

**Barton
& Loguidice**

Lake Waccabuc
Engineering Study

April 7, 2021

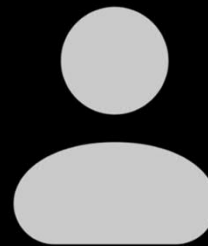


Zoom ▾

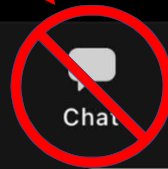
Leave

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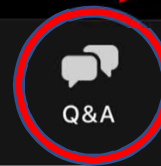
Please use the Q&A button to submit questions



Raise Hand



Chat



Q&A



More

Outline

I. Introduction

- A. Lake Engineering Studies
- B. The Lake Waccabuc Study Area
- C. What is a Watershed?
- D. Nutrients in Lake Waccabuc
- E. Nutrient Concentrations & Trophic States
- F. Effects of High Nutrient Concentrations
- G. Point-Source vs. Nonpoint-Source Pollution
- H. Potential Sources of Nutrient Pollution

II. Engineering Study Details

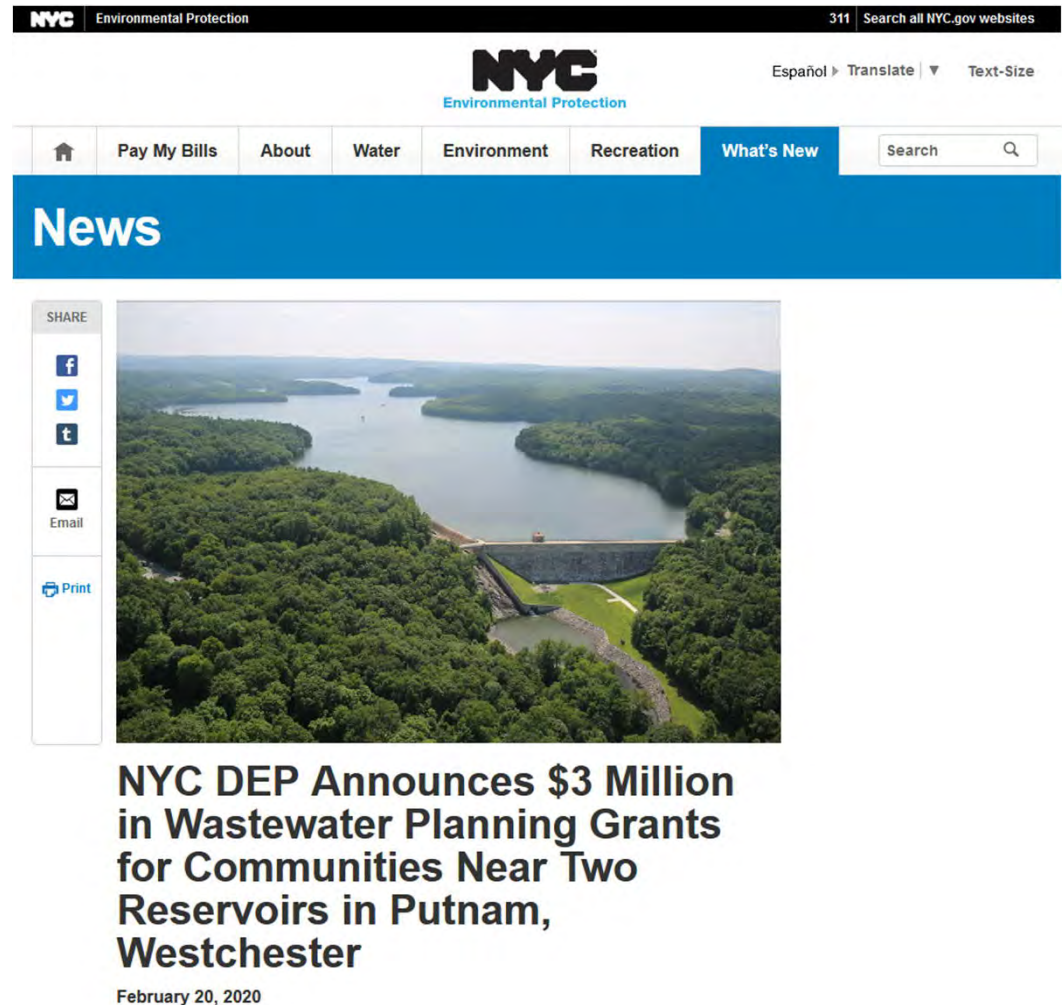
- A. Public Participation Schedule
- B. Engineering Study Objectives
- C. Identify Sources of Nutrient Pollution
- D. Determine Potential Solutions
- E. Evaluate Costs & Identify Funding Sources

III. Why It All Matters And How You Can Help

Introduction

Lake Engineering Studies

- The Town of Lewisboro obtained grant money to conduct engineering studies on three lakes:
 - Lake Waccabuc
 - Lake Truesdale
 - Lake Kitchawan
- The studies are funded by the East of Hudson Community Wastewater Planning Assistance Grant Program

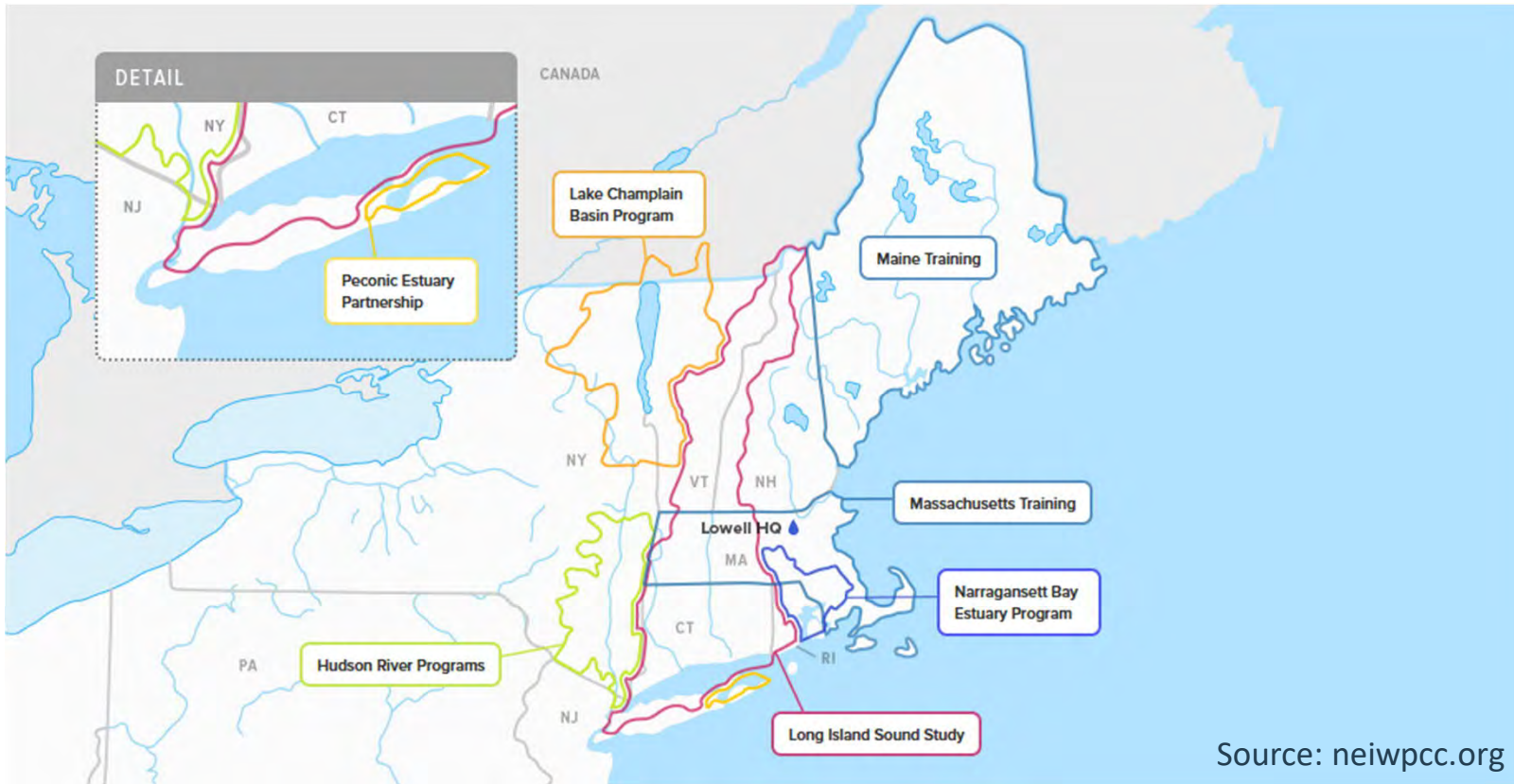


The screenshot shows the NYC Environmental Protection website. The top navigation bar includes 'NYC Environmental Protection', '311 Search all NYC.gov websites', and 'Español Translate Text-Size'. Below this is a menu with 'Pay My Bills', 'About', 'Water', 'Environment', 'Recreation', and 'What's New'. A search bar is also present. The main heading is 'News'. The featured article is titled 'NYC DEP Announces \$3 Million in Wastewater Planning Grants for Communities Near Two Reservoirs in Putnam, Westchester' and is dated February 20, 2020. The article is accompanied by a large photograph of a reservoir with a dam and surrounding greenery. To the left of the image are social media sharing options for Facebook, Twitter, and Tumblr, as well as an email and print button.

