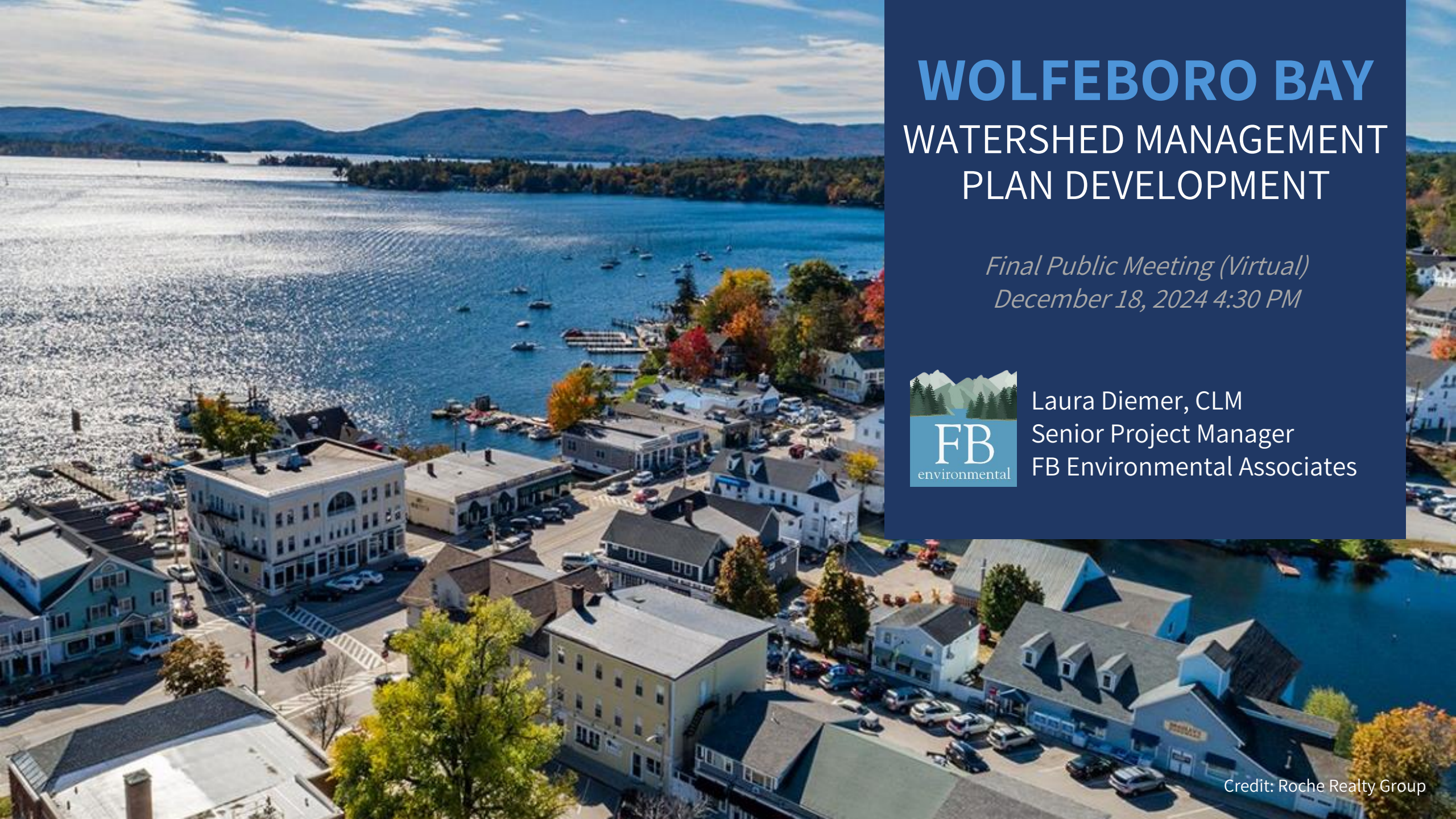


WOLFEBORO BAY
WATERSHED MANAGEMENT PLAN DEVELOPMENT

Final Public Meeting (Virtual)
December 18, 2024 4:30 PM

Laura Diemer, CLM
Senior Project Manager
FB Environmental Associates

Credit: Roche Realty Group

WATERSHED PLANNING CYCLE

Establish Committee
Engage Stakeholders

Complete Field Surveys

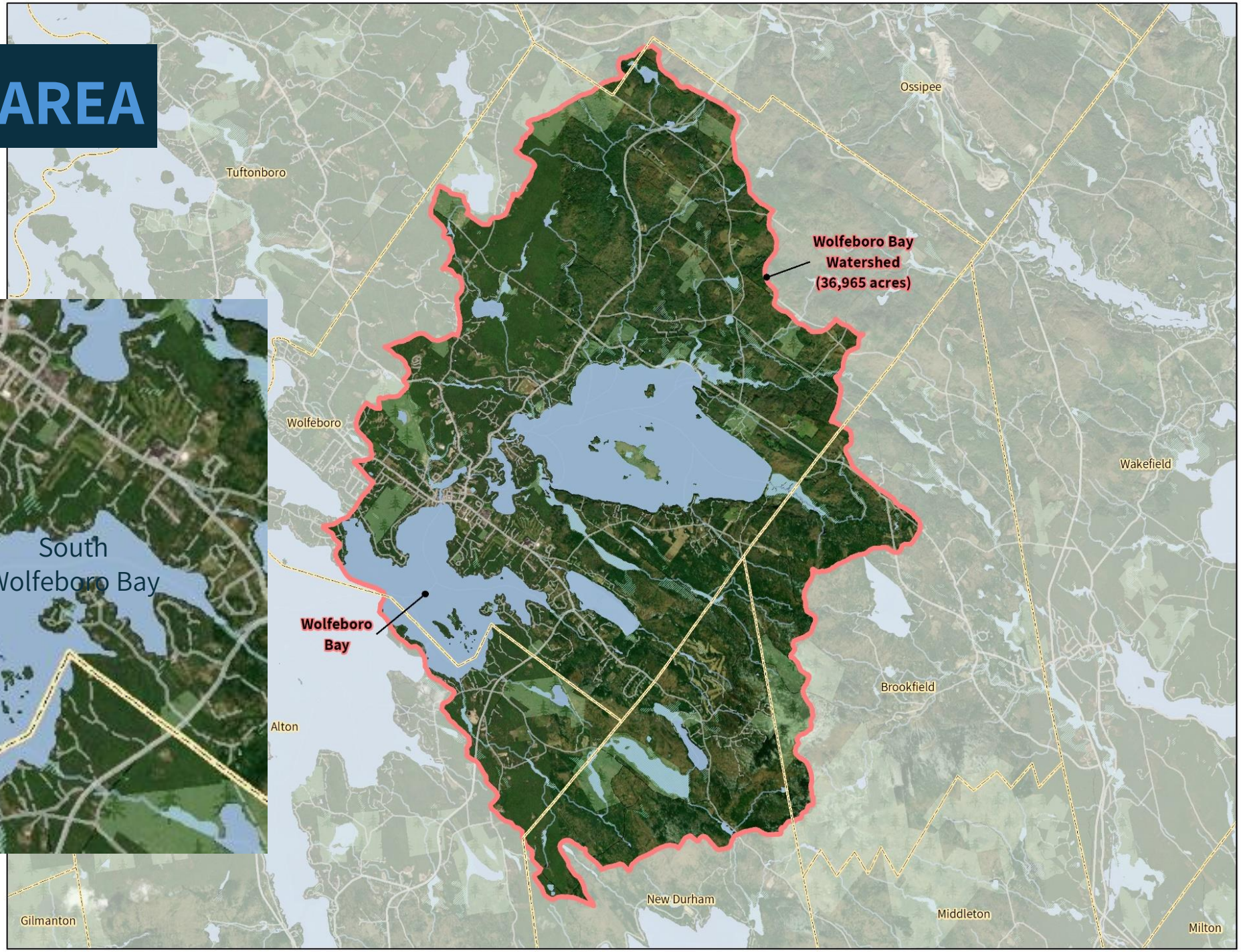
Complete WQ Analysis
Determine Assimilative Capacity
Run Models

