

Nitrogen Load Modeling in LIS Coastal Watersheds



S. Harold

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TNC Marine Research, Restoration, and Monitoring



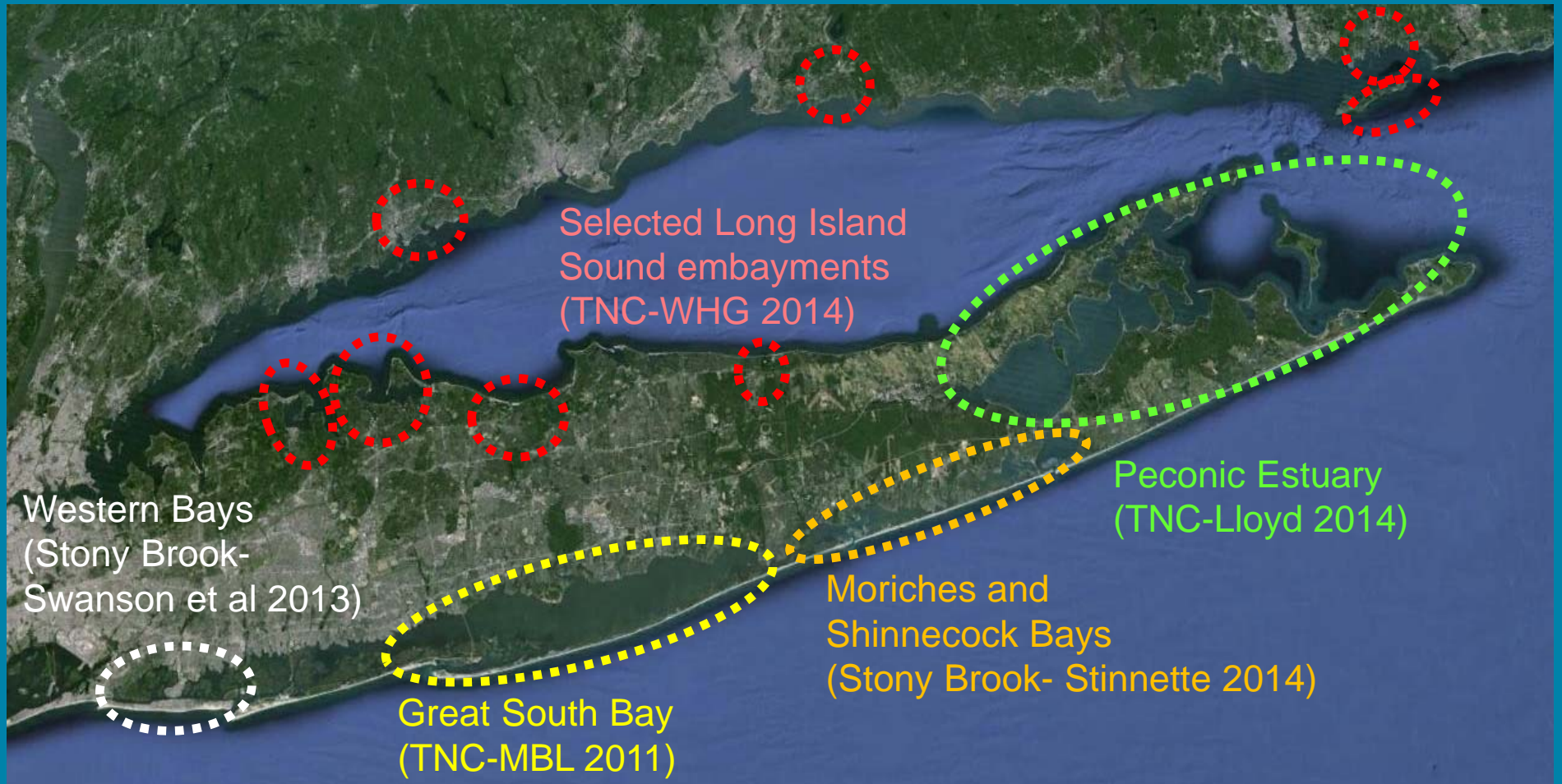
3 focal areas:

