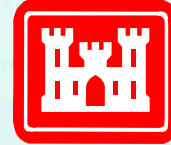


Intertidal Mudflat Construction at Jonesport, Maine

Doug Clarke and Gary Ray

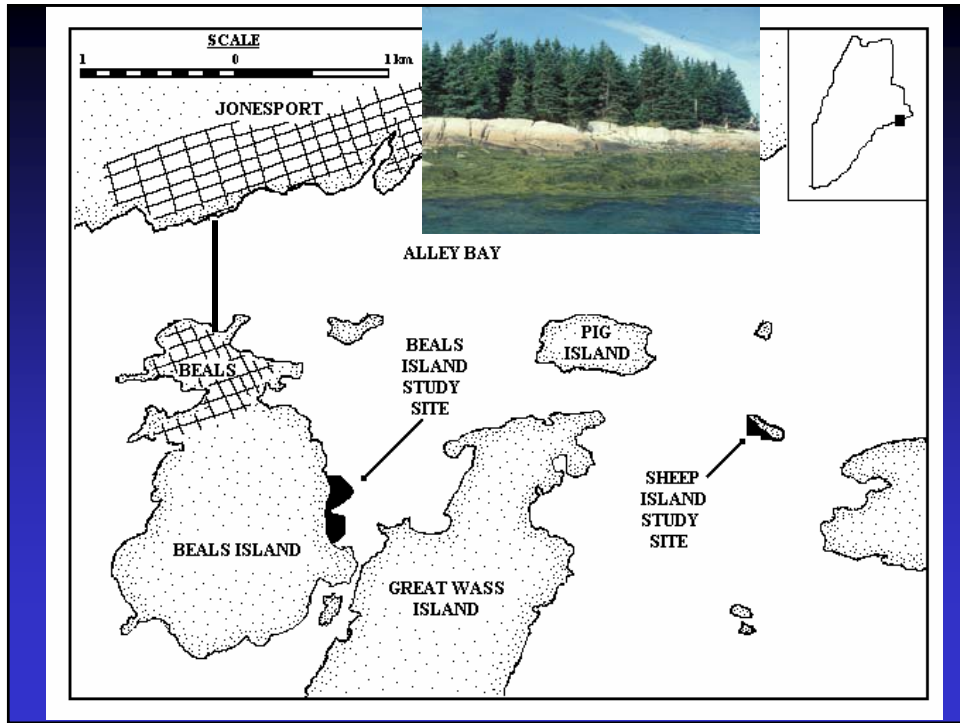
US Army Engineer Research and Development Center

