

**NATIONAL SHORELINE EROSION
CONTROL DEVELOPMENT &
DEMONSTRATION PROGRAM
(“Section 227”)
(“Erosion Control Demo”)**

Joan Pope



**US Army Corps
of Engineers**

**Engineer Research & Development Center,
Coastal and Hydraulics Laboratory**

SECTION 227 OF WRDA 1996

“...Establish and conduct a national shoreline erosion control development and demonstration program for a period of 6 years beginning on the date that funds are made available....”

“...constructing prototype engineered and vegetative shoreline erosion control devices and methods during the first 3 years....”

“...development and demonstration of innovative technologies....”

“...substantial public access....on open coast or on tidal waters.”

“....not fewer than....2 sites on the shorelines of the Atlantic and Pacific coastal; 2 sites on....the Great Lakes; and 1 site onGulf of Mexico.



Program Goals: General

- **Encompass all criteria as stated in authorizing language**
 - **Meet needs of Federal, State and non-governmental interests**
 - **Technical transfer (Scientific, Policy, Public)**
 - **Identify erosion abatement problems and innovative appropriate solutions**
 - **Advance the technology**
 - **Establish a generic evaluation process**
- 
- An aerial photograph of a coastal wetland. A concrete channel, likely for erosion control, runs diagonally from the bottom left towards the center. The surrounding area is covered in dense green marsh grasses. In the background, a body of water is visible under a bright sky.

Focus Erosion Control Problem Types

- **INCREASE SAND RETENTION (i.e., duration and volume)**
 - **COHESIVE SHORES**
 - **WETLANDS**
 - **BLUFF AND DUNE EROSION TECHNOLOGIES**
 - **LOCALIZED HOTSPOTS**
 - **PROMOTE HOLISTIC & NATURAL APPROACHES**
- 
- An aerial photograph of a coastal city, likely Manila, Philippines, showing a dense urban area with high-rise buildings on the left, a long beach in the middle, and the ocean on the right. The image is overlaid with a semi-transparent dark blue background and red text.

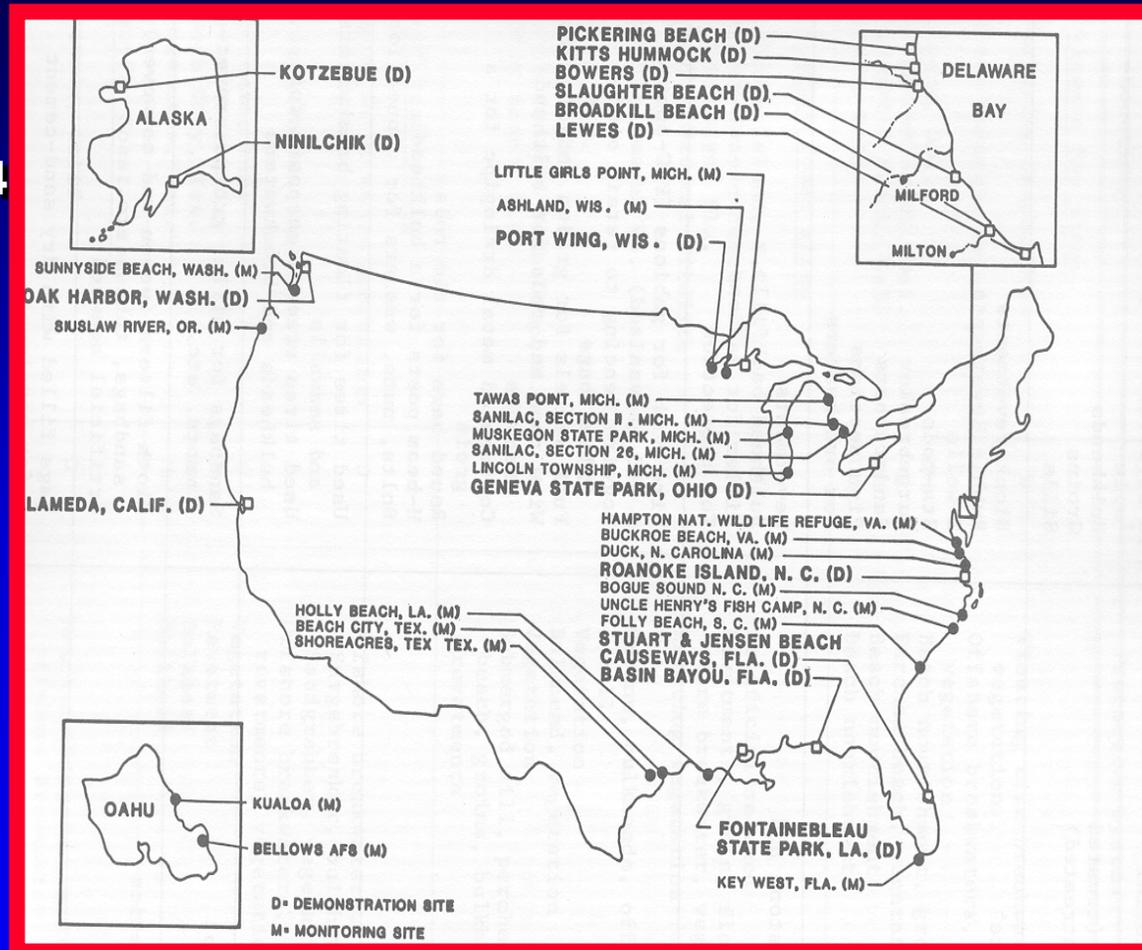
Focus Approaches for Development & Demonstration

