

Collaborative Science and Monitoring to Support Integrated Watershed Planning

Water Integration for Squamscott-Exeter (WISE)



National Monitoring Conference 2014
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Geosyntec
consultants



ROCKINGHAM
PLANNING
COMMISSION

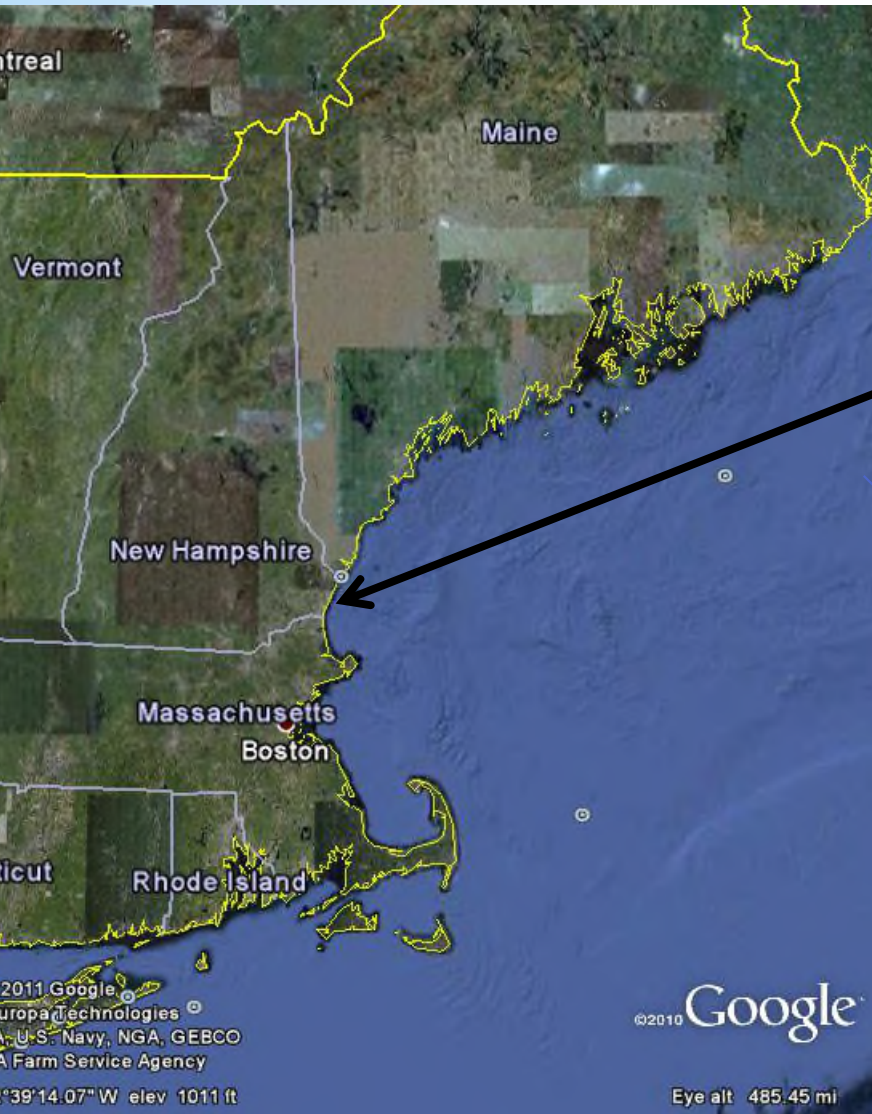


NATIONAL
ESTUARINE
RESEARCH
RESERVE
SYSTEM

cbi
Consensus Building Institute

Great Bay

Urbanizing estuary in southeast
New Hampshire

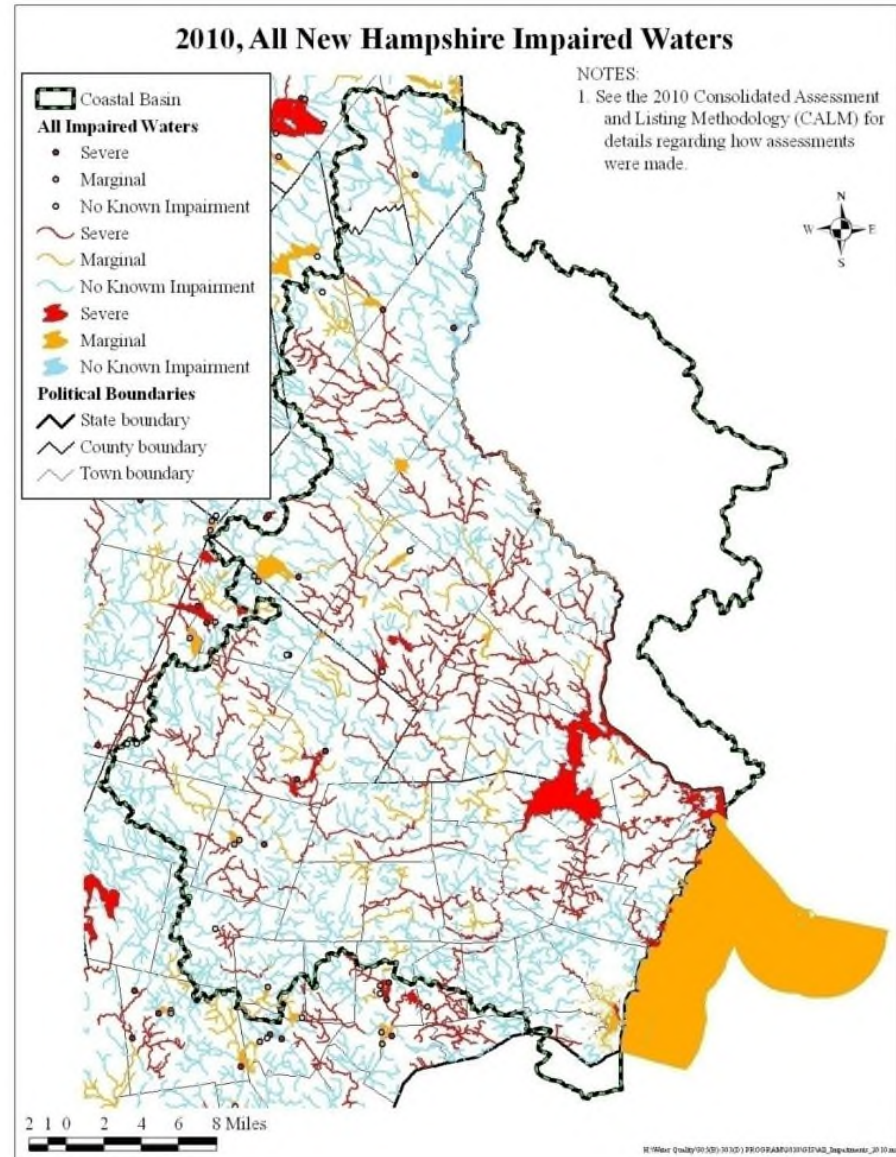


1,000 square miles
52 communities
3 states
25% NH population

Nutrient Impaired Estuary

2009 – Portions of the Great Bay Estuaries and tributaries listed as impaired for nitrogen

Communities face more stringent NPDES permits, and are struggling with cost and feasibility



The WISE Project Plan:

- Will support management of point and non-point wastewater sources in the communities of Exeter, Stratham and Newfields;
- Will identify and quantify the advantages of collaboration between these communities; and
- Could form the basis for an integrated permit application.



Integrated Permit Approach

Allows permittees to prioritize management actions across multiple permits. Encourages financially and environmental sustainable plans. EPA Memo, June 2012. Integrated Municipal Stormwater and Wastewater Planning Approach Framework

Recent EPA Region 1 wastewater NPDES permits contain requirements for non-point source control.

