

Dredging the Dredge?

Not in Baltimore, where it's vital because ships float lower in the reduced salinity of Chesapeake Bay. But there's another good reason too, as *DPC* found out...



There's only a small margin when loaded vessels with 14m draught sail through channels 15m deep, so scheduled, regular maintenance dredging is essential for the Port of Baltimore and its yearly tally of 2,000 cargo and cruise ship visits.

But *Maryland Port Administration* (MPA) and the private sector operating in the Port of Baltimore have a major advantage that busy ports the world over will envy: the clean material they're removing is being used to rebuild eroded islands in Chesapeake Bay. It's a move that's welcomed by residents and environmentalists alike and one that takes care of the port's annual 3M m³ of maintenance dredged silt, sand and clay.

That still, however, leaves the problem faced by all ports that have been surrounded by heavy industry in the past: disposal of contaminated dredged material. Government regulations dictate where it goes and how it gets there because of concerns about the heavy metals and other pollutants it may contain. According to Maryland law, *any* material dredged within



Baltimore dredges 3M m³ annually

Baltimore harbour basin is treated as contaminated, whereas there are fewer restrictions on the silt, sand and clay dredged from the 125nm of local channels and approaches to the port.

NATURAL ISLAND

One destination for that clean material is Poplar Island, 34nm south of the port. From an extent of more than 40ha

in the 1850s, it had dwindled to less than 4ha in the mid-1990s.

In pursuing a sustainable situation where economic, environmental and social interests complement each other, MPA for the past few years has been placing dredged silt and sand at Poplar as part of a project to restore the island to its original size (see *DPCs* *passim*). The site will accommodate more than





A shadow of its former self – Poplar pictured when work first started



The island was reconstructed in stages with cells – seen here in 2008



Poplar's progress – closing one of the containment cells



EcoDredge's Swinging Dragon

30M m³ of dredged material before it's closed to new shipments around 2020.

Costing roughly \$700M, Poplar Island has been dubbed a national model for habitat restoration with dredged material and it features both an upland area and a tidal marsh that attracts much migratory and local wildlife. But as the port authority's deputy director for harbour development Frank Hamons pointed out, reconstructing a land mass in open water requires substantial modelling of wave and wind patterns in order to understand how the project will affect local tides and currents.

"Shoals develop quickly because of the natural movement of sand," he said, "so a lot of planning is required." And a major part of it is simply how to get the necessary equipment to the island.

At Poplar, the containment dykes, the perimeter lined with rip-rap and the other sections that receive dredged material require earth-moving equipment that's delivered by barge via a 7.5m-deep channel. But silt accumulation has necessitated the island's own dredging programme, which is being carried out by operator Kentmorr EcoDredge.

With its smaller draught, EcoDredge's cutter suction dredger – an *Ellicott Swinging Dragon* – can get into the channel and deepen approaches to the island. And in the process the vessel's placed over 12,000m³ of new sand on to the beach and pumped material into geotubes to create a foundation for a living shoreline with buffering plants.

"EcoDredge is the only entity that we're aware of in the dredging industry that pursues sustainable solutions to every dredging project," stated company spokesman Pete McArdle. "With respect to Poplar, beneficial use of dredged material is the preferred management option in Maryland, so we are using the material in ways that are safe and advantageous to the environment."

COMMUNITY SUPPORT

MPA's been deriving environmental benefits from dredged material for decades, as demonstrated by the construction of a contaminant-designated site at Hart-Miller Island in Chesapeake

Outreach is the harder part, according to Frank Hamon

Bay, north of Baltimore. With that site set to close this year, plans have accelerated for construction of other Poplar-like sites around the bay – and there are several in the development/construction process that could handle that annual 3M m³ of maintenance material for the next 30 years.

MPA's considered a range of ideas for beneficial reuse of dredged material. Since its Hart-Miller experience, the agency's looked at creating building materials, capping brownfield sites or filling in abandoned mines and quarries. Not all solutions are economical, so MPA re-evaluated its entire approach – upending traditional notions of taking an engineer-developed plan to local citizens and seeking agreement before proceeding with the permit process.

It's a concept that recognises that success in the future means becoming sustainable now by actively pursuing environmental, economic and social benefits in its operations.

To achieve them, the agency's instigated a stakeholder engagement programme that includes environmental design ideas that avoid long, costly permitting processes (Hart-Miller took 12 years...) and ensures projects provide value to local communities. It's been so successful that it's already won awards from the *American Association of Port Authorities* and others.

The result? Well, as a rule citizens dislike having sludge dumped in their neighbourhoods, even when slurry walls to prevent leakage and sampling wells are included. Knowing this, MPA asked residents what they wanted in their communities. Armed with responses that included more beach access, shoreline protection and more jobs, the administration began developing plans that incorporated community benefits.

"We charged the engineers with putting these ideas into rough designs for the communities to evaluate and the process turned potential adversaries into partners," beamed Frank Hamons. "We've shaved years off the approval process because of the community efforts – in fact, it's been so successful we have communities calling us to try and get on our list for future sites of dredged material."

FINALLY...

As Poplar Island emerges from the sea and creates habitats for fish and wildlife and recreational facilities for boaters and visitors in the coming years, it's dredging they'll have to thank.

Other islands are scheduled to receive dredged material, too, but as they're built, the really hard work will already have been done...

"The science and engineering is the easier part of creating dredge sites," noted Hamons. "It's harder to do the outreach and involve people so they understand and support it."

More info at www.marylandports.com