Article Link: <https://www1.nyc.gov/site/dep/news/20-005/nyc-dep-3-million-wastewater-planning-grants-communities-near-two-reservoirs-in#/0>

Lake Engineering Studies

- The grant program is being administered by NEIWPC (New England Interstate Water Pollution Control Commission)



- NEIWPC is a regional commission that helps the states of the Northeast preserve and advance water quality

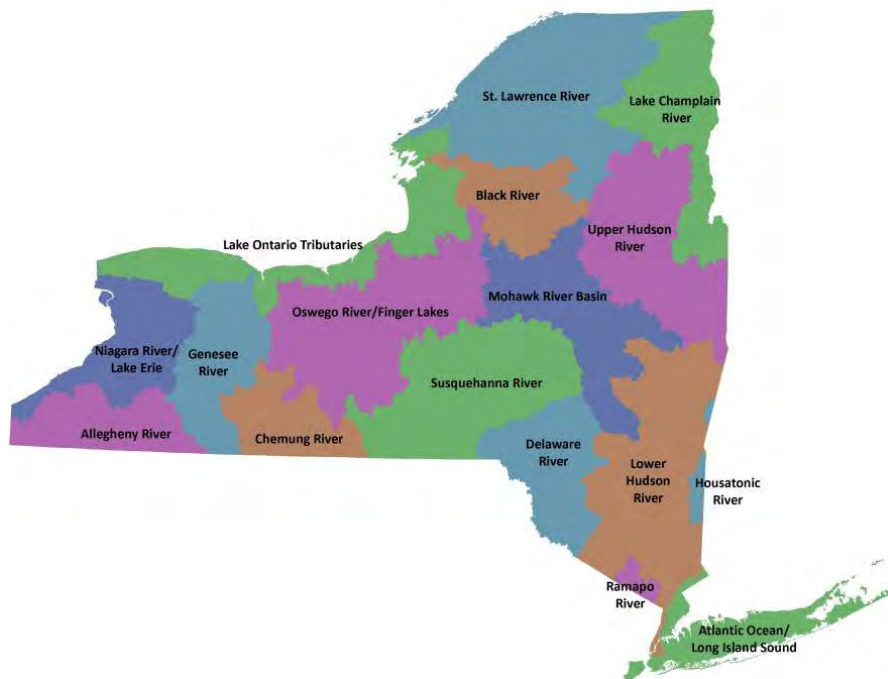
Lake Waccabuc Study Area



The study area is made up of the Lake Waccabuc watershed, excluding Lake Rippowam and Lake Oscaleta.

What is a Watershed?

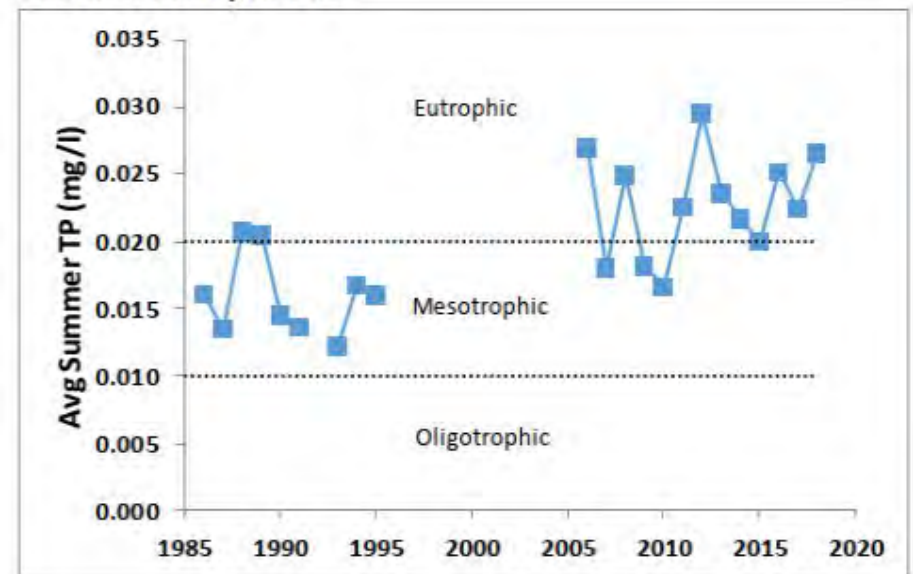
- **Definition:** an area of land that drains all streams and runoff to a common outlet
- Watersheds can range in size from less than 1-acre to hundreds of thousands of square miles
 - Large watersheds can be broken down into smaller sub-watersheds



Nutrients in Lake Waccabuc

- Water quality data is collected through the Citizen Statewide Lake Assessment Program (CSLAP)
- **Phosphorus** is the primary pollutant of concern for Lake Waccabuc
- CSLAP shows significant increase in phosphorus levels since 1986
- 2018 CSLAP data identified peak phosphorus concentrations of 0.044 mg/L
 - Over 2x greater than the NYS recommended limit (0.020 mg/L)

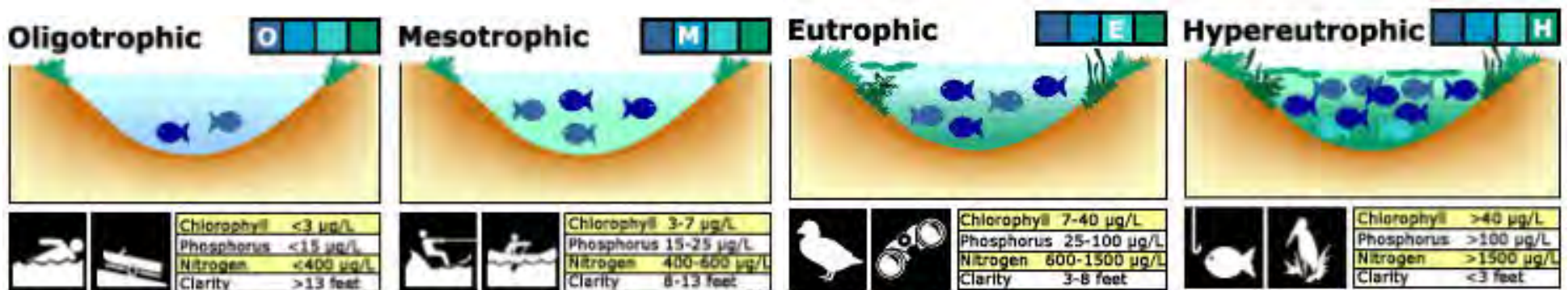
Surface Phosphorus



Open Water Indicators	2018 Sampling Results													Seasonal change	Long Term Avg
	4/9	5/14	6/11	6/24	7/8	7/22	7/26	8/5	8/19	9/3	9/16	10/14	11/11		
Surface TP (mg/l)			0.042	0.036	0.044	0.027		0.022	0.018	0.013	0.014			↘	0.021

Nutrient Concentrations & Trophic States

- Phosphorus and other nutrients (e.g. nitrogen) are essential to lake health
- Nutrients can also be a source of pollution
 - Excessive nutrients negatively impact water quality
- Lakes are classified by their ‘trophic state’
- **Trophic State:** A system of classifying water bodies based on biological productivity