- GROIN OPTIMIZATION
- BREAKWATER OPTIMIZATION
- ARMORING OPTIMIZATION
- BIOENGINEERING/VEGETATIVE
- BEACH FILL LONGEVITY
- SEDIMENT MANAGEMENT
- CONSTRUCTION MATERIALS OPTIMIZATION
- ? (OTHER)
 - Construction Method
 - Material
 - Design Configuration



Background: 1974 - Section 54

- Authorized via
- Public Law 9-251, WRDA '74
- Accomplished by:
 - 16 Corps Districts
 - 7 Corps Divisions
 - HQUSACE



Section 54 Sites

Florida

Delaware

Washington

Louisiana

Section 54 Lessons

- **No such thing as long-term Low cost protection .**
- **Low cost for one location not transferable to other sites**
- **Longer than a 10-year design life is difficult to attain**
- **No panacea for shoreline erosion around the country**



Section 54 vs Section 227

SIMILARITIES

- **Projects mandated on the Atlantic, Pacific, Great Lakes, and Gulf of Mexico**
- **Funding for design, construction, and monitoring of projects**
- **Cost sharing with local sponsors**
- **Employ vegetative methods**



Comparison of Section's 54 & 227

SECTION 54

- **Emphasis on low-cost**
- **Emphasis on innovative devices**
- **Focus on low-energy wave environment**
- **Sites mandated in Alaska and specific location in Delaware**
- **Five year program, \$8M**

SECTION 227

- **No emphasis on low-cost**
- **Less emphasis on patented devices**
- **Emphasis on innovative devices and methods**
- **Focus on open coast**
- **Six year program, \$21M**



OVERVIEW OF SECTION 227 PROGRAM

- VARIETY OF SHORETYPES AND SETTINGS
- 3 TIERS OF PROJECTS
 - **FULL DEMO**, 7 sites, design, constructed, monitored (constructed NLT FY02)
 - **MONITORED**, built by others
 - **DOCUMENTED**, case examples documented with technology transfer
- MEASUREMENTS OF SUCCESS
 - Functional (relative to predictions)
 - Structural Integrity
 - Efficiency (\$'s saved)
 - Environmental Acceptability (**Emphasize Vegetation**)
 - Innovative (**Not just patented devices**)



CRITERIA FOR SELECTION OF FULL DEMO SITES

- Experiencing “manageable” rate of erosion
- Large enough to demonstrate functional performance
- Suitable area for control or/and pre-project data
- Broadens coastal type area within program (**but not “one-of-a-kind”**)
- Publicly accessible
- Local cooperating partner (**take over O&M**)
- Opportunities for cost “leveraging”
- Environmentally acceptable
- Monitor-able
- Politically astute



CRITERIA FOR SELECTION OF EROSION CONTROL APPROACH

- Applicability of technology to the site
- Suitable and quantifiable prediction metrics
- Sound engineering design
- Economical feasibility (**reasonable construction & maintenance costs**)
- Able to meet permitting & regulatory requirements
- Monitor-able
- “Innovative” (**i.e., new technology, new application of old, non-traditional**)



MONITORING PROGRAM GOALS

- Include control areas and/or pre-project baseline data
- Track both short-term event and long-term performance
- Document functional performance & structural stability
- Environmental impacts (**include ecosystem enhancements**)
- Local hydrodynamic & sediment transport processes
- Assess transferability of technology to other sites/applications.



Shore Protection: Functional Areas

- **“Draw the line” - Armoring**
 - **“Slow it down” - Breakwaters, Groins, etc.**
 - **“Fill it up” - Beach Fill, Bypassing and Wetlands**
-
- Hard Structure (cement, steel, rock)**
 - Soft Alternative (sand, vegetative)**
 - Temporary Structure (geotextile)**



