

Action Plan: Town of Barnstable Ponds

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Overview

- Review assignment
- Ecology of inland kettle ponds
- Current status and trends
- Recommended actions



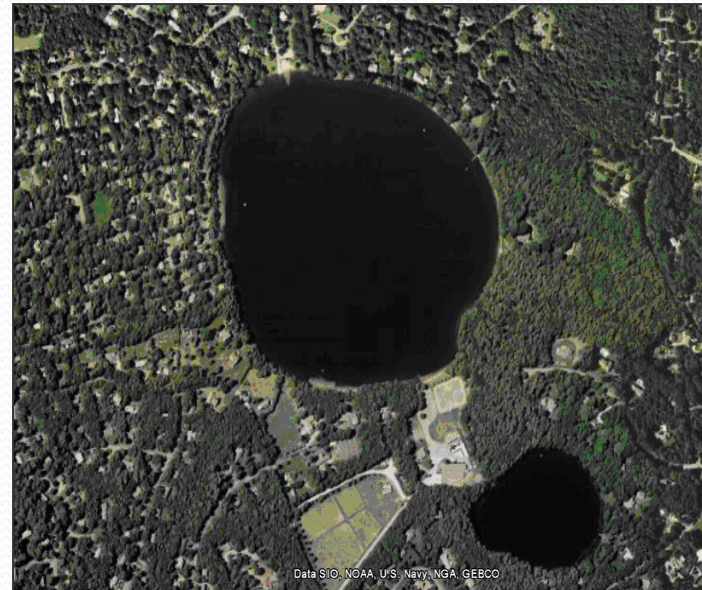


Scope of investigation

- Component of comprehensive nutrient management planning
- Identify underlying causes of water quality conditions
- Define potentially effective actions
 - Town-wide
 - Pond-specific
- Set priorities and outline implementation strategy

Kettle Pond ecosystems

- Glacial ice blocks
- Many lack surface inflows and outlets
- Groundwater seepage
- Nutrient accumulation



Eutrophication

- Nutrient enrichment- process & effects
- Nitrogen and Phosphorus
- Thresholds for “impaired waters”



Hamblin Pond: Recreational use



*Lovell's Pond, with algal bloom
July 2009*

Lake and Pond Criteria

Investigator/Program	Total P (ug/l)	Total N (mg/l)	Chlorophyll-a (ug/l)	Secchi Disk (m)
Carlson TSI				
Oligotrophic	<6-12	ND	<0.95-2.6	>8-4
Mesotrophic	12-24	ND	2.6-7.3	4-2
Eutrophic	24-96	ND	7.3-56	2-0.5
Cape Cod: Ecoregional (Reference conditions)	9	0.41	6	2
Cape Cod: PALS Data (Unimpacted threshold)	10	0.31	1.7	ND

ND= Not determined

Trophic State

	Ultra-Shallow	Shallow	Deep
Oligotrophic	Hathaway (South) Mary Dunn Mill (MM) Red Lily	Garrett's Joshua	Hamblin Hathaway (North) Micah Middle Neck Shubael
Mesotrophic	Aunt Betty's Bog Fawcett Lumbert	Bearse Coleman No Bottom Shallow	Lovell's Mystic Wequaquet
Eutrophic	Dunn's Little/Stony Mill (WB)	Eagle Long (C'ville) Long (MM) Muddy Parker Round (MM)	
Hypereutrophic	Little Parker	Schoolhouse	

Summary of Use Attainment

Depth Categories:	Water Quality and Aquatic Habitat Status		
	Supports Desired Uses	Currently Supports Desired Uses, with Evidence of Degradation	Does Not Support Desired Uses
Ultra-shallow (less than 1.2 m maximum depth)	Aunt Betty's Hathaway (South) Lumbert Mary Dunn Mill (MM)	Red Lily Bog Dunn's Fawcett Little/Stony Mill (WB)	Little Parker
Shallow (from 2.1 to 8.6 m maximum depths)	Garrett's Joshua Eagle	Bearse Coleman Long(MM) Elizabeth No Bottom Round (MM) Shallow	Hinckley Long (C'ville) Muddy Parker Schoolhouse
Deep (from 9.3 to 17.3 m maximum depths)	Hathaway (North) Micah Middle Neck	Chrystal Hamblin Mystic Shubael Wequaquet	Lovell's

Build-Out Analysis

- Assess the vulnerability of Barnstable ponds to future development
 - How likely is increased nutrient loading?
(zoning & land use changes)
 - How might ponds react to increased loading?
(current conditions & assimilative capacity)



Potential for Development

Pond Watershed	Percent Increase in Residential Units	Percent increase in Commercial Square Ft
Lovell	44	0
Indian	9	0
Mill	34	0
Bog	27	330
Garrett	20	0
Wequaquet/Bearse/Shallow/Long	8	39
Hinckley	24	0
Hathaway	>100	821
Fawcett	17	146
Israel/Lamsom	0	290

Potential for Degradation

Pond Watershed	Current Conditions	Vulnerability
Lovell	Impaired	High
Indian	Supports uses	Low
Mill	Supports uses	Moderate
Bog	Supports uses	Moderate
Garrett	Fully supports uses	Moderate
Wequaquet/Bearse/Shallow/ Long (CV)	Long (CV) impaired, others support uses	Moderate
Hinckley	Supports uses	Moderate
Hathaway	Supports uses	Low Protected (Town)
Fawcett	Supports uses	Moderate
Israel/Lamsom	Unknown	Moderate

Priorities for Action: High

Pond	Status	Recommendations
Little Parker	H; Impacted; does not support desired uses	Watershed BMPs; hand-pulling, benthic barriers
Hinckley	E; Impacted	Stormwater management, septic inspections
Joshua	O; At risk; Town beach, natural vegetation; reference pond indicative of pristine conditions	Priority for protection, education, BMPs
Long (Centerville)	E; Impacted; Town beach, highly developed; Does not support desired uses	Stormwater management, septic inspections, benthic mats, hand-pulling
Schoolhouse	H; Impacted; does not support desired uses	Stormwater management, septic inspections, benthic mats, hand-pulling

Priorities for Action: High

Pond	Status	Recommendations
Hamblin	O; At risk; Town Beach, conservation land; alum-treated; potential for increased residential development	Monitor for effectiveness of alum treatment; controls on future density and/or BMPs to minimize phosphorus migration
Hathaway (north)	O; At risk; Town beach, mix of conservation land and development	Continue acquisition of hydrologically important parcels in watershed
Lovell's	M; Impacted; Town beach closed; blue-green algal bloom; does not support desired uses	Priority for monitoring deep water phosphorus levels and N/P ratio; consider nutrient inactivation
Mystic	M; Impacted/at risk; Public access, endangered mussels; permit phase for alum application; potential for increased residential development	Priority for alum treatment program; guide future development to minimize surface runoff and groundwater nutrient input



Priorities for Action: High

Pond	Status	Recommendations
Michah	O; At risk; Undeveloped, reference pond	Priority for monitoring deep water phosphorus levels
Middle	O; At risk; Public access, very clear	Priority for monitoring deep water phosphorus levels; consider acquisition of key parcels to control density



Recommended Actions

- Education
 - Public forum on inland ponds
 - Report card
- Monitoring- three year rotation
- Local laws
 - Enhanced inspections & maintenance of on-site systems
 - Sediment & erosion control
- Restoration
 - Plan for alum treatment

Questions and Discussion

