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Agency

Water Management Division
Wetlands, Coastal & Nonpoint Source Section
Atlanta, GA

December, 2007

Savannah ODMDS Status and Trends May 2006



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ACKNOWLEDGEMENTS

Samples were collected May 4-5, 2006 from the Savannah Ocean Dredged Material Disposal Site (Doug Johnson, Site Manager; Gary W. Collins, Chief Scientist). Sample tracking and custody were performed by Phyllis Meyer. Water quality profiling and sampling were led by Christopher McArthur. Sediment sampling was led by Steve Blackburn. On-board sample processing of the invertebrate samples, chemical samples, and the sediment particle size samples were led by Doug Johnson, Jennifer Derby and Kris Carter, respectively.

In addition, the scientific party would like to express their appreciation to the following members of senior-level management for taking the time out of their hectic schedules to allow us the opportunity to demonstrate the capabilities of the OSV Bold, along with our ocean protection monitoring techniques: Regional Administrator J.I. Palmer, Jr., Chief of Staff Don Christy, Water Division Director James Giattina, and WCNS Branch Chief Tom Welborn.

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INTRODUCTION

Ocean disposal of dredged materials can affect the environment of a disposal site by disturbing the benthic community and potentially causing long-term reduction of oxygen in the pore waters of the sediments and the overlying waters. Natural oceanographic processes can also be responsible for transporting disposed materials offsite into nearby habitats.

As part of Region 4's strategy to monitor the effects of dredged material disposal within the marine environment, routine surveys of the benthos and water column within and adjacent to our sites are conducted so that their status may be assessed. In addition, the data is archived so that over time, trends which may occur can be observed. These status and trends surveys are consistent with the requirements of 40 C.F.R. 228.9. The present study being discussed was conducted aboard the Ocean Survey Vessel (OSV) Bold on May 4-5, 2006.

BACKGROUND

The Savannah ODMDS was designated by EPA in 1987. The ODMDS has typically received an annual average of over 900,000 cubic yards. The exception to those volumes was during the deepening of the entrance channel from 1993-94, when volumes averaged 3 million cubic yards per year.

A Site Management and Monitoring Plan was developed for the Savannah ODMDS in 1997. Annual bathymetry surveys have been conducted at the site by the U. S. Army Corps of Engineers. The first status and trends survey conducted at this site was in 1992.

Survey Area and Location

The study area is within and surrounding the Savannah, GA ODMDS located offshore Tybee Island. The ODMDS is approximately 4.26 square nautical miles (nmi) in area. Twelve stations were selected in order to analyze the sediment grain size, chemical, and biological characteristics of two areas – one where disposal has occurred and the other one undisturbed by disposal. Of these 12, one (1) station received water quality sampling. Depths in this area average 37 feet. The ODMDS boundary corner coordinates are:

31°55'53"N 80°44'20"W
31°57'55"N 80°46'48"W
31°57'55"N 80°44'20"W
31°55'53"N 80°46'48"W

The ODMDS, survey area and station locations are shown in Figure 1.

METHODS AND MATERIALS

Method Rationale: Characterization of the benthic community and sediment size/chemistry at selected stations, followed by analysis of community parameters via statistical treatment, allows for identification and interpretation of changes in the community structure. Such community statistics can be used to draw inferences regarding perturbations to the benthic macroinvertebrate community and subsequently allow for judgments regarding the likelihood of impact from dredged material disposal.

Sampling Stations

The boundaries of the Savannah ODMDS measure approximately 2 X 2 nmi. Twelve stations (see Table 1 and Figure 1) were established by selecting half within and half outside of the site, which provides two treatments with 6 replicates/treatment. Station locations were selected by a stratified, random method.

Water Quality

To characterize the general water quality associated with the dump site, the following water column parameters were sampled: conductivity, dissolved oxygen (DO), salinity, temperature, density, turbidity, % light transmission and Chlorophyll a.

All measurements were collected utilizing the ship's CTD. Go Flow[®] bottles attached to the CTD/rosette frame were tripped at the bottom and near the surface to obtain water samples for the laboratory analysis. Once the rosette was back aboard the ship, the bottles were emptied directly into the appropriate sample containers, labeled, and refrigerated until demobilization. Laboratory analyses of the water include nutrients, metals, PAHs, PCBs and pesticides. In addition, one other sample container was filled with bottom water and analyzed for dioxins.

Seafloor Sampling

Bottom sampling at all twelve stations was accomplished by a minimum of two deployments of a Young grab (surface area = 0.04 m²; depth of 10 cm) from the stern of the ship. After retrieval of the grab and confirmation of an adequate sample, the device was either sub-sampled in order to obtain discrete samples for sediment particle size analyses and sediment chemical analyses, or used entirely for benthic macroinvertebrate identification. The sampling device and handling/preservative protocol for each type of sample follows below:

Sediment Particle Size

Two separate samples for particle size were collected from the Young grab by acrylic 5 cm diameter coring tubes. The subsamples were placed into whirl packs, labeled, and frozen for return to the lab. The samples were analyzed by subcontractor utilizing a wet sieve method (see Vittor, 2007).

Sediment Chemistry

Analyses for the following parameters were conducted at the SESD lab in Athens, Georgia: heavy metals scan, nutrients which includes total phosphorous (TP), NO₂+NO₃, NH₃, and TKN, extractable organic compounds, pesticides, and PCBs. The sample was transferred to a glass pan and thoroughly mixed. The sample was aliquoted into two 236.6 ml. glass containers and preserved by storing at 4 C until analyzed. One container was analyzed for extractable organic compounds and the other was analyzed for metals and nutrients. In addition, at stations SA04, SA07, SA08 and SA12, one additional container was filled from the sample and analyzed for dioxins. The limited number of dioxin samples were due to budgetary constraints.

Benthic Macroinvertebrate Infauna

Sediment from a separate deployment of the grab were collected to obtain benthic macroinvertebrate organisms. On-board processing involved washing the sample through a #35 screen (0.5mm). The sample retained on the screen after washing was preserved in 10% seawater formalin with staining solution. Benthic containers were labeled both internally and externally and stored for transfer to contract lab facilities. The details of sorting and identification of infaunal taxa are described in Vittor, 2007.

All sampling procedures and sample preservation for analyses were according to the SESD Standard Operating Procedures (SOP), (US EPA 1996, 2002).

RESULTS AND DISCUSSION

Water Quality

The results of the water quality profiles are summarized in Table 2. In general, the narrow range of values seen within the data demonstrates the well-mixed nature of the ODMDS's water column.

Turbidity ranged from 0.55 to 1.06 NTUs, while dissolved oxygen (DO) readings ranged from 6.50 mg/L to 6.84 mg/L (see Table 2 and Figure 2).

Temperature and salinity profiles also showed that the waters within and around the Savannah ODMDS are very well-mixed. Temperatures ranged from 20.93 to 21.57 °C; salinities ranged from 31.37 to 32.58 ppt (see Table 2 and Figure 3).

Chemical analyses of the water samples collected as part of this study showed all analytes to be at or below the detection limit with the limited exceptions of arsenic, copper and a few of the least problematic dioxin congeners (see Appendix D).

Seafloor Sampling

Sediment Particle Size.

The results of the sediment particle size analyses are given in Table 3. In general, all stations were found to be predominantly sand with small amounts of gravel and silt/clay. The two most notable exceptions were Stations SA01 and SA06, which both had more than 16% gravel.

Sediment Chemistry.

The sediment chemistry showed nearly all contaminants to be below detection limits with the notable exception of ten metals (see Table 4) and a variety of dioxin congeners. Because the average concentration for stations from within the ODMDS was consistently lower than the average concentration for stations from outside the site, for all metals, a test for statistical difference between these two treatments was deemed unnecessary.

The results of dioxin analyses are provided in Appendix C. Although several dioxin congeners were detectable across the four sediment stations, no distinctive pattern can be discerned, either within the two stations inside the ODMDS or outside the ODMDS. The most notable pattern found within the data seems to be the relatively higher concentrations found at SA07, which did have 4-5 times the amount of silts and clays found at the other three stations analyzed for dioxin. Despite the substantially higher silt/clay fraction found at SA07, it still did not average more than 2.8 % of the total sediments for that station.

Benthic Macroinvertebrate Infauna.

The benthic infauna data is detailed and summarized in "Savannah, Georgia ODMDS 2006 Benthic Community Assessment "(Vittor, 2007). Polychaetes dominated the total assemblage (60.3%), and also ranked first in number of taxa (54.7%) represented. In terms of abundance, the polychaetes were followed by malacostracans (9.1%) and bivalves (8.0%); by taxa, the polychaetes were followed by malacostracans (19.3%) and bivalves (10.0%).

The dominant taxa found outside the ODMDS were the polychaete, *Spiophanes bombyx* (9.8%), the chordate, *Branchiostoma* [LPIL] (8.6%) and the bivalve, *Crassinella lunulata* (5.5%). Inside the ODMDS, the dominant taxa were the polychaete, *Spiophanes bombyx* (20.2%), the polychaete, *Spio pettiboneae* (6.9%), the amphipod, *Rhepoxynius hudsoni* (6.7%), the bivalve, *Tellina* [LPIL] (5.7%), the cumacean, *Oxyurostylis smithi* (5.2%) and the polychaete, *Mediomastus californiensis* (5.1%).

Mean densities ranged from 1175 organisms/m² at Station SA05 to 31000 organisms/m² at Station SA01. Although densities averaged 9950 outside the ODMDS

compared to 3687.5 inside the ODMDS, there was not a significant difference in densities between stations inside vs. outside (Vittor, 2007).

The mean number of taxa ranged from 21 taxa/station at Station SA05 to 61 taxa/station at Station SA01. Again, although taxa richness averaged 42.5 outside the ODMDS compared to 34.8 inside the ODMDS, there was not a significant difference in mean number of taxa between stations inside vs. outside (Vittor, 2007).

The results of cluster, ANOSIM and SIMPLER analyses are discussed in detail within Vittor, 2007. In summary, these results indicate that assemblages inside and outside the ODMDS are similar. Table 5 lists the infaunal community parameters by station.

CONCLUSIONS

When comparing the various study parameters between stations located within the ODMDS and those outside the ODMDS, no significant differences can be found. Table 6 summarizes the main parameters of this study, demonstrating that no physical, chemical nor biological difference can be seen.

REFERENCES

- ASTM D-422. Standard Test Method for Particle Size Analysis of Soils. American Society for Testing and Materials. Pennsylvania. 1994.
- USEPA. 1996. Environmental Investigations Standard Operating Procedures and Quality Assurance Manual. US Environmental Protection Agency, Region 4. Athens, GA.
- USEPA. 2002. Standard Operation Procedures Ecological Assessment Branch. US Environmental Protection Agency, Region 4. Athens, GA.
- Vittor. 2007 – Savannah Harbor, Georgia ODMDS 2006 Benthic Community Assessment. Barry A. Vittor & Associates, Inc., Mobile, Alabama.

Table 1. Savannah ODMDS Status and Trends Stations –May 2006.

2006 Station ID	(Degrees, minutes)		Young Grabs(y/n)	CTD Casts(y/n)
	Latitude(N)	Longitude(W)		
SA01	31 58.46000 N	80 45.18000 W	Y	N
SA02	31 57.80000 N	80 46.18000 W	Y	N
SA03	31 57.52000 N	80 46.65000 W	Y	N
SA04	31 57.62000 N	80 45.34000 W	Y	Y
SA05	31 57.80000 N	80 44.50999 W	Y	N
SA06	31 57.50000 N	80 43.40000 W	Y	N
SA07	31 56.77028 N	80 47.15000 W	Y	N
SA08	31 57.00000 N	80 46.00000 W	Y	N
SA09	31 56.81067 N	80 44.90000 W	Y	N
SA10	31 56.20000 N	80 43.36000 W	Y	N
SA11	31 55.72001 N	80 47.16999 W	Y	N
SA12	31 55.65000 N	80 45.18000 W	Y	N

SAVANNAH ODMDS STATUS AND TRENDS – MAY 2006

Table 2. Savannah ODMDS Water Quality data – May 2006

Depth (meters)	Temperature ©	Salinity (ppt)	DO (mg/L)	Turbidity (ntu's)
1.51	21.54	31.45	6.82	0.88
1.70	21.56	31.41	6.82	0.94
2.04	21.57	31.38	6.82	1.06
2.47	21.57	31.38	6.82	0.94
2.70	21.56	31.39	6.84	0.98
3.13	21.56	31.41	6.82	0.98
3.62	21.55	31.42	6.83	0.93
3.54	21.55	31.42	6.83	0.94
3.42	21.55	31.41	6.84	0.91
3.60	21.56	31.39	6.84	0.98
3.90	21.57	31.37	6.84	0.92
4.13	21.57	31.37	6.84	0.95
4.32	21.57	31.37	6.83	1.00
4.60	21.46	31.68	6.82	0.85
5.02	21.36	31.96	6.79	0.91
5.35	21.29	32.15	6.77	0.77
5.56	21.19	32.32	6.71	0.61
5.81	21.10	32.41	6.71	0.55
6.12	20.99	32.51	6.69	0.62
6.51	20.95	32.56	6.65	0.73
6.85	20.94	32.58	6.59	0.93
7.17	20.93	32.58	6.53	0.87
7.31	20.93	32.58	6.52	0.83
7.69	20.93	32.58	6.50	0.90
7.97	20.93	32.58	6.51	0.93
8.12	20.93	32.58	6.51	0.95
8.33	20.93	32.58	6.51	0.90

Table 3. Savannah ODMDS Sediment particle size – May 2006.