Set WQ Goal
Draft Plan

Prioritize Action Plan
Finalize Plan

Apply for Grants
Evaluate Plan Regularly

PLAN STUDY AREA



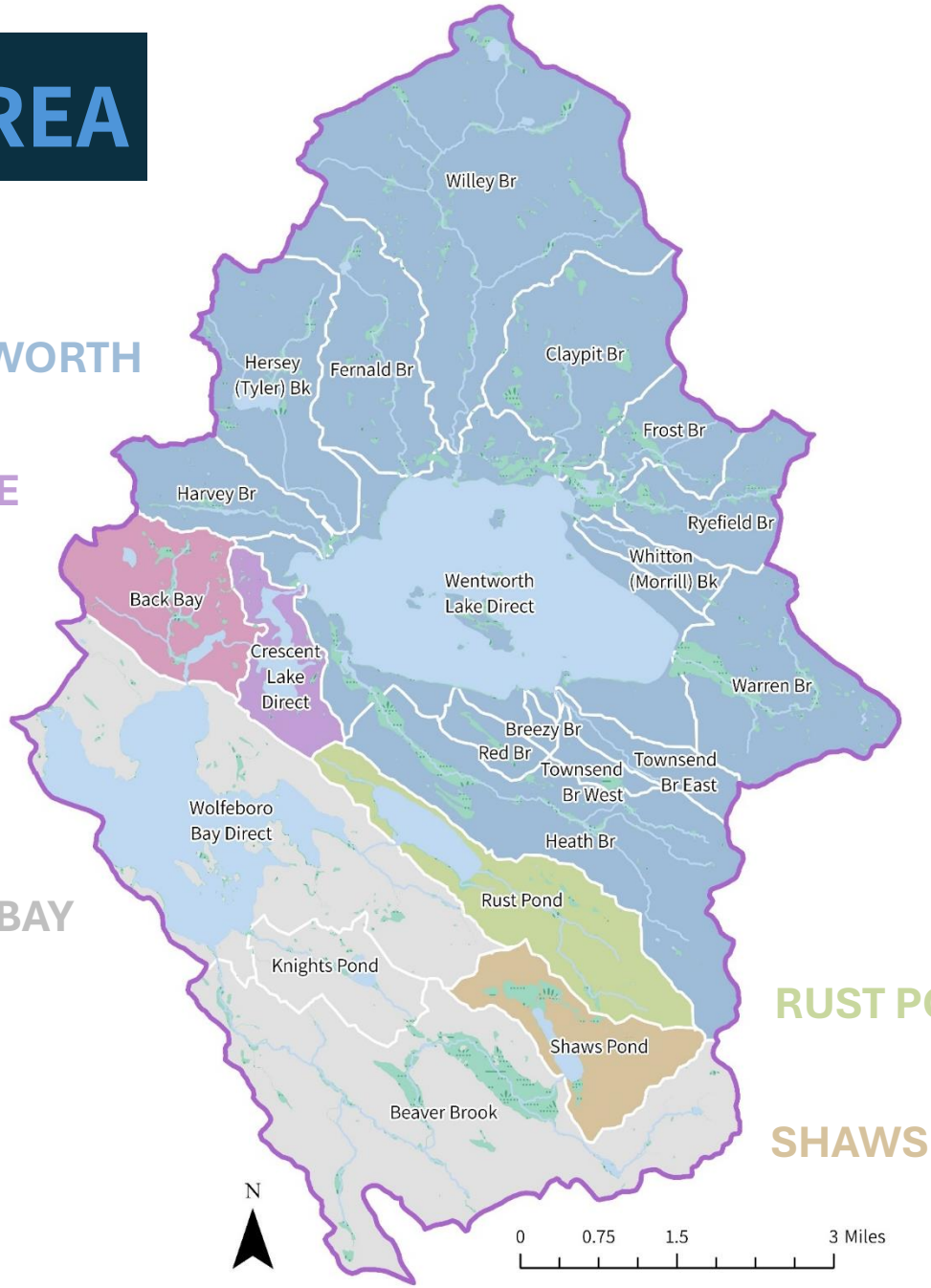
PLAN STUDY AREA

LAKE WENTWORTH

CRESCENT LAKE

BACK BAY

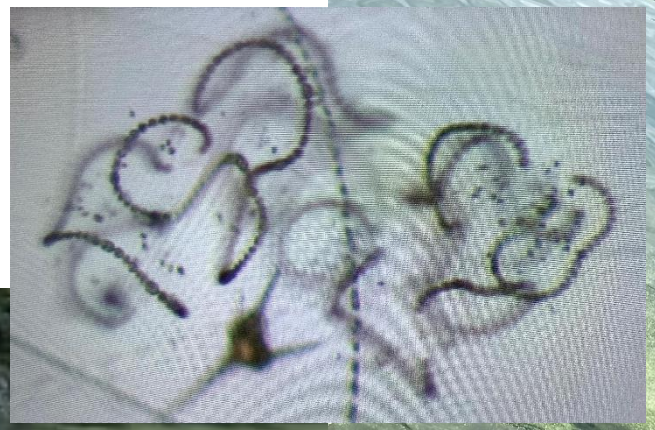
WOLFEBORO BAY

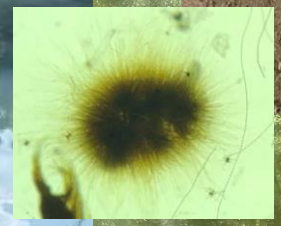


RUST POND

SHAWS POND

THE PROBLEM





WE ARE IN A **NEW ERA** WITH ENHANCED EFFECTS OF CLIMATE CHANGE

The world has surpassed a heat threshold that scientists have been warning about

How is climate change affecting cyanobacteria in N.H. lakes, ponds and other waters?

New Hampshire Public Radio | By Mara Hoplamazian, Bol Nakdimo
Published July 15, 2022 at 4:50 PM EDT

NOAA says New England's temps are warming, sea levels rising faster than the global rate