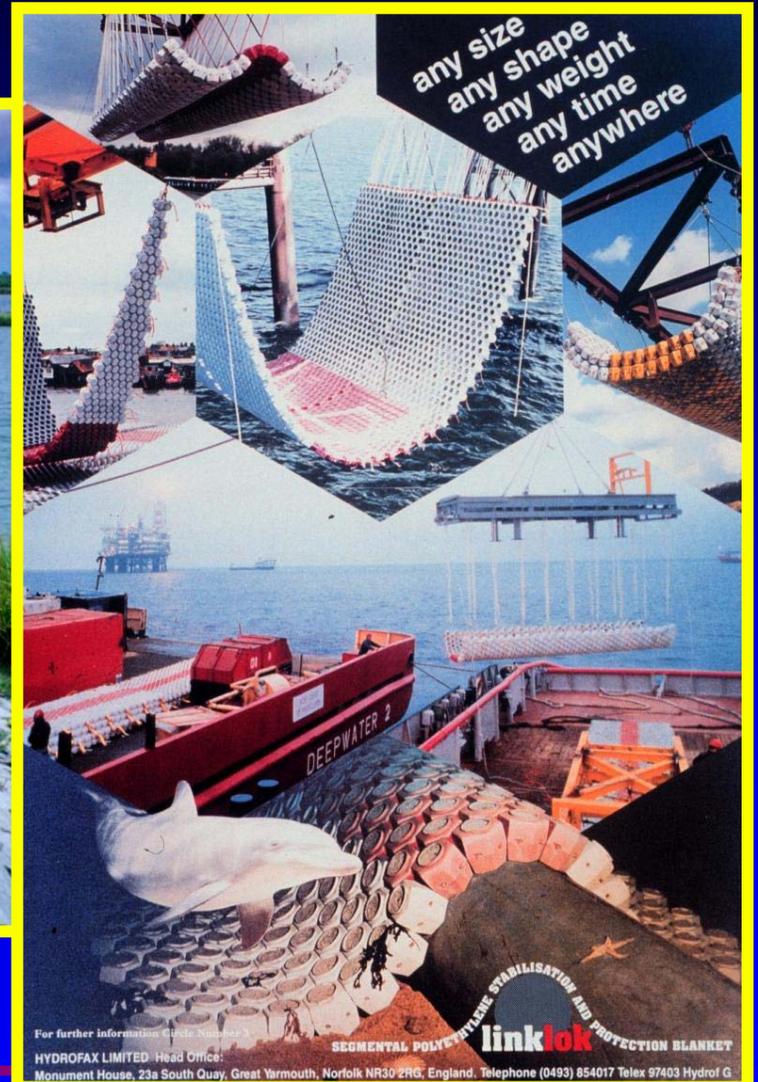
Draw the Line: Precast Concrete Armor Units



US Army Corps
of Engineers

Engineer Research & Development Center,
Coastal and Hydraulics Laboratory

Draw the Line: Concrete Flexible Mat



US Army Corps
of Engineers

Engineer Research & Development Center,
Coastal and Hydraulics Laboratory

Draw the Line: Geotextile Tubes/Bags



Draw the Line: Bioengineering/Structural



Slow It Down: Precast Concrete BW Units



US Army Corps
of Engineers

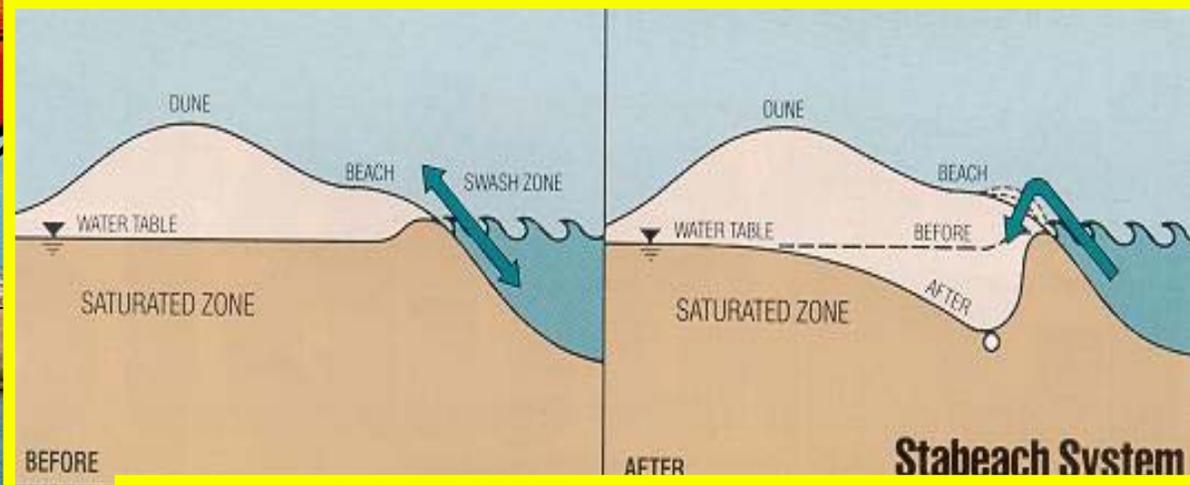
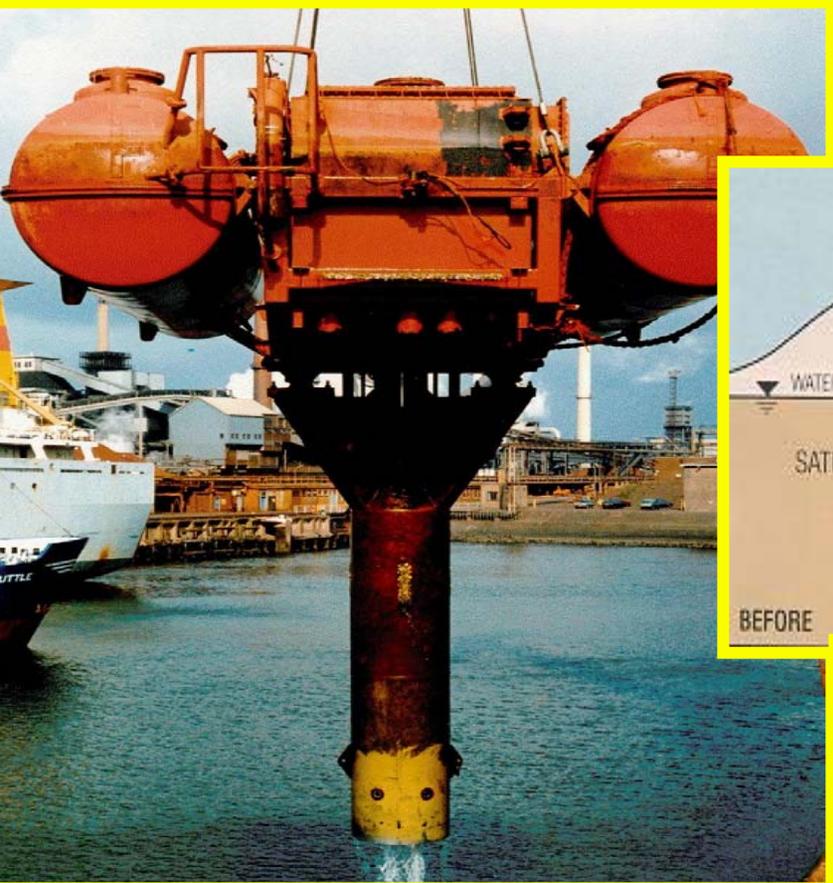
Engineer Research & Development Center,
Coastal and Hydraulics Laboratory