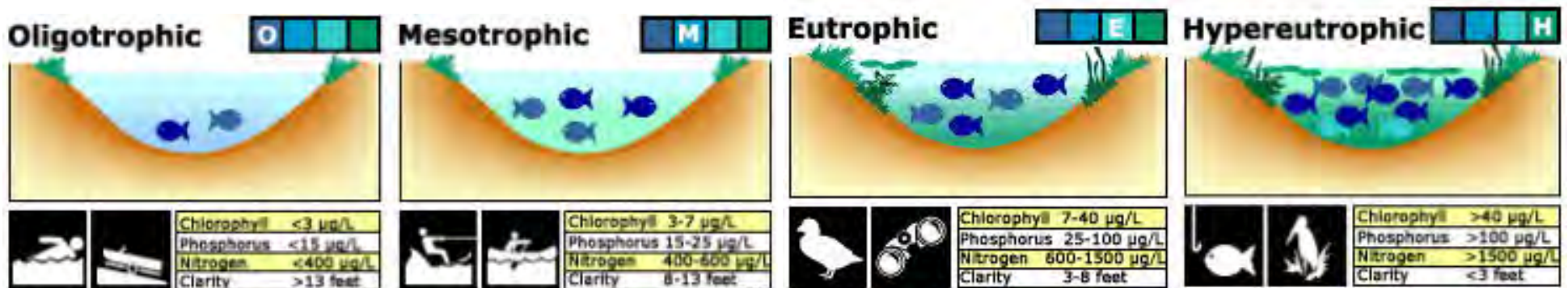


Source: University of Florida, Water Institute

Nutrient Concentrations & Trophic States

- Trophic state classifications help determine safety and usability of water
- Lake Waccabuc is in a **mesotrophic** state

Classification	Definition	Water Quality
Oligotrophic	Low level of biological productivity	Good
Mesotrophic	Moderate level of biological productivity	Fair
Eutrophic	High level of biological productivity	Poor
Hypereutrophic	Highest level of biological productivity	Very Poor



Source: University of Florida, Water Institute

Effects of High Nutrient Concentrations

Effects of high nutrient concentrations in Lake Waccabuc include:

- Depletion of dissolved oxygen concentrations
 - Can result in fish kills
- Frequent harmful algal blooms (HABs)
 - HABs produce algal toxins harmful to human health and aquatic life
- Impairment of drinking water supply
- Vulnerability for invasive species
 - Increased growth of lake weed
- Limits on recreational opportunities



Effects of Excess Nutrients



Lake Waccabuc
Source: NEIWPC

Point-Source vs. Nonpoint-Source Pollution

Point-Source

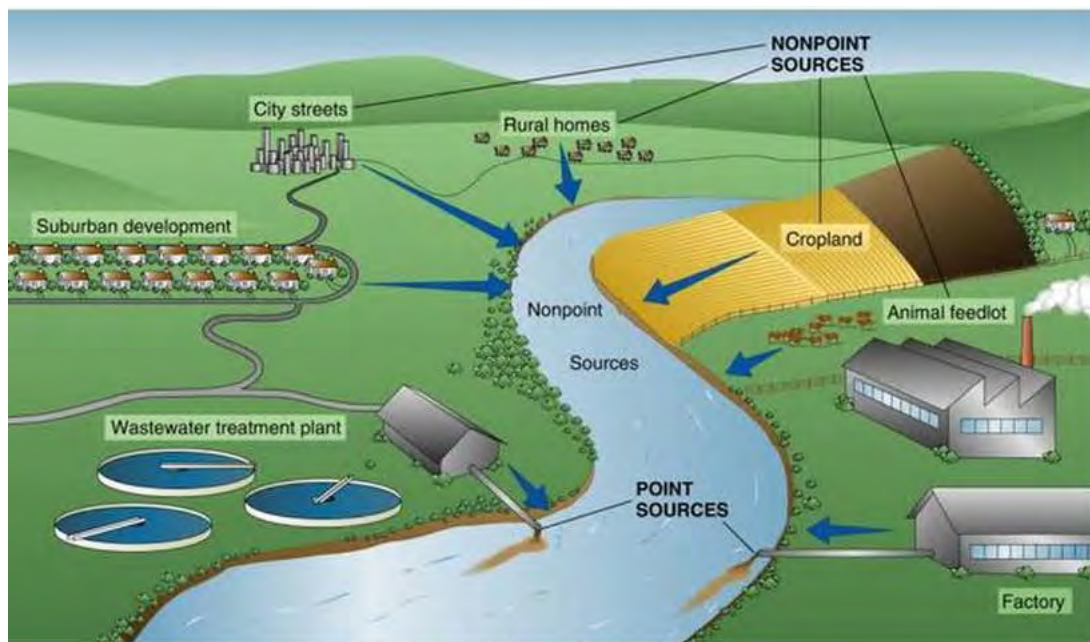
Pollutants originating from a single identifiable source/location (pipe, ditch, etc.)

- Factories
- Wastewater treatment plants
- Septic systems (surface or subsurface failure)

Nonpoint-Source

Pollutants originating from a range of locations and land uses, transported by surface runoff (stormwater)

- Soil erosion
- Fertilizers
- Pesticides/herbicides
- Oil and grease
- Household chemicals
- Pet Waste



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The primary purpose of this study is to evaluate point-source wastewater pollution

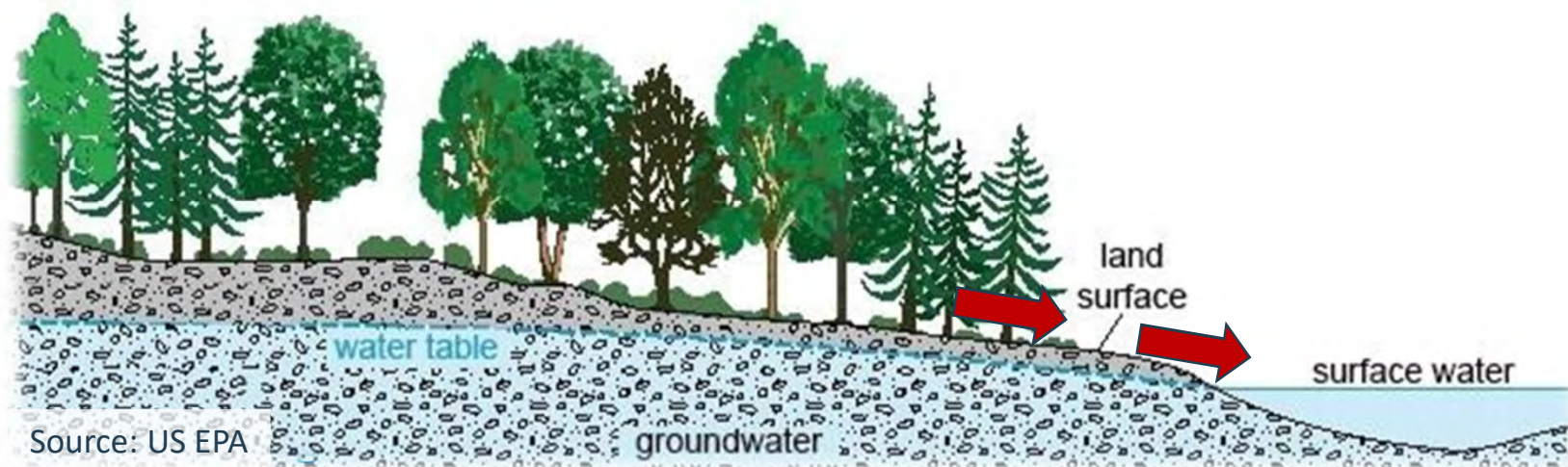
Potential Sources of Nutrient Pollution

Sources of nutrient pollution can reach Lake Waccabuc in the following ways:

- Land Overflow/
Direct Discharge
- Stormwater/Soil Erosion
- Groundwater

Some Potential Sources:

- Failing or poorly functioning septic systems
- Fertilizers, pesticides, and herbicides



