A WATERSHED-BASED PLAN FOR LAKE WYOLA

FRANKLIN REGIONAL COUNCIL OF GOVERNMENTS (FRCOG)

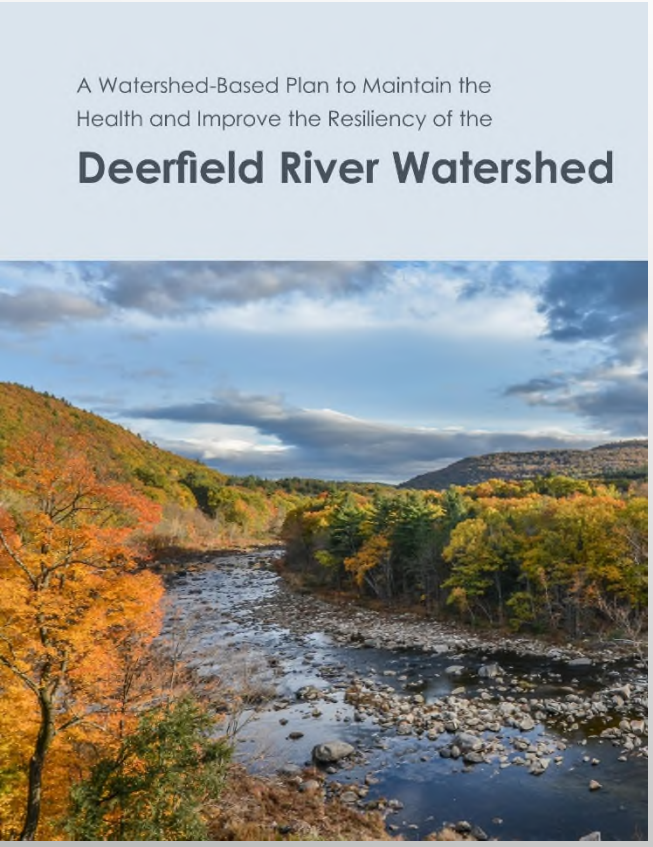
PRESENTATION TO THE SHUTESBURY SELECTBOARD

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

NPS POLLUTION IN LAKE WYOLA: LAND USE & CLIMATE CHANGE

WATERSHED HYDROLOGY NO LONGER A "NATURAL" SYSTEM. IT HAS BEEN MANIPULATED THROUGH HUMAN-DRIVEN DEVELOPMENT AND LAND USE.

CLIMATE CHANGE CREATES A COMPLEX SET OF INTERACTING STRESSORS, BRINGING INCREASED HEAT, INCREASED ANNUAL PRECIPITATION, AND MORE FREQUENT DROUGHTS.


