	1.53

Analyte	Sample Number	Sample Matrix	Dry Weight (ppb)	DL Dry Weight (ppb)	Wet Weight (ppb)	DL Wet Weight (ppb)
	2BNWR05sed	Sediments	20.0	10.0	2.02	1.40
	2BNWR06sed	Sediments	12.0	10.0	1.43	1.10
	2BNWR07sed	Sediments	13.0	10.0	2.04	1.57
	2BNMR04watO	Water			< 0.500	0.500
	2BNWR01watO	Water			< 0.500	0.500
	2BNWR02watO	Water			< 0.500	0.500
	2BNWR03watO	Water			< 0.500	0.500
	2BNWR05watO	Water			< 0.500	0.500
	2BNWR06watO	Water			< 0.500	0.500
	2BNWR07watO	Water			< 0.500	0.500
C2-phenanthrenes						
	2BNWR01sed	Sediments	33.0	10.0	4.10	1.20
	2BNWR02sed	Sediments	< 10.0	10.0	< 1.43	1.43
	2BNWR03sed	Sediments	24.0	10.0	3.70	1.54
	2BNWR04sed	Sediments	50.0	10.0	8.57	1.53
	2BNWR05sed	Sediments	24.0	10.0	3.50	1.40
	2BNWR06sed	Sediments	31.0	10.0	3.00	1.10
	2BNWR07sed	Sediments	10.0	10.0	1.57	1.57
	2BNMR04watO	Water			< 0.500	0.500
	2BNWR01watO	Water			< 0.500	0.500
	2BNWR02watO	Water			< 0.500	0.500
	2BNWR03watO	Water			< 0.500	0.500
	2BNWR05watO	Water			< 0.500	0.500
	2BNWR06watO	Water			< 0.500	0.500
	2BNWR07watO	Water			< 0.500	0.500
C3-chrysenes						
	2BNWR01sed	Sediments	< 10.0	10.0	< 1.20	1.20
	2BNWR02sed	Sediments	< 10.0	10.0	< 1.43	1.43
	2BNWR03sed	Sediments	< 10.0	10.0	< 1.54	1.54

Analyte	Sample Number	Sample Matrix	Dry Weight (ppb)	DL Dry Weight (ppb)	Wet Weight (ppb)	DL Wet Weight (ppb)
	2BNWR04sed	Sediments	< 10.0	10.0	< 1.53	1.53
	2BNWR05sed	Sediments	< 10.0	10.0	< 1.40	1.40
	2BNWR06sed	Sediments	< 10.0	10.0	< 1.10	1.10
	2BNWR07sed	Sediments	< 10.0	10.0	< 1.57	1.57
	2BNMR04watO	Water			< 0.500	0.500
	2BNWR01watO	Water			< 0.500	0.500
	2BNWR02watO	Water			< 0.500	0.500
	2BNWR03watO	Water			< 0.500	0.500
	2BNWR05watO	Water			< 0.500	0.500
	2BNWR06watO	Water			< 0.500	0.500
	2BNWR07watO	Water			< 0.500	0.500
C3-dibenzothiophenes						
	2BNWR01sed	Sediments	< 10.0	10.0	< 1.20	1.20
	2BNWR02sed	Sediments	< 10.0	10.0	< 1.43	1.43
	2BNWR03sed	Sediments	< 10.0	10.0	< 1.54	1.54
	2BNWR04sed	Sediments	< 10.0	10.0	< 1.53	1.53
	2BNWR05sed	Sediments	< 10.0	10.0	< 1.40	1.40
	2BNWR06sed	Sediments	< 10.0	10.0	< 1.10	1.10
	2BNWR07sed	Sediments	< 10.0	10.0	< 1.57	1.57
	2BNMR04watO	Water			< 0.500	0.500
	2BNWR01watO	Water			< 0.500	0.500
	2BNWR02watO	Water			< 0.500	0.500
	2BNWR03watO	Water			< 0.500	0.500
	2BNWR05watO	Water			< 0.500	0.500
	2BNWR06watO	Water			< 0.500	0.500
	2BNWR07watO	Water			< 0.500	0.500
C3-fluorenes						
	2BNWR01sed	Sediments	< 10.0	10.0	< 1.20	1.20
	2BNWR02sed	Sediments	< 10.0	10.0	< 1.43	1.43

Analyte	Sample Number	Sample Matrix	Dry Weight (ppb)	DL Dry Weight (ppb)	Wet Weight (ppb)	DL Wet Weight (ppb)
	2BNWR03sed	Sediments	< 10.0	10.0	< 1.54	1.54
	2BNWR04sed	Sediments	< 10.0	10.0	< 1.53	1.53
	2BNWR05sed	Sediments	< 10.0	10.0	< 1.40	1.40
	2BNWR06sed	Sediments	< 10.0	10.0	< 1.10	1.10
	2BNWR07sed	Sediments	< 10.0	10.0	< 1.57	1.57
	2BNMR04watO	Water			< 0.500	0.500
	2BNWR01watO	Water			< 0.500	0.500
	2BNWR02watO	Water			< 0.500	0.500
	2BNWR03watO	Water			< 0.500	0.500
	2BNWR05watO	Water			< 0.500	0.500
	2BNWR06watO	Water			< 0.500	0.500
	2BNWR07watO	Water			< 0.500	0.500
C3-naphthalenes						
	2BNWR01sed	Sediments	17.0	10.0	2.14	1.26
	2BNWR02sed	Sediments	22.0	10.0	3.15	1.43
	2BNWR03sed	Sediments	50.0	10.0	8.02	1.54
	2BNWR04sed	Sediments	35.0	10.0	5.30	1.53
	2BNWR05sed	Sediments	20.0	10.0	2.02	1.40
	2BNWR06sed	Sediments	13.0	10.0	1.55	1.10
	2BNWR07sed	Sediments	20.0	10.0	4.55	1.57
	2BNMR04watO	Water			< 0.500	0.500
	2BNWR01watO	Water			< 0.500	0.500
	2BNWR02watO	Water			< 0.500	0.500
	2BNWR03watO	Water			< 0.500	0.500
	2BNWR05watO	Water			< 0.500	0.500
	2BNWR06watO	Water			< 0.500	0.500
	2BNWR07watO	Water			< 0.500	0.500
C3-phenanthrenes						
	2BNWR01sed	Sediments	47.0	10.0	5.02	1.26

Analyte	Sample Number	Sample Matrix	Dry Weight (ppb)	DL Dry Weight (ppb)	Wet Weight (ppb)	DL Wet Weight (ppb)
	2BNWR02sed	Sediments	23.0	10.0	3.20	1.43
	2BNWR03sed	Sediments	11.0	10.0	1.00	1.54
	2BNWR04sed	Sediments	20.0	10.0	3.08	1.53
	2BNWR05sed	Sediments	25.0	10.0	3.05	1.40
	2BNWR06sed	Sediments	13.0	10.0	1.55	1.10
	2BNWR07sed	Sediments	23.0	10.0	3.01	1.57
	2BNMR04watO	Water			< 0.500	0.500
	2BNWR01watO	Water			< 0.500	0.500
	2BNWR02watO	Water			< 0.500	0.500
	2BNWR03watO	Water			< 0.500	0.500
	2BNWR05watO	Water			< 0.500	0.500
	2BNWR06watO	Water			< 0.500	0.500
	2BNWR07watO	Water			< 0.500	0.500
C4-chrysenes						
	2BNWR01sed	Sediments	< 10.0	10.0	< 1.20	1.20
	2BNWR02sed	Sediments	< 10.0	10.0	< 1.43	1.43
	2BNWR03sed	Sediments	< 10.0	10.0	< 1.54	1.54
	2BNWR04sed	Sediments	< 10.0	10.0	< 1.53	1.53
	2BNWR05sed	Sediments	< 10.0	10.0	< 1.40	1.40
	2BNWR06sed	Sediments	< 10.0	10.0	< 1.10	1.10
	2BNWR07sed	Sediments	< 10.0	10.0	< 1.57	1.57
	2BNMR04watO	Water			< 0.500	0.500
	2BNWR01watO	Water			< 0.500	0.500
	2BNWR02watO	Water			< 0.500	0.500
	2BNWR03watO	Water			< 0.500	0.500
	2BNWR05watO	Water			< 0.500	0.500
	2BNWR06watO	Water			< 0.500	0.500
	2BNWR07watO	Water			< 0.500	0.500
C4-naphthalenes						

Analyte	Sample Number	Sample Matrix	Dry Weight (ppb)	DL Dry Weight (ppb)	Wet Weight (ppb)	DL Wet Weight (ppb)
	2BNWR01sed	Sediments	43.0	10.0	5.42	1.26
	2BNWR02sed	Sediments	40.0	10.0	5.72	1.43
	2BNWR03sed	Sediments	47.0	10.0	7.24	1.54
	2BNWR04sed	Sediments	42.0	10.0	6.43	1.53
	2BNWR05sed	Sediments	47.0	10.0	6.86	1.46
	2BNWR06sed	Sediments	40.0	10.0	4.70	1.10
	2BNWR07sed	Sediments	40.0	10.0	7.00	1.57
	2BNMR04watO	Water			< 0.500	0.500
	2BNWR01watO	Water			< 0.500	0.500
	2BNWR02watO	Water			< 0.500	0.500
	2BNWR03watO	Water			< 0.500	0.500
	2BNWR05watO	Water			< 0.500	0.500
	2BNWR06watO	Water			< 0.500	0.500
	2BNWR07watO	Water			< 0.500	0.500
C4-phenanthrenes						
	2BNWR01sed	Sediments	< 10.0	10.0	< 1.26	1.26
	2BNWR02sed	Sediments	< 10.0	10.0	< 1.43	1.43
	2BNWR03sed	Sediments	< 10.0	10.0	< 1.54	1.54
	2BNWR04sed	Sediments	< 10.0	10.0	< 1.53	1.53
	2BNWR05sed	Sediments	< 10.0	10.0	< 1.46	1.46
	2BNWR06sed	Sediments	< 10.0	10.0	< 1.10	1.10
	2BNWR07sed	Sediments	< 10.0	10.0	< 1.57	1.57
	2BNMR04watO	Water			< 0.500	0.500
	2BNWR01watO	Water			< 0.500	0.500
	2BNWR02watO	Water			< 0.500	0.500
	2BNWR03watO	Water			< 0.500	0.500
	2BNWR05watO	Water			< 0.500	0.500
	2BNWR06watO	Water			< 0.500	0.500
	2BNWR07watO	Water			< 0.500	0.500

Analyte	Sample Number	Sample Matrix	Dry Weight (ppb)	DL Dry Weight (ppb)	Wet Weight (ppb)	DL Wet Weight (ppb)
Dibenz(a,h)anthracene						
	2BNWR01sed	Sediments	6.00	5.00	0.750	0.630
	2BNWR02sed	Sediments	9.00	5.00	1.20	0.715
	2BNWR03sed	Sediments	< 5.00	5.00	< 0.770	0.770
	2BNWR04sed	Sediments	23.0	5.00	3.52	0.765
	2BNWR05sed	Sediments	14.0	5.00	2.04	0.730
	2BNWR06sed	Sediments	8.00	5.00	0.952	0.505
	2BNWR07sed	Sediments	6.00	5.00	0.942	0.785
	2BNMR04watO	Water			< 0.0500	0.0500
	2BNWR01watO	Water			0.0600	0.0500
	2BNWR02watO	Water			< 0.0500	0.0500
	2BNWR03watO	Water			< 0.0500	0.0500
	2BNWR05watO	Water			0.0700	0.0500
	2BNWR06watO	Water			< 0.0500	0.0500
	2BNWR07watO	Water			0.0700	0.0500
HCB						
	2BNWR01sed	Sediments	< 2.00	2.00	< 0.252	0.252
	2BNWR02sed	Sediments	< 2.00	2.00	< 0.280	0.280
	2BNWR03sed	Sediments	< 2.00	2.00	< 0.308	0.308
	2BNWR04sed	Sediments	< 2.00	2.00	< 0.300	0.300
	2BNWR05sed	Sediments	< 2.00	2.00	< 0.202	0.202
	2BNWR06sed	Sediments	< 2.00	2.00	< 0.238	0.238
	2BNWR07sed	Sediments	< 2.00	2.00	< 0.314	0.314
	2BNMR04watO	Water			< 0.0200	0.0200
	2BNWR01watO	Water			< 0.0200	0.0200
	2BNWR02watO	Water			< 0.0200	0.0200
	2BNWR03watO	Water			< 0.0200	0.0200
	2BNWR05watO	Water			< 0.0200	0.0200
	2BNWR06watO	Water			< 0.0200	0.0200

Analyte	Sample Number	Sample Matrix	Dry Weight (ppb)	DL Dry Weight (ppb)	Wet Weight (ppb)	DL Wet Weight (ppb)
	2BNWR07watO	Water			< 0.0200	0.0200
PCB-1242						
	2BNWR01sed	Sediments	< 10.0	10.0	< 1.20	1.20
	2BNWR02sed	Sediments	< 10.0	10.0	< 1.43	1.43
	2BNWR03sed	Sediments	< 10.0	10.0	< 1.54	1.54
	2BNWR04sed	Sediments	< 10.0	10.0	< 1.53	1.53
	2BNWR05sed	Sediments	< 10.0	10.0	< 1.40	1.40
	2BNWR06sed	Sediments	< 10.0	10.0	< 1.10	1.10
	2BNWR07sed	Sediments	< 10.0	10.0	< 1.57	1.57
	2BNMR04watO	Water			< 0.100	0.100
	2BNWR01watO	Water			< 0.100	0.100
	2BNWR02watO	Water			< 0.100	0.100
	2BNWR03watO	Water			< 0.100	0.100
	2BNWR05watO	Water			< 0.100	0.100
	2BNWR06watO	Water			< 0.100	0.100
	2BNWR07watO	Water			< 0.100	0.100
PCB-1248						
	2BNWR01sed	Sediments	< 10.0	10.0	< 1.20	1.20
	2BNWR02sed	Sediments	< 10.0	10.0	< 1.43	1.43
	2BNWR03sed	Sediments	< 10.0	10.0	< 1.54	1.54
	2BNWR04sed	Sediments	< 10.0	10.0	< 1.53	1.53
	2BNWR05sed	Sediments	< 10.0	10.0	< 1.40	1.40
	2BNWR06sed	Sediments	< 10.0	10.0	< 1.10	1.10
	2BNWR07sed	Sediments	< 10.0	10.0	< 1.57	1.57
	2BNMR04watO	Water			< 0.100	0.100
	2BNWR01watO	Water			< 0.100	0.100
	2BNWR02watO	Water			< 0.100	0.100
	2BNWR03watO	Water			< 0.100	0.100
	2BNWR05watO	Water			< 0.100	0.100

Analyte	Sample Number	Sample Matrix	Dry Weight (ppb)	DL Dry Weight (ppb)	Wet Weight (ppb)	DL Wet Weight (ppb)
	2BNWR06watO	Water			< 0.100	0.100
	2BNWR07watO	Water			< 0.100	0.100
PCB-1254						
	2BNWR01sed	Sediments	< 10.0	10.0	< 1.20	1.20
	2BNWR02sed	Sediments	< 10.0	10.0	< 1.43	1.43
	2BNWR03sed	Sediments	< 10.0	10.0	< 1.54	1.54
	2BNWR04sed	Sediments	< 10.0	10.0	< 1.53	1.53
	2BNWR05sed	Sediments	< 10.0	10.0	< 1.40	1.40
	2BNWR06sed	Sediments	< 10.0	10.0	< 1.10	1.10
	2BNWR07sed	Sediments	< 10.0	10.0	< 1.57	1.57
	2BNMR04watO	Water			< 0.100	0.100
	2BNWR01watO	Water			< 0.100	0.100
	2BNWR02watO	Water			< 0.100	0.100
	2BNWR03watO	Water			< 0.100	0.100
	2BNWR05watO	Water			< 0.100	0.100
	2BNWR06watO	Water			< 0.100	0.100
	2BNWR07watO	Water			< 0.100	0.100
PCB-1260						
	2BNWR01sed	Sediments	< 10.0	10.0	< 1.20	1.20
	2BNWR02sed	Sediments	< 10.0	10.0	< 1.43	1.43
	2BNWR03sed	Sediments	< 10.0	10.0	< 1.54	1.54
	2BNWR04sed	Sediments	< 10.0	10.0	< 1.53	1.53
	2BNWR05sed	Sediments	< 10.0	10.0	< 1.40	1.40
	2BNWR06sed	Sediments	< 10.0	10.0	< 1.10	1.10
	2BNWR07sed	Sediments	< 10.0	10.0	< 1.57	1.57
	2BNMR04watO	Water			< 0.100	0.100
	2BNWR01watO	Water			< 0.100	0.100
	2BNWR02watO	Water			< 0.100	0.100
	2BNWR03watO	Water			< 0.100	0.100

Analyte	Sample Number	Sample Matrix	Dry Weight (ppb)	DL Dry Weight (ppb)	Wet Weight (ppb)	DL Wet Weight (ppb)
	2BNWR05watO	Water			< 0.100	0.100
	2BNWR06watO	Water			< 0.100	0.100
	2BNWR07watO	Water			< 0.100	0.100
PCB-TOTAL						
	2BNWR01sed	Sediments	< 10.0	10.0	< 1.26	1.26
	2BNWR02sed	Sediments	< 10.0	10.0	< 1.43	1.43
	2BNWR03sed	Sediments	< 10.0	10.0	< 1.54	1.54
	2BNWR04sed	Sediments	< 10.0	10.0	< 1.53	1.53
	2BNWR05sed	Sediments	< 10.0	10.0	< 1.46	1.46
	2BNWR06sed	Sediments	< 10.0	10.0	< 1.19	1.19
	2BNWR07sed	Sediments	< 10.0	10.0	< 1.57	1.57
	2BNMR04watO	Water			< 0.100	0.100
	2BNWR01watO	Water			< 0.100	0.100
	2BNWR02watO	Water			< 0.100	0.100
	2BNWR03watO	Water			< 0.100	0.100
	2BNWR05watO	Water			< 0.100	0.100
	2BNWR06watO	Water			< 0.100	0.100
	2BNWR07watO	Water			< 0.100	0.100
acenaphthalene						
	2BNWR01sed	Sediments	< 5.00	5.00	< 0.630	0.630
	2BNWR02sed	Sediments	< 5.00	5.00	< 0.715	0.715
	2BNWR03sed	Sediments	< 5.00	5.00	< 0.770	0.770
	2BNWR04sed	Sediments	< 5.00	5.00	< 0.765	0.765
	2BNWR05sed	Sediments	< 5.00	5.00	< 0.730	0.730
	2BNWR06sed	Sediments	< 5.00	5.00	< 0.595	0.595
	2BNWR07sed	Sediments	< 5.00	5.00	< 0.785	0.785
	2BNMR04watO	Water			< 0.0500	0.0500
	2BNWR01watO	Water			< 0.0500	0.0500
	2BNWR02watO	Water			< 0.0500	0.0500

Analyte	Sample Number	Sample Matrix	Dry Weight (ppb)	DL Dry Weight (ppb)	Wet Weight (ppb)	DL Wet Weight (ppb)
	2BNWR03watO	Water			< 0.0500	0.0500
	2BNWR05watO	Water			< 0.0500	0.0500
	2BNWR06watO	Water			< 0.0500	0.0500
	2BNWR07watO	Water			< 0.0500	0.0500
acenaphthene						
	2BNWR01sed	Sediments	6.00	5.00	0.750	0.630
	2BNWR02sed	Sediments	< 5.00	5.00	< 0.715	0.715
	2BNWR03sed	Sediments	8.00	5.00	1.23	0.770
	2BNWR04sed	Sediments	< 5.00	5.00	< 0.765	0.765
	2BNWR05sed	Sediments	< 5.00	5.00	< 0.730	0.730
	2BNWR06sed	Sediments	8.00	5.00	0.952	0.595
	2BNWR07sed	Sediments	5.00	5.00	0.785	0.785
	2BNMR04watO	Water			< 0.0500	0.0500
	2BNWR01watO	Water			< 0.0500	0.0500
	2BNWR02watO	Water			< 0.0500	0.0500
	2BNWR03watO	Water			< 0.0500	0.0500
	2BNWR05watO	Water			< 0.0500	0.0500
	2BNWR06watO	Water			< 0.0500	0.0500
	2BNWR07watO	Water			< 0.0500	0.0500
alpha BHC						
	2BNWR01sed	Sediments	< 2.00	2.00	< 0.252	0.252
	2BNWR02sed	Sediments	< 2.00	2.00	< 0.280	0.280
	2BNWR03sed	Sediments	< 2.00	2.00	< 0.308	0.308
	2BNWR04sed	Sediments	< 2.00	2.00	< 0.306	0.306
	2BNWR05sed	Sediments	< 2.00	2.00	< 0.292	0.292
	2BNWR06sed	Sediments	< 2.00	2.00	< 0.238	0.238
	2BNWR07sed	Sediments	< 2.00	2.00	< 0.314	0.314
	2BNMR04watO	Water			< 0.0200	0.0200
	2BNWR01watO	Water			< 0.0200	0.0200

Analyte	Sample Number	Sample Matrix	Dry Weight (ppb)	DL Dry Weight (ppb)	Wet Weight (ppb)	DL Wet Weight (ppb)
	2BNWR02watO	Water			< 0.0200	0.0200
	2BNWR03watO	Water			< 0.0200	0.0200
	2BNWR05watO	Water			< 0.0200	0.0200
	2BNWR06watO	Water			< 0.0200	0.0200
	2BNWR07watO	Water			< 0.0200	0.0200
alpha chlordane						
	2BNWR01sed	Sediments	3.00	2.00	0.378	0.252
	2BNWR02sed	Sediments	< 2.00	2.00	< 0.286	0.286
	2BNWR03sed	Sediments	< 2.00	2.00	< 0.308	0.308
	2BNWR04sed	Sediments	< 2.00	2.00	< 0.306	0.306
	2BNWR05sed	Sediments	< 2.00	2.00	< 0.292	0.292
	2BNWR06sed	Sediments	< 2.00	2.00	< 0.238	0.238
	2BNWR07sed	Sediments	4.00	2.00	0.628	0.314
	2BNMR04watO	Water			< 0.0200	0.0200
	2BNWR01watO	Water			< 0.0200	0.0200
	2BNWR02watO	Water			< 0.0200	0.0200
	2BNWR03watO	Water			< 0.0200	0.0200
	2BNWR05watO	Water			< 0.0200	0.0200
	2BNWR06watO	Water			< 0.0200	0.0200
	2BNWR07watO	Water			< 0.0200	0.0200
anthracene						
	2BNWR01sed	Sediments	< 5.00	5.00	< 0.630	0.630
	2BNWR02sed	Sediments	< 5.00	5.00	< 0.715	0.715
	2BNWR03sed	Sediments	< 5.00	5.00	< 0.770	0.770
	2BNWR04sed	Sediments	18.0	5.00	2.75	0.765
	2BNWR05sed	Sediments	10.0	5.00	1.46	0.730
	2BNWR06sed	Sediments	12.0	5.00	1.43	0.595
	2BNWR07sed	Sediments	< 5.00	5.00	< 0.785	0.785
	2BNMR04watO	Water			< 0.0500	0.0500

Analyte	Sample Number	Sample Matrix	Dry Weight (ppb)	DL Dry Weight (ppb)	Wet Weight (ppb)	DL Wet Weight (ppb)
	2BNWR01watO	Water			< 0.0500	0.0500
	2BNWR02watO	Water			< 0.0500	0.0500
	2BNWR03watO	Water			< 0.0500	0.0500
	2BNWR05watO	Water			< 0.0500	0.0500
	2BNWR06watO	Water			< 0.0500	0.0500
	2BNWR07watO	Water			< 0.0500	0.0500
benzo(a)pyrene						
	2BNWR01sed	Sediments	30.0	5.00	4.01	0.630
	2BNWR02sed	Sediments	40.0	5.00	7.01	0.715
	2BNWR03sed	Sediments	17.0	5.00	2.62	0.770
	2BNWR04sed	Sediments	87.0	5.00	13.3	0.765
	2BNWR05sed	Sediments	51.0	5.00	7.45	0.730
	2BNWR06sed	Sediments	19.0	5.00	2.20	0.595
	2BNWR07sed	Sediments	7.00	5.00	1.10	0.785
	2BNMR04watO	Water			< 0.0500	0.0500
	2BNWR01watO	Water			< 0.0500	0.0500
	2BNWR02watO	Water			< 0.0500	0.0500
	2BNWR03watO	Water			< 0.0500	0.0500
	2BNWR05watO	Water			< 0.0500	0.0500
	2BNWR06watO	Water			< 0.0500	0.0500
	2BNWR07watO	Water			< 0.0500	0.0500
benzo(b)fluoranthene						
	2BNWR01sed	Sediments	63.0	5.00	7.04	0.630
	2BNWR02sed	Sediments	34.0	5.00	4.80	0.715
	2BNWR03sed	Sediments	21.0	5.00	3.23	0.770
	2BNWR04sed	Sediments	95.0	5.00	14.5	0.765
	2BNWR05sed	Sediments	26.0	5.00	3.80	0.730
	2BNWR06sed	Sediments	27.0	5.00	3.21	0.595
	2BNWR07sed	Sediments	18.0	5.00	2.83	0.785

