

BENEFICIAL USE OF DREDGED MATERIAL TO RESTORE CHESAPEAKE BAY WETLANDS

BASED ON THE INTERNATIONAL TIDAL WETLANDS CONFERENCE

PRINTED: FEBRUARY 2007

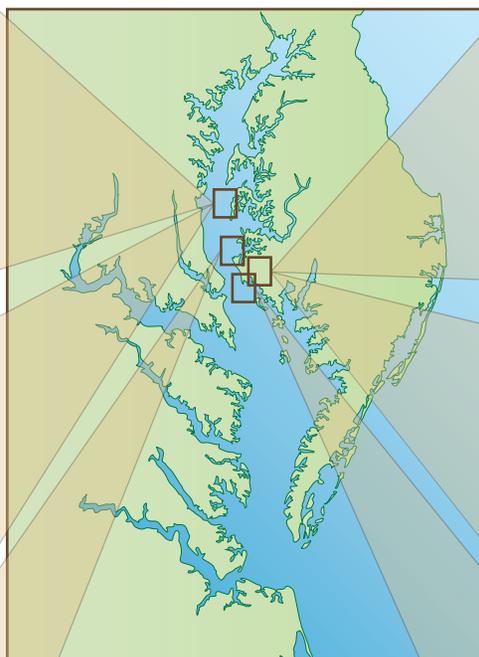


A Mid-Chesapeake Bay Marshland Restoration project is being developed by the Integration and Application Network, US Army Corps of Engineers, Maryland Port Administration, US Fish & Wildlife Service, and Maryland Department of Natural Resources. An International Tidal Wetlands Conference was held May 31–June 2, 2006 at Salisbury University, Maryland, to discuss ecological, economic, and engineering issues associated with using dredged material to restore the eroding marshes of the mid-Chesapeake Bay.



Poplar Island.

US Army Corps of Engineers



Blackwater National Wildlife Refuge.

H. Lane, UMCES



Poplar Island.

J. Thomas, UMCES



Blackwater National Wildlife Refuge.

J. Thomas, UMCES



James Island.

Google Earth



Dredged material can be used to restore eroding marshes.

USFWS



Barren Island.

Google Earth

The Federal Dredged Material Management Plan discusses options for placement of dredged material. This dredged material comes from the Baltimore Harbor channels, channels in the Chesapeake Bay and C&D Canal, and channels in Virginia waters. These locations were chosen because a large proportion of the sediment is recent and is suitable for purposes of habitat restoration including wetland, upland, and submerged aquatic habitat types. Dredged sediment is mostly fine-grained particles derived from the Susquehanna River Basin, with some additional inputs from eroding shorelines. Currently, the majority of material is dredged for channel maintenance reasons; however,

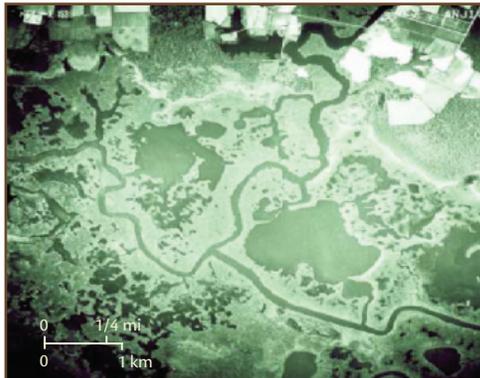
it also includes some older deposits dredged for 'new' work such as channel straightening. Three to four million cubic yards of material are dredged annually in the region.

Options for placement of this material include: Poplar Island, mid-Bay islands including James and Barren, and Dorchester County including the Fishing Bay Wildlife Management Area and Blackwater National Wildlife Refuge. These options were discussed in detail at the conference, with particular attention to the ecological, engineering, and economic issues associated with this sort of project.

