

Putting Regional Sediment Management into Action: Dealing with Natural, Political and Municipal Boundaries

#### **Moderators:**

Mark Borrelli: Center for Coastal Studies

Tonna-Marie Rogers: Dept of Conservation/Recreation

#### Panel:

John Ramsey: Applied Coastal Research and Engineering

Brad Washburn: MA Office of Coastal Zone Management

Ted Keon: Town of Chatham

Heather McElroy: Cape Cod Commission



Putting Regional Sediment Management into Action: Dealing with Natural, Political and Municipal Boundaries (75 minutes)

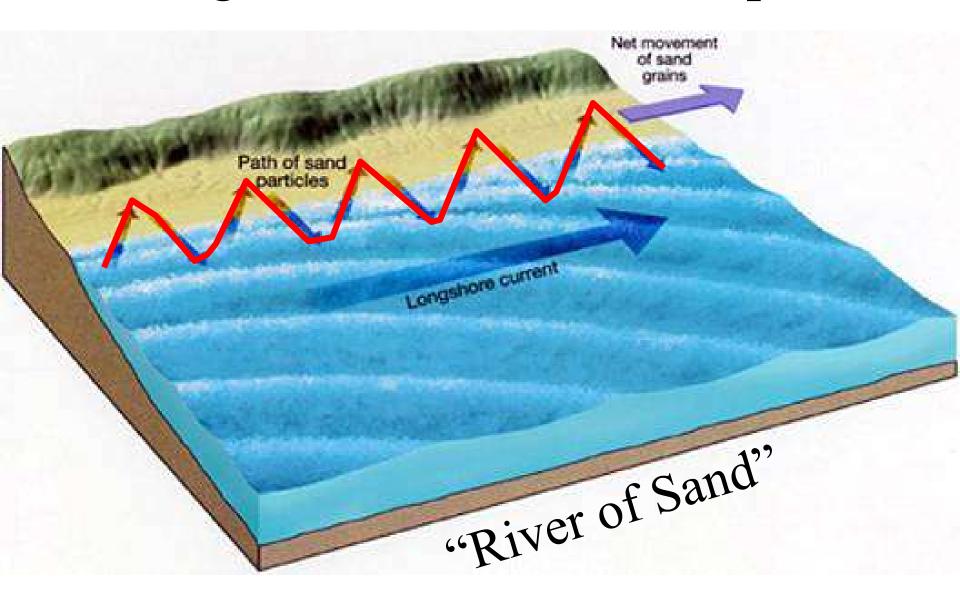
- I. Coastal Processes 101 (10-15 minutes)
- II. RSM Introduction (~5 minutes each)
  - Modeling Tools for RSM
  - Developing Sediment Budgets
  - 3. CZM's Perspective
  - 4. Chatham's Sediment Management Activities
- III. Panel/Audience Discussion (~30-40 min)

#### Waves

• 1 cubic meter of seawater = 1 metric tonne

- On average a wave hits the shoreline every 6 seconds
  - -600/hr
  - -14,400/day
  - 5.2 million/year

# Longshore Sediment Transport

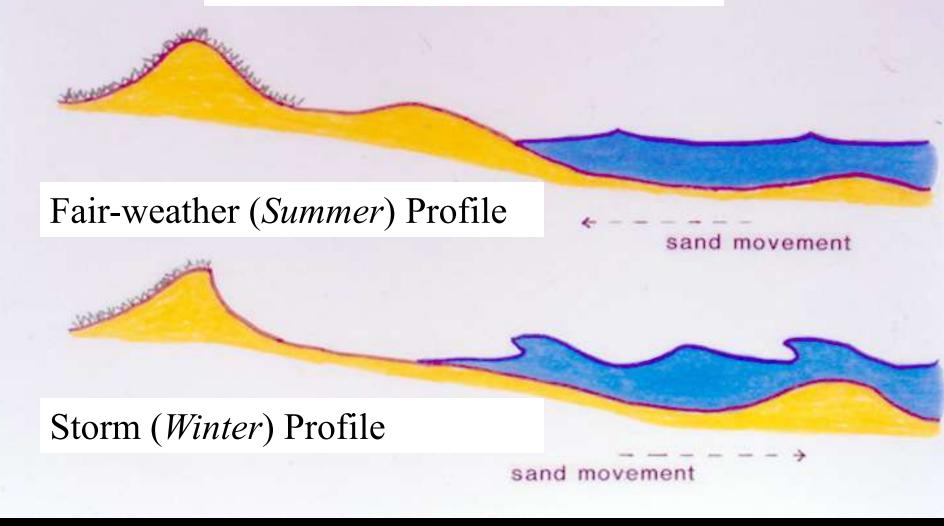


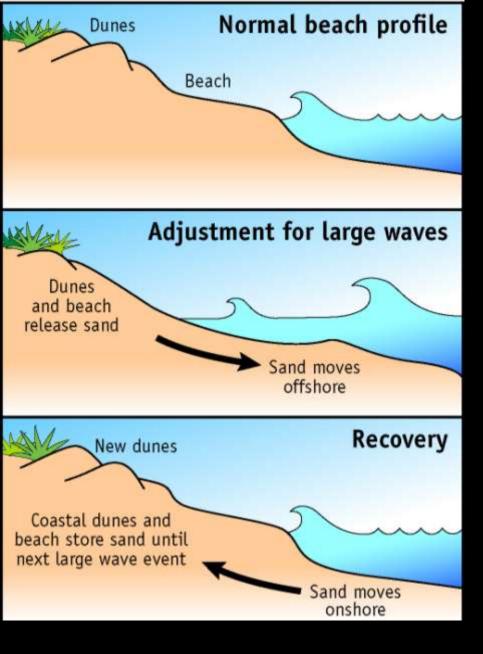
# Rates of Longshore Sediment Transport

- ~500,000 cubic yards of LST/year
- ~1370 cubic yards of LST/day
- 137 Dump Trucks sand/day rolling down beach
- One every ~10 minutes!



#### Seasonal Changes to Beach



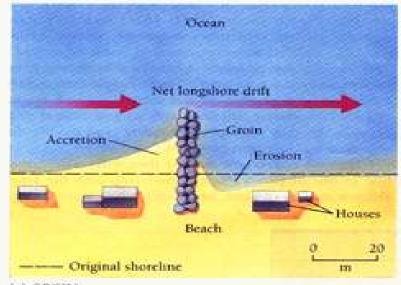


# 'Dynamic Equilibrium'

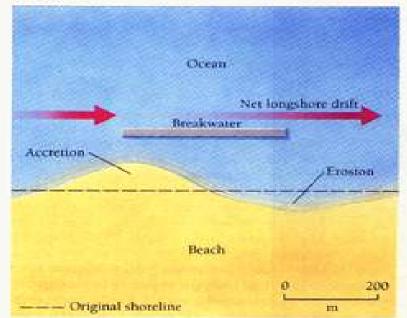
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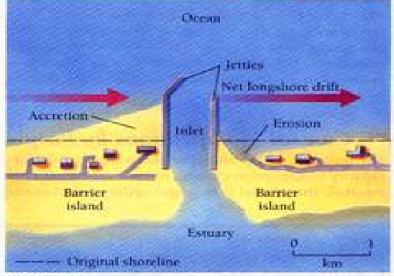
# Erosion Relocation Structures



