Bantam Lake
Watershed-Based Plan Project

Public Meeting:
July 29, 2021

Project Background

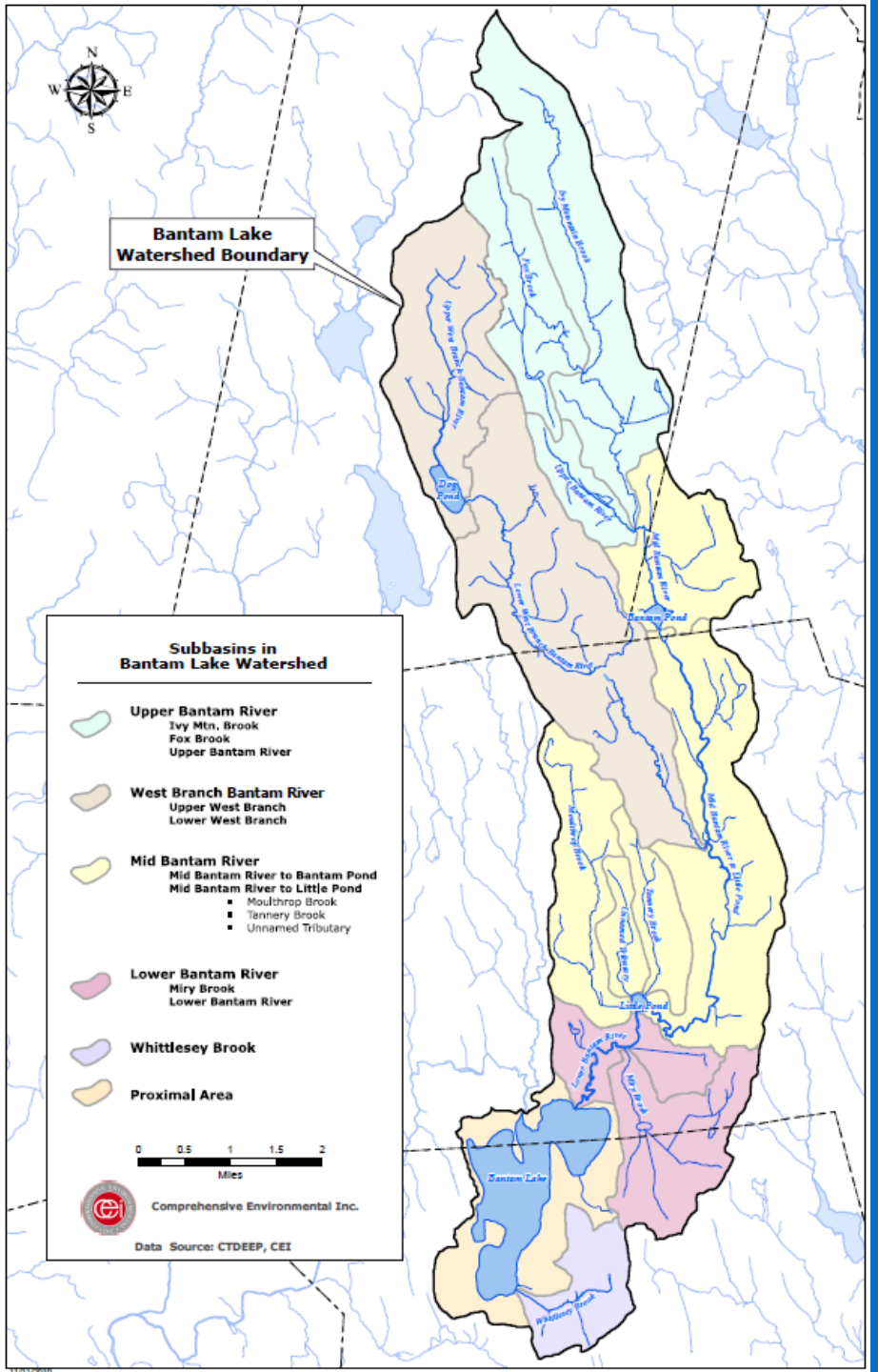
- **Excess nutrients can contribute to eutrophication and Harmful Algal Blooms (HABs)**
- **CT DEEP and EPA has developed a draft statewide nutrient TMDL for impaired lakes**
- **TMDL will include watershed-based plans for each lake…Bantam Lake is the first!**

Bantam Lake cyanobacteria bloom, August 2016

What is a Watershed Based Plan?

- ✓ Identify and quantify pollutant sources
- ✓ Determine potential solutions
- ✓ Develop plan to implement
- ✓ Develop plan to reassess

A "9-element plan" is required by EPA for all s.319-funded watershed projects



The 9 Elements

Element A:

Identify ***causes and sources*** that need to be controlled to achieve necessary pollutant load reductions.

The 9 Elements

Element B:

Determine ***pollutant load reductions*** needed to meet water quality goals

The 9 Elements

Element C:

Develop ***management measures*** to achieve water quality goals.

BMPs = Best Management Practices

Structural

Non-structural

Public Education

The 9 Elements

Element D:
Estimate the ***technical and financial assistance*** needed to implement the plan.