- shellfish restoration
- seagrass research
- salt marsh monitoring

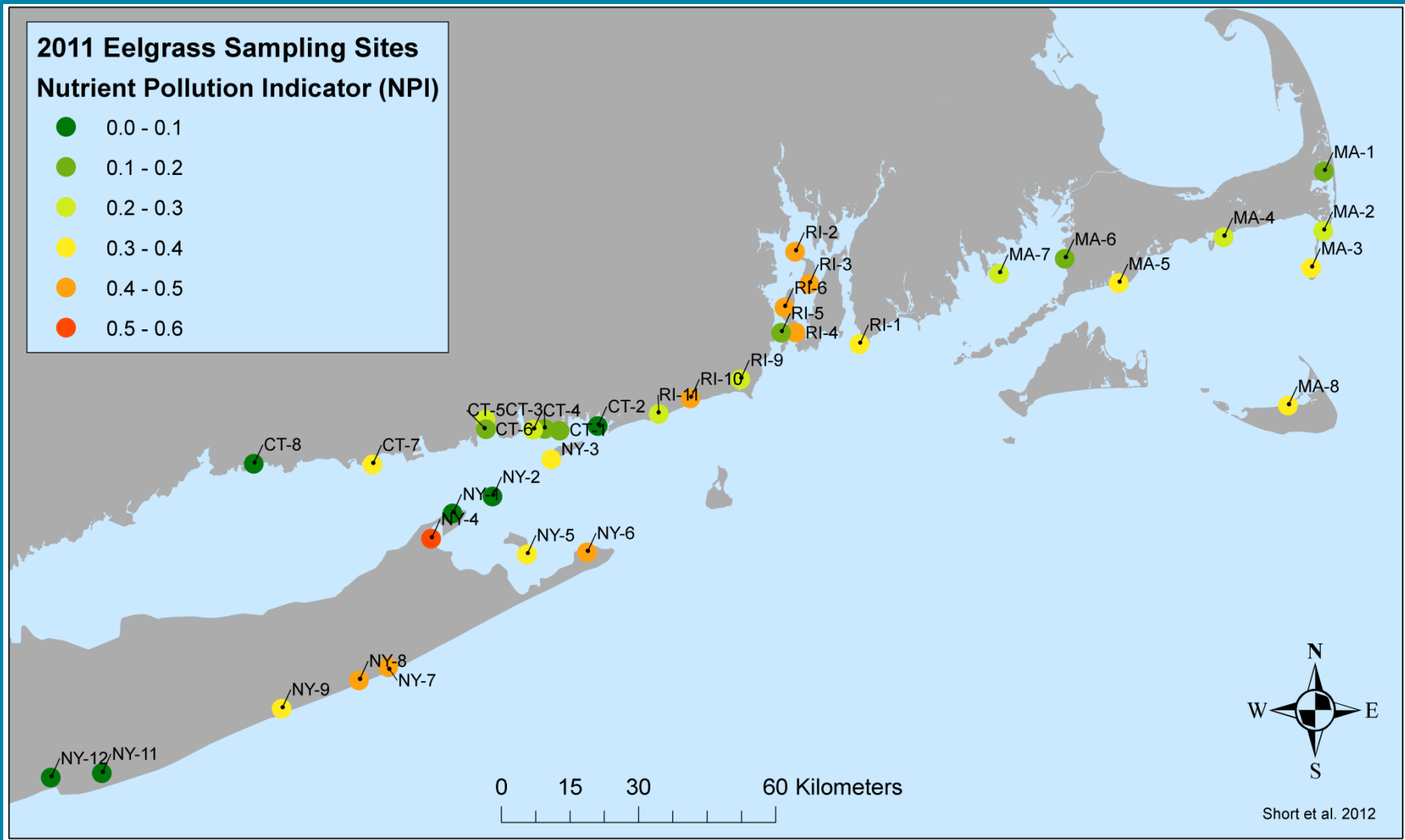
1 Conclusion:
Water quality - specifically **nitrogen pollution** - is impairing ecosystem function, and degrading critical habitats