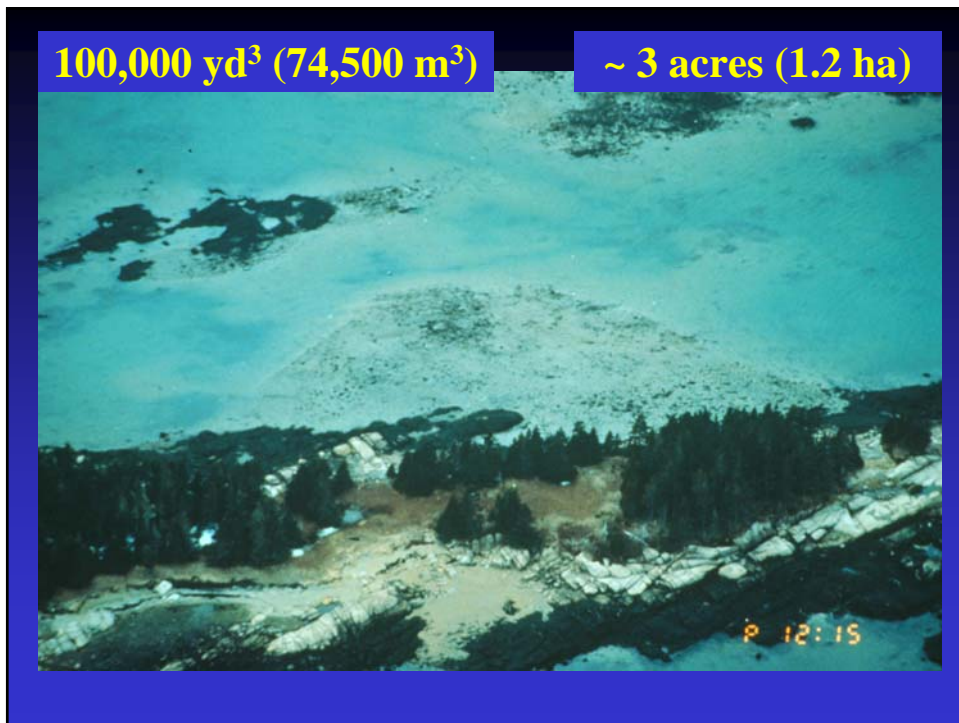


Beneficial Use of Dredged Material for Mudflat Creation

- Few examples in the US, although applied on relatively large scales in Europe and Japan
- Recent interest in Delaware Bay for horseshoe crab spawning habitat
- Relatively easy to “engineer”
 - Placed with split-hull barges and hoppers in deeper waters
 - Pumped hydraulically in shallow waters







Target Species

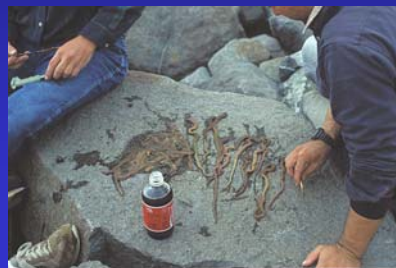


CLAM-WORM
Nereis virens
~ \$1 M Bait Fishery

SOFT CLAM
Mya arenaria
~ \$7.6 M Fishery



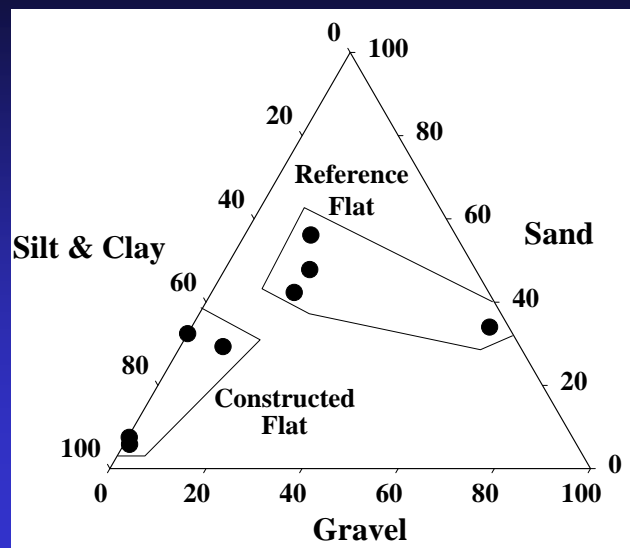
Infauna sampled with benthic cores
Worms & clams sampled with rakes



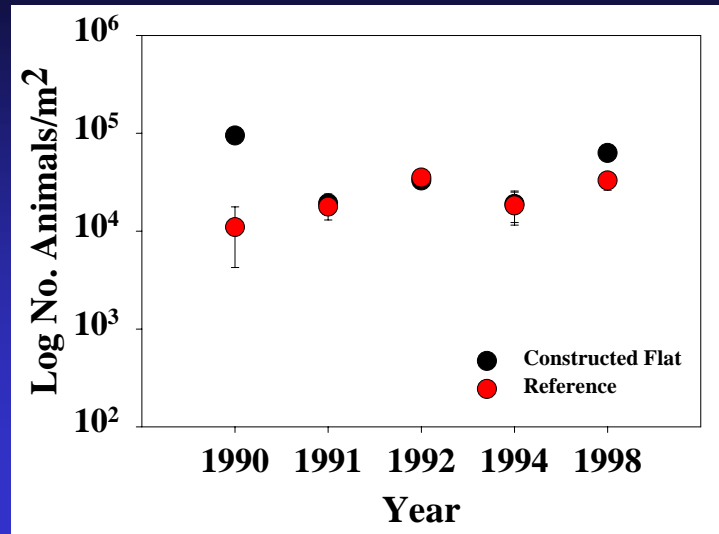
Sequence

- **Sheep Island construction completed in January 1989**
- **Sampling in August - September**
- **Monitoring began in 1990, continued in 1992 through 1994 (Beals Island only in 1993)**
- **Revisited in 1998**