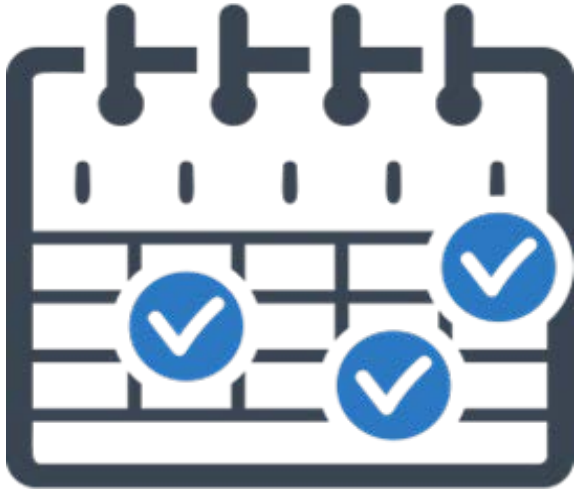
The 9 Elements

Element E:
Public Information and Education

The 9 Elements

Element F: Implementation Schedule

Element G: Interim Measureable Milestones



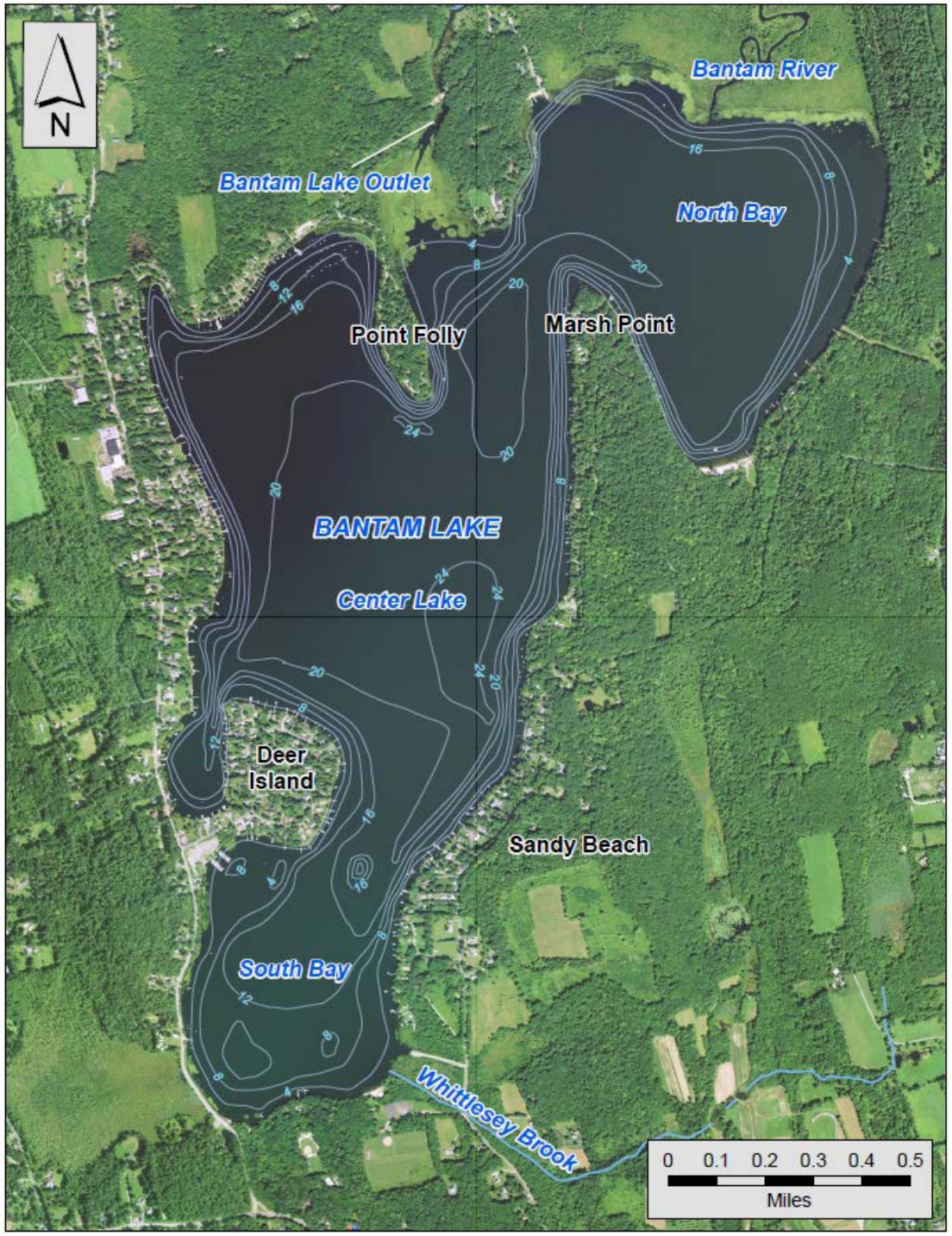
The 9 Elements

Element H: Criteria to measure progress

Element I: Monitoring

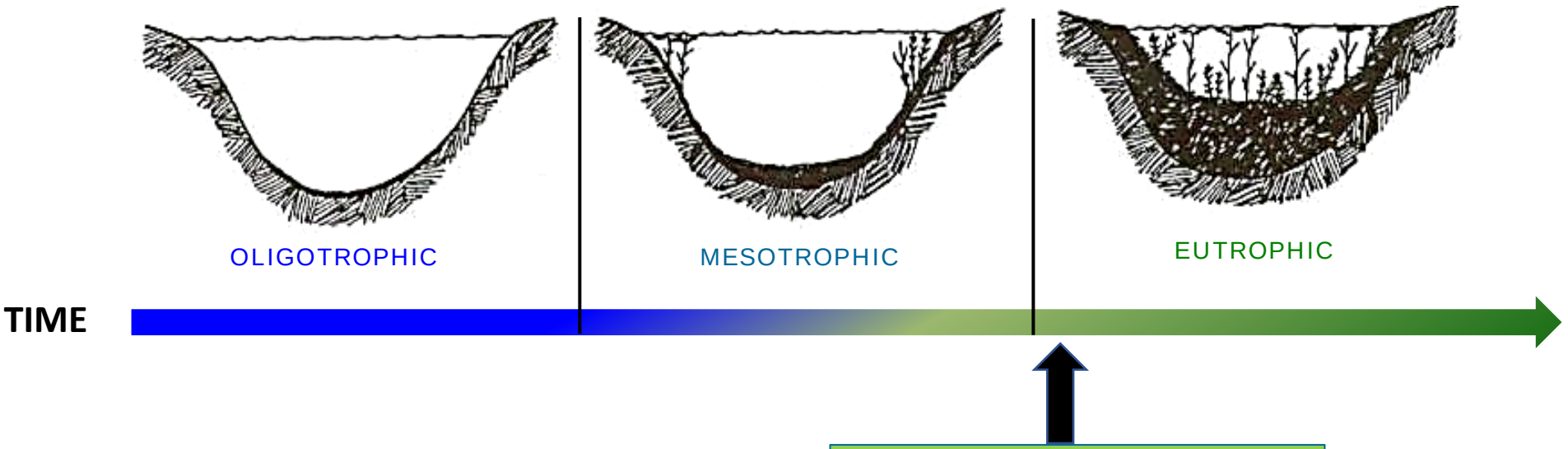
Bantam Lake Background

- **Bantam Lake is state-listed as impaired (recreational use) due to:**
  - **algae**
  - **chlorophyll-*a***
  - **nutrients**
- **Bantam Lake Nutrient TMDL Modeling project completed (Feb. 2020) to support TMDL and watershed planning**



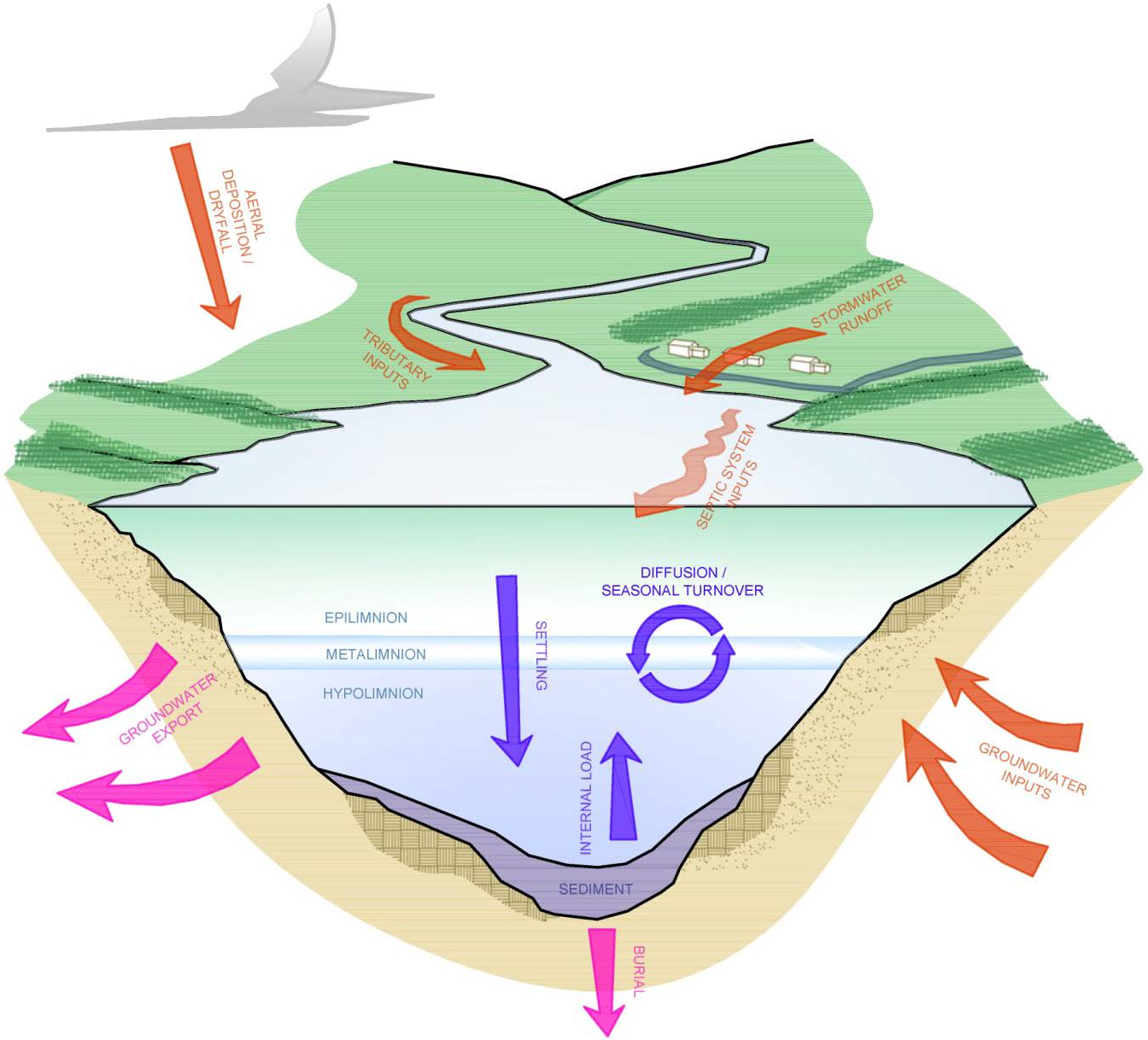
Lake Trophic Classes

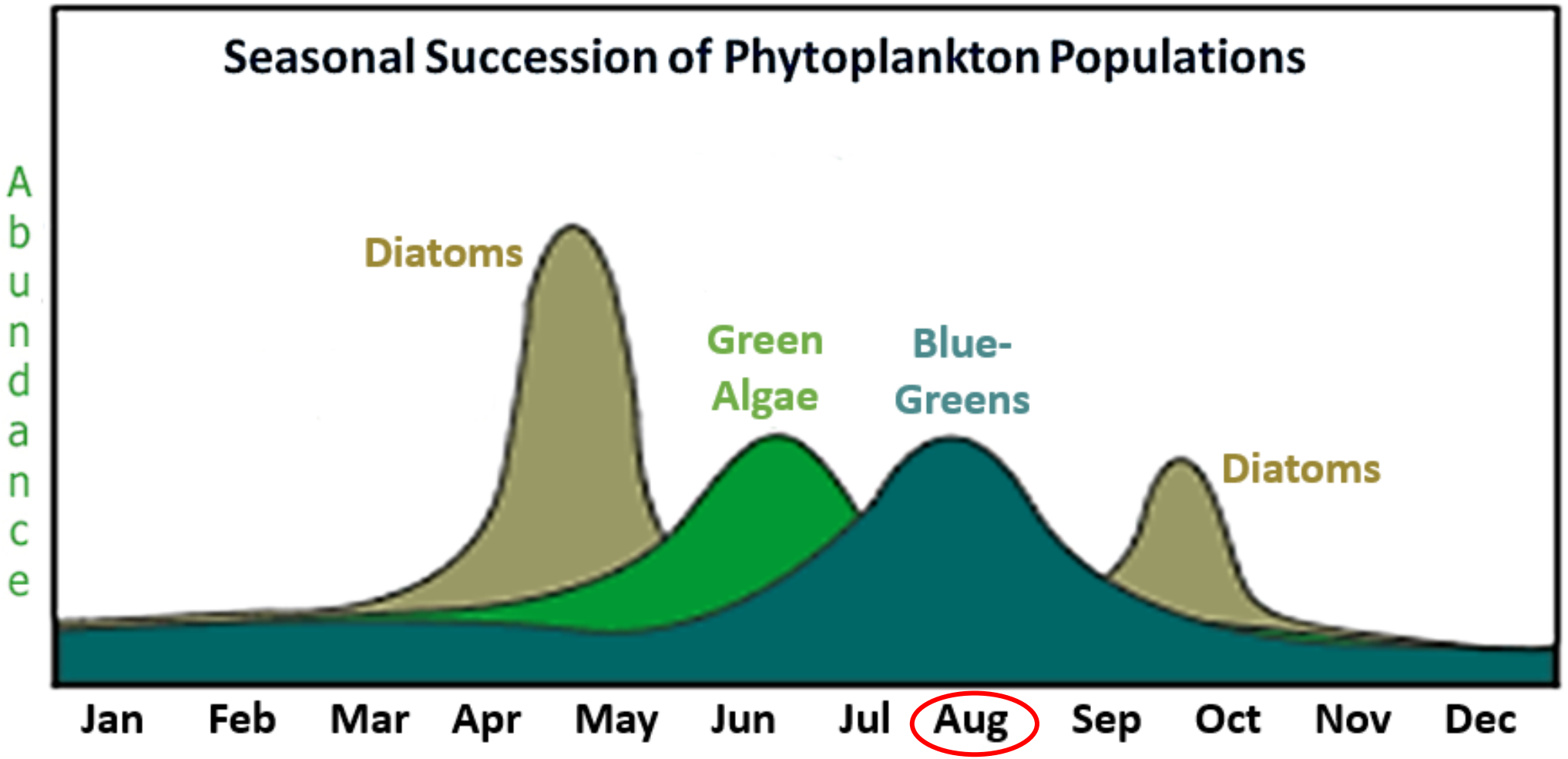
EUTROPHICATION: **The natural process by which nutrients, organic matter and sediments gradually accumulate within a water body, resulting in decreased depth and increased biological productivity.**