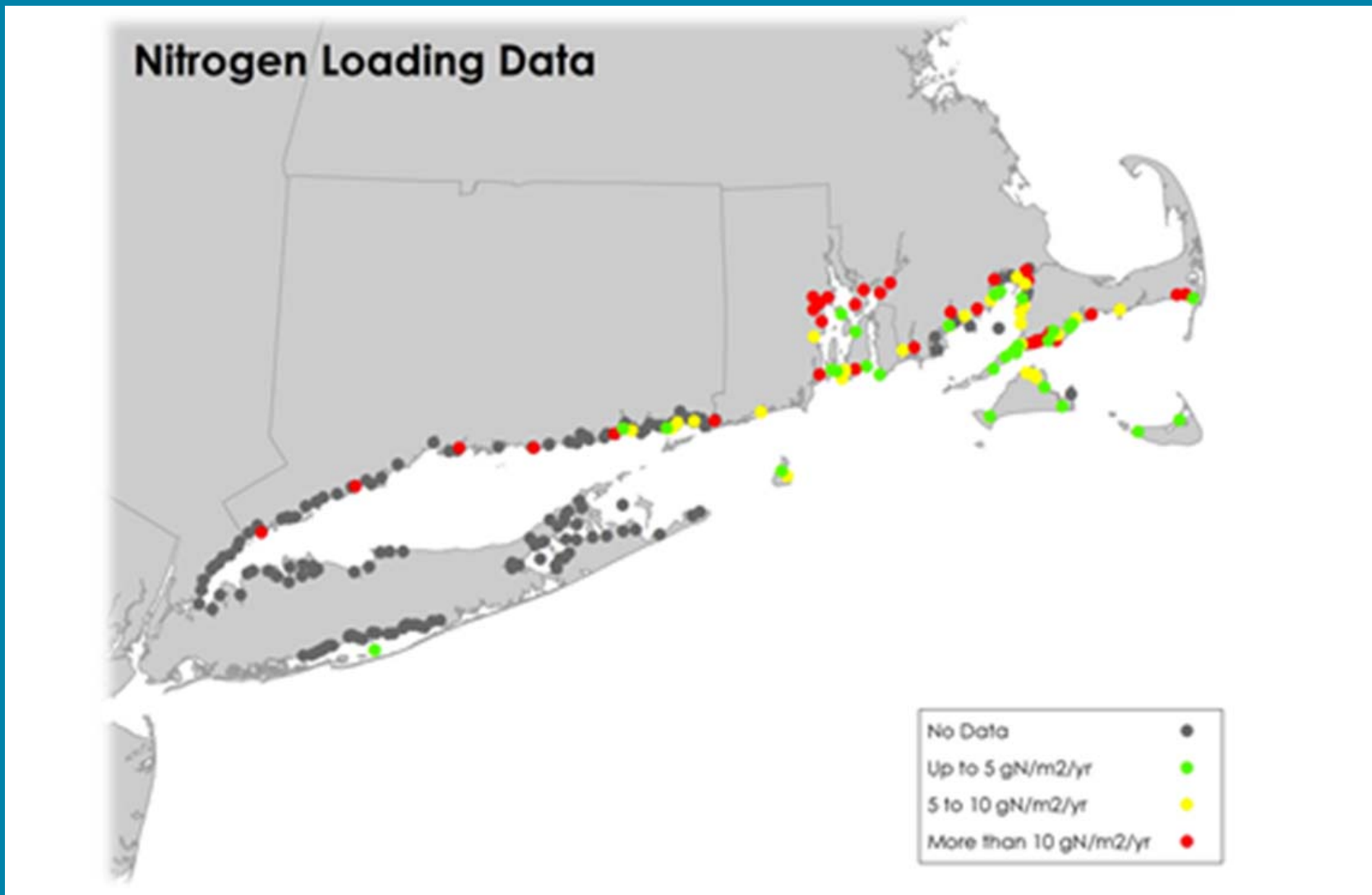
Completed Nitrogen Load Models on Long Island & in Long Island Sound