Hadley Barndollar USA TODAY NETWORK

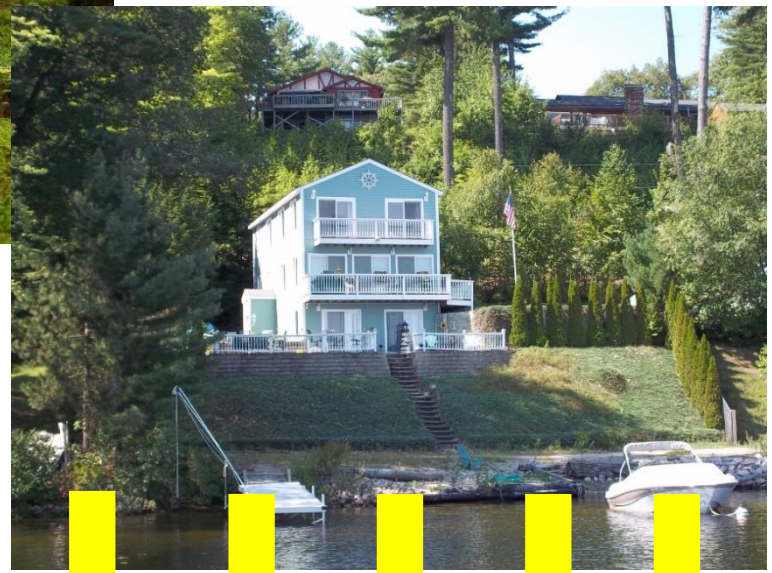
CLIMATE CRISIS CONNECT THE WORLD

EXPERTS: GLOBAL TEMPERATURES BROKE RECORDS IN JULY

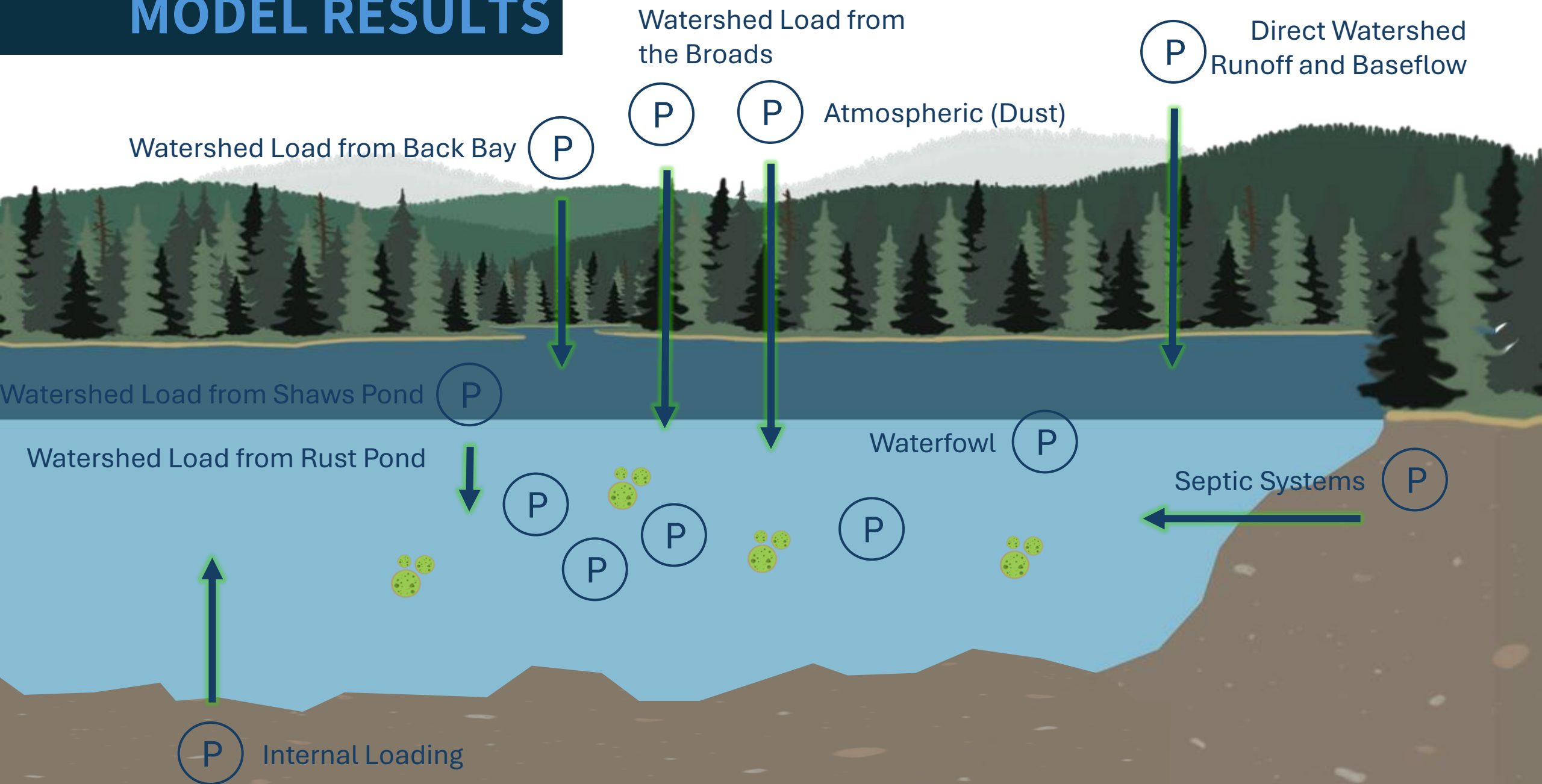
Findings from European Union's Copernicus Climate Change Service