Bantam Lake classified as **eutrophic** by CT DEEP (*water chemistry + plants*)

Lake/Watershed Nutrient Dynamics

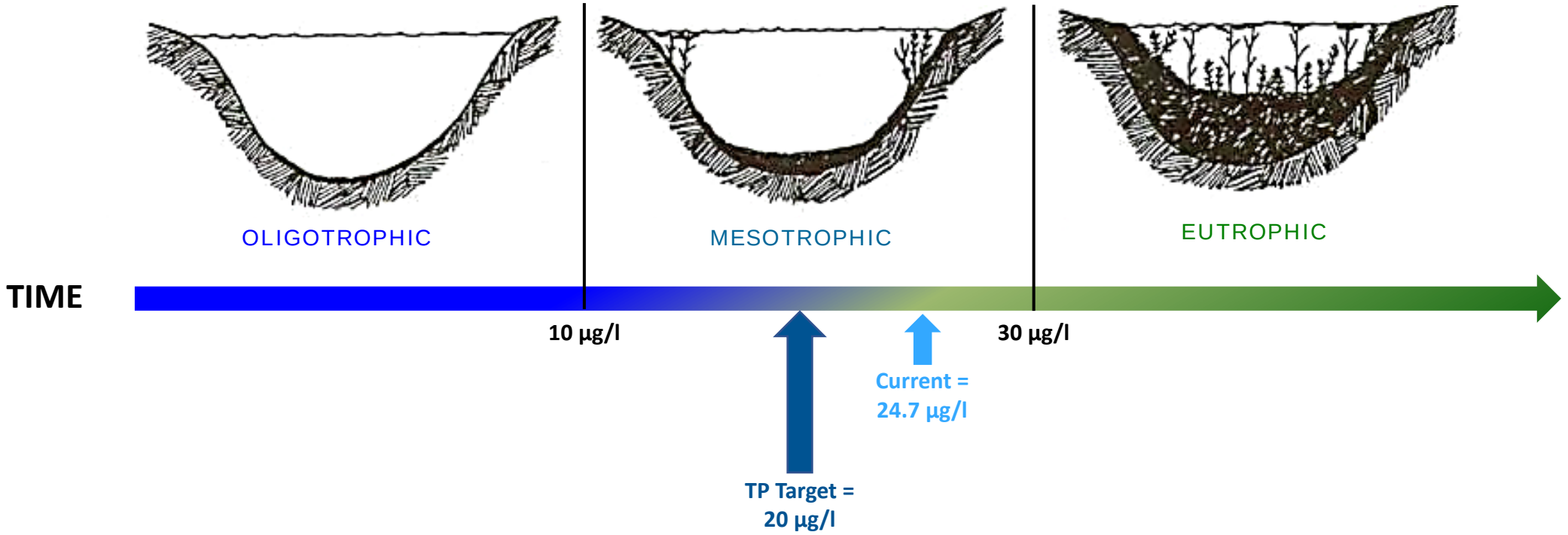



Seasonal Succession of Phytoplankton Populations
Abundance
Diatoms
Green Algae
Blue-Greens
Diatoms
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec

Water Quality Targets

15
P
Phosphorus
30.9738

Bantam Lake – Water Quality Targets



Bantam Lake – Water Quality Targets

Inputs from Various Sources	Description	TP (kg/yr)	TN (kg/yr)
WLA from NPDES-regulated Stormwater[2]	Load from stormwater regulated under NPDES Phase II MS4 permit. *None of the watershed is regulated as an MS4 area.*	0.0	0.0
WLA from NPDES Regulated Wastewater Discharges	Woodridge Lake Sewer District Discharge	265.9	989.5
Nonregulated Stormwater	The watershed load associated with non-regulated stormwater minus background loads and permitted loads	163.8	7,070.4
Septic Systems[3]	Load estimated from on-site wastewater treatment systems located within approximately 300 feet from Bantam Lake	9.7	388.2
Internal Phosphorus Load[3]	Estimated seasonal internal phosphorus load released from bottom sediments	560.0	--
Background Watershed Loads	Estimated watershed load under fully forested watershed conditions[3]	547.7	14,293.5
Waterfowl[3]	Load estimated from waterfowl (geese, ducks)	25.2	119.6
Atmospheric Load[3]	Estimated pollutant load from atmospheric deposition directly to Bantam Lake	42.0	3,945.0

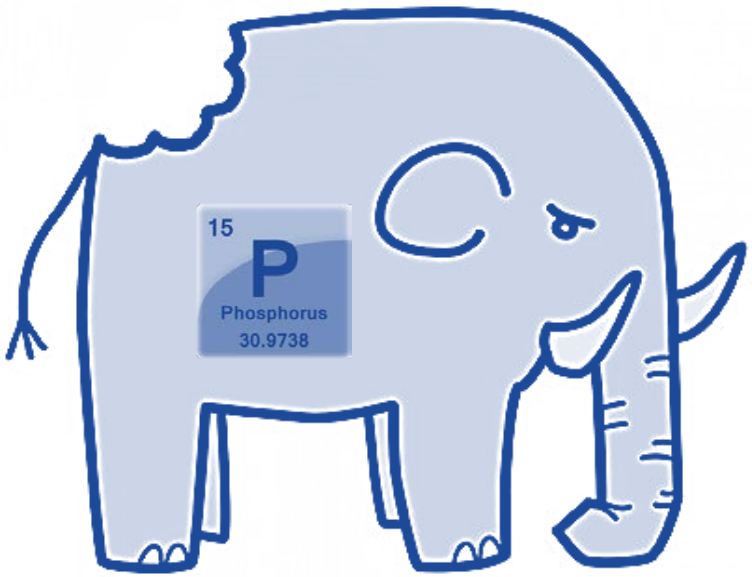
Bantam Lake – Water Quality Targets

Table 3. Pollutant Load Reduction Targets Used in Optimization Analysis

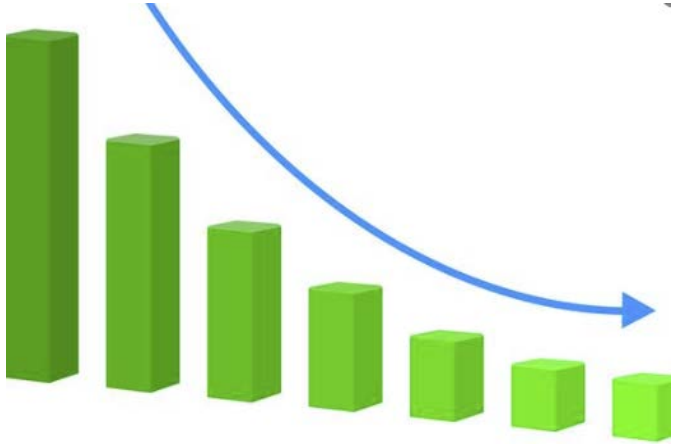
Description	Total Phosphorus (TP)	Total Nitrogen (TN)
Predicted Loading (kg /yr)[1]	163.8	7,070.4
Reduction Targets (%)	29.7%	91.7%
Reduction Targets	**48.6 kg/yr** (107 lb/yr)	**6,483.6 kg/yr** (14,294 lb/yr)

HOW DO YOU EAT AN ELEPHANT?

ONE BITE AT A TIME!



Pollutant Load Reduction Optimization Analysis



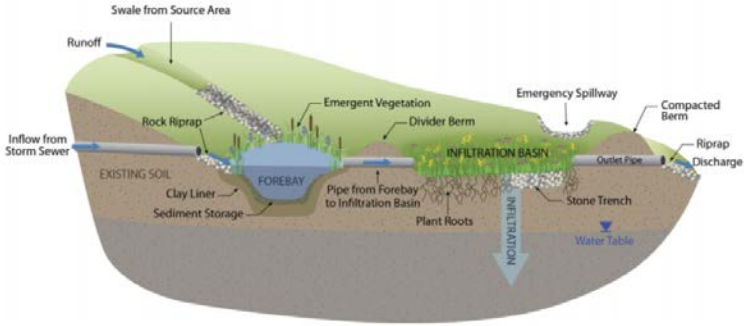
- **Planning-level analysis** to determine best mix of BMPs to **achieve load reduction goals at least cost**
- BMP optimization conducted for 10 BMP types using **EPA's Opti-Tool** *(structural BMPs only)* and other tools
- 3 BMP categories:
  - **Structural**
  - **Institutional**
  - **Agricultural**

Pollutant Load Reduction Optimization:

Structural BMPs

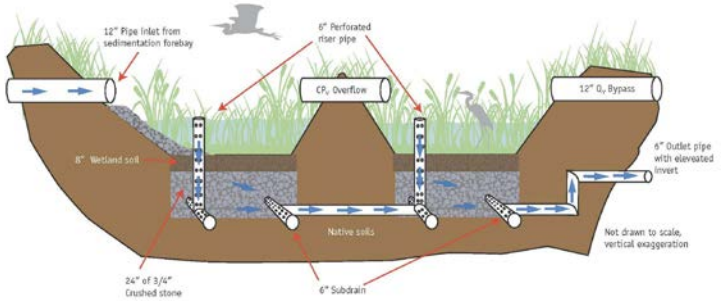
For “High Infiltration" sites (Type A or B soils)