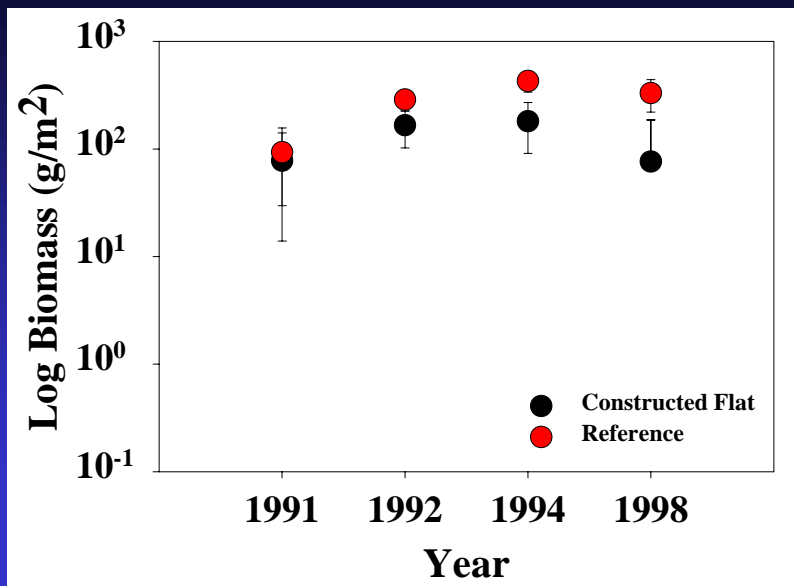
Sheep Island Sediments



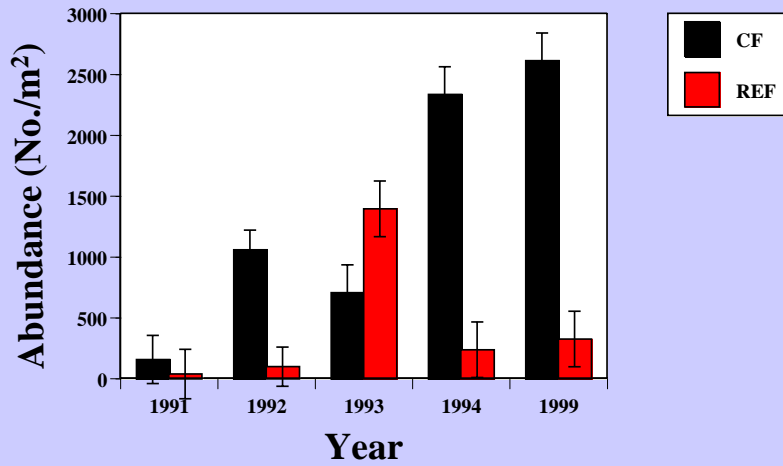
Sheep Island Infaunal Abundance



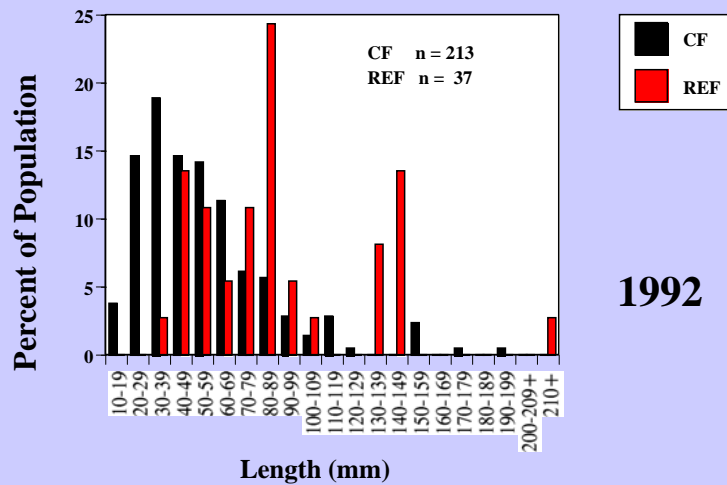
Sheep Island Infaunal Biomass



Sheep Island – *Nereis* Abundance



Sheep Island *Nereis* Size Frequency



Findings

- **At Sheep Island a stable (>9 years) mudflat was established**
- **Infaunal assemblages were similar to those reported for other northeastern mudflats in terms of diversity, abundance, and biomass**
- **Dense soft clam populations were present within 2 years, consistent through 1998**
- **Dense populations of small clam-worms were consistently present, but densities of large worms varied greatly between years**

CONCLUSIONS



- **Given suitable site conditions and dredged material characteristics, mudflat construction is a viable beneficial use option**
- **Future applications should be monitored and results documented, particularly with respect to habitat functions for bird populations**

Available references for the Jonesport Study:

- **Ray, Clarke, Wilber and Fredette 1994. Construction of intertidal mudflats as a beneficial use of dredged material. Proceedings of the 2nd International Conference on Dredging and Dredged Material Placement, American Society of Civil Engineers, pp.946-955**
