

A Systems Approach: *Conceptual Regional Sediment Budget for the USACE North Atlantic Division*

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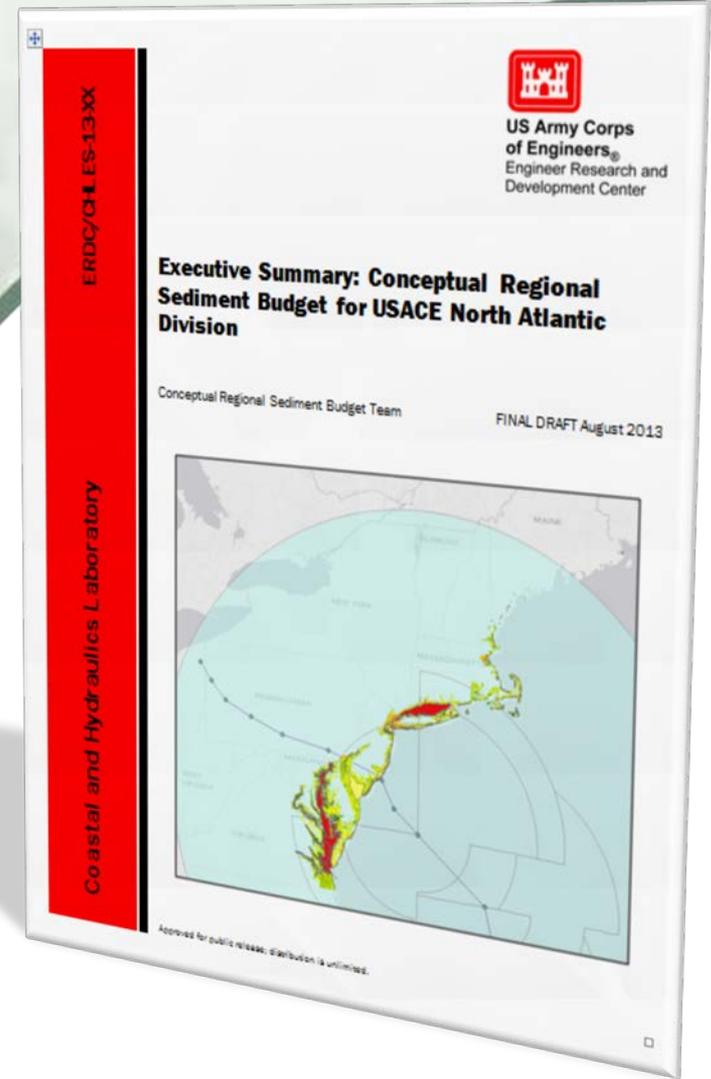
Coastal & Hydraulics Laboratory

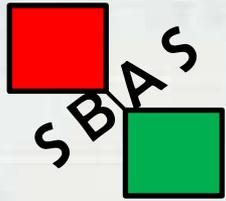
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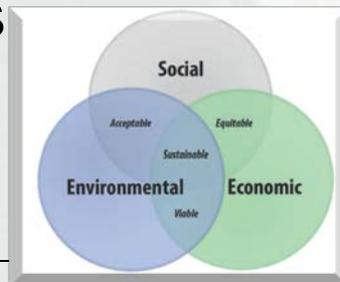
Why a Systems Approach?

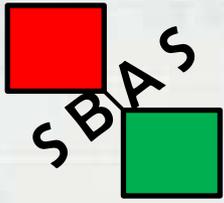
- Coastal change occurs over large temporal and spatial scales, with complex interactions within:
 - Environment, Economic, Social
- Multiple, competing objectives between stakeholders

A Systems Approach:

- *Takes broad view of interactions & objectives to develop potential solution sets*
- *Intentionally aligns engineering and natural systems*

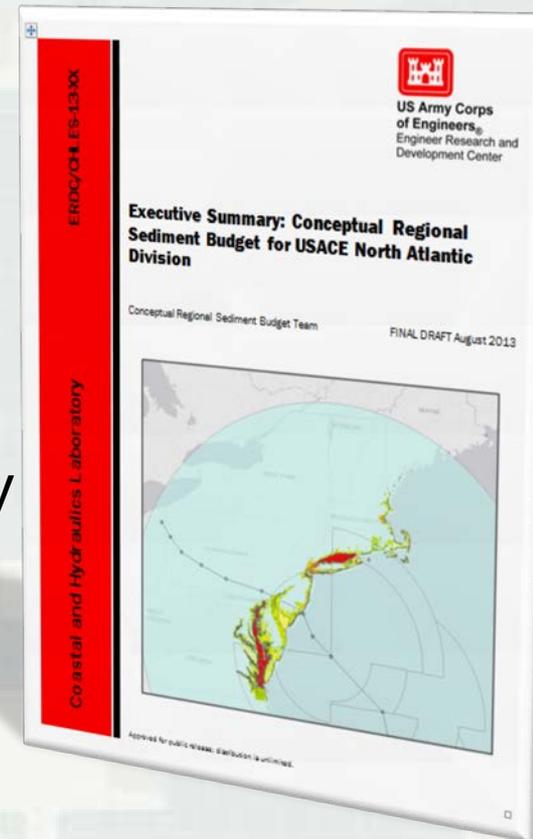
*Restoration of Deer Island, MS
Barrier Island and Marsh*