LAND CLEARING

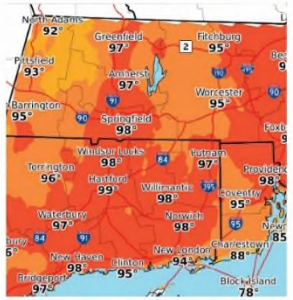

FOREST CUTTING


ABSENCE OF RIPARIAN BUFFER


ENCROACHMENT


CHANNEL MODIFICATION


INVASIVE SPECIES



HOTTER TEMPERATURES


SEVERE PRECIPITATION


DROUGHT

RAINFALL AND STORMWATER RUNOFF VS. INFILTRATION

UNDEVELOPED

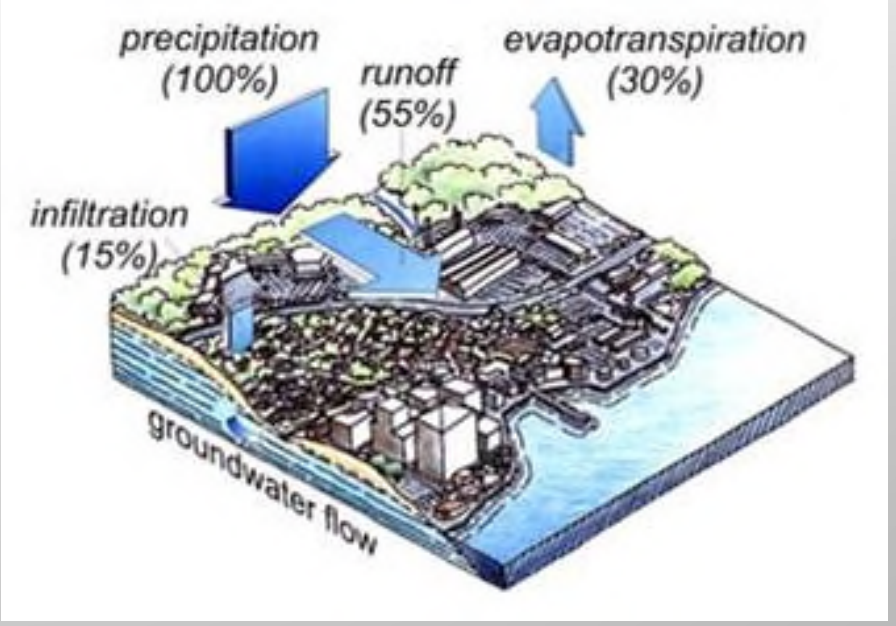
STORMWATER RUNOFF = 10%

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

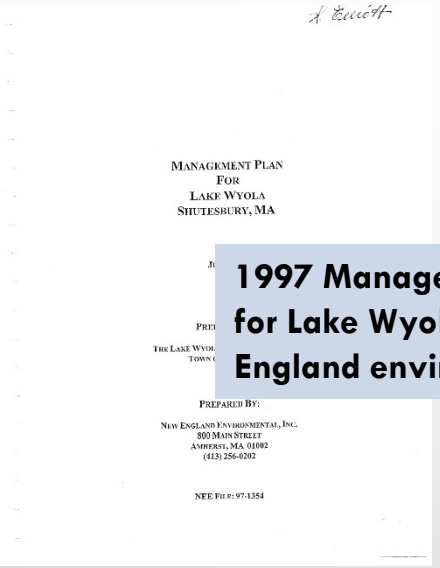
A **FLUVIAL GEOMORPHIC IMPAIRMENT** RELATES TO HOW A STREAM INTERACTS WITH THE LANDSCAPE AROUND IT – EROSION, SCOUR, INCISION.

TIMELINE

IMAGE BY SUSAN LORING

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

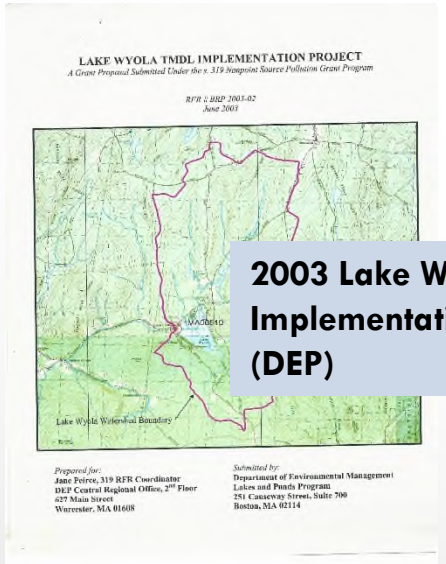

MANAGEMENT PLAN
FOR
LAKE WYOLA
SHUTESBURY, MA

PREPARED BY:

NEW ENGLAND ENVIRONMENTAL, INC.
800 MAIN STREET
AMHERST, MA 01002
(413) 256-0202

NEE FILE: 97-1354

1997 Management Plan for Lake Wyola (New England environmental)


LAKE WYOLA TMDL IMPLEMENTATION PROJECT
A Grant Proposal Submitted Under the s. 319 Nonpoint Source Pollution Grant Program