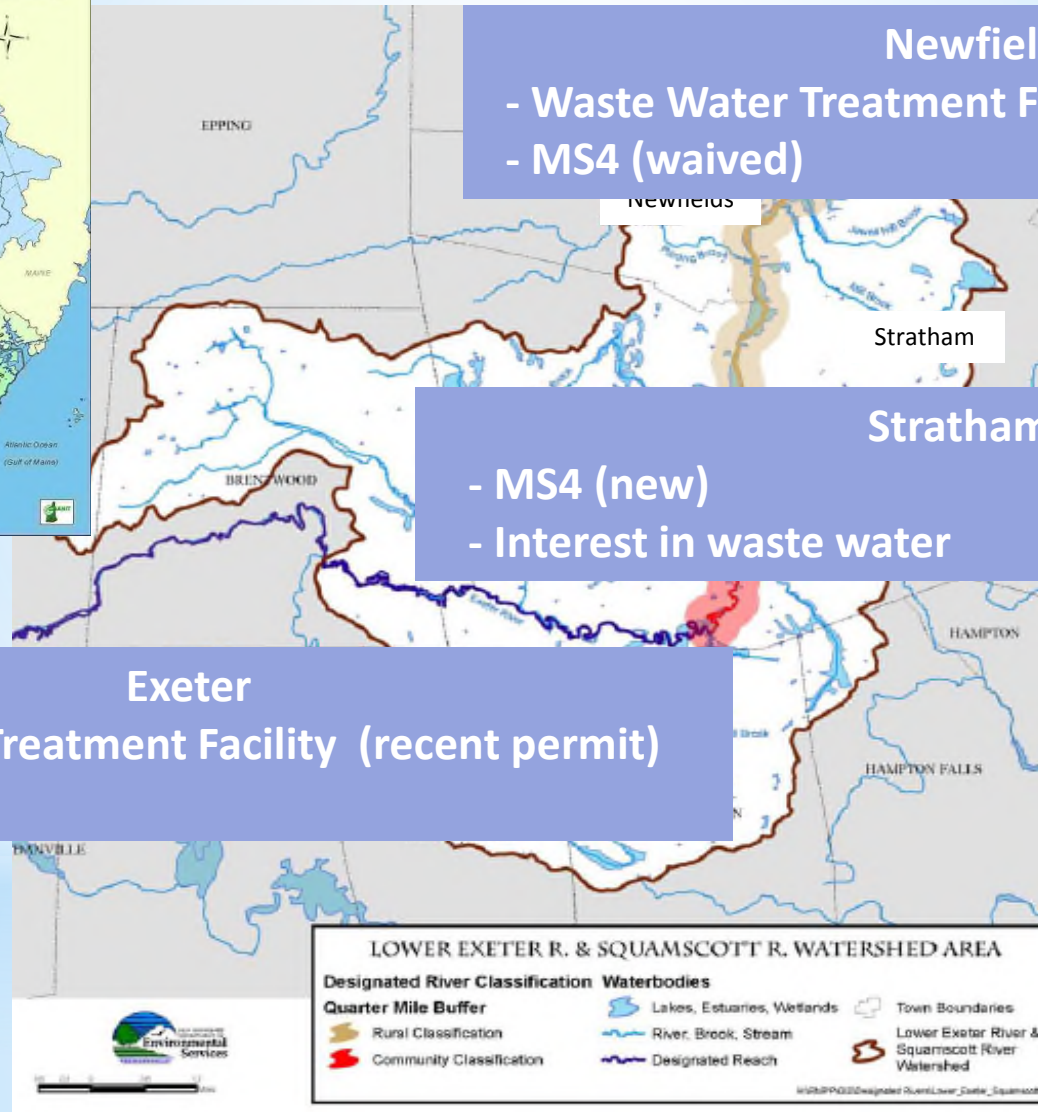


Collaboration



UNH, Geosyntec, Great Bay NERRS, Rockingham Planning Commission, Consensus Building Institute - Communities of Exeter, Newfields, Stratham - EPA, NH DES, other communities

Lower Exeter River & Squamscott River Watershed Base Map



Newfields

- Waste Water Treatment Facility (old permit)
- MS4 (waived)

Stratham

- MS4 (new)
- Interest in waste water

Exeter

- Waste Water Treatment Facility (recent permit)
- MS4

Elements of EPA Integrated Planning Guidance with Nine-Element Watershed Planning.