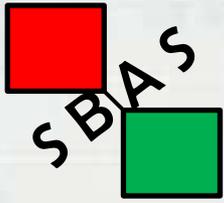




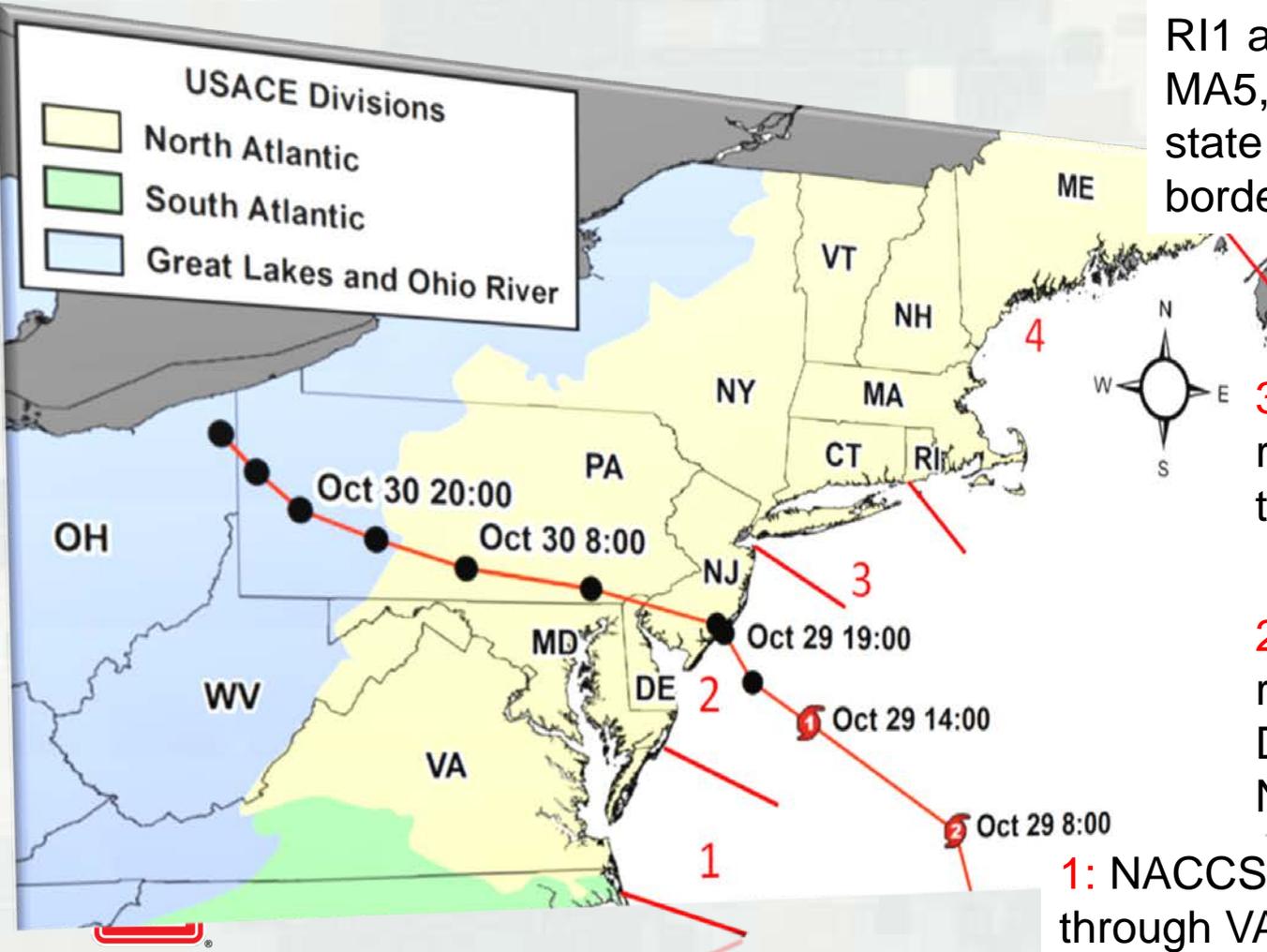
Conceptual Regional Sediment Budget (CRSB)

