



## *Facts About...*

### **The Port of Baltimore Sediment Dredged from the Shipping Channels in the Baltimore Harbor Dredged Material Characteristics Innovative and Beneficial Use Opportunities**

- To provide safe ship navigation, channels in the Baltimore Harbor are dredged periodically to remove sediments that accumulate over time; this is referred to as maintenance dredging. Baltimore Harbor includes the tidal portions of the Patapsco River and its tributaries lying west of a line drawn from Rock Point in Anne Arundel County to North Point in Baltimore County. Sediments come from stormwater runoff in the upper portions of the Harbor, such as the Inner Harbor and the Middle Branch. In the outer Harbor, closer to the Key Bridge, the majority of the sediments originate in the Chesapeake Bay where they are carried by waves and tidal currents to settle in the channels.
- Maintenance dredging is conducted to maintain the channels at their authorized depths and is typically conducted during late fall and winter months. Sediment dredged from Harbor channels has been placed in diked facilities called “dredged material containment facilities” or DMCFs. In recent years, it has become difficult to find new sites for DMCFs, which has led to a search for ways to reuse or recycle dredged sediment.
- Maintaining safe navigation is integral to the continued economic vitality of the Port of Baltimore. The Port supports 13,650 direct jobs with a total of 127,600 jobs linked to the Port. This represents \$2.9 billion in salaries and \$2.2 billion in revenues.
- Sediment in the Baltimore Harbor navigational channels is analyzed by the Maryland Department of Transportation Port Administration and the U.S. Army Corps of Engineers for chemical and physical characteristics prior to dredging, placement and/or use. On average, 1.5 million cubic yards of sediment is dredged annually from Baltimore Harbor.
- Once the chemical quality and physical properties of the maintenance sediments are known through testing, appropriate uses that are protective of human health and the environment can be determined. Examples of beneficial uses include island restoration, restoration of underwater grass habitat, shoreline stabilization, creation or restoration of wetlands, restoration or enhancement of fish or shellfish habitats. Innovative uses include, but are not limited to, use as fill material and for land reclamation, mine reclamation, manufactured topsoil, and use as a building material or engineered fill (such as foundation support for structures). Many of these innovative uses, which typically involve adding amendments to the sediment, have been successfully implemented at other ports around the country.



- Much of the Harbor navigational channel sediment could be used for innovative and beneficial use projects. Sediment with elevated concentrations of chemical constituents could be amended, processed, or conditioned to reduce, remove, or immobilize the metals or other chemical constituents.
  - Chemical immobilization can occur to bind constituents in dredged sediment through addition of amendments such as clay, cement, lime, or fly ash.
  - Processing sediment can occur by physically separating large grain sand from fine grain silts and clays; chemical constituents do not readily bind to the sand portion of the sediment.
  - Thermal immobilization can occur to break down organic constituents at high temperatures during production of bricks or aggregate processed from dredged sediment.
- Baltimore Harbor is a brackish, estuarine environment, which means the sediment has a salinity (salt) content ranging between freshwater (salinity = 0 parts per thousand [ppt]) and marine or ocean water (salinity =35 ppt). Baltimore Harbor water salinity can range from 1 to 15 ppt depending upon recent freshwater inflow from seasonal rainfall and storm events. This is important because salinity affects the chemistry of the sediment and needs to be considered when evaluating reuse options.
- The testing for physical properties of the sediment includes grain size distribution, water content, bulk density, porosity, and permeability. This is important because these characteristics determine appropriate options for innovative and beneficial use. Based on physical testing, the majority of Baltimore Harbor navigation channel maintenance sediment is classified as silt and clay (small fine-grain size) as opposed to sand (large grain size).
- Dredged sediment from the Harbor is generally 70-80% water by weight. During placement at a DMCF, large volumes of water are placed along with the dredged sediment. The goal is removal or separation of the water from the dredged sediment by drying it. The separated water is released through controlled and permitted water discharge via spillways at the DMCF. The remaining dried sediment is the material that can be used for innovative and beneficial use projects.
- The Baltimore Harbor navigation channel material, as well as all Chesapeake Bay fine-grained sediments, contains sulfides. When exposed to oxygen, which happens when sediment is brought up to the surface and then dried out, the sulfides produce acidic (low pH) conditions in the sediment. This is important because the low pH levels can cause the release of trace metals that are otherwise bound to the sediment particles. The acidic conditions and metal concentrations can be safely managed by amending, processing, or conditioning the material.
- The beneficial and innovative use of dredged sediment is a high priority for Maryland's Dredged Material Management Program (DMMP). Stakeholder engagement and input is critical for the implementation of projects that utilize dredged material. MPA will continue to work with the DMMP Innovative Reuse Committee (IRC) and other stakeholder groups to build awareness and support for opportunities to recycle sediment dredged from the shipping channels. Safe passage for our cargo ships and safe reuse of the dredged material are both essential components to the continued success of the Port of Baltimore.

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