- **Ray 1999. Ecological monitoring of a constructed intertidal flat at Jonesport, Maine. Disposal Area Monitoring System DAMOS Contr. 126, US Army Corps of Engineers New England District, 62pp.
WWW.WES.ARMY.MIL/EL/DOTS/**
- **Ray 2000. Infaunal assemblages on constructed intertidal mudflats at Jonesport, Maine (USA). Marine Pollution Bulletin 40(12):1186-1200**

DREDGED MATERIAL PLACEMENT TECHNIQUES

- **Mechanical (Bucket or Clamshell)**
- **Hydraulic**
 - **Pipeline Cutterhead**
 - **Hopper (Trailer Suction)**
 - **Dustpan**

Mechanical (Bucket) Dredge



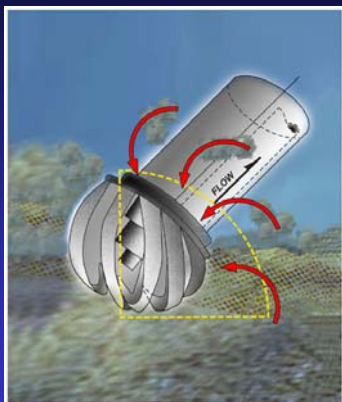
Hydraulic Cutterhead Dredges

32 Inch Pipeline

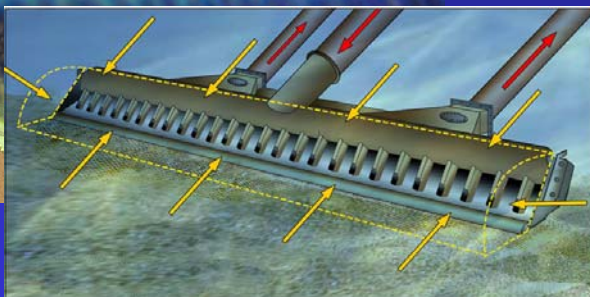
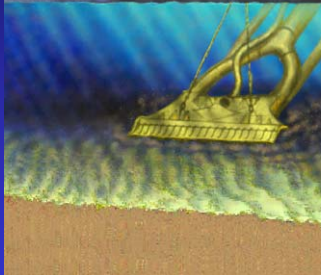


16 Inch Pipeline

CUTTERHEADS



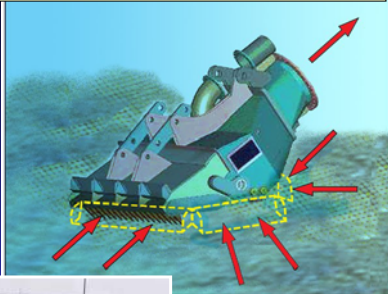
DUSTPAN DREDGE



Dustpan Dredge "Beachbuilder"



Hopper Dredges



Dragarm



Dredge Pump Out with Submerged or Floating Pipeline



Placement Technique – Direct Pump-out

“Rainbowing”



Split-Hull Dredge Placement



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