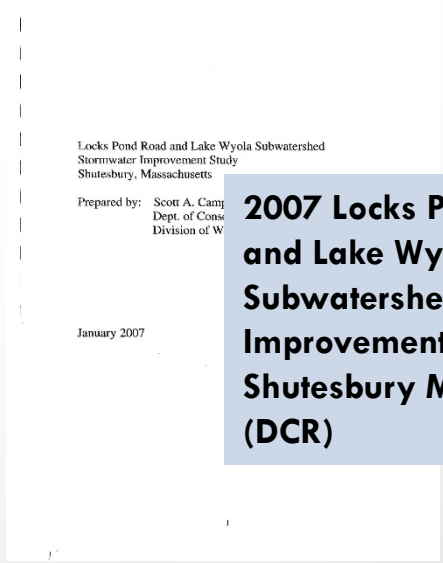
RFR 2 BRP 2003-02
June 2003

Lake Wyola Watershed Boundary

Prepared for:
Jane Feirce, 319 RFR Coordinator
DEP Central Regional Office, 2nd Floor
627 Main Street
Worcester, MA 01608

Submitted by:
Department of Environmental Management
Lakes and Ponds Program
251 Causeway Street, Suite 700
Boston, MA 02114

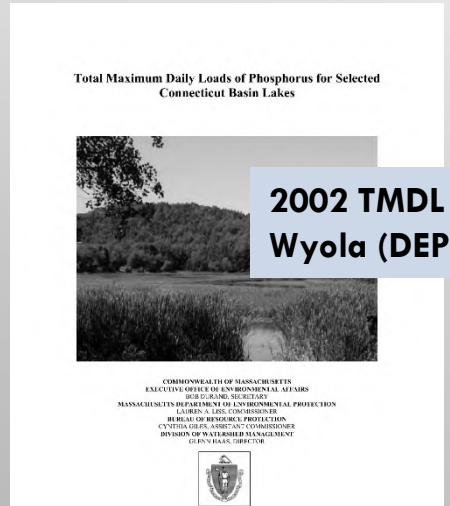
2003 Lake Wyola TMDL Implementation Project (DEP)


Locks Pond Road and Lake Wyola Subwatershed
Stormwater Improvement Study
Shutesbury, Massachusetts

Prepared by: Scott A. Camp
Dept. of Conse
Division of W

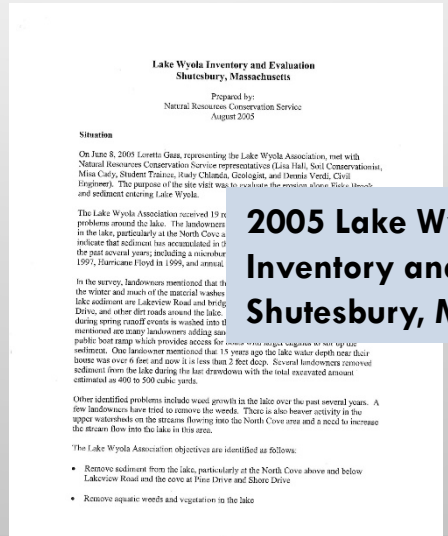
January 2007

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


Total Maximum Daily Loads of Phosphorus for Selected Connecticut Basin Lakes

COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF ENVIRONMENTAL AFFAIRS
BOB DURAND, SECRETARY
MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION
LAUREN A. LISS, COMMISSIONER
BUREAU OF RESOURCE PROTECTION
CYNTHIA GILES, ASSISTANT COMMISSIONER
DIVISION OF WATERSHED MANAGEMENT
GLENN HAAS, DIRECTOR

2002 TMDL for Lake Wyola (DEP)


Lake Wyola Inventory and Evaluation
Shutesbury, Massachusetts

Prepared by:
Natural Resources Conservation Service
August 2005

Situation

On June 8, 2005 Loretta Gaza, representing the Lake Wyola Association, met with Natural Resources Conservation Service representatives (Lisa Hall, Soil Conservationist, Miss Caty, Student Trainee, Rudy Chlanda, Geologist, and Dennis Verdi, Civil Engineer). The purpose of the site visit was to evaluate the erosion along Flicks Brook and sediment entering Lake Wyola.