Seagrass Research



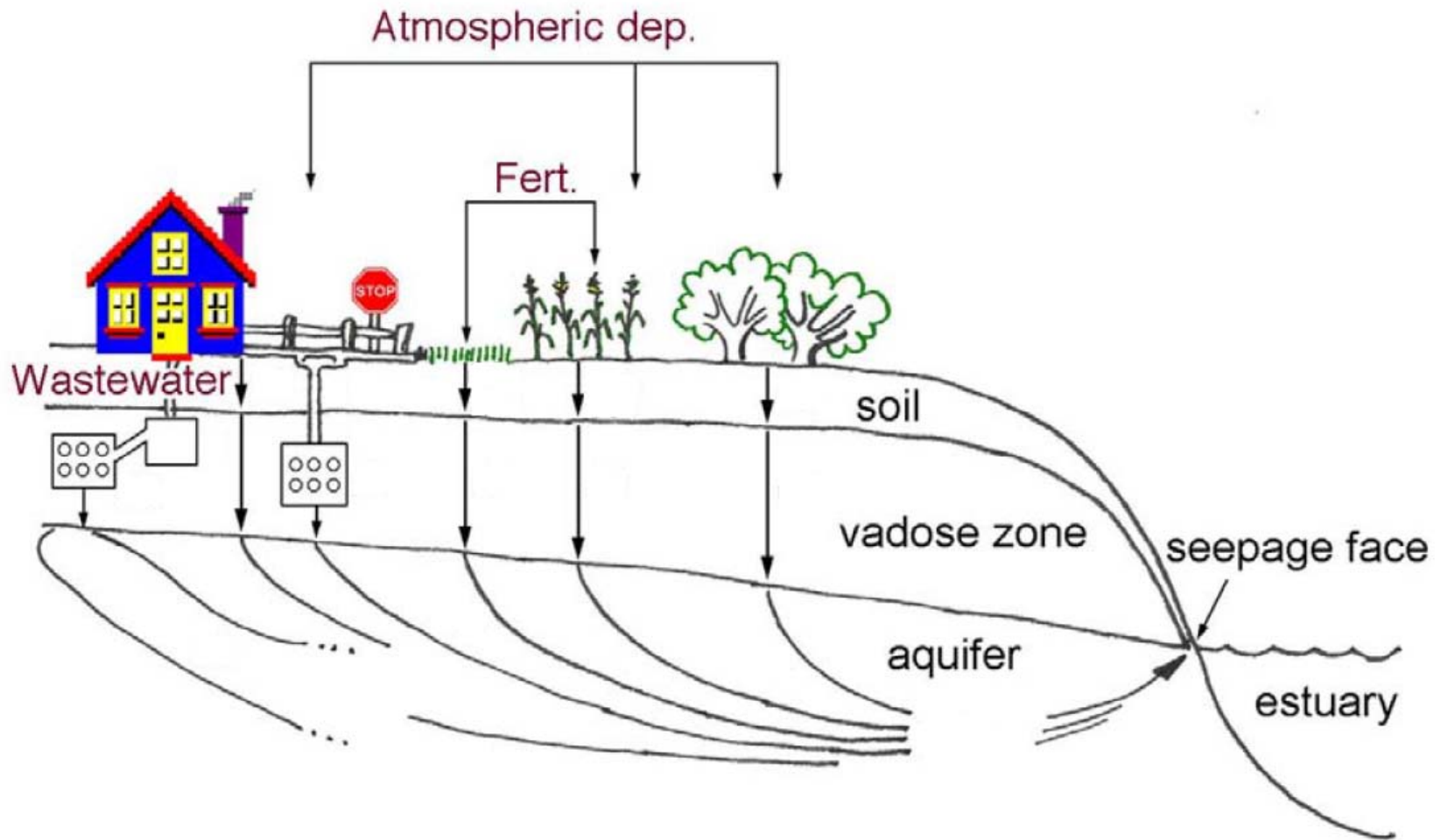
Nitrogen Thresholds for Seagrass Survival



Nitrogen Loading Model (NLM)

- A spatial data model that produces *relatively accurate* estimates of nitrogen load by the major contributing sources.
- Can be adapted to meet **local conditions**, and utilized to explore **scenarios** for how to **reduce** nitrogen load
- Developed by leading researchers at the **Marine Biological Laboratory** in Woods Hole.
- Has been **validated** in other watersheds, and against other models such as the USGS SPARROW model
- **Some limitations:** Static model, generalized assumptions, requires lots of inputs to be made site specific.