WISE Project Elements	EPA Integrated Planning Guidance Elements	EPA Nine-Element Watershed Planning
Element 1: Watershed Assessment	Element 1: A description of the water quality, human health and regulatory issues to be addressed in the plan	Element a: Identify causes and sources of pollution
Element 2: Pollutant Load Status and Assessment	Element 2: A description of existing wastewater and stormwater systems under consideration and summary information describing the systems' current performance	Element b: Estimate pollutant loads and expected load reductions
Element 3 Alternatives Analysis, Implementation Plan and Schedule	Element 4: A process for identifying, evaluating, and selecting alternatives and proposing implementation schedules	Element c: management measures to achieve load reduction; Element d: Identify technical and financial assistance, and relevant authorities; Element f: Project schedule; Element g: Interim, measurable milestones
Element 4: Monitoring and Evaluation	Element 5: Measuring success, which may include evaluation of monitoring data, information developed by pilot studies and other studies and other relevant information	Element i: Monitoring
Element 5: Adaptive Management	Element 6: Improvements to the Plan	Element h: Identify indicators to measure progress
Element 6: Communication and Outreach	Element 3: A process which opens and maintains channels of communication with relevant community stakeholders	Element e: Information/education component

Element 1: Watershed Status and Assessment

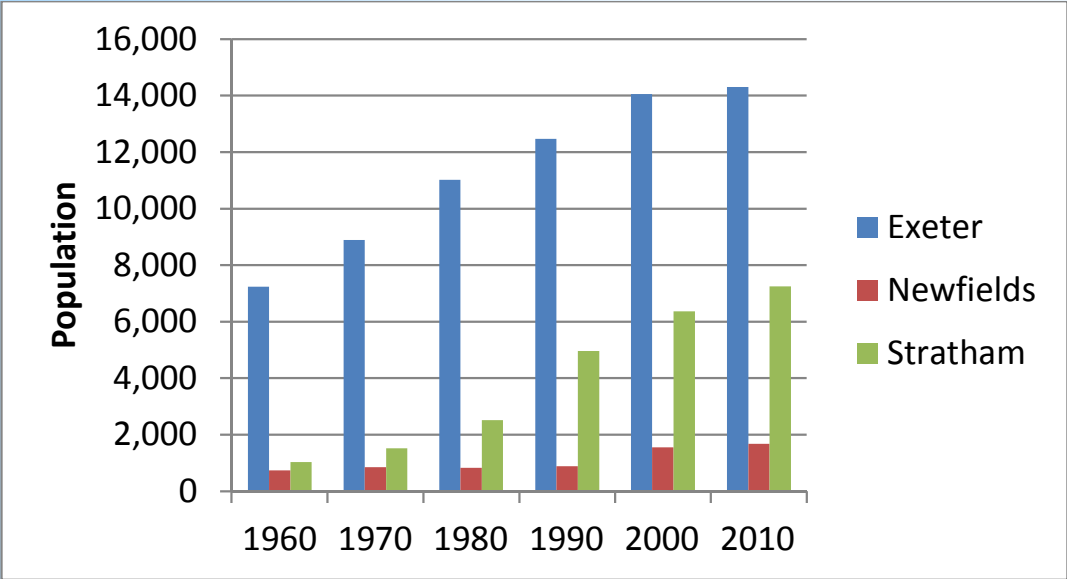


Figure 1: Population changes in the Towns of Exeter, Newfields and Stratham from 1960-2010