NOTE: station IDs omitted to demonstrate that each serves as a replicate for each treatment (inside vs. outside)

	Outside			Inside		
	<i>silt/clay</i>	<i>Sand</i>	<i>gravel</i>	<i>silt/clay</i>	<i>sand</i>	<i>Gravel</i>
	1.5	82.4	16.1	0.5	97.3	2.3
	0.3	83.5	16.2	1.0	98.7	0.4
	2.8	97.1	0.1	0.5	99.1	0.4
	0.4	96.8	2.8	0.2	99.4	0.4
	0.0	99.6	0.3	0.4	99.6	0.0
	<u>0.6</u>	<u>99.1</u>	<u>0.3</u>	<u>0.4</u>	<u>94.0</u>	<u>5.6</u>
Mean	0.93	93.08	5.97	0.50	98.02	1.52

Table 4. Metal Analyses of Sediments – Savannah ODMDS, May 2006.

<p>Aluminum</p> <table border="0" style="width: 100%;"> <tr> <td style="text-align: center;"><u>Outside</u></td> <td style="text-align: center;"><u>Inside</u></td> <td></td> <td></td> </tr> <tr> <td style="text-align: center;">530</td> <td style="text-align: center;">770</td> <td></td> <td></td> </tr> <tr> <td style="text-align: center;">1600</td> <td style="text-align: center;">1500</td> <td></td> <td></td> </tr> <tr> <td style="text-align: center;">950</td> <td style="text-align: center;">670</td> <td></td> <td></td> </tr> <tr> <td style="text-align: center;">1200</td> <td style="text-align: center;">780</td> <td></td> <td></td> </tr> <tr> <td style="text-align: center;">350</td> <td style="text-align: center;">840</td> <td></td> <td></td> </tr> <tr> <td style="text-align: center;">3300</td> <td style="text-align: center;">560</td> <td></td> <td></td> </tr> </table> <table border="1" style="width: 100%; border-collapse: collapse; margin-left: auto; margin-right: auto;"> <thead> <tr> <th></th> <th style="text-align: center;"><u>Outside</u></th> <th style="text-align: center;"><u>Inside</u></th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">mean</td> <td style="text-align: center;">1321.67</td> <td style="text-align: center;">853.33</td> </tr> <tr> <td style="text-align: center;">std dev</td> <td style="text-align: center;">1069.12</td> <td style="text-align: center;">331.76</td> </tr> <tr> <td style="text-align: center;">var</td> <td style="text-align: center;">1143017</td> <td style="text-align: center;">110067</td> </tr> </tbody> </table>	<u>Outside</u>	<u>Inside</u>			530	770			1600	1500			950	670			1200	780			350	840			3300	560				<u>Outside</u>	<u>Inside</u>	mean	1321.67	853.33	std dev	1069.12	331.76	var	1143017	110067	<p>Arsenic</p> <table border="0" style="width: 100%;"> <tr> <td style="text-align: center;"><u>Outside</u></td> <td style="text-align: center;"><u>Inside</u></td> </tr> <tr> <td style="text-align: center;">2.0</td> <td style="text-align: center;">1.4</td> </tr> <tr> <td style="text-align: center;">1.7</td> <td style="text-align: center;">1.7</td> </tr> <tr> <td style="text-align: center;">2.8</td> <td style="text-align: center;">1.8</td> </tr> <tr> <td style="text-align: center;">2.5</td> <td style="text-align: center;">2.2</td> </tr> <tr> <td style="text-align: center;">2.7</td> <td style="text-align: center;">1.2</td> </tr> <tr> <td style="text-align: center;">2.0</td> <td style="text-align: center;">1.9</td> </tr> </table> <table border="1" style="width: 100%; border-collapse: collapse; margin-left: auto; margin-right: auto;"> <thead> <tr> <th></th> <th style="text-align: center;"><u>Outside</u></th> <th style="text-align: center;"><u>Inside</u></th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">mean</td> <td style="text-align: center;">2.28</td> <td style="text-align: center;">1.70</td> </tr> <tr> <td style="text-align: center;">std dev</td> <td style="text-align: center;">0.445</td> <td style="text-align: center;">0.358</td> </tr> <tr> <td style="text-align: center;">var</td> <td style="text-align: center;">0.198</td> <td style="text-align: center;">0.128</td> </tr> </tbody> </table>	<u>Outside</u>	<u>Inside</u>	2.0	1.4	1.7	1.7	2.8	1.8	2.5	2.2	2.7	1.2	2.0	1.9		<u>Outside</u>	<u>Inside</u>	mean	2.28	1.70	std dev	0.445	0.358	var	0.198	0.128
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Table 5. Infaunal Community Parameters – Savannah ODMDS, May 2006.

Station	Taxa Richness	Density	Diversity	Evenness
Outside the ODMDS				
SA01	61	31000.0	3.34	0.81
SA06	42	4700.0	2.83	0.76
SA07	44	7275.0	3.25	0.86
SA10	58	10275.0	3.02	0.74
SA11	24	2850.0	2.05	0.65
SA12	26	3600.0	2.60	0.80
Mean	42.5	9950.0	2.85	0.77
Std Dev.	15.5	10664.5		
Inside the ODMDS				
SA02	36	5850.0	2.75	0.77
SA03	32	3475.0	2.77	0.80
SA04	22	1725.0	2.51	0.81
SA05	21	1175.0	2.37	0.78
SA08	49	5850.0	3.14	0.81
SA09	49	4050.0	3.41	0.88
Mean	34.8	3687.5	2.82	0.81
Std. Dev.	12.4	1984.6		

Table 6. Comparative Summary – Savannah ODMDS, May 2006.

	Inside ODMDS	Outside ODMDS
Grain Size Analyses		
	<u>2006</u>	<u>2006</u>
% gravel	1.52	5.97
% sand	98.02	93.08
% silt/clay	0.50	0.93
Sediment chemistry		
	Mean conc. (ppm)	Mean conc. (ppm)
Aluminum	931.43	1321.67
Arsenic	1.71	2.28
Cadmium	0.17	0.16
Chromium	4.33	4.85
Copper	0.52	0.69
Iron	2343	2650
Lead	1.19	1.55
Manganese	38.4	49.8
Nickel	0.99	1.18
Zinc	5.3	6.0
Infauna analyses		
Taxa richness (#spp./station)		
Minimum	21	24
Maximum	49	61
Mean	34.8	42.5
Density (#organisms/m ²)		
Minimum	1175	2850
Maximum	5850	31000
Mean	3687.5	10664.5
Taxa diversity (H')		
Mean	2.82	2.85
Taxa evenness (J')		
Mean	0.81	0.77

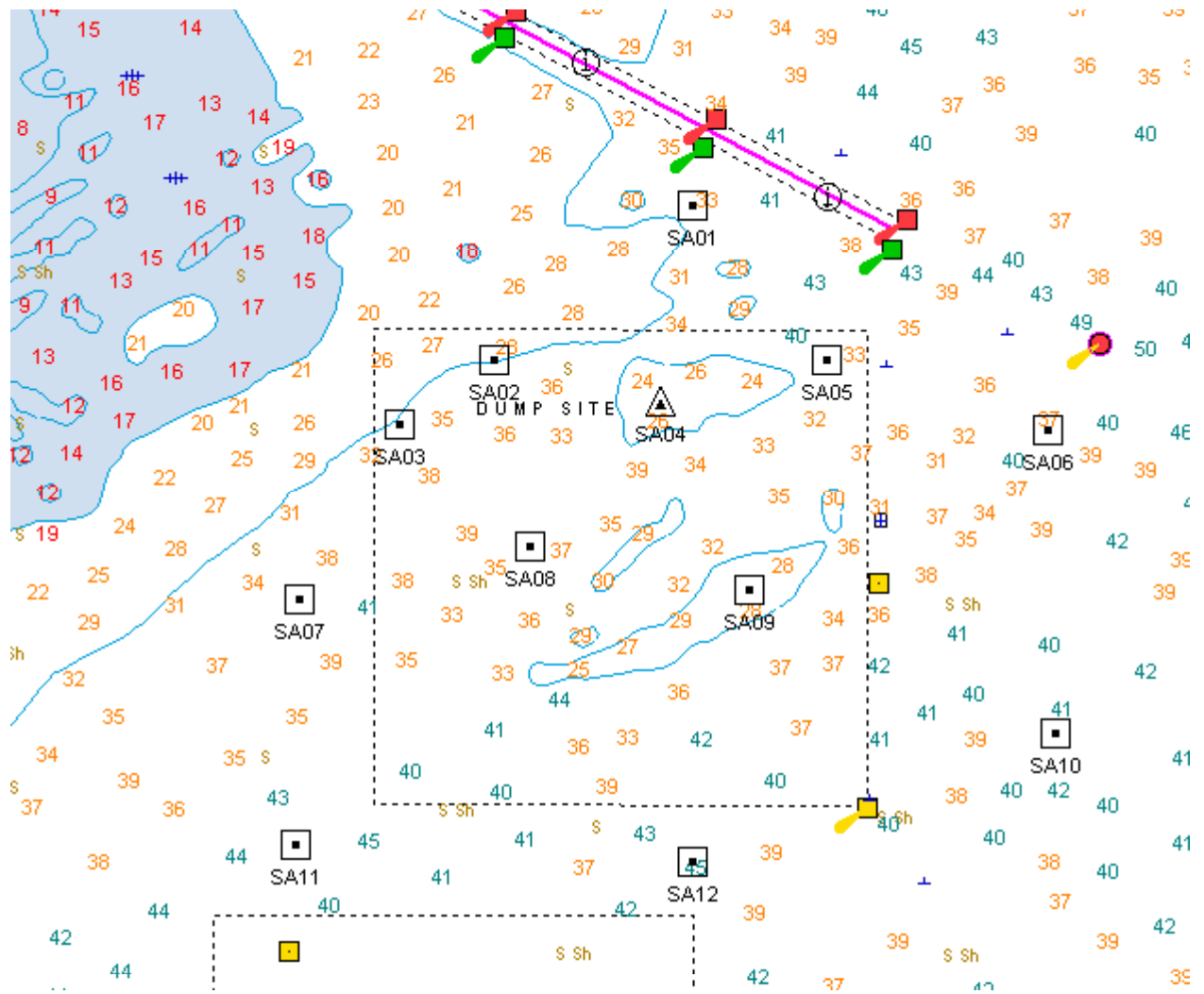


Figure 1. Savannah sample stations, May, 2006
(station SA04 was also sampled for water)