- **Bioretention**
- **Infiltration Basin**
- **Sand Filter**



For "Poor Infiltration” sites (Type C or D soils)

- **Bioretention**
  (***with Internal Storage Reservoir***)
- **Gravel Wetland**
- **Wet Pond**



Pollutant Load Reduction Optimization Analysis:

Non-Structural BMPs

- **Street Sweeping**

- **Catch Basin Cleaning**

Pollutant Load Reduction Optimization Analysis:
Agricultural BMPs

- **Riparian Buffer Improvement**

- **Livestock Steam Crossing / Exclusion Fencing**

Pollutant Load Reduction Optimization Analysis:

4 Scenarios Evaluated

Scenario 1: **Maximum Potential BMP Implementation**

Scenario 2: **Realistic BMP Implementation**

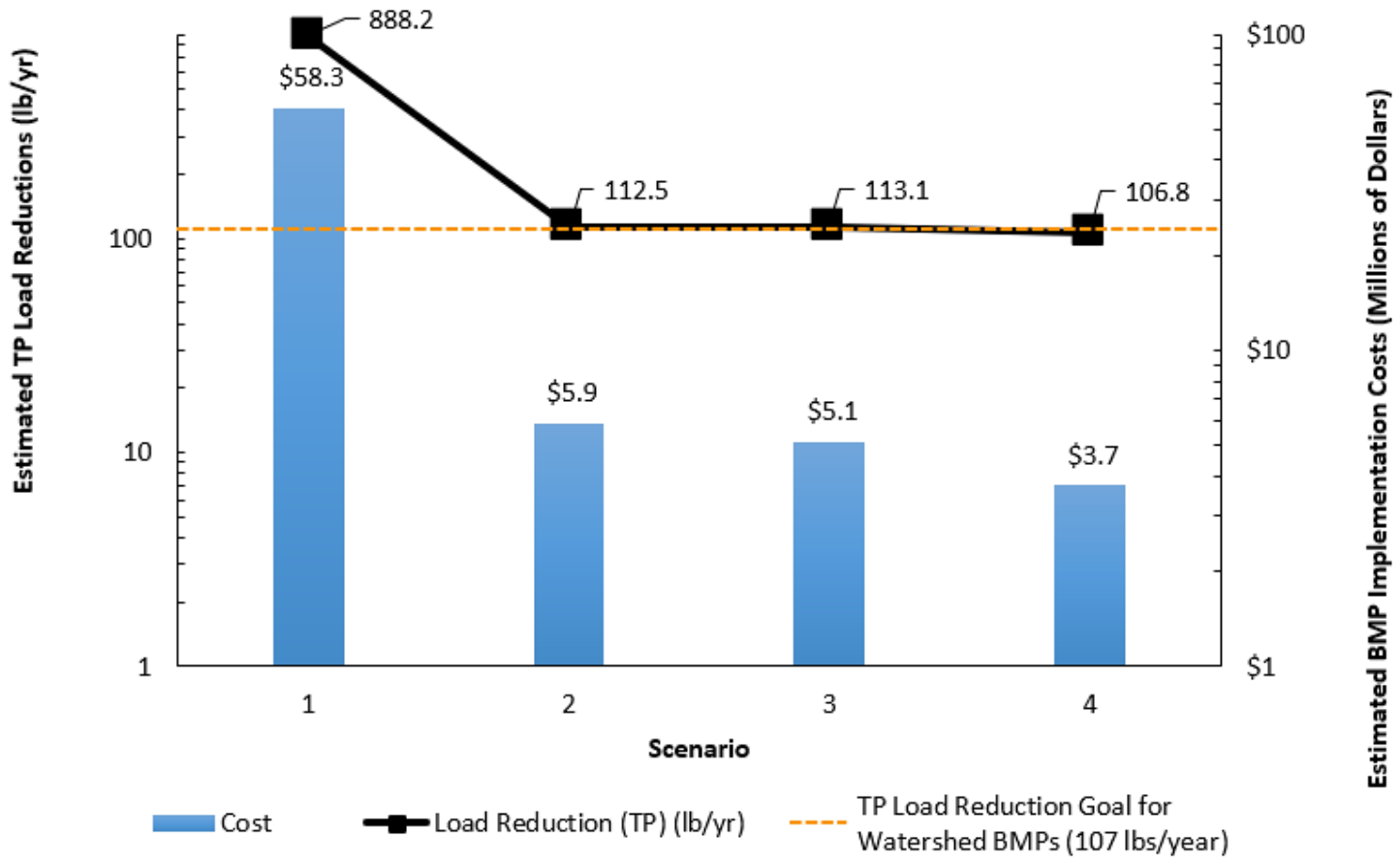
Scenario 3: **Realistic BMP Implementation *with Structural BMP Adjustments***

- adjust BMP implementation % based on scenarios 1 and 2

Scenario 4: **Realistic BMP Implementation *with Structural BMP Adjustments and Optimization***

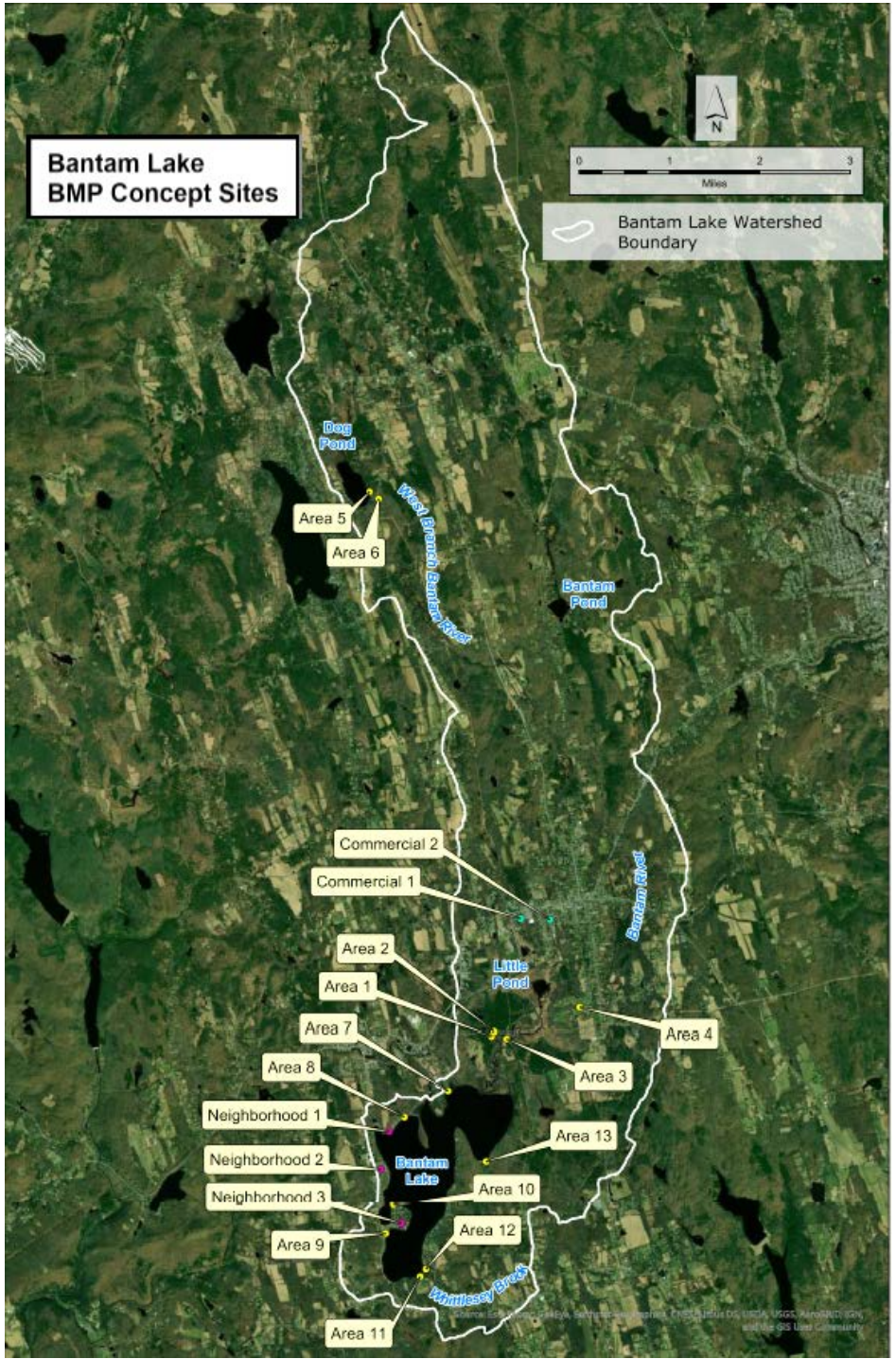
- adjust BMP sizing (treatment depth) for most load reduction at lowest cost

Pollutant Load Reduction Optimization Analysis:



Field Assessment for Structural BMP Concepts

- **Desktop/GIS Evaluation**
- **Preliminary Field Screening**
  - ***White Memorial Foundation/Bantam Lake Protective Association volunteers***
    - Over 200 sites! Thank you!
- **Field Investigation** – High Priority Locations



Factor	Criteria			Score		
	Low	Medium	High	Low	Medium	High
TP Removal	< 0. 6 lb/yr	0.6 to 1.5 lb/yr	> 1.5 lb/yr	10	15	25
Capital Cost	> $60k	$20k - $60k	< $20k	10	15	25
Waterbody Proximity	Not Near Waterbody	Within 100-ft of Waterbody	Within 100' of Bantam Lake	5	10	20
Implementation Complexity	High	Moderate	Low	5	10	20
Public Visibility / Outreach	Low Visibility	Moderate Visibility	High Visibility	0	5	10
			Possible Point Range:	**30**	**55**	**100**

Example BMP Sites

AREA 1: White Mountain Foundation Road Flooding and Watershed-wide Culverts

Location:	Whitehall Road trail network	**Source Type**:	Culvert
Owner:	White Memorial Foundation	**Priority**:	Low

Photo 1-1: Section of Whitehall Road that floods multiple times per year.