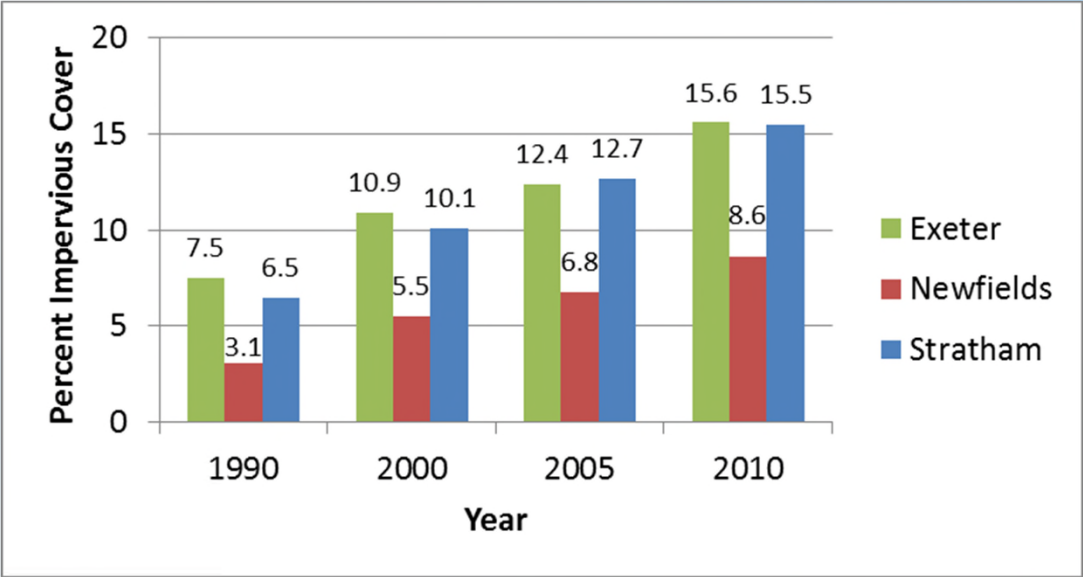
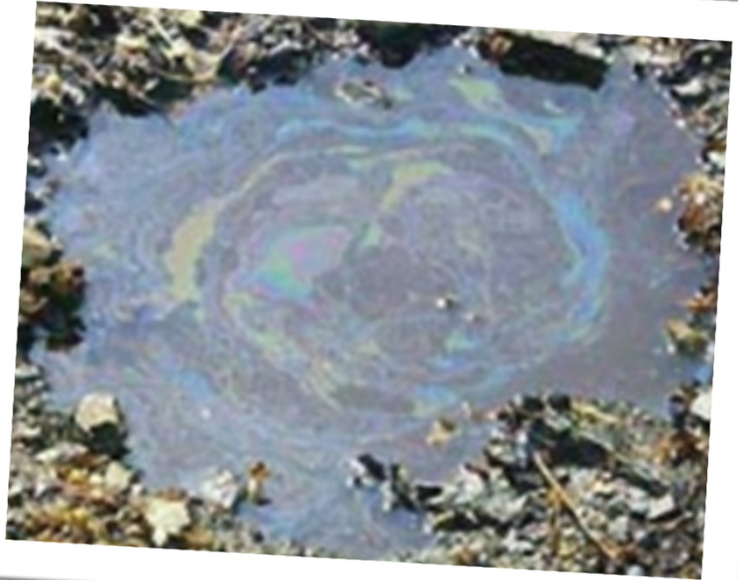


Figure 2: Impervious Cover Trends in the Towns of Exeter, Newfields, and Stratham from 1990-2010

Element 2: Pollutant Load Status and Assessment - Watershed Load Model



Wastewater Treatment Facility (WWTF) discharges to the Exeter River watershed accounted for 21 percent of the total nitrogen per year between 2003 and 2008.



Non-point sources contributed 79 percent of the total watershed nitrogen per year between 2003 and 2008.

Element 3: Alternatives Analysis, Implementation Plan and Schedule

Optimize Cost/Benefit Analysis for each community & for watershed

Alternatives Analysis – Water Quality and Cost

Scenario	Description
A - WWTP To $N \leq 3$ mg/L	Updating WWTP only ($N \leq 3$ mg/L)
B- WWTP to $N \leq 5$ mg/L and LID; Septic and Fertilizer Controls	Updating WWTP ($N \leq 5$ mg/L), GI, Septic Improvements and Fertilizer Controls
C – Ocean Outfall and WWTP $N \leq 8$ mg/L and GI; Septic and Fertilizer Controls	Updating WWTP ($N \leq 8$ mg/L), GI, Septic Improvements, Fertilizer Controls and Ocean Outfall
D – Status Quo with Growth at 25 years	Growth at 20-25 years; updating WWTP ($N \leq 5$ mg/L), GI, Septic Improvements and Fertilizer Controls

Multiple Benefits Analysis – Triple Bottom Line:

Element 4: Monitoring and Evaluation – Monitoring Program

Watershed



Receiving Waters
(Squamscott)



Downstream Water
(Great Bay)



Goals:

- Meet regulatory requirements
- Identify management opportunities
- Measure progress
- Allocate responsibility



WISE MONITORING PROGRAM - GOALS AND OBJECTIVES

The goal of this monitoring plan is to provide accurate and informative data at spatial and temporal scales that meet regulatory requirements, assure management goals are being attained, evaluate ecosystem condition, and equitably allocate pollutant loads.