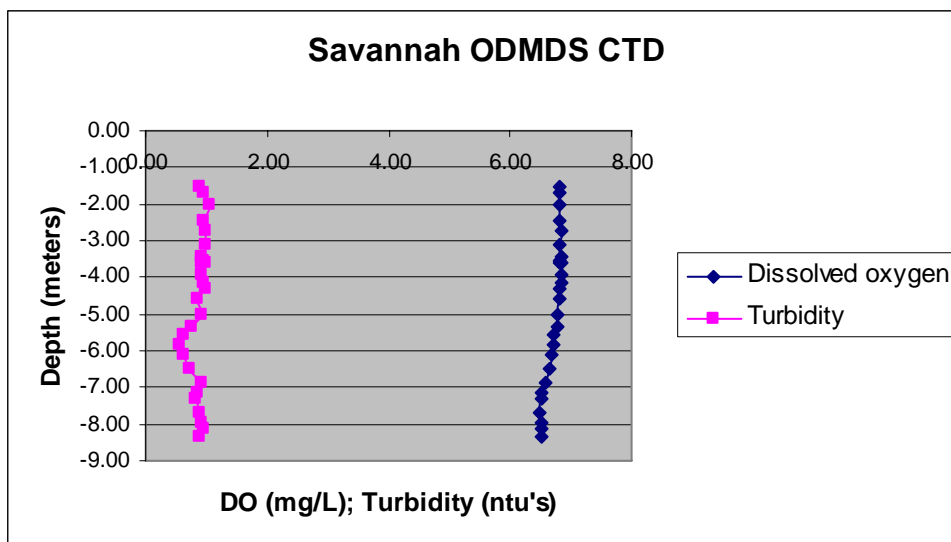


Figure 2. Dissolved Oxygen and Turbidity Profiles – Savannah ODMDS, May 2006

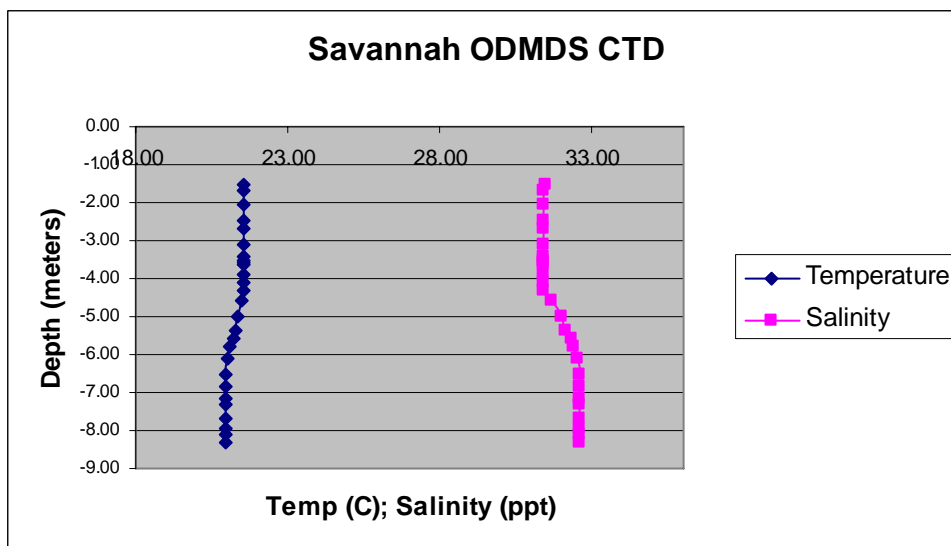


Figure 3. Temperature and Salinity Profiles – Savannah ODMDS, May 2006.

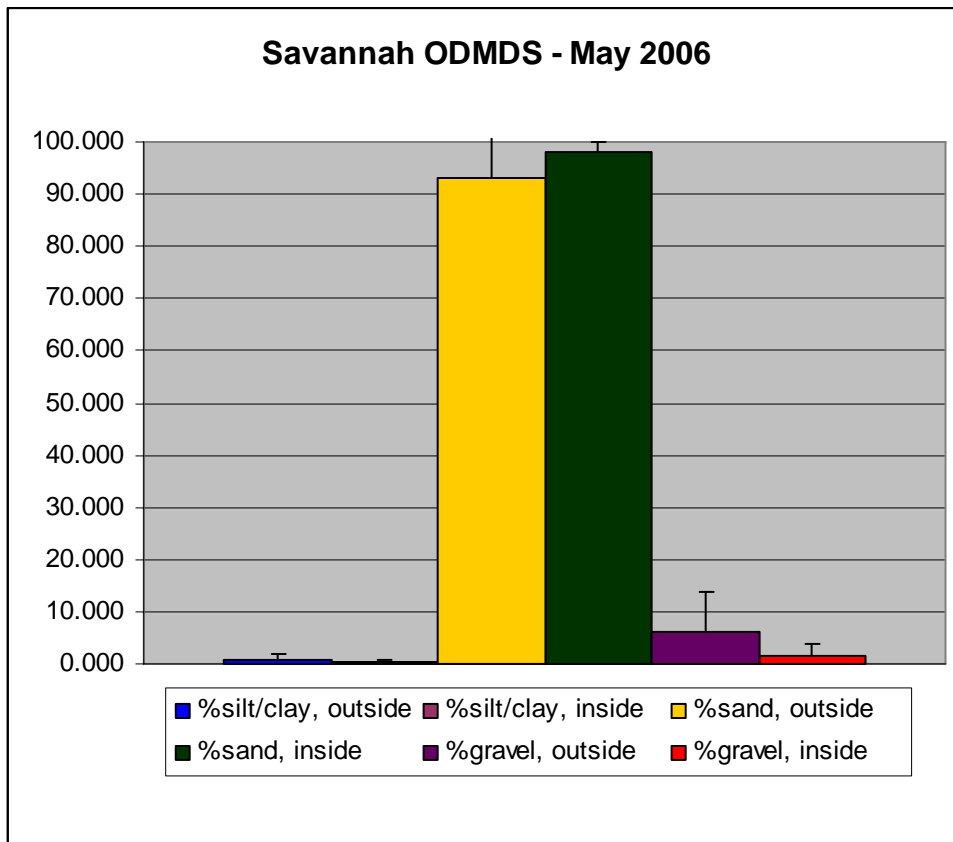


Figure 4. Grain Size Distribution, Savannah ODMDS – May 2006.

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APPENDIX A

SCIENTIFIC PARTY

<u>Name</u>	<u>Survey Responsibility</u>	<u>Organization</u>
1) Gary Collins	Chief Scientist	EPA/ Atlanta
2) Christopher McArthur	Water Quality/Navigation	EPA/ Atlanta
3) Doug Johnson	Invertebrate Processing	EPA/Atlanta
4) Phyllis Meyer	Sample Tracking	EPA/Athens
5) Steve Blackburn	Deck Ops	EPA/Atlanta
6) Jennifer Derby	Sample Processing	EPA/Atlanta
7) Kris Carter	Sample Processing	EPA/Atlanta

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Appendix B

Sediment Particle Size Distribution

Table B1.

	%silt/clay	%sand	%gravel
SA01	1.50	82.40	16.10
SA02	0.50	97.30	2.30
SA03	1.00	98.70	0.40
SA04	0.50	99.10	0.40
SA05	0.20	99.40	0.40
SA06	0.30	83.50	16.20
SA07	2.80	97.10	0.10
SA08	0.40	99.60	0.00
SA09	0.40	94.00	5.60
SA10	0.40	96.80	2.80
SA11	0.00	99.60	0.30
SA12	0.60	99.10	0.30

APPENDIX C

Sediment Chemistry – Metals, Extractables, Pesticides, PCBs and Dioxins

SAVANNAH ODMDS STATUS AND TRENDS – MAY 2006

Table C1. Sediment Metals Analyses - Savannah ODMDS, May 2006.

(concentrations reported as mg/kg)

	SA01	SA02	SA03	SA03D	SA04	SA05	SA06	SA07	SA08	SA09	SA10	SA11	SA12
Aluminum	1200	770	1500	1400	670	780	350	3300	840	560	530	1600	950
Antimony	0.24U	0.25U	0.25U	0.25U	0.25U	0.25U	0.25U	0.25U	0.25U	0.25U	0.25U	0.25U	0.25U
Arsenic	2	1.4	1.7	1.8	1.8	2.2	1.7	2.8	1.2	1.9	2.5	2.7	2
Beryllium	0.3U	0.3U	0.3U	0.3U	0.3U	0.3U	0.3U	0.3U	0.3U	0.3U	0.3U	0.3U	0.3U
Cadmium	0.13U	0.2	0.12U	0.12U	0.31	0.13	0.12U	0.12U	0.12U	0.22	0.12U	0.18	0.3
Chromium	4	4.2	5.2	5.1	4.2	4.4	1.3	8.8	3.6	3.6	2.6	7.2	5.2
Copper	0.5U	0.49U	0.63	0.55	0.5U	0.49U	0.49U	1.5	0.5U	0.49U	0.49U	0.68	0.5U
Iron	2700	2000	3100	3200	1900	2400	1300	5600	2200	1600	1400	3100	1800
Lead	1.4	1.2	1.5	1.4	0.95	0.99	0.62	3.2	1.1	1.2	1.2	1.5	1.4
Manganese	58	26	46	46	34	50	33	62	41	26	70	47	29
Nickel	0.98U	0.99U	1U	0.98U	1U	0.98U	0.99U	2	0.99U	0.99U	0.98U	1.1	1U
Selenium	0.49U	0.49U	0.5U	0.49U	0.5U	0.49U	0.49U	0.5U	0.5U	0.49U	0.49U	0.49U	0.5U
Silver	0.49U	0.49U	0.5U	0.49U	0.5U	0.49U	0.49U	0.5U	0.5U	0.49U	0.49U	0.49U	0.5U
Thallium	0.24U	0.25U	0.25U	0.25U	0.25U	0.25U	0.25U	0.25U	0.25U	0.25U	0.25U	0.25U	0.25U
Total Mercury	0.05U	0.046U	0.049U	0.048U	0.048U	0.047U	0.047U	0.046U	0.048U	0.046U	0.046U	0.048U	0.048U
Zinc	5.6	4.9	6.4	6.4	5	5.5	2.4	11	4.6	4.6	3.6	7.8	5.6

U-Analyte not detected at or above reporting limit. The number is the minimum quantitation limit.

Table C2. Sediment Extractables Analyses - Savannah ODMDS, May 2006.

	SA0 1	SA0 2	SA0 3	SA03D	SA0 4	SA05	SA06	SA07	SA08	SA09	SA10	SA11	SA12
2-Methylnaphthalene	17	18	18	18	18	18	18	21	18	17	17	18	18
Acenaphthene	9.2	9.2	9.5	9.6	9.4	9.4	9.3	11	9.6	9.1	9.1	9.8	9.4
Acenaphthylene	9	9.1	9.4	9.4	9.2	9.3	9.2	11	9.4	9	9	9.6	9.3
Anthracene	8.2	8.3	8.5	8.6	8.4	8.4	8.3	9.7	8.6	8.1	8.1	8.7	8.4
Benzo(a)Anthracene	8.2	8.3	8.5	8.6	8.4	8.4	8.3	9.7	8.6	8.1	8.1	8.7	8.4
Benzo(b)Fluoranthene	8.9	9	9.3	9.3	9.1	9.2	9	11	9.3	8.9	8.8	9.5	9.2
Benzo(ghi)Perylene	8.2	8.3	8.5	8.6	8.4	8.4	8.3	9.7	8.6	8.1	8.1	8.7	8.4
Benzo(k)Fluoranthene	8.2	8.3	8.5	8.6	8.4	8.4	8.3	9.7	8.6	8.1	8.1	8.7	8.4
Benzo-a-Pyrene	8.2	8.3	8.5	8.6	8.4	8.4	8.3	9.7	8.6	8.1	8.1	8.7	8.4
Chrysene	8.2	8.3	8.5	8.6	8.4	8.4	8.3	9.7	8.6	8.1	8.1	8.7	8.4
Dibenzo(a,h)Anthracene	8.7	8.8	9	9.1	8.9	8.9	8.8	10	9.1	8.6	8.6	9.2	8.9
Fluoranthene	8.2	8.3	8.5	8.6	8.4	8.4	8.3	9.7	8.6	8.1	8.1	8.7	8.4
Fluorene	8.2	8.3	8.5	8.6	8.4	8.4	8.3	9.7	8.6	8.1	8.1	8.7	8.4
Indeno (1,2,3-cd) Pyrene	8.2	8.3	8.5	8.6	8.4	8.4	8.3	9.7	8.6	8.1	8.1	8.7	8.4
Naphthalene	22	22	23	23	22	22	22	26	23	22	22	23	22
Phenanthrene	8.2	8.3	8.5	8.6	8.4	8.4	8.3	9.7	8.6	8.1	8.1	8.7	8.4
Pyrene	13	13	14	14	13	14	13	16	14	13	13	14	14

NOTE: All values were "U" flagged – Analyte not detected at or above reporting limit.

Table C3. Sediment Pesticides Analyses - Savannah ODMDS, May 2006.