Analyte	Sample Number	Sample Matrix	Dry Weight (ppb)	DL Dry Weight (ppb)	Wet Weight (ppb)	DL Wet Weight (ppb)
	2BNMR04watO	Water			< 0.0500	0.0500
	2BNWR01watO	Water			< 0.0500	0.0500
	2BNWR02watO	Water			< 0.0500	0.0500
	2BNWR03watO	Water			< 0.0500	0.0500
	2BNWR05watO	Water			< 0.0500	0.0500
	2BNWR06watO	Water			< 0.0500	0.0500
	2BNWR07watO	Water			< 0.0500	0.0500
benzo(e)pyrene						
	2BNWR01sed	Sediments	47.0	5.00	5.02	0.630
	2BNWR02sed	Sediments	19.0	5.00	2.72	0.715
	2BNWR03sed	Sediments	15.0	5.00	2.31	0.770
	2BNWR04sed	Sediments	54.0	5.00	8.20	0.765
	2BNWR05sed	Sediments	27.0	5.00	3.94	0.730
	2BNWR06sed	Sediments	21.0	5.00	2.50	0.505
	2BNWR07sed	Sediments	8.00	5.00	1.20	0.785
	2BNMR04watO	Water			< 0.0500	0.0500
	2BNWR01watO	Water			< 0.0500	0.0500
	2BNWR02watO	Water			< 0.0500	0.0500
	2BNWR03watO	Water			< 0.0500	0.0500
	2BNWR05watO	Water			< 0.0500	0.0500
	2BNWR06watO	Water			< 0.0500	0.0500
	2BNWR07watO	Water			< 0.0500	0.0500
benzo(g,h,i)perylene						
	2BNWR01sed	Sediments	38.0	5.00	4.70	0.630
	2BNWR02sed	Sediments	27.0	5.00	3.80	0.715
	2BNWR03sed	Sediments	26.0	5.00	4.31	0.770
	2BNWR04sed	Sediments	20.0	5.00	3.00	0.765
	2BNWR05sed	Sediments	12.0	5.00	1.75	0.730
	2BNWR06sed	Sediments	22.0	5.00	2.02	0.505

Analyte	Sample Number	Sample Matrix	Dry Weight (ppb)	DL Dry Weight (ppb)	Wet Weight (ppb)	DL Wet Weight (ppb)
	2BNWR07sed	Sediments	11.0	5.00	1.73	0.785
	2BNMR04watO	Water			< 0.0500	0.0500
	2BNWR01watO	Water			< 0.0500	0.0500
	2BNWR02watO	Water			< 0.0500	0.0500
	2BNWR03watO	Water			< 0.0500	0.0500
	2BNWR05watO	Water			0.100	0.0500
	2BNWR06watO	Water			0.0700	0.0500
	2BNWR07watO	Water			0.140	0.0500
benzo(k)fluoranthene						
	2BNWR01sed	Sediments	58.0	5.00	7.31	0.630
	2BNWR02sed	Sediments	21.0	5.00	3.00	0.715
	2BNWR03sed	Sediments	7.00	5.00	1.08	0.770
	2BNWR04sed	Sediments	62.0	5.00	9.40	0.765
	2BNWR05sed	Sediments	41.0	5.00	5.00	0.730
	2BNWR06sed	Sediments	10.0	5.00	1.90	0.595
	2BNWR07sed	Sediments	< 5.00	5.00	< 0.785	0.785
	2BNMR04watO	Water			< 0.0500	0.0500
	2BNWR01watO	Water			< 0.0500	0.0500
	2BNWR02watO	Water			< 0.0500	0.0500
	2BNWR03watO	Water			< 0.0500	0.0500
	2BNWR05watO	Water			< 0.0500	0.0500
	2BNWR06watO	Water			< 0.0500	0.0500
	2BNWR07watO	Water			< 0.0500	0.0500
beta BHC						
	2BNWR01sed	Sediments	< 2.00	2.00	< 0.252	0.252
	2BNWR02sed	Sediments	< 2.00	2.00	< 0.280	0.280
	2BNWR03sed	Sediments	< 2.00	2.00	< 0.308	0.308
	2BNWR04sed	Sediments	< 2.00	2.00	< 0.300	0.300
	2BNWR05sed	Sediments	< 2.00	2.00	< 0.202	0.202

Analyte	Sample Number	Sample Matrix	Dry Weight (ppb)	DL Dry Weight (ppb)	Wet Weight (ppb)	DL Wet Weight (ppb)
	2BNWR06sed	Sediments	< 2.00	2.00	< 0.238	0.238
	2BNWR07sed	Sediments	< 2.00	2.00	< 0.314	0.314
	2BNMR04watO	Water			< 0.0200	0.0200
	2BNWR01watO	Water			< 0.0200	0.0200
	2BNWR02watO	Water			< 0.0200	0.0200
	2BNWR03watO	Water			< 0.0200	0.0200
	2BNWR05watO	Water			< 0.0200	0.0200
	2BNWR06watO	Water			< 0.0200	0.0200
	2BNWR07watO	Water			< 0.0200	0.0200
biphenyl						
	2BNWR01sed	Sediments	< 5.00	5.00	< 0.630	0.630
	2BNWR02sed	Sediments	< 5.00	5.00	< 0.715	0.715
	2BNWR03sed	Sediments	< 5.00	5.00	< 0.770	0.770
	2BNWR04sed	Sediments	5.00	5.00	0.765	0.765
	2BNWR05sed	Sediments	7.00	5.00	1.02	0.730
	2BNWR06sed	Sediments	5.00	5.00	0.505	0.505
	2BNWR07sed	Sediments	< 5.00	5.00	< 0.785	0.785
	2BNMR04watO	Water			< 0.0500	0.0500
	2BNWR01watO	Water			< 0.0500	0.0500
	2BNWR02watO	Water			< 0.0500	0.0500
	2BNWR03watO	Water			< 0.0500	0.0500
	2BNWR05watO	Water			< 0.0500	0.0500
	2BNWR06watO	Water			< 0.0500	0.0500
	2BNWR07watO	Water			< 0.0500	0.0500
chrysene						
	2BNWR01sed	Sediments	38.0	5.00	4.70	0.630
	2BNWR02sed	Sediments	7.00	5.00	1.00	0.715
	2BNWR03sed	Sediments	20.0	5.00	3.08	0.770
	2BNWR04sed	Sediments	71.0	5.00	10.0	0.765

Analyte	Sample Number	Sample Matrix	Dry Weight (ppb)	DL Dry Weight (ppb)	Wet Weight (ppb)	DL Wet Weight (ppb)
	2BNWR05sed	Sediments	24.0	5.00	3.50	0.730
	2BNWR06sed	Sediments	33.0	5.00	3.03	0.505
	2BNWR07sed	Sediments	21.0	5.00	3.30	0.785
	2BNMR04watO	Water			< 0.0500	0.0500
	2BNWR01watO	Water			0.100	0.0500
	2BNWR02watO	Water			0.0700	0.0500
	2BNWR03watO	Water			0.0700	0.0500
	2BNWR05watO	Water			< 0.0500	0.0500
	2BNWR06watO	Water			< 0.0500	0.0500
	2BNWR07watO	Water			< 0.0500	0.0500
cis-nonachlor						
	2BNWR01sed	Sediments	< 2.00	2.00	< 0.252	0.252
	2BNWR02sed	Sediments	< 2.00	2.00	< 0.280	0.280
	2BNWR03sed	Sediments	< 2.00	2.00	< 0.308	0.308
	2BNWR04sed	Sediments	< 2.00	2.00	< 0.306	0.306
	2BNWR05sed	Sediments	< 2.00	2.00	< 0.202	0.202
	2BNWR06sed	Sediments	< 2.00	2.00	< 0.238	0.238
	2BNWR07sed	Sediments	2.00	2.00	0.314	0.314
	2BNMR04watO	Water			< 0.0200	0.0200
	2BNWR01watO	Water			< 0.0200	0.0200
	2BNWR02watO	Water			< 0.0200	0.0200
	2BNWR03watO	Water			< 0.0200	0.0200
	2BNWR05watO	Water			< 0.0200	0.0200
	2BNWR06watO	Water			< 0.0200	0.0200
	2BNWR07watO	Water			< 0.0200	0.0200
delta BHC						
	2BNWR01sed	Sediments	< 2.00	2.00	< 0.252	0.252
	2BNWR02sed	Sediments	< 2.00	2.00	< 0.280	0.280
	2BNWR03sed	Sediments	< 2.00	2.00	< 0.308	0.308

Analyte	Sample Number	Sample Matrix	Dry Weight (ppb)	DL Dry Weight (ppb)	Wet Weight (ppb)	DL Wet Weight (ppb)
	2BNWR04sed	Sediments	< 2.00	2.00	< 0.300	0.300
	2BNWR05sed	Sediments	< 2.00	2.00	< 0.202	0.202
	2BNWR06sed	Sediments	< 2.00	2.00	< 0.238	0.238
	2BNWR07sed	Sediments	< 2.00	2.00	< 0.314	0.314
	2BNMR04watO	Water			< 0.0200	0.0200
	2BNWR01watO	Water			< 0.0200	0.0200
	2BNWR02watO	Water			< 0.0200	0.0200
	2BNWR03watO	Water			< 0.0200	0.0200
	2BNWR05watO	Water			< 0.0200	0.0200
	2BNWR06watO	Water			< 0.0200	0.0200
	2BNWR07watO	Water			< 0.0200	0.0200
dibenzothiophene						
	2BNWR01sed	Sediments	10.0	5.00	1.20	0.630
	2BNWR02sed	Sediments	14.0	5.00	2.00	0.715
	2BNWR03sed	Sediments	< 5.00	5.00	< 0.770	0.770
	2BNWR04sed	Sediments	14.0	5.00	2.14	0.765
	2BNWR05sed	Sediments	5.00	5.00	0.730	0.730
	2BNWR06sed	Sediments	7.00	5.00	0.833	0.595
	2BNWR07sed	Sediments	15.0	5.00	2.30	0.785
	2BNMR04watO	Water			< 0.0500	0.0500
	2BNWR01watO	Water			< 0.0500	0.0500
	2BNWR02watO	Water			< 0.0500	0.0500
	2BNWR03watO	Water			< 0.0500	0.0500
	2BNWR05watO	Water			< 0.0500	0.0500
	2BNWR06watO	Water			< 0.0500	0.0500
	2BNWR07watO	Water			< 0.0500	0.0500
dieldrin						
	2BNWR01sed	Sediments	3.00	2.00	0.378	0.252
	2BNWR02sed	Sediments	2.00	2.00	0.280	0.280

Analyte	Sample Number	Sample Matrix	Dry Weight (ppb)	DL Dry Weight (ppb)	Wet Weight (ppb)	DL Wet Weight (ppb)
	2BNWR03sed	Sediments	2.00	2.00	0.308	0.308
	2BNWR04sed	Sediments	< 2.00	2.00	< 0.300	0.300
	2BNWR05sed	Sediments	< 2.00	2.00	< 0.292	0.292
	2BNWR06sed	Sediments	< 2.00	2.00	< 0.238	0.238
	2BNWR07sed	Sediments	2.00	2.00	0.314	0.314
	2BNMR04watO	Water			< 0.0200	0.0200
	2BNWR01watO	Water			< 0.0200	0.0200
	2BNWR02watO	Water			< 0.0200	0.0200
	2BNWR03watO	Water			< 0.0200	0.0200
	2BNWR05watO	Water			< 0.0200	0.0200
	2BNWR06watO	Water			< 0.0200	0.0200
	2BNWR07watO	Water			< 0.0200	0.0200
endrin						
	2BNWR01sed	Sediments	< 2.00	2.00	< 0.252	0.252
	2BNWR02sed	Sediments	< 2.00	2.00	< 0.280	0.280
	2BNWR03sed	Sediments	< 2.00	2.00	< 0.308	0.308
	2BNWR04sed	Sediments	< 2.00	2.00	< 0.300	0.300
	2BNWR05sed	Sediments	< 2.00	2.00	< 0.292	0.292
	2BNWR06sed	Sediments	< 2.00	2.00	< 0.238	0.238
	2BNWR07sed	Sediments	< 2.00	2.00	< 0.314	0.314
	2BNMR04watO	Water			< 0.0200	0.0200
	2BNWR01watO	Water			< 0.0200	0.0200
	2BNWR02watO	Water			< 0.0200	0.0200
	2BNWR03watO	Water			< 0.0200	0.0200
	2BNWR05watO	Water			< 0.0200	0.0200
	2BNWR06watO	Water			< 0.0200	0.0200
	2BNWR07watO	Water			< 0.0200	0.0200
fluoranthene						
	2BNWR01sed	Sediments	50.0	5.00	6.30	0.630

Analyte	Sample Number	Sample Matrix	Dry Weight (ppb)	DL Dry Weight (ppb)	Wet Weight (ppb)	DL Wet Weight (ppb)
	2BNWR02sed	Sediments	27.0	5.00	3.80	0.715
	2BNWR03sed	Sediments	47.0	5.00	7.24	0.770
	2BNWR04sed	Sediments	170.	5.00	20.0	0.705
	2BNWR05sed	Sediments	75.0	5.00	11.0	0.730
	2BNWR06sed	Sediments	80.0	5.00	10.2	0.505
	2BNWR07sed	Sediments	28.0	5.00	4.40	0.785
	2BNMR04watO	Water			< 0.0500	0.0500
	2BNWR01watO	Water			< 0.0500	0.0500
	2BNWR02watO	Water			< 0.0500	0.0500
	2BNWR03watO	Water			< 0.0500	0.0500
	2BNWR05watO	Water			< 0.0500	0.0500
	2BNWR06watO	Water			< 0.0500	0.0500
	2BNWR07watO	Water			< 0.0500	0.0500
fluorene						
	2BNWR01sed	Sediments	6.00	5.00	0.750	0.630
	2BNWR02sed	Sediments	5.00	5.00	0.715	0.715
	2BNWR03sed	Sediments	14.0	5.00	2.10	0.770
	2BNWR04sed	Sediments	18.0	5.00	2.75	0.705
	2BNWR05sed	Sediments	14.0	5.00	2.04	0.730
	2BNWR06sed	Sediments	12.0	5.00	1.43	0.505
	2BNWR07sed	Sediments	9.00	5.00	1.41	0.785
	2BNMR04watO	Water			< 0.0500	0.0500
	2BNWR01watO	Water			< 0.0500	0.0500
	2BNWR02watO	Water			< 0.0500	0.0500
	2BNWR03watO	Water			< 0.0500	0.0500
	2BNWR05watO	Water			< 0.0500	0.0500
	2BNWR06watO	Water			< 0.0500	0.0500
	2BNWR07watO	Water			< 0.0500	0.0500
gamma BHC						

Analyte	Sample Number	Sample Matrix	Dry Weight (ppb)	DL Dry Weight (ppb)	Wet Weight (ppb)	DL Wet Weight (ppb)
	2BNWR01sed	Sediments	< 2.00	2.00	< 0.252	0.252
	2BNWR02sed	Sediments	< 2.00	2.00	< 0.280	0.280
	2BNWR03sed	Sediments	< 2.00	2.00	< 0.308	0.308
	2BNWR04sed	Sediments	< 2.00	2.00	< 0.300	0.300
	2BNWR05sed	Sediments	< 2.00	2.00	< 0.202	0.202
	2BNWR06sed	Sediments	< 2.00	2.00	< 0.238	0.238
	2BNWR07sed	Sediments	< 2.00	2.00	< 0.314	0.314
	2BNMR04watO	Water			< 0.0200	0.0200
	2BNWR01watO	Water			< 0.0200	0.0200
	2BNWR02watO	Water			< 0.0200	0.0200
	2BNWR03watO	Water			< 0.0200	0.0200
	2BNWR05watO	Water			< 0.0200	0.0200
	2BNWR06watO	Water			< 0.0200	0.0200
	2BNWR07watO	Water			< 0.0200	0.0200
gamma chlordane						
	2BNWR01sed	Sediments	< 2.00	2.00	< 0.252	0.252
	2BNWR02sed	Sediments	< 2.00	2.00	< 0.280	0.280
	2BNWR03sed	Sediments	< 2.00	2.00	< 0.308	0.308
	2BNWR04sed	Sediments	< 2.00	2.00	< 0.300	0.300
	2BNWR05sed	Sediments	< 2.00	2.00	< 0.202	0.202
	2BNWR06sed	Sediments	< 2.00	2.00	< 0.238	0.238
	2BNWR07sed	Sediments	6.00	2.00	0.042	0.314
	2BNMR04watO	Water			< 0.0200	0.0200
	2BNWR01watO	Water			< 0.0200	0.0200
	2BNWR02watO	Water			< 0.0200	0.0200
	2BNWR03watO	Water			< 0.0200	0.0200
	2BNWR05watO	Water			< 0.0200	0.0200
	2BNWR06watO	Water			< 0.0200	0.0200
	2BNWR07watO	Water			< 0.0200	0.0200

Analyte	Sample Number	Sample Matrix	Dry Weight (ppb)	DL Dry Weight (ppb)	Wet Weight (ppb)	DL Wet Weight (ppb)
heptachlor epoxide						
	2BNWR01sed	Sediments	< 2.00	2.00	< 0.252	0.252
	2BNWR02sed	Sediments	< 2.00	2.00	< 0.280	0.280
	2BNWR03sed	Sediments	< 2.00	2.00	< 0.308	0.308
	2BNWR04sed	Sediments	< 2.00	2.00	< 0.300	0.300
	2BNWR05sed	Sediments	< 2.00	2.00	< 0.202	0.202
	2BNWR06sed	Sediments	< 2.00	2.00	< 0.238	0.238
	2BNWR07sed	Sediments	< 2.00	2.00	< 0.314	0.314
	2BNMR04watO	Water			< 0.0200	0.0200
	2BNWR01watO	Water			< 0.0200	0.0200
	2BNWR02watO	Water			< 0.0200	0.0200
	2BNWR03watO	Water			< 0.0200	0.0200
	2BNWR05watO	Water			< 0.0200	0.0200
	2BNWR06watO	Water			< 0.0200	0.0200
	2BNWR07watO	Water			< 0.0200	0.0200
indeno(1,2,3-cd)pyrene						
	2BNWR01sed	Sediments	40.0	5.00	5.04	0.630
	2BNWR02sed	Sediments	20.0	5.00	2.80	0.715
	2BNWR03sed	Sediments	17.0	5.00	2.02	0.770
	2BNWR04sed	Sediments	60.0	5.00	9.18	0.765
	2BNWR05sed	Sediments	24.0	5.00	3.50	0.730
	2BNWR06sed	Sediments	21.0	5.00	2.50	0.505
	2BNWR07sed	Sediments	11.0	5.00	1.73	0.785
	2BNMR04watO	Water			0.0600	0.0500
	2BNWR01watO	Water			0.0600	0.0500
	2BNWR02watO	Water			< 0.0500	0.0500
	2BNWR03watO	Water			0.0600	0.0500
	2BNWR05watO	Water			0.0700	0.0500
	2BNWR06watO	Water			< 0.0500	0.0500

Analyte	Sample Number	Sample Matrix	Dry Weight (ppb)	DL Dry Weight (ppb)	Wet Weight (ppb)	DL Wet Weight (ppb)
	2BNWR07watO	Water			0.500	0.0500
mirex						
	2BNWR01sed	Sediments	< 2.00	2.00	< 0.252	0.252
	2BNWR02sed	Sediments	< 2.00	2.00	< 0.280	0.280
	2BNWR03sed	Sediments	< 2.00	2.00	< 0.308	0.308
	2BNWR04sed	Sediments	< 2.00	2.00	< 0.300	0.300
	2BNWR05sed	Sediments	< 2.00	2.00	< 0.202	0.202
	2BNWR06sed	Sediments	< 2.00	2.00	< 0.238	0.238
	2BNWR07sed	Sediments	< 2.00	2.00	< 0.314	0.314
	2BNMR04watO	Water			< 0.0200	0.0200
	2BNWR01watO	Water			< 0.0200	0.0200
	2BNWR02watO	Water			< 0.0200	0.0200
	2BNWR03watO	Water			< 0.0200	0.0200
	2BNWR05watO	Water			< 0.0200	0.0200
	2BNWR06watO	Water			< 0.0200	0.0200
	2BNWR07watO	Water			< 0.0200	0.0200
naphthalene						
	2BNWR01sed	Sediments	7.00	5.00	0.882	0.630
	2BNWR02sed	Sediments	7.00	5.00	1.00	0.715
	2BNWR03sed	Sediments	7.00	5.00	1.08	0.770
	2BNWR04sed	Sediments	10.0	5.00	1.53	0.765
	2BNWR05sed	Sediments	10.0	5.00	1.40	0.730
	2BNWR06sed	Sediments	9.00	5.00	1.07	0.505
	2BNWR07sed	Sediments	6.00	5.00	0.942	0.785
	2BNMR04watO	Water			0.0000	0.0500
	2BNWR01watO	Water			0.0500	0.0500
	2BNWR02watO	Water			< 0.0500	0.0500
	2BNWR03watO	Water			0.0500	0.0500
	2BNWR05watO	Water			< 0.0500	0.0500

Analyte	Sample Number	Sample Matrix	Dry Weight (ppb)	DL Dry Weight (ppb)	Wet Weight (ppb)	DL Wet Weight (ppb)
	2BNWR06watO	Water			< 0.0500	0.0500
	2BNWR07watO	Water			< 0.0500	0.0500
o,p'-DDD						
	2BNWR01sed	Sediments	< 2.00	2.00	< 0.252	0.252
	2BNWR02sed	Sediments	< 2.00	2.00	< 0.286	0.286
	2BNWR03sed	Sediments	< 2.00	2.00	< 0.308	0.308
	2BNWR04sed	Sediments	< 2.00	2.00	< 0.306	0.306
	2BNWR05sed	Sediments	< 2.00	2.00	< 0.202	0.202
	2BNWR06sed	Sediments	< 2.00	2.00	< 0.238	0.238
	2BNWR07sed	Sediments	< 2.00	2.00	< 0.314	0.314
	2BNMR04watO	Water			< 0.0200	0.0200
	2BNWR01watO	Water			< 0.0200	0.0200
	2BNWR02watO	Water			< 0.0200	0.0200
	2BNWR03watO	Water			< 0.0200	0.0200
	2BNWR05watO	Water			< 0.0200	0.0200
	2BNWR06watO	Water			< 0.0200	0.0200
	2BNWR07watO	Water			< 0.0200	0.0200
o,p'-DDE						
	2BNWR01sed	Sediments	< 2.00	2.00	< 0.252	0.252
	2BNWR02sed	Sediments	< 2.00	2.00	< 0.286	0.286
	2BNWR03sed	Sediments	< 2.00	2.00	< 0.308	0.308
	2BNWR04sed	Sediments	< 2.00	2.00	< 0.306	0.306
	2BNWR05sed	Sediments	< 2.00	2.00	< 0.202	0.202
	2BNWR06sed	Sediments	< 2.00	2.00	< 0.238	0.238
	2BNWR07sed	Sediments	< 2.00	2.00	< 0.314	0.314
	2BNMR04watO	Water			< 0.0200	0.0200
	2BNWR01watO	Water			< 0.0200	0.0200
	2BNWR02watO	Water			< 0.0200	0.0200
	2BNWR03watO	Water			< 0.0200	0.0200

Analyte	Sample Number	Sample Matrix	Dry Weight (ppb)	DL Dry Weight (ppb)	Wet Weight (ppb)	DL Wet Weight (ppb)
	2BNWR05watO	Water			< 0.0200	0.0200
	2BNWR06watO	Water			< 0.0200	0.0200
	2BNWR07watO	Water			< 0.0200	0.0200
o,p'-DDT						
	2BNWR01sed	Sediments	< 2.00	2.00	< 0.252	0.252
	2BNWR02sed	Sediments	< 2.00	2.00	< 0.286	0.286
	2BNWR03sed	Sediments	< 2.00	2.00	< 0.308	0.308
	2BNWR04sed	Sediments	< 2.00	2.00	< 0.306	0.306
	2BNWR05sed	Sediments	< 2.00	2.00	< 0.202	0.202
	2BNWR06sed	Sediments	< 2.00	2.00	< 0.238	0.238
	2BNWR07sed	Sediments	< 2.00	2.00	< 0.314	0.314
	2BNMR04watO	Water			< 0.0200	0.0200
	2BNWR01watO	Water			< 0.0200	0.0200
	2BNWR02watO	Water			< 0.0200	0.0200
	2BNWR03watO	Water			< 0.0200	0.0200
	2BNWR05watO	Water			< 0.0200	0.0200
	2BNWR06watO	Water			< 0.0200	0.0200
	2BNWR07watO	Water			< 0.0200	0.0200
oxychlordane						
	2BNWR01sed	Sediments	< 2.00	2.00	< 0.252	0.252
	2BNWR02sed	Sediments	< 2.00	2.00	< 0.286	0.286
	2BNWR03sed	Sediments	< 2.00	2.00	< 0.308	0.308
	2BNWR04sed	Sediments	< 2.00	2.00	< 0.306	0.306
	2BNWR05sed	Sediments	< 2.00	2.00	< 0.202	0.202
	2BNWR06sed	Sediments	< 2.00	2.00	< 0.238	0.238
	2BNWR07sed	Sediments	< 2.00	2.00	< 0.314	0.314
	2BNMR04watO	Water			< 0.0200	0.0200
	2BNWR01watO	Water			< 0.0200	0.0200
	2BNWR02watO	Water			< 0.0200	0.0200

Analyte	Sample Number	Sample Matrix	Dry Weight (ppb)	DL Dry Weight (ppb)	Wet Weight (ppb)	DL Wet Weight (ppb)
	2BNWR03watO	Water			< 0.0200	0.0200
	2BNWR05watO	Water			< 0.0200	0.0200
	2BNWR06watO	Water			< 0.0200	0.0200
	2BNWR07watO	Water			< 0.0200	0.0200
p,p'-DDD						
	2BNWR01sed	Sediments	3.00	2.00	0.378	0.252
	2BNWR02sed	Sediments	3.00	2.00	0.420	0.280
	2BNWR03sed	Sediments	< 2.00	2.00	< 0.308	0.308
	2BNWR04sed	Sediments	3.00	2.00	0.450	0.300
	2BNWR05sed	Sediments	3.00	2.00	0.438	0.292
	2BNWR06sed	Sediments	4.00	2.00	0.476	0.238
	2BNWR07sed	Sediments	4.00	2.00	0.628	0.314
	2BNMR04watO	Water			< 0.0200	0.0200
	2BNWR01watO	Water			< 0.0200	0.0200
	2BNWR02watO	Water			< 0.0200	0.0200
	2BNWR03watO	Water			< 0.0200	0.0200
	2BNWR05watO	Water			< 0.0200	0.0200
	2BNWR06watO	Water			< 0.0200	0.0200
	2BNWR07watO	Water			< 0.0200	0.0200
p,p'-DDE						
	2BNWR01sed	Sediments	6.00	2.00	0.756	0.252
	2BNWR02sed	Sediments	< 2.00	2.00	< 0.280	0.280
	2BNWR03sed	Sediments	< 2.00	2.00	< 0.308	0.308
	2BNWR04sed	Sediments	< 2.00	2.00	< 0.300	0.300
	2BNWR05sed	Sediments	< 2.00	2.00	< 0.292	0.292
	2BNWR06sed	Sediments	< 2.00	2.00	< 0.238	0.238
	2BNWR07sed	Sediments	2.00	2.00	0.314	0.314
	2BNMR04watO	Water			< 0.0200	0.0200
	2BNWR01watO	Water			< 0.0200	0.0200