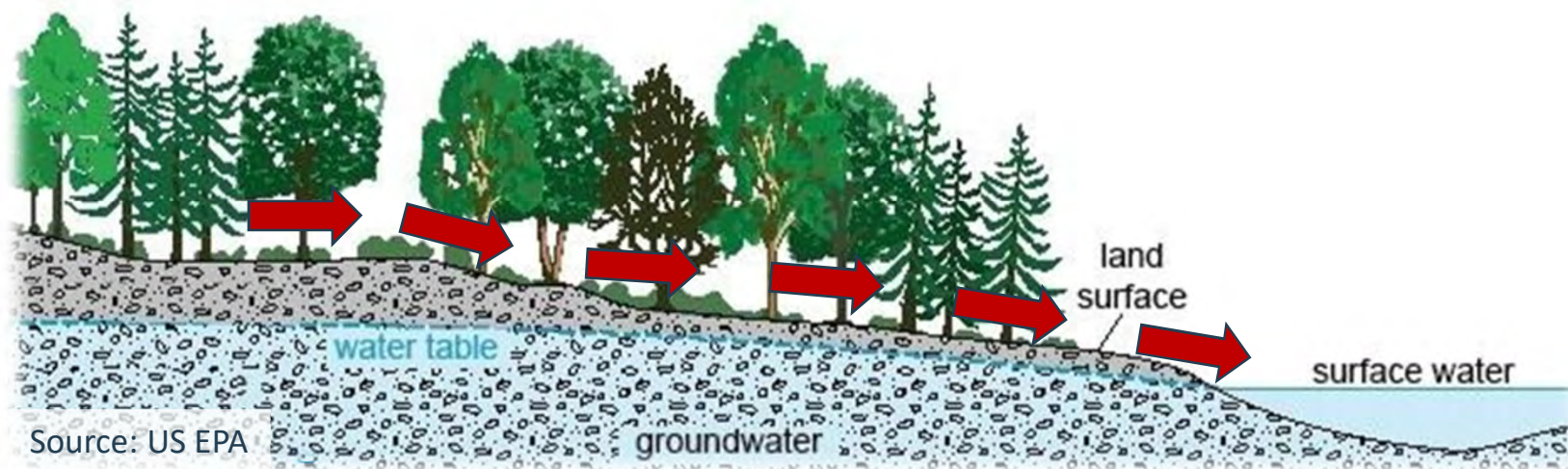
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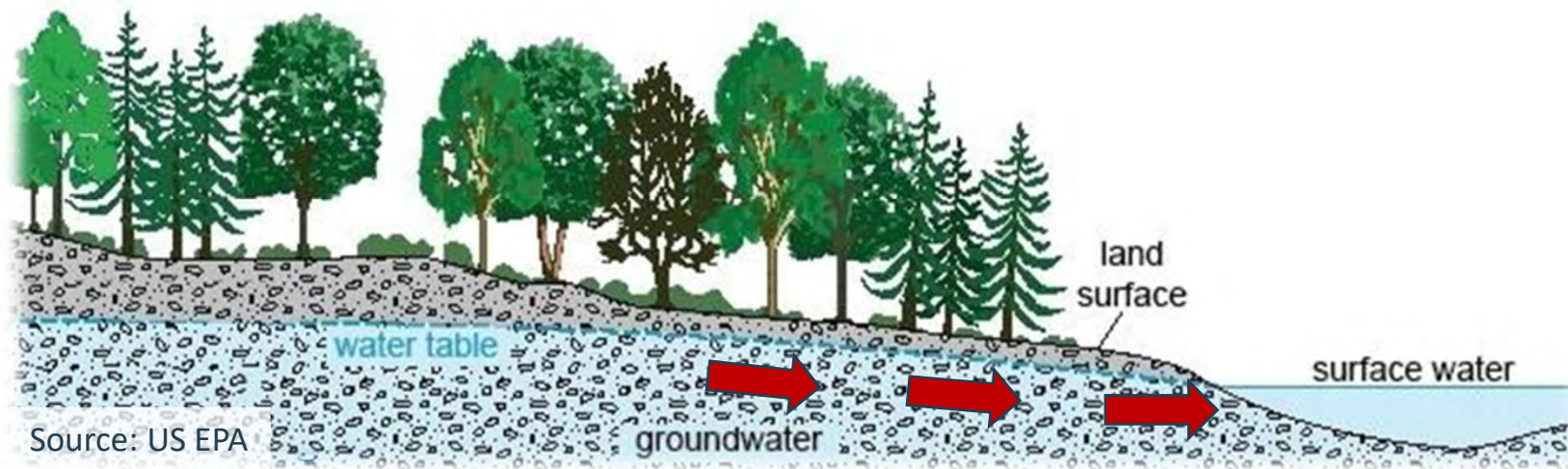
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Engineering Study Details

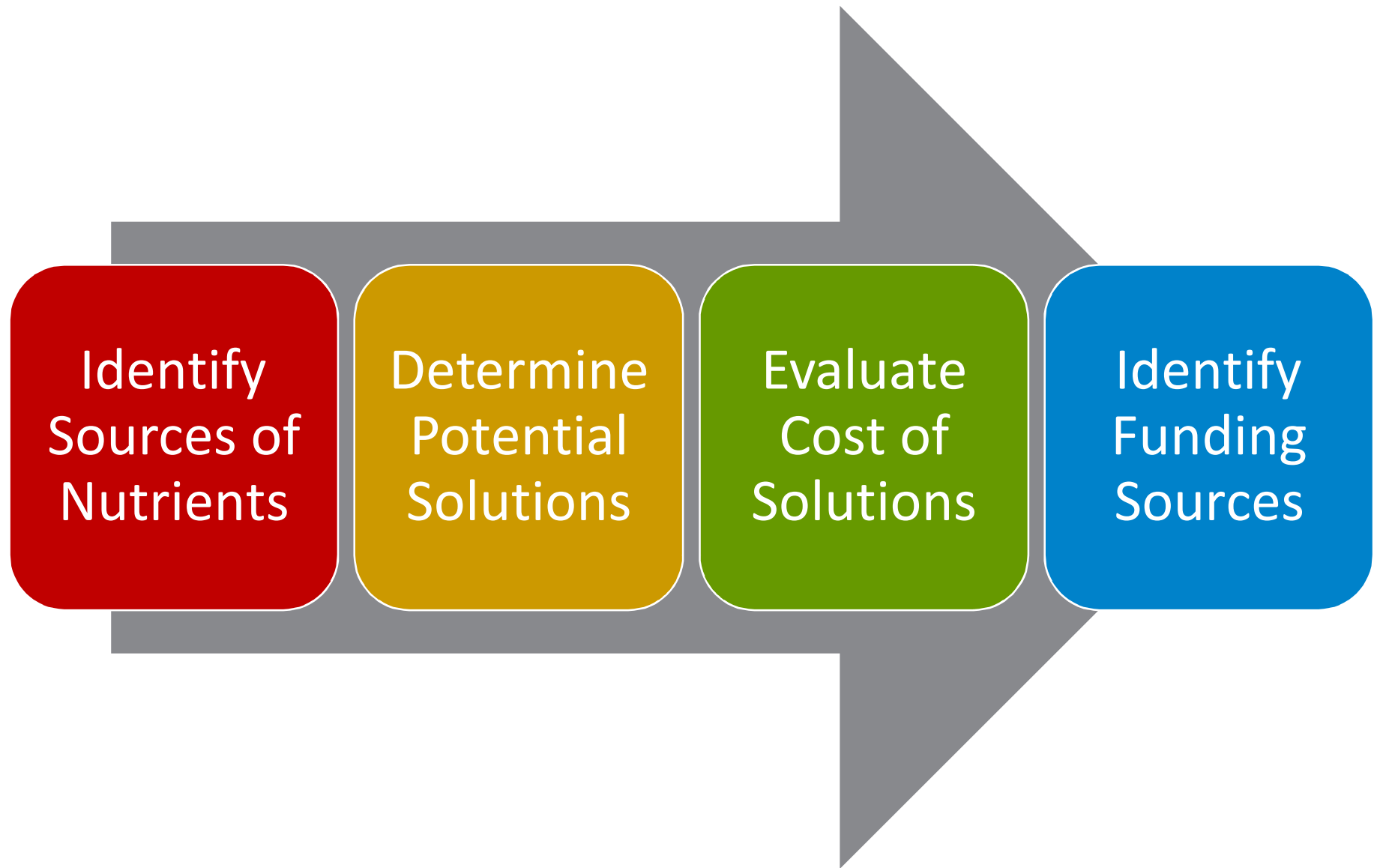
Public Participation Schedule

2021



April 7 th – April 21 st	First Public Survey
July (Day TBD)	Second Public Information Meeting
July (2 Weeks Following Meeting)	Second Public Survey
August 13 th	Draft Engineering Report Due
December 1 st	Final Engineering Report Due