	(concentrations reported as ug/kg)												
	SA01	SA02	SA03	SA03D	SA04	SA05	SA06	SA07	SA08	SA09	SA10	SA11	SA12
4,4'-DDD (p,p'-DDD)	1	1	1.1	0.98	1.2	1.2	1	1	1	0.99	1	1.2	0.82
4,4'-DDE (p,p'-DDE)	0.4	0.48	0.58	0.39	0.59	5.4	0.61	0.4	0.54	0.4	0.41	0.62	0.33
4,4'-DDT (p,p'-DDT)	1	1.5	1.4	0.98	1.3	12	1.5	1	1.4	1.4	1.4	1.5	0.82
Aldrin	4	4.1	3.9	3.9	4.1	4.6	4.1	4	4.1	4	4.1	3.3	3.3
alpha-BHC	4	4.1	3.9	3.9	4.1	4.6	4.1	4	4.1	4	4.1	3.3	3.3
alpha-Chlordane /2	4	4.1	3.9	3.9	4.1	4.6	4.1	4	4.1	4	4.1	3.3	3.3
beta-BHC	4	4.1	3.9	3.9	4.1	4.6	4.1	4	4.1	4	4.1	3.3	3.3
cis-Nonachlor /2	4	4.1	3.9	3.9	4.1	4.6	4.1	4	4.1	4	4.1	3.3	3.3
delta-BHC	4	4.1	3.9	3.9	4.1	5.5	4.1	4	4.1	4	4.1	3.3	3.3
Dieldrin	0.4	0.41	0.54	0.39	0.6	0.46	0.41	0.4	0.41	0.4	0.41	0.5	0.33
Endosulfan I (alpha)	4	4.1	3.9	3.9	4.1	4.6	4.1	4	4.1	4	4.1	3.3	3.3
Endosulfan II (beta)	10	10	9.8	9.8	10	12	10	9.9	10	9.9	10	8.3	8.2
Endosulfan Sulfate	10	10	9.8	9.8	10	12	10	9.9	10	9.9	10	8.3	8.2
Endrin	10	10	9.8	9.8	10	12	10	9.9	10	9.9	10	8.3	8.2
Endrin Ketone	10	10	9.8	9.8	10	12	10	9.9	10	9.9	10	8.3	8.2
gamma-BHC (Lindane)	4	4.1	3.9	3.9	4.1	4.6	4.1	4	4.1	4	4.1	3.3	3.3
gamma-Chlordane /2	4	4.1	3.9	3.9	4.1	4.6	4.1	4	4.1	4	4.1	3.3	3.3
Heptachlor	4	4.1	3.9	3.9	4.1	4.6	4.1	4	4.1	4	4.1	3.3	3.3
Heptachlor Epoxide	4	4.1	3.9	3.9	4.1	4.6	4.1	4	4.1	4	4.1	3.3	3.3
Methoxychlor	20	20	20	20	20	23	20	20	20	20	20	17	16
Toxaphene	40	41	39	39	41	46	41	40	41	40	41	33	33
trans-Nonachlor /2	4	4.1	3.9	3.9	4.1	4.6	4.1	4	4.1	4	4.1	3.3	3.3

SAVANNAH ODMDS STATUS AND TRENDS – MAY 2006

Table C4. Sediment PCBs - Savannah ODMDS, May 2006.

(concentrations reported as ug/kg)

	SA01	SA02	SA03	SA03D	SA04	SA05	SA06	SA07	SA08	SA09	SA10	SA11	SA12
PCB Congener #8	0.82	1	1	1	0.99	1	0.83	0.46	1	0.98	0.98	1	1
PCB Congener #18	0.82	1	1	1	0.99	1	0.83	0.46	1	0.98	0.98	1	1
PCB Congener #28	0.82	1	1	1	0.99	1	0.83	0.46	1	0.98	0.98	1	1
PCB Congener #44	0.82	1	1	1	0.99	1	0.83	0.46	1	0.98	0.98	1	1
PCB Congener #49	0.82	1	1	1	0.99	1	0.83	0.46	1	0.98	0.98	1	1
PCB Congener #52	0.82	1	1	1	0.99	1	0.83	0.46	1	0.98	0.98	1	1
PCB Congener #66	0.82	1	1	1	0.99	1	0.83	0.46	1	0.98	0.98	1	1
PCB Congener #77	0.82	1	1	1	0.99	1	0.83	0.46	1	0.98	0.98	1	1
PCB Congener #87	0.82	1	1	1	0.99	1	0.83	0.46	1	0.98	0.98	1	1
PCB Congener #101	0.82	1	1	1	0.99	1	0.83	0.46	1	0.98	0.98	1	1
PCB Congener #105	0.82	1	1	1	0.99	1	0.83	0.46	1	0.98	0.98	1	1
PCB Congener #118	0.82	1	1	1	0.99	1	0.83	0.46	1	0.98	0.98	1	1
PCB Congener #126	0.82	1	1	1	0.99	1	0.83	0.46	1	0.98	0.98	1	1
PCB Congener #128	0.82	1	1	1	0.99	1	0.83	0.46	1	0.98	0.98	1	1
PCB Congener #138	0.82	1	1	1	0.99	1	0.83	0.46	1	0.98	0.98	1	1
PCB Congener #153	0.82	1	1	1	0.99	1	0.83	0.46	1	0.98	0.98	1	1
PCB Congener #156	0.82	1	1	1	0.99	1	0.83	0.46	1	0.98	0.98	1	1
PCB Congener #169	0.82	1	1	1	0.99	1	0.83	0.46	1	0.98	0.98	1	1
PCB Congener #170	0.82	1	1	1	0.99	1	0.83	0.46	1	0.98	0.98	1	1
PCB Congener #180	0.82	1	1	1	0.99	1	0.83	0.46	1	0.98	0.98	1	1
PCB Congener #183	0.82	1	1	1	0.99	1	0.83	0.46	1	0.98	0.98	1	1
PCB Congener #184	0.82	1	1	1	0.99	1	0.83	0.46	1	0.98	0.98	1	1
PCB Congener #187	0.82	1	1	1	0.99	1	0.83	0.46	1	0.98	0.98	1	1
PCB Congener #195	0.82	1	1	1	0.99	1	0.83	0.46	1	0.98	0.98	1	1
PCB Congener #206	0.82	1	1	1	0.99	1	0.83	0.46	1	0.98	0.98	1	1
PCB Congener #209	0.82	1	1	1	0.99	1	0.83	0.46	1	0.98	0.98	1	1

NOTE: all values were "U" flagged -Analyte not detected at or above reporting limit. The number is the minimum quantitation limit.

SAVANNAH ODMDS STATUS AND TRENDS – MAY 2006

Table C5. Sediment Dioxin Analyses - Savannah ODMDS, May 2006.

	(concentrations are reported in ng/kg)			
	SA04	SA07	SA08	SA12
2,3,7,8-Tetrachlorodibenzodioxin	0.095 U	0.089 U	0.037 U	0.037 U
Tetrachlorodibenzodioxin (Total)	0.21	2.80	0.170	0.14
1,2,3,7,8-Pentachlorodibenzodioxin	0.55 U	0.26	0.077 U	0.037 U
Pentachlorodibenzodioxin (Total)	0.55 U	6.30	0.580	0.33
1,2,3,4,7,8-Hexachlorodibenzodioxin	0.43 U	0.47	0.076 U	0.050 U
1,2,3,6,7,8-Hexachlorodibenzodioxin	0.94	0.96	0.14 U	0.071 U
1,2,3,7,8,9-Hexachlorodibenzodioxin	0.45 U	1.50	0.13 U	0.10 U
Hexachlorodibenzodioxin (Total)	7.20	43.00	3.700	2.60
1,2,3,4,6,7,8-Heptachlorodibenzodioxin	2.80	18.00	2.200	1.3 U
Heptachlorodibenzodioxin (Total)	7.90	68.00	6.900	3.40
Octachlorodibenzodioxin	12.00	180.00	22.000	14.00
2,3,7,8-Tetrachlorodibenzofuran	0.18 U	0.14 U	0.13 U	0.10 U
Tetrachlorodibenzofuran (Total)	0.18 U	0.34	0.120	0.08
1,2,3,7,8-Pentachlorodibenzofuran	0.25 U	0.080 U	0.051 U	0.028 U
2,3,4,7,8-Pentachlorodibenzofuran	0.25 U	0.081 U	0.053 U	0.045 U
Pentachlorodibenzofuran (Total)	0.25 U	0.10	0.056	0.028 U
1,2,3,4,7,8-Hexachlorodibenzofuran	0.28 U	0.12 U	0.041 U	0.036 U
1,2,3,6,7,8-Hexachlorodibenzofuran	0.29 U	0.12 U	0.04 U	0.034 U
1,2,3,7,8,9-Hexachlorodibenzofuran	0.35 U	0.16 U	0.056 U	0.048 U
2,3,4,6,7,8-Hexachlorodibenzofuran	0.29 U	0.12 U	0.043 U	0.036 U
Hexachlorodibenzofuran (Total)	0.53	0.75	0.280	0.10
1,2,3,4,6,7,8-Heptachlorodibenzofuran	1.00	0.82	0.27 U	0.14 U
1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.40 U	0.24	0.094 U	0.078 U
Heptachlorodibenzofuran (Total)	3.00	2.00	52.000	0.14 U
Octachlorodibenzofuran	0.87 U	1.5 U	0.84 U	0.34 U
Avian Toxic. Equiv. Value, TEQ-98	1.1	0.95	0.24	0.16
Fish Toxic. Equiv. Value, TEQ-98	1.3	0.85	0.35	0.25
Mammalian Toxic. Equiv. Value, TEQ-98	1.2	0.75	0.22	0.15

APPENDIX D

Water Chemistry - Metals, Extractables, Pesticides, PCBs and Dioxins

Table D1. Water Metals Analyses - Savannah ODMDS, May 2006

(concentrations reported as ug/L; except Lead - mg/L)		
	Top	Bottom
Aluminum	50u	50u
Antimony	2.5u	2.5u
Arsenic	13	11
Beryllium	1.2u	1.2u
Cadmium	1.2u	1.2u
Chromium	7.9u	6.8u
Copper	7.6	8
Iron	0.22u	0.17u
Lead	2.5u	2.5u
Manganese	5u	5u
Nickel	2.5u	2.5u
Selenium	5.5u	5.5u
Silver	1.2u	1.2u
Thallium	2.5u	2.5u
Total Mercury	0.2u	0.2u
Zinc	14u	13u

Table D2. Water Extractables Analyses - Savannah ODMDS, May 2006.

(concentrations are reported as ug/L)		
	SA top	SA bottom
2-Methylnaphthalene	10	10
Acenaphthene	10	10
Acenaphthylene	10	10
Anthracene	10	10
Benzo(a)anthracene	10	10
Benzo(b)Fluoranthene	10	10
Benzo(ghi)Perylene	10	10
Benzo(k)Fluoranthene	10	10
Benzo-a-Pyrene	10	10
Chrysene	10	10
Dibenzo(a,h)Anthracene	10	10
Fluoranthene	10	10
Fluorene	10	10
Indeno(1,2,3-cd)Pyrene	10	10
Naphthalene	10	10
Phenanthrene	10	10
Pyrene	10	10

NOTE: all values were "U" flagged (analyte not detected at or above reporting limit... the number is the minimum quantitation limit.)

SAVANNAH ODMDS STATUS AND TRENDS – MAY 2006

Table D3. Water Pesticides Analyses - Savannah ODMDS, May 2006
(concentrations reported as ug/L)

	top	bottom
4,4'-DDD (p,p'-DDD)	0.051	0.05
4,4'-DDE (p,p'-DDE)	0.021	0.02
4,4'-DDT (p,p'-DDT)	0.051	0.05
Aldrin	0.03	0.02
alpha-BHC	0.021	0.02
alpha-Chlordane /2	0.021	0.02
beta-BHC	0.021	0.02
cis-Nonachlor /2	0.021	0.02
delta-BHC	0.021	0.02
Dieldrin	0.021	0.02
Endosulfan I (alpha)	0.021	0.02
Endosulfan II (beta)	0.051	0.05
Endosulfan Sulfate	0.06	0.06
Endrin	0.051	0.05
Endrin Ketone	0.051	0.05
gamma-BHC (Lindane)	0.021	0.02
gamma-Chlordane /2	0.021	0.02
Heptachlor	0.021	0.02
Heptachlor Epoxide	0.021	0.02
Methoxychlor	0.1	0.1
Toxaphene	2	2
trans-Nonachlor /2	0.021	0.02

NOTE: all values were "U" flagged (analyte not detected at or above reporting limit-
(number is minimum quantitation limit)

SAVANNAH ODMDS STATUS AND TRENDS – MAY 2006

Table D4. Water PCBs Analyses - Savannah ODMDS, May 2006
(concentrations reported as ug/L)

	top	bottom
PCB Congener #8	0.016	0.02
PCB Congener #18	0.016	0.02
PCB Congener #28	0.016	0.02
PCB Congener #44	0.016	0.02
PCB Congener #49	0.016	0.02
PCB Congener #52	0.016	0.02
PCB Congener #66	0.016	0.02
PCB Congener #77	0.016	0.02
PCB Congener #87	0.016	0.02
PCB Congener #101	0.016	0.02
PCB Congener #105	0.016	0.02
PCB Congener #118	0.016	0.02
PCB Congener #126	0.016	0.02
PCB Congener #128	0.016	0.02
PCB Congener #138	0.016	0.02
PCB Congener #153	0.016	0.02
PCB Congener #156	0.016	0.02
PCB Congener #169	0.016	0.02
PCB Congener #170	0.016	0.02
PCB Congener #180	0.016	0.02
PCB Congener #183	0.016	0.02
PCB Congener #184	0.016	0.02
PCB Congener #187	0.016	0.02
PCB Congener #195	0.016	0.02
PCB Congener #206	0.016	0.02
PCB Congener #209	0.016	0.02