Analyte	Sample Number	Sample Matrix	Dry Weight (ppb)	DL Dry Weight (ppb)	Wet Weight (ppb)	DL Wet Weight (ppb)
	2BNWR02watO	Water			< 0.0200	0.0200
	2BNWR03watO	Water			< 0.0200	0.0200
	2BNWR05watO	Water			< 0.0200	0.0200
	2BNWR06watO	Water			< 0.0200	0.0200
	2BNWR07watO	Water			< 0.0200	0.0200
p,p'-DDT						
	2BNWR01sed	Sediments	< 2.00	2.00	< 0.252	0.252
	2BNWR02sed	Sediments	< 2.00	2.00	< 0.286	0.286
	2BNWR03sed	Sediments	< 2.00	2.00	< 0.308	0.308
	2BNWR04sed	Sediments	< 2.00	2.00	< 0.300	0.300
	2BNWR05sed	Sediments	< 2.00	2.00	< 0.292	0.292
	2BNWR06sed	Sediments	< 2.00	2.00	< 0.238	0.238
	2BNWR07sed	Sediments	< 2.00	2.00	< 0.314	0.314
	2BNMR04watO	Water			< 0.0200	0.0200
	2BNWR01watO	Water			< 0.0200	0.0200
	2BNWR02watO	Water			< 0.0200	0.0200
	2BNWR03watO	Water			< 0.0200	0.0200
	2BNWR05watO	Water			< 0.0200	0.0200
	2BNWR06watO	Water			< 0.0200	0.0200
	2BNWR07watO	Water			< 0.0200	0.0200
perylene						
	2BNWR01sed	Sediments	770.	5.00	97.0	0.630
	2BNWR02sed	Sediments	240.	5.00	34.3	0.715
	2BNWR03sed	Sediments	330.	5.00	50.8	0.770
	2BNWR04sed	Sediments	84.0	5.00	12.9	0.765
	2BNWR05sed	Sediments	66.0	5.00	9.93	0.730
	2BNWR06sed	Sediments	40.0	5.00	4.76	0.595
	2BNWR07sed	Sediments	430.	5.00	67.5	0.785
	2BNMR04watO	Water			0.0000	0.0500

Analyte	Sample Number	Sample Matrix	Dry Weight (ppb)	DL Dry Weight (ppb)	Wet Weight (ppb)	DL Wet Weight (ppb)
	2BNWR01watO	Water			0.0800	0.0500
	2BNWR02watO	Water			0.0700	0.0500
	2BNWR03watO	Water			0.100	0.0500
	2BNWR05watO	Water			0.100	0.0500
	2BNWR06watO	Water			0.0600	0.0500
	2BNWR07watO	Water			0.200	0.0500
phenanthrene						
	2BNWR01sed	Sediments	30.0	5.00	3.78	0.630
	2BNWR02sed	Sediments	17.0	5.00	2.43	0.715
	2BNWR03sed	Sediments	25.0	5.00	3.85	0.770
	2BNWR04sed	Sediments	62.0	5.00	9.40	0.765
	2BNWR05sed	Sediments	42.0	5.00	6.13	0.730
	2BNWR06sed	Sediments	33.0	5.00	3.93	0.595
	2BNWR07sed	Sediments	25.0	5.00	3.92	0.785
	2BNMR04watO	Water			< 0.0500	0.0500
	2BNWR01watO	Water			0.0600	0.0500
	2BNWR02watO	Water			< 0.0500	0.0500
	2BNWR03watO	Water			< 0.0500	0.0500
	2BNWR05watO	Water			< 0.0500	0.0500
	2BNWR06watO	Water			< 0.0500	0.0500
	2BNWR07watO	Water			< 0.0500	0.0500
pyrene						
	2BNWR01sed	Sediments	47.0	5.00	5.92	0.630
	2BNWR02sed	Sediments	22.0	5.00	3.15	0.715
	2BNWR03sed	Sediments	35.0	5.00	5.39	0.770
	2BNWR04sed	Sediments	120.	5.00	18.4	0.765
	2BNWR05sed	Sediments	53.0	5.00	7.74	0.730
	2BNWR06sed	Sediments	63.0	5.00	7.50	0.595
	2BNWR07sed	Sediments	21.0	5.00	3.30	0.785

Analyte	Sample Number	Sample Matrix	Dry Weight (ppb)	DL Dry Weight (ppb)	Wet Weight (ppb)	DL Wet Weight (ppb)
	2BNMR04watO	Water			< 0.0500	0.0500
	2BNWR01watO	Water			< 0.0500	0.0500
	2BNWR02watO	Water			< 0.0500	0.0500
	2BNWR03watO	Water			< 0.0500	0.0500
	2BNWR05watO	Water			< 0.0500	0.0500
	2BNWR06watO	Water			< 0.0500	0.0500
	2BNWR07watO	Water			< 0.0500	0.0500
toxaphene						
	2BNWR01sed	Sediments	< 50.0	50.0	< 6.30	6.30
	2BNWR02sed	Sediments	< 50.0	50.0	< 7.15	7.15
	2BNWR03sed	Sediments	< 50.0	50.0	< 7.70	7.70
	2BNWR04sed	Sediments	< 50.0	50.0	< 7.05	7.05
	2BNWR05sed	Sediments	< 50.0	50.0	< 7.30	7.30
	2BNWR06sed	Sediments	< 50.0	50.0	< 5.05	5.05
	2BNWR07sed	Sediments	< 50.0	50.0	< 7.85	7.85
	2BNMR04watO	Water			< 1.00	1.00
	2BNWR01watO	Water			< 1.00	1.00
	2BNWR02watO	Water			< 1.00	1.00
	2BNWR03watO	Water			< 1.00	1.00
	2BNWR05watO	Water			< 1.00	1.00
	2BNWR06watO	Water			< 1.00	1.00
	2BNWR07watO	Water			< 1.00	1.00
trans-nonachlor						
	2BNWR01sed	Sediments	2.00	2.00	0.252	0.252
	2BNWR02sed	Sediments	< 2.00	2.00	< 0.280	0.280
	2BNWR03sed	Sediments	< 2.00	2.00	< 0.308	0.308
	2BNWR04sed	Sediments	< 2.00	2.00	< 0.300	0.300
	2BNWR05sed	Sediments	< 2.00	2.00	< 0.202	0.202
	2BNWR06sed	Sediments	< 2.00	2.00	< 0.238	0.238

Analyte	Sample Number	Sample Matrix	Dry Weight (ppb)	DL Dry Weight (ppb)	Wet Weight (ppb)	DL Wet Weight (ppb)
	2BNWR07sed	Sediments	3.00	2.00	0.471	0.314
	2BNMR04watO	Water			< 0.0200	0.0200
	2BNWR01watO	Water			< 0.0200	0.0200
	2BNWR02watO	Water			< 0.0200	0.0200
	2BNWR03watO	Water			< 0.0200	0.0200
	2BNWR05watO	Water			< 0.0200	0.0200
	2BNWR06watO	Water			< 0.0200	0.0200
	2BNWR07watO	Water			< 0.0200	0.0200

5. Procedural Blanks

Analyte	Lab Sample Number	Lab Sample Matrix	Result Total UG	** BEC (ppb/%)	Basis
1,6,7-Trimethyl-naphthalene					
	76018	Water	0.000	< 0.0500	Wet
	76027	Soil/Sediment	0.000	< 5.00	Dry
1-methylnaphthalene					
	76018	Water	0.000	< 0.0500	Wet
	76027	Soil/Sediment	0.000	< 5.00	Dry
1-methylphenanthrene					
	76018	Water	0.000	< 0.0500	Wet
	76027	Soil/Sediment	0.000	< 5.00	Dry
2,6-dimethylnaphthalene					
	76018	Water	0.000	< 0.0500	Wet
	76027	Soil/Sediment	0.000	< 5.00	Dry
2-methylnaphthalene					
	76018	Water	0.000	< 0.0500	Wet
	76027	Soil/Sediment	0.000	< 5.00	Dry
Benzo(a)anthracene					
	76018	Water	0.000	< 0.0500	Wet
	76027	Soil/Sediment	0.000	< 5.00	Dry
C1-Fluoranthenes & Pyrenes					
	76018	Water	0.000	< 0.500	Wet
	76027	Soil/Sediment	0.000	< 10.0	Dry
C1-chrysenes					
	76018	Water	0.000	< 0.500	Wet
	76027	Soil/Sediment	0.000	< 10.0	Dry
C1-dibenzothiophenes					
	76018	Water	0.000	< 0.500	Wet
	76027	Soil/Sediment	0.000	< 10.0	Dry
C1-fluorenes					
	76018	Water	0.000	< 0.500	Wet
	76027	Soil/Sediment	0.000	< 10.0	Dry

Analyte	Lab Sample Number	Lab Sample Matrix	Result Total UG	** BEC (ppb/%)	Basis
C1-naphthalenes					
	70018	Water	0.000	< 0.500	Wet
	70027	Soil/Sediment	0.000	< 10.0	Dry
C1-phenanthrenes					
	70018	Water	0.000	< 0.500	Wet
	70027	Soil/Sediment	0.000	< 10.0	Dry
C2-chrysenes					
	70018	Water	0.000	< 0.500	Wet
	70027	Soil/Sediment	0.000	< 10.0	Dry
C2-dibenzothiophenes					
	70018	Water	0.000	< 0.500	Wet
	70027	Soil/Sediment	0.000	< 10.0	Dry
C2-fluorenes					
	70018	Water	0.000	< 0.500	Wet
	70027	Soil/Sediment	0.000	< 10.0	Dry
C2-naphthalenes					
	70018	Water	0.000	< 0.500	Wet
	70027	Soil/Sediment	0.000	< 10.0	Dry
C2-phenanthrenes					
	70018	Water	0.000	< 0.500	Wet
	70027	Soil/Sediment	0.000	< 10.0	Dry
C3-chrysenes					
	70018	Water	0.000	< 0.500	Wet
	70027	Soil/Sediment	0.000	< 10.0	Dry
C3-dibenzothiophenes					
	70018	Water	0.000	< 0.500	Wet
	70027	Soil/Sediment	0.000	< 10.0	Dry
C3-fluorenes					
	70018	Water	0.000	< 0.500	Wet
	70027	Soil/Sediment	0.000	< 10.0	Dry
C3-naphthalenes					
	70018	Water	0.000	< 0.500	Wet
	70027	Soil/Sediment	0.000	< 10.0	Dry

Analyte	Lab Sample Number	Lab Sample Matrix	Result Total UG	** BEC (ppb/%)	Basis
C3-phenanthrenes					
	70018	Water	0.000	< 0.500	Wet
	70027	Soil/Sediment	0.000	< 10.0	Dry
C4-chrysenes					
	70018	Water	0.000	< 0.500	Wet
	70027	Soil/Sediment	0.000	< 10.0	Dry
C4-naphthalenes					
	70018	Water	0.000	< 0.500	Wet
	70027	Soil/Sediment	0.00540	27.0	Dry
C4-phenanthrenes					
	70018	Water	0.000	< 0.500	Wet
	70027	Soil/Sediment	0.000	< 10.0	Dry
Dibenz(a,h)anthracene					
	70018	Water	0.000	< 0.0500	Wet
	70027	Soil/Sediment	0.000	< 5.00	Dry
HCB					
	70018	Water	0.000	< 0.0200	Wet
	70027	Soil/Sediment	0.000	< 2.00	Dry
PCB-1242					
	70018	Water	0.000	< 0.100	Wet
	70027	Soil/Sediment	0.000	< 10.0	Dry
PCB-1248					
	70018	Water	0.000	< 0.100	Wet
	70027	Soil/Sediment	0.000	< 10.0	Dry
PCB-1254					
	70018	Water	0.000	< 0.100	Wet
	70027	Soil/Sediment	0.000	< 10.0	Dry
PCB-1260					
	70018	Water	0.000	< 0.100	Wet
	70027	Soil/Sediment	0.000	< 10.0	Dry
PCB-TOTAL					
	70018	Water	0.000	< 0.100	Wet
	70027	Soil/Sediment	0.000	< 10.0	Dry

Analyte	Lab Sample Number	Lab Sample Matrix	Result Total UG	** BEC (ppb/%)	Basis
acenaphthalene					
	70018	Water	0.000	< 0.0500	Wet
	70027	Soil/Sediment	0.000	< 5.00	Dry
acenaphthene					
	70018	Water	0.000	< 0.0500	Wet
	70027	Soil/Sediment	0.00120	6.00	Dry
alpha BHC					
	70018	Water	0.000	< 0.0200	Wet
	70027	Soil/Sediment	0.000	< 2.00	Dry
alpha chlordane					
	70018	Water	0.000	< 0.0200	Wet
	70027	Soil/Sediment	0.000	< 2.00	Dry
anthracene					
	70018	Water	0.000	< 0.0500	Wet
	70027	Soil/Sediment	0.000	< 5.00	Dry
benzo(a)pyrene					
	70018	Water	0.000	< 0.0500	Wet
	70027	Soil/Sediment	0.000	< 5.00	Dry
benzo(b)fluoranthene					
	70018	Water	0.000	< 0.0500	Wet
	70027	Soil/Sediment	0.000	< 5.00	Dry
benzo(e)pyrene					
	70018	Water	0.000	< 0.0500	Wet
	70027	Soil/Sediment	0.000	< 5.00	Dry
benzo(g,h,i)perylene					
	70018	Water	0.0350	0.0700	Wet
	70027	Soil/Sediment	0.00100	8.00	Dry
benzo(k)fluoranthene					
	70018	Water	0.000	< 0.0500	Wet
	70027	Soil/Sediment	0.000	< 5.00	Dry
beta BHC					
	70018	Water	0.000	< 0.0200	Wet
	70027	Soil/Sediment	0.000	< 2.00	Dry

Analyte	Lab Sample Number	Lab Sample Matrix	Result Total UG	** BEC (ppb/%)	Basis
biphenyl					
	70018	Water	0.000	< 0.0500	Wet
	70027	Soil/Sediment	0.000	< 5.00	Dry
chrysene					
	70018	Water	0.0300	0.0000	Wet
	70027	Soil/Sediment	0.00100	8.00	Dry
cis-nonachlor					
	70018	Water	0.000	< 0.0200	Wet
	70027	Soil/Sediment	0.000	< 2.00	Dry
delta BHC					
	70018	Water	0.000	< 0.0200	Wet
	70027	Soil/Sediment	0.000	< 2.00	Dry
dibenzothiophene					
	70018	Water	0.000	< 0.0500	Wet
	70027	Soil/Sediment	0.00180	9.00	Dry
dieldrin					
	70018	Water	0.000	< 0.0200	Wet
	70027	Soil/Sediment	0.000	< 2.00	Dry
endrin					
	70018	Water	0.000	< 0.0200	Wet
	70027	Soil/Sediment	0.000	< 2.00	Dry
fluoranthene					
	70018	Water	0.000	< 0.0500	Wet
	70027	Soil/Sediment	0.000	< 5.00	Dry
fluorene					
	70018	Water	0.000	< 0.0500	Wet
	70027	Soil/Sediment	0.000	< 5.00	Dry
gamma BHC					
	70018	Water	0.000	< 0.0200	Wet
	70027	Soil/Sediment	0.000	< 2.00	Dry
gamma chlordane					
	70018	Water	0.000	< 0.0200	Wet
	70027	Soil/Sediment	0.000	< 2.00	Dry

Analyte	Lab Sample Number	Lab Sample Matrix	Result Total UG	** BEC (ppb/%)	Basis
heptachlor epoxide					
	76018	Water	0.000	< 0.0200	Wet
	76027	Soil/Sediment	0.000	< 2.00	Dry
indeno(1,2,3-cd)pyrene					
	76018	Water	0.000	< 0.0500	Wet
	76027	Soil/Sediment	0.000	< 5.00	Dry
mirex					
	76018	Water	0.000	< 0.0200	Wet
	76027	Soil/Sediment	0.000	< 2.00	Dry
naphthalene					
	76018	Water	0.000	< 0.0500	Wet
	76027	Soil/Sediment	0.00140	7.00	Dry
o,p'-DDD					
	76018	Water	0.000	< 0.0200	Wet
	76027	Soil/Sediment	0.000	< 2.00	Dry
o,p'-DDE					
	76018	Water	0.000	< 0.0200	Wet
	76027	Soil/Sediment	0.000	< 2.00	Dry
o,p'-DDT					
	76018	Water	0.000	< 0.0200	Wet
	76027	Soil/Sediment	0.000	< 2.00	Dry
oxychlordane					
	76018	Water	0.000	< 0.0200	Wet
	76027	Soil/Sediment	0.000	< 2.00	Dry
p,p'-DDD					
	76018	Water	0.000	< 0.0200	Wet
	76027	Soil/Sediment	0.000	< 2.00	Dry
p,p'-DDE					
	76018	Water	0.000	< 0.0200	Wet
	76027	Soil/Sediment	0.000	< 2.00	Dry
p,p'-DDT					
	76018	Water	0.000	< 0.0200	Wet
	76027	Soil/Sediment	0.000	< 2.00	Dry

Analyte	Lab Sample Number	Lab Sample Matrix	Result Total UG	** BEC (ppb/%)	Basis
perylene					
	70018	Water	0.0850	0.170	Wet
	70027	Soil/Sediment	0.00240	12.0	Dry
phenanthrene					
	70018	Water	0.000	< 0.0500	Wet
	70027	Soil/Sediment	0.00120	6.00	Dry
pyrene					
	70018	Water	0.000	< 0.0500	Wet
	70027	Soil/Sediment	0.000	< 5.00	Dry
toxaphene					
	70018	Water	0.000	< 1.00	Wet
	70027	Soil/Sediment	0.000	< 50.0	Dry
trans-nonachlor					
	70018	Water	0.000	< 0.0200	Wet
	70027	Soil/Sediment	0.000	< 2.00	Dry

** Blank Equivalent Concentration

6. Duplicates

Analyte	Sample Number	Sample Matrix	Basis	Initial Result (ppb/%)	Duplicate Result (ppb/%)	Average	Relative Percent Diff.
% Moisture							
	2BNWR01sed	Sediments	Percent	87.4	87.7	87.6	0.340
1,6,7-Trimethyl-naphthalene							
	2BNWR01sed	Sediments	Dry	< 5.00	< 5.00	2.50	0.000
	2BNWR01wat O	Water	Wet	< 0.0500	< 0.0500	0.0250	0.000
1-methylnaphthalene							
	2BNWR01sed	Sediments	Dry	< 5.00	< 5.00	2.50	0.000
	2BNWR01wat O	Water	Wet	< 0.0500	< 0.0500	0.0250	0.000
1-methylphenanthrene							
	2BNWR01sed	Sediments	Dry	< 5.00	< 5.00	2.50	0.000
	2BNWR01wat O	Water	Wet	< 0.0500	< 0.0500	0.0250	0.000
2,6-dimethylnaphthalene							
	2BNWR01sed	Sediments	Dry	9.00	8.00	8.50	11.8
	2BNWR01wat O	Water	Wet	< 0.0500	< 0.0500	0.0250	0.000
2-methylnaphthalene							
	2BNWR01sed	Sediments	Dry	5.00	5.00	5.00	0.000
	2BNWR01wat O	Water	Wet	< 0.0500	< 0.0500	0.0250	0.000
Benzo(a)anthracene							
	2BNWR01sed	Sediments	Dry	24.0	20.0	22.0	18.2
	2BNWR01wat O	Water	Wet	< 0.0500	< 0.0500	0.0250	0.000
C1-Fluoranthenes & Pyrenes							
	2BNWR01sed	Sediments	Dry	49.0	42.0	45.5	15.4
	2BNWR01wat O	Water	Wet	< 0.500	< 0.500	0.250	0.000
C1-chrysenes							

Analyte	Sample Number	Sample Matrix	Basis	Initial Result (ppb/%)	Duplicate Result (ppb/%)	Average	Relative Percent Diff.
	2BNWR01sed	Sediments	Dry	120.	110.	115	8.70
	2BNWR01wat O	Water	Wet	< 0.500	< 0.500	0.250	0.000
C1-dibenzothiophenes							
	2BNWR01sed	Sediments	Dry	< 10.0	< 10.0	5.00	0.000
	2BNWR01wat O	Water	Wet	< 0.500	< 0.500	0.250	0.000
C1-fluorenes							
	2BNWR01sed	Sediments	Dry	< 10.0	< 10.0	5.00	0.000
	2BNWR01wat O	Water	Wet	< 0.500	< 0.500	0.250	0.000
C1-naphthalenes							
	2BNWR01sed	Sediments	Dry	< 10.0	< 10.0	5.00	0.000
	2BNWR01wat O	Water	Wet	< 0.500	< 0.500	0.250	0.000
C1-phenanthrenes							
	2BNWR01sed	Sediments	Dry	40.0	26.0	33.0	42.4
	2BNWR01wat O	Water	Wet	< 0.500	< 0.500	0.250	0.000
C2-chrysenes							
	2BNWR01sed	Sediments	Dry	46.0	29.0	37.5	45.3
	2BNWR01wat O	Water	Wet	< 0.500	< 0.500	0.250	0.000
C2-dibenzothiophenes							
	2BNWR01sed	Sediments	Dry	< 10.0	< 10.0	5.00	0.000
	2BNWR01wat O	Water	Wet	< 0.500	< 0.500	0.250	0.000
C2-fluorenes							
	2BNWR01sed	Sediments	Dry	< 10.0	< 10.0	5.00	0.000
	2BNWR01wat O	Water	Wet	< 0.500	< 0.500	0.250	0.000
C2-naphthalenes							
	2BNWR01sed	Sediments	Dry	22.0	24.0	23.0	8.70
	2BNWR01wat	Water	Wet	< 0.500	< 0.500	0.250	0.000

Analyte	Sample Number	Sample Matrix	Basis	Initial Result (ppb/%)	Duplicate Result (ppb/%)	Average	Relative Percent Diff.
	O						
C2-phenanthrenes							
	2BNWR01sed	Sediments	Dry	33.0	31.0	32.0	6.25
	2BNWR01wat O	Water	Wet	< 0.500	< 0.500	0.250	0.000
C3-chrysenes							
	2BNWR01sed	Sediments	Dry	< 10.0	< 10.0	5.00	0.000
	2BNWR01wat O	Water	Wet	< 0.500	< 0.500	0.250	0.000
C3-dibenzothiophenes							
	2BNWR01sed	Sediments	Dry	< 10.0	< 10.0	5.00	0.000
	2BNWR01wat O	Water	Wet	< 0.500	< 0.500	0.250	0.000
C3-fluorenes							
	2BNWR01sed	Sediments	Dry	< 10.0	< 10.0	5.00	0.000
	2BNWR01wat O	Water	Wet	< 0.500	< 0.500	0.250	0.000
C3-naphthalenes							
	2BNWR01sed	Sediments	Dry	17.0	21.0	19.0	21.0
	2BNWR01wat O	Water	Wet	< 0.500	< 0.500	0.250	0.000
C3-phenanthrenes							
	2BNWR01sed	Sediments	Dry	47.0	29.0	38.0	47.4
	2BNWR01wat O	Water	Wet	< 0.500	< 0.500	0.250	0.000
C4-chrysenes							
	2BNWR01sed	Sediments	Dry	< 10.0	< 10.0	5.00	0.000
	2BNWR01wat O	Water	Wet	< 0.500	< 0.500	0.250	0.000
C4-naphthalenes							
	2BNWR01sed	Sediments	Dry	43.0	64.0	53.5	30.2
	2BNWR01wat O	Water	Wet	< 0.500	< 0.500	0.250	0.000

Analyte	Sample Number	Sample Matrix	Basis	Initial Result (ppb/%)	Duplicate Result (ppb/%)	Average	Relative Percent Diff.
C4-phenanthrenes							
	2BNWR01sed	Sediments	Dry	< 10.0	< 10.0	5.00	0.000
	2BNWR01wat O	Water	Wet	< 0.500	< 0.500	0.250	0.000
Dibenz(a,h)anthracene							
	2BNWR01sed	Sediments	Dry	0.00	15.0	10.5	85.7
	2BNWR01wat O	Water	Wet	0.0000	0.0500	0.0550	18.2
HCB							
	2BNWR01sed	Sediments	Dry	< 2.00	< 2.00	1.00	0.000
	2BNWR01wat O	Water	Wet	< 0.0200	< 0.0200	0.0100	0.000
PCB-1242							
	2BNWR01sed	Sediments	Dry	< 10.0	< 10.0	5.00	0.000
	2BNWR01wat O	Water	Wet	< 0.100	< 0.100	0.0500	0.000
PCB-1248							
	2BNWR01sed	Sediments	Dry	< 10.0	< 10.0	5.00	0.000
	2BNWR01wat O	Water	Wet	< 0.100	< 0.100	0.0500	0.000
PCB-1254							
	2BNWR01sed	Sediments	Dry	< 10.0	< 10.0	5.00	0.000
	2BNWR01wat O	Water	Wet	< 0.100	< 0.100	0.0500	0.000
PCB-1260							
	2BNWR01sed	Sediments	Dry	< 10.0	< 10.0	5.00	0.000
	2BNWR01wat O	Water	Wet	< 0.100	< 0.100	0.0500	0.000
PCB-TOTAL							
	2BNWR01sed	Sediments	Dry	< 10.0	< 10.0	5.00	0.000
	2BNWR01wat O	Water	Wet	< 0.100	< 0.100	0.0500	0.000
acenaphthalene							
	2BNWR01sed	Sediments	Dry	< 5.00	< 5.00	2.50	0.000

