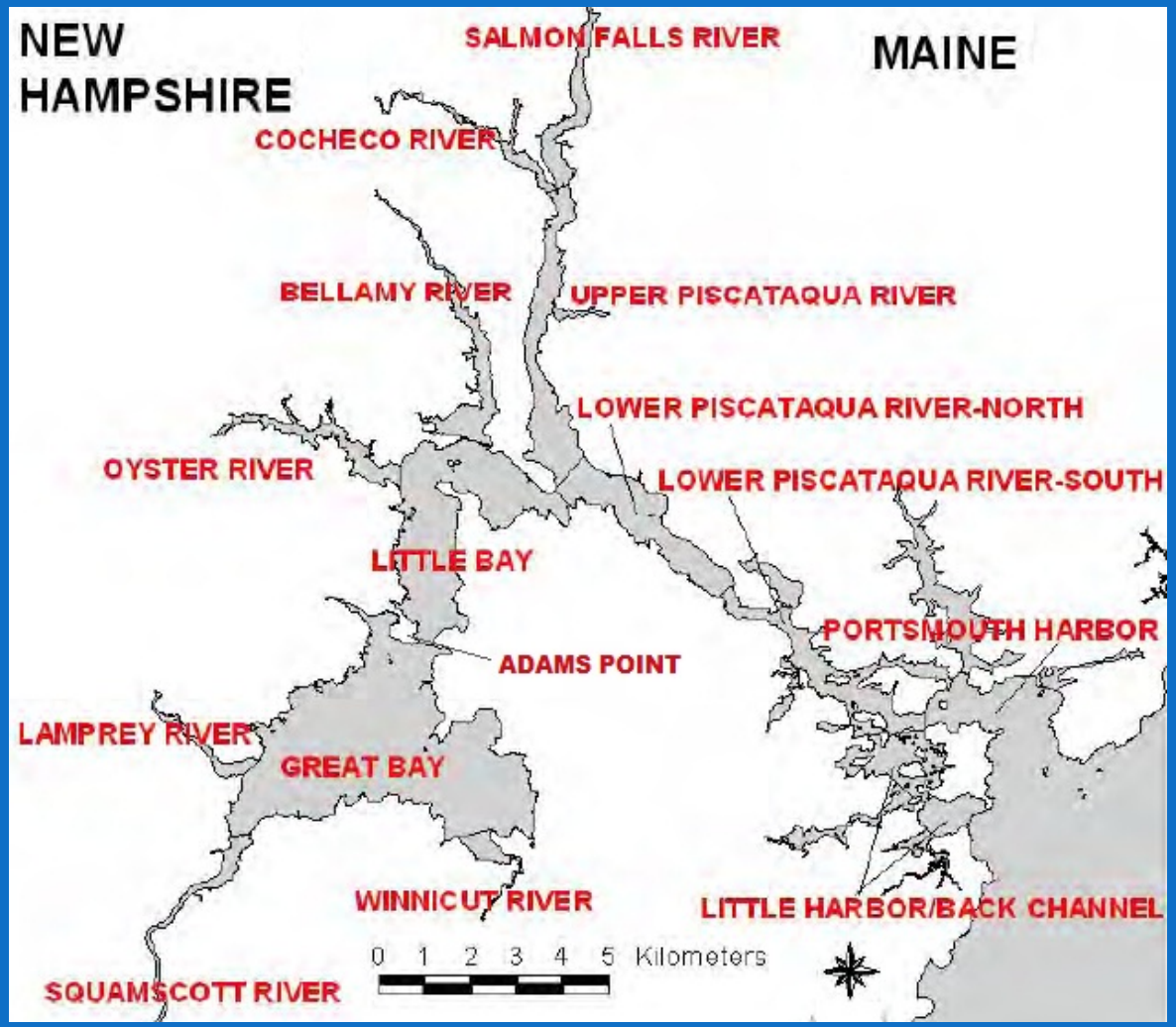
Great Bay Municipal Coalition

Suzanne Woodland and Terry Desmarais

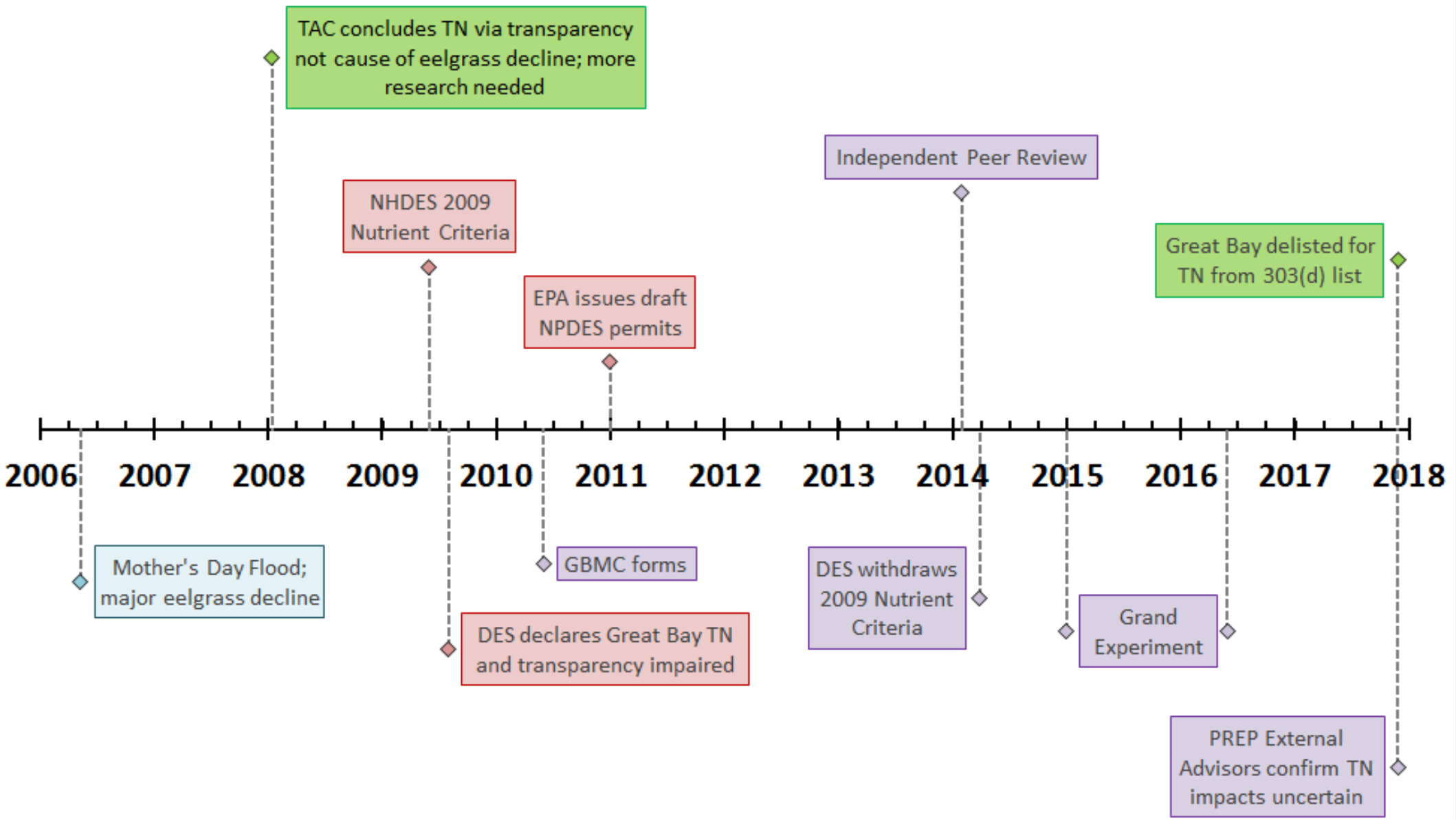
Great Bay Municipal Coalition

April 2, 2018

Great Bay Estuary, NH



History of Total Nitrogen Issue in Great Bay Estuary



2014 Independent Peer Review Committee