NOTE: all values were "U" flagged (analyte not detected at or above reporting limit-
(number is minimum quantitation limit)

SAVANNAH ODMDS STATUS AND TRENDS – MAY 2006

Table D5. Bottom Water Dioxin Analyses - Savannah ODMDS, May 2006

(concentrations reported as pg/L)

2,3,7,8-Tetrachlorodibenzodioxin	0.00046 U
Tetrachlorodibenzodioxin (Total)	0.00046 U
1,2,3,7,8-Pentachlorodibenzodioxin	0.00041 U
Pentachlorodibenzodioxin (Total)	0.00041 U
1,2,3,4,7,8-Hexachlorodibenzodioxin	0.00050 U
1,2,3,6,7,8-Hexachlorodibenzodioxin	0.00049 U
1,2,3,7,8,9-Hexachlorodibenzodioxin	0.00051 U
Hexachlorodibenzodioxin (Total)	0.00049 U
1,2,3,4,6,7,8-Heptachlorodibenzodioxin	0.0021 U
Heptachlorodibenzodioxin (Total)	0.0008
Octachlorodibenzodioxin	0.012
2,3,7,8-Tetrachlorodibenzofuran	0.00057 U
Tetrachlorodibenzofuran (Total)	0.00057 U
1,2,3,7,8-Pentachlorodibenzofuran	0.00037 U
2,3,4,7,8-Pentachlorodibenzofuran	0.00065
Pentachlorodibenzofuran (Total)	0.00063
1,2,3,4,7,8-Hexachlorodibenzofuran	0.00063 U
1,2,3,6,7,8-Hexachlorodibenzofuran	0.00053 U
1,2,3,7,8,9-Hexachlorodibenzofuran	0.0010 U
2,3,4,6,7,8-Hexachlorodibenzofuran	0.00069 U
Hexachlorodibenzofuran (Total)	0.0017 U
1,2,3,4,6,7,8-Heptachlorodibenzofuran	0.0015
1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.0012
Heptachlorodibenzofuran (Total)	0.0027
Octachlorodibenzofuran	0.0063 U
Avian Toxic. Equiv. Value, TEQ-98	0.0017
Fish Toxic. Equiv. Value, TEQ-98	0.0025
Mammalian Toxic. Equiv. Value, TEQ-98	0.0018

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APPENDIX E

Benthic Data Extracted from Vittor, 2007.

SAVANNAH ODMDS STATUS AND TRENDS – MAY 2006

Table 2. Summary of overall abundance of major benthic macroinfaunal taxonomic groups for the Savannah Harbor, Georgia ODMDS, May 2006.

Outside the ODMDS				
Taxa	Total No. Taxa	% Total	Total No. Individuals	% Total
Annelida				
Oligochaeta	2	1.3	62	2.6
Polychaeta	82	54.7	1,439	60.3
Mollusca				
Bivalvia	15	10.0	190	8.0
Gastropoda	5	3.3	33	1.4
Arthropoda				
Malacostraca	29	19.3	217	9.1
Ostracoda	3	2.0	21	0.9
Echinodermata				
Echinoidea	2	1.3	7	0.3
Holothuroidea	1	0.7	8	0.3
Ophiuroidea	3	2.0	86	3.6
Other Taxa	8	5.3	325	13.6
Total	150		2,388	
Inside the ODMDS				
Taxa	Total No. Taxa	% Total	Total No. Individuals	% Total
Annelida				
Oligochaeta	1	1.0	6	0.7
Polychaeta	45	44.6	502	56.7
Mollusca				
Bivalvia	13	12.9	93	10.5
Gastropoda	5	5.0	9	1.0
Arthropoda				
Malacostraca	26	25.7	213	24.1
Ostracoda	1	1.0	1	0.1
Echinodermata				
Ophiuroidea	1	1.0	4	0.5
Other Taxa	9	8.9	57	6.4
Total	101		885	

SAVANNAH ODMS STATUS AND TRENDS – MAY 2006

Table 3. Summary of abundance of major benthic macroinfaunal taxonomic groups by station for the Savannah Harbor, Georgia ODMS, May 2006.

Station	Taxa	Total No. Taxa	% Total	Total No. Individuals	% Total	Station	Taxa	Total No. Taxa	% Total	Total No. Individuals	% Total
1Out	Annelida	33	54.1	816	65.8	2In	Annelida	22	61.1	181	77.4
	Mollusca	11	18.0	184	14.8		Mollusca	4	11.1	20	8.5
	Arthropoda	10	16.4	96	7.7		Arthropoda	6	16.7	27	11.5
	Echinodermata	3	4.9	80	6.5		Echinodermata	0	0.0	0	0.0
	Other Taxa	4	6.6	64	5.2		Other Taxa	4	11.1	6	2.6
	Total	61		1240	100.0		Total	36		234	100.0
6Out	Annelida	25	59.5	101	53.7	3In	Annelida	17	53.1	87	62.6
	Mollusca	4	9.5	4	2.1		Mollusca	3	9.4	13	9.4
	Arthropoda	10	23.8	10	5.3		Arthropoda	7	21.9	12	8.6
	Echinodermata	1	2.4	7	3.7		Echinodermata	0	0.0	0	0.0
	Other Taxa	2	4.8	66	35.1		Other Taxa	5	15.6	27	19.4
	Total	42		188	100.0		Total	32		139	100.0
7Out	Annelida	23	52.3	204	70.1	4In	Annelida	6	27.3	18	26.1
	Mollusca	3	6.8	10	3.4		Mollusca	4	18.2	9	13.0
	Arthropoda	11	25.0	40	13.7		Arthropoda	10	45.5	39	56.5
	Echinodermata	3	6.8	10	3.4		Echinodermata	1	4.5	1	1.4
	Other Taxa	4	9.1	27	9.3		Other Taxa	1	4.5	2	2.9
	Total	44		291	100.0		Total	22		69	100.0
10Out	Annelida	37	63.8	256	62.3	5In	Annelida	8	38.1	13	27.7
	Mollusca	4	6.9	10	2.4		Mollusca	2	9.5	3	6.4
	Arthropoda	11	19.0	35	8.5		Arthropoda	10	47.6	30	63.8
	Echinodermata	2	3.4	3	0.7		Echinodermata	0	0.0	0	0.0
	Other Taxa	4	6.9	107	26.0		Other Taxa	1	4.8	1	2.1
	Total	58		411	100.0		Total	21		47	100.0
11Out	Annelida	17	70.8	50	43.9	8In	Annelida	22	44.9	130	55.6
	Mollusca	2	8.3	2	1.8		Mollusca	7	14.3	30	12.8
	Arthropoda	4	16.7	5	4.4		Arthropoda	14	28.6	60	25.6
	Echinodermata	0	0.0	0	0.0		Echinodermata	0	0.0	0	0.0
	Other Taxa	1	4.2	57	50.0		Other Taxa	6	12.2	14	6.0
	Total	24		114	100.0		Total	49		234	100.0
12Out	Annelida	14	53.8	74	51.4	9In	Annelida	22	44.9	79	48.8
	Mollusca	4	15.4	13	9.0		Mollusca	11	22.4	27	16.7
	Arthropoda	5	19.2	52	36.1		Arthropoda	12	24.5	46	28.4
	Echinodermata	1	3.8	1	0.7		Echinodermata	1	2.0	3	1.9
	Other Taxa	2	7.7	4	2.8		Other Taxa	3	6.1	7	4.3
	Total	26		144	100.0		Total	49		162	100.0

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Table 4. Wet-weight biomass of major benthic macroinfaunal taxonomic groups by station for the Savannah Harbor, Georgia ODMDS, May 2006.

1Out	Biomass (g)	2In	Biomass (g)
Annelida	0.6639	Annelida	0.6626
Mollusca	0.4429	Mollusca	0.5676
Arthropoda	0.4743	Arthropoda	0.4432
Echinodermata	0.4716	Echinodermata	0.0000
Other Taxa	0.4358	Other Taxa	0.4388
Total	2.4885	Total	2.1122

6Out	Biomass (g)	3In	Biomass (g)
Annelida	0.4850	Annelida	0.5251
Mollusca	0.4351	Mollusca	0.4483
Arthropoda	1.0590	Arthropoda	0.4330
Echinodermata	0.4312	Echinodermata	0.0000
Other Taxa	1.2329	Other Taxa	0.4596
Total	3.6432	Total	1.8660

7Out	Biomass (g)	4In	Biomass (g)
Annelida	1.1525	Annelida	0.4482
Mollusca	0.4766	Mollusca	0.4324
Arthropoda	0.4970	Arthropoda	0.4525
Echinodermata	27.1612	Echinodermata	0.4291
Other Taxa	0.5362	Other Taxa	0.4293
Total	29.8235	Total	2.1915

10Out	Biomass (g)	5In	Biomass (g)
Annelida	1.0942	Annelida	0.4648
Mollusca	0.4329	Mollusca	0.4642
Arthropoda	0.4461	Arthropoda	0.4447
Echinodermata	0.4394	Echinodermata	0.0000
Other Taxa	4.7878	Other Taxa	0.4312
Total	7.2004	Total	1.8049

11Out	Biomass (g)	8In	Biomass (g)
Annelida	0.5362	Annelida	0.5443
Mollusca	0.0000	Mollusca	0.5964
Arthropoda	0.4296	Arthropoda	0.4574
Echinodermata	0.0000	Echinodermata	1.6926
Other Taxa	1.2023	Other Taxa	0.5056
Total	2.1681	Total	3.7963

12Out	Biomass (g)	9In	Biomass (g)
Annelida	0.4607	Annelida	0.4558
Mollusca	0.4377	Mollusca	0.9101
Arthropoda	0.4386	Arthropoda	0.4473
Echinodermata	0.4304	Echinodermata	0.4316
Other Taxa	0.4434	Other Taxa	0.4644
Total	2.2108	Total	2.7092

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Table 5. Distribution and abundance of benthic macroinfaunal taxa for stations outside the Savannah Harbor, Georgia ODMDS, May 2006.