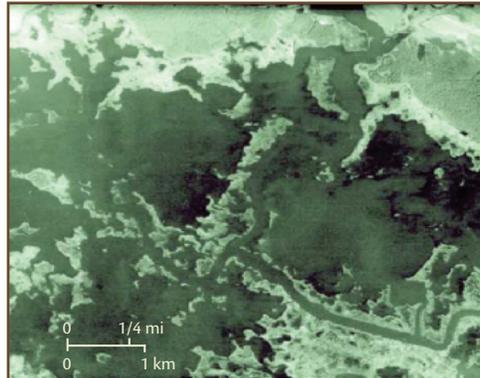
ECOLOGICAL CONSIDERATIONS

THE DISAPPEARING MARSH

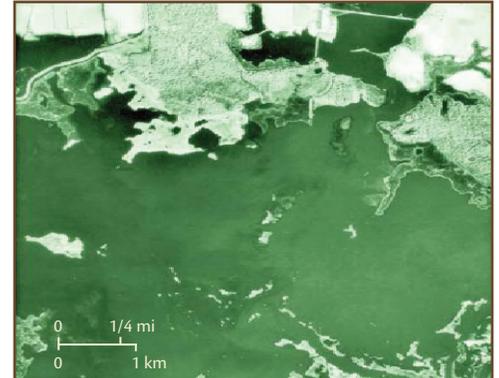
The marshes in Blackwater National Wildlife Refuge are disappearing at an alarming rate, as is depicted in the following photos.



1938



1974



1989

In 1938, the Little Blackwater River flowing into the larger Blackwater River is plainly visible. By 1989, it is difficult to discern the location of the Little Blackwater River. Since the 1930s, 8,000 acres of marsh have been lost at a rate of 150–400 acres per year. Causes of marsh loss include sea level rise, subsidence (gradual sinking), erosion, salt water intrusion, and invasive species. The Blackwater National Wildlife Refuge Comprehensive Conservation Plan calls for restoring the marsh to the 1933 conditions. Achievement of this goal will require an aggressive plan and concerted effort by all involved parties.

BLACKWATER MARSHES ARE ECOLOGICALLY SIGNIFICANT



More than 350 bird species visit Blackwater National Wildlife Refuge annually, including the great blue heron (middle) and the bald eagle (right).

Blackwater National Wildlife Refuge is part of the Chesapeake Marshlands National Wildlife Refuge Complex. One-third of Maryland's tidal wetlands are located within the Blackwater watershed, making it an ecologically important area within the state. Blackwater National Wildlife Refuge is also recognized as a wetland of international importance. In addition, the refuge has been named a priority wetland in the North American Waterfowl Management Plan, and has been designated an Internationally Important Bird Area.

BENEFICIAL USE OPTION

There are three separate options discussed in the Environmental Impact Statement associated with the Dredged Material Management Plan. These three options for placement of dredged material are:

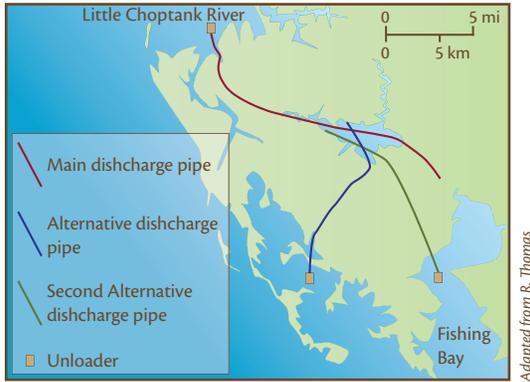
- expansion of Poplar Island;
- large island restoration in the mid-Chesapeake Bay; and
- wetland restoration—Dorchester County (Blackwater).

Of the three options under consideration, the Dorchester County (Blackwater) option provides the largest degree of environmental and ecological benefit.

The Dorchester County (Blackwater) restoration provides placement opportunities for dredged material for 25–50 years (and perhaps longer) and would restore the watershed of the Blackwater marshes. Potential future benefits of this option include ecosystem and environmental restoration, placement of substantial amounts of dredged material, community involvement, prevention of additional wetland loss, and benefits to finfish and shellfish fisheries, wildlife, and overall health of the Chesapeake Bay ecosystem.

ENGINEERING AND ECONOMIC FACTORS

TECHNICAL ISSUES



Preliminary concepts for long pipeline placement in Blackwater National Wildlife Refuge.

There are many technical and practical concerns related to the Dorchester County (Blackwater) placement option. These issues, including delivery and placement of dredged material, schedule for implementation, and economic competitiveness, must all be taken into account before a decision can be made on the efficacy of choosing Blackwater National Wildlife Refuge and Fishing Bay Wildlife Management Area as dredged material placement sites.

Delivery and placement of dredged material encompass a large variety of issues, including management of the project, size of equipment, methods for placement of the material, amount of material to place each year, analysis of materials, fill requirements, and mode of transportation for the material from the dredged site to the placement site. The implementation schedule must take into account dredging schedules of other projects as well as waterfowl nesting seasons and

the need to match capacity requirements with restoration goals. Economic competitiveness is a major issue in this project as there are high costs associated with the Dorchester County placement option, and not all of the benefits are quantifiable in the federal analysis of a benefit/cost ratio.