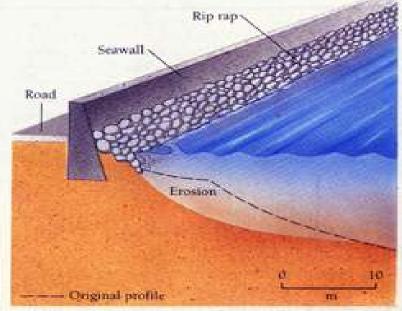
(a) GROIN



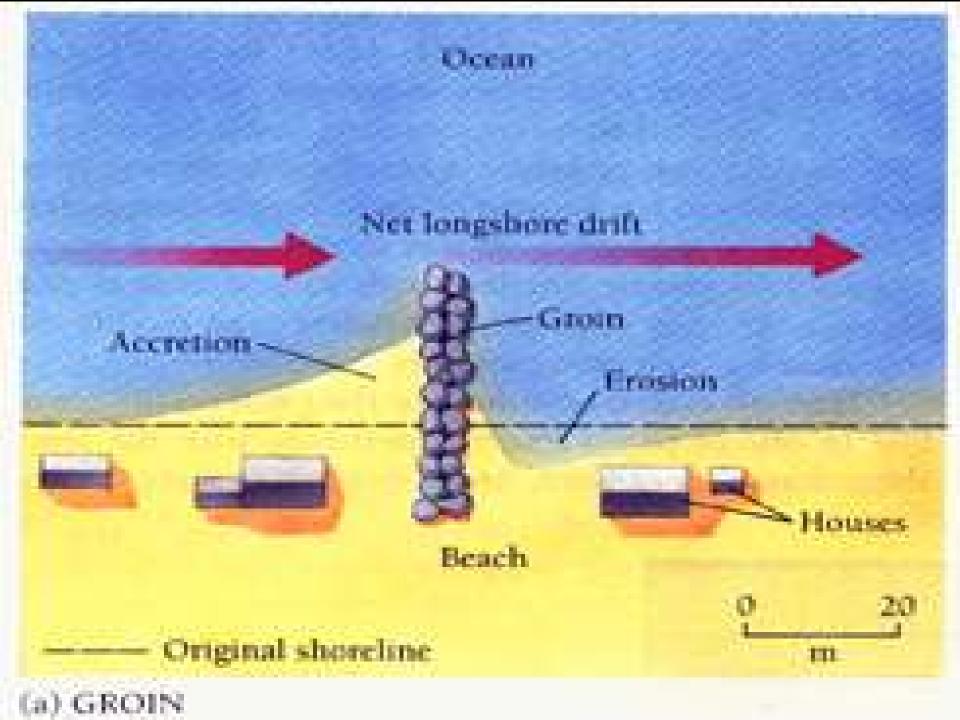
(c) BREAKWATER



(b) JETTIES



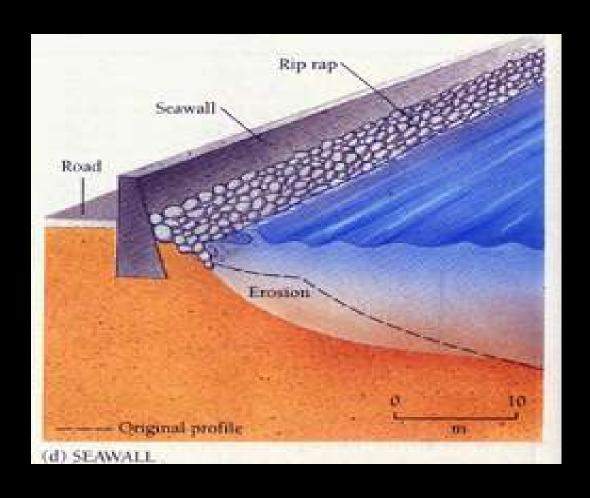
(d) SEAWALL

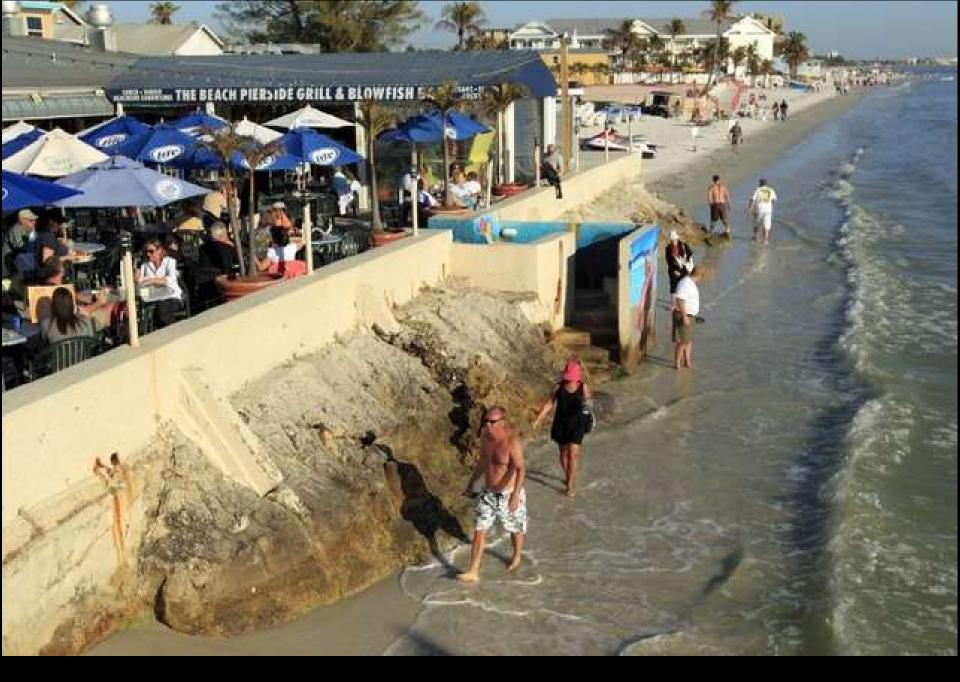


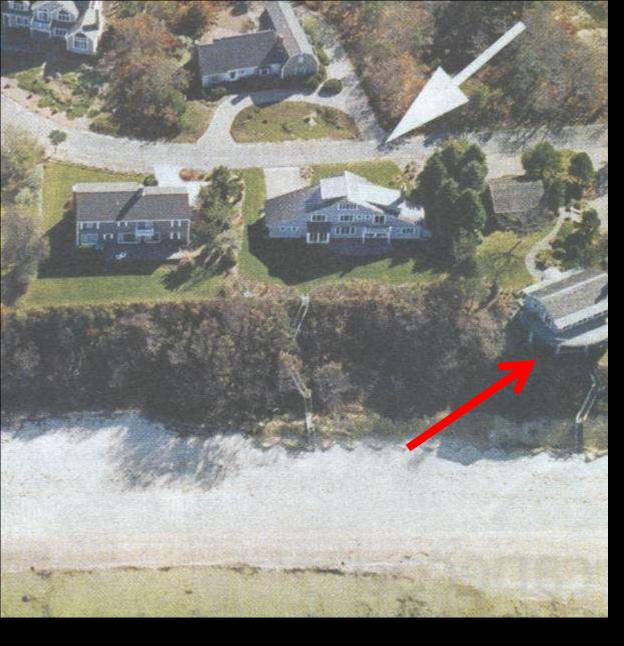




# Seawalls and Sediment Transport







People at the coast think....differently



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#### John Ramsey:

**Applied Coastal Research and Engineering** 





Modeling Tools for Regional Sediment Management





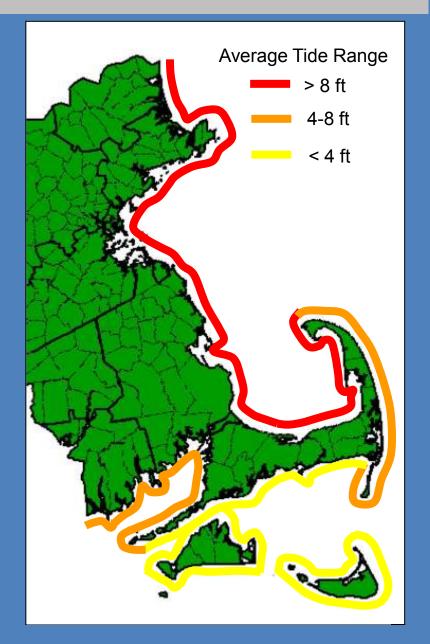


#### Some General Thoughts on Modeling

- Models Depend on the Quality of Input Data (Garbage In = Garbage Out)
- The "Wow" Graphics Factor Can Often Obscure Model Shortcomings
- Coastal Processes Modeling Is Most Appropriate for the Short-Term