Dr. Vic Bierman - Estuary modeler

LimnoTech

Dr. Robert Diaz – DO

Virginia Institute of Marine Science

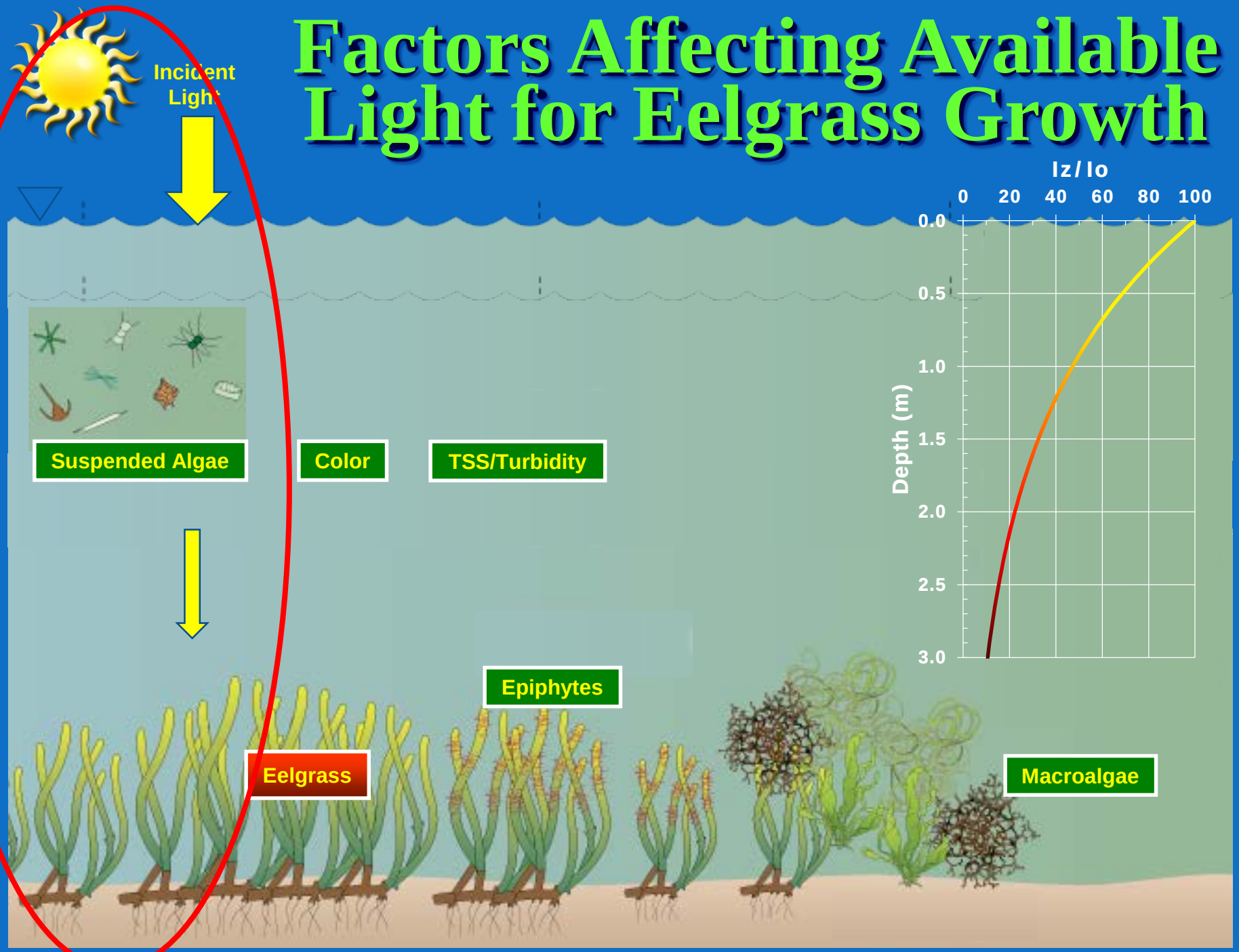
Dr. Ken Reckhow – Statistics

Duke University

Dr. Jud Kenworthy – Eelgrass

Center for Coastal Fisheries and Habitat Research

Factors Affecting Available Light for Eelgrass Growth