Analyte	Sample Number	Sample Matrix	Basis	Initial Result (ppb/%)	Duplicate Result (ppb/%)	Average	Relative Percent Diff.
	2BNWR01wat O	Water	Wet	< 0.0500	< 0.0500	0.0250	0.000
acenaphthene							
	2BNWR01sed	Sediments	Dry	6.00	14.0	10.0	80.0
	2BNWR01wat O	Water	Wet	< 0.0500	< 0.0500	0.0250	0.000
alpha BHC							
	2BNWR01sed	Sediments	Dry	< 2.00	< 2.00	1.00	0.000
	2BNWR01wat O	Water	Wet	< 0.0200	< 0.0200	0.0100	0.000
alpha chlordane							
	2BNWR01sed	Sediments	Dry	3.00	2.00	2.50	40.0
	2BNWR01wat O	Water	Wet	< 0.0200	< 0.0200	0.0100	0.000
anthracene							
	2BNWR01sed	Sediments	Dry	< 5.00	5.00	3.75	66.7
	2BNWR01wat O	Water	Wet	< 0.0500	< 0.0500	0.0250	0.000
benzo(a)pyrene							
	2BNWR01sed	Sediments	Dry	39.0	36.0	37.5	8.00
	2BNWR01wat O	Water	Wet	< 0.0500	< 0.0500	0.0250	0.000
benzo(b)fluoranthene							
	2BNWR01sed	Sediments	Dry	63.0	49.0	56.0	25.0
	2BNWR01wat O	Water	Wet	< 0.0500	< 0.0500	0.0250	0.000
benzo(e)pyrene							
	2BNWR01sed	Sediments	Dry	47.0	42.0	44.5	11.2
	2BNWR01wat O	Water	Wet	< 0.0500	< 0.0500	0.0250	0.000
benzo(g,h,i)perylene							
	2BNWR01sed	Sediments	Dry	38.0	47.0	42.5	21.2
	2BNWR01wat O	Water	Wet	< 0.0500	< 0.0500	0.0250	0.000

Analyte	Sample Number	Sample Matrix	Basis	Initial Result (ppb/%)	Duplicate Result (ppb/%)	Average	Relative Percent Diff.
benzo(k)fluoranthene							
	2BNWR01sed	Sediments	Dry	58.0	40.0	49.0	30.7
	2BNWR01wat O	Water	Wet	< 0.0500	< 0.0500	0.0250	0.000
beta BHC							
	2BNWR01sed	Sediments	Dry	< 2.00	< 2.00	1.00	0.000
	2BNWR01wat O	Water	Wet	< 0.0200	< 0.0200	0.0100	0.000
biphenyl							
	2BNWR01sed	Sediments	Dry	< 5.00	< 5.00	2.50	0.000
	2BNWR01wat O	Water	Wet	< 0.0500	< 0.0500	0.0250	0.000
chrysene							
	2BNWR01sed	Sediments	Dry	38.0	16.0	27.0	81.5
	2BNWR01wat O	Water	Wet	0.100	0.0800	0.0900	22.2
cis-nonachlor							
	2BNWR01sed	Sediments	Dry	< 2.00	< 2.00	1.00	0.000
	2BNWR01wat O	Water	Wet	< 0.0200	< 0.0200	0.0100	0.000
delta BHC							
	2BNWR01sed	Sediments	Dry	< 2.00	< 2.00	1.00	0.000
	2BNWR01wat O	Water	Wet	< 0.0200	< 0.0200	0.0100	0.000
dibenzothiophene							
	2BNWR01sed	Sediments	Dry	10.0	11.0	10.5	9.52
	2BNWR01wat O	Water	Wet	< 0.0500	< 0.0500	0.0250	0.000
dieldrin							
	2BNWR01sed	Sediments	Dry	3.00	2.00	2.50	40.0
	2BNWR01wat O	Water	Wet	< 0.0200	< 0.0200	0.0100	0.000
endrin							
	2BNWR01sed	Sediments	Dry	< 2.00	< 2.00	1.00	0.000

Analyte	Sample Number	Sample Matrix	Basis	Initial Result (ppb/%)	Duplicate Result (ppb/%)	Average	Relative Percent Diff.
	2BNWR01wat O	Water	Wet	< 0.0200	< 0.0200	0.0100	0.000
fluoranthene							
	2BNWR01sed	Sediments	Dry	50.0	58.0	54.0	14.8
	2BNWR01wat O	Water	Wet	< 0.0500	< 0.0500	0.0250	0.000
fluorene							
	2BNWR01sed	Sediments	Dry	6.00	6.00	6.00	0.000
	2BNWR01wat O	Water	Wet	< 0.0500	< 0.0500	0.0250	0.000
gamma BHC							
	2BNWR01sed	Sediments	Dry	< 2.00	< 2.00	1.00	0.000
	2BNWR01wat O	Water	Wet	< 0.0200	< 0.0200	0.0100	0.000
gamma chlordane							
	2BNWR01sed	Sediments	Dry	< 2.00	< 2.00	1.00	0.000
	2BNWR01wat O	Water	Wet	< 0.0200	< 0.0200	0.0100	0.000
heptachlor epoxide							
	2BNWR01sed	Sediments	Dry	< 2.00	< 2.00	1.00	0.000
	2BNWR01wat O	Water	Wet	< 0.0200	< 0.0200	0.0100	0.000
indeno(1,2,3-cd)pyrene							
	2BNWR01sed	Sediments	Dry	40.0	48.0	44.0	18.2
	2BNWR01wat O	Water	Wet	0.0600	< 0.0500	0.0425	82.4
mirex							
	2BNWR01sed	Sediments	Dry	< 2.00	< 2.00	1.00	0.000
	2BNWR01wat O	Water	Wet	< 0.0200	< 0.0200	0.0100	0.000
naphthalene							
	2BNWR01sed	Sediments	Dry	7.00	9.00	8.00	25.0
	2BNWR01wat O	Water	Wet	0.0500	0.0500	0.0500	0.000

Analyte	Sample Number	Sample Matrix	Basis	Initial Result (ppb/%)	Duplicate Result (ppb/%)	Average	Relative Percent Diff.
o,p'-DDD							
	2BNWR01sed	Sediments	Dry	< 2.00	< 2.00	1.00	0.000
	2BNWR01wat O	Water	Wet	< 0.0200	< 0.0200	0.0100	0.000
o,p'-DDE							
	2BNWR01sed	Sediments	Dry	< 2.00	< 2.00	1.00	0.000
	2BNWR01wat O	Water	Wet	< 0.0200	< 0.0200	0.0100	0.000
o,p'-DDT							
	2BNWR01sed	Sediments	Dry	< 2.00	< 2.00	1.00	0.000
	2BNWR01wat O	Water	Wet	< 0.0200	< 0.0200	0.0100	0.000
oxychlordane							
	2BNWR01sed	Sediments	Dry	< 2.00	< 2.00	1.00	0.000
	2BNWR01wat O	Water	Wet	< 0.0200	< 0.0200	0.0100	0.000
p,p'-DDD							
	2BNWR01sed	Sediments	Dry	3.00	3.00	3.00	0.000
	2BNWR01wat O	Water	Wet	< 0.0200	< 0.0200	0.0100	0.000
p,p'-DDE							
	2BNWR01sed	Sediments	Dry	6.00	4.00	5.00	40.0
	2BNWR01wat O	Water	Wet	< 0.0200	< 0.0200	0.0100	0.000
p,p'-DDT							
	2BNWR01sed	Sediments	Dry	< 2.00	< 2.00	1.00	0.000
	2BNWR01wat O	Water	Wet	< 0.0200	< 0.0200	0.0100	0.000
perylene							
	2BNWR01sed	Sediments	Dry	770.	700.	735	9.52
	2BNWR01wat O	Water	Wet	0.0800	0.120	0.100	40.0
phenanthrene							
	2BNWR01sed	Sediments	Dry	30.0	25.0	27.5	18.2

Analyte	Sample Number	Sample Matrix	Basis	Initial Result (ppb/%)	Duplicate Result (ppb/%)	Average	Relative Percent Diff.
	2BNWR01wat O	Water	Wet	0.0600	0.0500	0.0550	18.2
pyrene							
	2BNWR01sed	Sediments	Dry	47.0	58.0	52.5	21.0
	2BNWR01wat O	Water	Wet	< 0.0500	< 0.0500	0.0250	0.000
toxaphene							
	2BNWR01sed	Sediments	Dry	< 50.0	< 50.0	25.0	0.000
	2BNWR01wat O	Water	Wet	< 1.00	< 1.00	0.500	0.000
trans-nonachlor							
	2BNWR01sed	Sediments	Dry	2.00	2.00	2.00	0.000
	2BNWR01wat O	Water	Wet	< 0.0200	< 0.0200	0.0100	0.000

7. Spike Recoveries

Analyte	Sample Number	Sample Matrix	Basis	Spike Level (ppb/%)	Amount Recovered (ppb/%)	*** Spike Background	Percent Recovery
1,6,7-Trimethyl-naphthalene							
	2BNWR01sed	Sediments	Dry	500.	292	200.	58.5
	*76010	Water	Wet	5.00	3.81		76.2
1-methylnaphthalene							
	2BNWR01sed	Sediments	Dry	500.	258	200.	51.5
	*76010	Water	Wet	5.00	3.40		68.0
1-methylphenanthrene							
	2BNWR01sed	Sediments	Dry	500.	362	200.	72.3
	*76010	Water	Wet	5.00	4.32		86.4
2,6-dimethylnaphthalene							
	2BNWR01sed	Sediments	Dry	500.	268	55.6	53.6
	*76010	Water	Wet	5.00	3.41		68.2
2-methylnaphthalene							
	2BNWR01sed	Sediments	Dry	500.	250.	100.	50.0
	*76010	Water	Wet	5.00	3.42		68.4
Benzo(a)anthracene							
	2BNWR01sed	Sediments	Dry	500.	383	20.8	76.6
	*76010	Water	Wet	5.00	4.75		95.0
C1-naphthalenes							
	2BNWR01sed	Sediments	Dry	1000	510.	200.	51.0
	*76010	Water	Wet	10.0	6.01		60.1
C1-phenanthrenes							
	2BNWR01sed	Sediments	Dry	500.	335	12.5	67.0
	*76010	Water	Wet	5.00	4.32		86.4
C2-naphthalenes							
	2BNWR01sed	Sediments	Dry	500.	263	22.7	52.6
	*76010	Water	Wet	5.00	3.41		68.2
C3-naphthalenes							
	2BNWR01sed	Sediments	Dry	500.	703	20.4	141

Analyte	Sample Number	Sample Matrix	Basis	Spike Level (ppb/%)	Amount Recovered (ppb/%)	*** Spike Background	Percent Recovery
	*70010	Water	Wet	5.00	3.81		76.2
Dibenz(a,h)anthracene							
	2BNWR01sed	Sediments	Dry	500.	332	83.3	66.4
	*70010	Water	Wet	5.00	3.89		77.8
HCB							
	2BNWR01sed	Sediments	Dry	100.	85.0	100.	85.0
	*70010	Water	Wet	1.00	1.00		100.
acenaphthalene							
	2BNWR01sed	Sediments	Dry	500.	264	200.	52.7
	*70010	Water	Wet	5.00	3.60		72.0
acenaphthene							
	2BNWR01sed	Sediments	Dry	500.	278	83.3	55.6
	*70010	Water	Wet	5.00	3.78		75.6
alpha BHC							
	2BNWR01sed	Sediments	Dry	100.	77.0	100.	77.0
	*70010	Water	Wet	1.00	1.00		100.
alpha chlordane							
	2BNWR01sed	Sediments	Dry	100.	78.0	33.3	78.0
	*70010	Water	Wet	1.00	0.800		80.0
anthracene							
	2BNWR01sed	Sediments	Dry	500.	338	200.	67.5
	*70010	Water	Wet	5.00	3.99		79.8
benzo(a)pyrene							
	2BNWR01sed	Sediments	Dry	500.	301	12.8	60.2
	*70010	Water	Wet	5.00	3.24		64.8
benzo(b)fluoranthene							
	2BNWR01sed	Sediments	Dry	500.	285	7.94	57.0
	*70010	Water	Wet	5.00	3.37		67.4
benzo(e)pyrene							
	2BNWR01sed	Sediments	Dry	500.	261	10.6	52.2
	*70010	Water	Wet	5.00	3.25		65.0
benzo(g,h,i)perylene							

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Analyte	Sample Number	Sample Matrix	Basis	Spike Level (ppb/%)	Amount Recovered (ppb/%)	*** Spike Background	Percent Recovery
	2BNWR01sed	Sediments	Dry	500.	267	13.2	53.4
	*70010	Water	Wet	5.00	3.21		64.2
benzo(k)fluoranthene							
	2BNWR01sed	Sediments	Dry	500.	250.	8.62	50.0
	*70010	Water	Wet	5.00	3.17		63.4
beta BHC							
	2BNWR01sed	Sediments	Dry	100.	91.0	100.	91.0
	*70010	Water	Wet	1.00	1.10		110.
biphenyl							
	2BNWR01sed	Sediments	Dry	500.	264	200.	52.9
	*70010	Water	Wet	5.00	3.55		71.0
chrysene							
	2BNWR01sed	Sediments	Dry	500.	321	13.2	64.2
	*70010	Water	Wet	5.00	4.60		92.0
cis-nonachlor							
	2BNWR01sed	Sediments	Dry	100.	100	100.	100
	*70010	Water	Wet	1.00	1.00		100.
delta BHC							
	2BNWR01sed	Sediments	Dry	100.	68.0	100.	68.0
	*70010	Water	Wet	1.00	0.930		93.0
dibenzothiophene							
	2BNWR01sed	Sediments	Dry	500.	244	50.0	48.8
	*70010	Water	Wet	5.00	1.63		32.6
dieldrin							
	2BNWR01sed	Sediments	Dry	100.	83.0	33.3	83.0
	*70010	Water	Wet	1.00	1.10		110.
endrin							
	2BNWR01sed	Sediments	Dry	100.	90.0	100.	90.0
	*70010	Water	Wet	1.00	1.20		120.
fluoranthene							
	2BNWR01sed	Sediments	Dry	500.	350.	10.0	70.0
	*70010	Water	Wet	5.00	4.40		88.0

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Analyte	Sample Number	Sample Matrix	Basis	Spike Level (ppb/%)	Amount Recovered (ppb/%)	*** Spike Background	Percent Recovery
fluorene							
	2BNWR01sed	Sediments	Dry	500.	294	83.3	58.8
	*70010	Water	Wet	5.00	3.94		78.8
gamma BHC							
	2BNWR01sed	Sediments	Dry	100.	85.0	100.	85.0
	*70010	Water	Wet	1.00	1.10		110.
gamma chlordane							
	2BNWR01sed	Sediments	Dry	100.	90.0	100.	90.0
	*70010	Water	Wet	1.00	1.10		110.
heptachlor epoxide							
	2BNWR01sed	Sediments	Dry	100.	87.0	100.	87.0
	*70010	Water	Wet	1.00	0.840		84.0
indeno(1,2,3-cd)pyrene							
	2BNWR01sed	Sediments	Dry	500.	290.	12.5	58.0
	*70010	Water	Wet	5.00	3.12		62.4
mirex							
	2BNWR01sed	Sediments	Dry	100.	100	100.	100
	*70010	Water	Wet	1.00	0.000		00.0
naphthalene							
	2BNWR01sed	Sediments	Dry	500.	232	71.4	40.4
	*70010	Water	Wet	5.00	3.36		67.2
o,p'-DDD							
	2BNWR01sed	Sediments	Dry	100.	110	100.	110
	*70010	Water	Wet	1.00	0.000		00.0
o,p'-DDE							
	2BNWR01sed	Sediments	Dry	100.	100	100.	100
	*70010	Water	Wet	1.00	0.810		81.0
o,p'-DDT							
	2BNWR01sed	Sediments	Dry	100.	100	100.	100
	*70010	Water	Wet	1.00	1.10		110.
oxychlordane							
	2BNWR01sed	Sediments	Dry	100.	90.0	100.	90.0

Analyte	Sample Number	Sample Matrix	Basis	Spike Level (ppb/%)	Amount Recovered (ppb/%)	*** Spike Background	Percent Recovery
	*70010	Water	Wet	1.00	0.950		95.0
p,p'-DDD							
	2BNWR01sed	Sediments	Dry	100.	107	33.3	107
	*70010	Water	Wet	1.00	0.920		92.0
p,p'-DDE							
	2BNWR01sed	Sediments	Dry	100.	93.0	10.7	93.0
	*70010	Water	Wet	1.00	0.910		91.0
p,p'-DDT							
	2BNWR01sed	Sediments	Dry	100.	99.0	100.	99.0
	*70010	Water	Wet	1.00	0.850		85.0
perylene							
	2BNWR01sed	Sediments	Dry	500.	-2.00	0.650	-0.400
	*70010	Water	Wet	5.00	2.76		55.2
phenanthrene							
	2BNWR01sed	Sediments	Dry	500.	321	10.7	64.2
	*70010	Water	Wet	5.00	4.21		84.2
pyrene							
	2BNWR01sed	Sediments	Dry	500.	355	10.6	71.0
	*70010	Water	Wet	5.00	4.37		87.4
trans-nonachlor							
	2BNWR01sed	Sediments	Dry	100.	85.0	50.0	85.0
	*70010	Water	Wet	1.00	0.870		87.0

* See "Laboratory Notes" section.*** For a spike to be a valid measure of method accuracy, this ratio must be higher than 1.0.

9. Laboratory Notes

Analyte	Sample Number	Result Modifier
1,6,7-Trimethyl-naphthalene		
	76019	Lab Generated
1-methylnaphthalene		
	76019	Lab Generated
1-methylphenanthrene		
	76019	Lab Generated
2,6-dimethylnaphthalene		
	76019	Lab Generated
2-methylnaphthalene		
	76019	Lab Generated
Benzo(a)anthracene		
	76019	Lab Generated
C1-naphthalenes		
	76019	Lab Generated
C1-phenanthrenes		
	76019	Lab Generated
C2-naphthalenes		
	76019	Lab Generated
C3-naphthalenes		
	76019	Lab Generated
Dibenz(a,h)anthracene		
	76019	Lab Generated
HCB		
	76019	Lab Generated
acenaphthalene		
	76019	Lab Generated
acenaphthene		
	76019	Lab Generated
alpha BHC		

	70010	Lab Generated
alpha chlordane		
	70010	Lab Generated
anthracene		
	70010	Lab Generated
benzo(a)pyrene		
	70010	Lab Generated
benzo(b)fluoranthene		
	70010	Lab Generated
benzo(e)pyrene		
	70010	Lab Generated
benzo(g,h,i)perylene		
	70010	Lab Generated
benzo(k)fluoranthene		
	70010	Lab Generated
beta BHC		
	70010	Lab Generated
biphenyl		
	70010	Lab Generated
chrysene		
	70010	Lab Generated
cis-nonachlor		
	70010	Lab Generated
delta BHC		
	70010	Lab Generated
dibenzothiophene		
	70010	Lab Generated
dieldrin		
	70010	Lab Generated
endrin		
	70010	Lab Generated
fluoranthene		
	70010	Lab Generated

fluorene		
	70010	Lab Generated
gamma BHC		
	70010	Lab Generated
gamma chlordane		
	70010	Lab Generated
heptachlor epoxide		
	70010	Lab Generated
indeno(1,2,3-cd)pyrene		
	70010	Lab Generated
mirex		
	70010	Lab Generated
naphthalene		
	70010	Lab Generated
o,p'-DDD		
	70010	Lab Generated
o,p'-DDE		
	70010	Lab Generated
o,p'-DDT		
	70010	Lab Generated
oxychlordane		
	70010	Lab Generated
p,p'-DDD		
	70010	Lab Generated
p,p'-DDE		
	70010	Lab Generated
p,p'-DDT		
	70010	Lab Generated
perylene		
	70010	Lab Generated
phenanthrene		
	70010	Lab Generated
pyrene		

	70019	Lab Generated
trans-nonachlor		
	70019	Lab Generated

Code List

If appropriate, labs are instructed to use the following codes when entering laboratory notes. The labs may use one or more of the codes in each note displayed above.

Code	Comment
A	Values reported based on Aldrin response factor.
C	Sample possibly compromised due to improper handling / packaging.
D	Sample was deleted from the catalog by the submitter.
H	Due to sample characteristics it was difficult to obtain adequate sample homogeneity - precision was impacted.
I	Interferences occurred during analysis.
L	Sample compromised or destroyed during shipment - sample not analyzed.
M	Compound identity was confirmed by GC/MS.
N	Sample was not analyzed.
P	Sample destroyed during preparation at lab - sample not analyzed.
Q	Insufficient sample quantity to perform requested analysis.
R	Sample is highly decomposed - results may be impacted.
S	Sample was substituted by the submitter.
T	Retention time relative to Aldrin.
U	GC/MS identifies the unknown compound to be _____ (fill in analyte).
W	Insufficient sample quantity to perform duplicate / spike analyses.
Y	Sample was analyzed but results may be impacted (see 'C')

10. QAQC Summary

1. Procedural Blank Summary

Procedural Blank Summary of Blank Equivalent Concentration (BEC) Data

Within a lab sample matrix, there must be three or more Blank results for a given analyte in order to generate a report.

10.2. Duplicate Summary

Duplicate Summary of Relative Percent Difference (RPD) Data

Within a lab sample matrix and concentration range, there must be three or more Duplicate results for a given analyte in order to generate a report.

10.3. Spike Summary

Spike Summary of Percent Recovery (PR) Data

Within a lab sample matrix, there must be three or more Spike results for a given analyte in order to generate a report.

10.4. SRM Summary

Standard Reference Material Summary of Percent Recovery (PR) Data

Within an SRM ID, there must be three or more Recoveries for a given analyte in order to generate a report.

11. QA/QC Anomalies

1. Blank Frequency Anomalies

The required number of blank analyses were performed.

11.2. Duplicate Frequency Anomalies

The required number of duplicate analyses were performed.

11.3. Spike Frequency Anomalies

The required number of spike sample analyses were performed with the following exceptions.

Analyte	Lab Matrix	Number of Samples	Number of Spikes	Frequency (%)	See QA/QC Note No.
C1-chrysenes	Soil/Sediment	7	0	0	1
C1-chrysenes	Water	7	0	0	2
C1-dibenzothiophenes	Soil/Sediment	7	0	0	3
C1-dibenzothiophenes	Water	7	0	0	4
C1-Fluoranthenes & Pyrenes	Soil/Sediment	7	0	0	5
C1-Fluoranthenes & Pyrenes	Water	7	0	0	6
C1-fluorenes	Soil/Sediment	7	0	0	7
C1-fluorenes	Water	7	0	0	8
C2-chrysenes	Soil/Sediment	7	0	0	9
C2-chrysenes	Water	7	0	0	10
C2-dibenzothiophenes	Soil/Sediment	7	0	0	11
C2-dibenzothiophenes	Water	7	0	0	12
C2-fluorenes	Soil/Sediment	7	0	0	13

The required number of spike sample analyses were performed with the following exceptions.					
Analyte	Lab Matrix	Number of Samples	Number of Spikes	Frequency (%)	See QA/QC Note No.
C2-fluorenes	Water	7	0	0	14
C2-phenanthrenes	Soil/Sediment	7	0	0	15
C2-phenanthrenes	Water	7	0	0	16
C3-chrysenes	Soil/Sediment	7	0	0	17
C3-chrysenes	Water	7	0	0	18
C3-dibenzothiophenes	Soil/Sediment	7	0	0	19
C3-dibenzothiophenes	Water	7	0	0	20
C3-fluorenes	Soil/Sediment	7	0	0	21
C3-fluorenes	Water	7	0	0	22
C3-phenanthrenes	Soil/Sediment	7	0	0	23
C3-phenanthrenes	Water	7	0	0	24
C4-chrysenes	Soil/Sediment	7	0	0	25
C4-chrysenes	Water	7	0	0	26
C4-naphthalenes	Soil/Sediment	7	0	0	27
C4-naphthalenes	Water	7	0	0	28
C4-phenanthrenes	Soil/Sediment	7	0	0	29
C4-phenanthrenes	Water	7	0	0	30
PCB-1242	Soil/Sediment	7	0	0	31
PCB-1242	Water	7	0	0	32
PCB-1248	Soil/Sediment	7	0	0	33
PCB-1248	Water	7	0	0	34
PCB-1254	Soil/Sediment	7	0	0	35
PCB-1254	Water	7	0	0	36
PCB-1260	Soil/Sediment	7	0	0	37
PCB-1260	Water	7	0	0	38
PCB-TOTAL	Soil/Sediment	7	0	0	39
PCB-TOTAL	Water	7	0	0	40
toxaphene	Soil/Sediment	7	0	0	41
toxaphene	Water	7	0	0	42

11.4. Reference Material Frequency Anomalies

No Standard Reference Material data exists in this set of results; therefore, the anomaly test was not performed.

11.5. Mass Spec Frequency Anomalies

No Carbamate, OC, or OP data exists in this set of results; therefore, the anomaly test was not performed.

11.6. Limit of Detection Anomalies

Limits of Detection were within the contract requirements.

11.7. Blank Anomalies

Procedural Blank analyses were acceptable with the following exceptions.

Analyte	Lab Matrix	* BEC (ppm/%)	LOD (ppm/%)	Basis	See QA/QC Note No.
perylene	Water	0.00017	0.00005	Wet	43

* BEC = Blank Equivalent Concentration.

11.8. Duplicate Anomalies

All duplicate results were within normal limits with the following exceptions.