Engineering Study Objectives



Identify Sources of Nutrient Pollution

Data
Collection



Model
Data



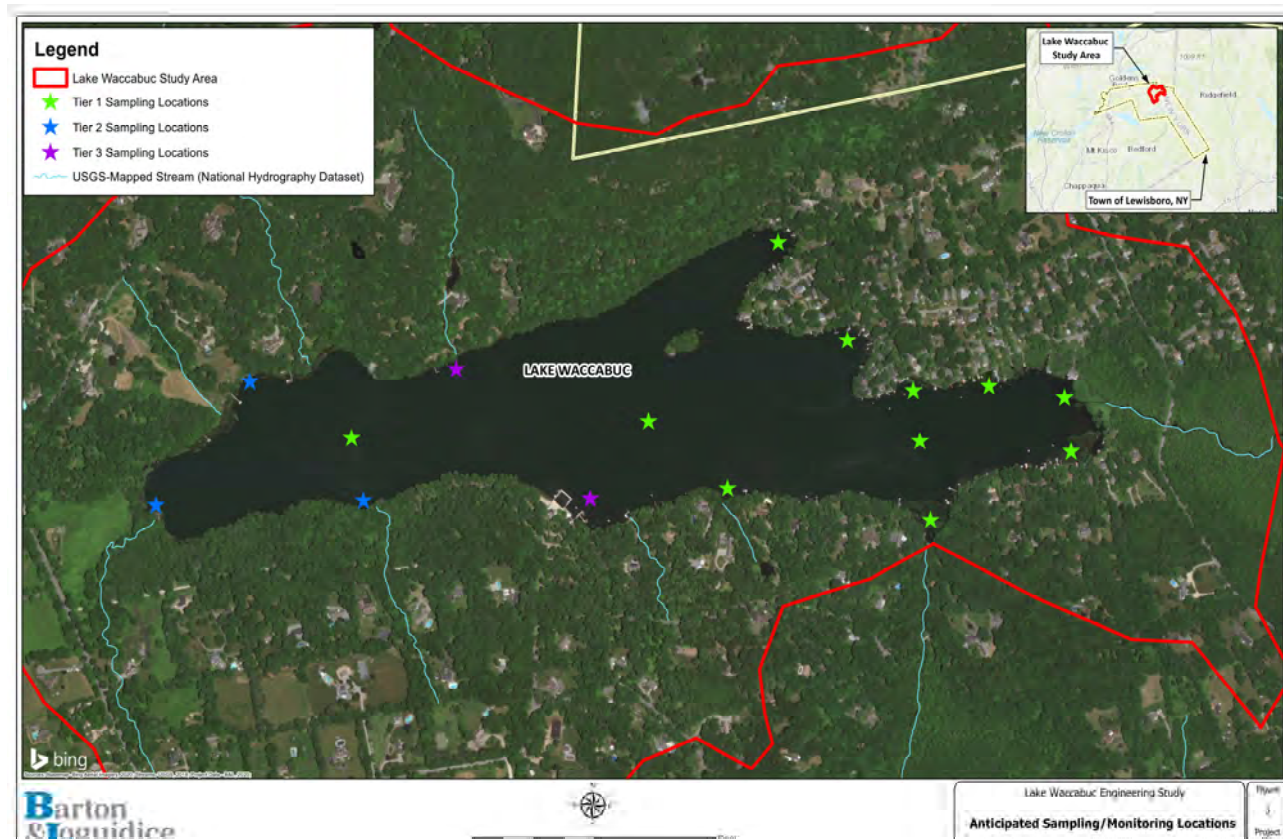
Sample
Lake



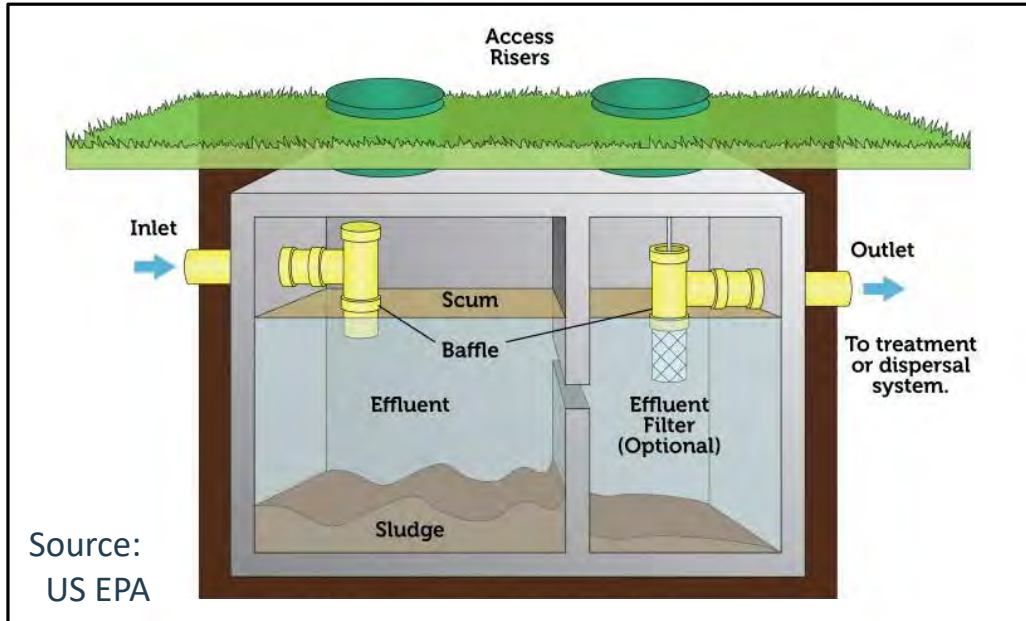
Compare
Results

Looking to answer the following questions:

1. To what extent are septic systems contributing nutrient pollution to Lake Waccabuc?
2. Which septic systems are likely the contributors?
3. What impact would providing sewer to these homes have on the lake?



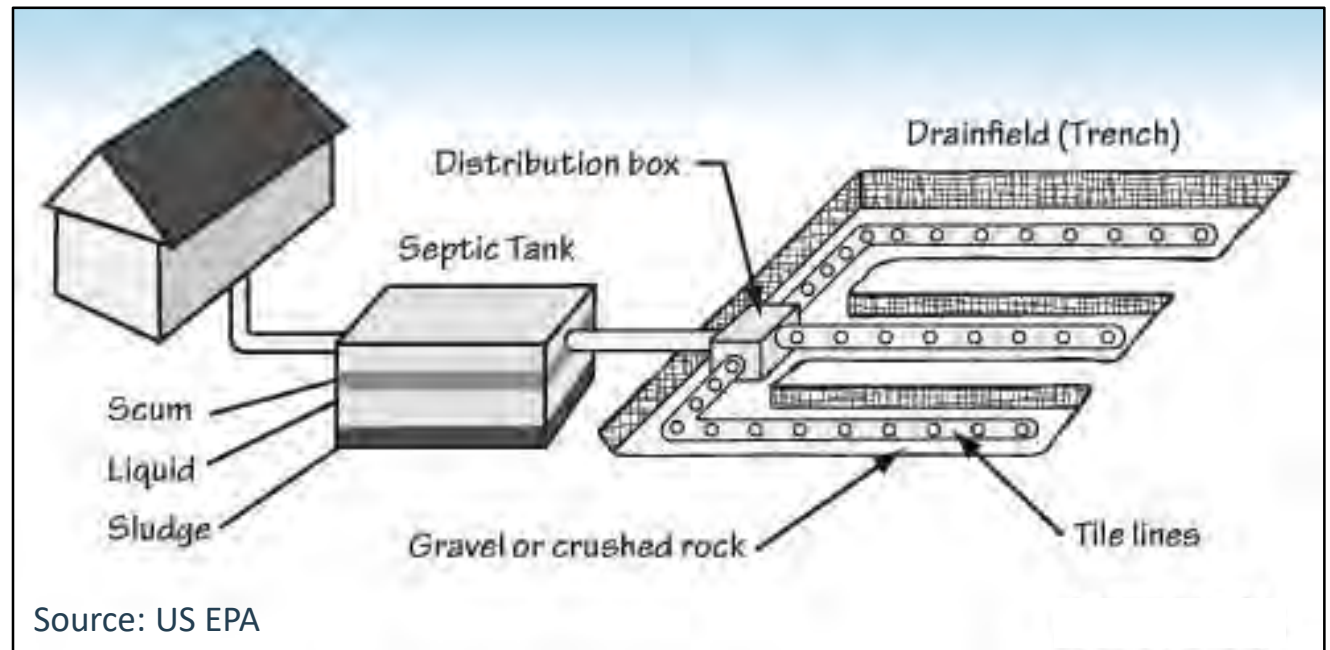
Residential Septic Systems



- Septic tanks separate out the scum and sludge before discharging to the drainfield
- Having your septic tank pumped out regularly is important

