Appendix C
Field Documentation

DMT APPENDIX A:

QUALITATIVE BENTHOS ANALYSIS

DUNDALK MARINE TERMINAL
BALTIMORE HARBOR, MARYLAND

Prepared For:

HONEYWELL

101 Columbia Road
P.O. Box 2105
Morristown, NJ 07962

Prepared By:

ENVIRON

1600 Parkwood Circle, Suite 310

Atlanta, GA 30114

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EXECUTIVE SUMMARY

An informal, qualitative analysis of the benthos at the site was performed during the May 2007 field effort to observe the organisms present and determine whether the organisms observed represented a freshwater or saltwater community. A detailed description and photographs of biological assemblages observed at DMT is provided in Appendix A and is briefly described below.

Polychaetes, amphipods, clams, and arthropods were observed in sediments from DMT, with differences in community composition dependent upon the sediment habitat. Although many of the organisms observed can tolerate freshwater, they are more typical of estuarine species assemblages. Additionally, the salinity data for the area indicates that the salinity regime is polyhaline/mesohaline, which would exclude the vast majority of freshwater organisms.

1.0 INTRODUCTION

An informal, qualitative analysis of the benthos at the site was performed in order to observe the organisms present. The purpose of this analysis was twofold:

- To help decide if marine or freshwater regulatory criteria are more appropriate for the Dundalk Marine Terminal (DMT), and;
- To evaluate what benthos are present in the area to guide potential future benthic community assessment.

2.0 METHODS

During the May 2007 sampling effort, a certified ecologist and Ph.D. in Marine Biology with a technical and academic background in marine science and benthic ecology, assisted with sediment sampling. During this time she recorded observations of the benthic organisms from the H and I transects on the northwest side of DMT. As a ponar of sediment was brought onto the boat, a few readily observable organisms were removed by hand (if possible), stored live in water from the site, and then photographed.

Additionally, approximately two liters of sediment from location B-9 on the southeast side of DMT was inspected for benthic organisms. The sediment was frozen on site, shipped on ice, and slowly defrosted. Organisms were retrieved by gently sieving the sediment through a 500 micron net using Instant Ocean artificial seawater at approximately 10 parts per thousand (ppt) salinity. Organisms were photographed, and stored in 70% ethyl alcohol at 4°C.

3.0 RESULTS

Sediment from the H and I transects were visually similar, and indicative of a low-energy depositional environment. These sediments consisted of soft clay and silt mud, with a trace of sand, and perhaps 2-10% shell marl and gravel. Based on visual observations of the sediment, the sediment was generally anoxic past two centimeters in depth. Sediment from the B transect was typical of a higher-energy environment than the H and I transect, and is apparently not a depositional environment. Sediment from the B transect consisted of medium sand, with perhaps 5-15% shell marl.

Measured salinity ranged from 5 to 13 ppt and indicates that both areas are mesohaline. This is in agreement with the Maryland Department of Natural Resources (MD DNR) monthly monitoring data that indicates that salinity in the area generally ranges from 5 to 18 ppt (MD DNR, 2007).

The most abundant organisms observed in the sediment from the H and I transects were large polychaetes. The polychaetes observed were typically large 2 to 7 centimeter (cm) predatory polychaetes that were visually similar to nereid polychaetes typical in this type of clayey sediment. A few small amphipods were also noted. Also, small polychaetes (1 millimeter or less in width) were visible in the sediment, particularly within 2 cm of the sediment surface, but were not recovered. These small polychaetes were occasionally locally abundant, but were not visible in every sample, and may have a patchy distribution in the area.

There were a variety of organisms observed in the sediment from the B transect, but no one type of organism dominated the observed community. Clams, polychaetes, amphipods, and a few other arthropods were recovered from the samples. The clams recovered were small – the largest was no more than 2 cm in its largest dimension. The few polychaetes observed were much smaller than the ones observed in the H and I transects, and were generally less than 2 cm in length. Amphipods observed were generally three to five millimeters in length. A small variety of other arthropods were also observed, but were not identified. They were generally vermiform, armored taxa, that may have been cumaceans or small stomatopods.

4.0 CONCLUSIONS

Organisms observed in the sediments near DMT are more typical of estuarine or marine organisms than they were of freshwater organisms. Although many of these organisms can tolerate freshwater, they are more typical of estuarine species assemblages. Additionally, the salinity data for the area indicates that the salinity regime is polyhaline/mesohaline and would exclude many freshwater organisms.

This qualitative analysis indicates that there are at least two types of benthic communities in the area, which is likely predicated by the two very different types of bottom sediment.

The clayey mud on the northwest side of DMT most likely supports a community of soft-bodied polychaetes that are probably a mix of deposit feeders, suspension feeders, detritivores, and large carnivores. Nearly all polychaetes (in terms of the number of species) are marine organisms, but some are polyhaline or freshwater (Brusca and Brusca, 1990). There are probably various smaller crustaceans, including amphipods, associated with this community, as well as other worms (including oligochaetes).

