A WATERSHED-BASED PLAN FOR LAKE WYOLA

FRANKLIN REGIONAL COUNCIL OF GOVERNMENTS (FRCOG)
PRESENTATION TO THE SHUTESBURY SELECTBOARD
JUNE 6, 2023
Lakes in [New England] were formed about 15,000 years ago. Once deep and clear, they are gradually accumulating and filling in with sediment, nutrients, and plants, and eventually, when they are entirely filled in, they will become [wetlands]. Lake aging typically takes place in a geologic timescale, which is very long and passes extremely slowly compared to our human timescale. However, humans are accelerating the natural lake aging process by increasing the amount of nutrients (particularly phosphorus), sediment, and other material that flows into a lake from throughout its watershed.

(New Hampshire Lake Smart Website)
WHAT IS A WATERSHED-BASED PLAN?

• PROGRAM OF THE MA DEPARTMENT OF ENVIRONMENTAL PROTECTION (DEP)

• FUNDED UNDER S.319 OF THE CLEAN WATER ACT

• PURPOSE
  • IMPAIRED AND HEALTHY WATERSHEDS
  • IDENTIFY PAST AND CURRENT WATER QUALITY CONDITIONS AND KNOWN AND LIKELY CAUSES AND SOURCES OF NONPOINT SOURCE POLLUTION
  • RECOGNIZE DATA GAPS
  • PRIORITIZE PROBLEMS AND THREATS
  • IDENTIFY APPROPRIATE BEST MANAGEMENT PRACTICES AND WATERSHED-BASED STRATEGIES

• REQUIRED FOR S.319 NONPOINT SOURCE COMPETITIVE GRANT FUNDING FOR IMPLEMENTATION PROJECTS; HELPFUL FOR OTHER WATER QUALITY GRANTS
WHAT IS NONPOINT SOURCE (NPS) POLLUTION?

• NOT FROM A SPECIFIC SOURCE (e.g., DISCHARGE PIPE)
• TYPICALLY SURFACE/STORMWATER RUNOFF PICKING UP POLLUTANTS
• SEDIMENT, VEHICLE CHEMICALS, FERTILIZERS, PESTICIDES, PET WASTE, MANURE, ROAD SALT & MORE

• MOST UNTREATED, UNMANAGED STORMWATER RUNOFF IN FRANKLIN COUNTY COMES FROM
  • DEVELOPED AREAS
  • ROADS AND CULVERTS
  • RESIDENTIAL HOMES
  • AGRICULTURE

• ACCORDING TO THE EPA, NPS POLLUTION IS NOW THE GREATEST CAUSE OF WATER QUALITY PROBLEMS IN THE COUNTRY
CLIMATE CHANGE CREATES A COMPLEX SET OF INTERACTING STRESSORS, BRINGING INCREASED HEAT, INCREASED ANNUAL PRECIPITATION, AND MORE FREQUENT DROUGHTS.

WATERSHED HYDROLOGY NO LONGER A “NATURAL” SYSTEM. IT HAS BEEN MANIPULATED THROUGH HUMAN-DRIVEN DEVELOPMENT AND LAND USE.
RAINFALL AND STORMWATER RUNOFF VS. INFILTRATION

**UNDEVELOPED**
STORMWATER RUNOFF = 10%
RAINFALL INFILTRATION = 50%

**DEVELOPED**
STORMWATER RUNOFF = 55%
RAINFALL INFILTRATION = 15%
NPS POLLUTION IN LAKE WYOLA: PHOSPHORUS

• MASS DEP LISTED LAKE WYOLA INTEGRATED LIST OF WATERS (ILW) AS HAVING A PHOSPHORUS IMPAIRMENT

A NPS POLLUTION IMPAIRMENT IS DETERMINED BY HOW MUCH POLLUTANT CONCENTRATION A WATERBODY CAN TAKE BEFORE THE VARIOUS USES (RECREATION, HABITAT & AESTHETICS) ARE COMPROMISED

• LAKE WYOLA VERY LIKELY DOES NOT HAVE A PHOSPHORUS IMPAIRMENT
NPS POLLUTION IN LAKE WYOLA: SEDIMENT

STORMWATER AND ROAD EROSION
• WEST AND EAST SIDES OF LAKE

FLUVIAL GEOMORPHIC IMPAIRMENTS
• TRIBUTARIES

A FLUVIAL GEOMORPHIC IMPAIRMENT RELATES TO HOW A STREAM INTERACTS WITH THE LANDSCAPE AROUND IT – EROSION, SCOUR, INCISION.
TIMELINE