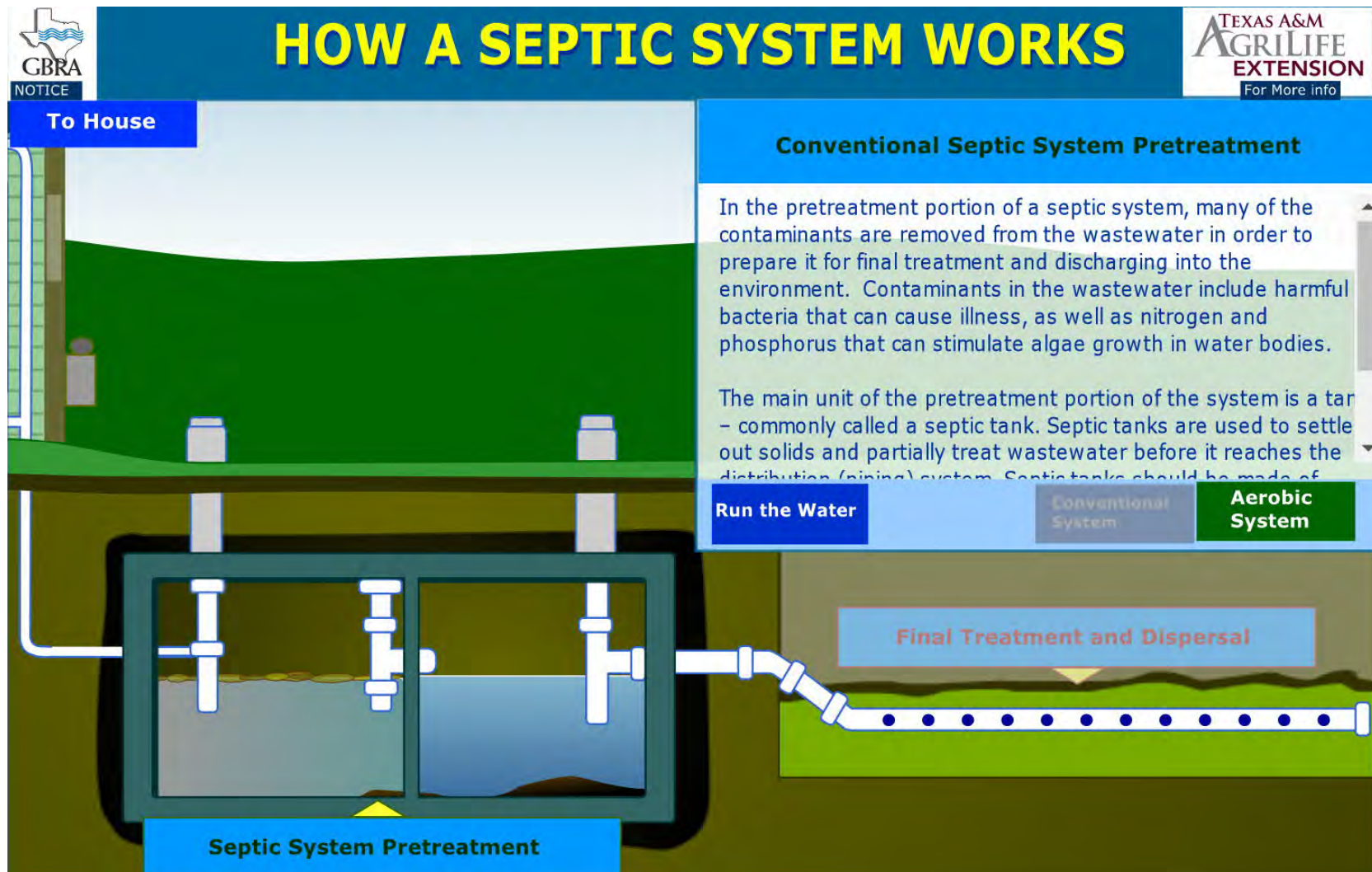
Septic Tank

Note: The survey refers to the "drainfield" as the "septic field"

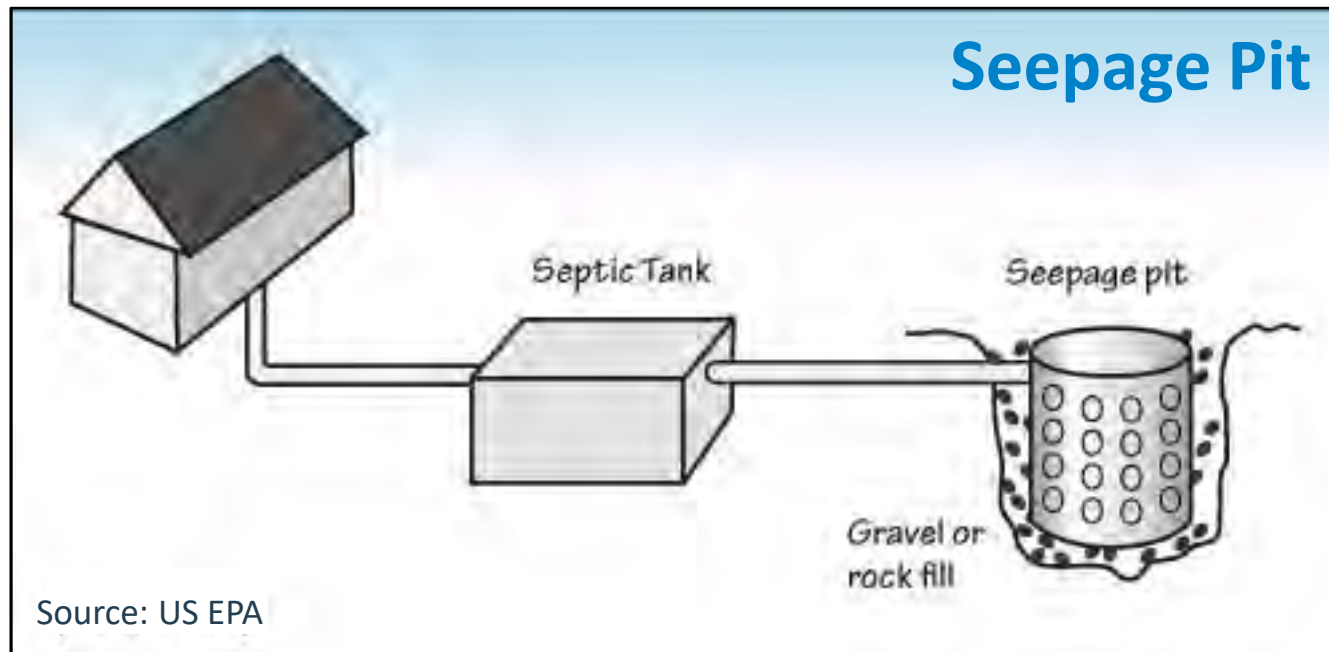


Animated Interactive Model

<https://www.gbra.org/septic/index.html>



Seepage Pits and Cesspools



- Cesspools are similar to seepage pits, but do not have septic tanks
 - No septic tank means no pretreatment
- Cesspools no longer meet state health code, therefore new cesspools cannot be constructed
- State health code only allows seepage pits to be installed when conventional drainfields are not possible

Seepage Pits and Cesspools



United States
Environmental
Protection Agency

Region 9 Ground Water
Office (WTR-9)

EPA 909-F-01-001
APRIL 2001

Seepage Pits May Endanger Ground Water Quality

While the use of cesspools for sewage disposal has been prohibited in most states for a number of years, some local ordinances still allow for the construction of drywells as a means of dispersing effluent from septic tanks. When used in this fashion, they are more commonly called "seepage pits." This method of effluent dispersal is deficient for a number of reasons:

