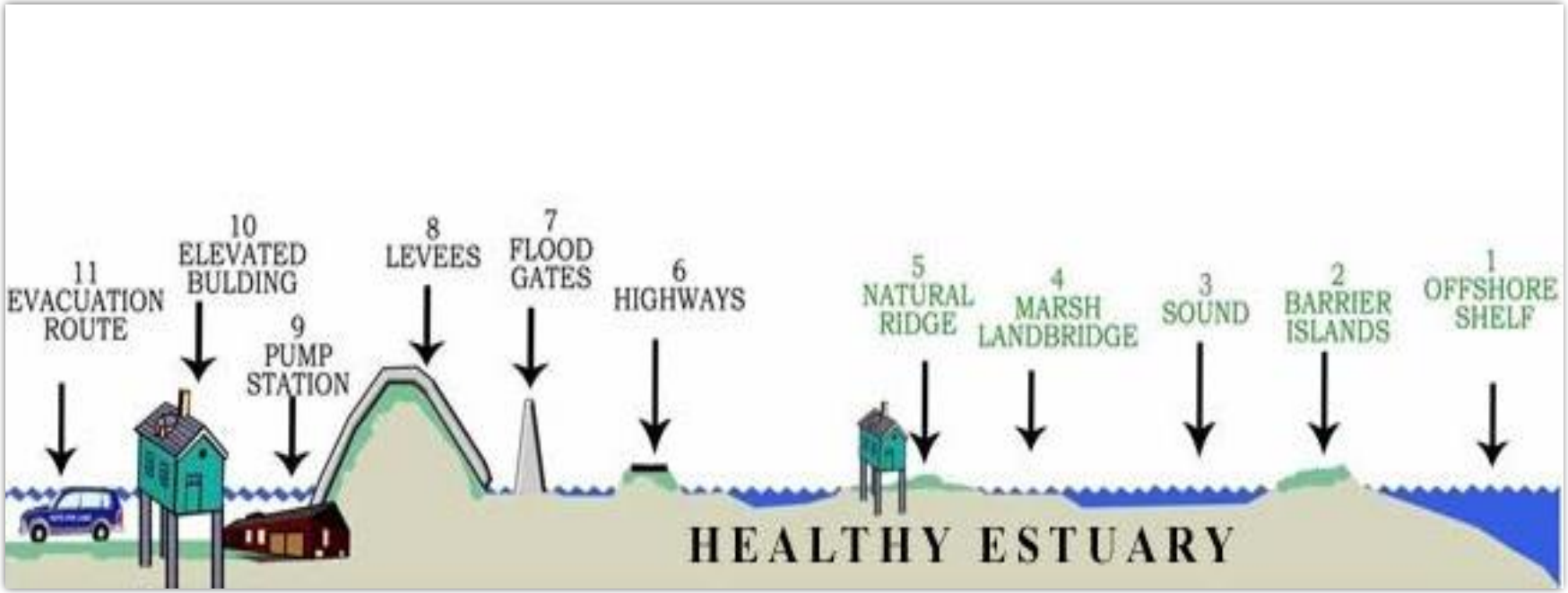
# Systems Approach to Geomorphic Engineering

**Debbie Larson Salvatore**
**U.S. Army Corps of Engineers/Institute for Water Resources**

# Systems Approach to Geomorphic Engineering (SAGE)

- Promotes the integration of green and gray solutions for coastal protection
- Understands shoreline changes in the context of natural coastal processes
- Builds partnerships to research, plan, design, and fund projects that increase the resilience of coastal communities

# Multiple Lines of Defense



# SAGE is a community of practice

- Collaborative effort between federal and state agencies, non-governmental organizations, academia, and private business & engineering firms

US Army Corps of Engineers®

NOAA

FEMA

U.S. Fish & Wildlife Service

National Wildlife Federation

The Nature Conservancy
Protecting nature. Preserving life.™

ASCE
American Society of Civil Engineers

CSO

The Conservation Fund
America's Partner in Conservation

William & Mary VIMS
Virginia Institute of Marine Science
School of Marine Science