Photo 1-2: Downstream side of culvert discharges to Bantam River.

Photo 1-3: Top of upstream side of culvert draining wetland.

Proposed Improvement: Replace culvert to meet stream crossing sizing standards for passage of peak flows and wildlife passage (1.2 times bankfull width). *Watershed-wide culvert improvement prioritization recommended.*

AREA 2: White Mountain Foundation Canoe/Kayak Launch

Location: Whitehall Road trail network
Owner: White Memorial Foundation
Source Type: Shoreline Erosion
Priority: Medium

Photo 2-1: Canoe/kayak launch

Photo 2-2: Severe erosion at site.

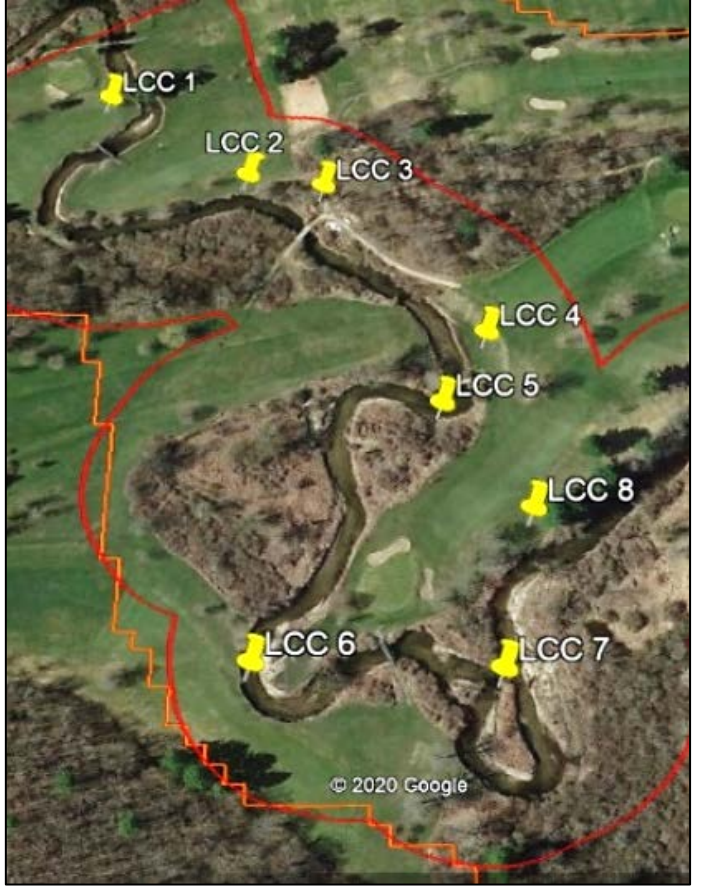
Photo 2-3: Sandy soils eroding into Bantam River.

Proposed Improvements:

1. Regrade canoe/kayak launch; install safe access point such as large steps with handrail.
2. Armor soil with stone stabilization and vegetation to prevent additional erosion.
3. Re-vegetate the sides of the ramp; stabilize area with biodegradable erosion control blanket.
4. Stabilize undercut areas at base of slope.

AREA 4: Litchfield Country Club (multiple sites)

Location: 256 Old South Road, Litchfield
Owner: White Memorial Foundation
Source Type: Golf course
Priority: Varies (See **Table 1**)



Proposed Improvements

1. **Enhance buffers** with native plantings where feasible.
2. Stabilize **eroding banks** using biostabilization techniques and a combination of stone stabilization and vegetation as needed.
3. **Move stockpiles** from the shoreline and cover.

4. Evaluate LCC **fertilizer use practices** to determine opportunities to reduce fertilizer nutrient loads, particularly in areas nearest to river

AREA 6: Town Hill Road

Location: Beach Street to Thorncrest Farm
Owner: Town of Goshen
Source Type: Steep Gravel Road
Priority: Low

Photo 6-1: Roadside erosion from Town Hill Road.

Photo 6-2: Roadside swale installed by Goshen DPW.

Photo 6-3: Small stream at base of Town Hill Road.

Proposed Improvements

1. Maintain/ enlarge existing rock swales and install new rock swales along east side of road (1,000 linear feet). Direct runoff into rock swale via regularly spaced water bars (approx. 100 ft spacing).

2. Install stone check dams within swales (appx. 100 ft spacing). Install water bars at appx. 100' spacing along remaining 2,000' of road. Install depressed riprap aprons and level spreader at each discharge point.

AREA 7: Litchfield Boat Launch and Town Beach

Location: 1 North Shore Road, Litchfield
Owner: Town of Litchfield
Source Type: Boat Launch/Town Beach
Priority: Medium

Proposed Improvements

1. Redirect surface runoff from gravel road to the grassy area behind beach

2. Install appx. 45' x 20' bioretention cell with curb inlet, underdrain, and stabilized riprap spillway to capture runoff from the dirt/gravel road. Install cape cod berms to direct flow into inlet.

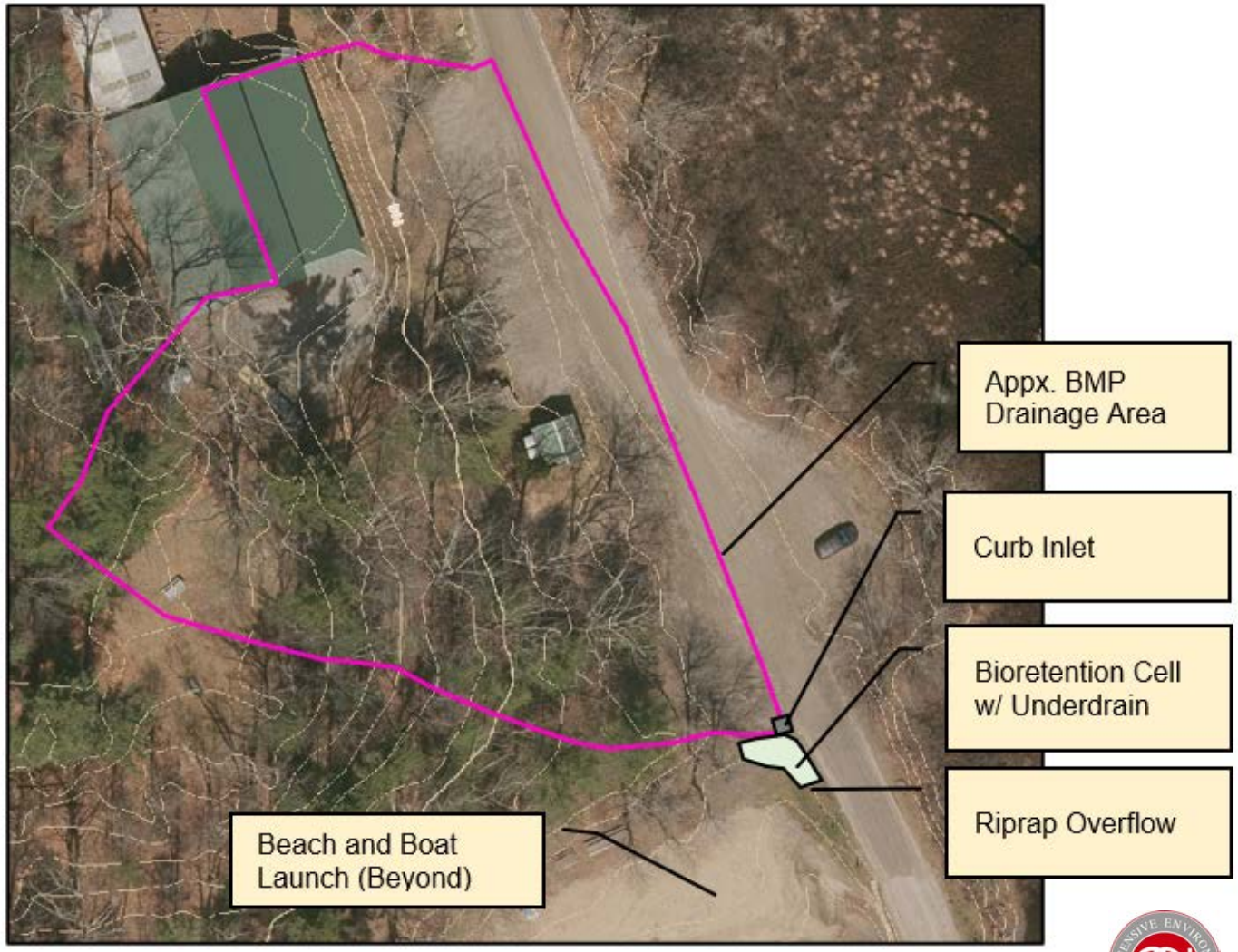


Photo 7-6: Proposed Improvements at Litchfield Town Beach and Boat Launch.

AREA 8: White Memorial Foundation Boat Launch and Campground Store Parking Lot

Location: North Shore Road, Litchfield
Owner: White Memorial Foundation
Source Type: Boat Launch/Parking Lot
Priority: Medium

Proposed Improvements

1. Stabilize area upgradient of the outfall with stone (approximately 10’ long by 3’ wide) (Photo 8-3)

2. Install 40’ by 20’ bioretention cell within grassed area at front of Campground Store parking lot. Connect to the downstream catch basin on North Shore Road via overflow riser and underdrain.

