



How Rhode Island Implemented Nitrogen Limits for Narragansett Bay



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Types of Permit Limits

- Technology-based limits (TBELs)
 - Secondary Treatment Standards found at 40 CFR Part 133 for POTWs are limited to BOD, TSS, and pH
- Water quality-based limits (WQBELs)
 - Per 40 CFR Part 131 - Developed on a site-specific basis to protect designated uses and water quality criteria (numeric and narrative)
- Best Professional Judgement (BPJ) Limits
 - Per 40 CFR 125.3(c)(2) – Developed on a case-by-case basis

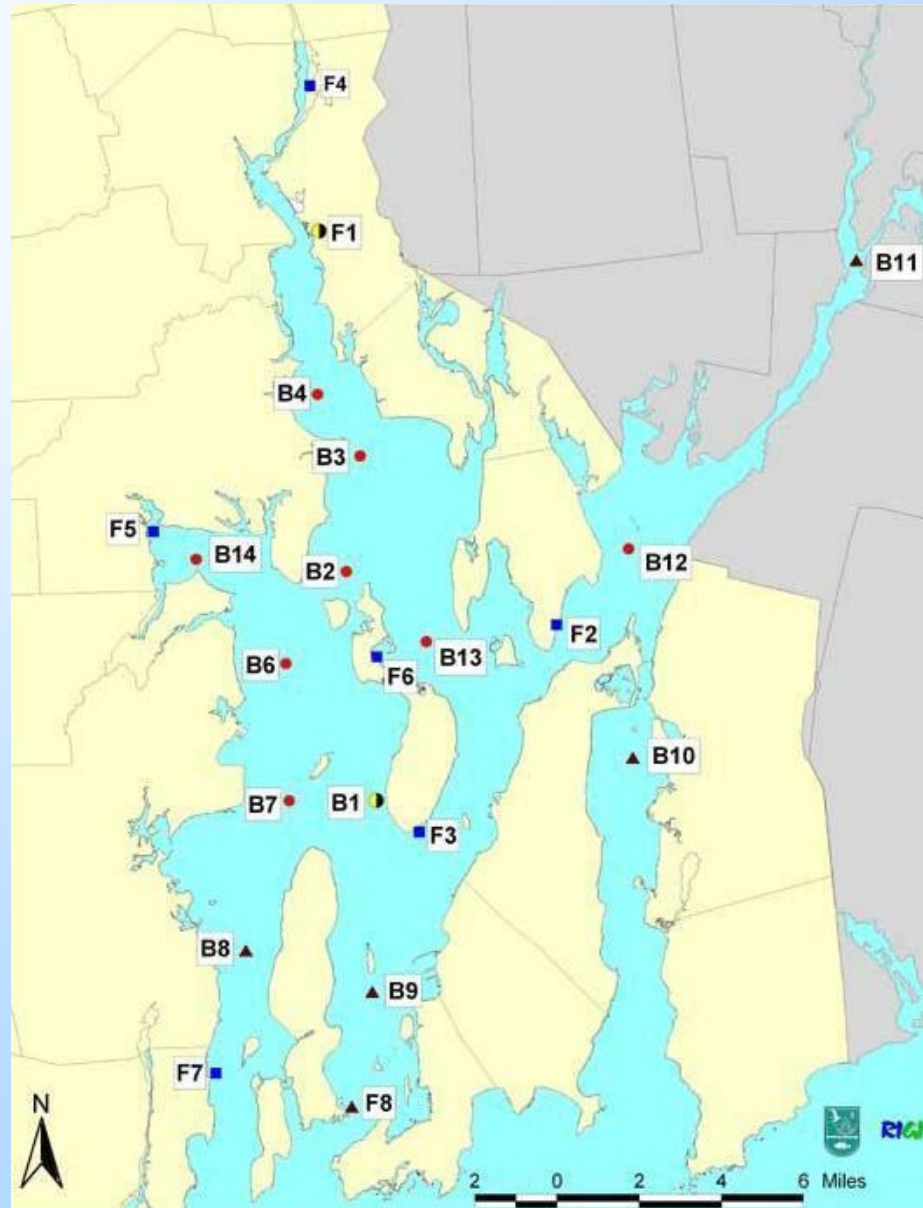


Reasonable Potential Requirements

- NPDES Permits - must include limits that meet WQS when “reasonable potential” to cause, or contribute to WQS violations (40 CFR 122.44(d)),
 - Additional “studies” or data collection efforts may not be substituted for enforceable permit limits where “reasonable potential” has been determined. (Central Tenets of the National Pollutant Discharge Elimination System (NPDES) Permitting)