The sandy bottom on the southeast side of DMT most likely supports a community of armored organisms that burrow within the sand as a refuge from fish predation and wave energy. Clams and other suspension feeders may survive well here as the increase in water velocity renews the supply of labile allochthonous detritus in the water column. Other organisms in this community are likely types that specialize in burrowing in the sandy sediment. This may include amphipods, isopods, copepods, and other armored arthropods that either deposit feeders or predators.

5.0 REFERENCES

Brusca, RC and Brusca GJ, 1990. Invertibrates. Sinauer Associates, Inc., Sunderland, MA.

MD DNR, 2007. Chesapeake Bay, Bay Conditions, Patapsco/Back Rivers, Station WT5.1. http://www.dnr.state.md.us/bay/conditions/wt51.html

Figure A-1

Typical Sediment from H and I Transects

Honeywell

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MARYLAND

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Figure A-2

Honeywell DUNDALK MARINE TERMINAL MARYLAND

Live Polychaetes from H & I Transects

ENVIRON CH2MHILL

Figure A-3

Honeywell DUNDALK MARINE TERMINAL MARYLAND

Sediment Typical of the Southeast Side of DMT

ENVIRON CH2MHILL

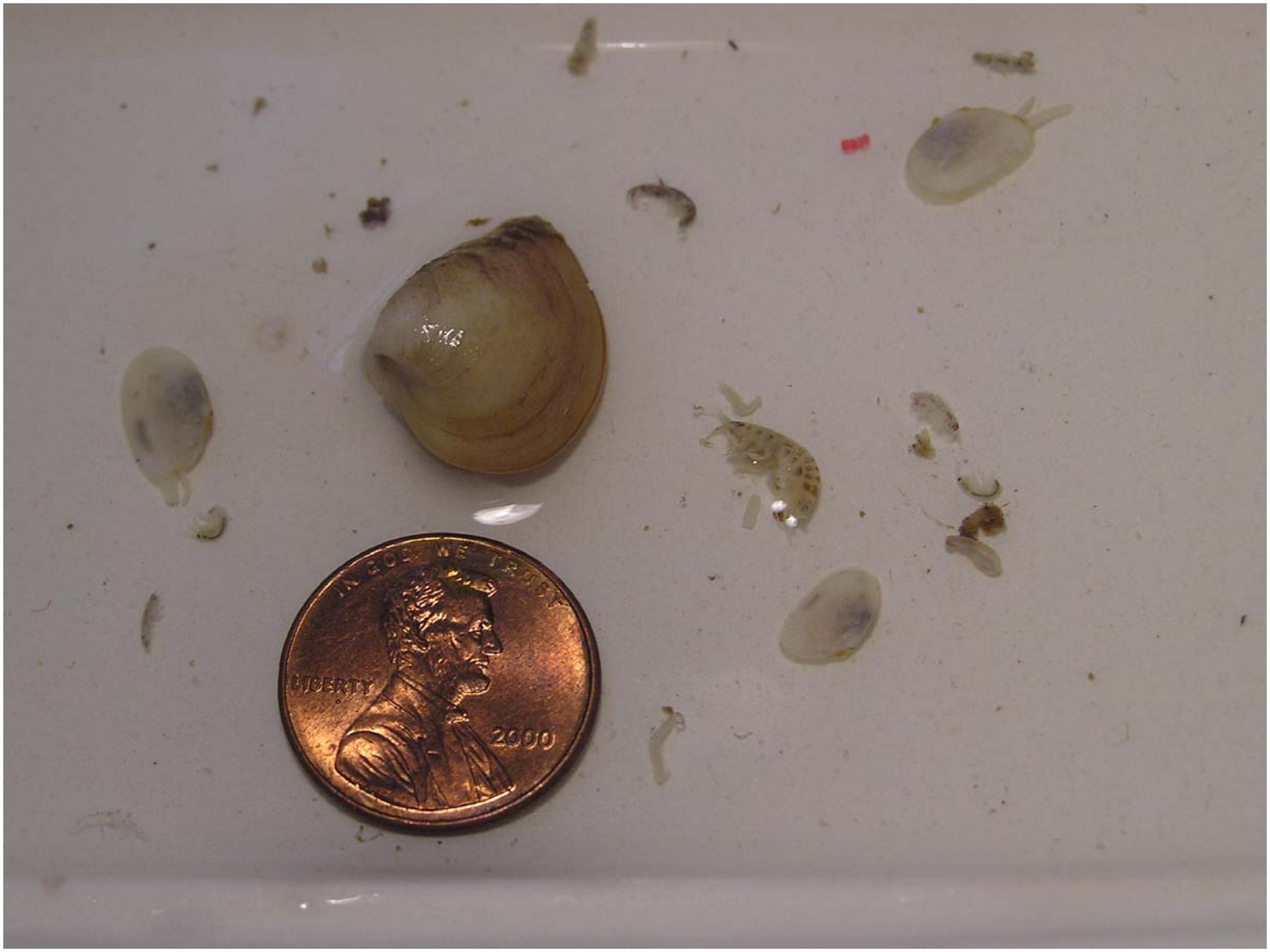

Figure A-4

Organisms Collected from Location B-9

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