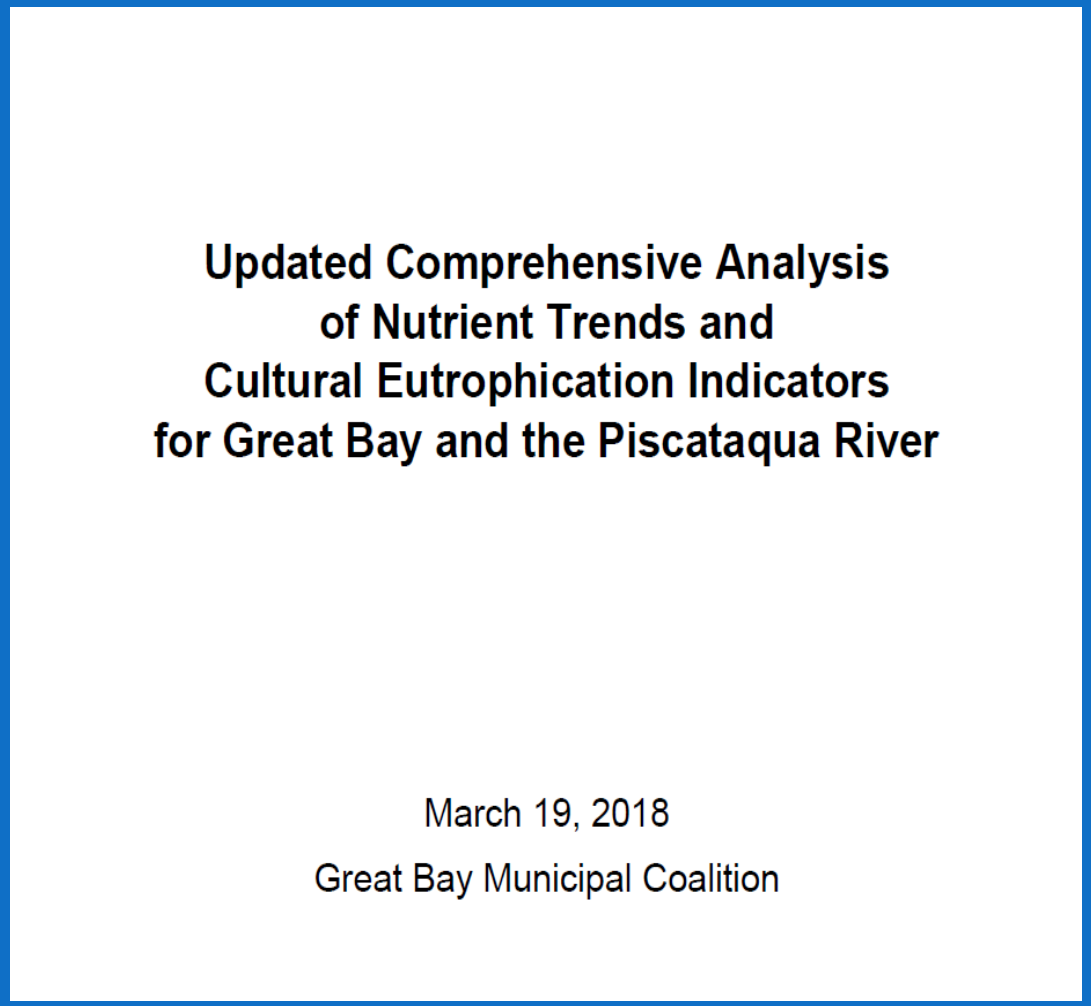
Peer Review Report - Key Conclusions

- Need To Look At Confounding Factors
- No Scientifically Defensible Linkage Between Nitrogen And Eelgrass Impairment
- Regulatory Conclusion That Excess Nitrogen Is A Factor Of Eelgrass Decline Was Not Supported By Data