CNN

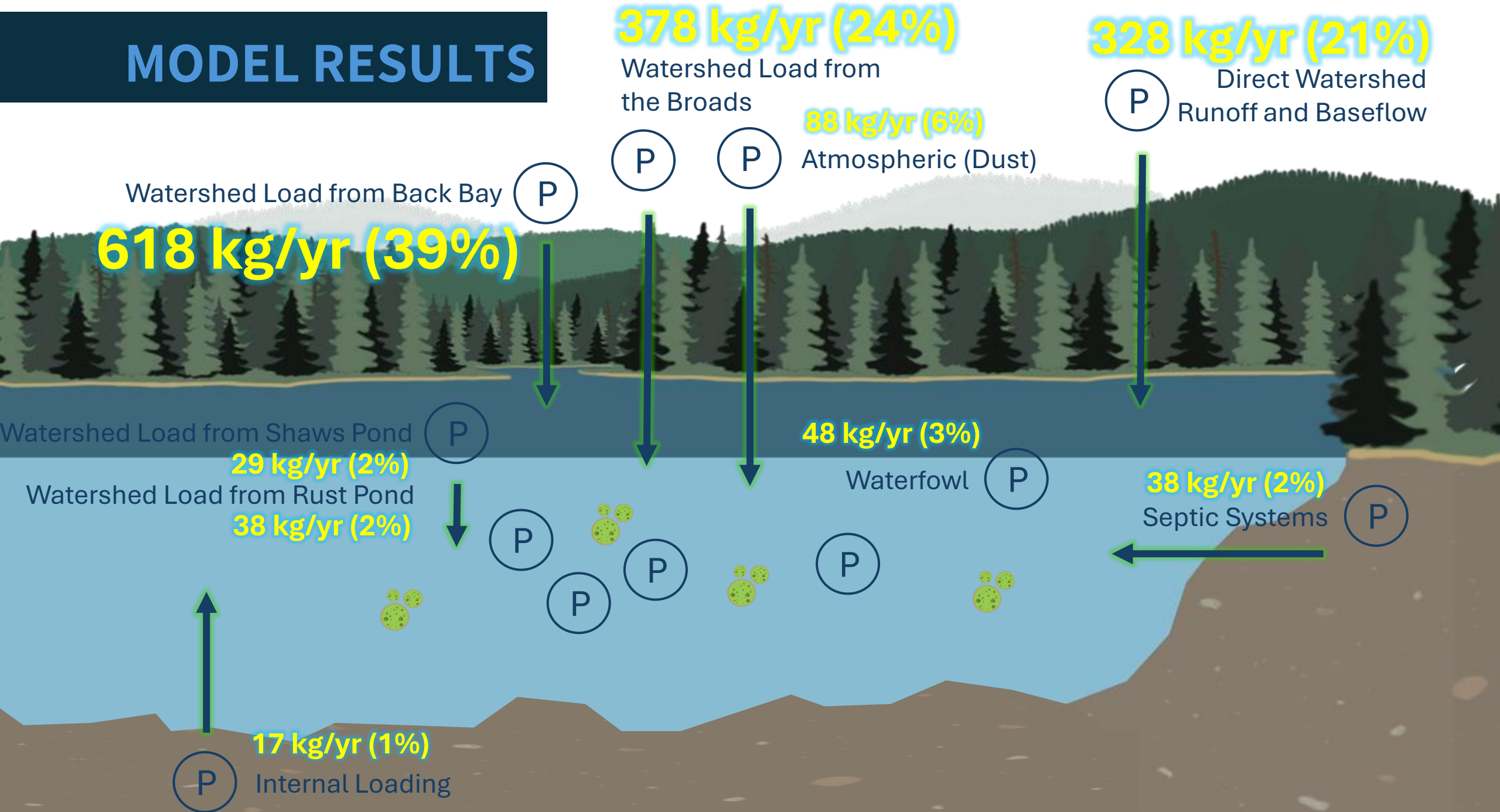
10 TIMES THE AMOUNT OF PHOSPHORUS



MODEL RESULTS

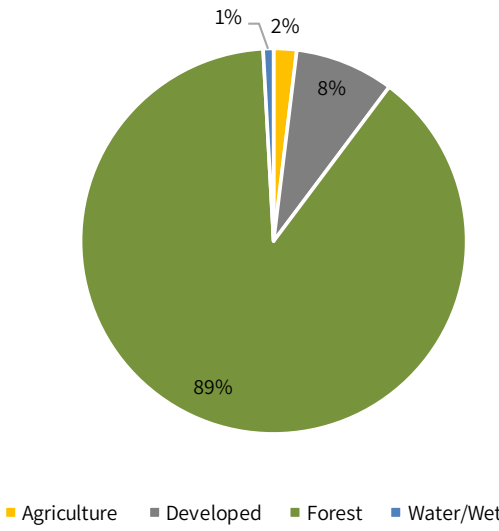


MODEL RESULTS

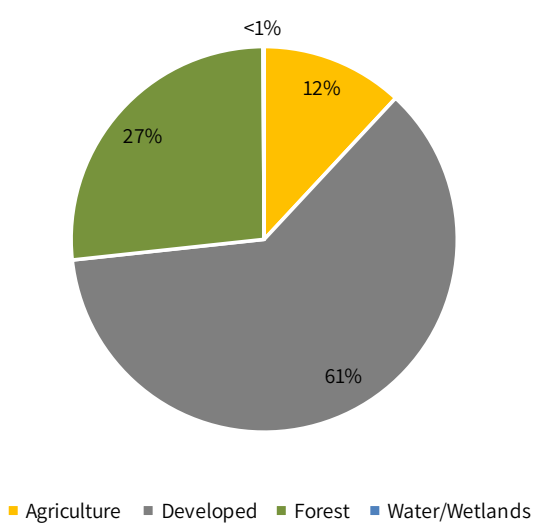


MODEL RESULTS

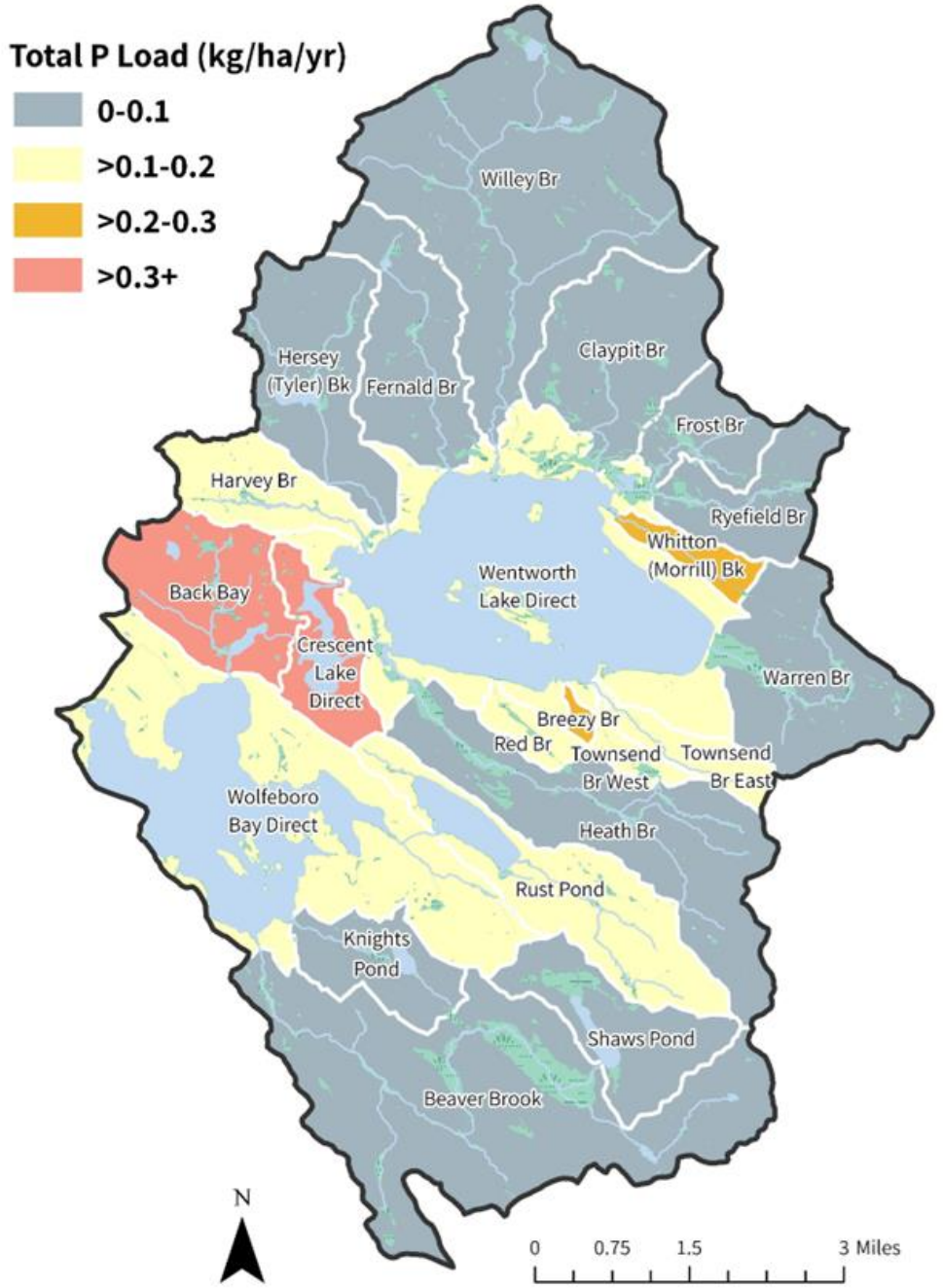
Watershed Land Cover Area



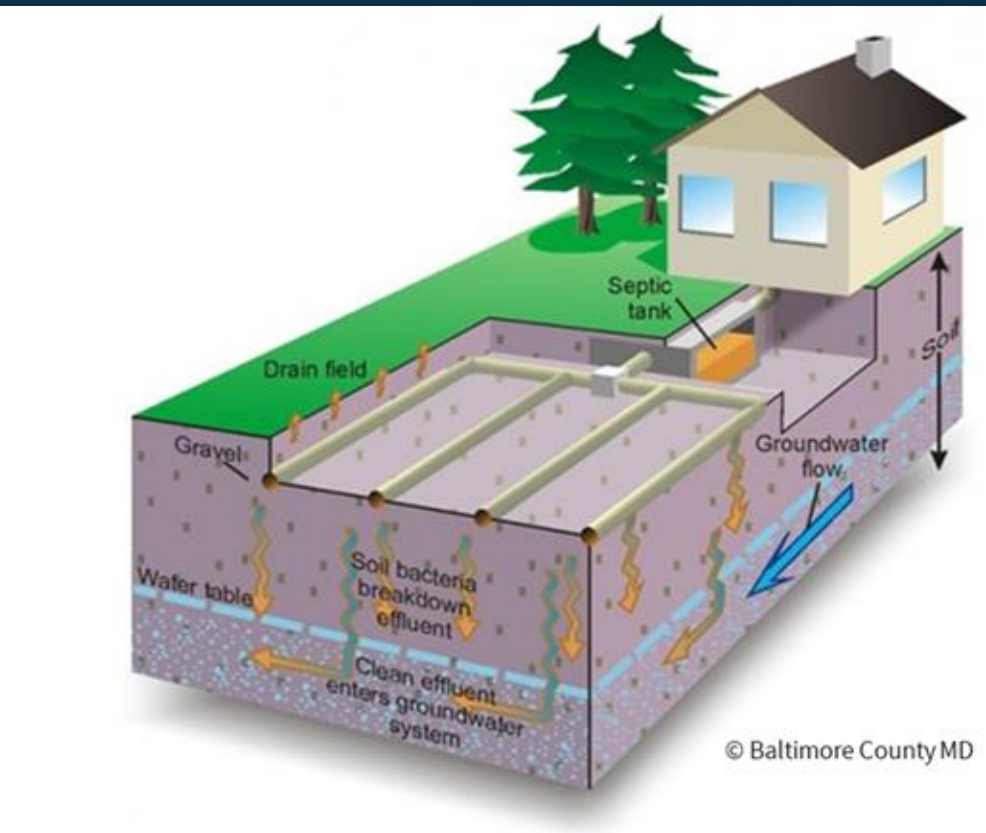
TP Load By Land Cover Type

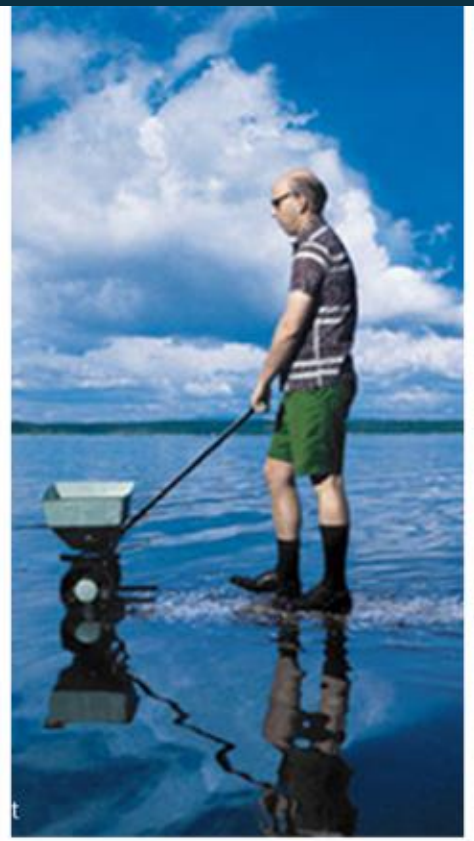


Developed land covers 8% of the Wolfeboro Bay watershed but contributes 61% of the TP load to Wolfeboro Bay.