Specific objectives are:

1. Meet existing and expected regulatory requirements associated with discharge from wastewater treatment plants, and expected requirements under a draft MS4 permit
2. Estimate loads from existing sources to prioritize management strategies, allocate responsibility and validate model
3. Support and improve integrated watershed understanding of human –caused ecosystem impacts and their solutions in the Exeter and Squamscott Rivers and Great Bay
4. Support adaptive management opportunities that help ensure cost-effective and productive management strategies and accountability
5. Support interactive tracking and assessment and potentially provide a framework for “trading” of reduction credits



Existing Monitoring Programs

Lots of Existing Monitoring:

National Estuarine Research Reserve (NOAA)

National Estuaries Project (EPA)

Gulf Watch (invertebrates)

National Coastal Assessment (sediment)

USGS hydrologic Observatory (watershed)

Nature Conservancy (oyster restoration)

University of New Hampshire research:

Eelgrass, Water quality, Stormwater, Land use

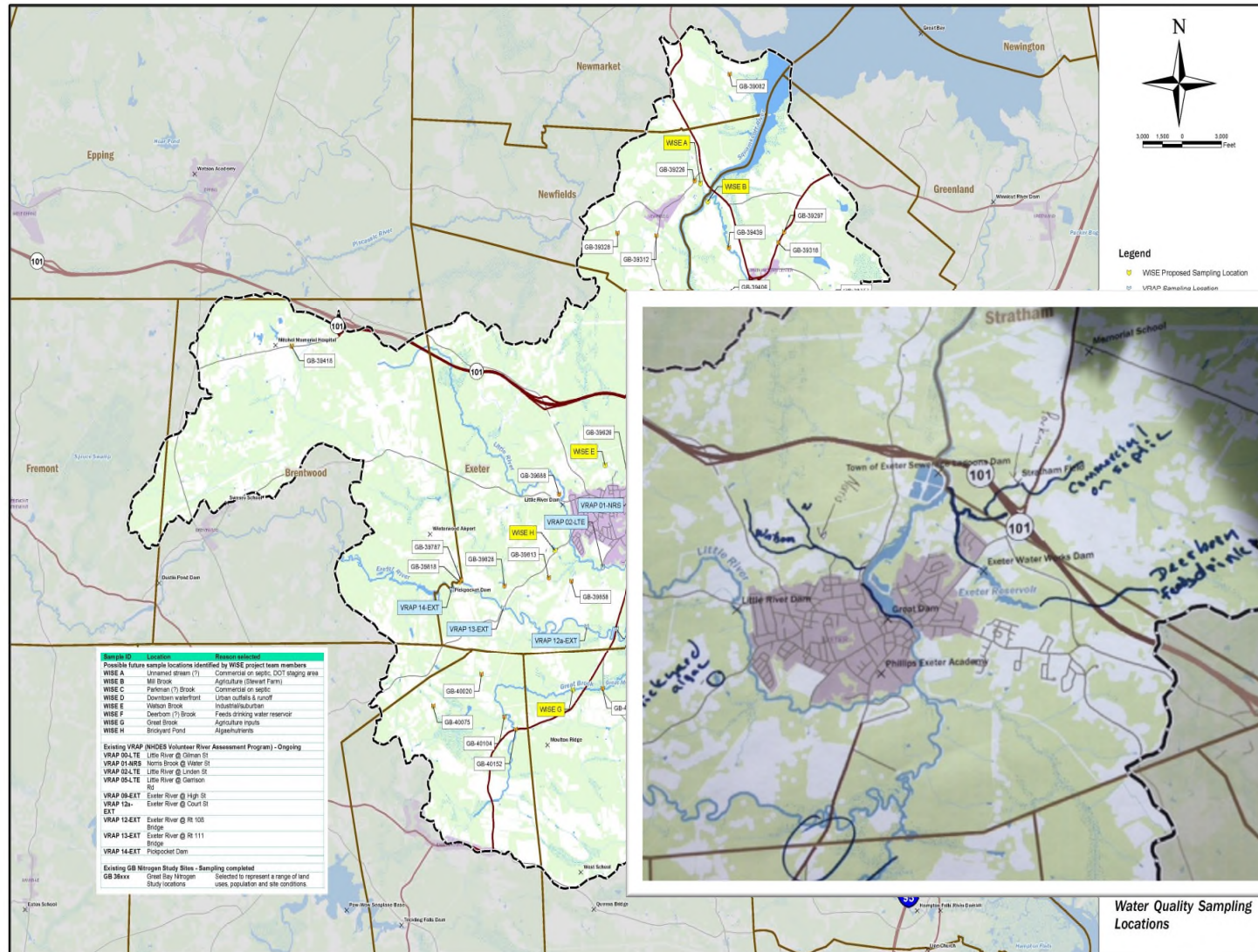


Communities need to fund monitoring to meet their needs.

Element 4: Monitoring and Evaluation – Monitoring Program

Focus Area	Management Question(s)	Location
Squamscott River	(a) Total Nitrogen concentrations in the river and downstream waters are trending toward nitrogen targets.	1 station in the Squamscott below Exeter WWTF monitored 2xMonth (falling and rising tide) for nutrients, TSS, and chlorophyll-a.