The Water Institute of the Gulf

Among others…

# National Work Groups

- Science and Engineering
- Metrics
- Policy
- Finance
- Communications

# Regional Pilots

- Develop communities of practice that advance a regional approach to living shorelines and other natural features
  - Expand knowledge base of practitioners
  - Demonstrate the value of collaboration
  - Lead to increased number of projects

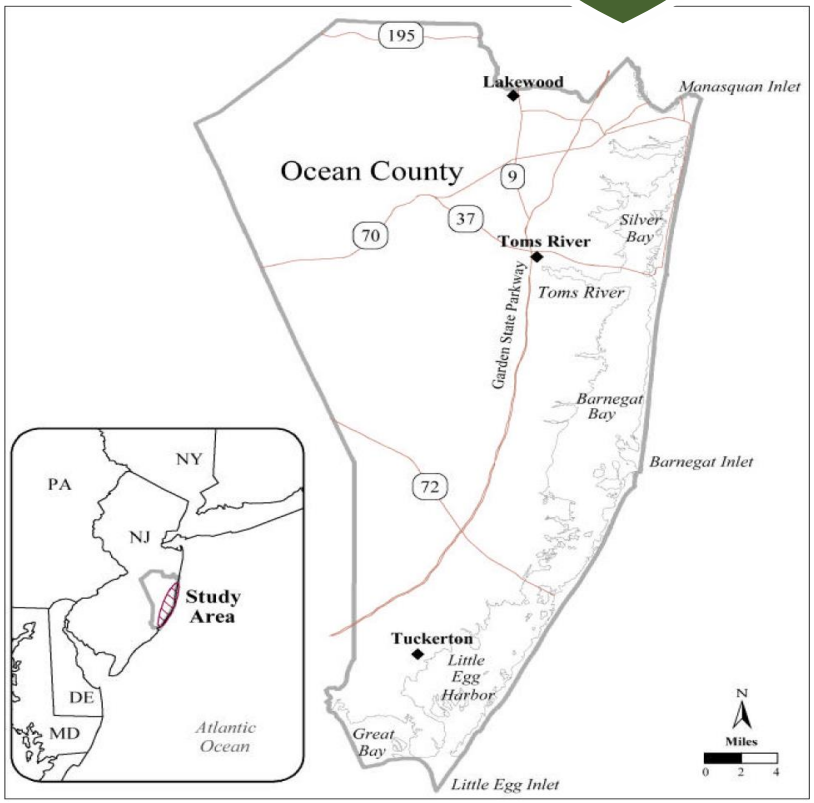
- Locations:
  - San Francisco Bay
  - Barnegat Bay
  - Chesapeake Bay

# Regional Pilot Goals

- Build a Community of Practice
  - Bringing together knowledge and expertise across all sectors
- Establish a regional plan
  - Applying knowledge from Community of Practice to set regional goals
  - Identifying priority areas
- Implement plans
  - Identifying funding sources (public and private)