- Visualizes magnitude and direction of sediment transport
- Includes dredging from Dredging Information System (DIS) and placement (if available)
- Based on existing knowledge or morphology
- Extends from Virginia to Maine
- Visualized in SBAS Web Portal; overlain with Exposure/Risk/Vulnerability (ERV) database





CRSB Regions

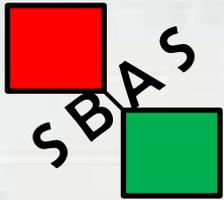


4: NACCS planning regions RI1 and RI2, MA1 through MA5, and NH1 including the state of Maine to the Canadian border

3: NACCS planning regions NJ1, NY-NJ1, NY1 through NY4, and CT1

2: NACCS planning regions MD1, DE1 through DE3, and NJ2 through NJ4

1: NACCS planning regions VA1 through VA6 and MD2 through MD5



Region 1: High Total ERV and Erosion/Low Confidence

**Exposure/
Risk/
Vulnerability**

High
Low

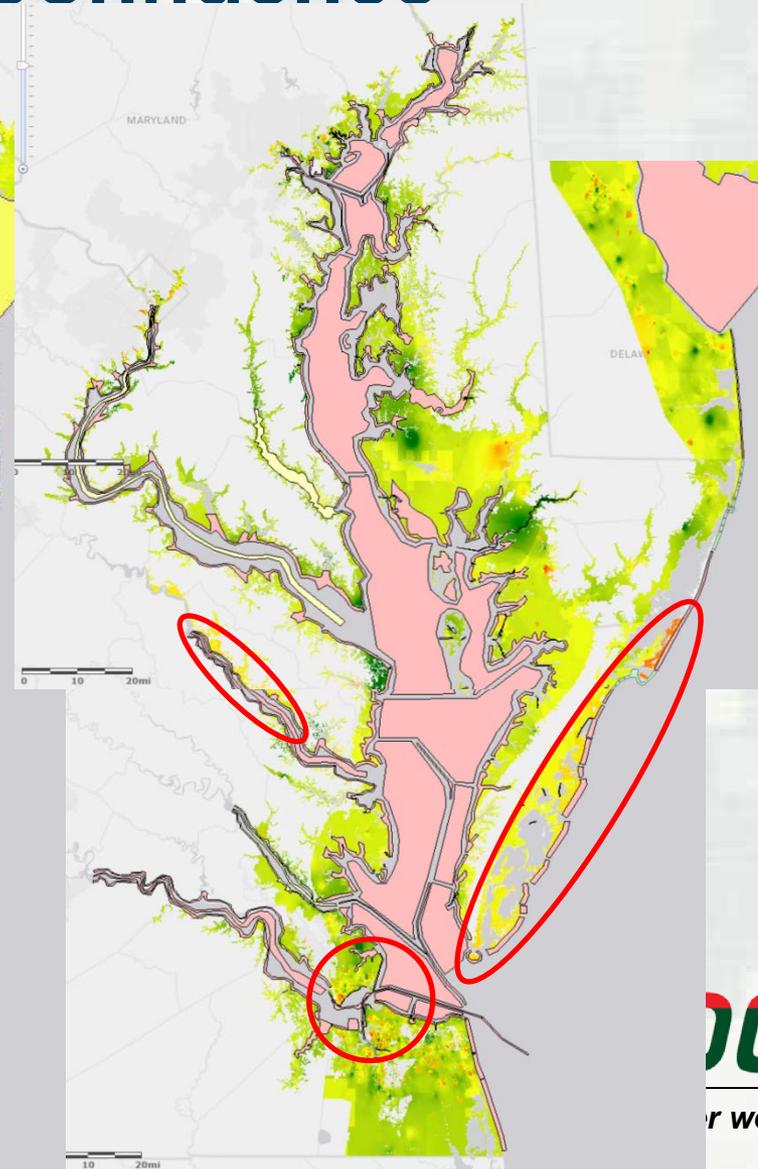
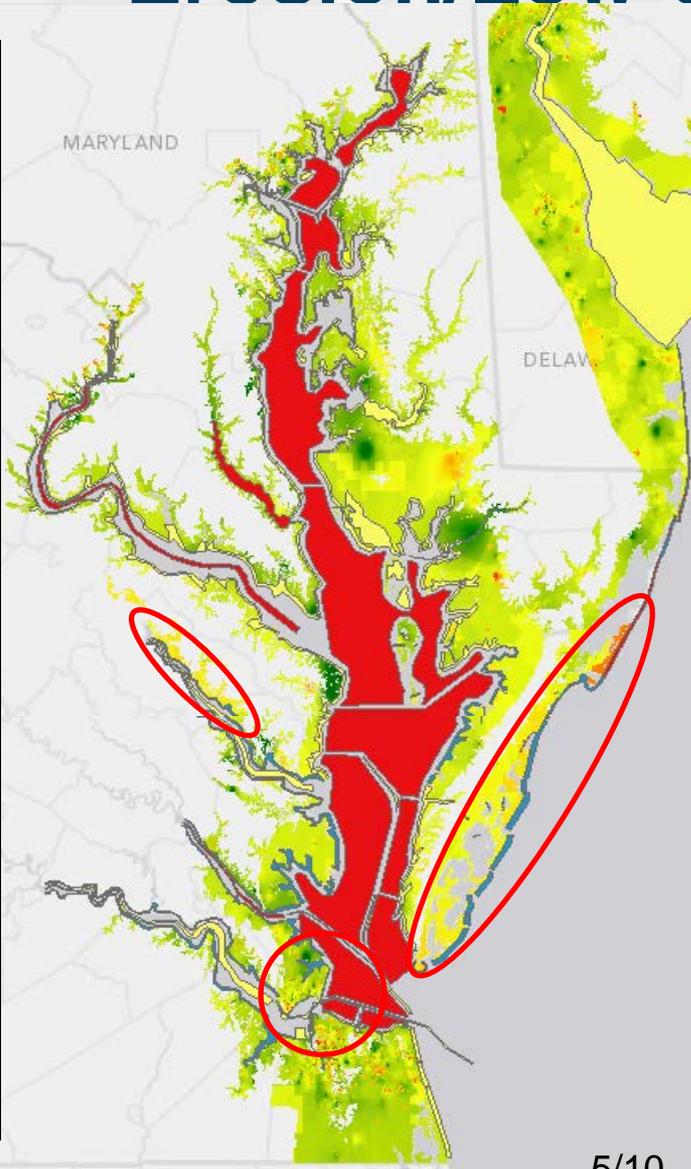
Cell Gain/Loss