Nitrogen Loading Model (NLM)



Source: Kinney and Valiela 2008

NLM inputs and parameters:

Required Data:

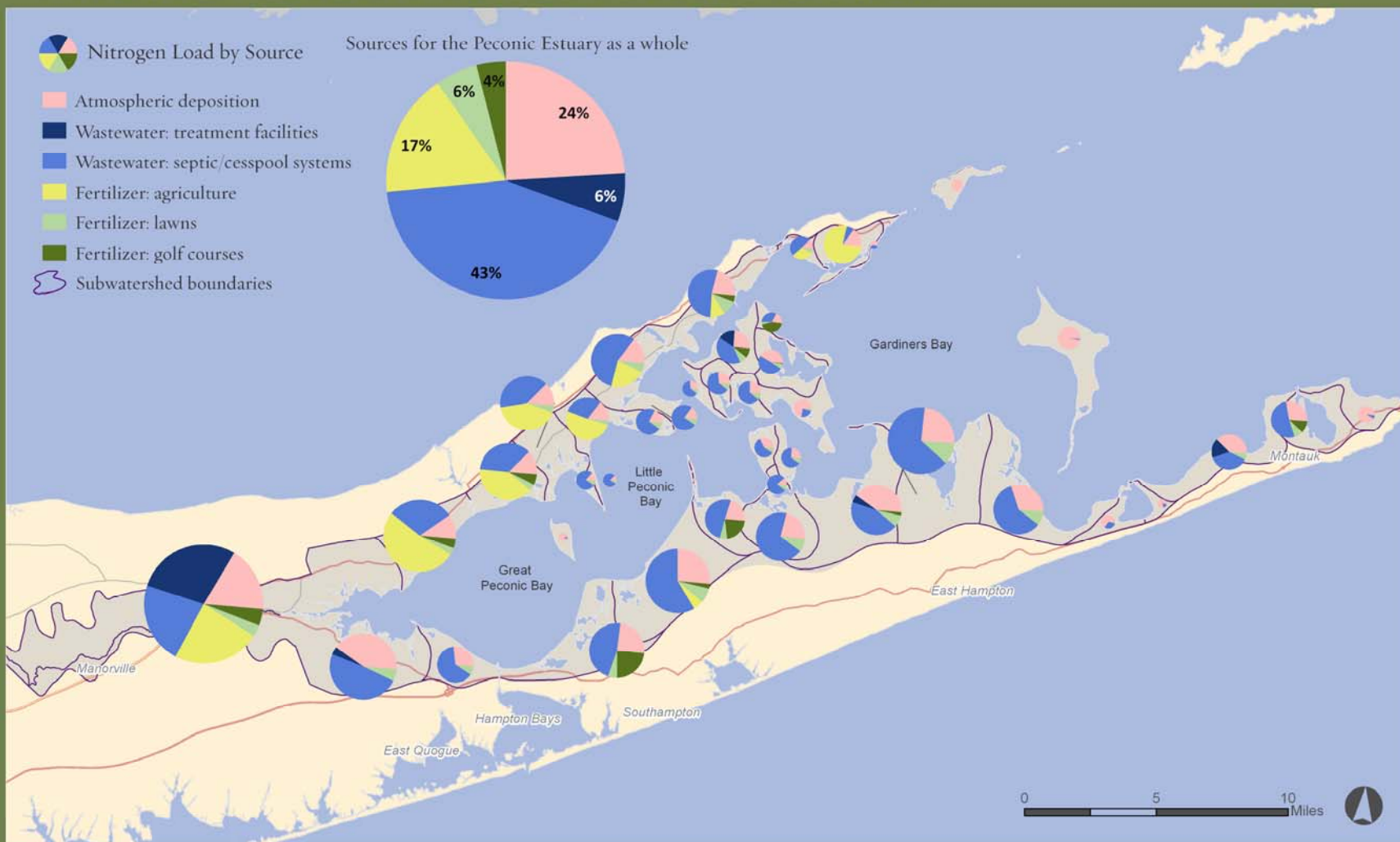
- Subwatersheds
- Land Cover (e.g. NLCD, CLEAR)
- Land Use (e.g. parcel data)
- Population data (e.g.. census)
- Sewer Boundaries
- Atmospheric Deposition monitoring locations
- STP locations and associated outflow data
- Fertilizer rates (lawns, golf/parks, agriculture)

Optional – if available (“model enhancers”)