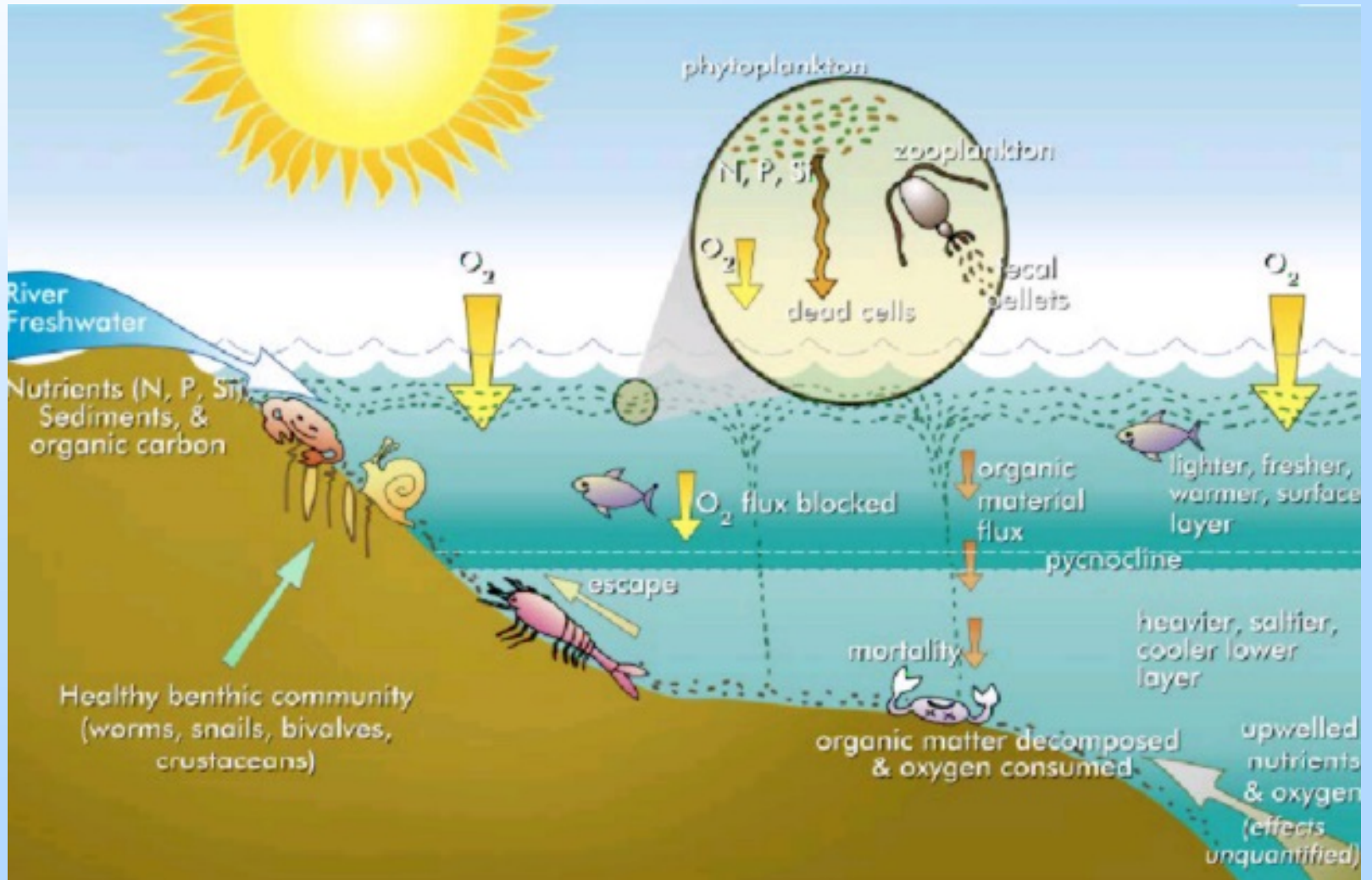


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Impacts of Excess Nitrogen





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Excess Nitrogen in Narragansett Bay