Slow it Down: Groin Optimization



US Army Corps of Engineers

Fill It Up: Sand Management



Accomplishments

- Program start-up funding of \$1.25mil (Nov 99)
- Oversight committee meeting (Dec 99)
- Workshop with USACE Districts & Divisions (Jan 00)
- Initiation of New Jersey Demo site Including Oversight Committee site visit (Mar 00)
- Nomination Package Invitation (Mar 00)
- Initiation of second site in upper Texas coast (Apr 00)
- Nomination Packages due from USACE Districts and Division (May 00)
- Inter-agency Coordination Workshop (May 00)
- Oversight Committee evaluation of Nominating Packages (May 00)



FY00 Remaining Actions

- **Review by CERB of Oversight Committee recommendations and program status (Jun 00)**
- **Invitation to Districts requesting formal proposal (Jun 00)**
- **Initiate Design of New Jersey Demo (Jun 00)**
- **Initiate Design of Texas Demo (Jun 00)**
- **Initiate Development of Innovative Practices Data Base (Jun 00)**
- **Activate Website (Jun 00)**
- **Workshop on Innovative Technologies (Aug 00)**
- **Pre-project data collection (NJ and TX) (Jul-Sep 00)**
- **Selection of other Demo and Monitoring sites (Aug-Sep 00)**