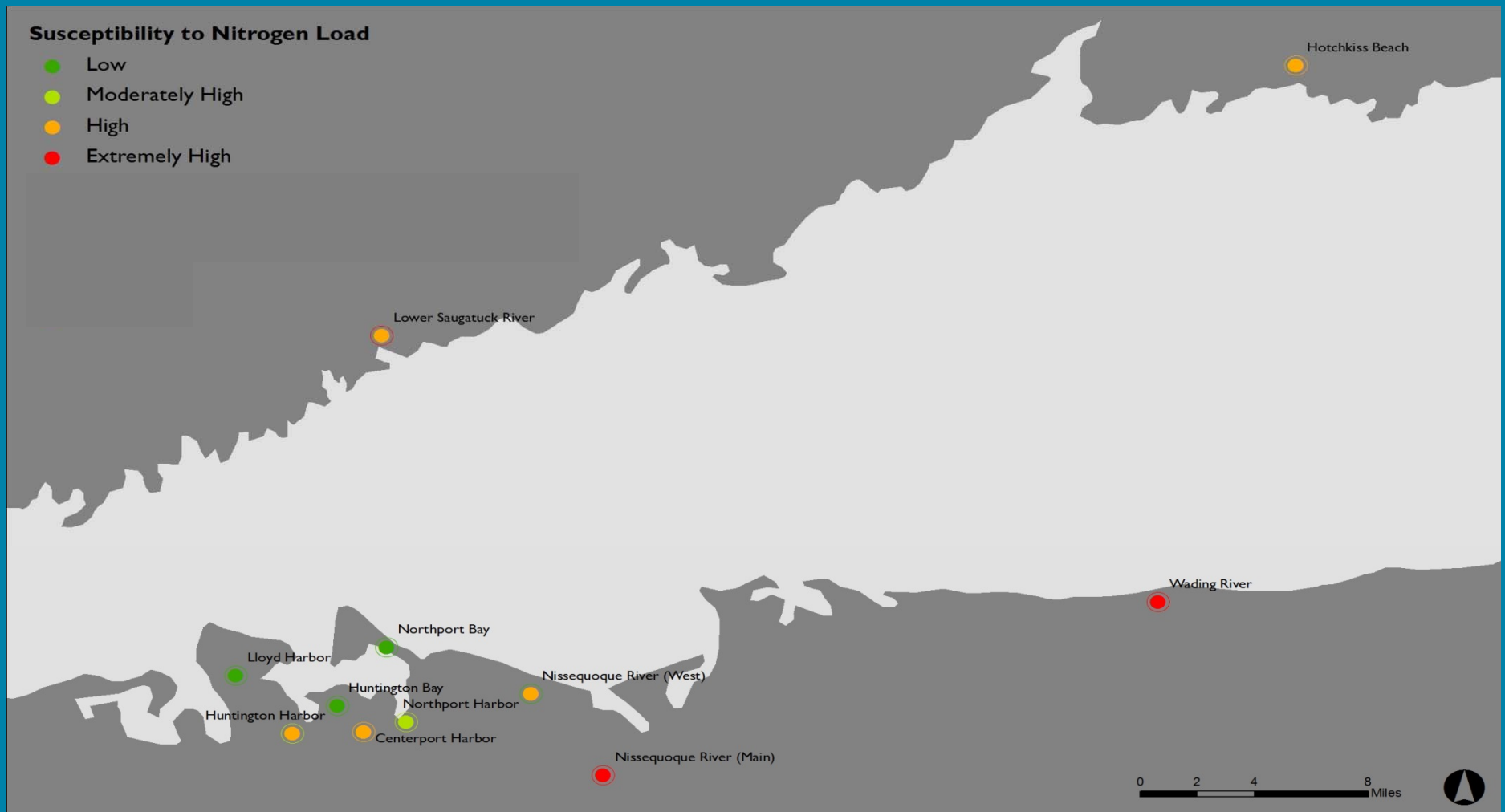
- Septic versus Cesspool percentages
- Agricultural crop types information
- Localized fertilizer rates
- Seasonal population data
- Unsewered commercial/institutional loading sources