Taxa	Phylum	Class	No. of Individuals	% Total	Cumulative %	Station Occurrence	% Station Occurrence
<i>Spioplanes bombyx</i>	Ann	Poly	234	9.80	9.80	6	100
<i>Brechiosoma</i> (LPIL)	Cho	Lept	205	8.58	18.38	3	50
<i>Crusticeffa laudata</i>	Mol	Biva	131	5.49	23.87	3	50
<i>Polycirrus eximius</i>	Ann	Poly	108	4.52	28.39	1	17
<i>Scolecopsis texana</i>	Ann	Poly	108	4.52	32.91	1	17
Omphidae (LPIL)	Ann	Poly	102	4.27	37.19	4	67
<i>Travina hobsonae</i>	Ann	Poly	95	3.98	41.16	3	50
Ophuridae (LPIL)	Ech	Ophi	80	3.35	44.51	5	83
<i>Prionospio cristata</i>	Ann	Poly	80	3.35	47.86	5	83
<i>Owenia fusiformis</i>	Ann	Poly	69	2.89	50.75	5	83
<i>Aedonotanus</i> (LPIL)	Ann	Poly	55	2.30	53.06	3	50
Rhynchocoela (LPIL)	Rhy	-	51	2.14	55.19	5	83
Tubificidae (LPIL)	Ann	Olig	51	2.14	57.33	3	50
<i>Spio petibonae</i>	Ann	Poly	46	1.93	59.25	5	83
<i>Diopatra cuprea</i>	Ann	Poly	44	1.84	61.10	2	33
<i>Oxyurostylis smithi</i>	Art	Mala	43	1.80	62.90	4	67
<i>Aedonotanus californiensis</i>	Ann	Poly	36	1.51	64.41	1	17
<i>Spioplanes macronensis</i>	Ann	Poly	36	1.51	65.91	1	17
<i>Tubulanus</i> (LPIL)	Rhy	Anop	32	1.34	67.25	2	33
<i>Rhegocorynus Austoni</i>	Art	Mala	30	1.26	68.51	4	67
<i>Goniadides caroliniae</i>	Ann	Poly	27	1.13	69.64	3	50
<i>Nephtys picta</i>	Ann	Poly	25	1.05	70.69	2	33
<i>Polygordius</i> (LPIL)	Ann	Poly	23	0.96	71.65	3	50
<i>Ucaiola ironata</i>	Art	Mala	23	0.96	72.61	3	50
<i>Bhawanis heteroseta</i>	Ann	Poly	22	0.92	73.53	2	33
<i>Elasmopus levii</i>	Art	Mala	22	0.92	74.46	2	33
<i>Schistomeringos pectinata</i>	Ann	Poly	17	0.71	75.17	2	33
Gastropoda (LPIL)	Mol	Gast	16	0.67	75.84	1	17
Phyllocoelidae (LPIL)	Ann	Poly	16	0.67	76.51	1	17
<i>Rudiermia mollisima</i>	Art	Ostr	16	0.67	77.18	1	17
<i>Phoronis</i> (LPIL)	Pho	-	15	0.63	77.81	1	17
<i>Phyllocoela</i> (LPIL)	Ann	Poly	15	0.63	78.43	3	50
<i>Tellina</i> (LPIL)	Mol	Biva	15	0.63	79.06	3	50
<i>Mangelona</i> sp. H	Ann	Poly	14	0.59	79.65	1	17
<i>Aedonotanus ambigua</i>	Ann	Poly	12	0.50	80.15	1	17
<i>Batea catharinensis</i>	Art	Mala	11	0.46	80.61	3	50
<i>Eschytraeidae</i> (LPIL)	Ann	Olig	11	0.46	81.07	4	67
<i>Ascbellides oculata</i>	Ann	Poly	10	0.42	81.49	2	33
<i>Cirratulidae</i> (LPIL)	Ann	Poly	10	0.42	81.91	2	33
<i>Edotea triloba</i>	Art	Mala	10	0.42	82.33	1	17
<i>Bivalvia</i> (LPIL)	Mol	Biva	9	0.38	82.71	2	33
<i>Eamida sanguinea</i>	Ann	Poly	9	0.38	83.08	2	33
<i>Erogone</i> (LPIL)	Ann	Poly	9	0.38	83.46	2	33
<i>Hemipodus roseus</i>	Ann	Poly	9	0.38	83.84	2	33
<i>Prionospio</i> (LPIL)	Ann	Poly	9	0.38	84.21	4	67
<i>Sipuncula</i> (LPIL)	Sip	-	9	0.38	84.59	1	17
<i>Tharyx acutus</i>	Ann	Poly	9	0.38	84.97	1	17
<i>Acteocina</i> (LPIL)	Cni	Anth	8	0.34	85.30	3	50
<i>Ampelisca abdita</i>	Art	Mala	8	0.34	85.64	1	17
<i>Cyathura</i> (LPIL)	Art	Mala	8	0.34	85.97	1	17
<i>Erogone dispar</i>	Ann	Poly	8	0.34	86.31	1	17
<i>Goniada lanosa</i>	Ann	Poly	8	0.34	86.64	2	33

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Table 5 continued:

Taxa	Phylum	Class	No. of Individuals	% Total	Cumulative %	Station Occurrence	% Station Occurrence
Hesionidae (LPIL)	Ann	Poly	8	0.34	86.98	3	50
Holothuroidea (LPIL)	Ech	Holo	8	0.34	87.31	1	17
Pectinaria goalkii	Ann	Poly	8	0.34	87.65	1	17
Pentata (LPIL)	Art	Mala	8	0.34	87.98	2	33
Aoridae (LPIL)	Art	Mala	7	0.29	88.27	3	50
Cacania johnsoni	Mol	Gast	7	0.29	88.57	1	17
Melastrom tricoelatus	Art	Mala	7	0.29	88.86	2	33
Parapionosoma sp. B	Ann	Poly	7	0.29	89.15	2	33
Parapionosyllis subelacherae	Ann	Poly	7	0.29	89.45	1	17
Taxinosus parvirostratus	Art	Mala	7	0.29	89.74	2	33
Ampharetidae (LPIL)	Ann	Poly	6	0.25	89.99	1	17
Ancistrosyllis hartmannae	Ann	Poly	6	0.25	90.34	3	50
Arvicola wangi	Ann	Poly	6	0.25	90.49	1	17
Erogone laevis	Ann	Poly	6	0.25	90.75	1	17
Glyceridae (LPIL)	Ann	Poly	6	0.25	91.00	2	33
Lepidosteus sp. A	Ann	Poly	6	0.25	91.25	2	33
Mora atropax	Ech	Echi	6	0.25	91.50	1	17
Litorosa antennata	Ann	Poly	5	0.21	91.71	2	33
Monocellina dorsobranchialis	Ann	Poly	5	0.21	91.92	2	33
Nereididae (LPIL)	Ann	Poly	5	0.21	92.13	2	33
Polycirrus pilosus	Ann	Poly	5	0.21	92.34	2	33
Rickia punctostriata	Mol	Gast	5	0.21	92.55	2	33
Sphaerosyllis pargirepits	Ann	Poly	5	0.21	92.76	1	17
Americibidius americanum	Art	Mala	4	0.17	92.92	3	50
Amphiridae (LPIL)	Ech	Ophi	4	0.17	93.09	1	17
Anadara trasseras	Mol	Biva	4	0.17	93.26	1	17
Arvicola taylori	Ann	Poly	4	0.17	93.43	1	17
Armonia maculata	Ann	Poly	4	0.17	93.59	1	17
Brania weilhouseni	Ann	Poly	4	0.17	93.76	1	17
Calyptraeidae (LPIL)	Mol	Gast	4	0.17	93.93	1	17
Cyathura barbaraki	Art	Mala	4	0.17	94.10	1	17
Erichthonia brevispinis	Art	Mala	4	0.17	94.26	1	17
Gastropoda Nereis	Mol	Biva	4	0.17	94.43	1	17
Littorilla barbaraki	Art	Mala	4	0.17	94.60	1	17
Lambrineris latreilli	Ann	Poly	4	0.17	94.77	1	17
Lyonia hyalina	Mol	Biva	4	0.17	94.93	1	17
Microphallus (LPIL)	Ann	Poly	4	0.17	95.10	1	17
Mytilidae (LPIL)	Mol	Biva	4	0.17	95.27	1	17
Nereis fulva	Ann	Poly	4	0.17	95.44	1	17
Nereis (LPIL)	Mol	Biva	4	0.17	95.60	1	17
Oweniidae (LPIL)	Ann	Poly	4	0.17	95.77	2	33
Sigambra tentaculata	Ann	Poly	4	0.17	95.94	1	17
Spirochaetopterus oculatus	Ann	Poly	4	0.17	96.11	1	17
Turbellaria (LPIL)	Fla	Turb	4	0.17	96.27	1	17
Veneridae (LPIL)	Mol	Biva	4	0.17	96.44	1	17
Erilia concentrica	Mol	Biva	3	0.13	96.57	2	33
Nephtys (LPIL)	Ann	Poly	3	0.13	96.69	2	33
Nereis macrozona	Ann	Poly	3	0.13	96.82	2	33
Pisone remota	Ann	Poly	3	0.13	96.94	1	17
Radiolima darbyi	Art	Outr	3	0.13	97.07	1	17
Sphaerosyllis taylori	Ann	Poly	3	0.13	97.19	1	17
Synelmu ewingi	Ann	Poly	3	0.13	97.32	2	33
Abra asquarii	Mol	Biva	2	0.08	97.40	1	17
Aphroditidae serrilli	Ann	Poly	2	0.08	97.49	1	17

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Table 5 continued:

Taxa	Phylum	Class	No. of Individuals	% Total	Cumulative %	Station Occurrence	% Station Occurrence
<i>Amphiochelis</i> (LPIL)	Art	Mala	2	0.08	97.57	2	35
<i>Apogonopsis</i> (LPIL)	Ann	Polyp	2	0.08	97.65	1	17
<i>Corophidae</i> (LPIL)	Art	Mala	2	0.08	97.74	1	17
<i>Dematiomyces caroliniae</i>	Ann	Polyp	2	0.08	97.82	1	17
<i>Hemiphaedusa elongata</i>	Ech	Ophi	2	0.08	97.91	1	17
<i>Leptochinus</i> (LPIL)	Art	Mala	2	0.08	97.99	1	17
<i>Phyllodoce mucosa</i>	Ann	Polyp	2	0.08	98.07	1	17
<i>Prionospio perkinsi</i>	Ann	Polyp	2	0.08	98.16	1	17
<i>Proceca</i> (LPIL)	Art	Mala	2	0.08	98.24	1	17
<i>Pseudosquilla kifersteini</i>	Ann	Polyp	2	0.08	98.32	2	35
<i>Pseudophilosodes ambon</i>	Art	Ostr	2	0.08	98.41	1	17
<i>Pteromeria perplata</i>	Mol	Biva	2	0.08	98.49	2	35
<i>Sigalion</i> sp. A	Ann	Polyp	2	0.08	98.58	2	35
<i>Spisopsanes</i> (LPIL)	Ann	Polyp	2	0.08	98.66	1	17
<i>Syllidae</i> (LPIL)	Ann	Polyp	2	0.08	98.74	1	17
<i>Tritona iris</i>	Mol	Biva	2	0.08	98.83	1	17
<i>Amphelica</i> (LPIL)	Art	Mala	1	0.04	98.87	1	17
<i>Aonides</i> (LPIL)	Ann	Polyp	1	0.04	98.91	1	17
<i>Aricidea cernati</i>	Ann	Polyp	1	0.04	98.95	1	17
<i>Bathyporeia parkeri</i>	Art	Mala	1	0.04	98.99	1	17
<i>Cardidae</i> (LPIL)	Mol	Biva	1	0.04	99.04	1	17
<i>Cyclaspis varians</i>	Art	Mala	1	0.04	99.08	1	17
<i>Echinocida</i> (LPIL)	Ech	Echi	1	0.04	99.12	1	17
<i>Gobiosoma oculata</i>	Ann	Polyp	1	0.04	99.16	1	17
<i>Glycera</i> (LPIL)	Ann	Polyp	1	0.04	99.20	1	17
<i>Orubomyces ciliatus</i>	Ann	Polyp	1	0.04	99.25	1	17
<i>Hydrozoa</i> (LPIL)	Cni	Hydr	1	0.04	99.29	1	17
<i>Isaidae</i> (LPIL)	Art	Mala	1	0.04	99.33	1	17
<i>Leucos americana</i>	Art	Mala	1	0.04	99.37	1	17
<i>Megalopa papillicornis</i>	Ann	Polyp	1	0.04	99.41	1	17
<i>Mesanthura</i> sp. C	Art	Mala	1	0.04	99.46	1	17
<i>Microprotopus raseyi</i>	Art	Mala	1	0.04	99.50	1	17
<i>Palaemonetes quadrivalvatus</i>	Ann	Polyp	1	0.04	99.54	1	17
<i>Polydora polita</i>	Art	Mala	1	0.04	99.58	1	17
<i>Polydora cornuta</i>	Ann	Polyp	1	0.04	99.62	1	17
<i>Scoloplos rubra</i>	Ann	Polyp	1	0.04	99.66	1	17
<i>Semela maculoides</i>	Mol	Biva	1	0.04	99.71	1	17
<i>Sigalionidae</i> (LPIL)	Ann	Polyp	1	0.04	99.75	1	17
<i>Spionidae</i> (LPIL)	Ann	Polyp	1	0.04	99.79	1	17
<i>Taylorphloeus hirsuta</i>	Ann	Polyp	1	0.04	99.83	1	17
<i>Terebellidae</i> (LPIL)	Ann	Polyp	1	0.04	99.87	1	17
<i>Trypanosyllis confusa</i>	Ann	Polyp	1	0.04	99.92	1	17
<i>Turbidae</i> (LPIL)	Mol	Gast	1	0.04	99.96	1	17
<i>Urosida</i> (LPIL)	Art	Mala	1	0.04	100.00	1	17

Taxa Key

Ann=Annelida	Ech=Echinodermata	Rhy=Rhynchocoela
Olig=Oligochaeta	Echi=Echinoides	Anop=Anopla
Polyp=Polychaeta	Holo=Holothuroidea	Sip=Sigambra
Art=Arthropoda	Ophi=Ophiuroidea	
Mala=Malacostraca	Mol=Mollusca	
Ostr=Ostracoda	Biva=Bivalvia	
Cni=Cnidaria	Gast=Gastropoda	
Lept=Leptocamnia	Pho=Phoronida	
Cni=Cnidaria	Pha=Phyllozoa	
Anth=Anthozoa	Turb=Turbellaria	
Hydr=Hydrozoa		

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Table 6. Distribution and abundance of benthic macrofaunal taxa for stations inside the Savannah Harbor, Georgia ODMDS, May 2006.