3. Direct runoff into the biorientation cell from the parking lot and North Shore Road through a combination of water bars, cape cod berms, and curb inlets

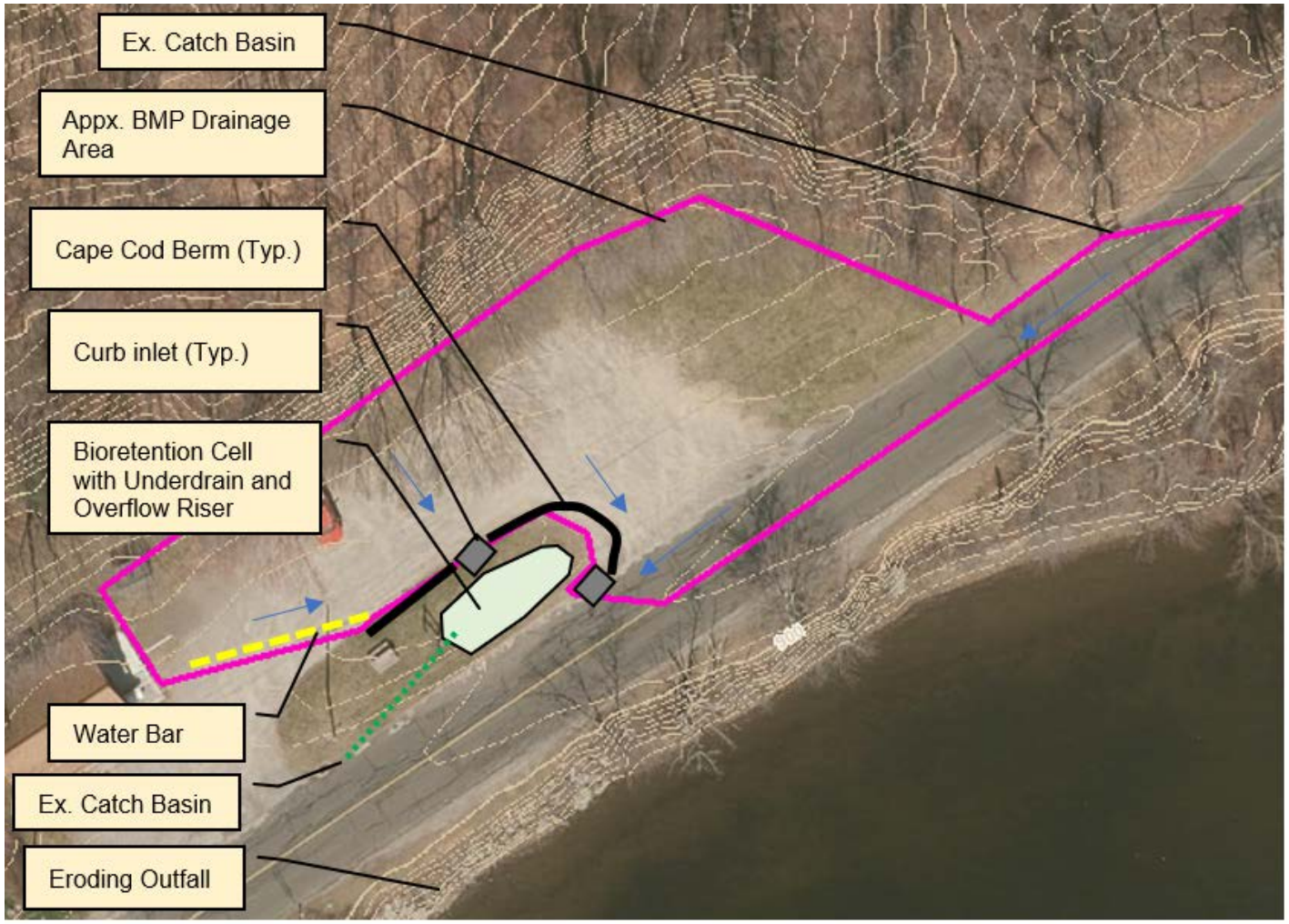


Photo 8-7: Proposed BMP Configuration.

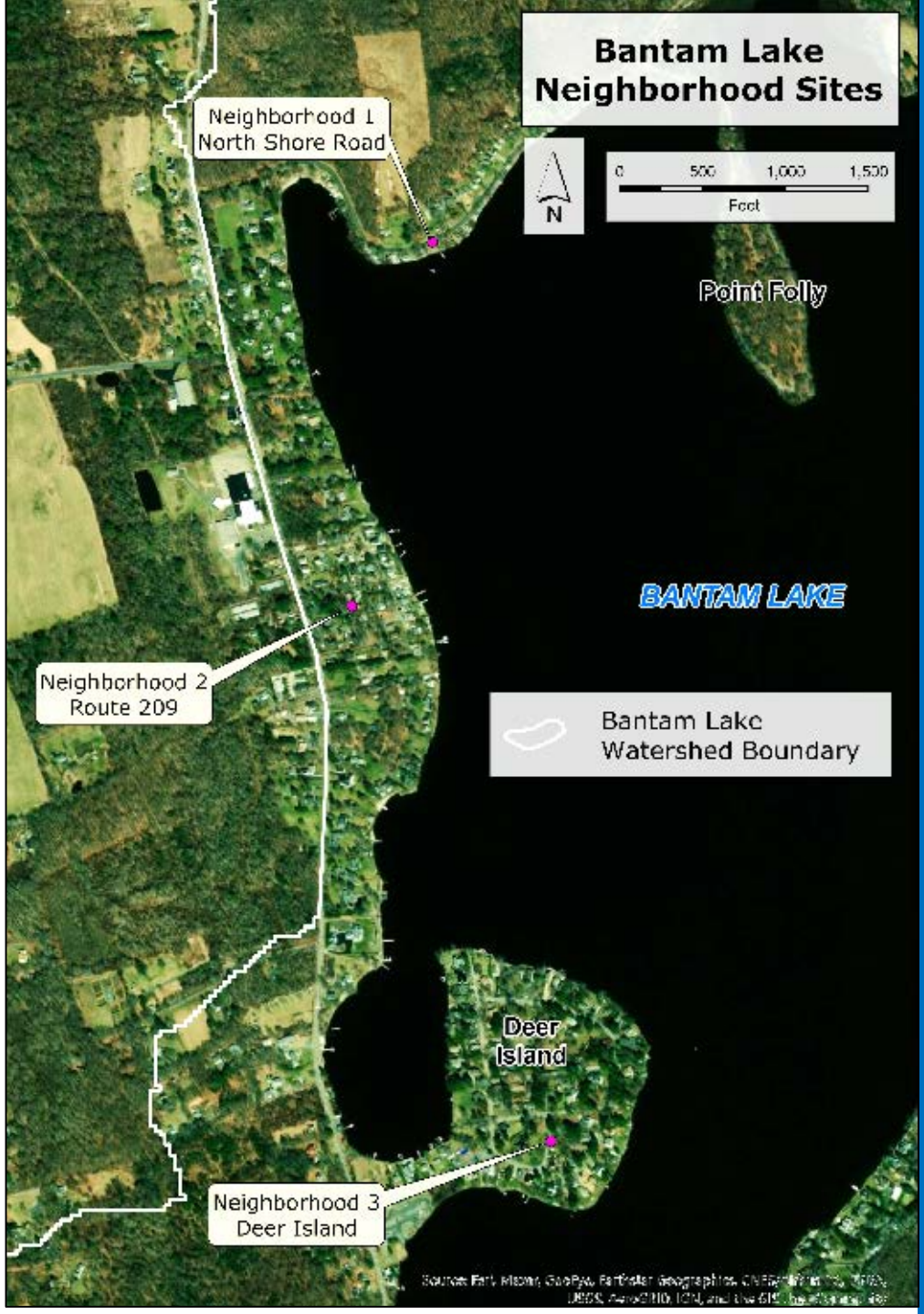
Neighborhood Sites

Proposed Improvements

1. **Provide educational materials to** homeowners about stormwater runoff, lawn/landscaping fertilizer management, and septic system maintenance, with a focus on potential impacts to water quality.

2. **Develop a neighborhood rain garden program** to infiltrate stormwater and reduce direct surface runoff discharged to the lake.

3. Encourage homeowners to **enhance buffers along the lake shore.**



Commercial Sites

Proposed Improvements

1. Provide educational materials to business owners and developers about stormwater impacts to water quality, including **de-icing alternatives to reduce the use of salt**.

2. Install **infiltration BMPs in parking lots** to encourage flow to infiltrate into the ground before being discharged from the property. Determine if there are any town-owned parcels adjacent to these properties to treat stormwater.