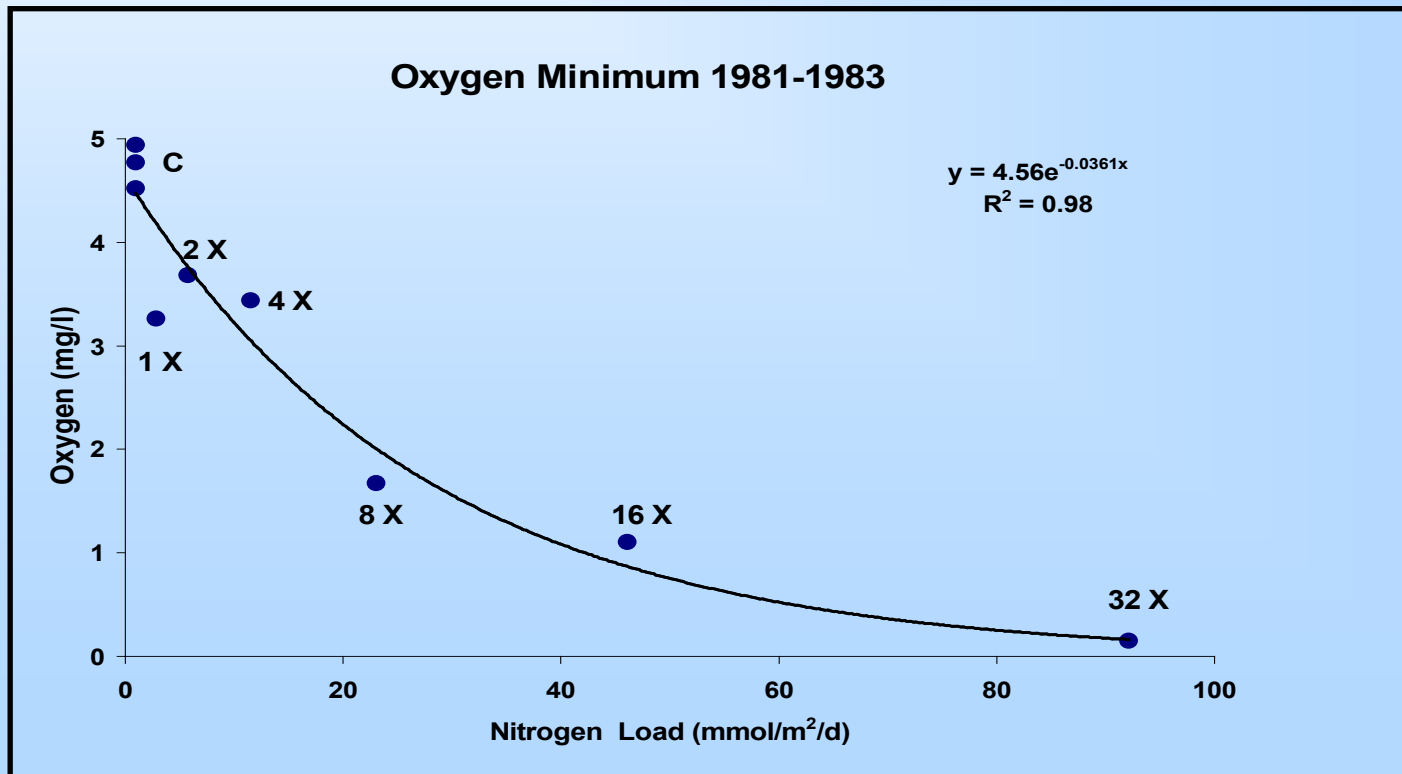
Rhode Island Nutrient Criteria

- Do not have numeric WQ criteria for nitrogen (only for phosphorus entering lakes, ponds, kettleholes, or reservoirs)
- Have a Narrative Criteria
 - None in such concentration that would impair any usages specifically assigned to said class or cause undesirable or nuisance aquatic species associated with cultural eutrophication. Shall not exceed site-specific limits if deemed necessary by the Director to prevent or minimize accelerated or cultural eutrophication.
- 1989 - 2001 Multiple attempts were made to model the Water Quality impact of nitrogen discharges to the upper bay.
- 2004 DEM used URI's MERL tank experiments to develop a nitrogen loading value that would be protective of water quality