### A Note on Our Local Conditions





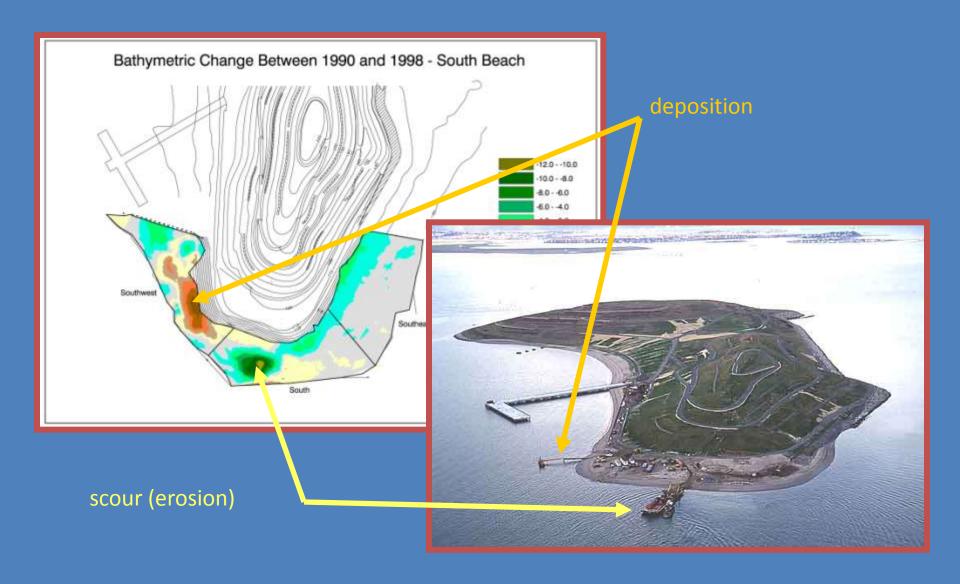
# **Shoreline Change Analysis**



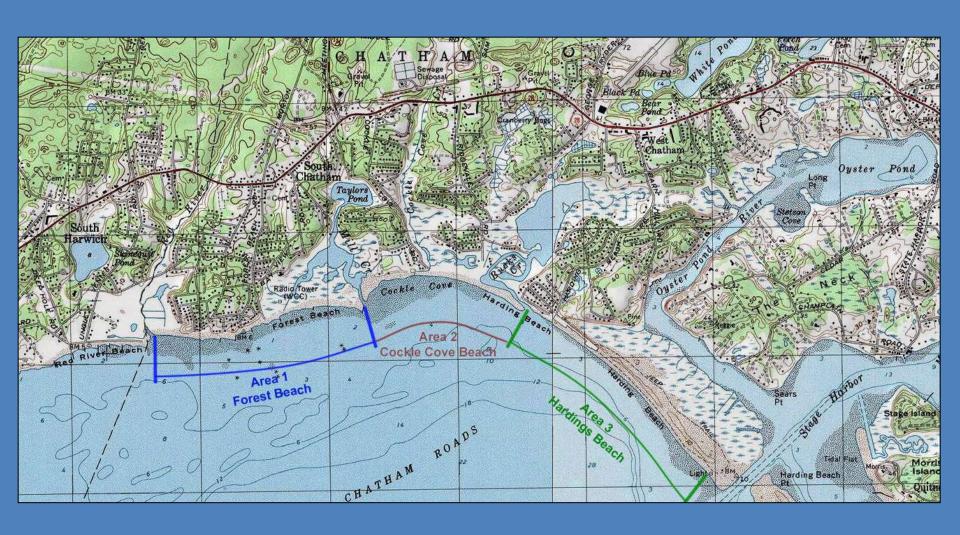
# **Shoreline Change Analysis**



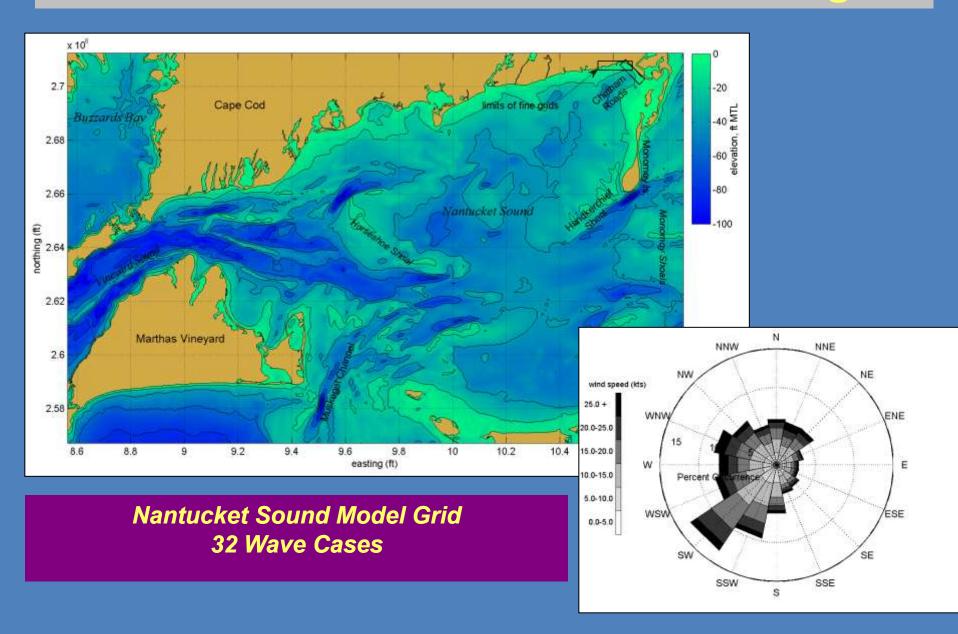
### Surface Modeling – Spectacle Island



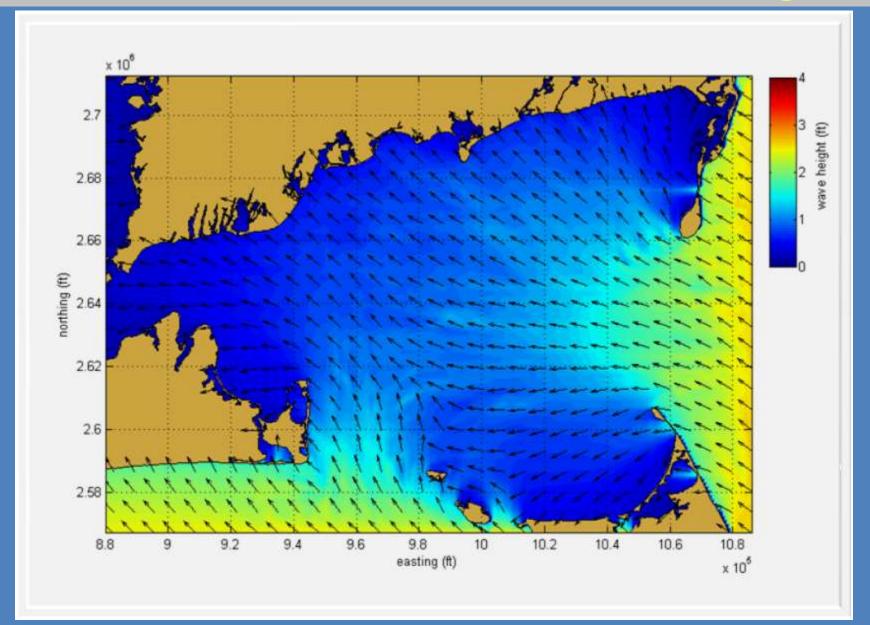
# **Study Area**



#### Coastal Processes - Wave Modeling



### Coastal Processes – Wave Modeling



### **Sediment Transport Modeling**

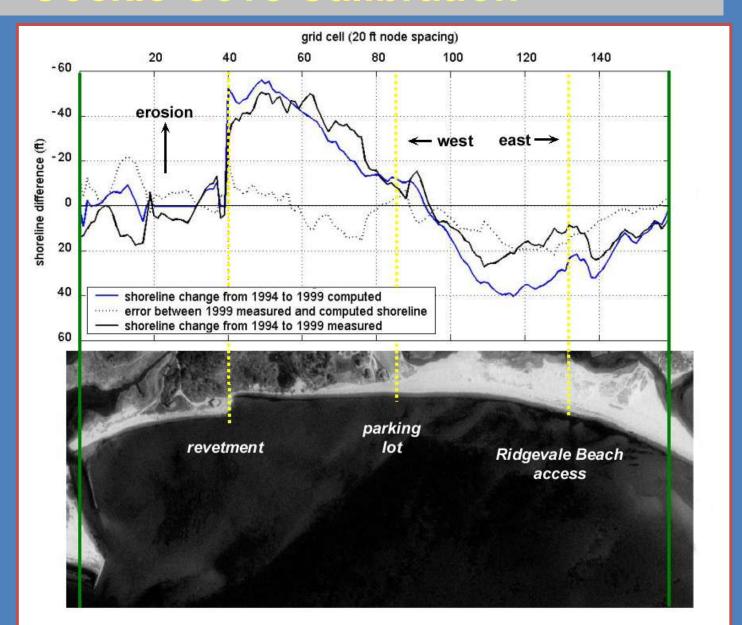
Cockle Cove and Ridgevale Beaches



#### **Cockle Cove Calibration**



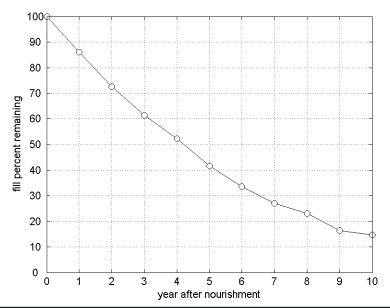
1994-1999



#### **Cockle Cove Beach Nourishment**



28,000 Cubic Yards 1,000 ft Length





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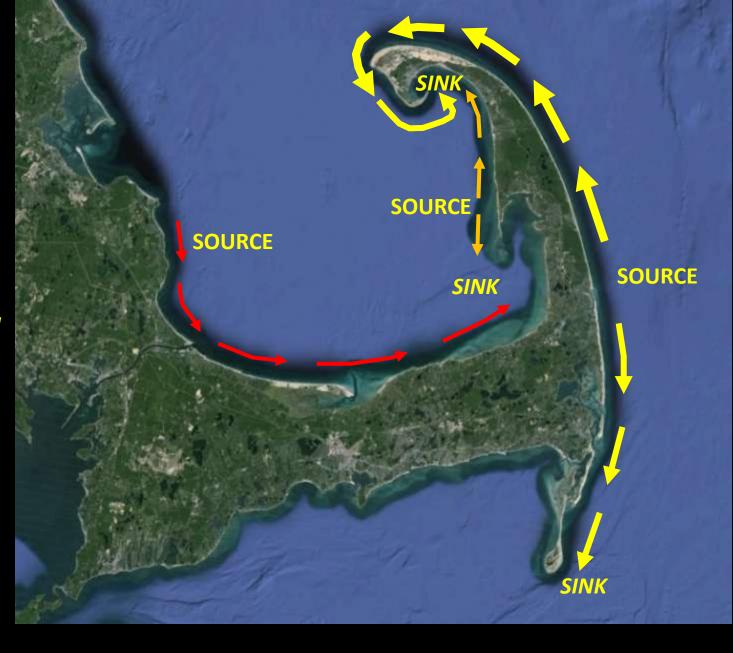
Mark Borrelli
Center for Coastal Studies