Sample Nitrogen Loading Results: Peconic Estuary

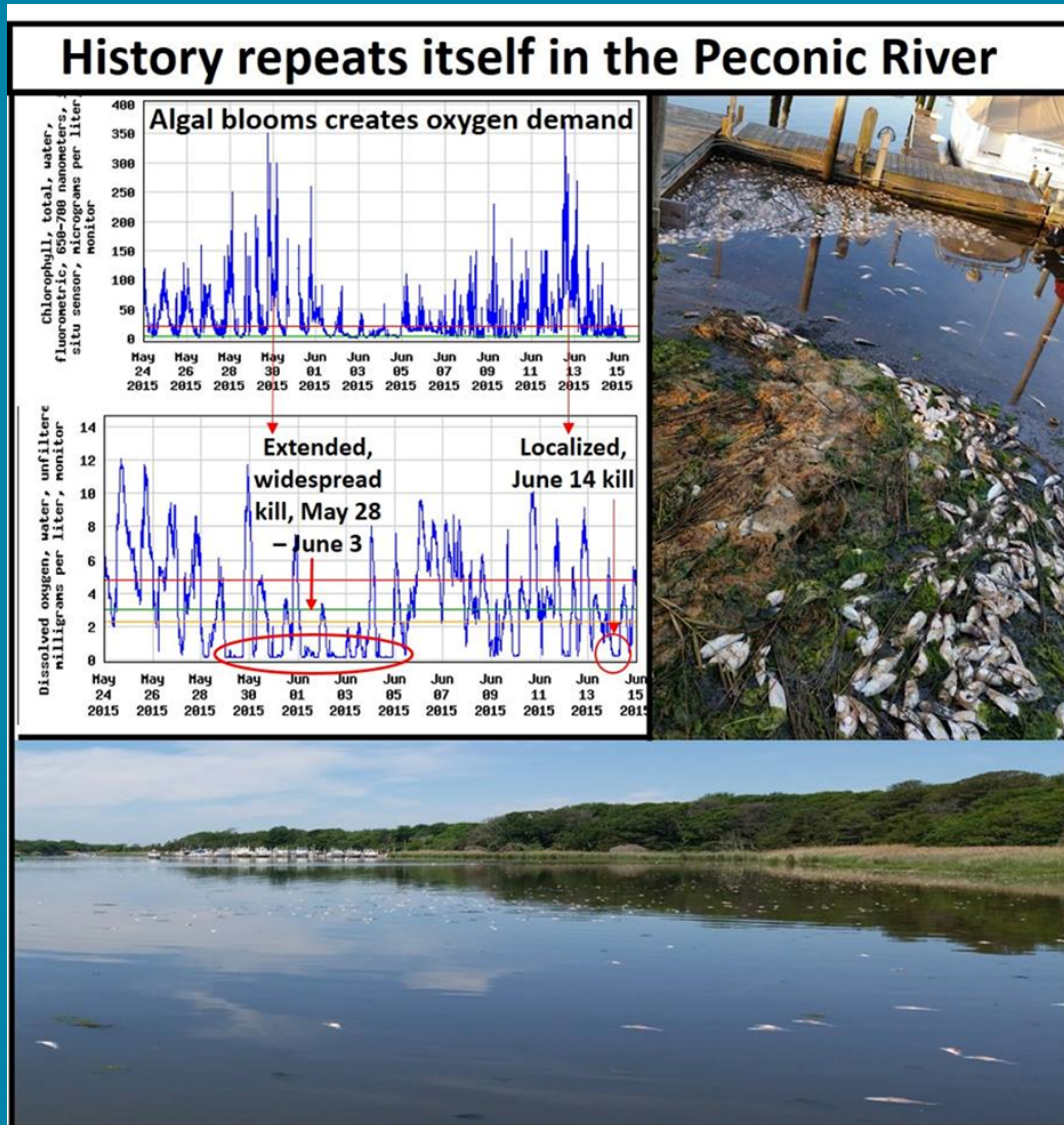
NITROGEN LOADING TO THE PECONIC ESTUARY



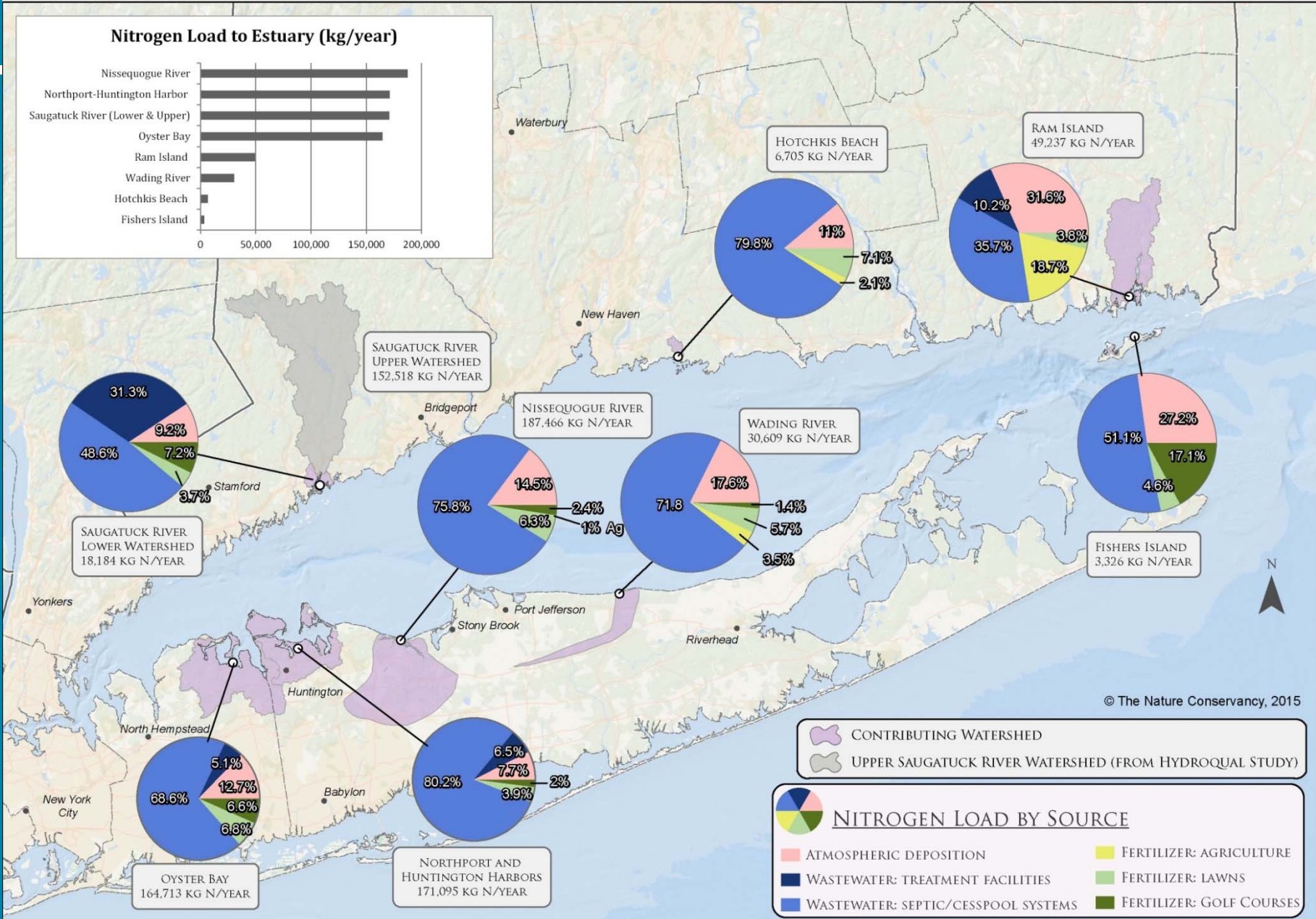
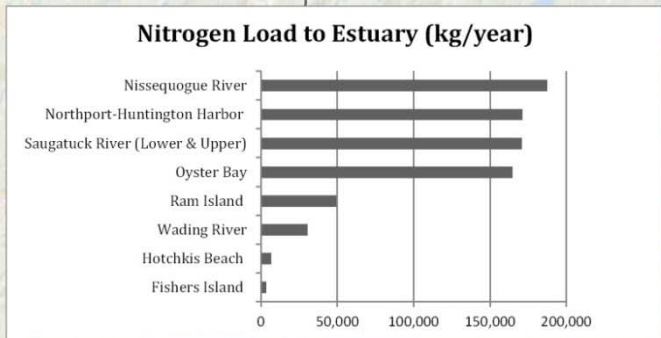
Management Applications



Verifying Results - Monitoring



NITROGEN LOADING SOURCES: LONG ISLAND SOUND



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