Evaluation of Nitrogen Targets and WWTF Load Reductions

- 2004 -DEM used MERL tank experiments to predict changes in water quality and WWTF nitrogen reduction necessary to meet water DO standards and reduce chlorophyll to acceptable levels.





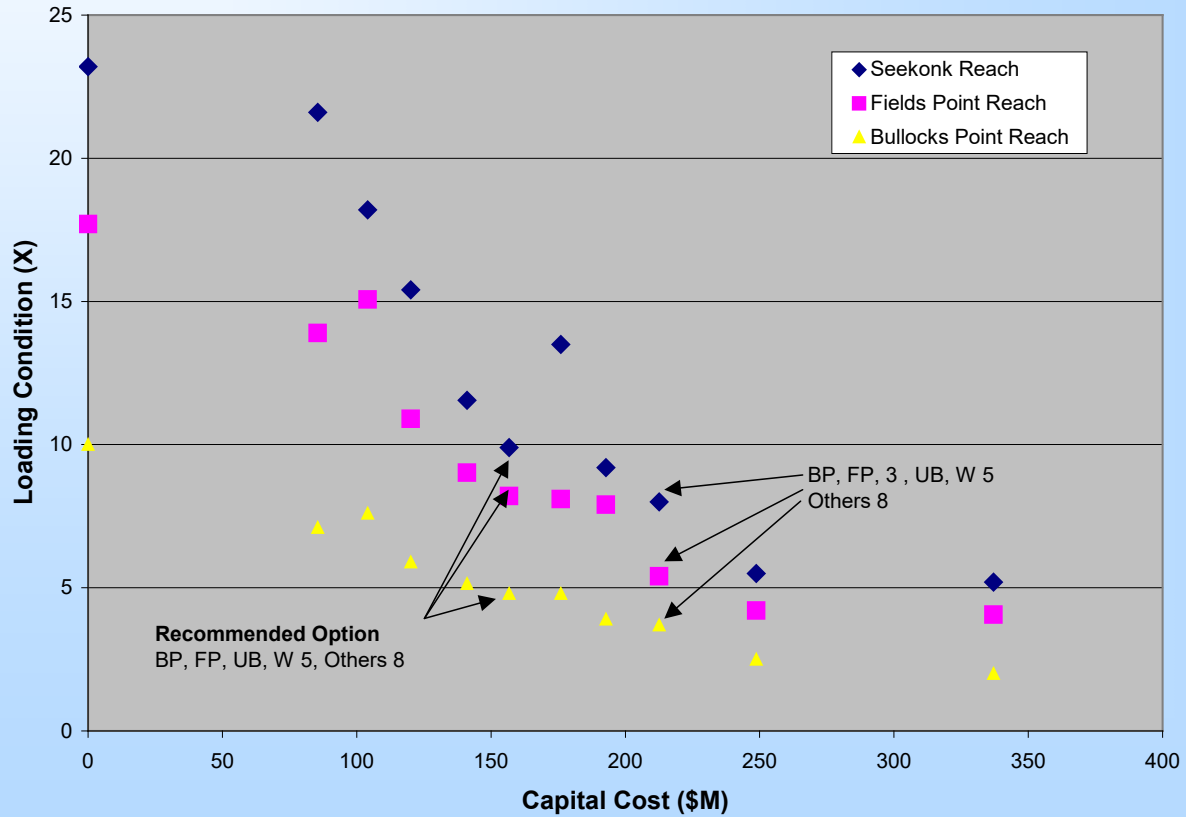
Implementation Approaches

EPA Memo dated August 2, 2006

- phased TMDL
 - significant data uncertainty and expect the loading capacity and allocation will be revised
- staged implementation
 - implementation in distinct stages, anticipated that allocations will not require significant adjustments.
- adaptive implementation
 - makes progress while using new data/information to reduce uncertainty and adjust implementation activities. Follow-up monitoring is integral to the adaptive implementation approach.