May 2003

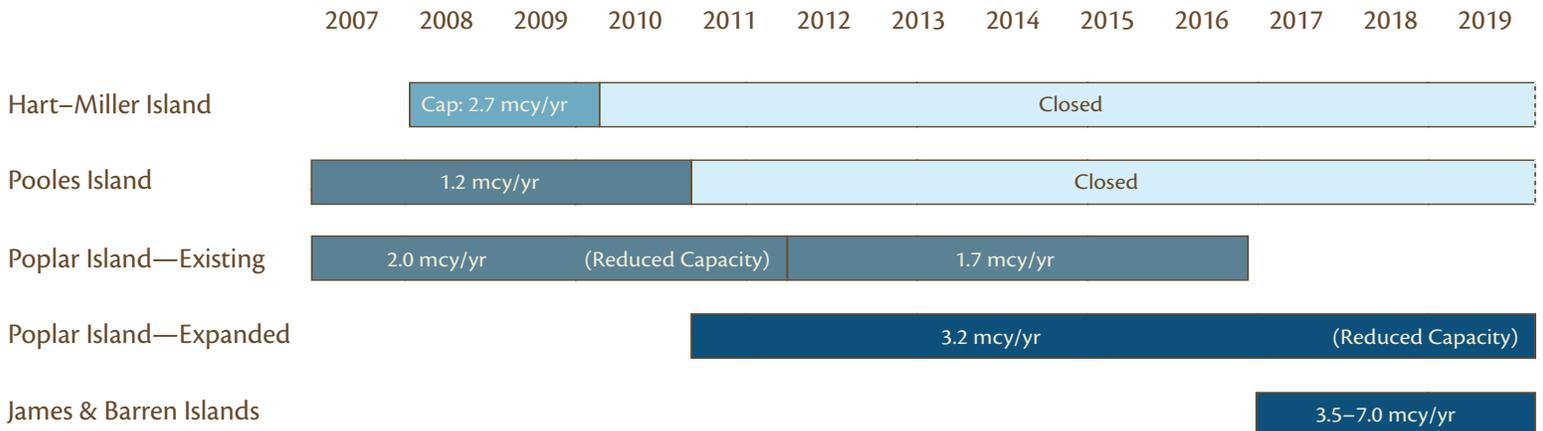
June 2003

August 2003

August 2004

In 2003, volunteers planted marsh grasses at three sites in Blackwater National Wildlife Refuge in an effort to contain sediment and prevent further marsh loss through erosion. As is apparent in this timeline of photographs, the marsh grass has grown and is thriving.

PROPOSED PLACEMENT OPTIONS TIMELINE



This timeline displays the proposed options for the placement of dredged material. The projects shown in dark blue are still in the planning phases and are not definite.

Dredging can continue at its current pace only if a new placement option is found. At the current rate of placement, Hart–Miller Island will be closed to dredged material placement by the end of 2009. Pooles Island will be closed as of the end of 2010. Poplar Island will have a reduced capacity by 2012, but could continue to be used in an expansion project through 2019. This expansion project would allow an additional 1.5 million cubic yards per year (mcy/yr) to be placed on the island. James and Barren Islands are anticipated to provide approximately 20 years of placement capacity, starting around 2016 (handling 3.5–7.0 mcy/yr). The new placement option of Dorchester County (Blackwater) would not be needed until about 2036, and has the potential to handle up to approximately 100 mcy.

RECOMMENDATIONS

CONCLUSIONS

The Dorchester County Wetland restoration project shows impressive potential as a beneficial use option. The Maryland Port Administration states, “Even with the limited amount of data available, Dorchester County wetland restoration appears to have enormous potential for environmental benefit and ecosystem restoration, and should be studied as a potential future beneficial use project option”.

FUTURE ACTIONS

The purpose of this effort is to develop a study plan that will evaluate the key ecological, economic, and engineering issues associated with a large scale marsh restoration project in Dorchester County.

This study plan will be used to develop a decision document for submittal to Congress. The plan will also include detailed costs, benefits, and an assessment of environmental impacts. The final results of the conference will be written in a summary report. In addition, recommendations will be incorporated into the Corps Project Management Plan. The Project Management Plan includes the scope of work, schedule, and estimated budget, and serves to guide the Corps study process.