- Erosion
- Stable
- Accretion

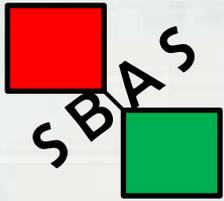
Confidence

- Low
- Medium
- High

Region of High ERV and Erosion/Low Confidence



Region 2: High Total ERV and Erosion/Low Confidence



**Exposure/
Risk/
Vulnerability**

High
Low

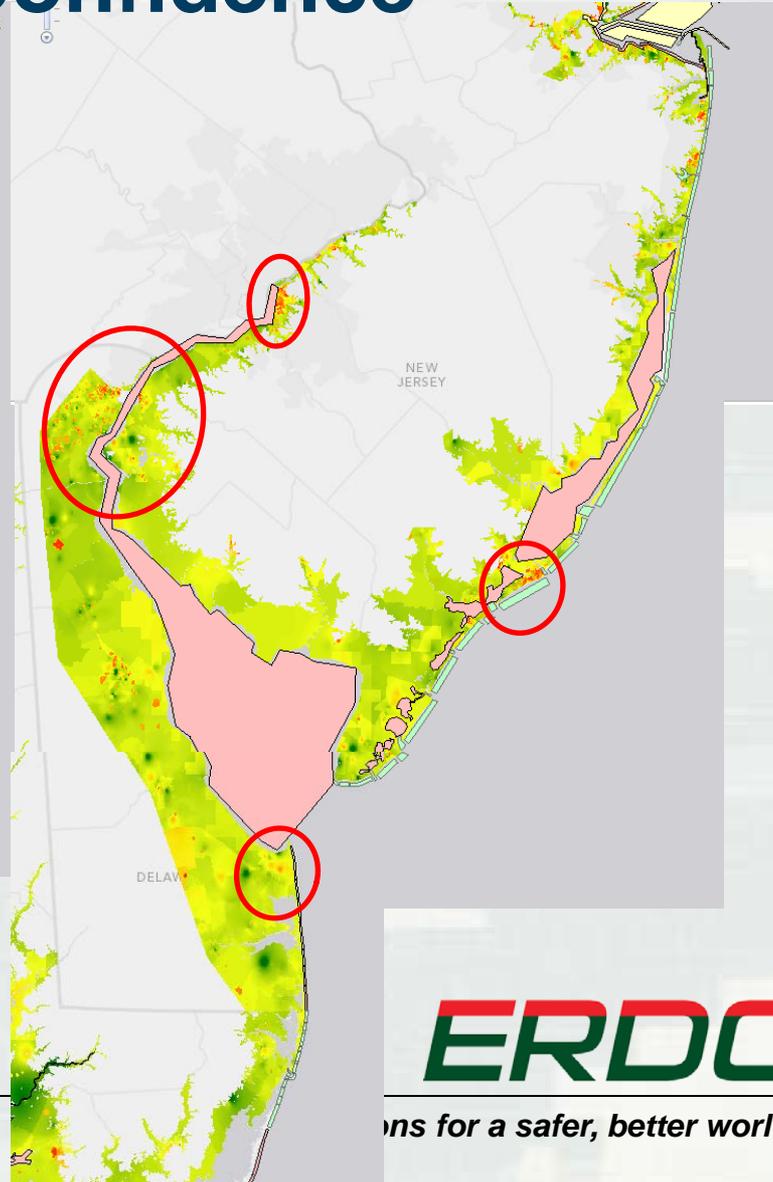
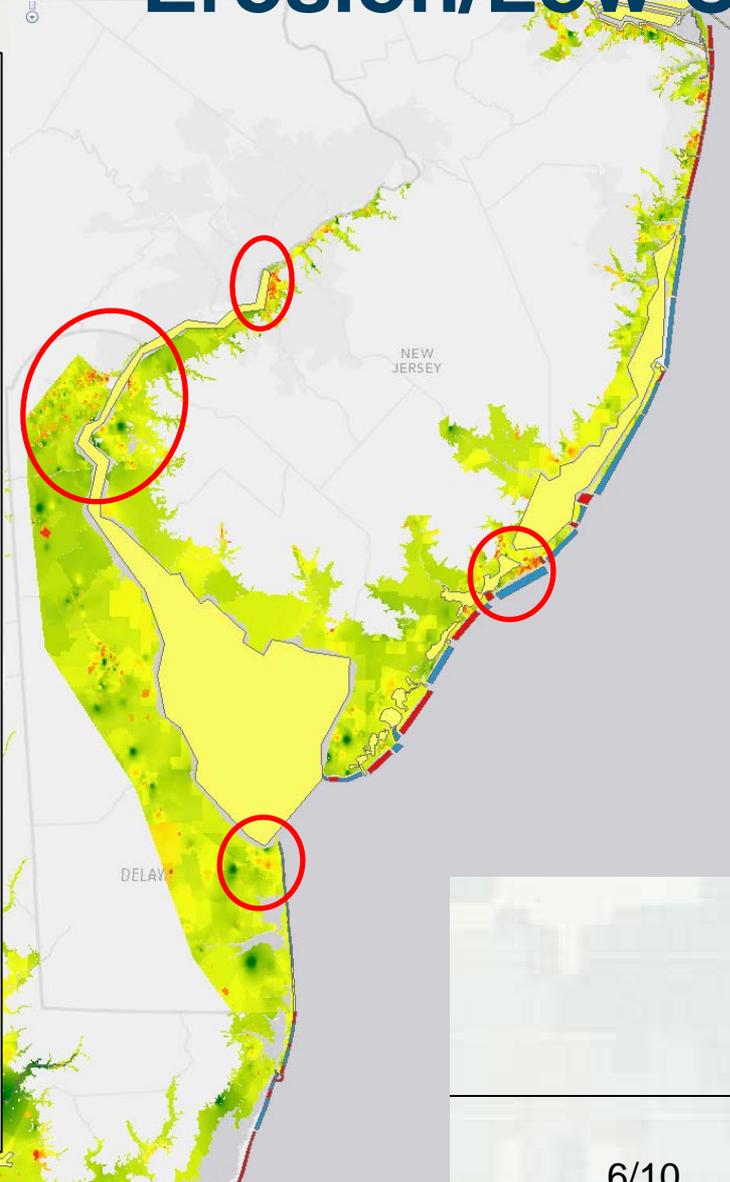
Cell Gain/Loss

