

It's the Water Quality, Stupid!

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# **It's** the Water Quality, Stupid!

- Fish Kills in Narragansett Bay
- Anoxia/Hypoxia in Long Island Sound
- Eelgrass declines in Great Bay Estuary
- Benthic community impacts in Boston, New Bedford and Gloucester









# It's the **Water Quality**, Stupid!

- Nitrogen/phosphorus concentrations
- Chlorophyll a
- Suspended solids
- Water clarity/light attenuation
- All of the Above

# It's the Water Quality, **Stupid!**

- Duarte et al. (2009) Return to *Neverland*: Shifting Baselines Affect Eutrophication Restoration Targets
  - May not be able to get the same system back
  - Trajectory of the recovery will likely be different than that of the decline
  - Ecosystems are complex with both top-down and bottom-up controls



# Do we really know what we Know?

- How much light do seagrasses need?
  - Eelgrass roughly 20%
  - Carbon production due to photosynthesis is a function of light and temperature
  - 20% is tied to adult shoot survival, does not guarantee successful completion of entire life cycle (i.e. viable seed production)
  - Seedlings need a much higher quantity

# Approaches to Management of Water Quality to protect Seagrass

- Ambient nutrient criteria
  - Indirect effects (Chesapeake Bay Model)
  - Direct effects
- Watershed loading model
  - Correlates system response with nutrient loading rate
- Multimetric approach
  - Looks at multiple parameters that affect water clarity
- System manipulation
  - Addition of shellfish, dredging

# Success Stories

- Tampa Bay Estuary
- Chesapeake Bay
- Boston Harbor
- New Bedford Harbor
- Gloucester Harbor