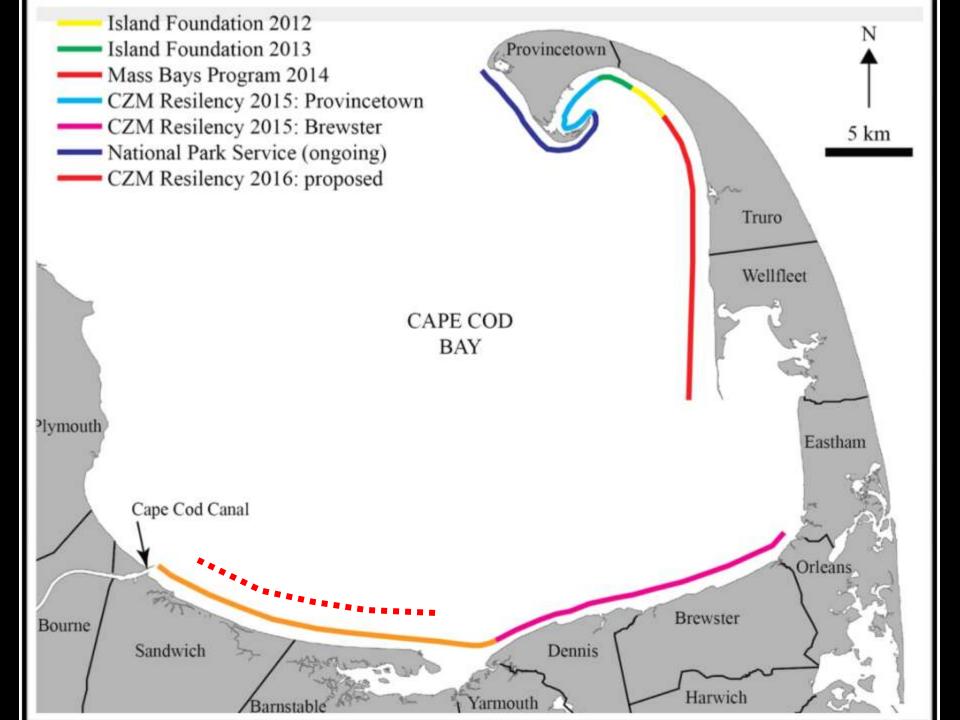
**Developing Sediment Budgets** 

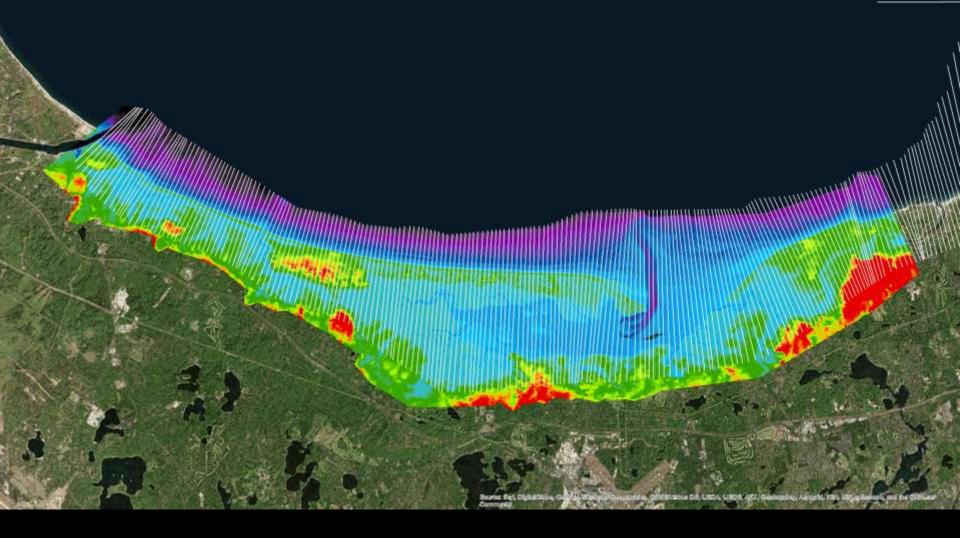
# Littoral Cells

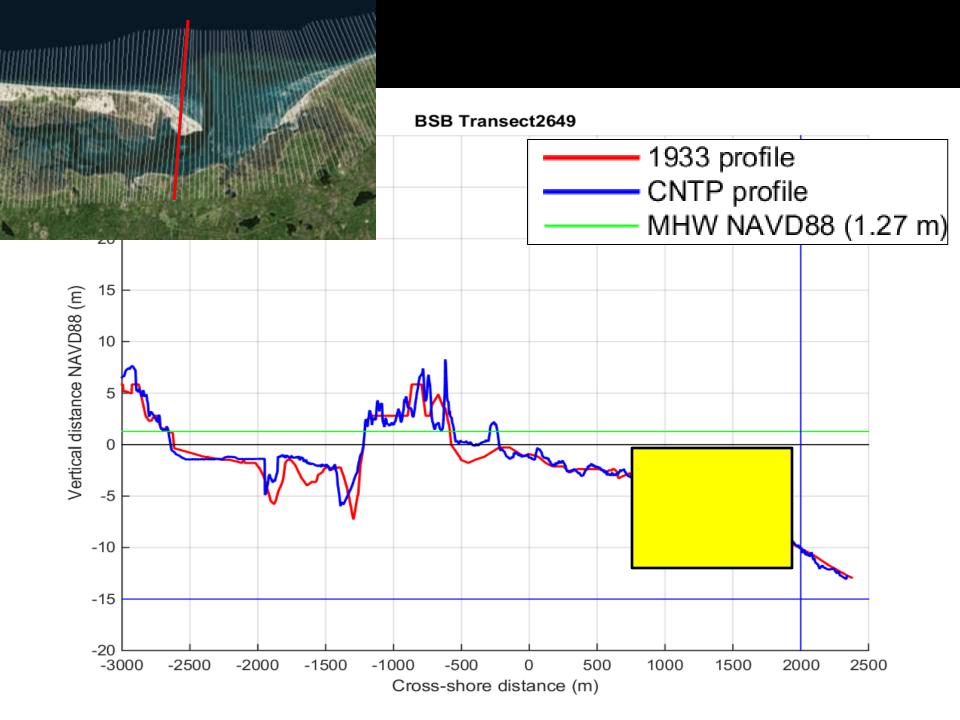
Sources And Sinks

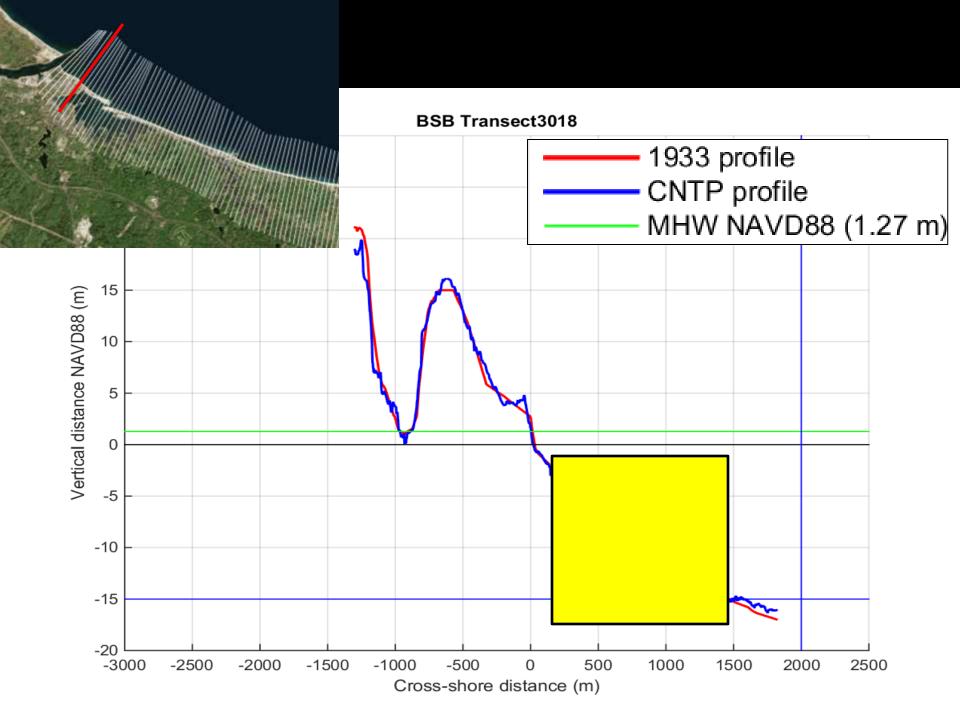
**NET**Direction

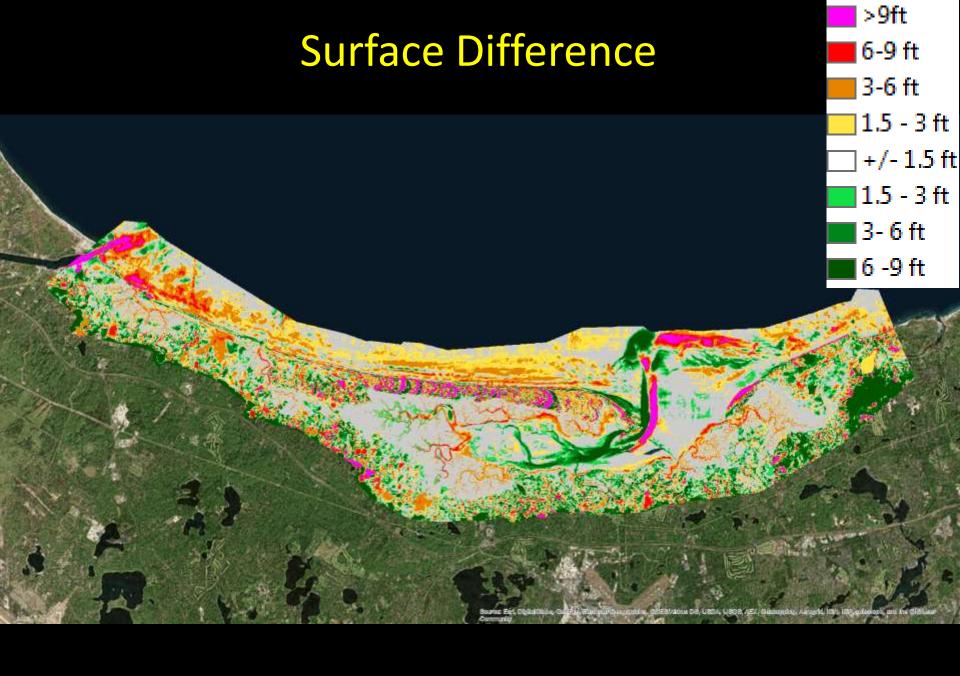








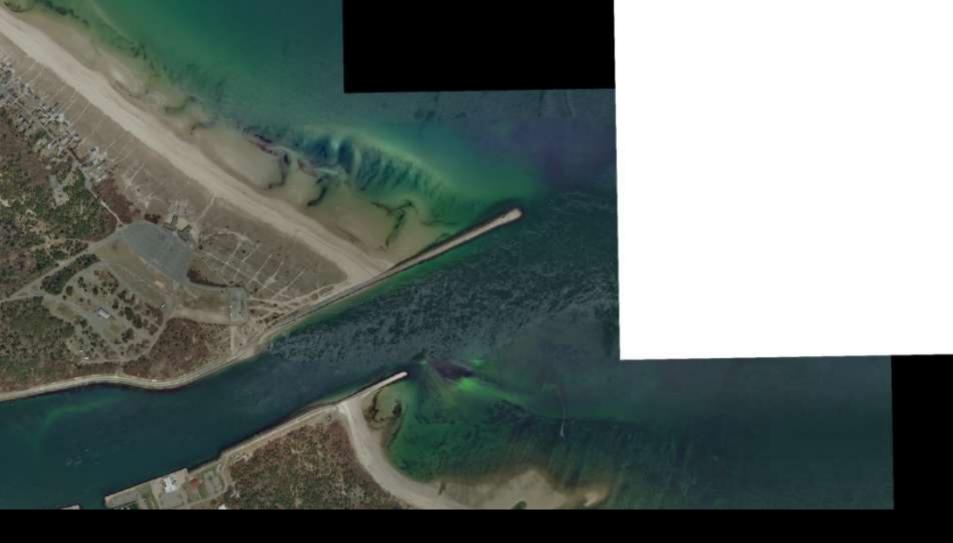


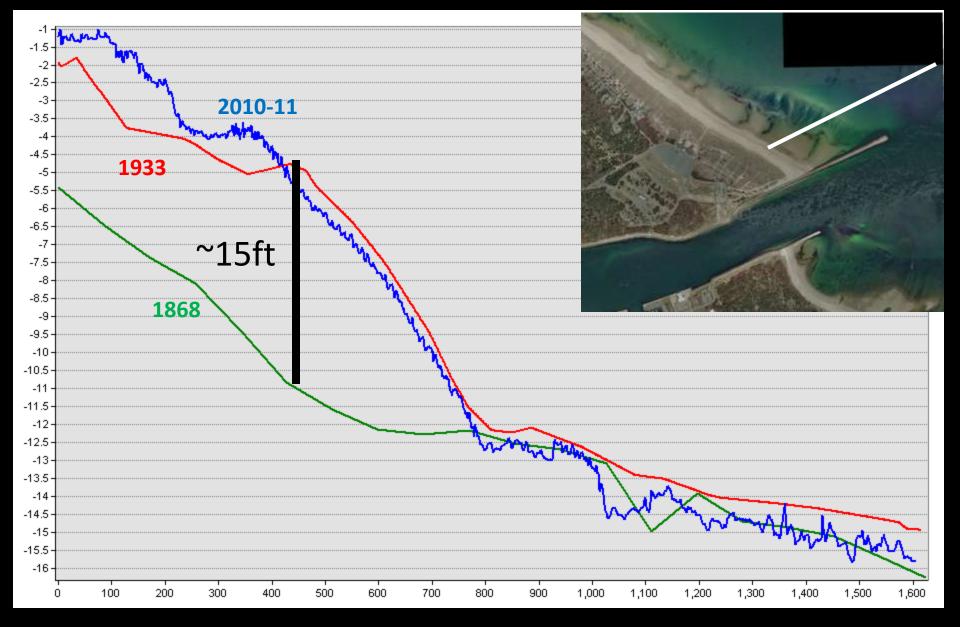


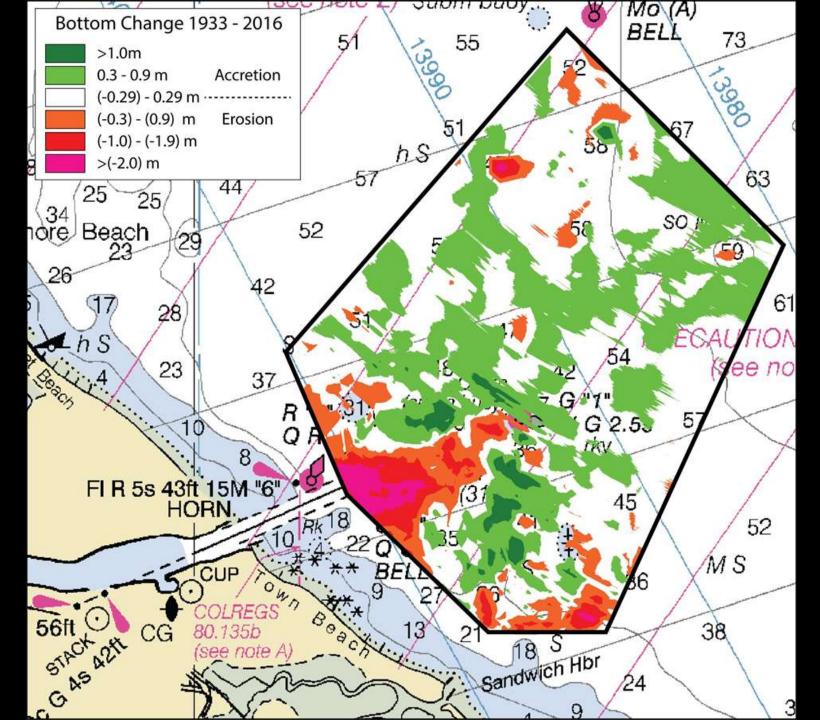