Site No.	Site ID	Location	Existing Issues	Proposed Improvements	Est. Load Reduction			Capital Cost Range		Ranking Factors / Scoring						PRIORITY
					TSS (ton/yr)	TP (lb/yr)	TN (lb/yr)	Low	High	TP Removal	Capital Cost	Water Proximity	Complexity to Implement	Visibility/ Outreach	Score	
1	Area 1	White Mountain Cons. Ctr. & Culverts	Culverts throughout the watershed lead to flooding, scour, and bank erosion.	Perform watershed-wide culvert assessment to identify potential culvert issues that contribute to nutrient loading and flooding.	-	-	-	$60,000	$90,000	L	L	M	H	L	50	L
2	Area 2	Whitehall Road Trail Network	Severe bank erosion caused by unoffical canoe and kayak boat launch.	Regrade; then stabilize, armor, and vegetate appx. 20' x 15' steep slope. Provide improved public access (i.e., steps).	4.70	4.0	8.00	$26,000	$39,000	H	M	M	M	H	70	M
3	Area 3	Bantam River Boat Launch (Mattatuck Trail)	Eroding gravel boat launch.	Stabilize gravel boat launch with add'l stone. Redirect flow from upstream parking area to vegetated area to west of the site via water bar / earthen berm with riprap outlet.	0.80	0.8	1.50	$11,440	$17,160	M	H	M	H	H	80	H
4	Area 4, LCC 1	Litchfield Country Club	Erosion of Bantam River Bank; inadequate vegetated buffer	Stabilize appx. 20' by 8' eroded bank with bio-stabilizaton techniques. Expand width of "no-mow" buffer as feasible.	0.60	0.6	1.20	$5,200	$7,800	M	H	M	H	L	70	M
5	Area 4, LCC 2	Litchfield Country Club	Inadequate vegetated buffer; Geese congregation.	Expand buffer width along appx. 100' length of streambank as feasible to reduce amount of geese droppings that enter Bantam River.	-	2.0	9.50	$10,400	$15,600	H	H	M	H	L	80	H
6	Area 4, LCC 3	Litchfield Country Club	Exposed topsoil stockpiles directly adjacent to Bantam River.	Cover stockpile and surround with perimeter controls when not in use. Relocate stockpiles to adjacent side of access road.	0.51	0.5	1.00	$0	$0	L	H	M	H	L	65	M
7	Area 4, LCC 4	Litchfield Country Club	Inadequate vegetated buffer and steep upstream slopes for appx. 100' long section.	Expand "no-mow" buffer width along appx. 100' length of streambank as feasible to reduce fertilizer loading from upstream fairway.	-	2.3	2.30	$0	$0	H	H	M	H	L	80	H
8	Area 4, LCC 5	Litchfield Country Club	Erosion of appx. 100' section of Bantam River Bank	Stabilize eroding bank (appx. 100' by 5') using combination of bio-stabilization and armoring techniques.	1.90	1.9	3.80	$8,320	$12,480	H	H	M	H	L	80	H
9	Area 4, LCC 6	Litchfield Country Club	Erosion of appx. 200' section of Bantam River Bank.	Stabilize eroding bank (appx. 200' by 6') using combination of bio-stabilization and armoring techniques. Expand "no mow" buffer as feasible.	4.60	4.6	9.20	$28,080	$42,120	H	M	M	M	L	60	L
10	Area 4, LCC 7	Litchfield Country Club	Oxbow formation	Allow oxbow formation to proceed naturally.	-	-	-	$0	$0	L	H	M	H	L	65	M
11	Area 4, LCC 8	Litchfield Country Club	Erosion of appx. 50' section of Bantam River Bank.	Stabilize eroding bank (appx. 50' by 6') using combination of bio-stabilization and armoring) techniques. Expand "no mow" buffer as feasible.	3.40	3.4	6.90	$12,480	$18,720	H	H	M	M	L	70	M
12	Area 5	Dog Pond Boat Launch	Untreated runoff from gravel parking lot to Dog Pond.	Enhance buffer along bottom edge of parking area with double row of plantings (appx. 80' x 5').	-	-	-	$5,200	$7,800	L	H	M	H	L	65	M
13	Area 6	Town Hill Road (Goshen)	Steep 3,500 linear foot gravel road with shoulder erosion that discharges into an unnamed stream.	Install rock swales with check dams along east side of road for appx. 1,000'. Install waterbar diversions that discharge to depressed riprap aprons along remaining forested 2,000' of road to unnamed stream.	5.30	4.5	8.90	$74,880	$112,320	H	L	M	L	L	50	L
14	Area 7	Litchfield Boat Launch	Discharge of untreated runoff from road into Bantam Lake.	Install approx. 45' x 20' bioretention cell with curb inlet, underdrain and stabilized riprap spillway to capture runoff from the dirt/gravel road.	0.09	0.6	4.30	$35,360	$53,040	M	M	H	L	H	65	M
15	Area 8	White Memorial Foundation Campground Store	Downstream outfall erosion, untreated runoff to Bantam Lake.	Stabilize gully erosion at outfall with stone (appx. 10' grassed area at front of Campground Store parking lo underdrain.											65	M
16	Area 9	State Boat Launch (Morris)	Discharge of untreated runoff from gravel/dirt parking lot into Bantam Lake.	Replace existing boat launch with articulated concre bioretention cell with deep sump curb inlet inlets, und											60	L
17	Area 10	Deer Island Boat Launch (Morris)	Gully erosion at gravel boat launch from steep upgradient paved road.	Install two (2) Tree Box Filters on either side of road. with trench drain that discharges to level spreader / r											50	L
18	Area 11	Morris Town Beach	Untreated runoff from gravel parking area to wetland upgradient of Bantam Lake.	Install appx. 60' x 30' bioretention cell with curb inlet, runoff from existing gravel parking lot. Direct runoff to											60	L
19	Area 12	Morris Boat Launch	Discharge of untreated runoff from gravel/dirt road into Bantam Lake.	Install two (2) bioretention cells on either side of road filter adjacent to boat launch, and cape cod berms to											60	L
20	Area 13	Sandy Beach (Morris)	Discharge of untreated runoff to Bantam Lake from access road & gully erosion from two pipes that discharge to beach.	Install runoff diversion water bars at appx. 100-ft intervals along access road with depressed riprap aprons / level spreader at each discharge point.	0.06	0.3	2.08	$26,000	$39,000	L	M	H	M	L	55	L
				Totals	22.6	30.1	88.2	$586,240	$879,360							

If all listed BMPs are constructed:

- TP load reduced by **30.1 lbs/yr**,
- **28.1% of the TMDL target** (for non-regulated stormwater)
- **Cost range:** $586K - $879K

Non-structural BMPs

Public Information and Education

Land Conservation

Regulatory Tools

Institutional Practices

Public Information and Education

- **Develop Watershed Management Team to coordinate WBPA implementation efforts.**

- **Coordinate with NRCS to develop Comprehensive Nutrient Management Plans for agricultural lands.**

- **Evaluate/develop local education and outreach programs regarding waterfowl, pet waste, septic systems, fertilizer/pesticide use, and vegetative buffers, etc.**

- **Conduct *Low Impact Development (LID) Techniques for Homeowners* workshop**

Land Conservation

Coordinate with watershed municipalities and conservation groups to prioritize:

- land conservation goals
- target parcels

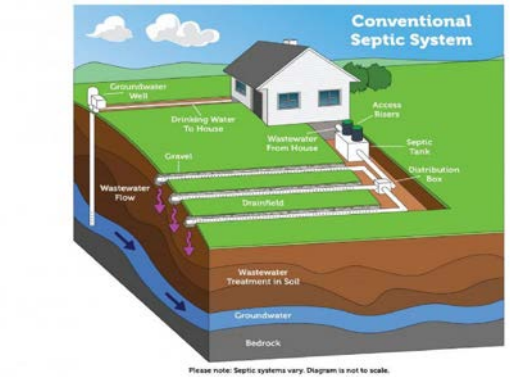
Litchfield Hills Greenprint Collaborative

HVA
HVATODAY.ORG

THE WHITE MEMORIAL CONSERVATION CENTER INC
1964

Regulatory Tools

- **Establish town regulations to enable/promote alternative wastewater treatment systems based on proximity to a waterbody (i.e., 200 meters)**
- **Develop septic system pumping ordinances requiring homeowners to pump their septic systems every 3-5 years.**
- **Develop landscaping fertilizer ordinances**
- **Strengthen stormwater management regulations**



Institutional Practices

- **Increase frequency of catch basin cleaning** (*2 additional cleanings per year*)

- **Develop Enhanced Street/Pavement Cleaning Programs**

- **Develop Enhanced Organic Waste and Leaf Litter Collection Programs**

Non-structural BMPs

BMP Priority Ranking Factors*

L = Low	M = Medium	H = High

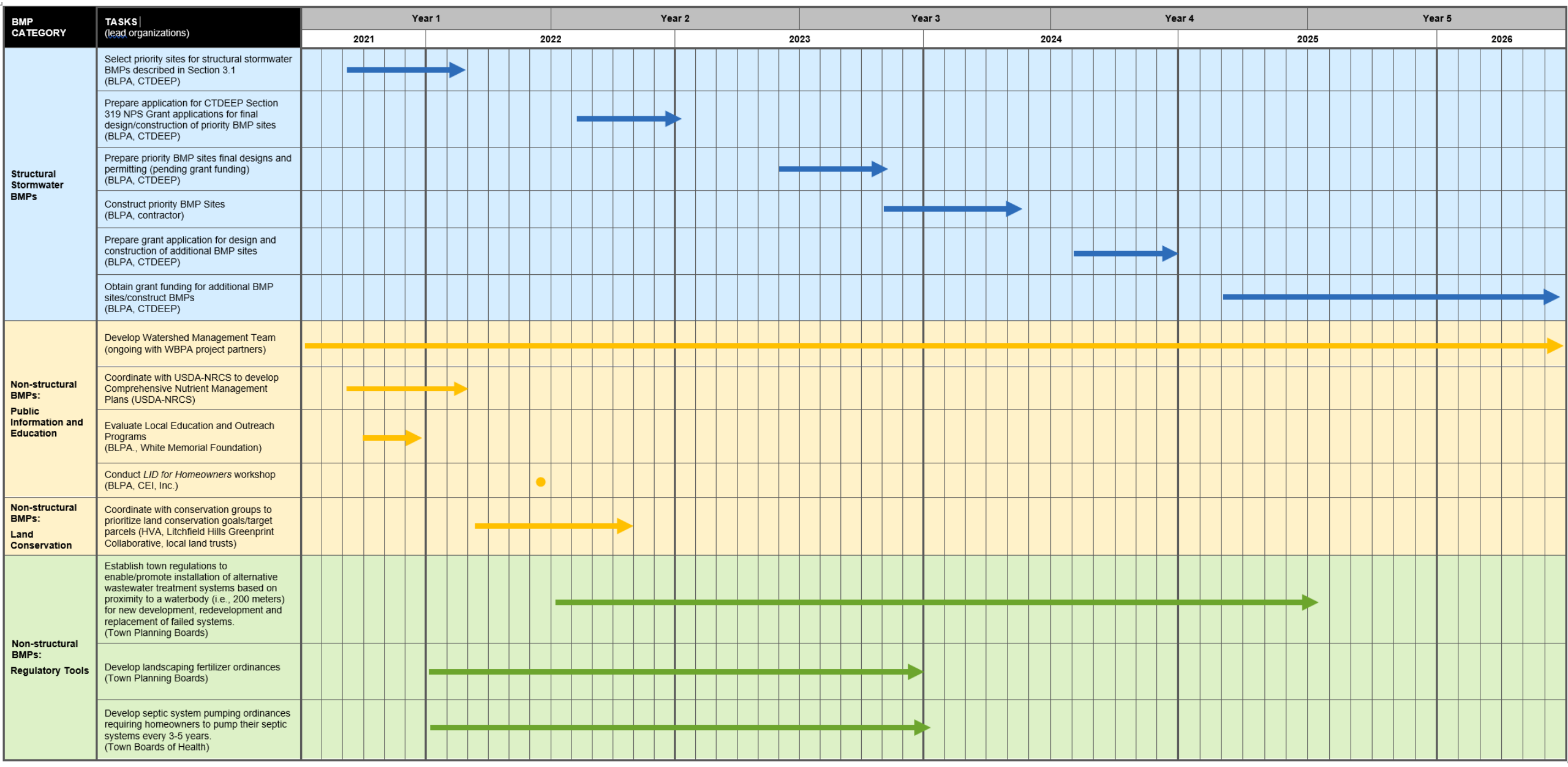
** For cost factors, lower cost = higher priority*