Post Peer Review

- Commented on DES During 303(d) Listing Evaluation
- GBMC Participated in the PREP Technical Advisory Committee
- Met With Governor Sununu Regarding GBMC Efforts
- Met With Environmental Protection Agency and DES Regarding Permit Conditions
- Provided GBMC Scientific Conclusions Report

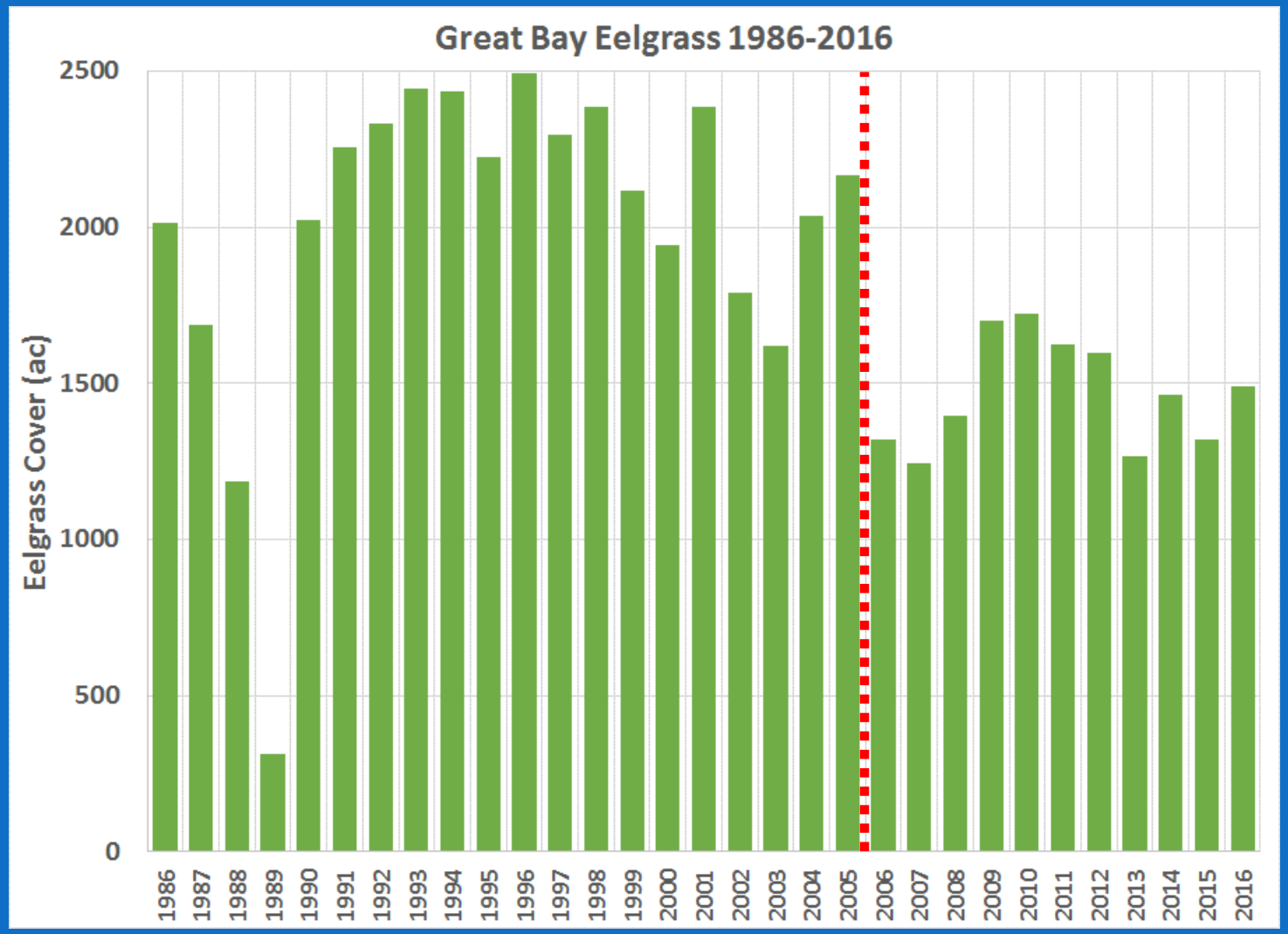
Latest Regulatory Submission



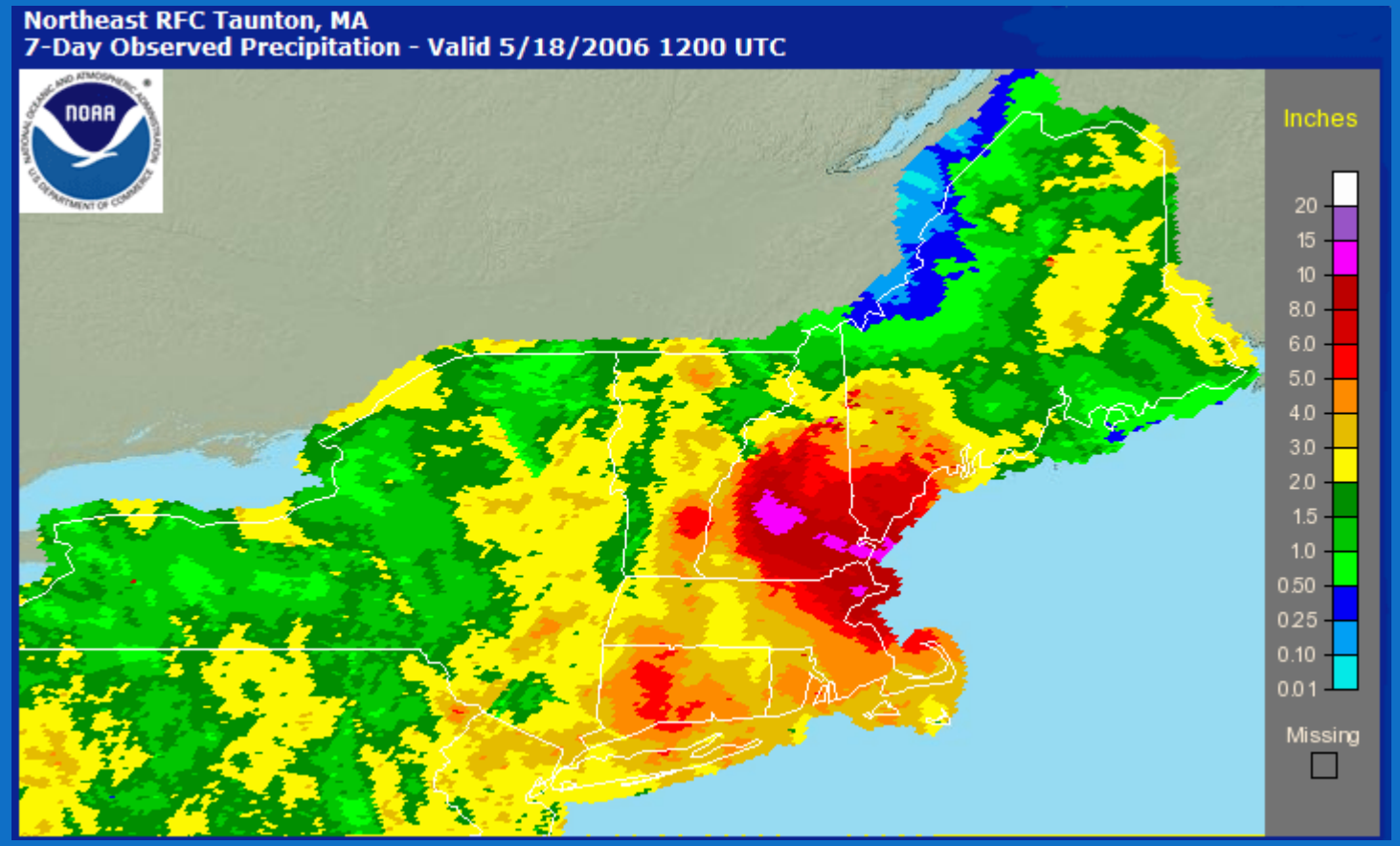
Issues Reviewed

- Eelgrass Changes
- Nitrogen Concentrations
- System Response

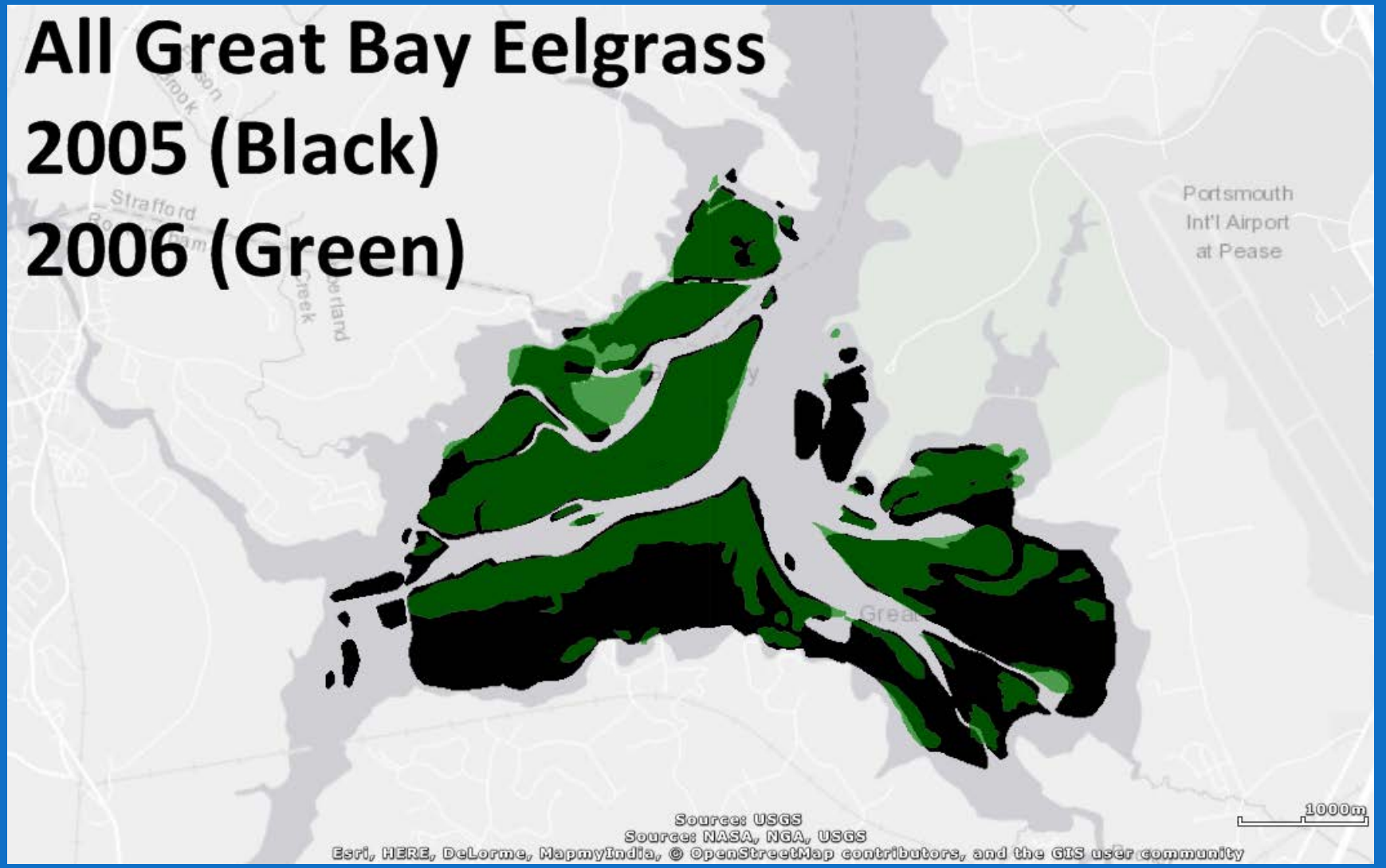
Prior to 2006, System Not Considered Eelgrass Impaired