Analyte	Sample Number	Lab Matrix	LOD Mean	Initial Result ppm/%	Duplicate Result ppm/%	Relative Percent Diff.	See QA/QC Note No.
benzo(k)fluoranthene	2BNWR01sed	Soil/Sediment	0.00500	0.0580	0.0400	36.7	44
chrysene	2BNWR01sed	Soil/Sediment	0.00500	0.0380	0.0100	81.5	46
C4-naphthalenes	2BNWR01sed	Soil/Sediment	0.0100	0.0430	0.0040	39.3	45

11.9. Spike Anomalies

All spike results were within normal limits with the following exceptions.									
Analyte	Sample Number	Lab Matrix	Sample Result ppm/%	LOD ppm/%	Spike Result ppm/%	Spike Level ppm/%	% Recovery	Spike / Background	See QA/QC Note No.
1,6,7-Trimethyl-naphthalene	2BNWR01sed	Soil/Sediment	< 0.00500	0.00500	0.295	0.500	59.0	100.	47
1-methylnaphthalene	2BNWR01sed	Soil/Sediment	< 0.00500	0.00500	0.260	0.500	52.0	100.	48
1-methylphenanthrene	2BNWR01sed	Soil/Sediment	< 0.00500	0.00500	0.364	0.500	72.8	100.	49
2,6-dimethylnaphthalene	2BNWR01sed	Soil/Sediment	0.00000	0.00500	0.277	0.500	53.6	55.6	50
2-methylnaphthalene	2BNWR01sed	Soil/Sediment	0.00500	0.00500	0.255	0.500	50.0	100.	51
acenaphthalene	2BNWR01sed	Soil/Sediment	< 0.00500	0.00500	0.266	0.500	53.2	100.	52
acenaphthene	2BNWR01sed	Soil/Sediment	0.00600	0.00500	0.284	0.500	55.6	83.3	53
anthracene	2BNWR01sed	Soil/Sediment	< 0.00500	0.00500	0.340	0.500	68.0	100.	54
benzo(a)pyrene	2BNWR01sed	Soil/Sediment	0.0300	0.00500	0.340	0.500	60.2	12.8	55
benzo(b)fluoranthene	2BNWR01sed	Soil/Sediment	0.0630	0.00500	0.348	0.500	57.0	7.94	56
benzo(e)pyrene	2BNWR01sed	Soil/Sediment	0.0470	0.00500	0.308	0.500	52.2	10.6	57
benzo(g,h,i)perylene	2BNWR01sed	Soil/Sediment	0.0380	0.00500	0.305	0.500	53.4	13.2	58
benzo(k)fluoranthene	2BNWR01sed	Soil/Sediment	0.0580	0.00500	0.308	0.500	50.0	8.62	59
biphenyl	2BNWR01sed	Soil/Sediment	< 0.00500	0.00500	0.267	0.500	53.4	100.	60
C1-naphthalenes	2BNWR01sed	Soil/Sediment	< 0.0100	0.0100	0.515	1.00	51.5	100.	61
C1-phenanthrenes	2BNWR01sed	Soil/Sediment	0.0400	0.0100	0.375	0.500	67.0	12.5	62
C2-naphthalenes	2BNWR01sed	Soil/Sediment	0.0220	0.0100	0.285	0.500	52.6	22.7	63

All spike results were within normal limits with the following exceptions.									
Analyte	Sample Number	Lab Matrix	Sample Result ppm/%	LOD ppm/%	Spike Result ppm/%	Spike Level ppm/%	% Recovery	Spike / Background	See QA/QC Note No.
C3-naphthalenes	2BNWR01sed	Soil/Sediment	0.0170	0.0100	0.720	0.500	141	29.4	64
chrysene	2BNWR01sed	Soil/Sediment	0.0380	0.00500	0.350	0.500	64.2	13.2	65
dibenzothiophene	2BNWR01sed	Soil/Sediment	0.0100	0.00500	0.254	0.500	48.8	50.0	66
fluoranthene	2BNWR01sed	Soil/Sediment	0.0500	0.00500	0.400	0.500	70.0	10.0	67
fluorene	2BNWR01sed	Soil/Sediment	0.00600	0.00500	0.300	0.500	58.8	83.3	68
indeno(1,2,3-cd)pyrene	2BNWR01sed	Soil/Sediment	0.0400	0.00500	0.330	0.500	58.0	12.5	69
naphthalene	2BNWR01sed	Soil/Sediment	0.00700	0.00500	0.230	0.500	46.4	71.4	70
phenanthrene	2BNWR01sed	Soil/Sediment	0.0300	0.00500	0.351	0.500	64.2	16.7	71
pyrene	2BNWR01sed	Soil/Sediment	0.0470	0.00500	0.402	0.500	71.0	10.6	72
1-methylnaphthalene	70010	Water		0.0000500	0.00340	0.00500	69.8		3000
2,6-dimethylnaphthalene	70010	Water		0.0000500	0.00341	0.00500	68.2		3001
2-methylnaphthalene	70010	Water		0.0000500	0.00342	0.00500	68.4		3002
acenaphthalene	70010	Water		0.0000500	0.00360	0.00500	72.0		3003
benzo(a)pyrene	70010	Water		0.0000500	0.00324	0.00500	64.8		3004
benzo(b)fluoranthene	70010	Water		0.0000500	0.00337	0.00500	67.4		3005
benzo(e)pyrene	70010	Water		0.0000500	0.00325	0.00500	65.0		3006
benzo(g,h,i)perylene	70010	Water		0.0000500	0.00321	0.00500	64.2		3007
benzo(k)fluoranthene	70010	Water		0.0000500	0.00317	0.00500	63.4		3008
biphenyl	70010	Water		0.0000500	0.00355	0.00500	71.0		3009
C1-naphthalenes	70010	Water		0.00050 0	0.00001	0.0100	69.1		3010

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All spike results were within normal limits with the following exceptions.									
Analyte	Sample Number	Lab Matrix	Sample Result ppm/%	LOD ppm/%	Spike Result ppm/%	Spike Level ppm/%	% Recovery	Spike / Background	See QA/QC Note No.
C2-naphthalenes	70010	Water		0.000500	0.00341	0.00500	68.2		3011
dibenzothiophene	70010	Water		0.0000500	0.00163	0.00500	32.6		3012
indeno(1,2,3-cd)pyrene	70010	Water		0.0000500	0.00312	0.00500	62.4		3013
naphthalene	70010	Water		0.0000500	0.00336	0.00500	67.2		3014
perylene	70010	Water		0.0000500	0.00276	0.00500	55.2		3015

11.10. S.R.M. Anomalies

No SRM data exists in this set of results; therefore, the anomaly test was not performed.

11.11. QA/QC Notes

QA/QC Note Number and Comments
Additional Lab Comments: This is a resend of the file with corrections. The Spike 70010 is a lab generated water spike. Please let me know if it needs to be in the file in a different way. 1-42. It is not practical to spike with every analyte. The method used is acceptable. 43. The analyte perylene was present in the blank. Sample results less than 10 times the amount found in the blank are considered non-detects. 44-46. The RPD s for the analytes were greater than the normal range. Positive results are considered estimates. 47-72. Spike recoveries for these analytes, with the exception of C3-napththalenes, were below normal limits. Results may be biased low. The results for C3-napthalenes may be biased high. QA/QC Team

Judy Bischoff, Ph.D.
Brenda Montgomery
Walter Riley, Jr.

3,000 - 3,0xx: All spike anomalies with a reference number of 3,000 or greater were added on 5/5/2008. These anomalies were missed, due to a bug in ECDMS, when the results were originally processed. For more information contact ACF.

12. Analytical Methods

Below are the analytical methods used by MSCL to produce the results included in this report.

Method Codes:	042

Lab Matrix	Analyte
Water	1,0,7-Trimethyl-naphthalene
	1-methylnaphthalene
	1-methylphenanthrene
	2,0-dimethylnaphthalene
	2-methylnaphthalene
	Benzo(a)anthracene
	C1-Fluoranthenes & Pyrenes
	C1-chrysenes
	C1-dibenzothiophenes
	C1-fluorenes
	C1-naphthalenes
	C1-phenanthrenes
	C2-chrysenes
	C2-dibenzothiophenes
	C2-fluorenes
	C2-naphthalenes
	C2-phenanthrenes
	C3-chrysenes
	C3-dibenzothiophenes
	C3-fluorenes
	C3-naphthalenes
	C3-phenanthrenes
	C4-chrysenes
	C4-naphthalenes
	C4-phenanthrenes
	Dibenz(a,h)anthracene
	HCB

PCB-1242
PCB-1248
PCB-1254
PCB-1260
PCB-TOTAL
acenaphthalene
acenaphthene
alpha BHC
alpha chlordane
anthracene
benzo(a)pyrene
benzo(b)fluoranthene
benzo(e)pyrene
benzo(g,h,i)perylene
benzo(k)fluoranthene
beta BHC
biphenyl
chrysene
cis-nonachlor
delta BHC
dibenzothiophene
dieldrin
endrin
fluoranthene
fluorene
gamma BHC
gamma chlordane
heptachlor epoxide
indeno(1,2,3-cd)pyrene
mirex
naphthalene
o,p'-DDD
o,p'-DDE
o,p'-DDT

oxychlordane
p,p'-DDD
p,p'-DDE
p,p'-DDT
perylene
phenanthrene
pyrene
toxaphene
trans-nonachlor

Method Code: 042

LABORATORY: Mississippi State Chemical Laboratory

Analysis for Organochlorine Pesticides, N/P Pesticides,
Aliphatic and Polynuclear Aromatic Hydrocarbons,
and Chlorophenoxy Acid Herbicides in Water

1. Record sample volume and pH. Add 800 ml of sample to a 1000-ml separatory funnel. Add 100 grams of sodium chloride and 50 mls phosphate buffer to the funnel and shake to mix.

2. Adjust to pH 8 by adding PRQ 6N KOH (SOP 1.255) or 6N sulfuric acid to sample, and shake vigorously 30 sec. Allow sample to stand one hour at pH 8. Rinse the sample container with 25-ml CH2Cl2 (SOP 1.255) and add this to the funnel. Pour the remainder of the sample back into the sample container and rinse the graduated cylinder 2 X 25 ml CH2Cl2.

3. Shake 2 min. with periodic venting. Drain CH2Cl2 through a funnel of CH2Cl2 washed sodium sulfate into a 500 ml French Square bottle if there is no emulsion. Otherwise, drain lower layer into centrifuge bottle and centrifuge to separate layers. Repeat 2 X 60 ml CH2Cl2. This combined extract contains organochlorine, aliphatic and aromatic hydrocarbons, and nitrogen/phosphorous containing pesticides.

4. Adjust pH to less than 2 with drop wise addition of PRQ 6N H2SO4 (SOP 1.255).

5. Extract water with 100ml Ethyl ether (SOP 1.255) by shaking two

minutes. Drain the water from the separatory funnel and pass the ether layer through acidified sodium sulfate into a 500-ml French square bottle. Repeat 2 x 60ml EtoEt. Extract with a final aliquot of 100ml petroleum ether (SOP 1.81). This combined extract contains chlorophenoxy acid herbicides.

6. Concentrate acid and neutral extracts separately with Kuderna-Danish evaporators (SOP 1.261).

7. Column Clean-Up:

* NEUTRAL FRACTION (N/P and organochlorine pesticides, Aliphatic and polynuclear aromatic hydrocarbons). Adjust sample extract to exact volume and remove an appropriate aliquot for column clean-up techniques specific to the analyte, for pesticides use florisil (SOP 1.104), for hydrocarbons use 1 % deactivated silica gel (SOP 1.203), for organophosphates, shoot directly on a NP-detector.

*ACID FRACTION (Chlorophenoxy acid herbicides) - Derivitization: Reduce the sample volume to approximately 0.5ml and ethylate using diazoethane (15 min.)(SOP 1.10).

Exchange to hexane (SOP 1.68) and reduce volume to 0.2ml.

* Column clean-up (CPA): Place 2.0g of 1% deactivated silica gel (SOP 1.255) in a 7mm id. chromatography column (#22 Kontes). Top with 1cm Na2SO4 (SOP 1.255) and prewet column with 10ml hexane (SOP 1.255). Collect sample eluents in three fractions as follows:

Fraction A: add sample and rinse container with two 0.5ml washes of 20% benzene (SOP 1.255) in hexane. Elute with 0ml of the same solution.(Contains PCP.)

Fraction B: add 10ml 40% benzene in hexane. Add 10ml 60% benzene in hexane. (Contains Dalapon, Silvex, Dinoseb, portion of Dicamba.)

Fraction C: add 10ml 80% benzene in hexane. Add10ml 100% benzene. (Contains remaining Dicamba, Dichlorprop, 2,4-D, 2,4,5-T, 2,4-DB, Bentazon, Blazer.)

Reference for column clean up for acid herbicides: Shafik, T. A., H. C. Sullivan, H. R. Enos, 1073." Multiresidue Procedure for Halo- and Nitrophenols. Measurement of Exposure to Biodegradable Pesticides Yielding These Compounds as Metabolites." J. Agr. Food Chem. 21:295-298.

Phosphate Buffer: 20.0 ml 0.1N hydrochloric acid & 50 ml 0.1M dipotassium phosphate

0.1N hydrochloric acid = 2.5 ml HCl in 200 ml H_2O

0.1M dipotassium phosphate = 8.7g dipotassium phosphate to 500 ml H_2O

(This makes approximately 800 ml buffer.)

References:

E.P.A. Method 507

E.P.A. Method 508

E.P.A. National Survey of Pesticides in Drinking Water Wells (11/90) Method 4

Method Codes:	067

Lab Matrix	Analyte
Soil/Sediment	% Moisture
	1,6,7-Trimethyl-naphthalene
	1-methylnaphthalene
	1-methylphenanthrene
	2,6-dimethylnaphthalene
	2-methylnaphthalene
	Benzo(a)anthracene
	C1-Fluoranthenes & Pyrenes
	C1-chrysenes
	C1-dibenzothiophenes
	C1-fluorenes

C1-naphthalenes
C1-phenanthrenes
C2-chrysenes
C2-dibenzothiophenes
C2-fluorenes
C2-naphthalenes
C2-phenanthrenes
C3-chrysenes
C3-dibenzothiophenes
C3-fluorenes
C3-naphthalenes
C3-phenanthrenes
C4-chrysenes
C4-naphthalenes
C4-phenanthrenes
Dibenz(a,h)anthracene
HCB
PCB-1242
PCB-1248
PCB-1254
PCB-1260
PCB-TOTAL
acenaphthalene
acenaphthene
alpha BHC
alpha chlordane
anthracene
benzo(a)pyrene
benzo(b)fluoranthene
benzo(e)pyrene
benzo(g,h,i)perylene
benzo(k)fluoranthene
beta BHC
biphenyl

chrysene
cis-nonachlor
delta BHC
dibenzothiophene
dieldrin
endrin
fluoranthene
fluorene
gamma BHC
gamma chlordane
heptachlor epoxide
indeno(1,2,3-cd)pyrene
mirex
naphthalene
o,p'-DDD
o,p'-DDE
o,p'-DDT
oxychlordane
p,p'-DDD
p,p'-DDE
p,p'-DDT
perylene
phenanthrene
pyrene
toxaphene
trans-nonachlor

Method Code: 067
LABORATORY: Mississippi State Chemical Laboratory Analysis for Organochlorine Pesticides and PCBs, Aliphatic and Polynuclear Aromatic Hydrocarbons in Soil and Sediment A 10-gram soil or sediment sample is weighed into a PRQ (SOP 1.105) centrifuge bottle. If the sample is less than 10% moisture, then 10- ml water (SOP 1.255) is added. Fifty-ml acetone (SOP 1.255) is added and the sample shaken well six times over a

ninety-minute period (about every 15 minutes). Fifty mls petroleum ether (SOP 1.81) is added to the sample and the shaking repeated. The sample is centrifuged (SOP 1.100) and the liquid decanted into a 500-ml separatory funnel containing 200 ml PRQ water and 15 ml saturated sodium chloride solution (SOP 1.255). Fifty mls of a 1:1 acetone/pet ether mixture is added to the sample and it is shaken, centrifuged, and the liquid added to the separatory funnel. The separatory funnel is shaken vigorously for two minutes and the layers allowed to separate. The pet ether is removed, and the water fraction extracted again with 50-ml pet ether. The combined pet ether is washed twice with water and concentrated by Kuderna-Danish (SOP 1.261) to appropriate volume. An aliquot of the concentrated extract representing 2 grams of sample is transferred to a 1.0 gram Florisil (SOP 1.255) mini-column topped with 1.0 grams sodium sulfate (SOP 1.255) for pesticide determination. A Kontes #7 column is used for this. Residues are eluted from the column in two elution fractions. Fraction I consists of 12 milliliters hexane (SOP 1.255) followed by 12 milliliters of 1% methanol (SOP 1.255) in hexane, and Fraction II consists of an additional 24 milliliters of 1% methanol in hexane. If additional cleanup is required to separate PCBs from other organochlorines in Fraction I, further chromatography on a Silicic acid (SOP 1.255) column is performed. Quantification of residues in the two Florisil fractions and three Silicic acid fractions is by dual megabore column (DB-608 and DB-5), electron capture gas chromatography (SOP 1.265).

A second aliquot of the concentrated extract for hydrocarbon determination representing 8 grams of sample is transferred to a 20 gram 1% deactivated silica gel (SOP 1.255) column (silica gel is added to the column in a pet ether slurry) topped with five grams neutral alumina (SOP 1.255). Aliphatic and polynuclear aromatic hydrocarbon residues are fractionated by eluting aliphatics from the column with 100 ml petroleum ether (Fraction I) followed by elution of aromatics using first, 100 ml 40% methylene chloride (SOP 1.255)/60% petroleum ether, then 50 ml methylene chloride (Combined elutes, Fraction II). Both fractions are concentrated, reconst chromatography - mass spec (SOP 1.270) using a Varian Saturn 2000 ion trap mass spec with a 30M DB-5MS capillary column.

Analytical Results Report TOC

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1. ECDMS Analytical Results Report 8/3/2010

Catalog Number	Purchase Order Number	Lab ID	Catalog Submitter	ECDMS User ID
5020126	04420-07-Y806	TERL	Guy, Chris - Annapolis, MD	r5afo

Catalog Title	Little Blackwater River Sediment Triad Study Yr 2
Lab Name:	Trace Element Research Laboratory
DEQ Project ID:	5N42
DEQ Project Title	Effects of Urban Sprawl on Sediment, Surface Water, And Biota in the Little Blackwater River, Blackwater National Wildlife Refuge, Dorchester County, Maryland

Notes, Symbols and Abbreviations Used
Based on the report options selected the report should be **printed in landscape mode**
Notes, Symbols and Abbreviations Used The following may appear before a reported result (e.g. < 1234). < - Less than symbol indicates that the actual result is less than the reported detection limit. > - Greater than symbol indicates that the actual result is greater than the reported result.
All results are reported as 3 significant digits.
All results are reported as parts per million (ppm), or percent, unless otherwise noted.

1. Integrity Report

Lab Receipt Date	09/12/2007	Lab Approval Date	09/12/2007

Catalog Problems
No problems reported
Problem Resolution

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2. Bulk Data

Sample Number	Sample Matrix	Sample Weight (grams)	Percent Moisture
2BNWR01sed	Sediments	500	87.4
2BNWR02sed	Sediments	500	80.5
2BNWR03sed	Sediments	500	85.4
2BNWR04sed	Sediments	500	80.2
2BNWR05sed	Sediments	500	88.8
2BNWR06sed	Sediments	500	80.4
2BNWR07sed	Sediments	500	85.0
2BNWR01fwat	Water	500	
2BNWR01watM	Water	500	
2BNWR02fwat	Water	500	
2BNWR02watM	Water	500	
2BNWR03fwat	Water	500	
2BNWR03watM	Water	500	
2BNWR04fwat	Water	500	
2BNWR04watM	Water	500	
2BNWR05fwat	Water	500	
2BNWR05watM	Water	500	
2BNWR06fwat	Water	500	
2BNWR06watM	Water	500	
2BNWR07fwat	Water	500	
2BNWR07watM	Water	500	
2BNWRfb	Water	500	
2BNWRfffb	Water	500	

3. Soil/Sediment Parameters

Sample Number	Percent Total Organic Carbon	Percent Sand	Percent Silt	Percent Clay
2BNWR01sed	18.9	4.70	19.7	75.6
2BNWR02sed	10.1	0.200	84.5	15.4
2BNWR03sed	17.9	3.20	33.5	63.3
2BNWR04sed	10.7	5.40	37.8	56.8
2BNWR05sed	25.3	2.30	47.1	50.7
2BNWR06sed	24.4	2.40	64.9	32.7
2BNWR07sed	32.0	2.30	91.2	6.50

4. Contaminant Concentrations

Analyte	Sample Number	Sample Matrix	Dry Weight (ppm)	DL Dry Weight (ppm)	Wet Weight (ppm)	DL Wet Weight (ppm)
AVS						
	2BNWR01sed	Sediments	206	30.0	33.8	4.54
	2BNWR02sed	Sediments	130.	34.0	17.0	4.50
	2BNWR03sed	Sediments	183	30.0	20.7	5.00
	2BNWR04sed	Sediments	213	20.0	20.4	4.00
	2BNWR05sed	Sediments	922	50.0	103	6.01
	2BNWR06sed	Sediments	385	30.0	52.4	4.00
	2BNWR07sed	Sediments	< 30.0	30.0	< 5.18	5.18
Silver						
	2BNWR01sed	Sediments	< 0.100	0.100	< 0.0247	0.0247
	2BNWR02sed	Sediments	< 0.100	0.100	< 0.0265	0.0265
	2BNWR03sed	Sediments	< 0.101	0.101	< 0.0270	0.0270
	2BNWR04sed	Sediments	0.242	0.100	0.0334	0.0270
	2BNWR05sed	Sediments	< 0.102	0.102	< 0.0215	0.0215
	2BNWR06sed	Sediments	< 0.102	0.102	< 0.0261	0.0261
	2BNWR07sed	Sediments	< 0.107	0.107	< 0.0284	0.0284
	2BNWR01fwat	Water			< 0.0100	0.0100
	2BNWR01watM	Water			< 0.0100	0.0100
	2BNWR02fwat	Water			< 0.0100	0.0100
	2BNWR02watM	Water			< 0.0100	0.0100
	2BNWR03fwat	Water			< 0.0100	0.0100
	2BNWR03watM	Water			< 0.0100	0.0100
	2BNWR04fwat	Water			< 0.0100	0.0100
	2BNWR04watM	Water			< 0.0100	0.0100
	2BNWR05fwat	Water			< 0.0100	0.0100
	2BNWR05watM	Water			< 0.0100	0.0100
	2BNWR06fwat	Water			< 0.0100	0.0100

Analyte	Sample Number	Sample Matrix	Dry Weight (ppm)	DL Dry Weight (ppm)	Wet Weight (ppm)	DL Wet Weight (ppm)
	2BNWR06watM	Water			< 0.0100	0.0100
	2BNWR07fwat	Water			< 0.0100	0.0100
	2BNWR07watM	Water			< 0.0100	0.0100
	2BNWRfb	Water			< 0.0100	0.0100
	2BNWRffb	Water			< 0.0100	0.0100
Aluminum						
	2BNWR01sed	Sediments	20100	0.060	3070	0.123
	2BNWR02sed	Sediments	20300	0.060	2740	0.132
	2BNWR03sed	Sediments	17000	0.050	2480	0.130
	2BNWR04sed	Sediments	14000	0.060	2060	0.135
	2BNWR05sed	Sediments	10500	0.060	1850	0.108
	2BNWR06sed	Sediments	11100	0.060	1510	0.131
	2BNWR07sed	Sediments	13200	0.060	1900	0.143
	2BNWR01fwat	Water			0.0100	0.0100
	2BNWR01watM	Water			0.0100	0.0100
	2BNWR02fwat	Water			0.0100	0.0100
	2BNWR02watM	Water			0.0400	0.0100
	2BNWR03fwat	Water			0.0100	0.0100
	2BNWR03watM	Water			0.0700	0.0100
	2BNWR04fwat	Water			0.0100	0.0100
	2BNWR04watM	Water			< 0.0100	0.0100
	2BNWR05fwat	Water			< 0.0100	0.0100
	2BNWR05watM	Water			< 0.0100	0.0100
	2BNWR06fwat	Water			< 0.0100	0.0100
	2BNWR06watM	Water			< 0.0100	0.0100
	2BNWR07fwat	Water			0.0100	0.0100
	2BNWR07watM	Water			0.0400	0.0100
	2BNWRfb	Water			< 0.0100	0.0100
	2BNWRffb	Water			< 0.0100	0.0100

Analyte	Sample Number	Sample Matrix	Dry Weight (ppm)	DL Dry Weight (ppm)	Wet Weight (ppm)	DL Wet Weight (ppm)
Arsenic						
	2BNWR01sed	Sediments	5.00	0.0080	0.713	0.0123
	2BNWR02sed	Sediments	4.38	0.0082	0.501	0.0133
	2BNWR03sed	Sediments	3.05	0.0055	0.533	0.0130
	2BNWR04sed	Sediments	2.72	0.0080	0.375	0.0135
	2BNWR05sed	Sediments	3.11	0.0002	0.348	0.0108
	2BNWR06sed	Sediments	4.44	0.0002	0.004	0.0131
	2BNWR07sed	Sediments	2.85	0.0085	0.410	0.0142
	2BNWR01fwat	Water			0.00150	0.0000500
	2BNWR01watM	Water			0.00170	0.0000500
	2BNWR02fwat	Water			0.00183	0.0000500
	2BNWR02watM	Water			0.00170	0.0000500
	2BNWR03fwat	Water			0.00372	0.0000500
	2BNWR03watM	Water			0.00352	0.0000500
	2BNWR04fwat	Water			0.00300	0.000100
	2BNWR04watM	Water			0.00270	0.000100
	2BNWR05fwat	Water			0.00320	0.000100
	2BNWR05watM	Water			0.00311	0.000100
	2BNWR06fwat	Water			0.00310	0.000100
	2BNWR06watM	Water			0.00258	0.000100
	2BNWR07fwat	Water			0.00265	0.0000500
	2BNWR07watM	Water			0.000000	0.0000500
	2BNWRflb	Water			< 0.0000500	0.0000500
	2BNWRfffb	Water			< 0.0000500	0.0000500
Boron						
	2BNWR01sed	Sediments	2.82	1.00	0.355	0.247
	2BNWR02sed	Sediments	2.00	1.00	0.282	0.265
	2BNWR03sed	Sediments	8.50	1.01	1.24	0.270
	2BNWR04sed	Sediments	7.77	1.00	1.07	0.270