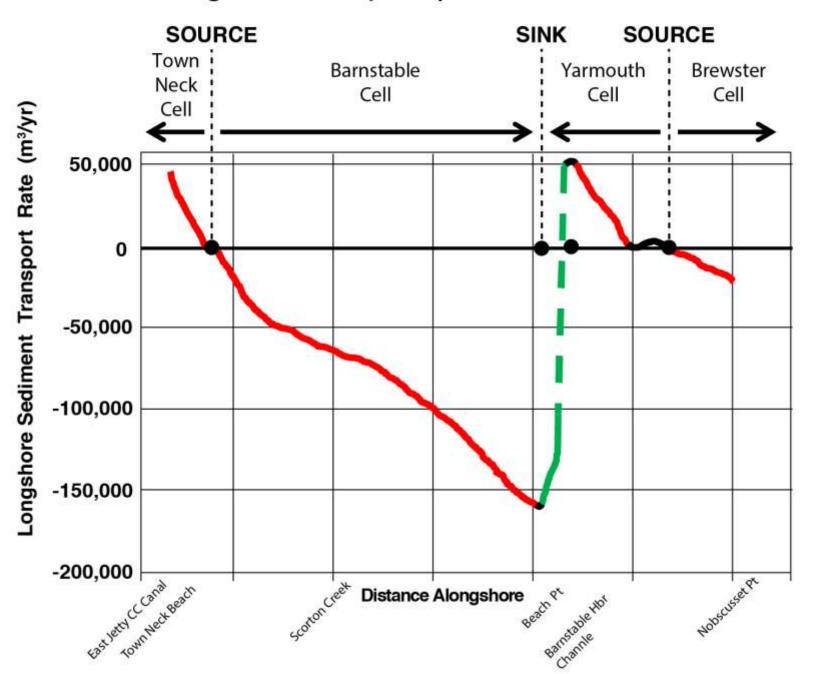




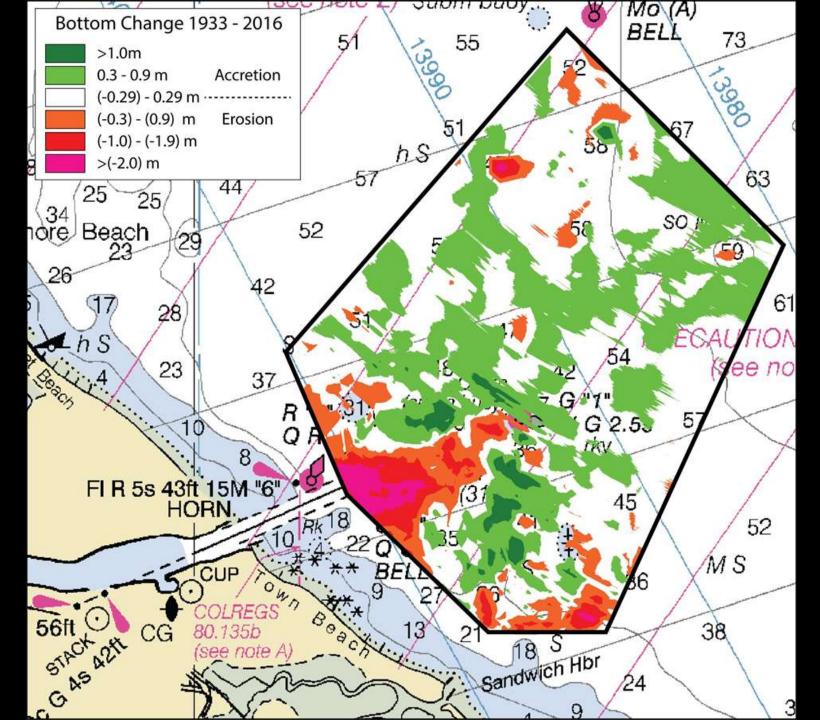


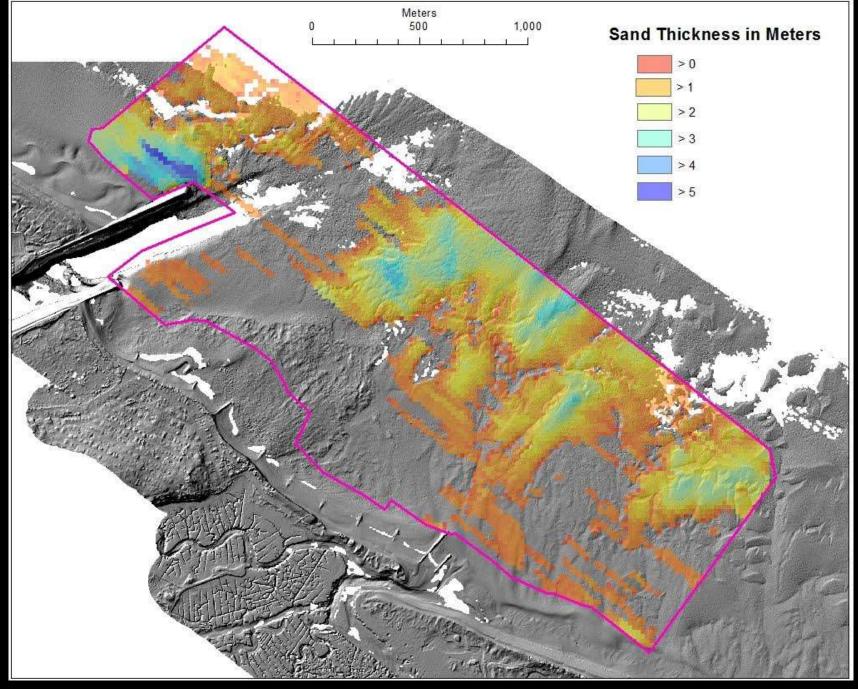


#### Sediment Budget Summary: Cape Cod Canal to Nobscusset Point

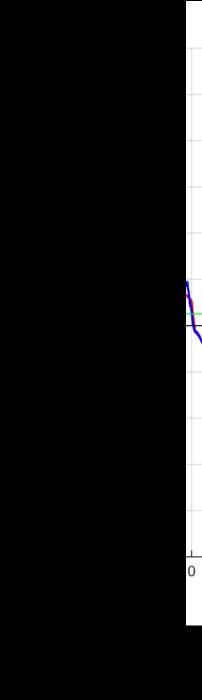








From, C. Sherwood and. Foster USGS (pers comm)





#### 4<sup>TH</sup> ANNUAL CAPE COASTAL CONFERENCE

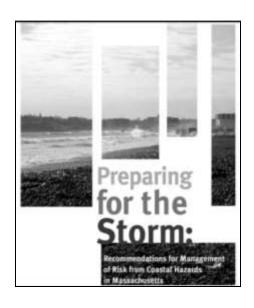
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# CZM Perspective...

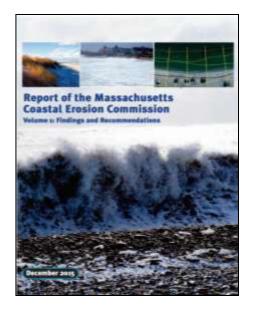
Brad Washburn, Assistant Director bradford.washburn@state.ma.us



#### **Coastal Hazards Commission & Coastal Erosion Commission**

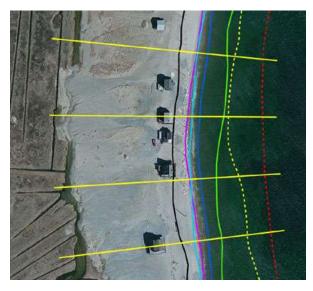


- Coastal Hazards Commission (2007)
  - review of coastal hazards policies/practices
  - recommendations to implement regional sand management program (inter-agency communication, resource mapping, etc.)