Non-structural BMP Category	BMP Description	Relevant Authorities	How BMP Achieves Pollutant Load Reductions or Other WBP Goals	Pollutant Load Reduction Potential	Anticipated Costs	Feasibility	PRIORITY
Public Information and Education	Develop a Watershed Management Team to coordinate WBPA implementation efforts.	Municipalities, health departments, BLPA, watershed homeowners, watershed stakeholders, CTDEEP	Reduces nutrient loading by improving coordination with agencies that are critical to plan implementation. Improves schedule coordination, BMP prioritization, and implementation logistics.	M	H	H	**High**
	Coordinate with NRCS to develop Comprehensive Nutrient Management Plans for farming activities on agricultural lands.	NRCS, BLPA, agricultural landowners, CTDEEP	Reduces nutrient loading by educating agricultural land owners on the potential water quality effects of their practices.	M	H	H	**High**
	Evaluate local education and outreach programs regarding waterfowl, pet waste, septic systems, fertilizer/pesticide use, and ensuring adequate vegetative buffers and bank protection.	CTDEEP, BLPA, watershed homeowners, consultant	Reduces nutrient loading by educating homeowners and promoting best practices.	L	H	H	**Medium**
	Conduct *Low Impact Development (LID) Techniques for Homeowners* workshop	CTDEEP, BLPA, watershed homeowners, consultant	Prevents increases in pollutant loading associated with land development.	L	H	H	**Medium**
Land Conservation	Coordinate with conservation groups to prioritize land conservation goals/target parcels.	Town planning staff and other local land conservation orgs.	Prevents increases in pollutant loading associated with land development.	H	H	H	**High**
Regulatory Tools	Establish town regulations to enable/promote installation of alternative wastewater treatment systems based on proximity to a waterbody (i.e., 200 meters) for new development, redevelopment and replacement of failed systems.	Municipal Boards of Health and Boards of Selectmen	Reduces nutrient loading from wastewater sources.	**H**	**H**	M	**High**
	Develop landscaping fertilizer ordinances	Municipal Planning Boards and Boards of Selectmen	Reduces nutrient loading from landscaping fertilizer applications.	H	L-M	M	**Medium**
	Develop septic system pumping ordinances requiring homeowners to pump their septic systems every 3-5 years.	Municipal Boards of Health and Boards of Selectmen	Reduces nutrient loading from wastewater sources.	M	L-M	M	**Medium**
Institutional Practices	Increase frequency of catch basin cleaning (2 additional cleanings per year)	Town DPW/Highway Depts., CTDOT	Reduces nutrient load as calculated according to CT Small MS4 General Permit formulas for each practice.	M	L	M	**Medium**
	Develop Enhanced Street/Pavement Cleaning Programs	Town DPW/Highway Depts., CTDOT		M	L-M	M	**Medium**
	Develop Enhanced Organic Waste and Leaf Litter Collection Programs	Town DPW/Highway Depts., CTDOT		M	L-M	M	**Medium**

Next Steps: Schedule and Milestones

- **5-year planning/implementation period: July 2021 - June 2026**
- **Schedule / milestones organized according to:**
  - **Structural Stormwater BMPs**
  - **Non-structural BMPs**
  - **Monitoring**
  - **Adaptive Management**

Next Steps: Schedule and Milestones



Next Steps: Schedule and Milestones

BMP CATEGORY	TASKS (lead organizations)	Year 1	Year 2	Year 3	Year 4	Year 5
		2021	2022	2023	2024	2025	2026
Non-structural BMPs: Institutional Practices	Increase frequency of catch basin cleaning (Town DPWs, Highway Depts.)						
	Develop and Implement Enhanced Street/Pavement Cleaning Programs (Town DPWs, Highway Depts.)						
	Develop and Implement Enhanced Organic Waste and Leaf Litter Collection Programs (Town DPWs, Highway Depts.)						
Monitoring	Conduct annual watershed-scale monitoring (BLPA, White Memorial Foundation)						
Adaptive Management	Review progress towards meeting WRMP water quality targets and project-specific goals and update as needed (CTDEEP and local project partners)						

Evaluation Criteria and Monitoring

EVALUATION CRITERIA

- **Water Quality Targets and TMDL Performance Criteria:**

  See CT Statewide Lake Nutrient TMDL Appendix 1: Bantam Lake Watershed

- **Project-Specific Criteria *(Examples)***:

  - ☑ # of structural BMPs implemented
  - ☑ # of watershed residents who attended workshops focused on reducing nutrient loading
  - ☑ Acres of land acquired/preserved through conservation efforts;
  - ☑ Number of septic systems pumped annually
  - ☑ Miles of streets swept annually

Evaluation Criteria and Monitoring

Monitoring

- Continued **watershed-scale water quality monitoring** recommended to help document extent that implementation efforts are succeeding.

  See CT Statewide Lake Nutrient TMDL Appendix 1: Bantam Lake Watershed

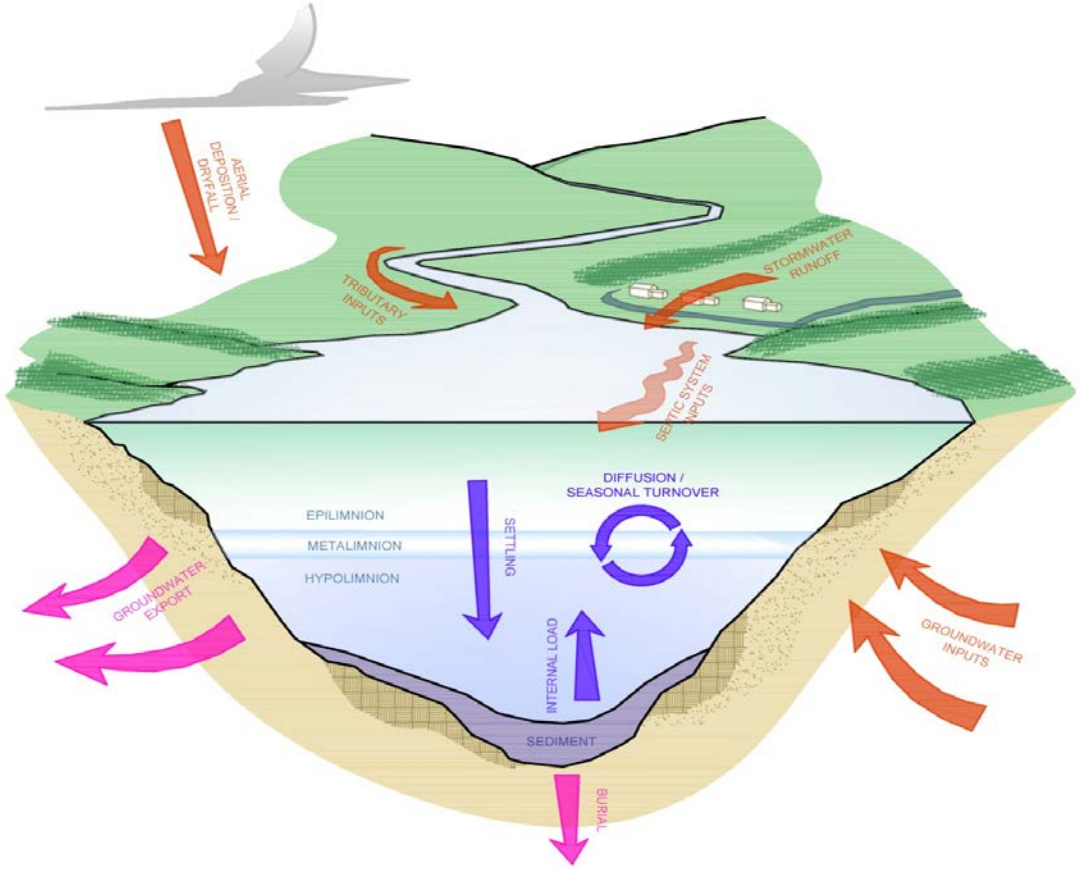
Adaptive Management

If, after **5 years of WBPA implementation**, direct measurements and indirect indicators do not show progress towards meeting water quality targets, **management measures and water quality targets should be revisited and modified accordingly**.

Adaptive management could include:

- Evaluation of options to reduce pollutant loads from **septic systems** and **internal loading**. Septic systems are estimated to contribute a small fraction of the lake's P load.

- **Internal load** is a much larger fraction of P load (34.7 %). Control of internal load may be an important part of an integrated P management approach **once watershed P sources have been reduced**.



Questions?