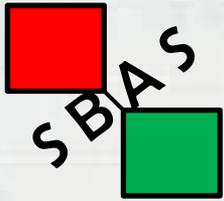
- Erosion
- Stable
- Accretion

Confidence

- Low
- Medium
- High

Region of High ERV and Erosion/Low Confidence





Region 3: High Total ERV and Erosion/Low Confidence

**Exposure/
Risk/
Vulnerability**

High
Low

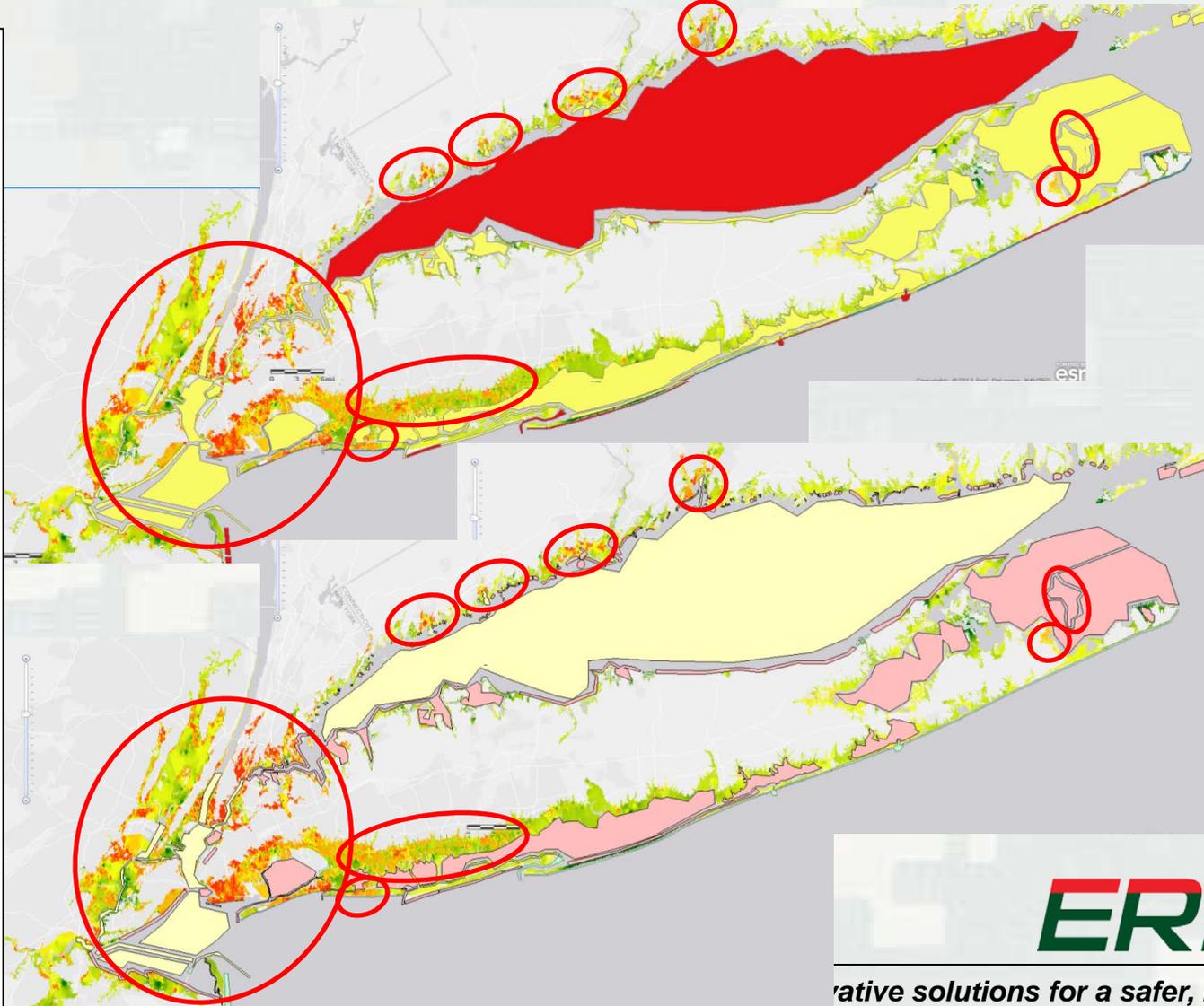
Cell Gain/Loss