IDENTIFYING SOURCES OF PHOSPHORUS



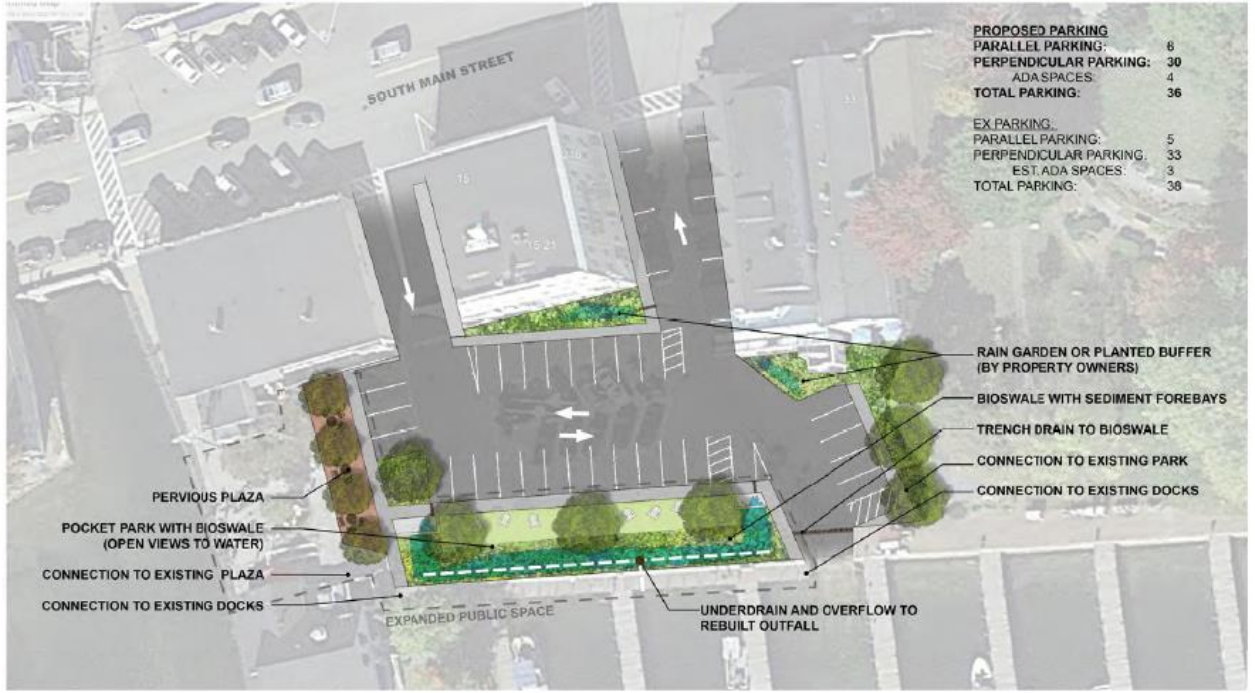


WATERSHED SURVEY

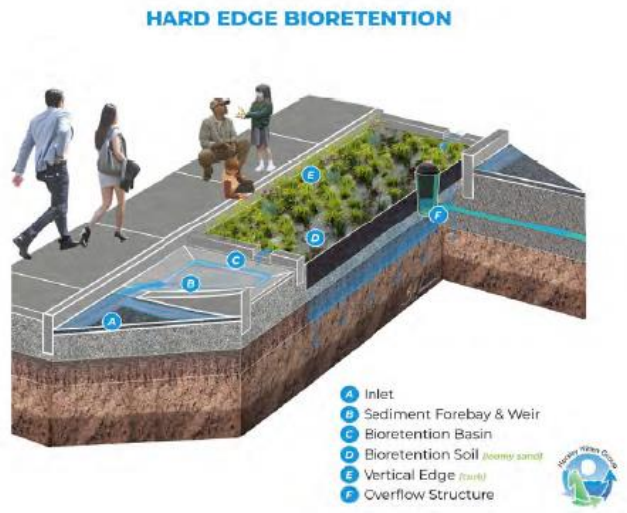
90 problem sites documented

WATERSHED SURVEY

Figure 3. Wolfeboro Town Docks and Boat Ramp Conceptual Design



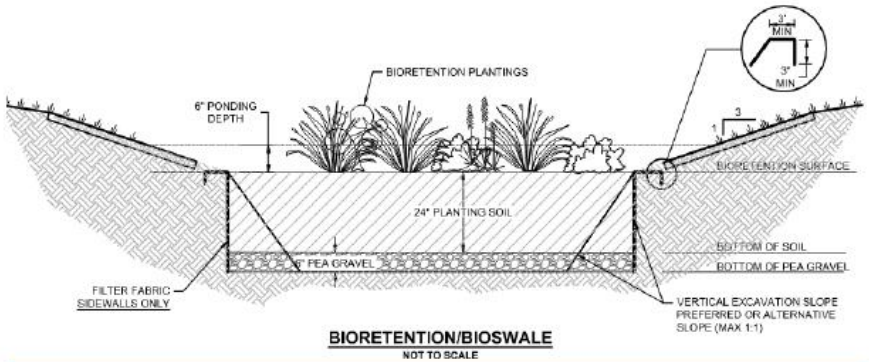
Horsley Witten Group
Sustainable Environmental Solutions



Bioretention
(Credit: HW)

Bioretention basin
(Credit: HW)

Volunteer planting day
(Credit: HW)



Bioretention Typical Section
(Credit: HW)

WATERSHED SURVEY

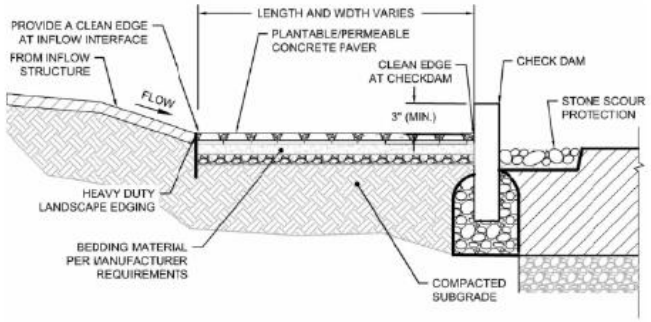
Figure 5. Back Back Boat Launch Conceptual Design

Horsley Witten Group
Sustainable Environmental Solutions

Rain Garden
(Credit: HW)

Sediment forebay with paver mat and level spreader
(Credit: HW)

Boat ramp with concrete dip diverting runoff to bioretention
(Credit: HW)



Sediment Forebay Typical Section
(Credit: HW)

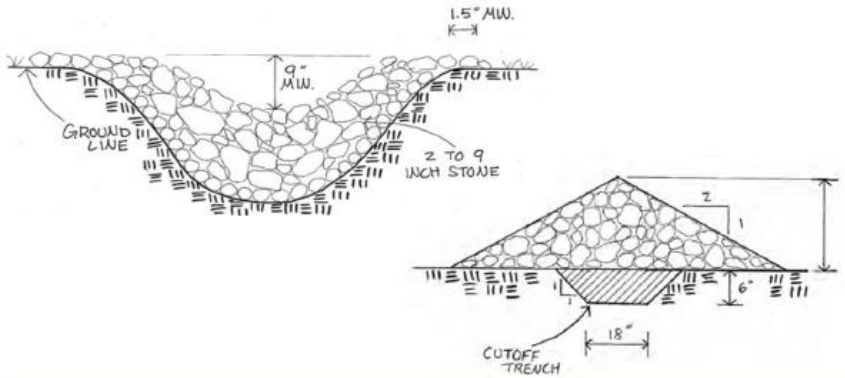
WATERSHED SURVEY

Figure 7. South Main St at Abenaukee Dr Conceptual Design

Horsley Witten Group
Sustainable Environmental Solutions

Rock-lined swale
(Source: VT Dept of Environmental Conservation)

Grass swale with stone check dams
(Source: LakeSuperiorStreams.org)



Stone Check Dam Typical Sections
(Source: Vermont Better Roads Manual, January 2024)

SHORELINE SURVEY

- 497 parcels evaluated
- Each parcel assessed for vegetated buffer, presence of bare soil, extent of shoreline erosion, distance of structures to the lake, and slope
- 60% (294) of shoreline parcels showed conditions that may be detrimental to water quality