	(b) Significant improvements in dissolved oxygen, chlorophyll-a, and macroalgae levels have been documented.	1 station in the Squamscott below Exeter WWTF discharge monitored continuously for dissolved oxygen with datasonde
Exeter/Squamscott Watershed	(c) Non-point source and stormwater point source reductions achieved are trending towards allocation targets and appropriate mechanisms are in place to ensure continued progress.	3 stations in watershed monitored monthly for nutrients, TSS, and chlorophyll-a. 3 stations monitored continuously for water level.
Great Bay	(a) Total Nitrogen concentrations in the river and downstream waters are trending toward nitrogen targets. (b) Significant improvements in dissolved oxygen, chlorophyll-a, and macroalgae levels have been documented.	Town contribution to Picataqua Region Monitoring Collaborative: eelgrass, macroalgae, saltmarsh, and water quality monitoring in Great Bay

Watershed Monitoring



Water Quality Sampling Locations

Piscataqua Region Monitoring Collaborative

Purpose

The Piscataqua Region Monitoring Collaborative will allow communities, agencies, and organizations to combine their resources for the collaborative monitoring of the region. Dozens of communities surrounding the Piscataqua Region estuaries have a common interest in understanding the health of their estuaries. These shared questions are best answered with a shared monitoring program.

Benefits of Participating in a Collaborative Monitoring Program

- Take advantage of cost sharing between local, state, and federal agencies.
- Have a role in deciding monitoring priorities and methods.
- Establish a baseline now to show progress in the future.
- Be part of the solution to restore the estuaries.