- Coastal Erosion Commission (2015)
  - document levels/impacts of coastal erosion
  - strategies and recommendations to reduce or minimize coastal erosion and its impact on property, infrastructure and beaches

### **CZM Shoreline Change Project**



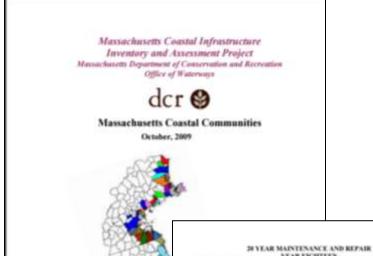


 Appx. 26,000 transects along entire coast

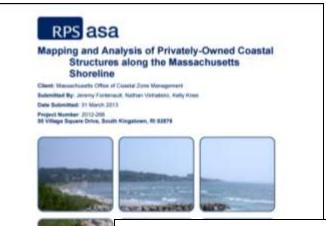


 Planning tool that provides insight into historical migration of shorelines and erosional hotspots

#### **Coastal Structures Inventories**



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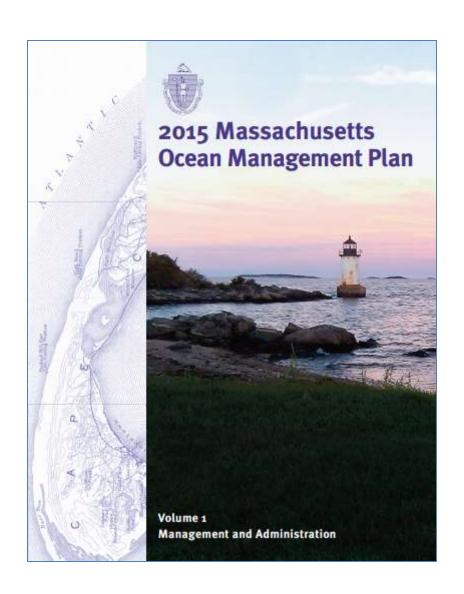




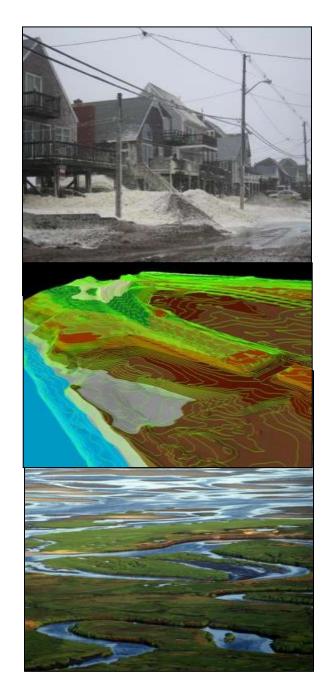
Revetment: A facing of sloping stone or other material built to protect an embarisment or another coastal structure against erosion by waves.



#### **Massachusetts Ocean Plan**



- Preliminary compatibility assessment and screening analysis identifying potential offshore sand resource areas for further investigation
  - Recommended formation of Offshore Sand Task Force



#### **CZM Coastal Resilience Grants**

Advance local efforts to manage coastal flooding, erosion, and sea level rise impacts through communication and public outreach initiatives, vulnerability assessments, planning activities, engineering projects, and natural storm damage protection approaches.

www.mass.gov/czm/stormsmart

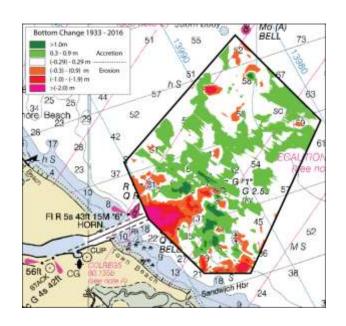
FY14: \$2.0 M, 19 awards

• FY15: \$2.7 M, 18 awards

FY16: \$2.2 M, 16 awards

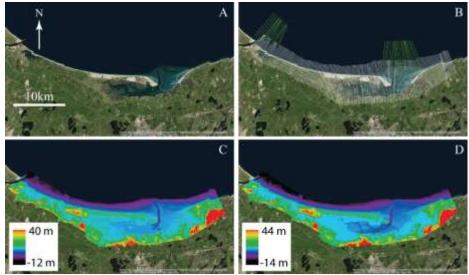
• FY17: \$1.8 M, 19 awards

#### **CZM Coastal Resilience Grants**



# Century Scale Sediment Budget: Towns of Sandwich and Barnstable

 Volume, rate and direction of sand moving along shoreline from Cape Cod Canal to Barnstable Harbor.



#### **CZM Coastal Resilience Grants**

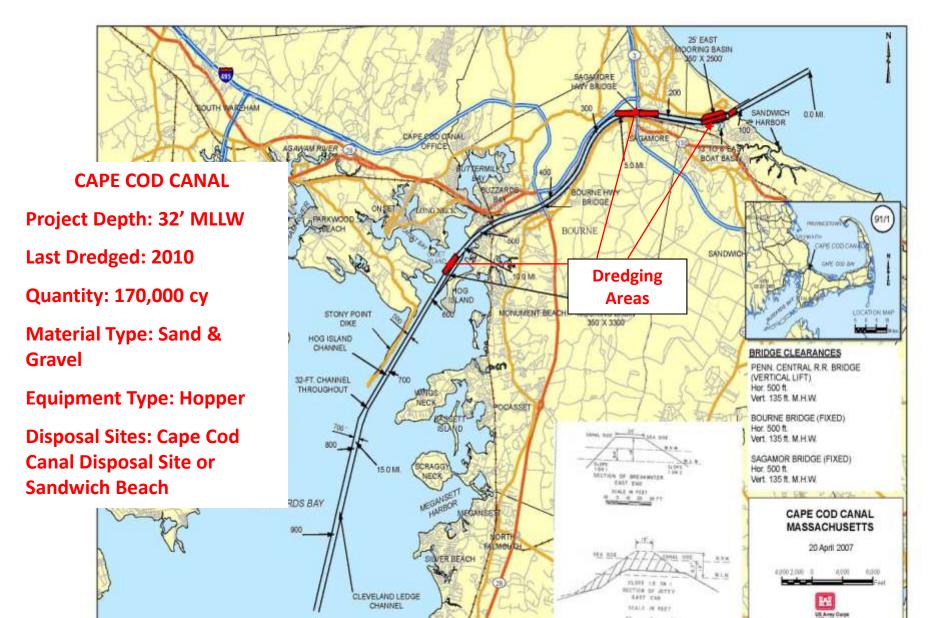




# Nearshore Sediment Borrow Source for Sandwich Town Beaches

 Analyze locations adjacent to Scusset Beach to determine viability to serve as sediment source for beaches downdrift of Cape Cod Canal jetties

# Cape Cod Canal Dredging – Sandwich Town Neck Beach Nourishment





#### **NEXT STEPS...**



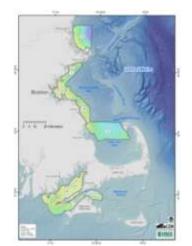
#### Continued coordination at all levels

Planning, project review & permitting



#### **Continued support to municipalities**

- Grant funding
- Technical assistance



Continued development of planning & technical resources



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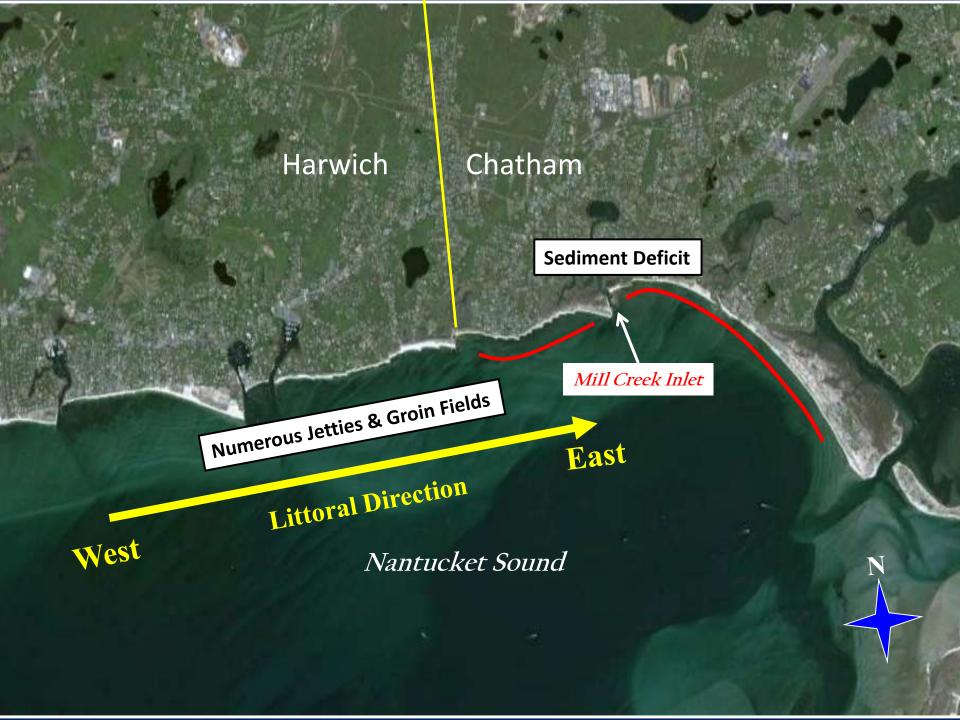
**Ted Keon**Town of Chatham