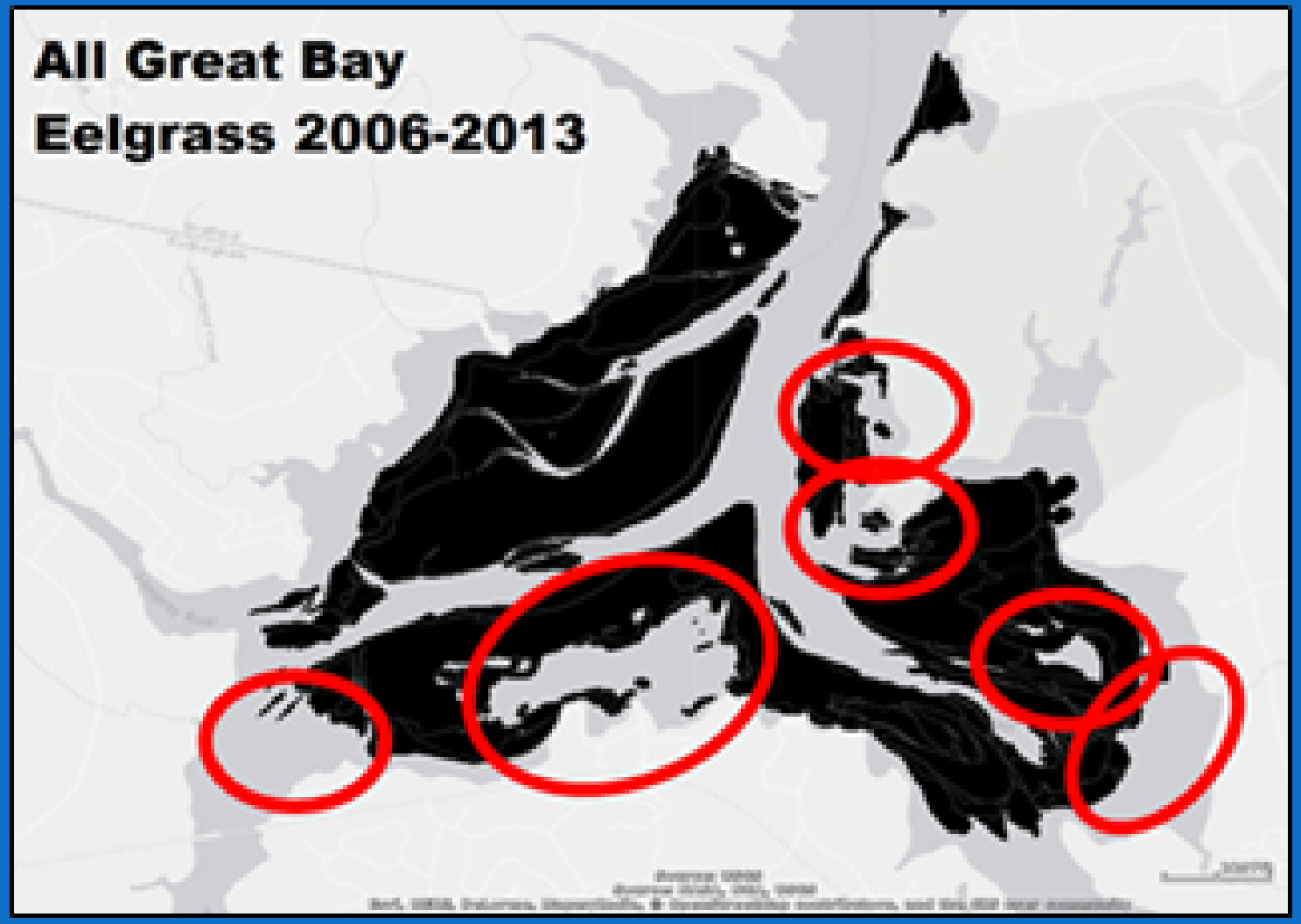
2006 Mother's Day Storm/Flood in Watershed