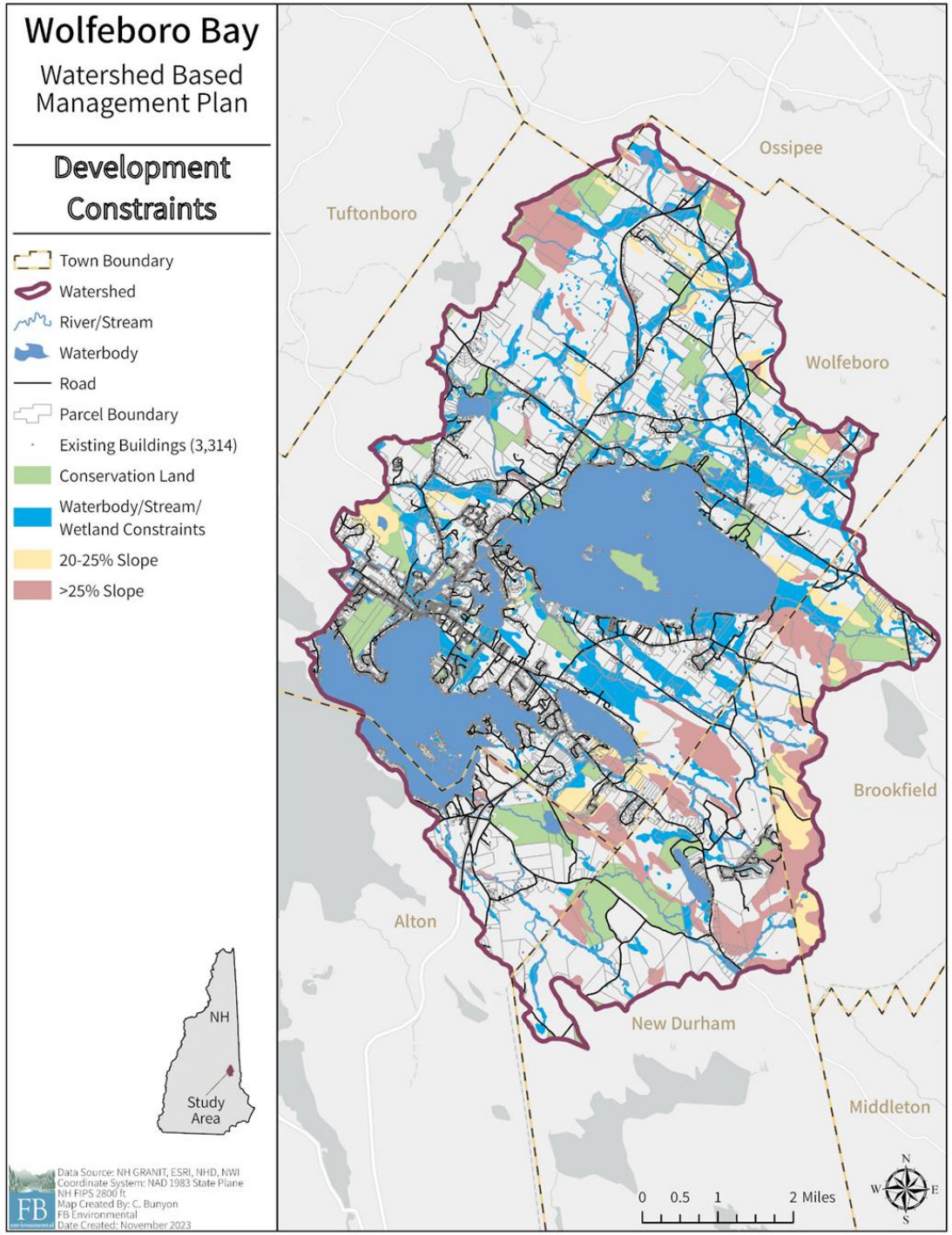



BUILD-OUT ANALYSIS

"Full Build-out" is a theoretical condition which represents the period when all "developable" land has been developed to the maximum conditions permitted by local ordinances.

Accounts for:

- Existing Buildings
- Conserved Land
- Water, Wetlands
- Hydric Soils
- Steep Slopes
- Current Zoning (minimum lot size, setbacks)

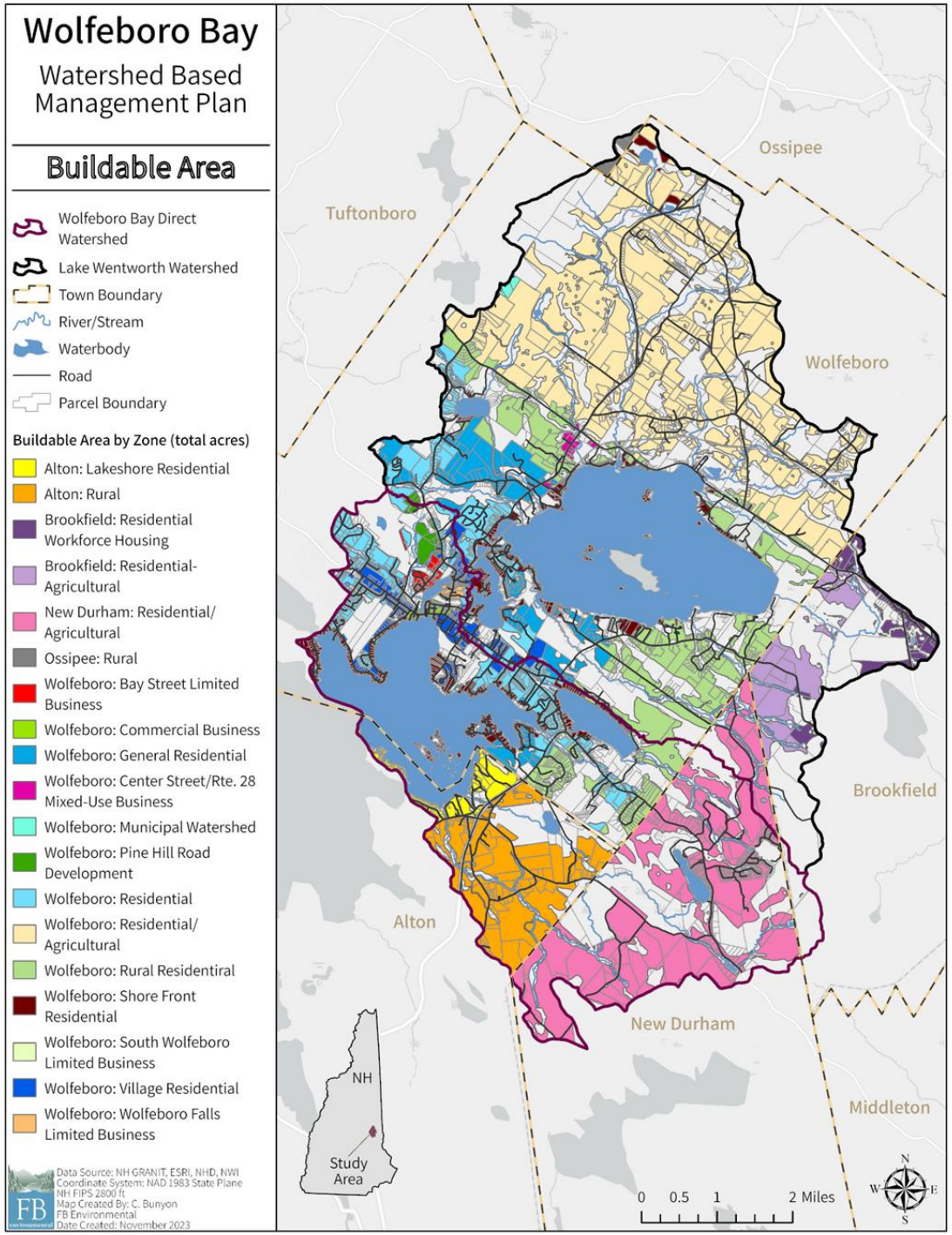


BUILD-OUT ANALYSIS

57% of the watershed area is buildable:

56% of the direct watershed

58% of Lake Wentworth/Crescent Lake watershed



BUILD-OUT ANALYSIS

Existing Buildings:

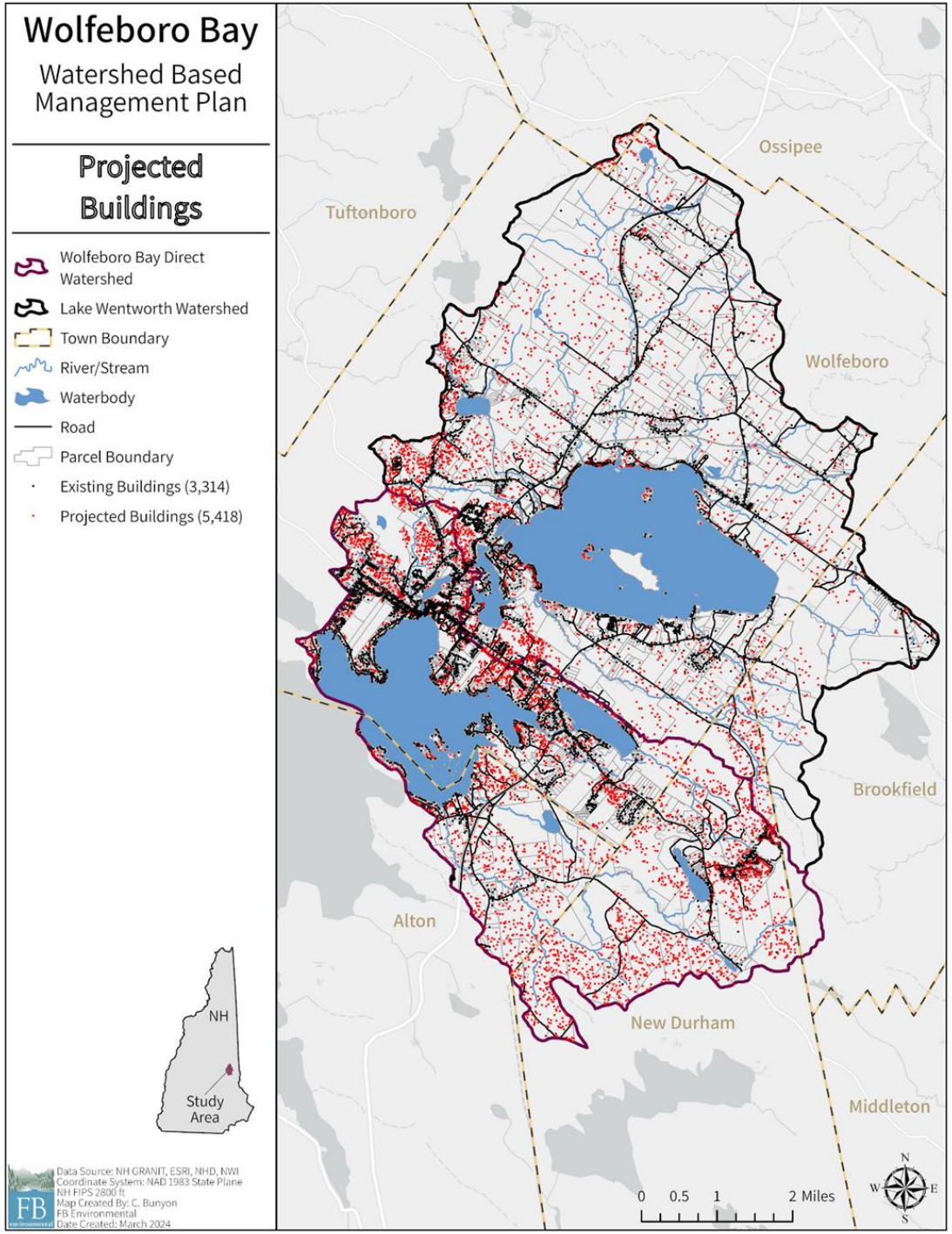
- 3,314

Projected Buildings:

- 5,418
- Most are in New Durham's Residential / Agricultural District and Wolfeboro's Residential District

TimeScope Analysis:

- Full build-out could occur as early as 2070 (based on 50-year compound annual growth rate)



WQ GOAL & OBJECTIVES

The goal of the Wolfeboro Bay WMP is **to improve the water quality of Wolfeboro Bay** such that it continues to meet state water quality standards for the protection of Aquatic Life Use and substantially **reduces the likelihood of harmful cyanobacteria blooms** in the lake.

Layman's Terms: No Lake Blooms, Deep Clarity, Healthy Aquatic Life

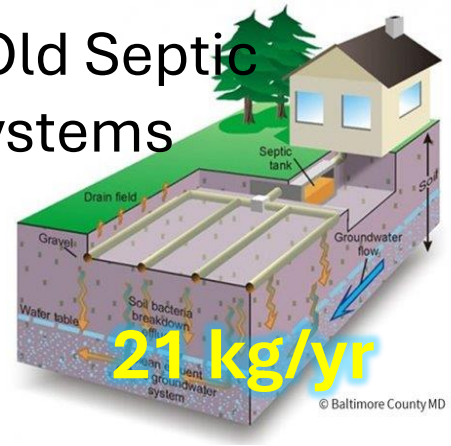
WQ GOAL & OBJECTIVES

Objective 1: Reduce pollutant loading from <u>existing development</u> by **9.4% (149 kg/yr) to Wolfeboro Bay.**

+

+

211 Old Septic Systems



149.2 kg/yr to Wolfeboro Bay

WQ GOAL & OBJECTIVES

Objective 2: Mitigate (prevent or offset) pollutant loading from future development by **203 kg P/yr to Wolfeboro Bay.**

+

THE ACTION PLAN: MONITORING

- ✓ Continue baseline monitoring
- ✓ Consider expanding lake monitoring frequency in the summer and at turnover periods
- ✓ Consider expanding tributary monitoring
- ✓ Consider collecting winter data under the lake ice

THE ACTION PLAN: STORMWATER

- ✓ Stabilization, infiltration
- ✓ Landscaping, erosion control

Reduce, divert, and infiltrate surface runoff.

Stabilize shoreline access points through vegetation or riprap.

Minimize and define parking areas and pathways.

Minimize pollutants (e.g., fertilizers, detergents, and other phosphorus-based products.

Maintain shoreline, streamside, and wetland buffers.

LakeSmart
NH LAKES
Award for lake-friendly living
www.nhlakes.org

Photo credit: FBE, AWWA, SOAK UP the Rain, Open Clipart

THE ACTION PLAN: ROADS

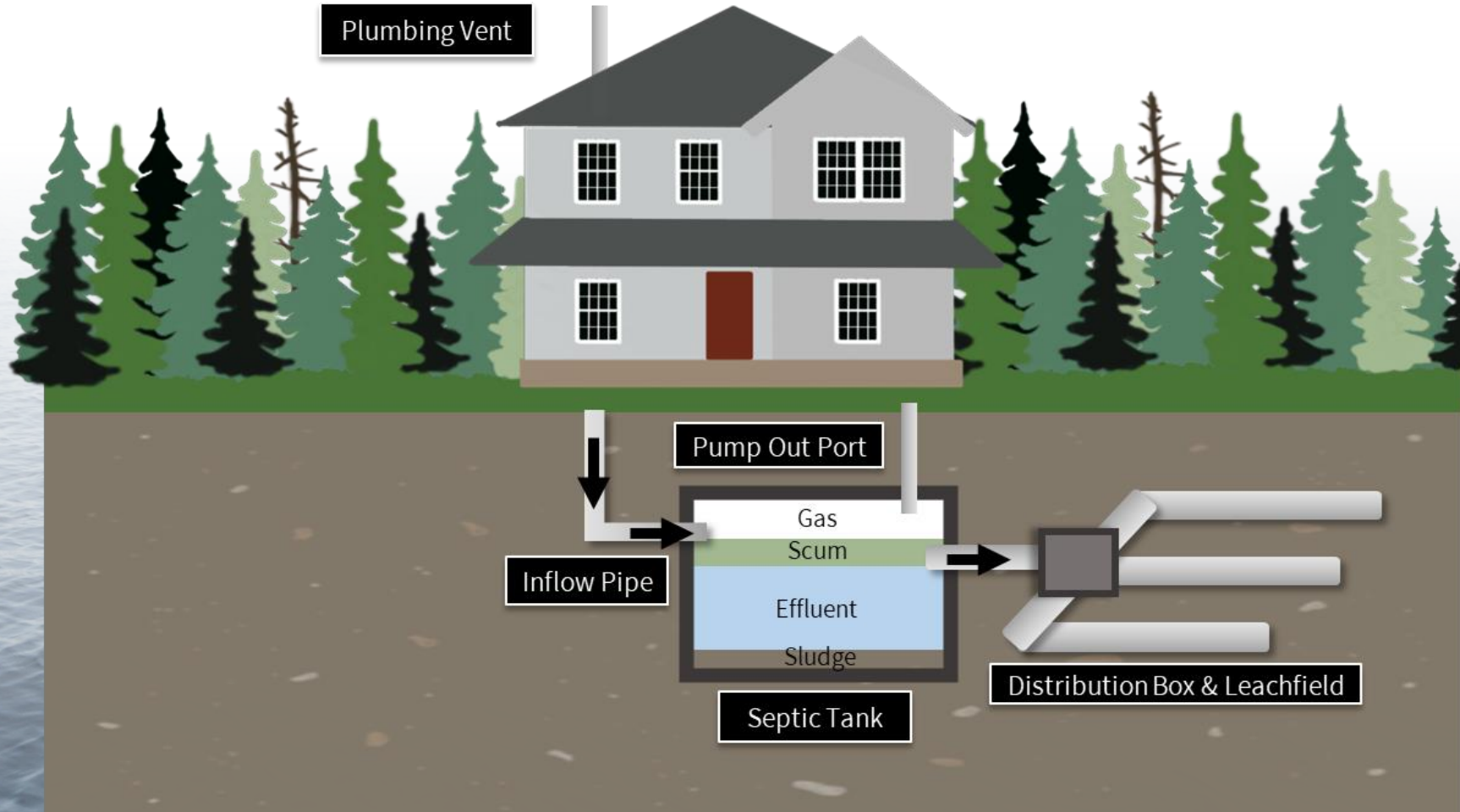
- ✓ Municipal best practices
- ✓ Stormwater runoff and erosion control on roads and other town property
- ✓ Low road/driveway salting

