Seagrass Restoration Research
Southern New England and New York

Project Characteristics:

- *Evaluated anthropogenic stressors to seagrass habitat*
- *Watershed nitrogen load modeling*
- *Statistical projections of climate change impacts (thermal stress and sea-level rise induced light attenuation)*
- *Strategies to promote enabling conditions in estuaries for seagrass preservation and restoration*

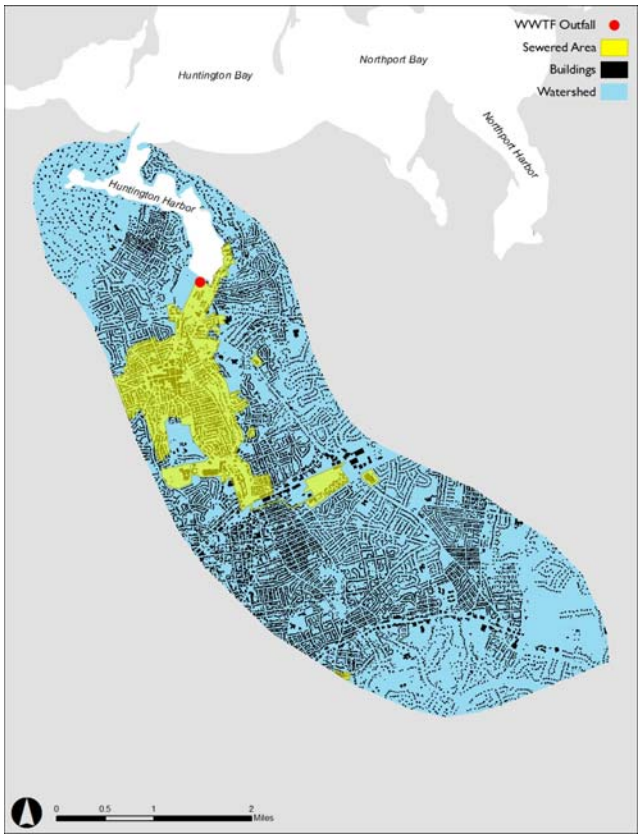
Woods Hole Group worked for The Nature Conservancy (TNC) to evaluate the interactive effects of multiple stressors on seagrass, and to develop strategies for TNC to optimize preservation and restoration investments. The work advanced Phase I genetic diversity tests and multi-stressor mesocosm studies, which identified regionally resilient eelgrass populations). The objective of Phase II was to collect and augment site-specific data on nitrogen loads, benthic conditions, and historical extent of seagrass habitats, and then predict how future conditions (effects of nitrogen loads and climate change) may influence and guide protection and restoration strategies in long-term planning.

Woods Hole Group conducted a literature review and data search to identify and catalogue relevant data for 170 embayments and subembayments (spanning Long Island to Cape Cod), including:

- Estuarine areas and volumes
- Estuarine flushing times
- Nitrogen loading rates
- Sediment organic matter content
- Present and historical extent of seagrass

Woods Hole Group ranked estuaries based on the susceptibility of seagrass habitat to nitrogen loads and water residence times, and selected 20 embayments for further analysis. The work included collaboration with TNC's Seagrass Initiative Technical Team to consider other factors (genetics, resilience, proximity to salt marsh, watershed conditions),

Woods Hole Group developed nitrogen loading models for the 20 embayments, evaluated the susceptibility of seagrass populations to nitrogen loading, and evaluated the probability of reducing nitrogen loading sufficiently to sustain seagrass populations.



Next, relative risks of climate change stressors were assessed. A statistical approach was developed to predict the frequency and severity of heat stress in each embayment. Simultaneously, an analysis of relative sea-level rise and tidal amplitude informed predictions of vertical/horizontal habitat migration and minimum light availability reductions.

The work integrated three lines of evidence (risks to nitrogen enrichment, thermal stress, and sea-level rise), and provided an overall relative risk to stressors for each embayment. TNC is using this evaluation and Woods Hole Group's recommendations to strategically inform their investments in seagrass preservation and restoration projects.

Location:	CT, MA, NY, RI
Client:	The Nature Conservancy 250 Lawrence Hill Road Cold Spring Harbor, NY 11724
Contact:	Christopher Clapp
Telephone:	631-329-3981