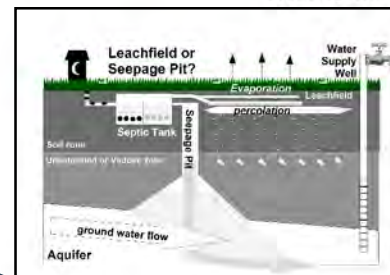
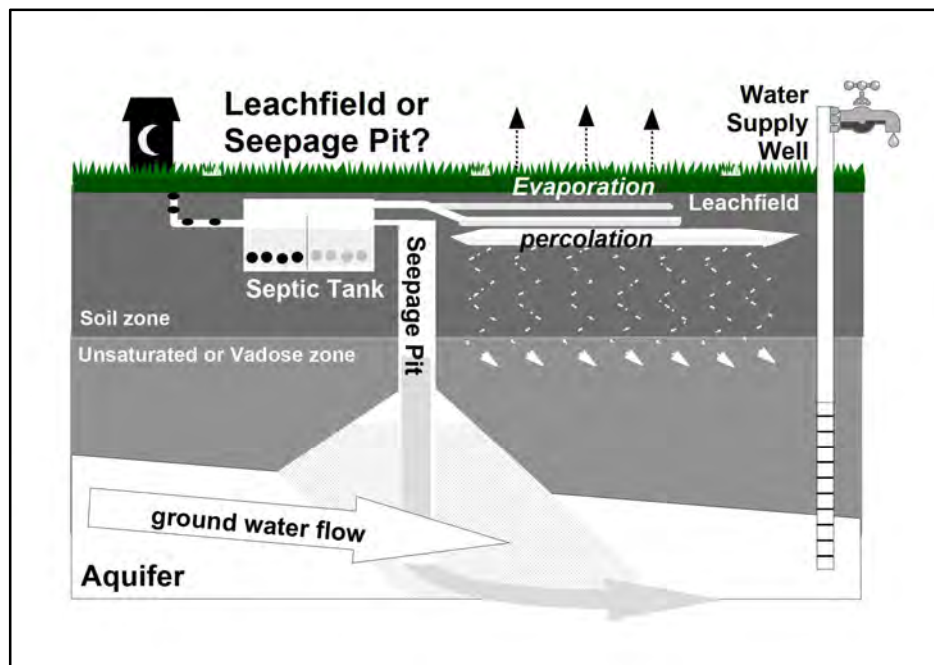
1. Seepage pits disperse effluent in anoxic, or oxygen-poor, environments, where pathogens (especially viruses) may not be treated before they reach the water table. They place fluids below the root zone, where there is no immediate uptake by plants of the water and nutrients, nor is there the potential for treatment by evaporation or evapotranspiration.
2. If septic tanks and other treatment components are not properly sized, constructed and maintained, seepage pits may receive sewage solids (essentially functioning like cesspools.)
3. Water tables are not static, and may rise above the bottom of the seepage pit, flooding it and allowing direct contact of pathogens and nitrogen species with ground water.
4. Seepage pit construction and use may open up pathways to cracks and fissures in rock, sending effluent directly to waterways.
5. Depending on their depth, seepage pits may allow contaminated ground water to pollute pristine aquifers.
6. Seepage pits used for the disposal of untreated or partially treated industrial or commercial waste may pose additional hazards to ground water quality, if the effluent contains soluble toxics.

Seepage pits may cause other hazards not directly related to water quality. They are a hazard for people, animals and property that may fall into them. They may also affect slope stability and promote landslides. For all of these reasons, the Ground Water Office at EPA, Region 9 **discourages the use of seepage pits for onsite sewage (or septic) system effluent**, particularly on steep slopes, fractured rock areas, areas with shallow ground water, and/or areas where ground water provides the sole source of drinking water.

Exceptions should only be allowed where the seepage pit is backfilled with cobbles or other weight-bearing material, where the sanitary waste stream has been treated (e.g., disinfection, nitrogen removal), and no other effluent dispersal mechanism is feasible. Regulators should assess cumulative impacts based on the number and types of other nearby subsurface discharges.

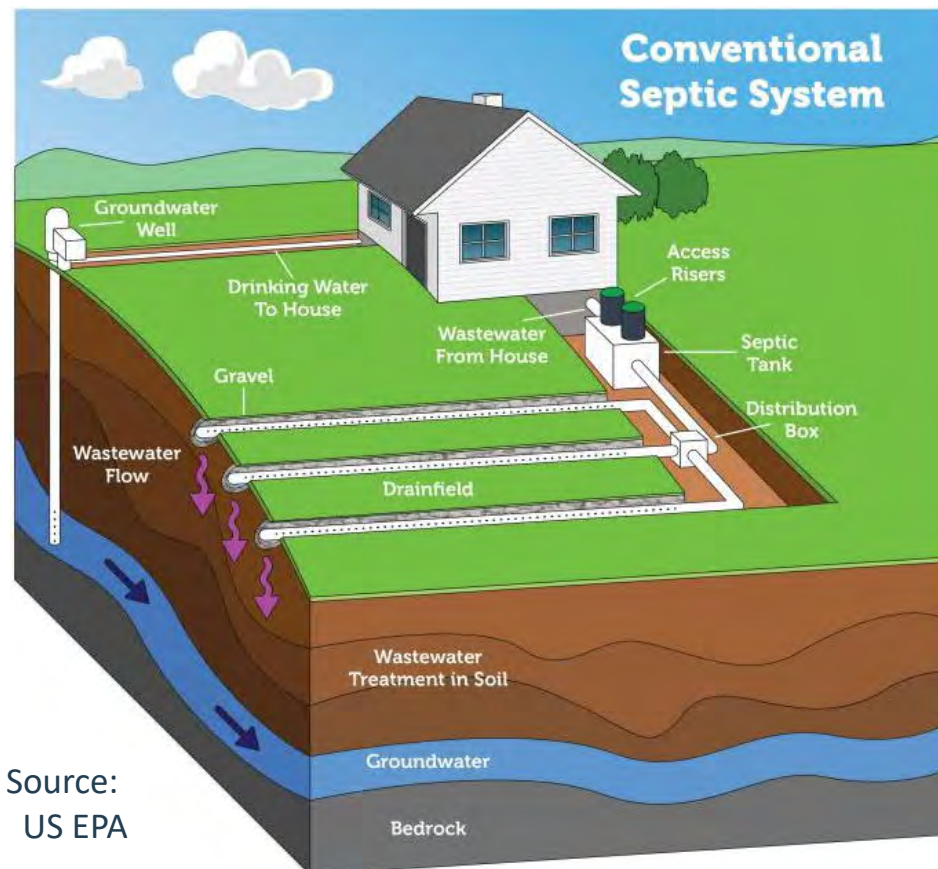
References are listed on the reverse of this sheet. For more information, please call Elizabeth Janes at (415) 972-3537, or e-mail janes.elizabeth@epa.gov.

In 1999, EPA promulgated regulations prohibiting the use of cesspools for the disposal of sewage from multi-family dwellings, and any other buildings where cesspool capacity was for 20 or more persons per day, such as schools, hospitals, and manufacturing facilities. In that rule, a cesspool was defined as "a 'drywell' that receives untreated sanitary waste containing human excreta, and which sometimes has an open bottom and/or perforated sides. 'Drywell' means a well, other than an improved sinkhole or subsurface fluid distribution system, completed above the water table so that its bottom and sides are typically dry except when receiving fluids. These regulations also contain a prohibition against the use of any seepage pit, drywell, septic system, or other subsurface disposal system for the disposal of hazardous or toxic substances (40 CFR part 144.)"