**Section 227 Demo Site:
Cape May Point, NJ**

Cape May Point



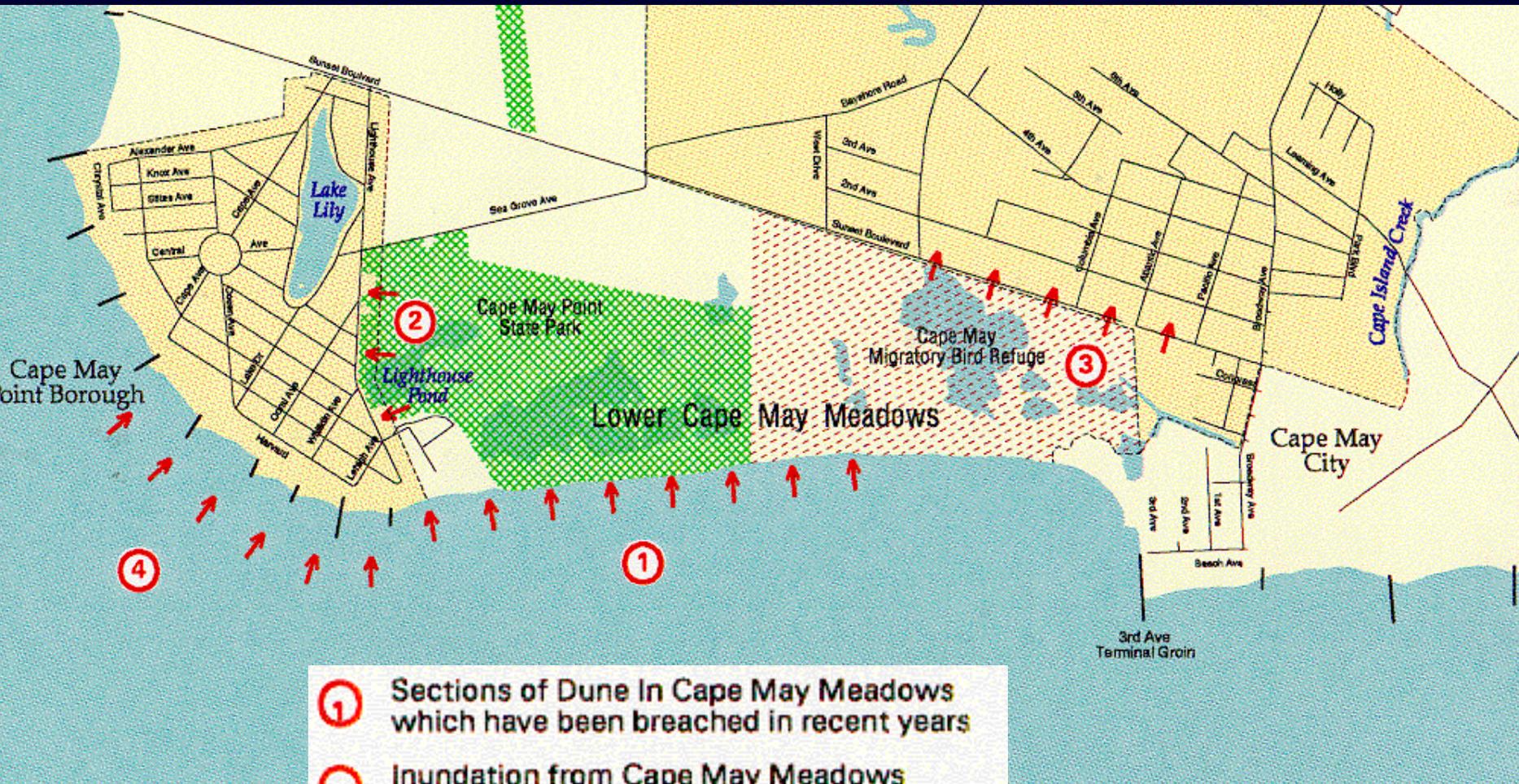
Cape May Point

Lower Cape May Meadows



Cape May City

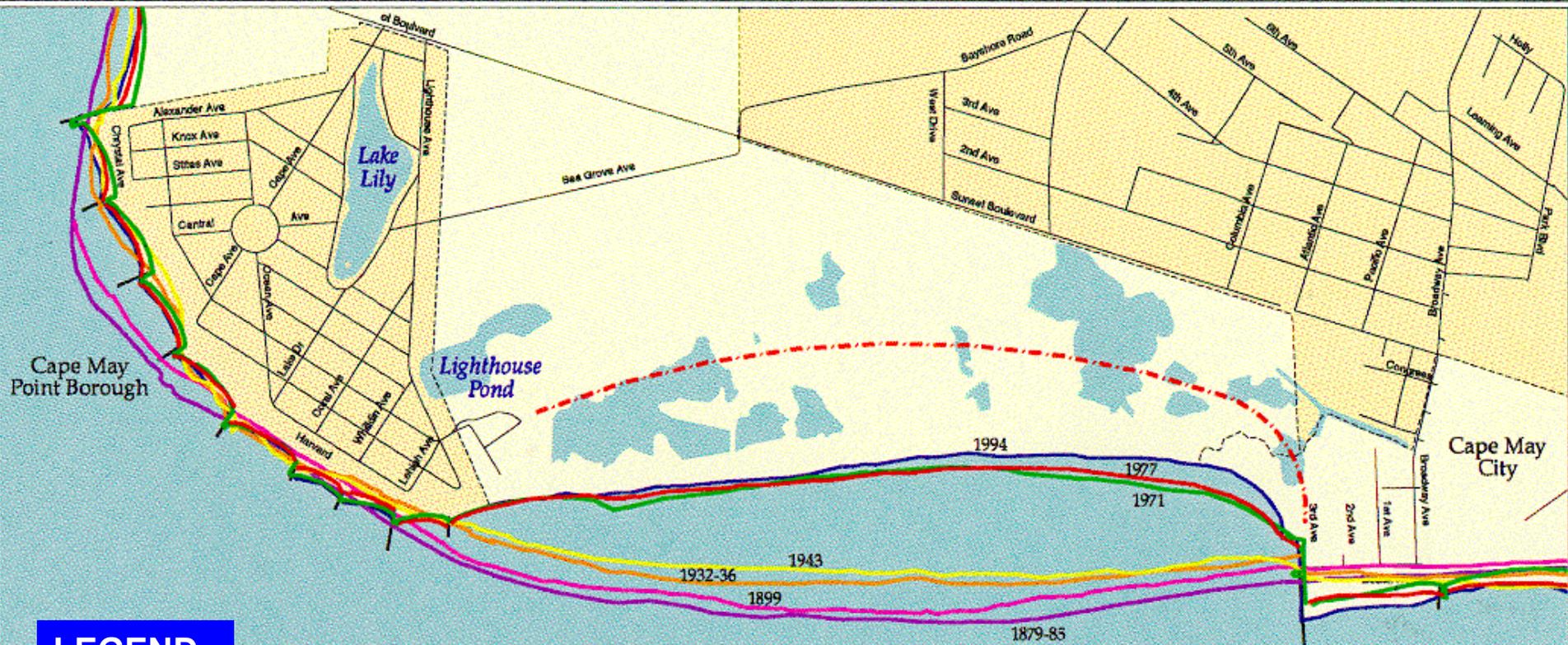
Problem Areas



- 1** Sections of Dune in Cape May Meadows which have been breached in recent years
- 2** Inundation from Cape May Meadows into Cape May Point Borough