Analyte	Sample Number	Sample Matrix	Dry Weight (ppm)	DL Dry Weight (ppm)	Wet Weight (ppm)	DL Wet Weight (ppm)
	2BNWR05sed	Sediments	17.4	1.02	1.05	0.215
	2BNWR06sed	Sediments	21.1	1.02	2.87	0.201
	2BNWR07sed	Sediments	8.28	1.07	1.10	0.284
	2BNWR01fwat	Water			0.0000	0.0100
	2BNWR01watM	Water			0.0500	0.0100
	2BNWR02fwat	Water			0.127	0.0100
	2BNWR02watM	Water			0.128	0.0100
	2BNWR03fwat	Water			0.511	0.0100
	2BNWR03watM	Water			0.510	0.0100
	2BNWR04fwat	Water			0.080	0.0100
	2BNWR04watM	Water			0.085	0.0100
	2BNWR05fwat	Water			0.080	0.0100
	2BNWR05watM	Water			0.001	0.0100
	2BNWR06fwat	Water			1.02	0.0100
	2BNWR06watM	Water			1.00	0.0100
	2BNWR07fwat	Water			0.532	0.0100
	2BNWR07watM	Water			0.523	0.0100
	2BNWRfb	Water			< 0.0100	0.0100
	2BNWRffb	Water			< 0.0100	0.0100
Barium						
	2BNWR01sed	Sediments	47.7	0.0060	6.01	0.0123
	2BNWR02sed	Sediments	37.2	0.0060	5.02	0.0132
	2BNWR03sed	Sediments	19.7	0.0050	2.88	0.0130
	2BNWR04sed	Sediments	19.1	0.0060	2.04	0.0135
	2BNWR05sed	Sediments	29.1	0.0000	3.20	0.0108
	2BNWR06sed	Sediments	24.8	0.0000	3.37	0.0131
	2BNWR07sed	Sediments	21.3	0.0000	3.07	0.0143
	2BNWR01fwat	Water			0.0140	0.00100
	2BNWR01watM	Water			0.0180	0.00100

Analyte	Sample Number	Sample Matrix	Dry Weight (ppm)	DL Dry Weight (ppm)	Wet Weight (ppm)	DL Wet Weight (ppm)
	2BNWR02fwat	Water			0.0300	0.00100
	2BNWR02watM	Water			0.0440	0.00100
	2BNWR03fwat	Water			0.100	0.00100
	2BNWR03watM	Water			0.100	0.00100
	2BNWR04fwat	Water			0.0000	0.00100
	2BNWR04watM	Water			0.0070	0.00100
	2BNWR05fwat	Water			0.105	0.00100
	2BNWR05watM	Water			0.108	0.00100
	2BNWR06fwat	Water			0.105	0.00100
	2BNWR06watM	Water			0.100	0.00100
	2BNWR07fwat	Water			0.103	0.00100
	2BNWR07watM	Water			0.180	0.00100
	2BNWRflb	Water			< 0.00100	0.00100
	2BNWRfflb	Water			< 0.00100	0.00100
Beryllium						
	2BNWR01sed	Sediments	1.84	0.0400	0.232	0.00017
	2BNWR02sed	Sediments	1.52	0.0401	0.205	0.00003
	2BNWR03sed	Sediments	1.50	0.0477	0.210	0.00090
	2BNWR04sed	Sediments	1.08	0.0400	0.140	0.00070
	2BNWR05sed	Sediments	1.15	0.0481	0.120	0.00530
	2BNWR06sed	Sediments	0.903	0.0481	0.131	0.00054
	2BNWR07sed	Sediments	1.70	0.0403	0.258	0.00710
	2BNWR01fwat	Water			< 0.000500	0.000500
	2BNWR01watM	Water			< 0.000500	0.000500
	2BNWR02fwat	Water			< 0.000500	0.000500
	2BNWR02watM	Water			< 0.000500	0.000500
	2BNWR03fwat	Water			< 0.000500	0.000500
	2BNWR03watM	Water			< 0.000500	0.000500
	2BNWR04fwat	Water			< 0.000500	0.000500

Analyte	Sample Number	Sample Matrix	Dry Weight (ppm)	DL Dry Weight (ppm)	Wet Weight (ppm)	DL Wet Weight (ppm)
	2BNWR04watM	Water			< 0.000500	0.000500
	2BNWR05fwat	Water			< 0.000500	0.000500
	2BNWR05watM	Water			< 0.000500	0.000500
	2BNWR06fwat	Water			< 0.000500	0.000500
	2BNWR06watM	Water			< 0.000500	0.000500
	2BNWR07fwat	Water			< 0.000500	0.000500
	2BNWR07watM	Water			< 0.000500	0.000500
	2BNWRfb	Water			< 0.000500	0.000500
	2BNWRffb	Water			< 0.000500	0.000500
Calcium						
	2BNWR01sed	Sediments	5120	0.80	645	1.23
	2BNWR02sed	Sediments	5250	0.80	700	1.32
	2BNWR03sed	Sediments	4300	0.50	637	1.30
	2BNWR04sed	Sediments	4260	0.80	501	1.35
	2BNWR05sed	Sediments	5250	0.00	588	1.08
	2BNWR06sed	Sediments	5030	0.00	684	1.31
	2BNWR07sed	Sediments	6020	0.00	867	1.43
	2BNWR01fwat	Water			12.0	0.0100
	2BNWR01watM	Water			12.0	0.0100
	2BNWR02fwat	Water			18.0	0.0100
	2BNWR02watM	Water			18.0	0.0100
	2BNWR03fwat	Water			54.0	0.0100
	2BNWR03watM	Water			55.0	0.0100
	2BNWR04fwat	Water			95.0	0.0100
	2BNWR04watM	Water			96.1	0.0100
	2BNWR05fwat	Water			97.0	0.0100
	2BNWR05watM	Water			96.0	0.0100
	2BNWR06fwat	Water			99.3	0.0100
	2BNWR06watM	Water			99.3	0.0100

Analyte	Sample Number	Sample Matrix	Dry Weight (ppm)	DL Dry Weight (ppm)	Wet Weight (ppm)	DL Wet Weight (ppm)
	2BNWR07fwat	Water			50.4	0.0100
	2BNWR07watM	Water			55.4	0.0100
	2BNWRfb	Water			< 0.0100	0.0100
	2BNWRffb	Water			< 0.0100	0.0100
Cadmium						
	2BNWR01sed	Sediments	0.580	0.0100	0.0731	0.00247
	2BNWR02sed	Sediments	0.418	0.0100	0.0504	0.00205
	2BNWR03sed	Sediments	0.201	0.0101	0.0425	0.00270
	2BNWR04sed	Sediments	0.238	0.0100	0.0328	0.00270
	2BNWR05sed	Sediments	0.230	0.0102	0.0204	0.00215
	2BNWR06sed	Sediments	0.257	0.0102	0.0350	0.00261
	2BNWR07sed	Sediments	0.603	0.0107	0.0808	0.00284
	2BNWR01fwat	Water			< 0.0000100	0.0000100
	2BNWR01watM	Water			< 0.0000100	0.0000100
	2BNWR02fwat	Water			< 0.0000100	0.0000100
	2BNWR02watM	Water			< 0.0000100	0.0000100
	2BNWR03fwat	Water			< 0.0000100	0.0000100
	2BNWR03watM	Water			< 0.0000100	0.0000100
	2BNWR04fwat	Water			< 0.0000200	0.0000200
	2BNWR04watM	Water			< 0.0000200	0.0000200
	2BNWR05fwat	Water			< 0.0000200	0.0000200
	2BNWR05watM	Water			< 0.0000200	0.0000200
	2BNWR06fwat	Water			< 0.0000200	0.0000200
	2BNWR06watM	Water			< 0.0000200	0.0000200
	2BNWR07fwat	Water			< 0.0000100	0.0000100
	2BNWR07watM	Water			0.0000200	0.0000100
	2BNWRfb	Water			< 0.0000100	0.0000100
	2BNWRffb	Water			< 0.0000100	0.0000100
Cobalt						

Analyte	Sample Number	Sample Matrix	Dry Weight (ppm)	DL Dry Weight (ppm)	Wet Weight (ppm)	DL Wet Weight (ppm)
	2BNWR01sed	Sediments	20.0	0.400	3.30	0.0017
	2BNWR02sed	Sediments	22.4	0.401	3.02	0.0003
	2BNWR03sed	Sediments	23.5	0.477	3.43	0.0000
	2BNWR04sed	Sediments	8.43	0.400	1.10	0.0070
	2BNWR05sed	Sediments	8.15	0.481	0.013	0.0530
	2BNWR06sed	Sediments	8.78	0.481	1.10	0.0054
	2BNWR07sed	Sediments	31.0	0.403	4.40	0.0710
	2BNWR01fwat	Water			< 0.00500	0.00500
	2BNWR01watM	Water			< 0.00500	0.00500
	2BNWR02fwat	Water			< 0.00500	0.00500
	2BNWR02watM	Water			< 0.00500	0.00500
	2BNWR03fwat	Water			< 0.00500	0.00500
	2BNWR03watM	Water			< 0.00500	0.00500
	2BNWR04fwat	Water			< 0.00500	0.00500
	2BNWR04watM	Water			< 0.00500	0.00500
	2BNWR05fwat	Water			< 0.00500	0.00500
	2BNWR05watM	Water			< 0.00500	0.00500
	2BNWR06fwat	Water			< 0.00500	0.00500
	2BNWR06watM	Water			< 0.00500	0.00500
	2BNWR07fwat	Water			< 0.00500	0.00500
	2BNWR07watM	Water			< 0.00500	0.00500
	2BNWRfb	Water			< 0.00500	0.00500
	2BNWRffb	Water			< 0.00500	0.00500
Chromium						
	2BNWR01sed	Sediments	20.0	0.100	3.30	0.0247
	2BNWR02sed	Sediments	20.0	0.100	2.70	0.0265
	2BNWR03sed	Sediments	10.7	0.101	2.44	0.0270
	2BNWR04sed	Sediments	10.0	0.100	2.21	0.0270
	2BNWR05sed	Sediments	17.4	0.102	1.05	0.0215

Analyte	Sample Number	Sample Matrix	Dry Weight (ppm)	DL Dry Weight (ppm)	Wet Weight (ppm)	DL Wet Weight (ppm)
	2BNWR06sed	Sediments	12.5	0.102	1.70	0.0261
	2BNWR07sed	Sediments	11.5	0.107	1.00	0.0284
	2BNWR01fwat	Water			< 0.00500	0.00500
	2BNWR01watM	Water			< 0.00500	0.00500
	2BNWR02fwat	Water			< 0.00500	0.00500
	2BNWR02watM	Water			< 0.00500	0.00500
	2BNWR03fwat	Water			< 0.00500	0.00500
	2BNWR03watM	Water			< 0.00500	0.00500
	2BNWR04fwat	Water			< 0.00500	0.00500
	2BNWR04watM	Water			< 0.00500	0.00500
	2BNWR05fwat	Water			< 0.00500	0.00500
	2BNWR05watM	Water			< 0.00500	0.00500
	2BNWR06fwat	Water			< 0.00500	0.00500
	2BNWR06watM	Water			< 0.00500	0.00500
	2BNWR07fwat	Water			< 0.00500	0.00500
	2BNWR07watM	Water			< 0.00500	0.00500
	2BNWRfb	Water			< 0.00500	0.00500
	2BNWRffb	Water			< 0.00500	0.00500
Copper						
	2BNWR01sed	Sediments	21.7	0.100	2.73	0.0247
	2BNWR02sed	Sediments	17.0	0.100	2.30	0.0265
	2BNWR03sed	Sediments	13.7	0.101	2.00	0.0270
	2BNWR04sed	Sediments	12.7	0.100	1.75	0.0270
	2BNWR05sed	Sediments	12.6	0.102	1.41	0.0215
	2BNWR06sed	Sediments	9.54	0.102	1.30	0.0261
	2BNWR07sed	Sediments	15.4	0.107	2.22	0.0284
	2BNWR01fwat	Water			< 0.00500	0.00500
	2BNWR01watM	Water			< 0.00500	0.00500
	2BNWR02fwat	Water			< 0.00500	0.00500

Analyte	Sample Number	Sample Matrix	Dry Weight (ppm)	DL Dry Weight (ppm)	Wet Weight (ppm)	DL Wet Weight (ppm)
	2BNWR02watM	Water			< 0.00500	0.00500
	2BNWR03fwat	Water			< 0.00500	0.00500
	2BNWR03watM	Water			< 0.00500	0.00500
	2BNWR04fwat	Water			< 0.00500	0.00500
	2BNWR04watM	Water			< 0.00500	0.00500
	2BNWR05fwat	Water			< 0.00500	0.00500
	2BNWR05watM	Water			< 0.00500	0.00500
	2BNWR06fwat	Water			< 0.00500	0.00500
	2BNWR06watM	Water			< 0.00500	0.00500
	2BNWR07fwat	Water			< 0.00500	0.00500
	2BNWR07watM	Water			< 0.00500	0.00500
	2BNWRfb	Water			< 0.00500	0.00500
	2BNWRffb	Water			< 0.00500	0.00500
Iron						
	2BNWR01sed	Sediments	20100	0.490	2530	0.0617
	2BNWR02sed	Sediments	21100	0.491	2850	0.0663
	2BNWR03sed	Sediments	23200	0.477	3300	0.0696
	2BNWR04sed	Sediments	17000	0.490	2350	0.0676
	2BNWR05sed	Sediments	16300	0.481	1830	0.0539
	2BNWR06sed	Sediments	14000	0.481	2030	0.0654
	2BNWR07sed	Sediments	15000	0.493	2160	0.0710
	2BNWR01fwat	Water			0.120	0.0100
	2BNWR01watM	Water			0.0800	0.0100
	2BNWR02fwat	Water			0.0100	0.0100
	2BNWR02watM	Water			0.0400	0.0100
	2BNWR03fwat	Water			< 0.0100	0.0100
	2BNWR03watM	Water			0.0300	0.0100
	2BNWR04fwat	Water			< 0.0100	0.0100
	2BNWR04watM	Water			< 0.0100	0.0100

Analyte	Sample Number	Sample Matrix	Dry Weight (ppm)	DL Dry Weight (ppm)	Wet Weight (ppm)	DL Wet Weight (ppm)
	2BNWR05fwat	Water			< 0.0100	0.0100
	2BNWR05watM	Water			< 0.0100	0.0100
	2BNWR06fwat	Water			< 0.0100	0.0100
	2BNWR06watM	Water			< 0.0100	0.0100
	2BNWR07fwat	Water			< 0.0100	0.0100
	2BNWR07watM	Water			< 0.0100	0.0100
	2BNWRflb	Water			< 0.0100	0.0100
	2BNWRfflb	Water			< 0.0100	0.0100
Mercury						
	2BNWR01sed	Sediments	0.123	0.00310	0.0155	0.000301
	2BNWR02sed	Sediments	0.107	0.00310	0.0144	0.000418
	2BNWR03sed	Sediments	0.110	0.00330	0.0101	0.000482
	2BNWR04sed	Sediments	0.0800	0.00330	0.0110	0.000455
	2BNWR05sed	Sediments	0.0730	0.00320	0.00818	0.000358
	2BNWR06sed	Sediments	0.0705	0.00330	0.0108	0.000449
	2BNWR07sed	Sediments	0.106	0.00330	0.0153	0.000475
	2BNWR01fwat	Water			< 0.0000300	0.0000300
	2BNWR01watM	Water			< 0.0000300	0.0000300
	2BNWR02fwat	Water			< 0.0000300	0.0000300
	2BNWR02watM	Water			< 0.0000300	0.0000300
	2BNWR03fwat	Water			< 0.0000300	0.0000300
	2BNWR03watM	Water			< 0.0000300	0.0000300
	2BNWR04fwat	Water			< 0.0000300	0.0000300
	2BNWR04watM	Water			< 0.0000300	0.0000300
	2BNWR05fwat	Water			< 0.0000300	0.0000300
	2BNWR05watM	Water			< 0.0000300	0.0000300
	2BNWR06fwat	Water			< 0.0000300	0.0000300
	2BNWR06watM	Water			< 0.0000300	0.0000300
	2BNWR07fwat	Water			< 0.0000300	0.0000300

Analyte	Sample Number	Sample Matrix	Dry Weight (ppm)	DL Dry Weight (ppm)	Wet Weight (ppm)	DL Wet Weight (ppm)
	2BNWR07watM	Water			< 0.0000300	0.0000300
	2BNWRfb	Water			< 0.0000300	0.0000300
	2BNWRffb	Water			< 0.0000300	0.0000300
Potassium						
	2BNWR01sed	Sediments	1420	0.80	170	1.23
	2BNWR02sed	Sediments	1060	0.80	140	1.32
	2BNWR03sed	Sediments	1270	0.50	185	1.30
	2BNWR04sed	Sediments	1500	0.80	215	1.35
	2BNWR05sed	Sediments	1050	0.00	218	1.08
	2BNWR06sed	Sediments	1520	0.00	207	1.31
	2BNWR07sed	Sediments	920	0.00	133	1.43
	2BNWR01fwat	Water			8.40	0.100
	2BNWR01watM	Water			8.00	0.100
	2BNWR02fwat	Water			13.0	0.100
	2BNWR02watM	Water			13.0	0.100
	2BNWR03fwat	Water			47.1	0.100
	2BNWR03watM	Water			47.5	0.100
	2BNWR04fwat	Water			85.4	0.100
	2BNWR04watM	Water			86.7	0.100
	2BNWR05fwat	Water			87.5	0.100
	2BNWR05watM	Water			85.4	0.100
	2BNWR06fwat	Water			80.1	0.100
	2BNWR06watM	Water			87.7	0.100
	2BNWR07fwat	Water			46.1	0.100
	2BNWR07watM	Water			46.1	0.100
	2BNWRfb	Water			< 0.100	0.100
	2BNWRffb	Water			< 0.100	0.100
Magnesium						
	2BNWR01sed	Sediments	2650	1.01	350	0.127

Analyte	Sample Number	Sample Matrix	Dry Weight (ppm)	DL Dry Weight (ppm)	Wet Weight (ppm)	DL Wet Weight (ppm)
	2BNWR02sed	Sediments	2060	1.01	302	0.136
	2BNWR03sed	Sediments	4810	1.01	702	0.147
	2BNWR04sed	Sediments	5200	1.01	718	0.139
	2BNWR05sed	Sediments	6650	1.01	767	0.113
	2BNWR06sed	Sediments	5060	1.01	811	0.137
	2BNWR07sed	Sediments	5100	1.01	734	0.145
	2BNWR01fwat	Water			7.83	0.0100
	2BNWR01watM	Water			7.78	0.0100
	2BNWR02fwat	Water			23.2	0.0100
	2BNWR02watM	Water			23.8	0.0100
	2BNWR03fwat	Water			126	0.0100
	2BNWR03watM	Water			126	0.0100
	2BNWR04fwat	Water			259	0.0100
	2BNWR04watM	Water			263	0.0100
	2BNWR05fwat	Water			261	0.0100
	2BNWR05watM	Water			263	0.0100
	2BNWR06fwat	Water			272	0.0100
	2BNWR06watM	Water			268	0.0100
	2BNWR07fwat	Water			130.	0.0100
	2BNWR07watM	Water			128	0.0100
	2BNWRflb	Water			< 0.0100	0.0100
	2BNWRfflb	Water			< 0.0100	0.0100
Manganese						
	2BNWR01sed	Sediments	305	0.0060	40.8	0.0123
	2BNWR02sed	Sediments	323	0.0060	43.0	0.0132
	2BNWR03sed	Sediments	294	0.0050	42.9	0.0139
	2BNWR04sed	Sediments	232	0.0060	32.0	0.0135
	2BNWR05sed	Sediments	224	0.0060	25.1	0.0108
	2BNWR06sed	Sediments	190.	0.0060	25.8	0.0131

Analyte	Sample Number	Sample Matrix	Dry Weight (ppm)	DL Dry Weight (ppm)	Wet Weight (ppm)	DL Wet Weight (ppm)
	2BNWR07sed	Sediments	213	0.0000	30.7	0.0143
	2BNWR01fwat	Water			< 0.00200	0.00200
	2BNWR01watM	Water			< 0.00200	0.00200
	2BNWR02fwat	Water			< 0.00200	0.00200
	2BNWR02watM	Water			0.00700	0.00200
	2BNWR03fwat	Water			< 0.00200	0.00200
	2BNWR03watM	Water			0.103	0.00200
	2BNWR04fwat	Water			< 0.00200	0.00200
	2BNWR04watM	Water			< 0.00200	0.00200
	2BNWR05fwat	Water			< 0.00200	0.00200
	2BNWR05watM	Water			< 0.00200	0.00200
	2BNWR06fwat	Water			< 0.00200	0.00200
	2BNWR06watM	Water			< 0.00200	0.00200
	2BNWR07fwat	Water			< 0.00200	0.00200
	2BNWR07watM	Water			< 0.00200	0.00200
	2BNWRfb	Water			< 0.00200	0.00200
	2BNWRffb	Water			< 0.00200	0.00200
Molybdenum						
	2BNWR01sed	Sediments	< 0.080	0.080	< 0.123	0.123
	2BNWR02sed	Sediments	< 0.080	0.080	< 0.132	0.132
	2BNWR03sed	Sediments	1.43	0.050	0.200	0.130
	2BNWR04sed	Sediments	1.07	0.080	0.148	0.135
	2BNWR05sed	Sediments	1.34	0.060	0.150	0.108
	2BNWR06sed	Sediments	1.05	0.060	0.224	0.131
	2BNWR07sed	Sediments	< 0.000	0.000	< 0.143	0.143
	2BNWR01fwat	Water			< 0.0100	0.0100
	2BNWR01watM	Water			< 0.0100	0.0100
	2BNWR02fwat	Water			< 0.0100	0.0100
	2BNWR02watM	Water			< 0.0100	0.0100

Analyte	Sample Number	Sample Matrix	Dry Weight (ppm)	DL Dry Weight (ppm)	Wet Weight (ppm)	DL Wet Weight (ppm)
	2BNWR03fwat	Water			< 0.0100	0.0100
	2BNWR03watM	Water			< 0.0100	0.0100
	2BNWR04fwat	Water			< 0.0100	0.0100
	2BNWR04watM	Water			< 0.0100	0.0100
	2BNWR05fwat	Water			< 0.0100	0.0100
	2BNWR05watM	Water			< 0.0100	0.0100
	2BNWR06fwat	Water			< 0.0100	0.0100
	2BNWR06watM	Water			< 0.0100	0.0100
	2BNWR07fwat	Water			< 0.0100	0.0100
	2BNWR07watM	Water			< 0.0100	0.0100
	2BNWRflb	Water			< 0.0100	0.0100
	2BNWRffb	Water			< 0.0100	0.0100
Nickel						
	2BNWR01sed	Sediments	20.6	0.400	3.35	0.0617
	2BNWR02sed	Sediments	22.8	0.401	3.08	0.0663
	2BNWR03sed	Sediments	23.9	0.477	3.40	0.0696
	2BNWR04sed	Sediments	15.2	0.400	2.10	0.0676
	2BNWR05sed	Sediments	16.0	0.461	1.79	0.0539
	2BNWR06sed	Sediments	13.8	0.461	1.88	0.0654
	2BNWR07sed	Sediments	27.1	0.403	3.00	0.0710
	2BNWR01fwat	Water			< 0.00500	0.00500
	2BNWR01watM	Water			< 0.00500	0.00500
	2BNWR02fwat	Water			< 0.00500	0.00500
	2BNWR02watM	Water			< 0.00500	0.00500
	2BNWR03fwat	Water			< 0.00500	0.00500
	2BNWR03watM	Water			< 0.00500	0.00500
	2BNWR04fwat	Water			< 0.00500	0.00500
	2BNWR04watM	Water			< 0.00500	0.00500
	2BNWR05fwat	Water			< 0.00500	0.00500

Analyte	Sample Number	Sample Matrix	Dry Weight (ppm)	DL Dry Weight (ppm)	Wet Weight (ppm)	DL Wet Weight (ppm)
	2BNWR05watM	Water			< 0.00500	0.00500
	2BNWR06fwat	Water			< 0.00500	0.00500
	2BNWR06watM	Water			< 0.00500	0.00500
	2BNWR07fwat	Water			< 0.00500	0.00500
	2BNWR07watM	Water			< 0.00500	0.00500
	2BNWRfb	Water			< 0.00500	0.00500
	2BNWRffb	Water			< 0.00500	0.00500
Phosphorus						
	2BNWR01sed	Sediments	1000	4.00	202	0.017
	2BNWR02sed	Sediments	1520	4.01	205	0.003
	2BNWR03sed	Sediments	742	4.77	108	0.006
	2BNWR04sed	Sediments	602	4.00	95.5	0.070
	2BNWR05sed	Sediments	700.	4.81	85.1	0.530
	2BNWR06sed	Sediments	577	4.81	78.5	0.054
	2BNWR07sed	Sediments	907	4.03	131	0.710
	2BNWR01fwat	Water			0.205	0.0500
	2BNWR01watM	Water			0.328	0.0500
	2BNWR02fwat	Water			0.132	0.0500
	2BNWR02watM	Water			0.300	0.0500
	2BNWR03fwat	Water			0.200	0.0500
	2BNWR03watM	Water			0.507	0.0500
	2BNWR04fwat	Water			< 0.0500	0.0500
	2BNWR04watM	Water			0.100	0.0500
	2BNWR05fwat	Water			< 0.0500	0.0500
	2BNWR05watM	Water			0.105	0.0500
	2BNWR06fwat	Water			< 0.0500	0.0500
	2BNWR06watM	Water			< 0.0500	0.0500
	2BNWR07fwat	Water			< 0.0500	0.0500
	2BNWR07watM	Water			0.208	0.0500