Before and After Mother's Day Storm

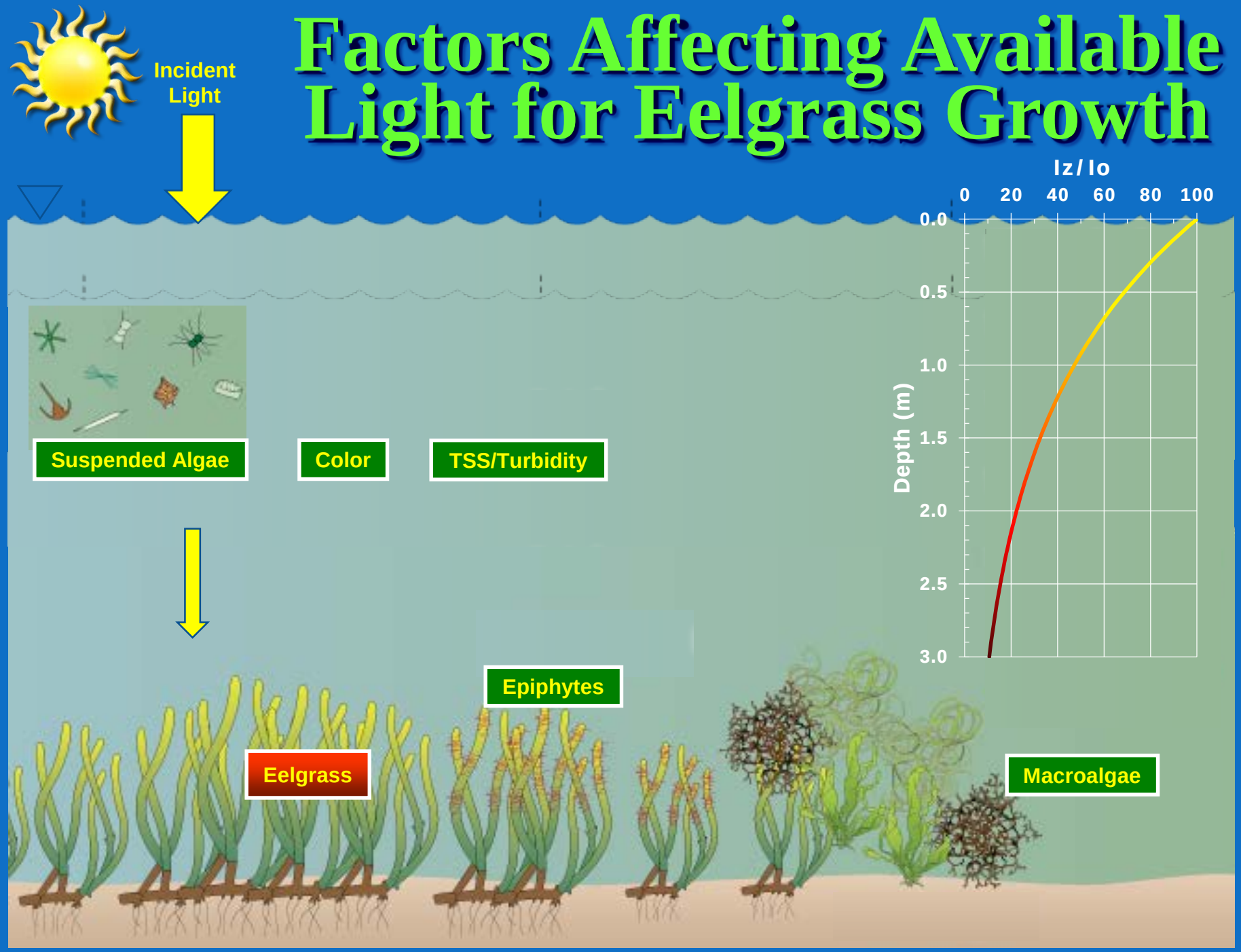


Post-Mother's Day Storm Eelgrass Recovery



Has anything changed over time? What conditions were present when eelgrass acreage was much higher?