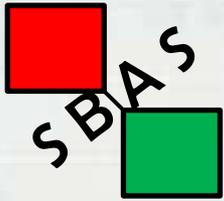
- Erosion
- Stable
- Accretion

Confidence

- Low
- Medium
- High

Region of High ERV and Erosion/Low Confidence





Region 4: High Total ERV and Erosion/Low Confidence

**Exposure/
Risk/
Vulnerability**

High
Low

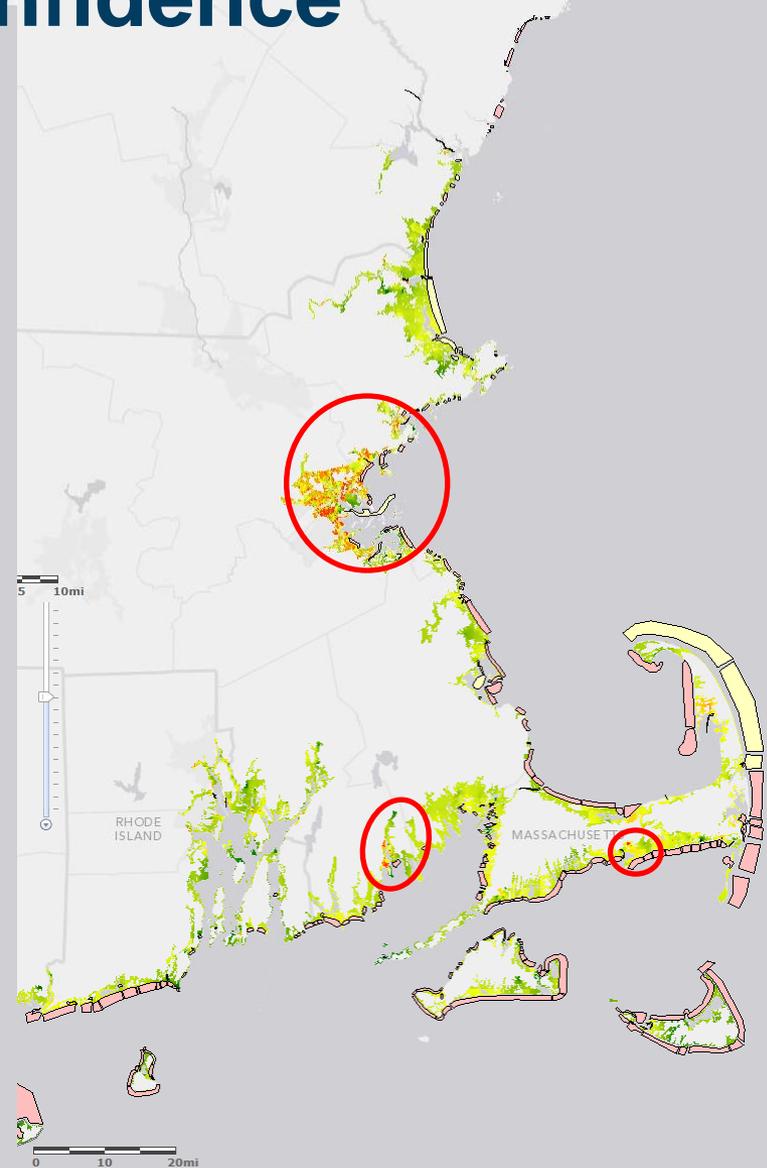
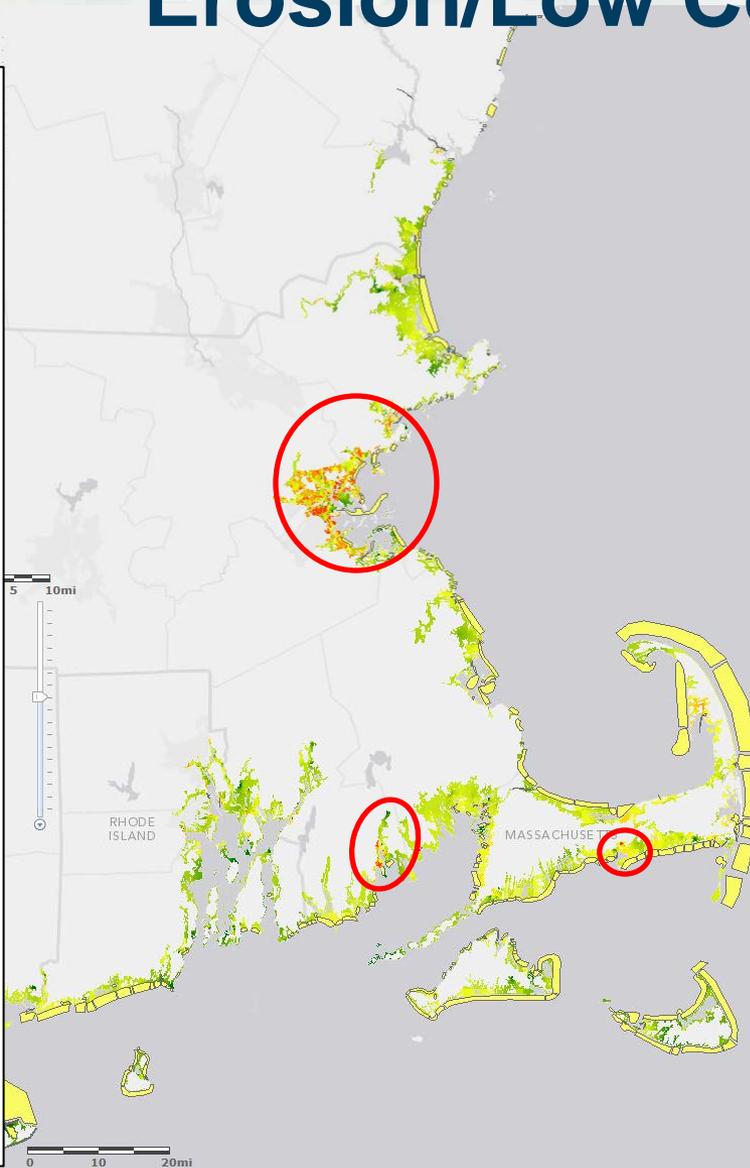
Cell Gain/Loss