Analyte	Sample Number	Sample Matrix	Dry Weight (ppm)	DL Dry Weight (ppm)	Wet Weight (ppm)	DL Wet Weight (ppm)
	2BNWRfb	Water			< 0.0500	0.0500
	2BNWRffb	Water			< 0.0500	0.0500
Lead						
	2BNWR01sed	Sediments	33.3	0.0060	4.20	0.0123
	2BNWR02sed	Sediments	29.2	0.0062	3.04	0.0133
	2BNWR03sed	Sediments	21.3	0.0055	3.11	0.0130
	2BNWR04sed	Sediments	21.0	0.0060	3.02	0.0135
	2BNWR05sed	Sediments	20.8	0.0062	2.33	0.0108
	2BNWR06sed	Sediments	19.4	0.0062	2.04	0.0131
	2BNWR07sed	Sediments	18.4	0.0065	2.05	0.0142
	2BNWR01fwat	Water			< 0.0000200	0.0000200
	2BNWR01watM	Water			< 0.0000200	0.0000200
	2BNWR02fwat	Water			0.0000400	0.0000200
	2BNWR02watM	Water			0.0000300	0.0000200
	2BNWR03fwat	Water			0.0000600	0.0000200
	2BNWR03watM	Water			0.0000300	0.0000200
	2BNWR04fwat	Water			0.0000600	0.0000400
	2BNWR04watM	Water			0.0000500	0.0000400
	2BNWR05fwat	Water			0.0000500	0.0000400
	2BNWR05watM	Water			0.0000400	0.0000400
	2BNWR06fwat	Water			0.0000500	0.0000400
	2BNWR06watM	Water			< 0.0000400	0.0000400
	2BNWR07fwat	Water			0.0000200	0.0000200
	2BNWR07watM	Water			0.000100	0.0000200
	2BNWRfb	Water			< 0.0000200	0.0000200
	2BNWRffb	Water			< 0.0000200	0.0000200
Sulfur						
	2BNWR01sed	Sediments	10700	0.80	1350	1.23
	2BNWR02sed	Sediments	14000	0.80	1070	1.32

Analyte	Sample Number	Sample Matrix	Dry Weight (ppm)	DL Dry Weight (ppm)	Wet Weight (ppm)	DL Wet Weight (ppm)
	2BNWR03sed	Sediments	31700	0.50	4030	1.30
	2BNWR04sed	Sediments	23100	0.80	3100	1.35
	2BNWR05sed	Sediments	24300	0.00	2720	1.08
	2BNWR06sed	Sediments	24000	0.00	3300	1.31
	2BNWR07sed	Sediments	24000	0.00	3460	1.43
	2BNWR01fwat	Water			4.10	0.100
	2BNWR01watM	Water			4.30	0.100
	2BNWR02fwat	Water			11.4	0.100
	2BNWR02watM	Water			11.7	0.100
	2BNWR03fwat	Water			95.2	0.100
	2BNWR03watM	Water			94.1	0.100
	2BNWR04fwat	Water			208	0.100
	2BNWR04watM	Water			207	0.100
	2BNWR05fwat	Water			208	0.100
	2BNWR05watM	Water			209	0.100
	2BNWR06fwat	Water			217	0.100
	2BNWR06watM	Water			213	0.100
	2BNWR07fwat	Water			97.5	0.100
	2BNWR07watM	Water			96.1	0.100
	2BNWRfb	Water			< 0.100	0.100
	2BNWRffb	Water			< 0.100	0.100
Selenium						
	2BNWR01sed	Sediments	1.07	0.100	0.135	0.0247
	2BNWR02sed	Sediments	0.830	0.100	0.112	0.0265
	2BNWR03sed	Sediments	0.937	0.101	0.137	0.0279
	2BNWR04sed	Sediments	0.778	0.100	0.107	0.0270
	2BNWR05sed	Sediments	0.929	0.102	0.104	0.0215
	2BNWR06sed	Sediments	1.00	0.102	0.130	0.0261
	2BNWR07sed	Sediments	0.884	0.107	0.127	0.0284

Analyte	Sample Number	Sample Matrix	Dry Weight (ppm)	DL Dry Weight (ppm)	Wet Weight (ppm)	DL Wet Weight (ppm)
	2BNWR01fwat	Water			0.000110	0.0000500
	2BNWR01watM	Water			0.000200	0.0000500
	2BNWR02fwat	Water			0.000180	0.0000500
	2BNWR02watM	Water			0.000210	0.0000500
	2BNWR03fwat	Water			0.000330	0.0000500
	2BNWR03watM	Water			0.000250	0.0000500
	2BNWR04fwat	Water			0.000400	0.000100
	2BNWR04watM	Water			0.000300	0.000100
	2BNWR05fwat	Water			0.000430	0.000100
	2BNWR05watM	Water			0.000300	0.000100
	2BNWR06fwat	Water			0.000500	0.000100
	2BNWR06watM	Water			0.000300	0.000100
	2BNWR07fwat	Water			0.000420	0.0000500
	2BNWR07watM	Water			0.000140	0.0000500
	2BNWRfb	Water			< 0.0000500	0.0000500
	2BNWRffb	Water			< 0.0000500	0.0000500
Strontium						
	2BNWR01sed	Sediments	39.4	0.0100	4.90	0.00247
	2BNWR02sed	Sediments	40.9	0.0100	5.52	0.00265
	2BNWR03sed	Sediments	60.3	0.0101	8.80	0.00270
	2BNWR04sed	Sediments	61.5	0.0100	8.40	0.00270
	2BNWR05sed	Sediments	80.2	0.0102	8.98	0.00215
	2BNWR06sed	Sediments	70.3	0.0102	10.4	0.00261
	2BNWR07sed	Sediments	74.1	0.0107	10.7	0.00284
	2BNWR01fwat	Water			0.0027	0.000500
	2BNWR01watM	Water			0.0032	0.000500
	2BNWR02fwat	Water			0.147	0.000500
	2BNWR02watM	Water			0.148	0.000500
	2BNWR03fwat	Water			0.830	0.000500

Analyte	Sample Number	Sample Matrix	Dry Weight (ppm)	DL Dry Weight (ppm)	Wet Weight (ppm)	DL Wet Weight (ppm)
	2BNWR03watM	Water			0.842	0.000500
	2BNWR04fwat	Water			1.70	0.000500
	2BNWR04watM	Water			1.00	0.000500
	2BNWR05fwat	Water			1.71	0.000500
	2BNWR05watM	Water			1.71	0.000500
	2BNWR06fwat	Water			1.77	0.000500
	2BNWR06watM	Water			1.75	0.000500
	2BNWR07fwat	Water			0.870	0.000500
	2BNWR07watM	Water			0.800	0.000500
	2BNWRfb	Water			< 0.000500	0.000500
	2BNWRffb	Water			< 0.000500	0.000500
Titanium						
	2BNWR01sed	Sediments	20.0	0.0080	3.28	0.0123
	2BNWR02sed	Sediments	24.8	0.0080	3.35	0.0132
	2BNWR03sed	Sediments	45.2	0.0050	6.00	0.0130
	2BNWR04sed	Sediments	25.0	0.0080	3.57	0.0135
	2BNWR05sed	Sediments	45.3	0.0060	5.07	0.0108
	2BNWR06sed	Sediments	50.4	0.0060	7.07	0.0131
	2BNWR07sed	Sediments	13.8	0.0060	1.00	0.0143
	2BNWR01fwat	Water			< 0.00500	0.00500
	2BNWR01watM	Water			< 0.00500	0.00500
	2BNWR02fwat	Water			< 0.00500	0.00500
	2BNWR02watM	Water			< 0.00500	0.00500
	2BNWR03fwat	Water			< 0.00500	0.00500
	2BNWR03watM	Water			< 0.00500	0.00500
	2BNWR04fwat	Water			< 0.00500	0.00500
	2BNWR04watM	Water			< 0.00500	0.00500
	2BNWR05fwat	Water			< 0.00500	0.00500
	2BNWR05watM	Water			< 0.00500	0.00500

Analyte	Sample Number	Sample Matrix	Dry Weight (ppm)	DL Dry Weight (ppm)	Wet Weight (ppm)	DL Wet Weight (ppm)
	2BNWR06fwat	Water			< 0.00500	0.00500
	2BNWR06watM	Water			< 0.00500	0.00500
	2BNWR07fwat	Water			< 0.00500	0.00500
	2BNWR07watM	Water			< 0.00500	0.00500
	2BNWRfb	Water			< 0.00500	0.00500
	2BNWRffb	Water			< 0.00500	0.00500
Vanadium						
	2BNWR01sed	Sediments	35.8	0.400	4.51	0.0617
	2BNWR02sed	Sediments	25.0	0.401	3.38	0.0603
	2BNWR03sed	Sediments	20.8	0.477	3.04	0.0690
	2BNWR04sed	Sediments	16.3	0.400	2.25	0.0676
	2BNWR05sed	Sediments	19.7	0.481	2.21	0.0539
	2BNWR06sed	Sediments	17.6	0.481	2.30	0.0654
	2BNWR07sed	Sediments	19.4	0.403	2.70	0.0710
	2BNWR01fwat	Water			< 0.0100	0.0100
	2BNWR01watM	Water			< 0.0100	0.0100
	2BNWR02fwat	Water			< 0.0100	0.0100
	2BNWR02watM	Water			< 0.0100	0.0100
	2BNWR03fwat	Water			0.0100	0.0100
	2BNWR03watM	Water			0.0100	0.0100
	2BNWR04fwat	Water			< 0.0100	0.0100
	2BNWR04watM	Water			< 0.0100	0.0100
	2BNWR05fwat	Water			< 0.0100	0.0100
	2BNWR05watM	Water			< 0.0100	0.0100
	2BNWR06fwat	Water			< 0.0100	0.0100
	2BNWR06watM	Water			< 0.0100	0.0100
	2BNWR07fwat	Water			< 0.0100	0.0100
	2BNWR07watM	Water			< 0.0100	0.0100
	2BNWRfb	Water			< 0.0100	0.0100

Analyte	Sample Number	Sample Matrix	Dry Weight (ppm)	DL Dry Weight (ppm)	Wet Weight (ppm)	DL Wet Weight (ppm)
	2BNWRffb	Water			< 0.0100	0.0100
Zinc						
	2BNWR01sed	Sediments	192	0.100	24.2	0.0247
	2BNWR02sed	Sediments	141	0.100	10.0	0.0265
	2BNWR03sed	Sediments	102	0.101	14.0	0.0270
	2BNWR04sed	Sediments	70.5	0.100	10.0	0.0270
	2BNWR05sed	Sediments	60.0	0.102	7.73	0.0215
	2BNWR06sed	Sediments	62.1	0.102	8.45	0.0261
	2BNWR07sed	Sediments	128	0.107	18.4	0.0284
	2BNWR01fwat	Water			< 0.00200	0.00200
	2BNWR01watM	Water			< 0.00200	0.00200
	2BNWR02fwat	Water			< 0.00200	0.00200
	2BNWR02watM	Water			< 0.00200	0.00200
	2BNWR03fwat	Water			< 0.00200	0.00200
	2BNWR03watM	Water			< 0.00200	0.00200
	2BNWR04fwat	Water			< 0.00200	0.00200
	2BNWR04watM	Water			< 0.00200	0.00200
	2BNWR05fwat	Water			< 0.00200	0.00200
	2BNWR05watM	Water			< 0.00200	0.00200
	2BNWR06fwat	Water			< 0.00200	0.00200
	2BNWR06watM	Water			< 0.00200	0.00200
	2BNWR07fwat	Water			< 0.00200	0.00200
	2BNWR07watM	Water			< 0.00200	0.00200
	2BNWRflb	Water			< 0.00200	0.00200
	2BNWRffb	Water			< 0.00200	0.00200

5. Procedural Blanks

Analyte	Lab Sample Number	Lab Sample Matrix	Result Total UG	** BEC (ppm/%)	Basis
AVS					
	Blan0741	Soil/Sediment	0.10	< 30.8	Dry
Silver					
	Blan0064	Soil/Sediment	0.0042	< 0.105	Dry
	Blan0523	Water	-0.000808	< 0.000200	Wet
Aluminum					
	Blan0064	Soil/Sediment	0.285	< 0.070	Dry
	Blan0523	Water	-0.000374	< 0.000200	Wet
Arsenic					
	Blan0017	Water	0.0000440	< 0.0000500	Wet
	Blan0301	Soil/Sediment	0.0487	< 0.0060	Dry
Boron					
	Blan0064	Soil/Sediment	0.280	< 1.05	Dry
	Blan0523	Water	-0.00387	< 0.000200	Wet
Barium					
	Blan0064	Soil/Sediment	-0.00085	< 0.0070	Dry
	Blan0523	Water	0.000200	< 0.0000200	Wet
Beryllium					
	Blan0064	Soil/Sediment	-0.0000104	< 0.0400	Dry
	Blan0523	Water	-0.000000100	< 0.0000100	Wet
Calcium					
	Blan0064	Soil/Sediment	4.02	< 0.70	Dry
	Blan0523	Water	0.0140	0.000208	Wet
Cadmium					
	Blan0017	Water	-0.000000400	< 0.0000100	Wet
	Blan0301	Soil/Sediment	-0.00431	< 0.0100	Dry
Cobalt					
	Blan0064	Soil/Sediment	-0.0100	< 0.400	Dry
	Blan0523	Water	0.000800	< 0.000100	Wet
Chromium					

Analyte	Lab Sample Number	Lab Sample Matrix	Result Total UG	** BEC (ppm/%)	Basis
	Blan0084	Soil/Sediment	-0.0445	< 0.195	Dry
	Blan0523	Water	0.00180	< 0.000100	Wet
Copper					
	Blan0084	Soil/Sediment	0.0491	< 0.195	Dry
	Blan0523	Water	0.00150	< 0.000100	Wet
Iron					
	Blan0084	Soil/Sediment	0.222	< 0.490	Dry
	Blan0523	Water	-0.00110	< 0.000200	Wet
Mercury					
	Blan0330	Soil/Sediment	0.000	< 0.00323	Dry
	Blan0781	Water	0.000000700	< 0.000000600	Wet
Potassium					
	Blan0084	Soil/Sediment	0.680	< 0.76	Dry
	Blan0523	Water	0.137	0.00274	Wet
Magnesium					
	Blan0084	Soil/Sediment	0.320	< 1.02	Dry
	Blan0523	Water	0.0144	0.000288	Wet
Manganese					
	Blan0084	Soil/Sediment	0.0240	< 0.0970	Dry
	Blan0523	Water	-0.000300	< 0.0000400	Wet
Molybdenum					
	Blan0084	Soil/Sediment	0.0040	< 0.070	Dry
	Blan0523	Water	-0.000100	< 0.000200	Wet
Nickel					
	Blan0084	Soil/Sediment	-0.0345	< 0.490	Dry
	Blan0523	Water	-0.000300	< 0.000100	Wet
Phosphorus					
	Blan0084	Soil/Sediment	1.08	< 4.00	Dry
	Blan0523	Water	0.00830	< 0.00100	Wet
Lead					
	Blan0017	Water	0.00000170	< 0.0000200	Wet
	Blan0301	Soil/Sediment	0.00308	< 0.0060	Dry
Sulfur					

Analyte	Lab Sample Number	Lab Sample Matrix	Result Total UG	** BEC (ppm/%)	Basis
	Blan0084	Soil/Sediment	0.021	< 0.70	Dry
	Blan0523	Water	-0.0131	< 0.00200	Wet
Selenium					
	Blan0017	Water	-0.0000180	< 0.0000500	Wet
	Blan0301	Soil/Sediment	-0.0005	< 0.100	Dry
Strontium					
	Blan0084	Soil/Sediment	0.0148	0.0204	Dry
	Blan0523	Water	0.000200	< 0.0000100	Wet
Titanium					
	Blan0084	Soil/Sediment	0.0080	0.137	Dry
	Blan0523	Water	-0.000000500	< 0.000100	Wet
Tot. Organic Carbon					
	Blan0305	Soil/Sediment	0.000	< 0.0	Percent
Vanadium					
	Blan0084	Soil/Sediment	-0.0304	< 0.400	Dry
	Blan0523	Water	0.00280	< 0.000200	Wet
Zinc					
	Blan0084	Soil/Sediment	-0.0301	< 0.105	Dry
	Blan0523	Water	-0.000500	< 0.0000400	Wet

** Blank Equivalent Concentration

6. Duplicates

Analyte	Sample Number	Sample Matrix	Basis	Initial Result (ppm/%)	Duplicate Result (ppm/%)	Average	Relative Percent Diff.
AVS							
	2BNWR05sed	Sediments	Dry	022	070	050.	0.00
Silver							
	2BNWR01sed	Sediments	Dry	< 0.100	< 0.105	0.0078	0.510
	2BNWR00watM	Water	Wet	< 0.0100	< 0.0100	0.00500	0.000
Aluminum							
	2BNWR01sed	Sediments	Dry	20100	20200	24000	30.1
	2BNWR00watM	Water	Wet	< 0.0100	< 0.0100	0.00500	0.000
Arsenic							
	2BNWR01sed	Sediments	Dry	5.00	3.88	4.77	37.3
	2BNWR00watM	Water	Wet	0.00258	0.00287	0.00272	10.0
Boron							
	2BNWR01sed	Sediments	Dry	2.82	< 1.05	1.00	07.2
	2BNWR00watM	Water	Wet	1.00	1.01	1.00	1.00
Barium							
	2BNWR01sed	Sediments	Dry	47.7	25.0	30.4	02.4
	2BNWR00watM	Water	Wet	0.100	0.111	0.110	1.82
Beryllium							
	2BNWR01sed	Sediments	Dry	1.84	1.37	1.00	20.3
	2BNWR00watM	Water	Wet	< 0.000500	< 0.000500	0.000250	0.000
Calcium							
	2BNWR01sed	Sediments	Dry	5120	4070	4000	22.8
	2BNWR00watM	Water	Wet	00.3	08.0	00.1	0.400
Cadmium							

Analyte	Sample Number	Sample Matrix	Basis	Initial Result (ppm/%)	Duplicate Result (ppm/%)	Average	Relative Percent Diff.
	2BNWR01sed	Sediments	Dry	0.580	0.488	0.534	17.2
	2BNWR00watM	Water	Wet	< 0.0000200	< 0.0000200	0.0000100	0.000
Cobalt							
	2BNWR01sed	Sediments	Dry	26.0	19.0	23.4	20.0
	2BNWR00watM	Water	Wet	< 0.00500	< 0.00500	0.00250	0.000
Chromium							
	2BNWR01sed	Sediments	Dry	26.0	19.2	23.0	33.4
	2BNWR00watM	Water	Wet	< 0.00500	< 0.00500	0.00250	0.000
Copper							
	2BNWR01sed	Sediments	Dry	21.7	16.0	18.8	30.2
	2BNWR00watM	Water	Wet	< 0.00500	< 0.00500	0.00250	0.000
Iron							
	2BNWR01sed	Sediments	Dry	20100	14900	17500	29.7
	2BNWR00watM	Water	Wet	< 0.0100	< 0.0100	0.00500	0.000
Grain Size-Clay							
	2BNWR01sed	Sediments	Percent	75.0	73.0	74.0	2.68
Grain Size-Sand							
	2BNWR01sed	Sediments	Percent	4.70	3.90	4.30	18.6
Grain Size-Silt							
	2BNWR01sed	Sediments	Percent	19.7	22.5	21.1	13.3
Mercury							
	2BNWR02sed	Sediments	Dry	0.107	0.109	0.108	1.85
	2BNWR00watM	Water	Wet	< 0.0000300	< 0.0000300	0.0000150	0.000
Potassium							
	2BNWR01sed	Sediments	Dry	1420	1040	1230	30.9
	2BNWR00watM	Water	Wet	87.7	90.1	88.9	2.70

Analyte	Sample Number	Sample Matrix	Basis	Initial Result (ppm/%)	Duplicate Result (ppm/%)	Average	Relative Percent Diff.
Magnesium							
	2BNWR01sed	Sediments	Dry	2850	2050	2450	32.0
	2BNWR00watM	Water	Wet	268	270.	269	0.740
Manganese							
	2BNWR01sed	Sediments	Dry	305	300.	348	27.3
	2BNWR00watM	Water	Wet	< 0.00200	< 0.00200	0.00100	0.000
Molybdenum							
	2BNWR01sed	Sediments	Dry	< 0.060	< 0.060	0.400	0.000
	2BNWR00watM	Water	Wet	< 0.0100	< 0.0100	0.00500	0.000
Nickel							
	2BNWR01sed	Sediments	Dry	26.6	19.8	23.2	29.3
	2BNWR00watM	Water	Wet	< 0.00500	< 0.00500	0.00250	0.000
Phosphorus							
	2BNWR01sed	Sediments	Dry	1600	1140	1370	33.6
	2BNWR00watM	Water	Wet	< 0.0500	< 0.0500	0.0250	0.000
Lead							
	2BNWR01sed	Sediments	Dry	33.3	26.3	29.8	23.5
	2BNWR00watM	Water	Wet	< 0.0000400	< 0.0000400	0.0000200	0.000
Sulfur							
	2BNWR01sed	Sediments	Dry	10700	8420	9560	23.8
	2BNWR00watM	Water	Wet	213	213	213	0.000
Selenium							
	2BNWR01sed	Sediments	Dry	1.07	0.702	0.886	41.5
	2BNWR00watM	Water	Wet	0.000390	0.000480	0.000435	20.7
Strontium							
	2BNWR01sed	Sediments	Dry	39.4	29.3	34.4	29.4

Analyte	Sample Number	Sample Matrix	Basis	Initial Result (ppm/%)	Duplicate Result (ppm/%)	Average	Relative Percent Diff.
	2BNWR00watM	Water	Wet	1.75	1.77	1.76	1.14
Titanium							
	2BNWR01sed	Sediments	Dry	26.0	11.4	18.7	78.1
	2BNWR00watM	Water	Wet	< 0.00500	< 0.00500	0.00250	0.000
Tot. Organic Carbon							
	2BNWR05sed	Sediments	Percent	25.3	23.1	24.2	9.09
Vanadium							
	2BNWR01sed	Sediments	Dry	35.8	25.0	30.4	35.5
	2BNWR00watM	Water	Wet	< 0.0100	< 0.0100	0.00500	0.000
Zinc							
	2BNWR01sed	Sediments	Dry	192	153	172	22.6
	2BNWR00watM	Water	Wet	< 0.00200	< 0.00200	0.00100	0.000

7. Spike Recoveries

Analyte	Sample Number	Sample Matrix	Basis	Spike Level (ppm/%)	Amount Recovered (ppm/%)	*** Spike Background	Percent Recovery
AVS							
	2BNWR07sed	Sediments	Dry	6800	3600	381	52.5
Silver							
	2BNWR07sed	Sediments	Dry	5.00	5.15	50.7	103
	2BNWR07watM	Water	Wet	0.0600	0.0550	12.0	91.7
Aluminum							
	2BNWR07sed	Sediments	Dry	9000	9000	0.760	99.1
	2BNWR07watM	Water	Wet	1.20	1.22	30.0	102
Arsenic							
	2BNWR07sed	Sediments	Dry	9.99	8.75	3.51	87.6
	2BNWR07watM	Water	Wet	0.0200	0.0208	20.2	104
Boron							
	2BNWR07sed	Sediments	Dry	99.9	77.6	12.1	77.7
	2BNWR07watM	Water	Wet	0.500	0.487	0.960	97.4
Barium							
	2BNWR07sed	Sediments	Dry	200.	52.1	9.38	26.1
	2BNWR07watM	Water	Wet	0.600	0.615	3.17	102
Beryllium							
	2BNWR07sed	Sediments	Dry	0.999	0.800	0.560	80.1
	2BNWR07watM	Water	Wet	0.0120	0.0116	48.0	96.2
Calcium							
	2BNWR07sed	Sediments	Dry	20000	18000	3.32	94.5
	2BNWR07watM	Water	Wet	24.0	22.0	0.430	91.7
Cadmium							

Analyte	Sample Number	Sample Matrix	Basis	Spike Level (ppm/%)	Amount Recovered (ppm/%)	*** Spike Background	Percent Recovery
	2BNWR07sed	Sediments	Dry	5.00	4.90	8.20	98.0
	2BNWR07wat M	Water	Wet	0.0200	0.0198	1000	98.9
Cobalt							
	2BNWR07sed	Sediments	Dry	20.0	10.8	0.040	54.0
	2BNWR07wat M	Water	Wet	0.120	0.110	48.0	92.1
Chromium							
	2BNWR07sed	Sediments	Dry	50.0	47.9	4.34	95.9
	2BNWR07wat M	Water	Wet	0.120	0.110	48.0	92.1
Copper							
	2BNWR07sed	Sediments	Dry	50.0	48.7	3.24	97.5
	2BNWR07wat M	Water	Wet	0.240	0.232	96.0	96.5
Iron							
	2BNWR07sed	Sediments	Dry	9999	7999	0.070	79.1
	2BNWR07wat M	Water	Wet	2.40	2.52	480.	105
Mercury							
	2BNWR02sed	Sediments	Dry	0.182	0.140	1.70	77.1
	2BNWR07wat M	Water	Wet	0.00100	0.000895	96.7	89.5
Potassium							
	2BNWR07sed	Sediments	Dry	9999	11100	10.8	111
	2BNWR07wat M	Water	Wet	6.00	4.00	0.130	66.7
Magnesium							
	2BNWR07sed	Sediments	Dry	9999	9500	1.99	95.1
	2BNWR07wat M	Water	Wet	12.0	8.00	0.0000	66.7
Manganese							
	2BNWR07sed	Sediments	Dry	500.	499	2.35	93.9
	2BNWR07wat	Water	Wet	0.600	0.599	999.	99.8

Analyte	Sample Number	Sample Matrix	Basis	Spike Level (ppm/%)	Amount Recovered (ppm/%)	*** Spike Background	Percent Recovery
	M						
Molybdenum							
	2BNWR07sed	Sediments	Dry	0.00	0.16	20.2	01.6
	2BNWR07wat M	Water	Wet	0.500	0.478	100.	05.6
Nickel							
	2BNWR07sed	Sediments	Dry	00.0	88.0	3.60	80.0
	2BNWR07wat M	Water	Wet	0.120	0.106	48.0	88.8
Phosphorus							
	2BNWR07wat M	Water	Wet	0.500	0.545	2.40	100
Lead							
	2BNWR07sed	Sediments	Dry	50.0	48.4	2.72	00.0
	2BNWR07wat M	Water	Wet	0.0200	0.0200	200.	100.
Sulfur							
	2BNWR07wat M	Water	Wet	10.0	8.00	0.100	80.0
Selenium							
	2BNWR07sed	Sediments	Dry	5.00	5.45	5.65	100
	2BNWR07wat M	Water	Wet	0.0200	0.0200	143	00.8
Strontium							
	2BNWR07sed	Sediments	Dry	50.0	43.0	0.670	87.0
	2BNWR07wat M	Water	Wet	0.200	0.100	0.230	05.0
Titanium							
	2BNWR07wat M	Water	Wet	0.100	0.0005	40.0	00.5
Tot. Organic Carbon							
	2BNWR07sed	Sediments	Percent	38.5	0.50	1.20	10.0
Vanadium							

Analyte	Sample Number	Sample Matrix	Basis	Spike Level (ppm/%)	Amount Recovered (ppm/%)	*** Spike Background	Percent Recovery
	2BNWR07sed	Sediments	Dry	50.0	38.6	2.58	77.3
	2BNWR07wat M	Water	Wet	0.120	0.112	24.0	93.3
Zinc							
	2BNWR07sed	Sediments	Dry	200.	170.	1.50	85.1
	2BNWR07wat M	Water	Wet	1.20	1.19	1200	99.1

*** For a spike to be a valid measure of method accuracy, this ratio must be higher than 1.0.

8. Reference Materials

Analyte	Lab Sample Number	S.R.M. ID	Basis	Certified Reference Value	95% Confidence Interval	Result (ppm/%)	Percent Recovery
Silver							
	10400525	NIST 1040	Wet	0.00702	0.00025	0.0100	131
	MESS0080	NRCC MESS-3	Dry	0.18	0.02	0.372	207
Aluminum							
	10400525	NIST 1040	Wet	0.052	0.0015	0.0500	96.2
	MESS0080	NRCC MESS-3	Dry			10000	
Arsenic							
	10400010	NIST 1040	Wet	0.02007	0.00041	0.0208	100.
	MESS0303	NRCC MESS-3	Dry	21.2	1.1	17.4	82.1
Boron							
	10400525	NIST 1040	Wet	0.3011	0.0001	0.277	92.0
	MESS0080	NRCC MESS-3	Dry			22.3	
Barium							
	10400525	NIST 1040	Wet	0.148	0.0022	0.151	102
	MESS0080	NRCC MESS-3	Dry			310	
Beryllium							
	10400525	NIST 1040	Wet	0.03404	0.00041	0.0341	97.0
	MESS0080	NRCC MESS-3	Dry	2.3	0.12	0.961	41.8
Calcium							
	10400525	NIST 1040	Wet	7.045	0.080	7.11	101
	MESS0080	NRCC MESS-3	Dry			13500	
Cadmium							
	10400010	NIST 1040	Wet	0.02270	0.00000	0.0233	102
	MESS0303	NRCC MESS-	Dry	0.24	0.01	0.241	100.