Reduction Scenarios





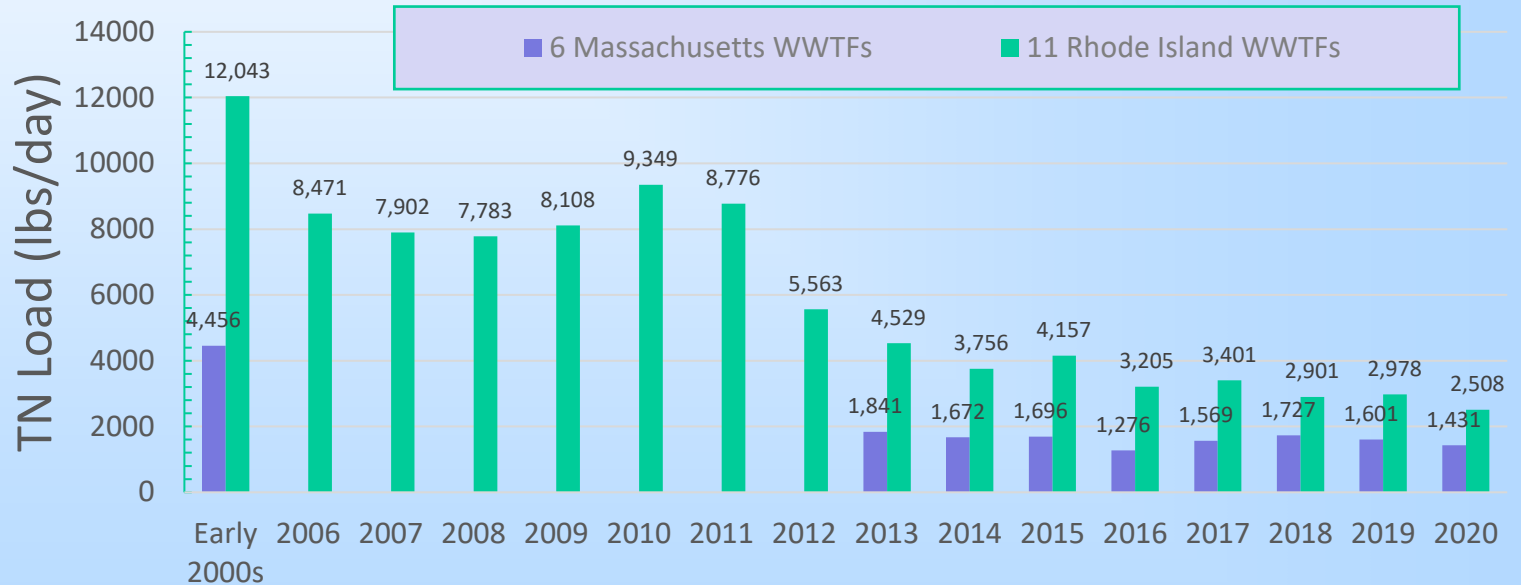
Limits Assigned

	Flow (MGD)	Total Nitrogen (mg/l)
Upper Blackstone	56	5.0
North Attleborough	4.61	8.0
Attleboro	8.6	8.0
Woonsocket	16.0	3.0
Bucklin Point	31	5.0
Field's Point	65	5.0
East Providence	14.2	5.9
Cranston	20.2	8.0
Warwick	7.7	8.0
West Warwick	11.0	7.6