© Water Education Colorado

High Point, **SEATTLE, WA**
Credit: Seattle Public Utilities

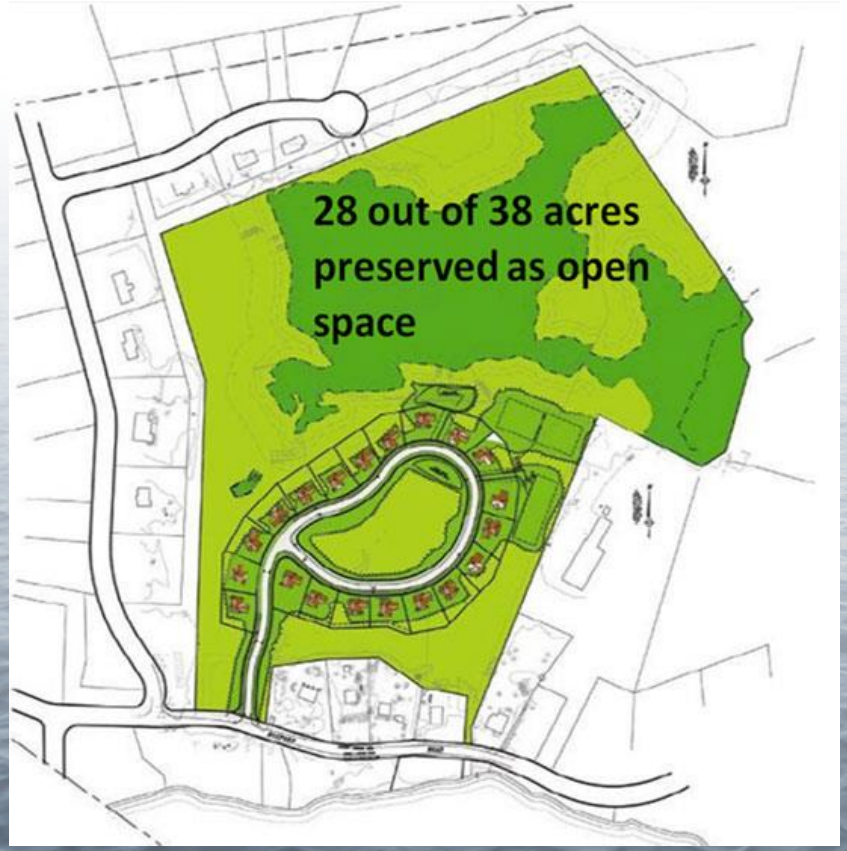
THE ACTION PLAN: SEPTIC SYSTEMS

- ✓ Regular septic system inspections (every 3-5 years)
- ✓ Regular pump outs when the scum layer is as thick as 1/3 of the effluent layer (~ every 1-3 years)



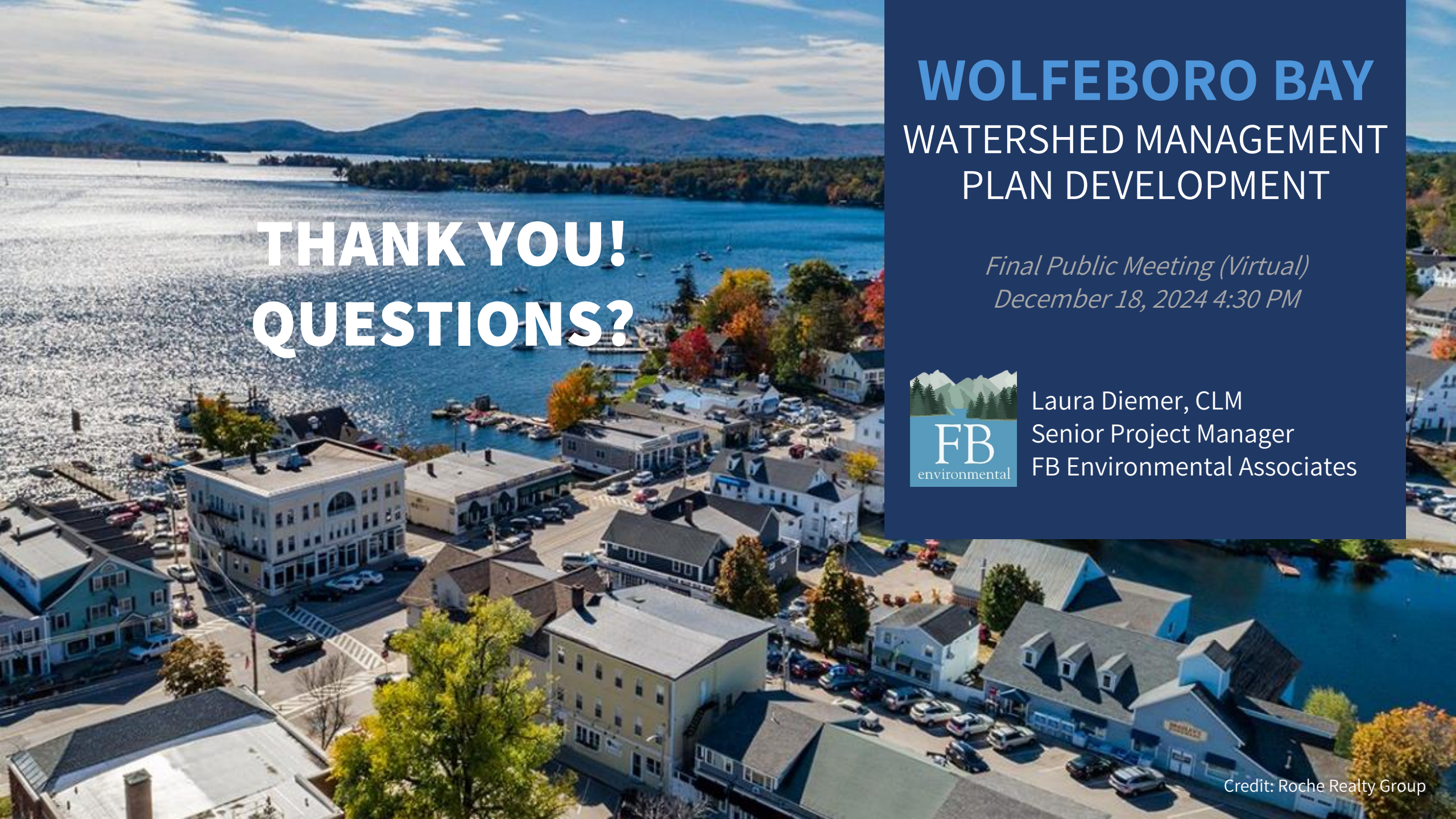
THE ACTION PLAN: PLANNING & CONSERVATION

- ✓ Update ordinances and setbacks
- ✓ Land conservation



THE ACTION PLAN: EDUCATION

- ✓ Share what you learn with your neighbors and help each other



WOLFEBORO BAY
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THANK YOU!
QUESTIONS?

Laura Diemer, CLM
Senior Project Manager
FB Environmental Associates

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