Analyte	Lab Sample Number	S.R.M. ID	Basis	Certified Reference Value	95% Confidence Interval	Result (ppm/%)	Percent Recovery
		3					
Cobalt							
	10400525	NIST 1040	Wet	0.02028	0.00031	0.0190	93.7
	MESS0080	NRCC MESS-3	Dry	14.4	2	12.5	86.8
Chromium							
	10400525	NIST 1040	Wet	0.0380	0.0010	0.0360	93.3
	MESS0080	NRCC MESS-3	Dry	105	4	28.5	27.1
Copper							
	10400525	NIST 1040	Wet	0.0852	0.0012	0.0830	97.4
	MESS0080	NRCC MESS-3	Dry	33.9	1.0	32.1	94.7
Iron							
	10400525	NIST 1040	Wet	0.0343	0.0010	0.0300	87.5
	MESS0080	NRCC MESS-3	Dry			31700	
Mercury							
	10410783	NIST 1041d	Wet	1.50	0.018	1.40	93.7
	MESS0331	NRCC MESS-3	Dry	0.091	0.009	0.0770	85.3
Potassium							
	10400525	NIST 1040	Wet	0.994	0.027	1.00	101
	MESS0080	NRCC MESS-3	Dry			5020	
Magnesium							
	10400525	NIST 1040	Wet	5.810	0.050	5.65	97.1
	MESS0080	NRCC MESS-3	Dry			13200	
Manganese							
	10400525	NIST 1040	Wet	0.1215	0.0011	0.110	97.9
	MESS0080	NRCC MESS-3	Dry	324	12	280	86.2

Analyte	Lab Sample Number	S.R.M. ID	Basis	Certified Reference Value	95% Confidence Interval	Result (ppm/%)	Percent Recovery
Molybdenum							
	10400525	NIST 1040	Wet	0.04075	0.00020	0.0400	85.0
	MESS0080	NRCC MESS-3	Dry	2.78	0.07	2.30	84.0
Nickel							
	10400525	NIST 1040	Wet	0.0274	0.0008	0.0200	94.0
	MESS0080	NRCC MESS-3	Dry	40.0	2.2	30.0	70.8
Phosphorus							
	10400525	NIST 1040	Wet			< 0.0500	
	MESS0080	NRCC MESS-3	Dry			1100	
Lead							
	10400010	NIST 1040	Wet	0.02780	0.00014	0.0283	101
	MESS0303	NRCC MESS-3	Dry	21.1	0.7	17.4	82.5
Sulfur							
	10400525	NIST 1040	Wet			4.10	
	MESS0080	NRCC MESS-3	Dry			1710	
Selenium							
	10400010	NIST 1040	Wet	0.02100	0.00051	0.0207	94.3
	MESS0303	NRCC MESS-3	Dry	0.72	0.05	0.602	83.6
Strontium							
	10400525	NIST 1040	Wet	0.1242	0.0007	0.119	95.8
	MESS0080	NRCC MESS-3	Dry	129	11	59.7	46.3
Titanium							
	10400525	NIST 1040	Wet			< 0.00500	
	MESS0080	NRCC MESS-3	Dry			15.5	
Tot. Organic Carbon							
	27020307	NIST 2702	Percent	3.27		3.32	102

Analyte	Lab Sample Number	S.R.M. ID	Basis	Certified Reference Value	95% Confidence Interval	Result (ppm/%)	Percent Recovery
Vanadium							
	10400525	NIST 1040	Wet	0.01200	0.00037	0.0200	154
	MESS0080	NRCC MESS-3	Dry	243	10	66.2	27.2
Zinc							
	10400525	NIST 1040	Wet	0.0532	0.0011	0.0530	99.6
	MESS0080	NRCC MESS-3	Dry	159	8	135	84.9

S.R.M Names

SRM ID	SRM Name
NIST 1040	Water
NIST 1641d	Mercury in Water
NIST 2702	Marine Sediment
NRCC MESS-3	Marine Sediment

10. QAQC Summary

1. Procedural Blank Summary

Procedural Blank Summary of Blank Equivalent Concentration (BEC) Data

Within a lab sample matrix, there must be three or more Blank results for a given analyte in order to generate a report.

10.2. Duplicate Summary

Duplicate Summary of Relative Percent Difference (RPD) Data

Within a lab sample matrix and concentration range, there must be three or more Duplicate results for a given analyte in order to generate a report.

10.3. Spike Summary

Spike Summary of Percent Recovery (PR) Data

Within a lab sample matrix, there must be three or more Spike results for a given analyte in order to generate a report.

10.4. SRM Summary

Standard Reference Material Summary of Percent Recovery (PR) Data

Within an SRM ID, there must be three or more Recoveries for a given analyte in order to generate a report.

11. QA/QC Anomalies

1. Blank Frequency Anomalies

The required number of blank analyses were performed.

11.2. Duplicate Frequency Anomalies

The required number of duplicate analyses were performed.

11.3. Spike Frequency Anomalies

The required number of spike analyses were performed.

11.4. Reference Material Frequency Anomalies

The required number of Standard Reference Material analyses were performed.

11.5. Mass Spec Frequency Anomalies

No Carbamate, OC, or OP data exists in this set of results; therefore, the anomaly test was not performed.

11.6. Limit of Detection Anomalies

Limits of Detection were within the contract requirements with the following exceptions.

Analyte	Sample Number	Lab Matrix	* CRDL (ppm/%)	Basis	Acceptable To (ppm/%)	LOD (ppm/%)	See QA/QC Note No.
Phosphorus	2BNWRfb	Water	0.005	Wet	0.0150	0.0500	1
Phosphorus	2BNWR00fwat	Water	0.005	Wet	0.0150	0.0500	2
Phosphorus	2BNWR04fwat	Water	0.005	Wet	0.0150	0.0500	3
Phosphorus	2BNWRfb	Water	0.005	Wet	0.0150	0.0500	4

Limits of Detection were within the contract requirements with the following exceptions.							
Analyte	Sample Number	Lab Matrix	* CRDL (ppm/%)	Basis	Acceptable To (ppm/%)	LOD (ppm/%)	See QA/QC Note No.
Phosphorus	2BNWR07fwat	Water	0.005	Wet	0.0150	0.0500	5
Phosphorus	2BNWR00wat M	Water	0.005	Wet	0.0150	0.0500	6
Phosphorus	2BNWR05fwat	Water	0.005	Wet	0.0150	0.0500	7
Sulfur	2BNWRffb	Water	0.005	Wet	0.0150	0.100	8
Sulfur	2BNWRfb	Water	0.005	Wet	0.0150	0.100	9
Vanadium	2BNWR00fwat	Water	0.001	Wet	0.00300	0.0100	10
Vanadium	2BNWR02fwat	Water	0.001	Wet	0.00300	0.0100	11
Vanadium	2BNWR04fwat	Water	0.001	Wet	0.00300	0.0100	12
Vanadium	2BNWR01wat M	Water	0.001	Wet	0.00300	0.0100	13
Vanadium	2BNWR02wat M	Water	0.001	Wet	0.00300	0.0100	14
Vanadium	2BNWR00wat M	Water	0.001	Wet	0.00300	0.0100	15
Vanadium	2BNWR01fwat	Water	0.001	Wet	0.00300	0.0100	16
Vanadium	2BNWRfb	Water	0.001	Wet	0.00300	0.0100	17
Vanadium	2BNWRffb	Water	0.001	Wet	0.00300	0.0100	18
Vanadium	2BNWR07wat M	Water	0.001	Wet	0.00300	0.0100	19
Vanadium	2BNWR07fwat	Water	0.001	Wet	0.00300	0.0100	20
Vanadium	2BNWR05wat M	Water	0.001	Wet	0.00300	0.0100	21
Vanadium	2BNWR04wat M	Water	0.001	Wet	0.00300	0.0100	22
Vanadium	2BNWR05fwat	Water	0.001	Wet	0.00300	0.0100	23

* CRDL = Contract Required Detection Limit.

11.7. Blank Anomalies

Procedural Blank analyses were acceptable.

11.8. Duplicate Anomalies

All duplicate results were within normal limits with the following exceptions.							
Analyte	Sample Number	Lab Matrix	LOD Mean	Initial Result ppm/%	Duplicate Result ppm/%	Relative Percent Diff.	See QA/QC Note No.
Aluminum	2BNWR01sed	Soil/Sediment	0.080	20100	20200	30.1	24
Zinc	2BNWR01sed	Soil/Sediment	0.100	102	153	22.0	30
Barium	2BNWR01sed	Soil/Sediment	0.0080	47.7	25.0	62.4	26
Beryllium	2BNWR01sed	Soil/Sediment	0.0480	1.84	1.37	29.3	27
Cobalt	2BNWR01sed	Soil/Sediment	0.480	26.0	10.0	29.0	28
Chromium	2BNWR01sed	Soil/Sediment	0.100	26.0	10.2	33.4	29
Copper	2BNWR01sed	Soil/Sediment	0.100	21.7	16.0	30.2	30
Iron	2BNWR01sed	Soil/Sediment	0.480	20100	14000	29.7	31
Potassium	2BNWR01sed	Soil/Sediment	0.80	1420	1040	30.9	32
Magnesium	2BNWR01sed	Soil/Sediment	1.01	2850	2050	32.7	33
Manganese	2BNWR01sed	Soil/Sediment	0.0080	305	300.	27.3	34
Phosphorus	2BNWR01sed	Soil/Sediment	4.80	1600	1140	33.0	35
Strontium	2BNWR01sed	Soil/Sediment	0.0105	30.4	29.3	29.4	36
Titanium	2BNWR01sed	Soil/Sediment	0.0080	26.0	11.4	78.1	37
Vanadium	2BNWR01sed	Soil/Sediment	0.480	35.8	25.0	35.5	38
Arsenic	2BNWR01sed	Soil/Sediment	0.0078	5.00	3.88	37.3	25

11.9. Spike Anomalies

All spike results were within normal limits with the following exceptions.									
Analyte	Sample Number	Lab Matrix	Sample Result ppm/%	LOD ppm/%	Spike Result ppm/%	Spike Level ppm/%	% Recovery	Spike / Background	See QA/QC Note No.
AVS	2BNWR07sed	Soil/Sediment	< 30.0	43.0	3620	6800	52.8	100.	40
Barium	2BNWR07sed	Soil/Sediment	21.3	0.0050	73.4	200.	26.1	0.38	41

11.10. S.R.M. Anomalies

All SRM results were within normal limits with the following exceptions.							
Analyte	S.R.M. ID	Certified Value	95% Confidence Interval	LOD (ppm/%)	Result (ppm/%)	% Recovery	See QA/QC Note No.
Chromium	NRCC MESS-3	105	4.00	0.108	28.5	27.1	42

S.R.M Names

SRM ID	SRM Name
NRCC MESS-3	Marine Sediment

11.11. QA/QC Notes

QA/QC Note Number and Comments
Additional Lab Comments: Spiking solutions do not contain P, S, or Ti (three analytes that are provided at no cost to the Service) and so spike recovery calculations will result in errors for these QC samples. The results percent for TOC on that sample should be...38.5% This should result in an "invalid" spike. We generally have to spike the samples without knowing what their unspiked values are. Turns out that these samples, including the one that was chosen for the spike, have about 10x as much toc as a "normal" sample. These must be loaded with organic matter, to the extent that you might be able to toss 'em in your garden in case the price of peat moss was too high at your local nursery. Bob ---------- QA/QC Comments: 1-23: ICP analysis requires the addition of an internal standard in order to overcome matrix interference problems. This however sometimes causes the DL to increase for Phosphorus, Sulfur and Vanadium. Phosphorus and Sulfur are not required elements of the contract but extra elements that the lab reports as part of the normal ICP Scan when QC is acceptable. 24-30: Some analytes had RPDS slightly higher than the contract requirement. These values are acceptable for soil duplicates

and should have no effect on the interpretation of the data.

40-41: Two samples had spike recoveries lesser than the contract requirement. Based on other QC data, this should have no effect on the interpretation of the data.

42: The SRM NRCC MESS-3 normally has a low recovery for Cr because a substantial fraction of the analyte is buried within the mineral lattice and therefore is generally not well solubilized using a nitric-hydrochloric digestion. The median value for Cr recovery for NRCC MESS-3 in the database for this laboratory is 28%. Therefore, 27.1% is comparable with other results.

Brenda Montgomery
ACF Inorganic Chemist

12. Analytical Methods

Below are the analytical methods used by TERL to produce the results included in this report.

Method Codes:	002 005

Lab Matrix	Analyte
Soil/Sediment	AVS
	Silver
	Aluminum
	Boron
	Barium
	Beryllium
	Calcium
	Cobalt
	Chromium
	Copper
	Iron
	Potassium
	Magnesium
	Manganese
	Molybdenum
	Nickel
	Phosphorus
	Sulfur
	Strontium
	Titanium
	Vanadium
	Zinc

Method Code: 002
LABORATORY: Trace Element Research Laboratory Digestion of soil and sediment.

Soil and sediment samples are wet digested with nitric and hydrochloric acids and converted into acidic digest solutions for analysis by various atomic spectroscopy methods. Wet sediment is homogenized in its container, and an aliquot is freeze dried and homogenized to a fine powder. Approximately 0.5 g of powdered sediment is weighed into a tall form beaker and 10 ml of Aqua Regia (1:4 v:v HNO3:HCl) are added. The vessel is heated on a hot plate for 2 hrs., with swirling, repositioning, and rinsing of the beaker walls (if necessary) at 1 hr. Samples are then transferred into centrifuge tubes and diluted to a final volume of 30 ml with distilled deionized water. They are spun to settle particles and transferred to 1 oz polyethylene bottles for storage until analysis. The samples are then diluted as necessary and analyzed for trace metals by various TERL analytical methods.

Method Code: 005

LABORATORY: Trace Element Research Laboratory

Analysis of trace metals by inductively coupled plasma
optical emission spectroscopy (ICP).

Liquid samples are nebulized and the resulting aerosol is transported to the plasma torch. Element-specific atomic-line emission spectra are produced by a inductively coupled argon plasma. The spectra are dispersed by a grating spectrometer, and the intensities of the lines are monitored by photomultiplier tubes or solid state detectors. Samples are quantitated by comparison with external standards. One or more internal standards may be incorporated to compensate for physical effects resulting from viscosity and varying levels of total dissolved solids in the samples. Background correction is required and is measured adjacent to analyte lines on samples during analysis.

Method Codes:	002 010

Lab Matrix	Analyte
Soil/Sediment	Arsenic
	Cadmium
	Lead
	Selenium

Method Code: 002

LABORATORY: Trace Element Research Laboratory

Digestion of soil and sediment.

Soil and sediment samples are wet digested with nitric and hydrochloric acids and converted into acidic digest solutions for analysis by various atomic spectroscopy methods. Wet sediment is homogenized in its container, and an aliquot is freeze dried and homogenized to a fine powder. Approximately 0.5 g of powdered sediment is weighed into a tall form beaker and 10 ml of Aqua

Regia (1:4 v:v HNO3:HCl) are added. The vessel is heated on a hot plate for 2 hrs., with swirling, repositioning, and rinsing of the beaker walls (if necessary) at 1 hr. Samples are then transferred into centrifuge tubes and diluted to a final volume of 30 ml with distilled deionized water. They are spun to settle particles and transferred to 1 oz polyethylene bottles for storage until analysis. The samples are then diluted as necessary and analyzed for trace metals by various TERL analytical methods.

Method Code: 016

LABORATORY: Trace Element Research Laboratory

Analysis of trace metals in water samples by inductively coupled plasma-mass spectroscopy (ICP-MS).

Concentrations of trace elements in water samples are determined with an atomic spectroscopy method that relies on ionization of sample constituents in a high temperature argon plasma and separation of positively-charged ions on the basis of their mass:charge ratios (m:z) by a quadrupole mass spectrometer. The method offers extremely low detection limits but is subject to interferences from atomic and molecular ions having values within 1 AMU of the target ions. Sample preconcentration and matrix elimination can sometimes eliminate these problems, along with those resulting from high total dissolved solids.

Method Codes:	003 007

Lab Matrix	Analyte
Water	Mercury

Method Code: 003

LABORATORY: Trace Element Research Laboratory

Digestion of water, soil, sediment, and biological tissue for mercury analysis.

Before samples are analyzed by the CVAAS method in use in this laboratory, the mercury is converted to the Hg2+ form. Mercury is digested by a modified version of EPA method 245.5 and 245.6. Sediment and tissue samples can be analyzed either freeze dried or on a wet basis. Sediment samples are homogenized by mixing before subsampling, while tissue samples are homogenized in the original sample containers either after freeze drying or with a Tekmar Tissumizer and subsampled. Samples are digested with nitric acid, sulfuric acid, potassium permanganate, and potassium persulfate in polypropylene tubes in a water bath at 90-95 C. Before analysis, hydroxylamine hydrochloride is added to reduce excess permanganate and the samples are brought to volume with distilled-deionized water.

Method Code: 007

LABORATORY: Trace Element Research Laboratory

Analysis of mercury by cold-vapor atomic absorption spectroscopy (CVAAS).

In this procedure, divalent mercury (Hg++) in aqueous samples (digests of water, tissue or sediment samples) is reduced to the elemental state (Hgo) by a strong reducing agent (stannous chloride). Gaseous Hgo enters the sweep gas and is introduced into an atomic absorption cell, where light produced by a mercury vapor lamp is absorbed by the free Hg atoms. Mercury in the sample is determined by comparing light absorption of the sample with that of external calibration standards.

Method Codes:	004 005

Lab Matrix	Analyte
Water	Silver
	Aluminum
	Boron
	Barium
	Beryllium
	Calcium
	Cobalt
	Chromium
	Copper
	Iron
	Potassium
	Magnesium
	Manganese
	Molybdenum
	Nickel
	Phosphorus
	Sulfur
	Strontium
	Titanium
	Vanadium
	Zinc

Method Code: 004
LABORATORY: Trace Element Research Laboratory Digestion of water samples for "total recoverable" metals (other than mercury). Water samples are digested for two hours at 85 degrees Centigrade in polyethylene containers with ultrapure nitric and hydrochloric acids. Acid strength, on a vol:vol basis, is 1% HCl and 0.5% HNO3. Sample aliquots for digestion are taken after vigorous shaking to assure resuspension of solids that may have settled. The original sample must have had preservative added (usually HNO3) in order to ensure that metals do not adhere to the walls of the container.
Method Code: 005
LABORATORY: Trace Element Research Laboratory Analysis of trace metals by inductively coupled plasma optical emission spectroscopy (ICP). Liquid samples are nebulized and the resulting aerosol is transported to the plasma torch. Element-specific atomic-line emission spectra are produced by a inductively coupled argon plasma. The spectra are dispersed by a grating spectrometer, and the intensities of the lines are monitored by photomultiplier tubes or solid state detectors. Samples are quantitated by comparison with external standards. One or more internal standards may be incorporated to compensate for physical effects resulting from viscosity and varying levels of total dissolved solids in the samples. Background correction is required and is measured adjacent to analyte lines on samples during analysis.

Method Codes:	004 010

Lab Matrix	Analyte
Water	Arsenic
	Cadmium
	Lead
	Selenium

Method Code: 004
LABORATORY: Trace Element Research Laboratory Digestion of water samples for "total recoverable" metals (other than mercury).

Water samples are digested for two hours at 85 degrees Centigrade in polyethylene containers with ultrapure nitric and hydrochloric acids. Acid strength, on a vol:vol basis, is 1% HCl and 0.5% HNO3. Sample aliquots for digestion are taken after vigorous shaking to assure resuspension of solids that may have settled. The original sample must have had preservative added (usually HNO3) in order to ensure that metals do not adhere to the walls of the container.

Method Code: 016

LABORATORY: Trace Element Research Laboratory

Analysis of trace metals in water samples by inductively coupled plasma-mass spectroscopy (ICP-MS).

Concentrations of trace elements in water samples are determined with an atomic spectroscopy method that relies on ionization of sample constituents in a high temperature argon plasma and separation of positively-charged ions on the basis of their mass:charge ratios (m:z) by a quadrupole mass spectrometer. The method offers extremely low detection limits but is subject to interferences from atomic and molecular ions having values within 1 AMU of the target ions. Sample preconcentration and matrix elimination can sometimes eliminate these problems, along with those resulting from high total dissolved solids.

Method Codes:	011

Lab Matrix	Analyte
Soil/Sediment	Grain Size-Clay
	Grain Size-Sand
	Grain Size-Silt

Method Code: 011

LABORATORY: Trace Element Research Laboratory

Analysis of grain size distribution in soil and sediment samples (GS).

This method incorporates wet-sieving and the pipette method to separate soil and sediment samples into sand, silt, and clay size fractions. A 0.0625 mm sieve is used to collect the sand fraction, which is dried and weighed. Material passing the sieve is diluted to volume and at given times, small volumes of suspension are withdrawn, evaporated, and the residue weighed. Values are expressed as percent of the dry sample on a weight:weight basis.

Method Codes:	014

Lab Matrix	Analyte
Soil/Sediment	% Moisture

Method Code: 014
LABORATORY: Trace Element Research Laboratory Moisture content of sediment, soil, and tissue samples. Moisture content is determined by weight loss upon freeze-drying, and is expressed as weight percent of the original wet sample. Depending upon sample size, either the whole sample or a representative aliquot is frozen and then dried under vacuum until a constant weight is attained. Samples are prepared and dried using plastic materials, whenever possible, in order to minimize potential contamination artifacts that might impact subsequent trace element analysis.

Method Codes:	024

Lab Matrix	Analyte
Soil/Sediment	Mercury

Method Code: 024
LABORATORY: Trace Element Research Laboratory Determination of mercury in tissue and sediment Determination of mercury in tissue and sediment samples by decomposition, trapping, and atomic absorption. Total mercury is determined in wet or dry samples by combustion in a stream of oxygen, trapping on a gold column, release by electrothermal heating, and analysis by atomic absorption. Mercury is reported in ppm on either a wet or dry weight basis.

Method Codes:	029

Lab Matrix	Analyte
Soil/Sediment	Tot. Organic Carbon

Method Code: 029
LABORATORY:Trace Element Research Laboratory Determination of carbon, nitrogen, and/or stable C and N isotopes by isotope ratio mass spectroscopy Stable istopes of C and N, as well as C and N content, are determined by isotope ratio mass spectroscopy. Samples are combusted under oxygen, converting C to CO2 gas and N to N2 gas. Ratios of the CO2 and N2 species are determined on a multicollector isotope ratio mass spectrometer. Values are reported as "delta 13C" and "delta 15N", in "per mil" (parts per thousand", relative to the PDB standard for C and air for N. Inorganic species can be removed by vapor acidification prior to analysis in order to measure only organic species.