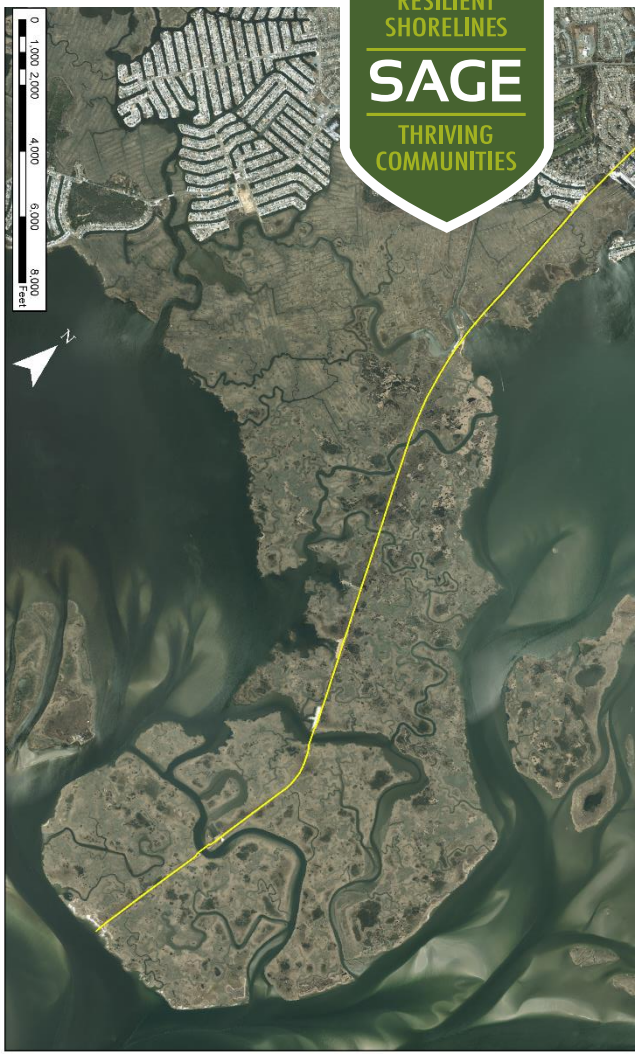
# Barnegat Bay, NJ

- 75 $mi^2$ estuary, situated between the mainland and barrier islands
- Wetland loss and shoreline erosion
- Assembled a Community of Practice
- Developed a regional strategy that identifies priority areas and funding needs
- Received a FHWA Green Infrastructure Grant to conduct research in one of the priority areas



# Great Bay Boulevard Project

- Investigate physical conditions that initiate flooding
- Determine influence of the natural wetland system in protecting the highway
- Provide recommendations for use of green infrastructure solutions to lessen frequency and severity of flooding
- Work with FHWA and SAGE Finance Group to get the preferred option constructed



# Science and Engineering

- Design criteria for living shorelines
- Value of ecosystem and coastal protection services
- Data needs
  - Wave attenuation over marshes
  - Long-term monitoring efforts
- Metrics for evaluating success of living shorelines