December 2021
Identified need for WBP

January 2022
FRCOG watershed visit

April 2022
Engineer watershed visit

August 2022
Draft WBP to DEP

May 2023
Draft WBP to ConCom & LWAC

June 2023
Public forum and review period

Summer 2023
Watershed visit
PREVIOUS & ONGOING WORK

1997 Management Plan for Lake Wyola (New England environmental)

2002 TMDL for Lake Wyola (DEP)

2003 Lake Wyola TMDL Implementation Project (DEP)

2005 Lake Wyola Inventory and Evaluation, Shutesbury, MA (NRCS)

2007 Locks Pond Road and Lake Wyola Subwatershed Stormwater Improvement Study, Shutesbury Massachusetts (DCR)

2019 Wildlife Habitat Evaluation Report, Lake Wyola, Shutesbury, MA
WATER QUALITY DATA & GAPS

**PHOSPHORUS**
- Most recent sampling: 2014
- Sample well below standard

**E. COLI**
- LWAC monitors 3 LW beach
- Only one date over the standard in past 6 years

**SEDIMENT**
- No measurements
LAND USE & IMPERVIOUS SURFACE

STORMWATER RUNOFF

• NEARBY ROADS
• EROSION OF NEARBY UNPAVED ROADS
• LAWNS
• PIPED STORMWATER OUTFALLS

STREAM EROSION FROM FLUVIAL GEOMORPHIC IMPAIRMENTS

OTHER POSSIBLE SOURCES CONSIDERED

• AGRICULTURE
• RESOURCE EXTRACTION SITES
• BOAT WAKES
• FOREST
• GROUNDWATER WITHDRAWAL
• SEPTIC SYSTEMS
• UNDERGROUND STORAGE TANKS
• WATERFOWL
### POLLUTANT LOADING GOAL

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>Existing Estimated Total Load</th>
<th>Water Quality Goal</th>
<th>Required Load Reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Phosphorus</td>
<td>WBP modeled estimate: 606 lbs/yr</td>
<td>ALREADY REACHED</td>
<td>Any reduction is desirable in order to protect existing high-quality waters.</td>
</tr>
</tbody>
</table>
| Total Suspended Solids | 113 tons/yr                | **Class B Standards**  
These waters shall be free from floating, suspended and settleable solids in concentrations and combinations that would impair any use assigned to this Class, that would cause aesthetically objectionable conditions, or that would impair the benthic biota or degrade the chemical composition of the bottom.  
Estimated pre-development loading rate is 107.4 tons/yr | 5.6 tons/yr (long term goal)  
(Estimated existing load of 113 tons minus estimated pre-development load of 107.37 tons) |
## Opportunities for Improving Watershed Management

### More Study
- Hydraulic & hydrology (H&H)
- Sediment loading
- Fiske Brook Fluvial Geomorphic Assessment
- Evaluation of existing BMPs
- Engineering study of potential BMPs
- Beaver management plan

### Voluntary Residential BMPs
- Rain barrels
- Impervious driveways
- Driveway turnouts
- Vegetated or rock-lined swales
- Rain gardens
- Riparian buffers
- Seeded bare spots
- Native plants and shrubs
- No waterfowl feeding
- Dog waste removal

### Constructed BMPs
- Correctly sized culverts
- Armored/vegetated outlet
- Road regrading/crowning
- Waterbar
- Road turnout
- Vegetated or rock WQ swale
- Bioretention basin/rain garden
- Sediment forebay
- Check dam
- Deep sump/leaching catch basin

On public or private roads/land
WHAT IS A STORMWATER BEST MANAGEMENT PRACTICE?

PRINCIPLES

• TREAT STORMWATER CLOSE TO THE SOURCE
• PROVIDE FILTRATION, TREATMENT, AND INFILTRATION
OPPORTUNITIES FOR IMPROVING WATERSHED MANAGEMENT

**MONITORING**
- Water quality monitoring plan
- Start monitoring for phosphorus
- Document accumulation in BMPs

**EDUCATION & OUTREACH**
- Reach Lake Wyola residents (including renters and LWA non-members), Shutesbury & Wendell community members, and students
- Provide general information about nonpoint source pollution, sources, and mitigation
- With LWA and LWAC, educational materials to lake residents. In-person and virtual educational presentations
- Informational signs at completed BMP locations.
- Public tours of installed BMPs
- Dirt roads management BMPs

**MAINTENANCE**
- Road maintenance plan
- BMP operations & management plan
- Beaver management
- Highway Department ongoing BMPs: street sweeping, catch basin cleaning, reduced salt application
- Waterfowl control
NEXT STEPS

• REVIEW THE **DRAFT LAKE WYOLA WATERSHED-BASED PLAN** POSTED TO THE TOWN OF SHUTESBURY WEBSITE AS OF JUNE 7

• EMAIL YOUR COMMENTS ON THE DRAFT WATERSHED BASED PLAN TO **KIMBERLY NOAKE MACPHEE AT KMACPHEE@FRCOG.ORG** BY FRIDAY, JULY 7

• LOOK FOR OUR ANNOUNCEMENT FOR A LAKE WYOLA FIELD VISIT WITH THE FRCOG

• SEND US IMAGES OF UNTREATED STORMWATER RUNOFF, EROSION, OR SEDIMENTATION IN THE LAKE ON YOUR PROPERTY

| June 7 – July 7 | 30-day public comment period |
| Summer | Watershed visit |
| Fall | Submit WBP to DEP |
| Winter | WBP approval |
FUNDING

MassDEP 604b GRANT

• Determine nature, extent, and causes of water quality problems
• Preliminary designs
• Support future s.319 grant implementation projects

MassDEP s.319 GRANT

• Restore & protect
• Implementation projects
• Zoning projects
• Match required

OTHER SOURCES OF FUNDING/SUPPORT

• MUNICIPAL VULNERABILITY PREPAREDNESS (MVP)
• LONG ISLAND SOUND FUTURES FUND
• LWA FUNDS
• TOWN CH. 90 FUNDS
• TOWN CAPITAL FUNDS
• TOWN WETLAND MITIGATION FUNDS
• TOWN CPA FUNDS
• FEMA HAZARD MITIGATION GRANT
• VOLUNTEER TIME FOR PUBLIC OUTREACH AND MONITORING

FRCOG HAS FUNDING TO ASSIST WITH GRANT PROPOSALS
QUESTIONS