Taxa	Phylum	Class	No. of Individuals	% Total	Cumulative %	Station Occurrence	% Station Occurrence
<i>Spiophanes bombyx</i>	Ann	Poly	179	20.23	20.23	6	100
<i>Spio petiboneae</i>	Ann	Poly	61	6.89	27.12	6	100
<i>Rhepoxynius hudsoni</i>	Art	Mala	59	6.67	33.79	6	100
<i>Tellina</i> (LPIL)	Mol	Biva	50	5.65	39.44	5	83
<i>Oxyurostylis smithi</i>	Art	Mala	46	5.20	44.63	6	100
<i>Mediomastus californiensis</i>	Ann	Poly	45	5.08	49.72	3	50
<i>Mediomastus</i> (LPIL)	Ann	Poly	28	3.16	52.88	5	83
<i>Eudavenopus honduramus</i>	Art	Mala	20	2.26	55.14	6	100
<i>Magelona papillicornis</i>	Ann	Poly	18	2.03	57.18	4	67
<i>Owenia flustiformis</i>	Ann	Poly	17	1.92	59.10	4	67
<i>Rhynchocoela</i> (LPIL)	Rhy	-	16	1.81	60.90	5	83
<i>Apopronospio dayi</i>	Ann	Poly	15	1.69	62.60	1	17
<i>Prochaetostorius</i> sp. B	Art	Mala	15	1.69	64.29	5	83
<i>Tubulanus</i> (LPIL)	Rhy	Anop	15	1.69	65.99	3	50
<i>Omphidae</i> (LPIL)	Ann	Poly	14	1.58	67.57	4	67
<i>Crassinella duplokinza</i>	Mol	Biva	12	1.36	68.93	3	50
<i>Metatriton tropakis</i>	Art	Mala	12	1.36	70.28	4	67
<i>Magelona</i> sp. H	Ann	Poly	11	1.24	71.53	3	50
<i>Polycirrus eximius</i>	Ann	Poly	11	1.24	72.77	1	17
<i>Americhelidium americanum</i>	Art	Mala	10	1.13	73.90	3	50
<i>Nephtys pecta</i>	Ann	Poly	10	1.13	75.03	4	67
<i>Actinaria</i> (LPIL)	Cni	Anth	9	1.02	76.05	3	50
<i>Batea catharinensis</i>	Art	Mala	9	1.02	77.06	2	33
<i>Polygordius</i> (LPIL)	Ann	Poly	9	1.02	78.08	3	50
<i>Prionospio cristata</i>	Ann	Poly	8	0.90	78.98	3	50
<i>Tellina iris</i>	Mol	Biva	8	0.90	79.89	2	33
<i>Tharyx acutus</i>	Ann	Poly	8	0.90	80.79	1	17
<i>Crassinella humata</i>	Mol	Biva	7	0.79	81.58	4	67
<i>Metatriton triocellatus</i>	Art	Mala	7	0.79	82.37	2	33
<i>Phoronis</i> (LPIL)	Pho	-	7	0.79	83.16	1	17
<i>Acanthohamontius intermedius</i>	Art	Mala	6	0.68	83.84	2	33
<i>Onuphis eremita oculata</i>	Ann	Poly	6	0.68	84.52	2	33
<i>Scolecopsis texana</i>	Ann	Poly	6	0.68	85.20	2	33
<i>Tubificidae</i> (LPIL)	Ann	Olif	6	0.68	85.88	3	50
<i>Cyclopsis varians</i>	Art	Mala	5	0.56	86.44	3	50
<i>Phyllodoce</i> (LPIL)	Ann	Poly	5	0.56	87.01	4	67
<i>Branchiostoma</i> (LPIL)	Cho	Lept	4	0.45	87.46	2	33
<i>Eusoda sanguinea</i>	Ann	Poly	4	0.45	87.91	1	17
<i>Ophiuroidea</i> (LPIL)	Ech	Ophi	4	0.45	88.36	2	33
<i>Prionospio</i> (LPIL)	Ann	Poly	4	0.45	88.81	3	50
<i>Rictaxis punctostriatus</i>	Mol	Gast	4	0.45	89.27	2	33
<i>Cirratulidae</i> (LPIL)	Ann	Poly	3	0.34	89.60	1	17
<i>Dentatylis caroliniae</i>	Ann	Poly	3	0.34	89.94	1	17
<i>Edotia triloba</i>	Art	Mala	3	0.34	90.28	2	33
<i>Goniada litorea</i>	Ann	Poly	3	0.34	90.62	2	33
<i>Hydrozoa</i> (LPIL)	Cni	Hydr	3	0.34	90.96	3	50
<i>Kallipsectes</i> (LPIL)	Art	Mala	3	0.34	91.30	1	17
<i>Letistocolopis</i> (LPIL)	Ann	Poly	3	0.34	91.64	3	50
<i>Metatriton</i> (LPIL)	Art	Mala	3	0.34	91.98	3	50
<i>Nephtys</i> (LPIL)	Ann	Poly	3	0.34	92.32	2	33
<i>Spiomidae</i> (LPIL)	Ann	Poly	3	0.34	92.66	2	33
<i>Spiralia solidissima</i>	Mol	Biva	3	0.34	92.99	2	33
<i>Acteocina bidentata</i>	Mol	Gast	2	0.23	93.22	1	17

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Table 6 continued:

Taxa	Phylum	Class	No. of Individuals	% Total	Cumulative %	Station Occurrence	% Station Occurrence
<i>Apoprionospto</i> (LPIL)	Ann	Poly	2	0.23	93.45	2	33
<i>Bathyporeia parkeri</i>	Art	Mala	2	0.23	93.67	1	17
Cardiidae (LPIL)	Mol	Biva	2	0.23	93.90	1	17
<i>Lyonia hyalina</i>	Mol	Biva	2	0.23	94.12	1	17
<i>Pandora</i> (LPIL)	Mol	Biva	2	0.23	94.35	2	33
<i>Phylodoce arenae</i>	Ann	Poly	2	0.23	94.58	1	17
<i>Semele</i> (LPIL)	Mol	Biva	2	0.23	94.80	1	17
<i>Semele maculoides</i>	Mol	Biva	2	0.23	95.03	1	17
<i>Spiochaetopterus oculatus</i>	Ann	Poly	2	0.23	95.25	2	33
<i>Spiophanes missionensis</i>	Ann	Poly	2	0.23	95.48	1	17
<i>Synechis ewingi</i>	Ann	Poly	2	0.23	95.71	2	33
<i>Tanaisius psammophilus</i>	Art	Mala	2	0.23	95.93	1	17
<i>Ampelisca</i> (LPIL)	Art	Mala	1	0.11	96.05	1	17
<i>Ampelisca bicarinata</i>	Art	Mala	1	0.11	96.16	1	17
<i>Ancistrosyllis hartmanae</i>	Ann	Poly	1	0.11	96.27	1	17
<i>Aonides paucibranchiata</i>	Ann	Poly	1	0.11	96.38	1	17
<i>Armandia agilis</i>	Ann	Poly	1	0.11	96.50	1	17
Ascidacea (LPIL)	Cho	Asci	1	0.11	96.61	1	17
<i>Bathyporeia</i> (LPIL)	Art	Mala	1	0.11	96.72	1	17
<i>Bemlos</i> (LPIL)	Art	Mala	1	0.11	96.84	1	17
<i>Bhawania heteroseta</i>	Ann	Poly	1	0.11	96.95	1	17
<i>Caecum johnsoni</i>	Mol	Gast	1	0.11	97.06	1	17
<i>Calyptraeidae</i> (LPIL)	Mol	Gast	1	0.11	97.18	1	17
<i>Corbula</i> (LPIL)	Mol	Biva	1	0.11	97.29	1	17
<i>Cyclasps pustulata</i>	Art	Mala	1	0.11	97.40	1	17
<i>Diplosoma</i> (LPIL)	Mol	Biva	1	0.11	97.51	1	17
<i>Erichthonis brasiliensis</i>	Art	Mala	1	0.11	97.63	1	17
<i>Glycera abbranchiata</i>	Ann	Poly	1	0.11	97.74	1	17
<i>Glycera</i> sp. E	Ann	Poly	1	0.11	97.85	1	17
<i>Granditerella bonnieroides</i>	Art	Mala	1	0.11	97.97	1	17
Haustoriidae (LPIL)	Art	Mala	1	0.11	98.08	1	17
<i>Hypereteone</i> (LPIL)	Ann	Poly	1	0.11	98.19	1	17
<i>Mageiona</i> (LPIL)	Ann	Poly	1	0.11	98.31	1	17
Nephtyidae (LPIL)	Ann	Poly	1	0.11	98.42	1	17
<i>Oliva sayana</i>	Mol	Gast	1	0.11	98.53	1	17
Oweniidae (LPIL)	Ann	Poly	1	0.11	98.64	1	17
<i>Parapionosyllis uebelacherae</i>	Ann	Poly	1	0.11	98.76	1	17
<i>Phascolion strombi</i>	Sip	-	1	0.11	98.87	1	17
Phoxocephalidae (LPIL)	Art	Mala	1	0.11	98.98	1	17
<i>Phylodoce mucosa</i>	Ann	Poly	1	0.11	99.10	1	17
<i>Pinnixa</i> (LPIL)	Art	Mala	1	0.11	99.21	1	17
<i>Polydora cornuta</i>	Ann	Poly	1	0.11	99.32	1	17
<i>Protodorvillea kefersteini</i>	Ann	Poly	1	0.11	99.44	1	17
<i>Pseudophilomedes ambon</i>	Art	Ostr	1	0.11	99.55	1	17
<i>Pteromeris perplana</i>	Mol	Biva	1	0.11	99.66	1	17
Sigalionidae (LPIL)	Ann	Poly	1	0.11	99.77	1	17
<i>Sipuncula</i> (LPIL)	Sip	-	1	0.11	99.89	1	17
<i>Unciola</i> (LPIL)	Art	Mala	1	0.11	100.00	1	17

Taxa Key

Ann=Annelida
 Olig=Oligochaeta
 Poly=Polychaeta
 Art=Arthropoda
 Mala=Malacostraca
 Ostr=Ostracoda
 Cho=Chordata
 Asci=Ascidacea
 Lept=Leptocardia
 Cni=Cnidaria
 Anth=Anthozoa
 Hydr=Hydrozoa
 Ech=Echinodermata
 Ophi=Ophiuroidea
 Mol=Mollusca
 Biva=Bivalvia
 Gast=Gastropoda
 Pho=Phoronida

Rhy=Rhynchocoela

Anop=Anopla

Sip=Sipuncula

SAVANNAH ODMDS STATUS AND TRENDS – MAY 2006

Table 8. Summary of assemblage parameters for the Savannah Harbor, Georgia ODMDS stations, May 1992 and 2006.

2006							
Station	Date (m/d/y)	Total No. Taxa	Total No. Individuals	Density (nos/m ²)	H' Shannon (log e)	J' Pielou Evenness	D Margalef Richness
1Out	5/1/06	61	1240	31000.0	3.34	0.81	8.42
6Out	5/1/06	42	188	4700.0	2.83	0.76	7.83
7Out	5/1/06	44	291	7275.0	3.25	0.86	7.58
10Out	5/1/06	58	411	10275.0	3.02	0.74	9.47
11Out	5/1/06	24	114	2850.0	2.05	0.65	4.86
12Out	5/1/06	26	144	3600.0	2.60	0.80	5.03
	Mean	42.5		9950.0	2.85	0.77	7.20
	SD	15.5		10664.5			
2In	5/1/06	36	234	5850.0	2.75	0.77	6.42
3In	5/1/06	32	139	3475.0	2.77	0.80	6.28
4In	5/1/06	22	69	1725.0	2.51	0.81	4.96
5In	5/1/06	21	47	1175.0	2.37	0.78	5.19
8In	5/1/06	49	234	5850.0	3.14	0.81	8.80
9In	5/1/06	49	162	4050.0	3.41	0.88	9.43
	Mean	34.8		3687.5	2.82	0.81	6.85
	SD	12.4		1984.6			
1992							
Station	Date	Mean No. Taxa	Total No. Individuals	Mean Density (nos/m ²)	H' Shannon (log e)	J' Pielou Evenness	D Margalef Richness
Outside							
1	May-92	8.8	248	2093	2.92	0.76	8.16
2	May-92	24.9	970	8186	3.38	0.75	13.09
3	May-92	21.1	1092	9215	2.85	0.64	12.44
7	May-92	18.5	438	3696	3.87	0.84	16.44
11	May-92	28.3	5152	43477	1.74	0.36	13.81
12	May-92	24.8	935	7890	3.67	0.75	19.00
	Mean	21.1		12426.2	3.07	0.68	13.82
Inside							
4	May-92	21.5	992	83.71	3.03	0.60	111.74
5	May-92	22.7	862	7274	3.40	0.74	14.05
6	May-92	19.3	956	8068	2.79	0.66	9.91
8	May-92	17.7	687	5797	3.18	0.74	11.33
9	May-92	20.3	778	6565	3.10	0.68	14.57
10	May-92	27.1	782	6599	3.96	0.81	19.81
	Mean	21.4		5731.1	3.24	0.71	30.24

Figure 3. Summary of overall abundance of major benthic macroinfaunal taxonomic groups for the Savannah Harbor, Georgia ODMDS stations, 2006.