- 3** Inundation from Cape May Meadows into West Cape May Borough
- 4** Storm damage vulnerability to Cape May Point Borough



Historic Shorelines with Projected Erosion



LEGEND

1879-85	1971
1899	1977
1932-36	1994
1943	2050 (Projected)

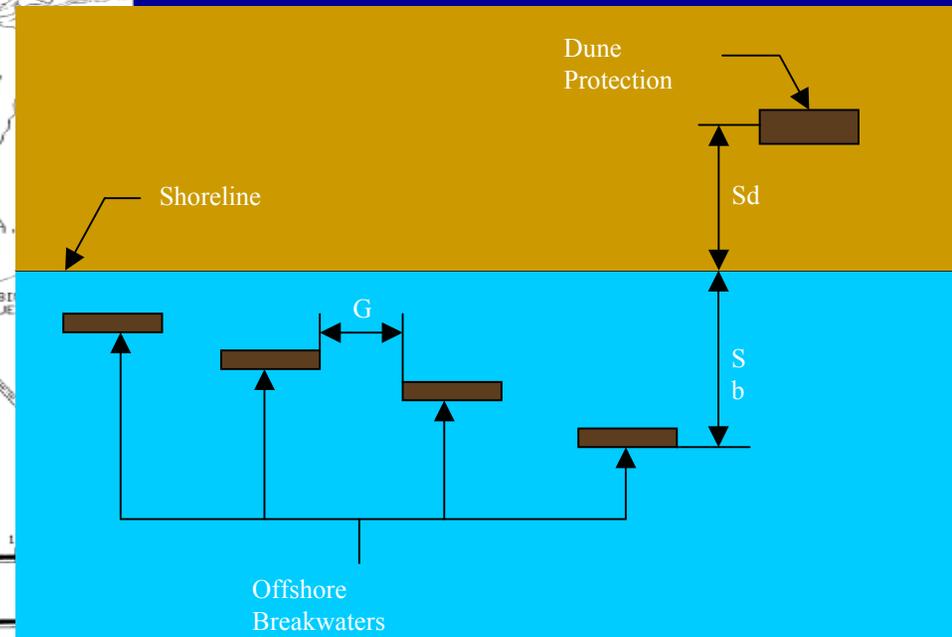
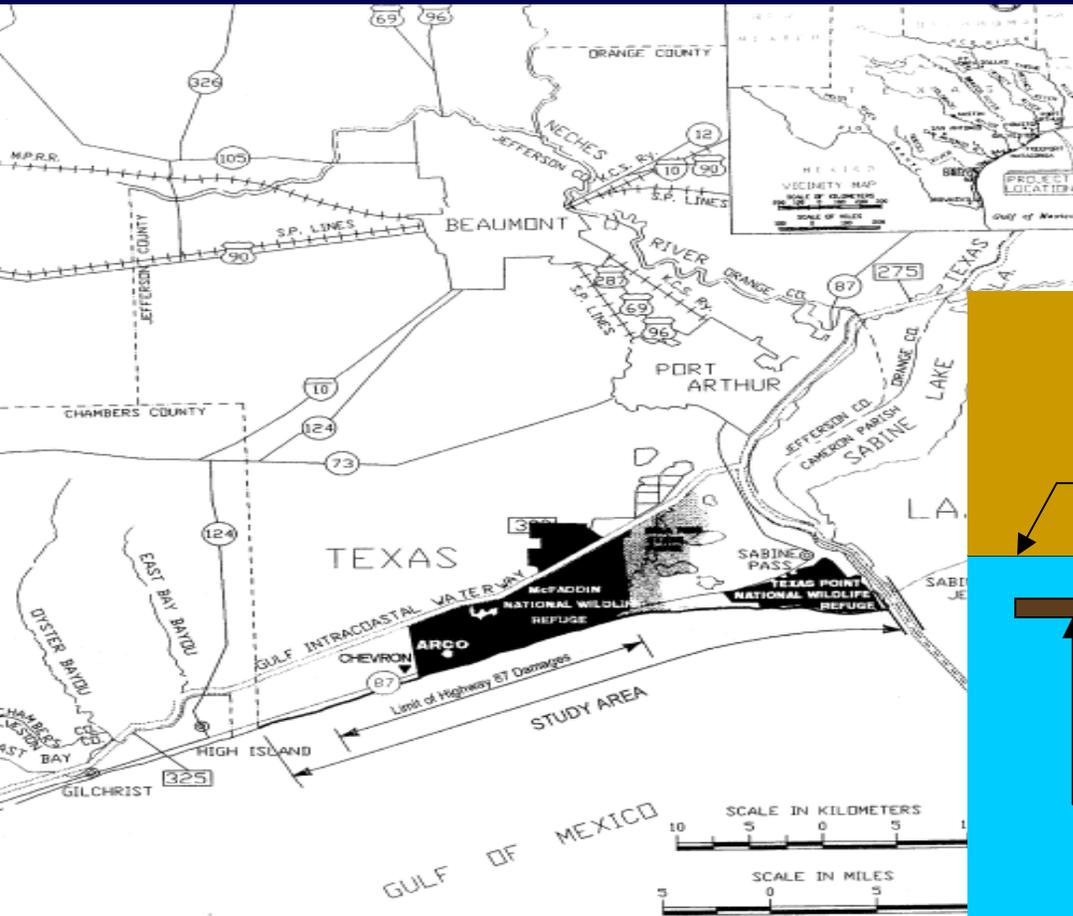
Section 227 Demo Site: HIGH ISLAND, TX