Nitrogen Reductions

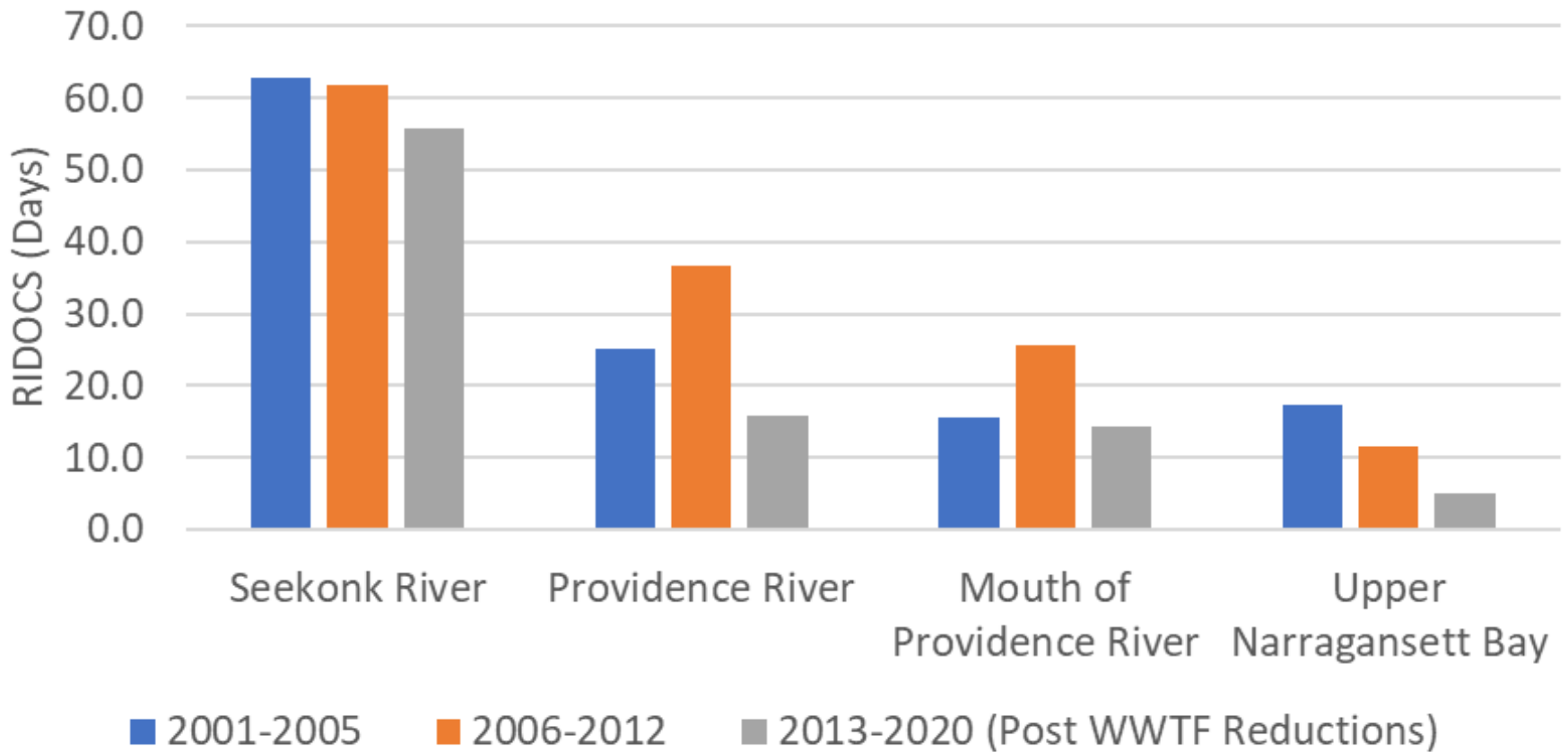
Summer WWTF Nitrogen Loads



RI WWTFs: Burrillville, East Greenwich, East Providence, NBC Bucklin Point, NBC Fields Point, Smithfield, Cranston, Warren, Warwick, West Warwick, Woonsocket; MA WWTFs: Attleboro, Graton, North Attleborough, Northbridge, UBWPAD, Uxbridge



Improvements so Far





Next Steps

- Continue with enhanced storm water controls BMPs/LID.
- Continue fixed station monitoring network
- Develop nutrient criteria.
- Continue coordination with researchers to develop observational and modeling tools.
- Apply tools to evaluate additional controls.



Questions?