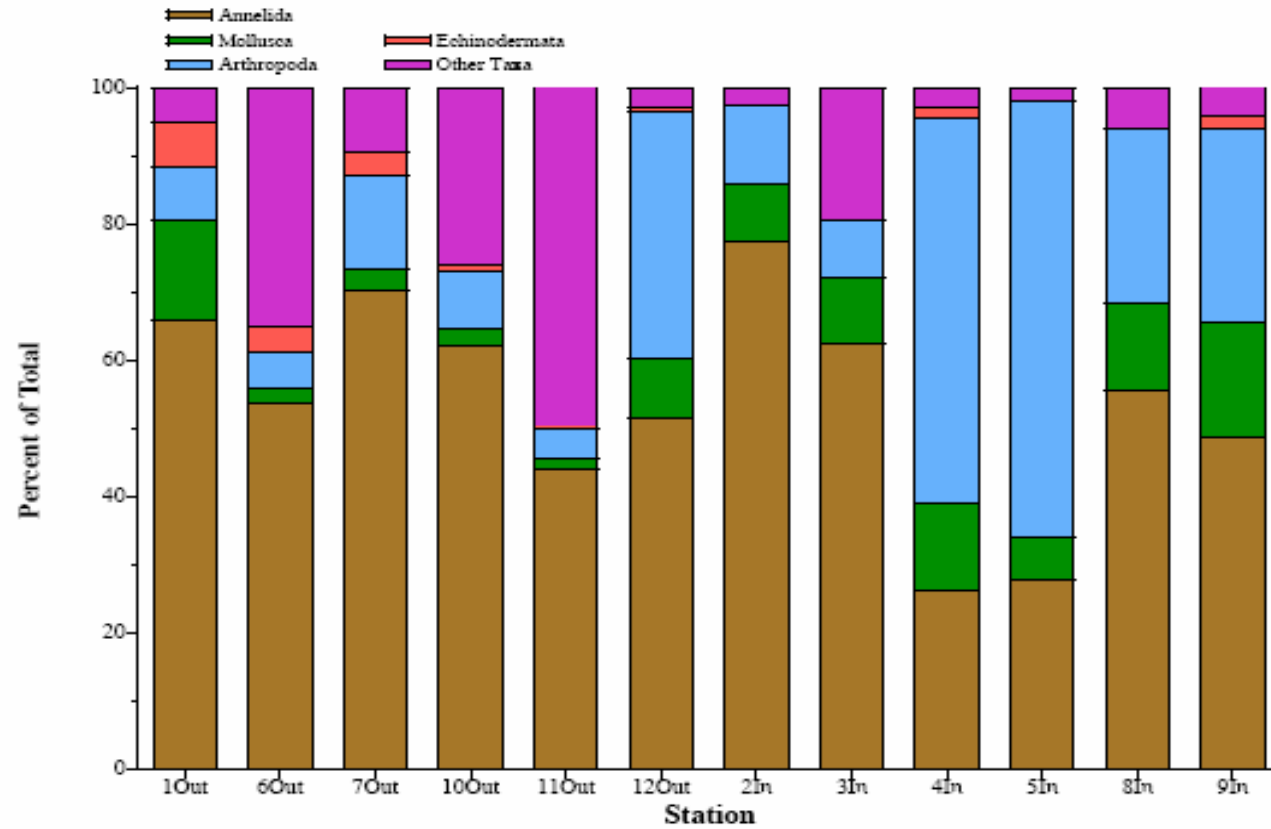
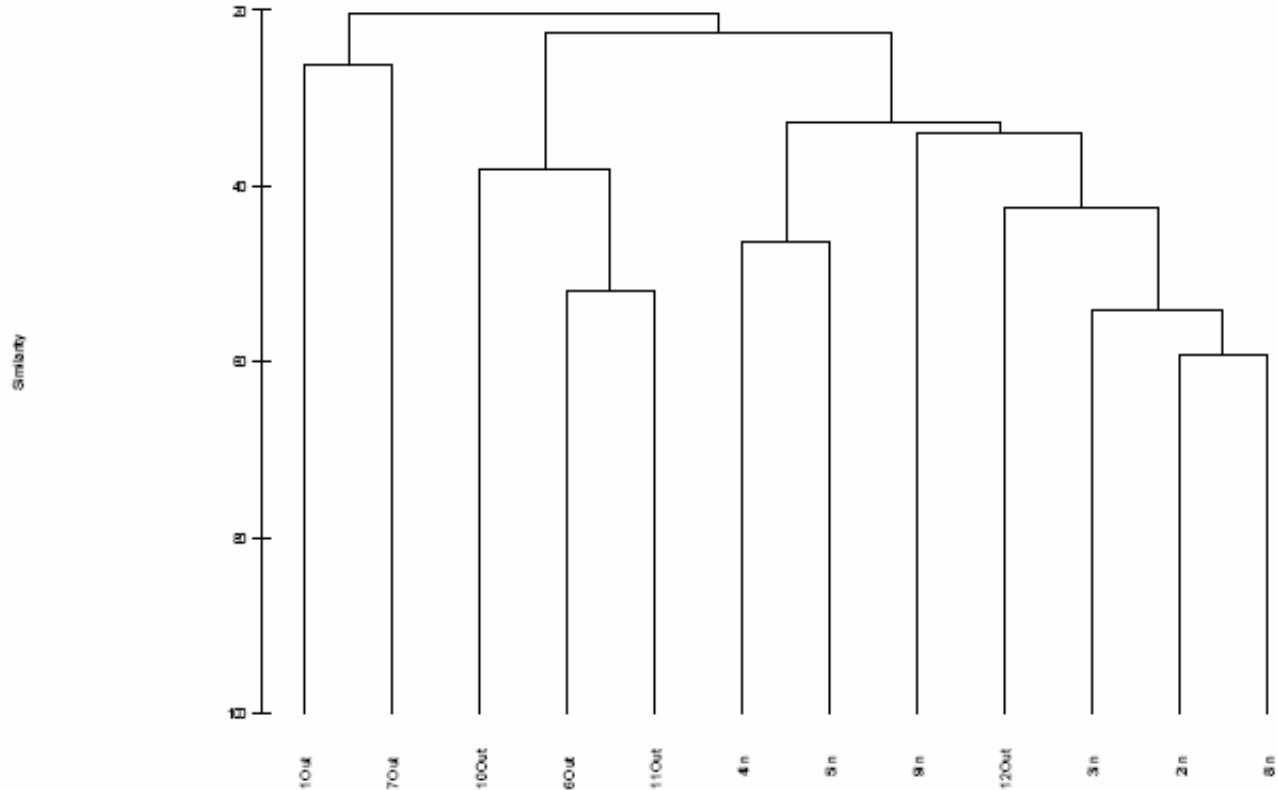


Figure 9. Cluster analysis of the Savannah Harbor ODMS stations, May 2006.



APPENDIX F

Target Detection Limits

SAVANNAH ODMDS STATUS AND TRENDS – MAY 2006

ANALYTE	Water ug/L (ppb)	Sediment mg/kg (ppm)
Antimony	2.5	2
Arsenic	5	1
Aluminum	500	50
Beryllium	30	0.5
Cadmium	2.5	0.5
Chromium	50	1
Copper*	4.8	1
Iron	500	25
Lead	5	0.5
Manganese	100	1
Mercury	0.2	0.05
Nickel*	74	2
Selenium	10	4
Silver*	1.9	1
Thallium	5	0.5
Zinc*	50	1
Ammonia	0.05	2.5
Nitrate+Nitrite	0.05	12.5
Phosphorus, Total	0.01	25
Phosphorus, Ortho	0.01	25
Sulfate	0.1	1
Sulfide	0.04	0.4
Kjeldahl Nitrogen	0.05	12.5
Total Solids/dry weight		0.01
Total Org. Carbon	5 (0.0005%)	0.001

ANALYTE	Water ug/L(ppb)	Soil/Sed* ug/kg(ppb)
2-Methylnaphthalene	10	20
Acenaphthene	10	10
Acenaphthylene	10	20
Anthracene	10	20
Benzo(a)anthracene	10	20
Benzo(a)pyrene	10	20
Benzo(b/k)fluoranthene	10	20
Benzo(g,h,i)perylene	10	20
Chrysene	10	20
Dibenz(a,h)anthracene	10	20
Fluoranthene	10	20
Fluorene	10	10
Indeno(1,2,3,c,d)pyrene	10	20
Naphthalene	10	20
Phenanthrene	10	20
Pyrene	10	20

SAVANNAH ODMDS STATUS AND TRENDS – MAY 2006

<u>ANALYTE</u>	<u>Water ug/L(ppb)</u>	<u>Soil/Sed* ug/kg(ppb)</u>
(3- and/or 4-)Methylphenol	10	100
1,2,4-Trichlorobenzene	10	200
2,4-Dimethylphenol	10	20
2-Methylphenol	10	50
Benzyl Butyl Phthalate	10	200
Bis(2-ethylhexyl)phthalate	10	200
Di-n-butylphthalate	10	200
Di-n-octylphthalate	10	200
Dibenzofuran	10	200
Diethyl phthalate	10	200
Dimethyl Phthalate	10	200
Hexachlorobenzene	10	200
Hexachlorobutadiene	10	200
Hexachlorocyclopentadiene	10	200
Hexachloroethane	10	200
N-Nitrosodiphenylamine	10	200
Pentachlorophenol	20	100
Phenol	10	100

<u>ANALYTE</u>	<u>Water ug/L (ppb)</u>	<u>Sediment ug/kg (ppb)</u>
Aldrin	0.5	20
Heptachlor*	0.05	20
Hept. Epoxide*	0.05	20
alpha-BHC	0.5	20
Beta-BHC	0.5	20
gamma-BHC*	0.1	20
Delta-BHC	0.5	20
Endosulfan- I*	0.05	20
Dieldrin*	0.5	1
p,p'-DDT*	0.1	2
p,p'-DDD*	0.1	2
p,p'-DDE*	0.1	2
Endrin*	0.05	20
Endosulfan -II*	0.05	20
Endosulfan- SO4*	0.5	20
Endrin Ketone	0.5	20
Methoxychlor	1	50
g-chlordane*	0.1	5
a-chlordane*	0.1	5
Trans-nonachlor*	0.1	20
cis-nonachlor	0.5	20
Toxaphene*	2	50
PCB (as Congeners - see list)	0.02	1

SAVANNAH ODMDS STATUS AND TRENDS – MAY 2006

PCB Congener	Water ug/L (ppb)	Sediment ug/kg (ppb)
8	0.02	1
18	0.02	1
28	0.02	1
44	0.02	1
49	0.02	1
52	0.02	1
66	0.02	1
77	0.02	1
87	0.02	1
101	0.02	1
105	0.02	1
118	0.02	1
126	0.02	1
128	0.02	1
138	0.02	1
153	0.02	1
156	0.02	1
169	0.02	1
170	0.02	1
180	0.02	1
183	0.02	1
184	0.02	1
187	0.02	1
195	0.02	1
206	0.02	1
209	0.02	1

Congener	Sediment Target RL (ng/Kg)	Water Target RL (pg/L)
2,3,7,8-TCDD	1	10
1,2,3,7,8-PentaCDD	2.5	50
1,2,3,4,7,8-HexaCDD	5	50
1,2,3,6,7,8-HexaCDD	5	50
1,2,3,7,8,9-HexaCDD	5	50
1,2,3,4,6,7,8-HeptaCDD	5	50
1,2,3,4,6,7,8,9-OCDD	10	100
2,3,7,8-TetraCDF	1	10
1,2,3,7,8-PentaCDF	2.5	50
2,3,4,7,8-PentaCDF	2.5	50
1,2,3,4,7,8-HexaCDF	5	50
1,2,3,6,7,8-HexaCDF	5	50
1,2,3,7,8,9-HexaCDF	5	50
2,3,4,6,7,8-HexaCDF	5	50
1,2,3,4,6,7,8-HeptaCDF	5	50
1,2,3,4,7,8,9-HeptaCDF	5	50
1,2,3,4,6,7,8,9-OCDF	10	100