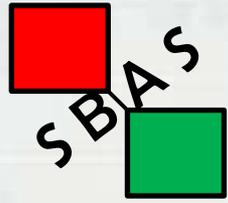
Erosion (Blue)
Stable (Yellow)
Accretion (Red)

Confidence

Low (Pink)
Medium (Light Yellow)
High (Light Green)

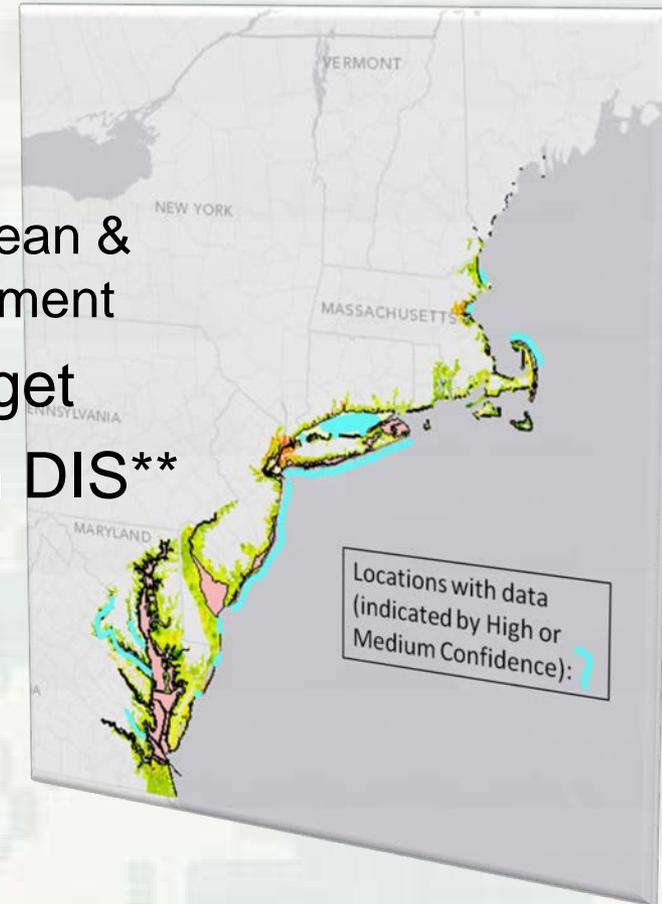
Region of High ERV and Erosion/Low Confidence





CRSB Summary & Findings

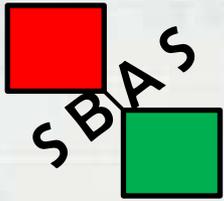
- 990 cells in CRSB; 67% no data
- Most estuaries/bays did not have data*
 - ▶ Damage from Sandy occurred from both ocean & bay; great potential to improve bay management
- Most placement data missing from budget
- Total of 18.7 Mill cu yd/year dredging in DIS**
 - ▶ Region 1: 6.3 Mill cu yd/year
 - ▶ Region 2: 7.3 Mill cu yd/year
 - ▶ Region 3: 4.9 Mill cu yd/year
 - ▶ Region 4: 0.2 Mill cu yd/year



* Chesapeake Bay and Long Island Sound only exceptions

**3 records or more; 1990 to present

ERDC



CRSB Recommendations

- Document dredged sediment type for best placement options and regional management
 - ▶ Coarser sand = building beaches and dunes
 - ▶ Finer silt and clay = providing estuarine habitat and wetland features
 - ▶ Rock = constructing artificial reef and fish habitat
- Quantify sediment transport in the estuaries & bays
 - ▶ Much damage from Hurricane Sandy occurred in estuaries and bays