The Lake Wyola Association received 19 r
problems around the lake. The landowners
in the lake, particularly at the North Cove a
indicate that sediment has accumulated in t
the past several years, including a microbur
1997, Hurricane Floyd in 1999, and annual

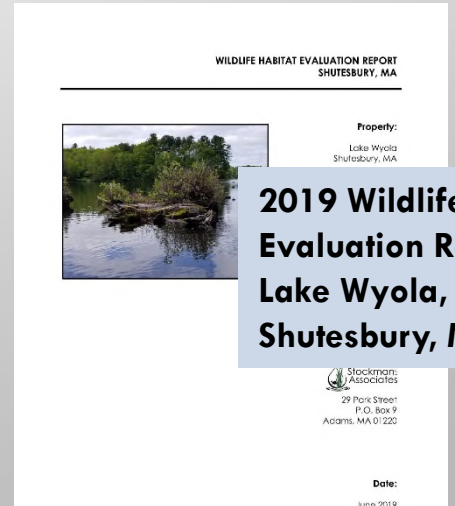
In the survey, landowners mentioned that th
the winter and much of the material washes
lake sediment are Lakeview Road and bridg
Drive, and other dirt roads around the lake.
during spring runoff events is washed into t
mentioned are many landowners adding sand
public boat ramp which provides access for
sediment. One landowner mentioned that 15 years ago the lake water depth near their house was over 6 feet and now it is less than 2 feet deep. Several landowners removed sediment from the lake during the last drawdown with the total excavated amount estimated as 400 to 500 cubic yards.

Other identified problems include weed growth in the lake over the past several years. A few landowners have tried to remove the weeds. There is also beaver activity in the upper watersheds on the streams flowing into the North Cove area and a need to increase the stream flow into the lake in this area.

The Lake Wyola Association objectives are identified as follows:

- Remove sediment from the lake, particularly at the North Cove above and below Lakeview Road and the cove at Pine Drive and Shore Drive
- Remove aquatic weeds and vegetation in the lake

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


WILDLIFE HABITAT EVALUATION REPORT
SHUTESBURY, MA

Property:

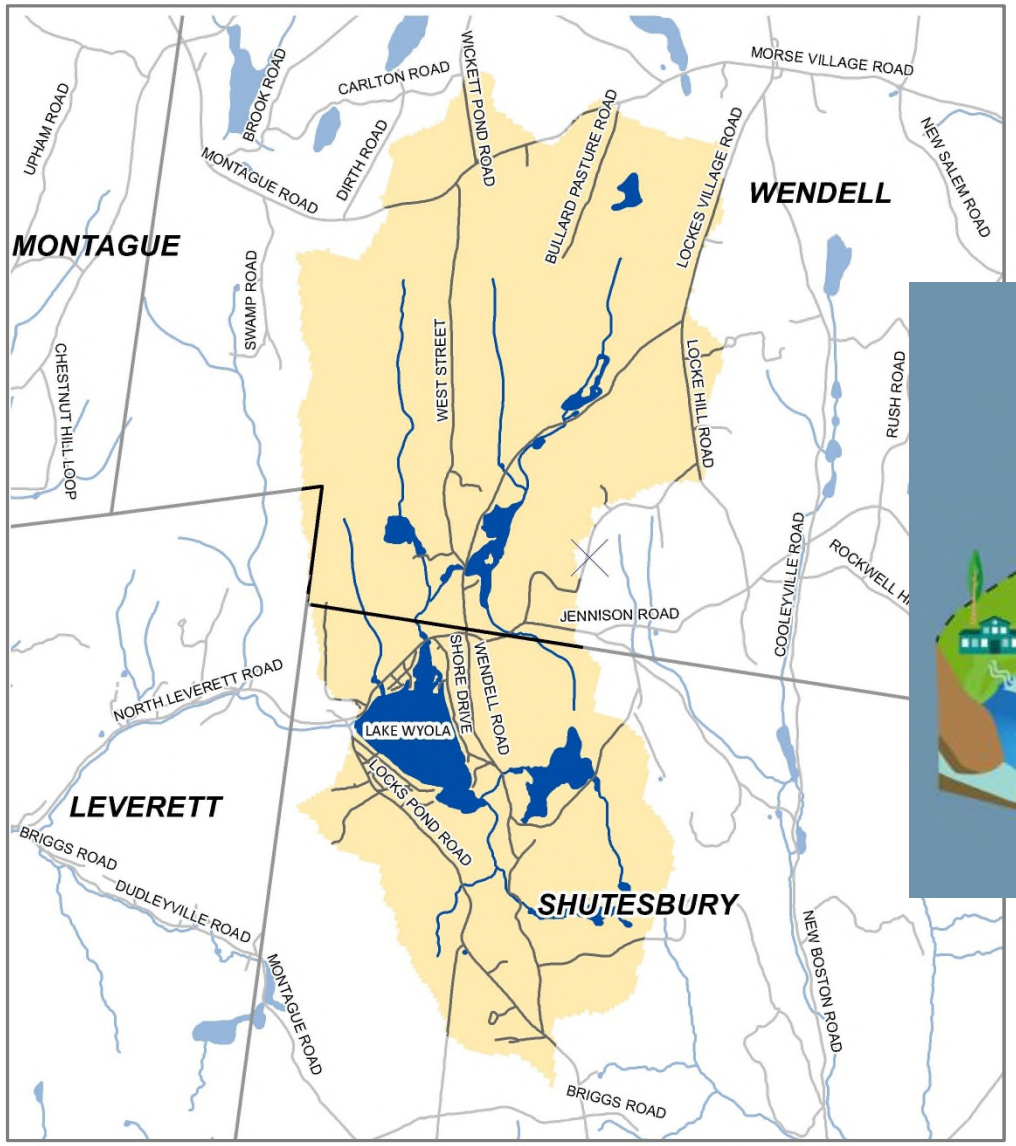
Lake Wyola
Shutesbury, MA

Stockman Associates

29 Park Street
P.O. Box 9
Adams, MA 01220

Date:

2019 Wildlife Habitat Evaluation Report, Lake Wyola, Shutesbury, MA



Lake Wyola Watershed in Shutesbury and Wendell, MA

- Town Boundaries
- Roads
- Streams and Waterbodie
- Lake Wyola Watershed

N

0 0.25 0.5 1 Miles

Lake Wyola Landmarks

Legend

- Water
- Structures
- Municipal Property
- Lake Wyola Assn Property
- Lake Wyola State Park
- Watershed Boundary