US Army Corps
of Engineers

Engineer Research & Development Center,
Coastal and Hydraulics Laboratory

Section 227 Demo Site: HIGH ISLAND, TX



JEFFERSON COUNTY, TEXAS
STUDY AREA MAP
FIGURE 1
DISTRICT: GALVESTON DIVISION: SOUTHWESTERN

TARGET SCHEDULE*

FY00	\$1.25mil	Start-up, website, workshops, site selection, Sites 1&2 underway
FY01	\$6.38mil	Sites 1, 2, & 3 constructed Sites 4, 5, 6, 7 underway
FY02	\$6.37mil	Sites 4, 5, 6, 7 constructed All sites being monitored
FY03	\$2.33mil	All sites monitored Technology transfer
FY04	\$2.33mil	All sites monitored Technology transfer
FY05	\$2.33mil	All sites monitored Technology transfer



TECHNOLOGY TRANSFER COMMUNICATION

- WEBSITE
- LIST OF DISTRICT E-MAIL POC's (w/alternatives)
- METHODOLOGY/APPROACH WORKSHOPS
 - geotextile bags
 - bio-engineered/vegetative/"natural", etc.
- DATA BASE OF DOCUMENTED METHODS/PROJECTS (CLEARINGHOUSE)
- CETN-TYPE SUMMARIES ON "MONITORED" PROJECTS
- DEMO PROJECT REPORTS





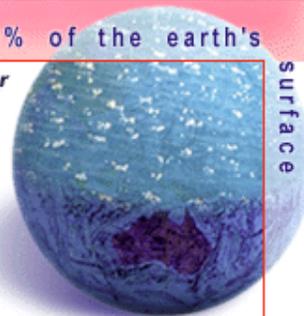
http://chl.wes.army.mil/



Coastal and Hydraulics Laboratory

...because water covers 70% of the earth's

... part of the *Engineer Research and Development Center*
Waterways Experiment Station



Help us help you!

Fill out our [online Survey](#) (takes less than 1 minute).

Research Areas

[Coastal Processes](#)

[Flood Control](#)

[Coastal Structures](#)

[Groundwater](#)

[Dredging](#)

[Hydraulic Structures](#)

[Estuaries](#)

[Military Hydrology](#)

[Fish Passage](#)

[Navigation](#)

[Field Data Research](#)

[Watersheds](#)

Technical Exchange

- [Software](#)
- [Data](#)
- [Training](#)
- [Publications](#)
- [Library](#)
- [Specialized Groups](#)

CHL Organization

- [Executive Office](#)
 - [Coastal Sediments and Engineering Division, CC](#)
 - [Estuaries and Hydroscience Division, CE](#)
 - [Rivers and Structures Division, CR](#)
 - [Navigation and Harbors Division, CN](#)

Search CHL...

[Advanced search...](#)

Recent...