PARTICIPANT LIST

AKRF: Shawn Shotzberger; **Assateague Coastal Trust:** Jay Charland; **BBL Sciences:** Timothy Iannuzzi, David Ludwig, Ram Mohan, Joseph Shisler; **Blasland, Bouck, and Lee, Inc.:** Walter Dinicola; **Consorzio Venezia Nuova:** Giovanni Ceconi; **Ducks Unlimited:** Jonas Davis, Kurt Dyroff; **EA Engineering, Science, and Technology:** Jane Boraczek, Peggy Derrick; **EcoLogix:** Paul Massicot; **Environmental Concern Inc.:** Suzanne P. Slear, Gene Slear; **Gahagan & Bryant Associates:** Tim R. Donegan, Wendell Mears, Steve C. Shaw, Richard Thomas, Daniel Wilson; **Groningen University:** Wim Wolff; **Louisiana State University:** Irv Mendelsohn; **Maryland Department of Natural Resources:** David Goshorn, Roland Limpert, Bruce Michael, Keven Smith; **Maryland Environmental Service:** Tammy Banta, Jennifer Harlan, James Jett, Anna Krainer, Stephanie Lindley, Megan Simon; **Maryland Geological Survey:** Lamere Hennessee, James Hill, William Panageotou; **Maryland Port Administration:** David Bibo, Nathaniel Brown; Frances Flanigan, Margie Hamby, Frank Hamons, Bill Lear, Stephen Storms; **National Aquarium in Baltimore:** David Nemerson, Glenn Page; **National Audubon Society:** David Curson; **NMFS:** John Nichols; **NOAA:** Galen Scott;

NOAA/NOS/CO-OPS: Stephen Gill; **Salisbury University:** Judith Stribling; **The Washington Post:** Michael Grunwald; **University of Maryland Center for Environmental Science:** Donald Boesch, Jeffrey Cornwell, Bill Dennison, Kristine Hopfensperger, Dennis King, Heather Lane, Elizabeth Price, Lisa Wainger; **University of Maryland College Park:** Brian Needelman, Skye Wills; **University of Maryland Eastern Shore:** Joseph Love; **University of Maryland:** Andrew Baldwin, Michael Kearney; **University of New Orleans:** Denise Reed; **US Army Corps of Engineers:** Mary Andrews, Robert Blama, Christopher Spaur, Barry Cortright, Charles Frey, Scott Johnson, Steven Kopecky, Karen Nook, Steven Pugh, Colleen Tennity; **US Environmental Protection Agency:** David Rider; **US Fish and Wildlife Service:** Dixie Birch, Glenn Carowan, William Giese, John Gill, Larry McGowan, Rebekah Packett; **US Geological Survey:** Donald Cahoon, Wayne Newell, Daniel Soeder, Matt Wright; **US Geological Survey Patuxent Wildlife Research Center:** Richard Hammerschlag, Paula Henry; **Virginia Marine Resources Commission:** Tony Watkinson; **WH Nuckols Consulting/Coastal America:** William Nuckols; **Weston Solutions, Inc.:** Kurt Frederick, Bob Lindner, Jack Word

REFERENCES

Hamons, F. (2006, May 10). Use of Dredged Materials for Developing Marshes. Available: <http://ian.umces.edu/marshlands/>
Thomas, R. (2006, May 10). Engineering Issues. Available: <http://ian.umces.edu/marshlands/>

The Integration and Application Network (IAN) is a collection of scientists interested in solving, not just studying environmental problems. The intent of IAN is to inspire, manage, and produce timely syntheses and assessments on key environmental issues, with a special emphasis on Chesapeake Bay and its watershed. IAN is an initiative of the faculty of the University of Maryland Center for Environmental Science, but will link with other academic institutions, various resource management agencies, and non-governmental organizations.

PRIMARY OBJECTIVES FOR IAN

- **Foster** problem-solving using integration of scientific data and information
- **Support** the application of scientific understanding to forecast consequences of environmental policy options
- **Provide** a rich training ground in complex problem solving and science application
- **Facilitate** a productive interaction between scientists and the broader community



FURTHER INFORMATION

IAN: www.ian.umces.edu
Dr Bill Dennison: dennison@umces.edu

SCIENCE COMMUNICATION

Based on International Tidal Wetlands Conference
Newsletter prepared by Emily Benson, Heather Lane, & Jane Thomas