N W E S

0 0.125 0.25 Miles

frcog

Data: Shutesbury Town Assessor, Wendell Town Assessor, MassGIS 2021

WATER QUALITY DATA & GAPS

PHOSOPHORUS

- MOST RECENT SAMPLING: 2014
- SAMPLE WELL BELOW STANDARD

E. COLI

- LWAC MONITORS 3 LWA BEACHES
- ONLY ONE DATE OVER THE STANDARD IN PAST 6 YEARS

SEDIMENT

- NO MEASUREMENTS

LAND USE & IMPERVIOUS SURFACE

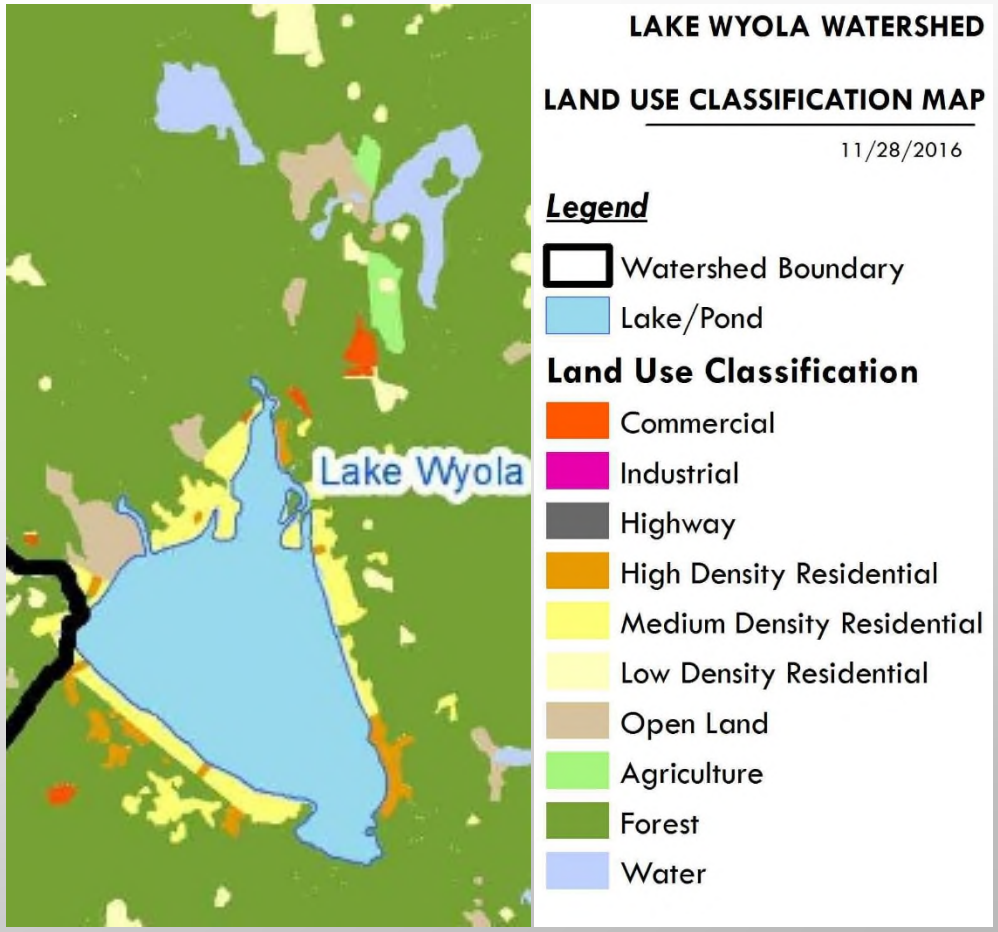
STORMWATER RUNOFF

- 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

Pollutant	Existing Estimated Total Load	Water Quality Goal	Required Load Reduction
Total Phosphorus	WBP modeled estimate: 606 lbs/yr	ALREADY REACHED	Any reduction is desirable in order to protect existing high-quality waters.
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

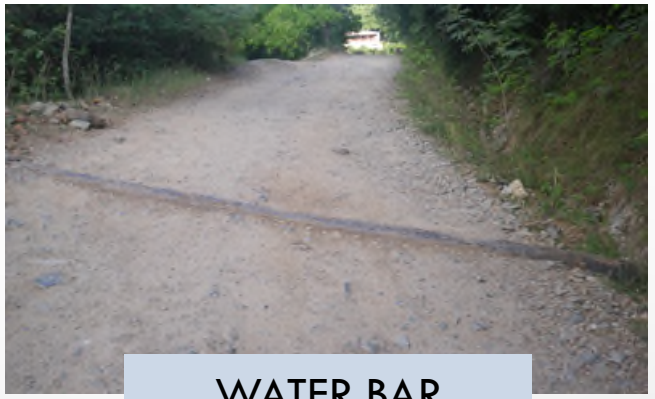
CONSTRUCTED BMPS On public or private roads/land

- 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

WHAT IS A STORMWATER BEST MANAGEMENT PRACTICE?

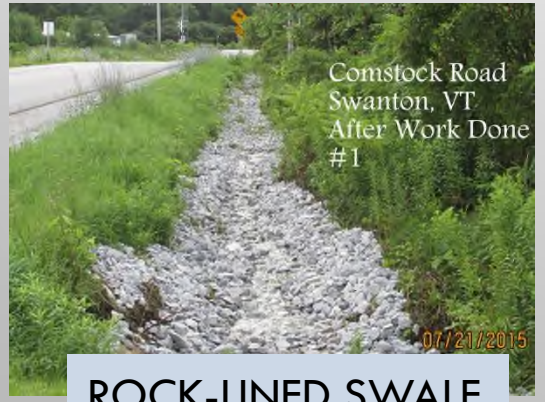
PRINCIPLES

- TREAT STORMWATER CLOSE TO THE SOURCE
- PROVIDE FILTRATION, TREATMENT, AND INFILTRATION



WATER BAR

TURNOUT



ROCK-LINED SWALE

WATER QUALITY SWALE

ROCK APRON

RAIN GARDEN

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