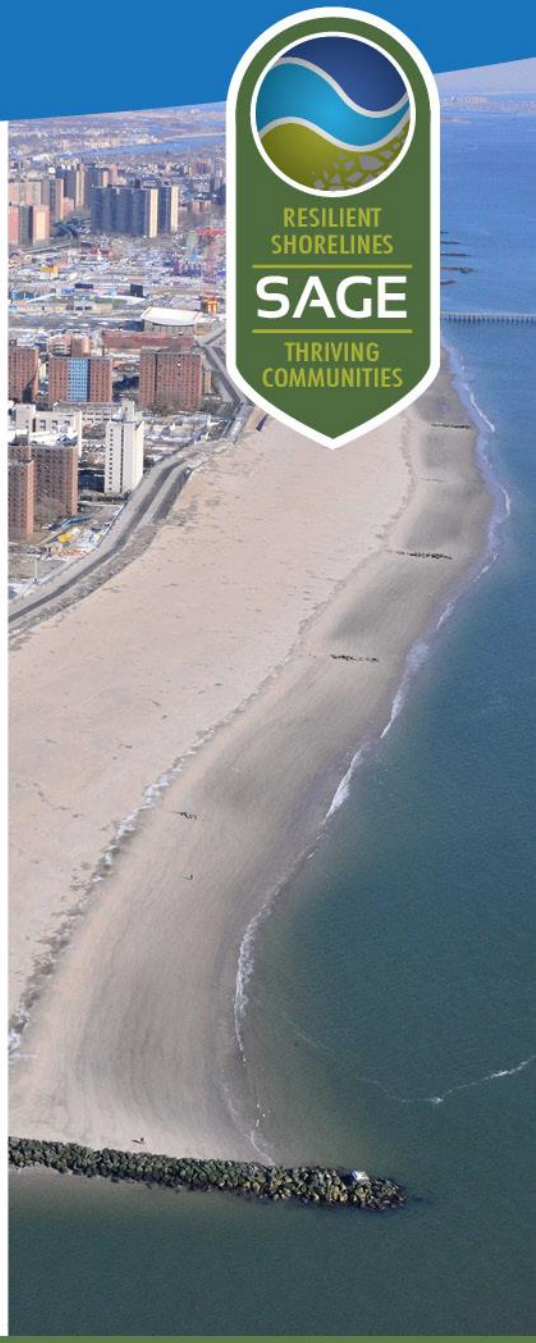

# Policy

Permits!

- Easier to get a permit for hard structures than living shorelines
  - Communicate with regulators
  - State and Regional General Permits
  - Nationwide Permit B for living shorelines

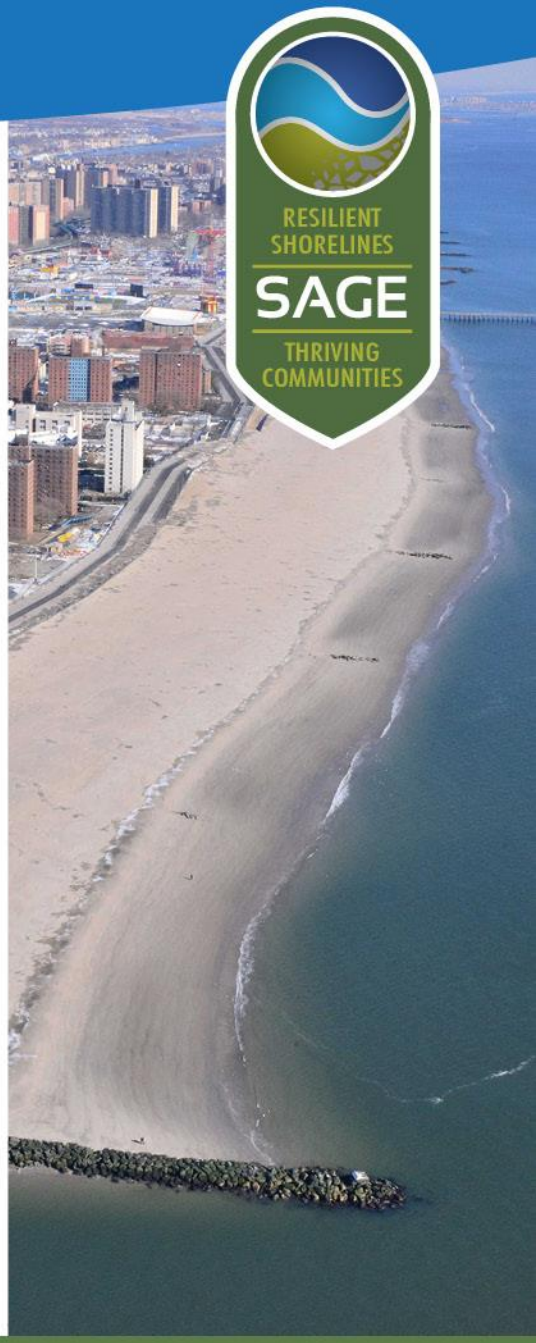
# Conservation Finance

- New opportunities in conservation finance
- Linking coastal conservation projects with investor expectations
- Challenges to conservation finance growth
- Potential investment mechanisms
- Paradigm shifts necessary to reduce impediments for investors



# Building a Community of Practice

- Duplication of efforts
  - A lot of momentum around living shorelines, but not enough communication
  - Understand all the stakeholders and projects within a region before starting a new initiative
- Leadership
  - States need to be the leaders



# Questions?

**SAGE Website:**
**http://sagecoast.org**

Debbie Larson-Salvatore
U.S. Army Corps of Engineers
debbie.larson-salvatore@usace.army.mil