Organization and Governance

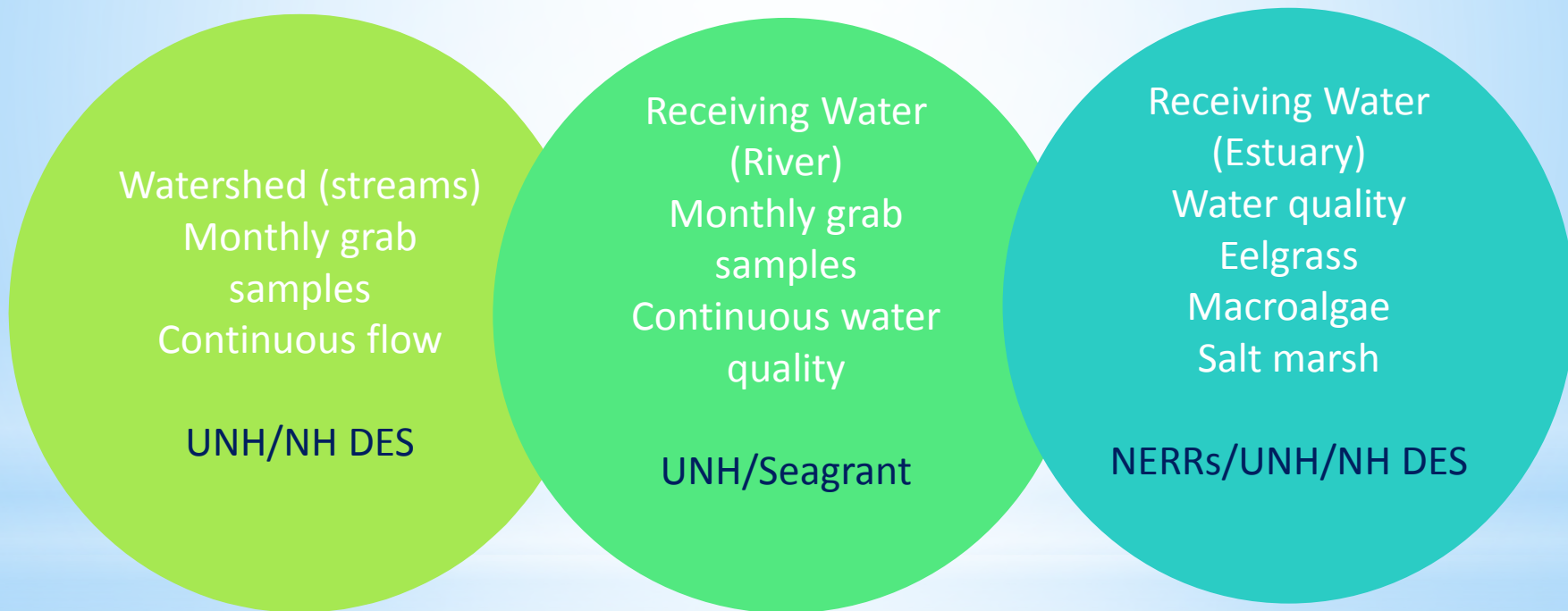
- Fiscal Agent Pisquatica region Estuaries project (PREP)
- Reporting PREP
- Data Management – Individual organization, NH DES
- Priorities /Activities – Determinied by paying members

Piscataqua Region Monitoring Collaborative

Municipal \$ → PREP

(Piscataqua Region Estuaries Project)

Federal/State/Research



PREP → Data to Municipalities

IN THE MATTER OF:

Town of Exeter, New Hampshire
NPDES Permit No. NH0100871

2. By December 31, 2023, the Town shall submit an engineering evaluation that includes recommendations for the implementation of any additional measures necessary to achieve compliance with the NPDES Permit, or a justification for leaving the interim discharge limit set forth in Attachment 1.a in place (or lower the interim limit to a level below 8.0 mg/l but still above 3.0 mg/l) beyond that date. Such justification shall analyze whether:
 - a. Total nitrogen concentrations in the Squamscott River and downstream waters are trending towards nitrogen targets;³
 - b. Significant improvements in dissolved oxygen, chlorophyll a, and macroalgae levels have been documented; and
 - c. Non-point source and storm water point source reductions achieved are trending towards allocation targets and appropriate mechanisms are in place to ensure continued progress.

Next Steps

Continued discussion with all communities

- Assurance that monitoring meets permit needs
- Long term commitment
- Equitable funding structure
- Clear rewards for ratepayers



Develop an integrated plan that engages municipalities, agencies, watershed groups and researchers in a common program that is innovative, adaptive and effective.

Thank You

Alison Watts, UNH

Robert Roseen, Renee Bourdeau - Geosyntec

Paul Stacey, Corey Riley, Steve Miller - Great Bay NERRs

Doug Thompson, Eric Roberts – Consensus Building Institute

Theresa Walker, Cliff Sinnott – Rockingham Planning Commission

Towns of Exeter, Stratham & Newfields

**Funded by
NERRs Science Collaborative**