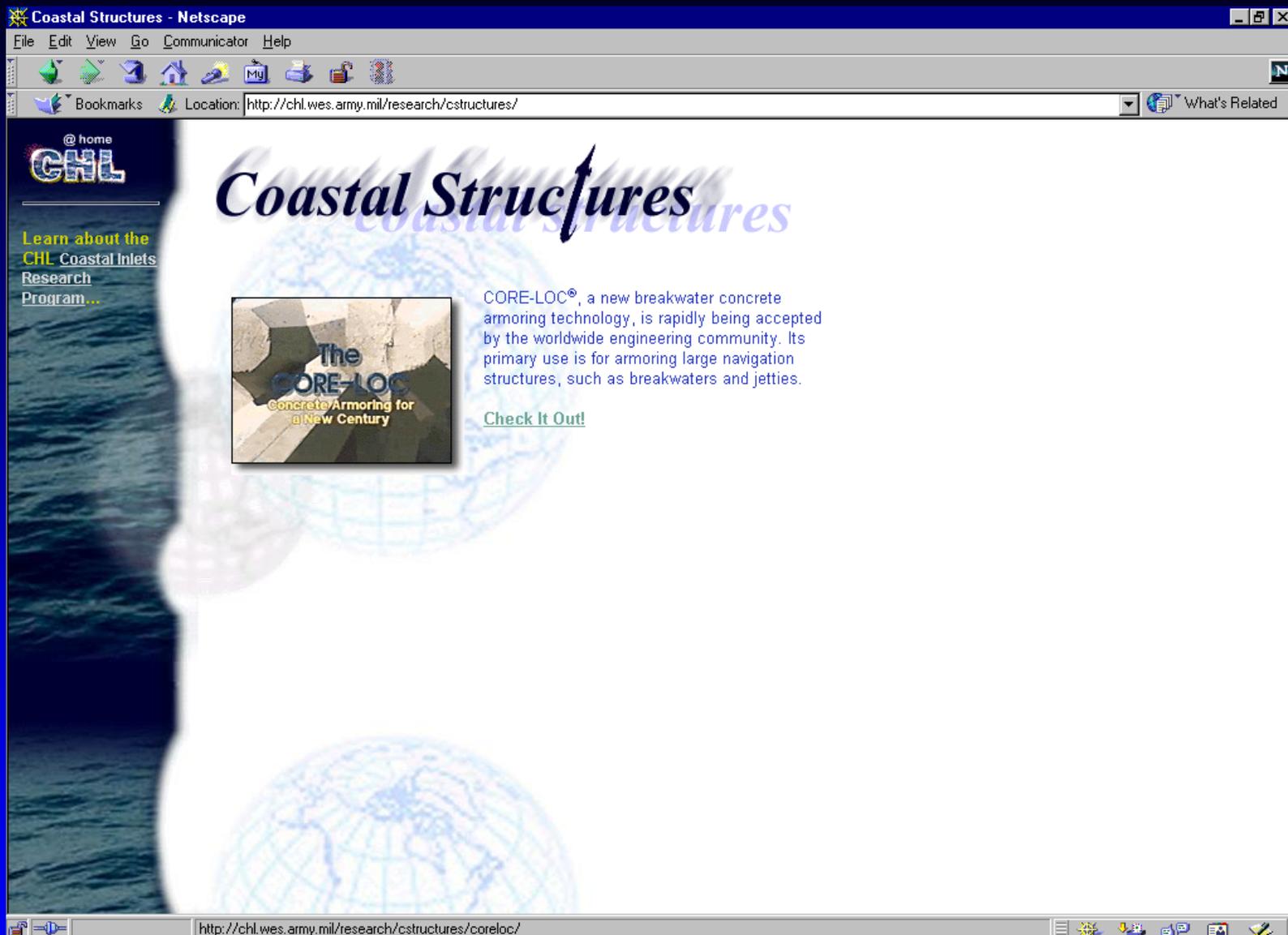
Areas of Special Interest...

- [CERC-U - Coastal Engineering Education Program](#)
- [Coastal Inlets Research Program](#)
- [CORE-LOC - Concrete Armoring For The 21st Century](#)
- [Environmental Quality Modeling And Simulation](#)
- [Rapidly Installed Breakwater Systems for Logistics-Over-The-Shore Operations](#)
- [Scanning Hydrographic Operational Airborne Lidar Survey \(SHOALS\)](#)
- [Tsunami Research at CHL](#)

Special Events...

[Hydro](#)





Coastal Structures

National Shoreline Erosion Control Development and Demonstration Program - (Section 227)



Beachsaver Reef™ construction at Cape May Point, NJ. The Beachsaver Reef is a system of precast concrete units that function as a submerged breakwater or sill (photo courtesy of Breakwaters International, Inc.).



Dune Ladder™ installation at Long Island, NY. The Dune Ladder combines vegetative and structural approaches to abate coastal dune erosion (photo courtesy of Glenn Development Company, LTD).

For more information, contact Joan Pope at popelj@wes.army.mil, Bill Curtis at curtisw@wes.army.mil or George F. Turk at turkg@wes.army.mil.

@ home
CHL

[Coastal Structures](#)

[Introduction](#)

[Organization](#)

[News & Events](#)

[Demonstration Sites](#)

[Online Presentations](#)

Complementary Programs

Related Sites