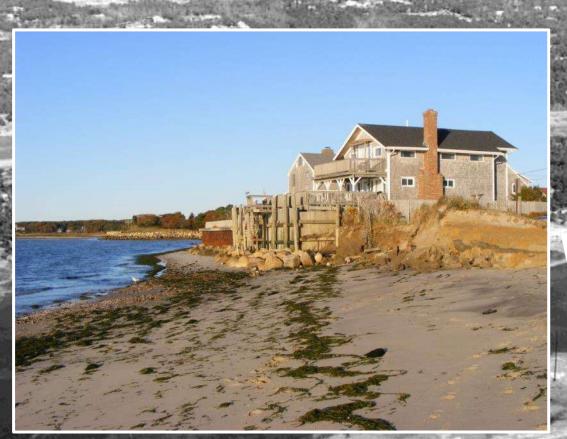
# REGIONAL SEDIMENT MANAGEMENT: Implementation at the Local Level Ted Keon, Town of Chatham











Sediment Deficit- Heightened Erosion

Mill Creek Inlet

Forest Beach

Little to no natural sand by-passing

1979

#### <u>Issues</u>

- Poor flushing/water quality
- East jetty "flanking"
- Navigation impacts
- Shellfish habitat impacts
  - Abandonment of propagation beds

Taylor's Pond

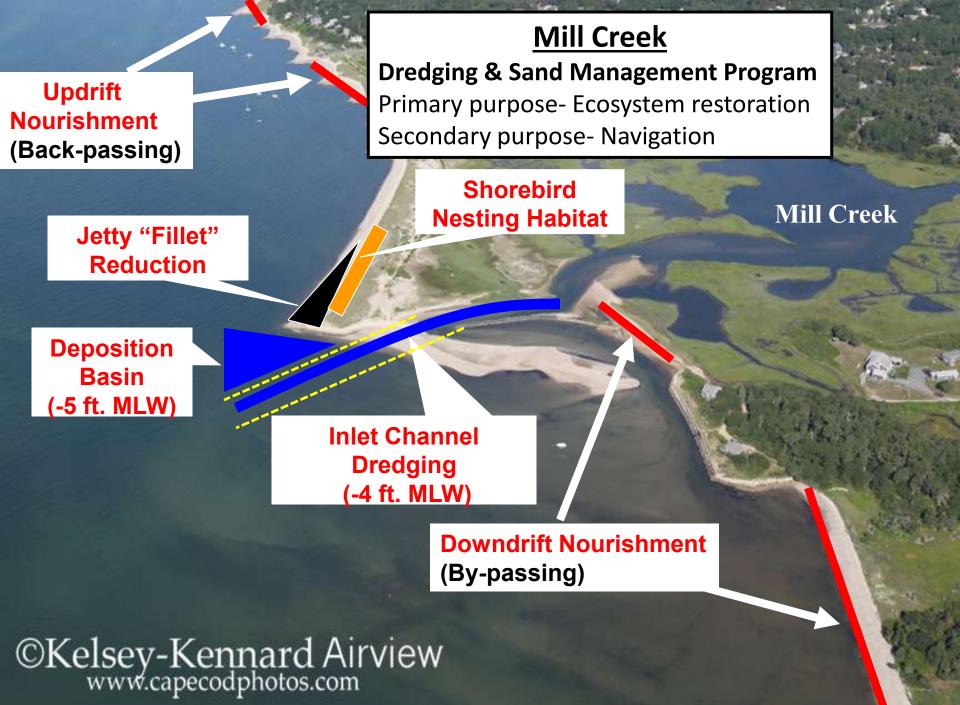
Forest Beach

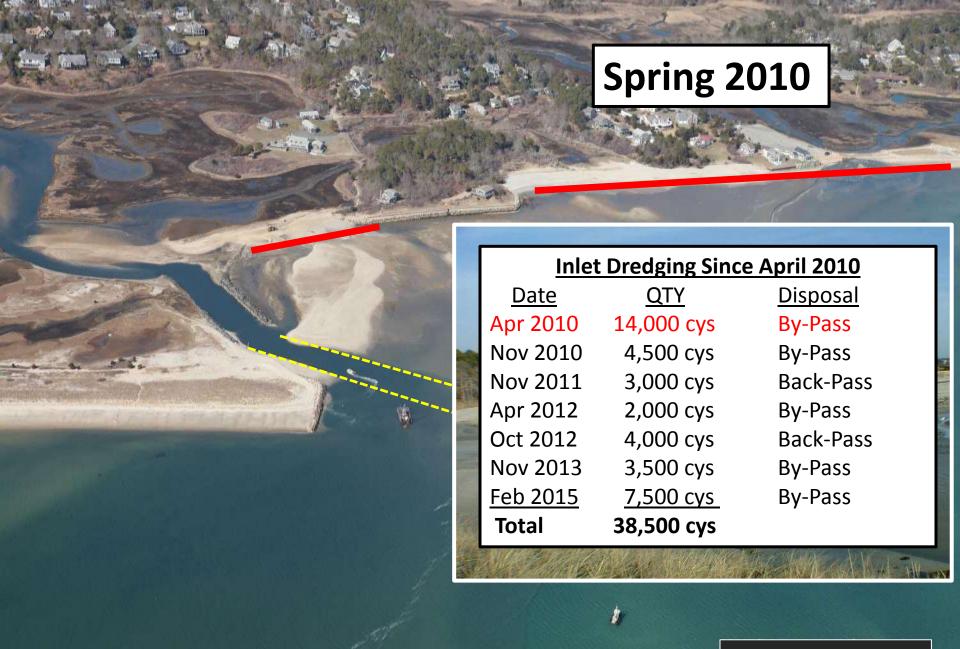
Jetty "fillet" filled to full entrapment

Mill Creek Inlet

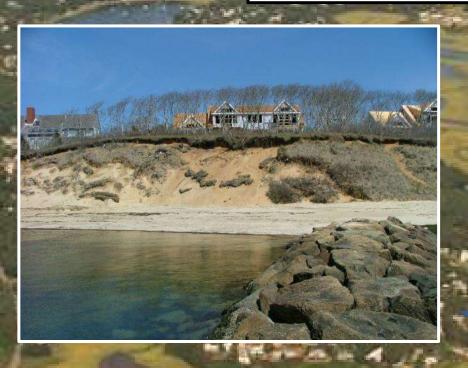
Oct 2009

©Kelsey-Kennard Airview www.capecodphotos.com





# **Public/Private Partnership**



Mill Creek

**Fillet Reduction** 

#### **Town Support:**

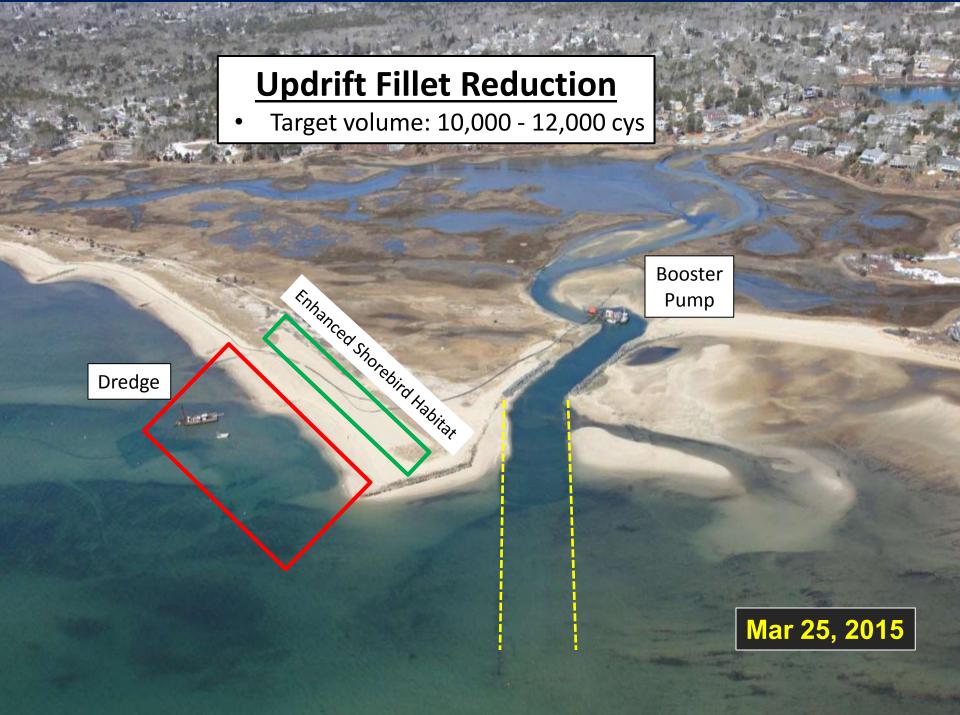
- Reduce inlet shoaling
- Sand back-passing
- Privately funded \$\$

**Beach Disposal** 

**Red River** 

Chatham

Harwich





Mill Creek

Dredge

Approx. 6,000 ft.

Public beach 930 cys

Private beaches 9,800 cys

Red River

Mar 2015

Spencer Kennard







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