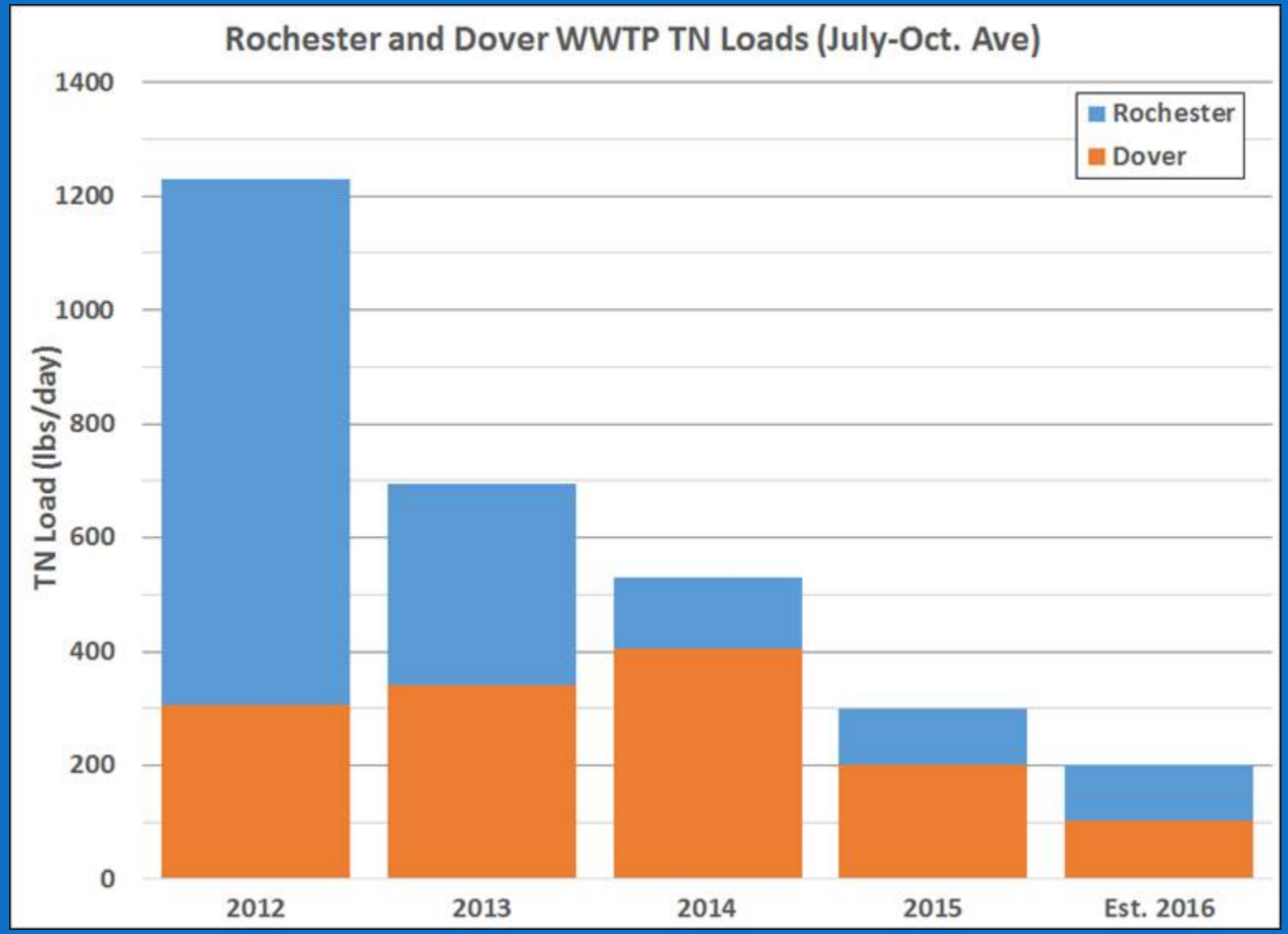
Factors Affecting Available Light for Eelgrass Growth



Other Factors to Consider?

- Substrate Conditions
- Macroalgae Populations and Impacts
- Episodic Stressors Such As Major Rain Events, Wasting Disease, etc.
- System Hydrodynamics (bathymetery, residence time, water motion, etc.)

Rochester and Dover WWTP TN Load Reductions



Long Term Data Shows

- Total Nitrogen Levels are Trending Lower
- Dissolved Inorganic Nitrogen (DIN) at Historic Low Levels
- Algal Growth Trend is Unchanged

Updated Comprehensive Analysis of Nutrient Trends and Cultural Eutrophication Indicators for Great Bay and the Piscataqua River, Great Bay Municipal Coalition, March 19, 2018

http://files.cityofportsmouth.com/files/ww/GreatBayComprehensiveAnalysis3.19.18.pdf

PREP – 2018 State of Our Estuaries Report
Total Nitrogen

- [T]he Great Bay Estuary may have traits that *make it more tolerant of high nutrient levels* (such as high flushing rates) […]. (SOOE at 8)
- Eelgrass decline may relate to episodic stressors, such as storms, but it is equally plausible that chronic stressors, such as decreased water quality, may have limited the resilience of eelgrass to episodic disturbances. *More comprehensive data is needed to better understand the interactive effects of these stressors*. (at 9)
- How much nitrogen reduction is enough or too much? *The data to answer this question do not currently exist*. (External Advisors at 239)

GBMC Scientific Conclusions

- 2006 major eelgrass decline not caused by nutrient impairment
- TN loads have decreased substantially over past several years, below levels when eelgrass historically thrived
  - *System-wide nitrogen reductions had to date no demonstrable impact on eelgrass or other forms of plant growth in system*
- DIN and algae concentrations indicate “good” water quality in Great Bay and the Piscataqua River
- Eelgrass cover remained relatively constant since 2006 eelgrass losses, slow recovery is indicated

Approach

- Adaptive Management (Build and Measure)
- Continue Current Voluntary Nitrogen Reductions
- Collaborative Science
- Advance Regulatory Discussions

Efforts Undertaken by GBMC

- Voluntary TN Reductions
- 2014 Peer Reviewers
- UNH Water Quality Data Collection
- Hydrodynamic Model
- Comments On Regulatory Actions
- Legislative Initiatives For Outdated Regulations
- PREP SOOE Report Input
- Eelgrass Mapping/Ground-trothing
- Updated Comprehensive Analysis, March 2018

Ongoing City Efforts

- Complete Peirce Island Wastewater Treatment Facility Upgrade
- Pease WWTF NPDES Permit Discussion
- 303(d) State Water Body Impairment Listing Review
- Sagamore Creek Water Quality Sampling
- Install Sewers In Sagamore Creek Area Near Route 1A Bridge