Determine Potential Solutions

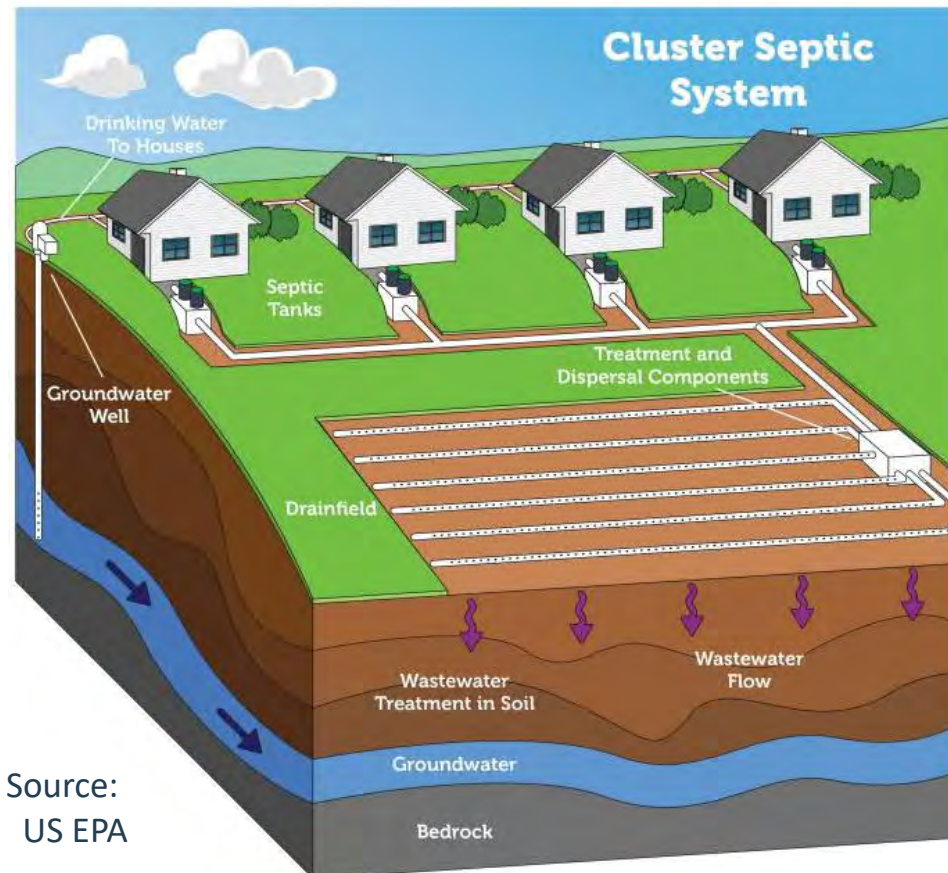
- Upgrades/Replacements of Individual Septic Systems
- Connection to Community / Cluster Septic Systems
- Sewer to an Existing Wastewater Treatment Plant
- Sewer to a New Wastewater Treatment Plant



Source:
US EPA

Determine Potential Solutions

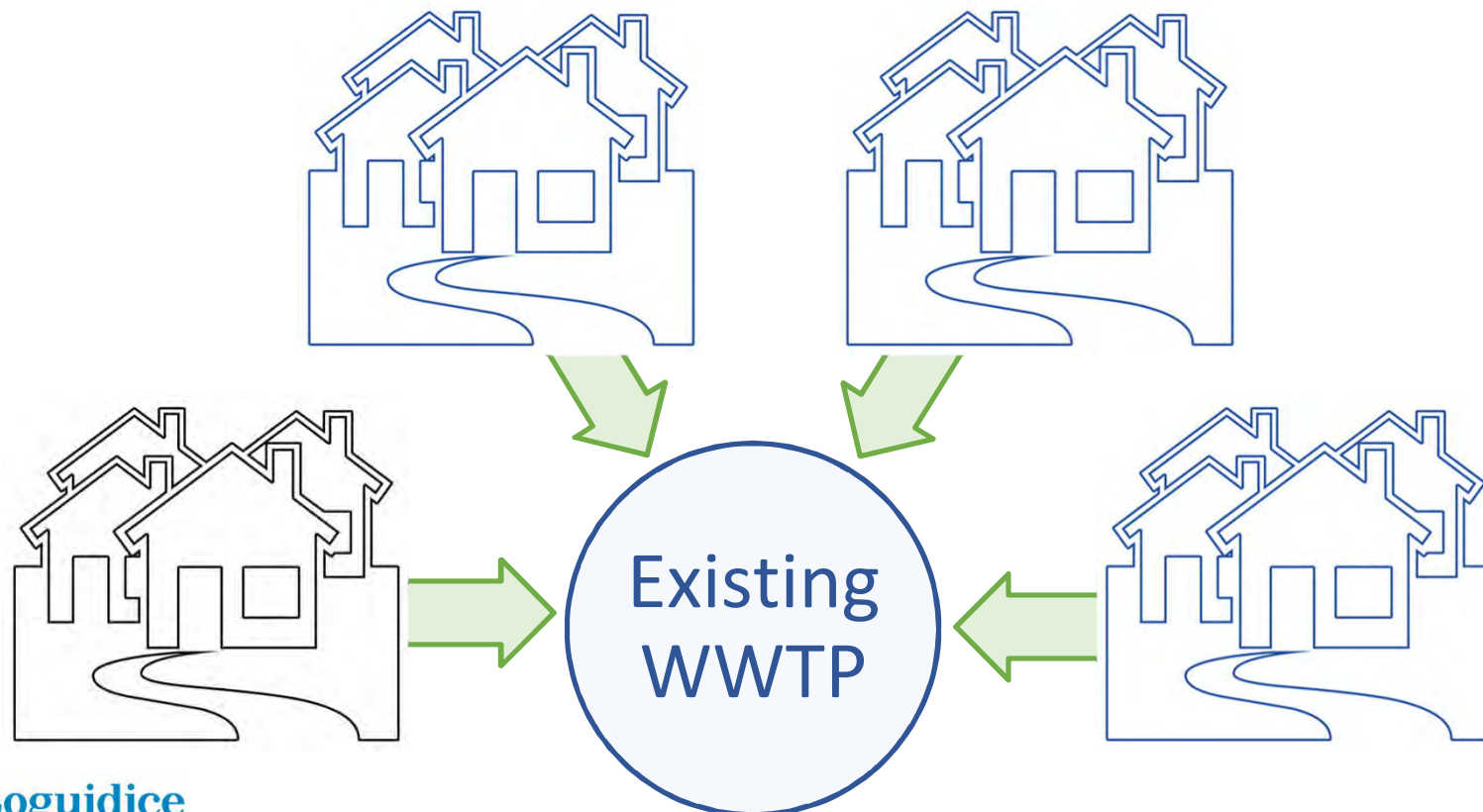
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US EPA

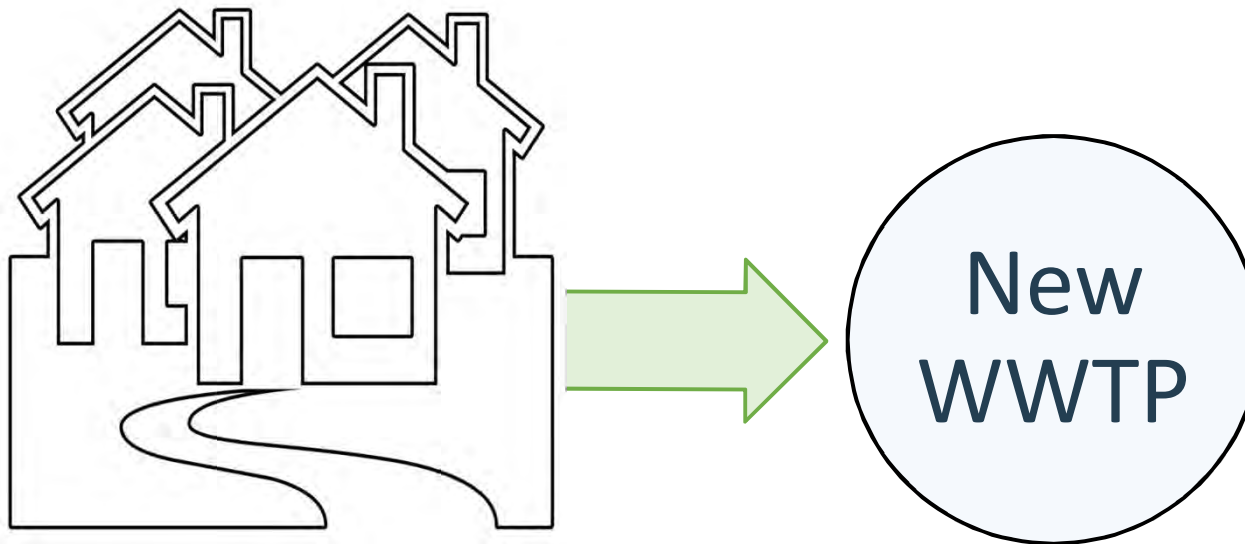
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Determine Potential Solutions

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Evaluate Costs & Identify Funding Sources

- A cost analysis will be prepared for each proposed alternative solution
- The cost analysis will include capital costs, as well as operations and maintenance costs
- The eligibility of each alternative solution will be evaluated for grant funding programs
 - NYS EFC
 - NYS CFA
 - US EPA



The background features a white field with two large, solid blue geometric shapes. One is a triangle in the top-left corner, and the other is a parallelogram in the bottom-left corner. A horizontal grey bar spans the width of the slide, containing the title text.

Why It All Matters And How You Can Help

Why It All Matters

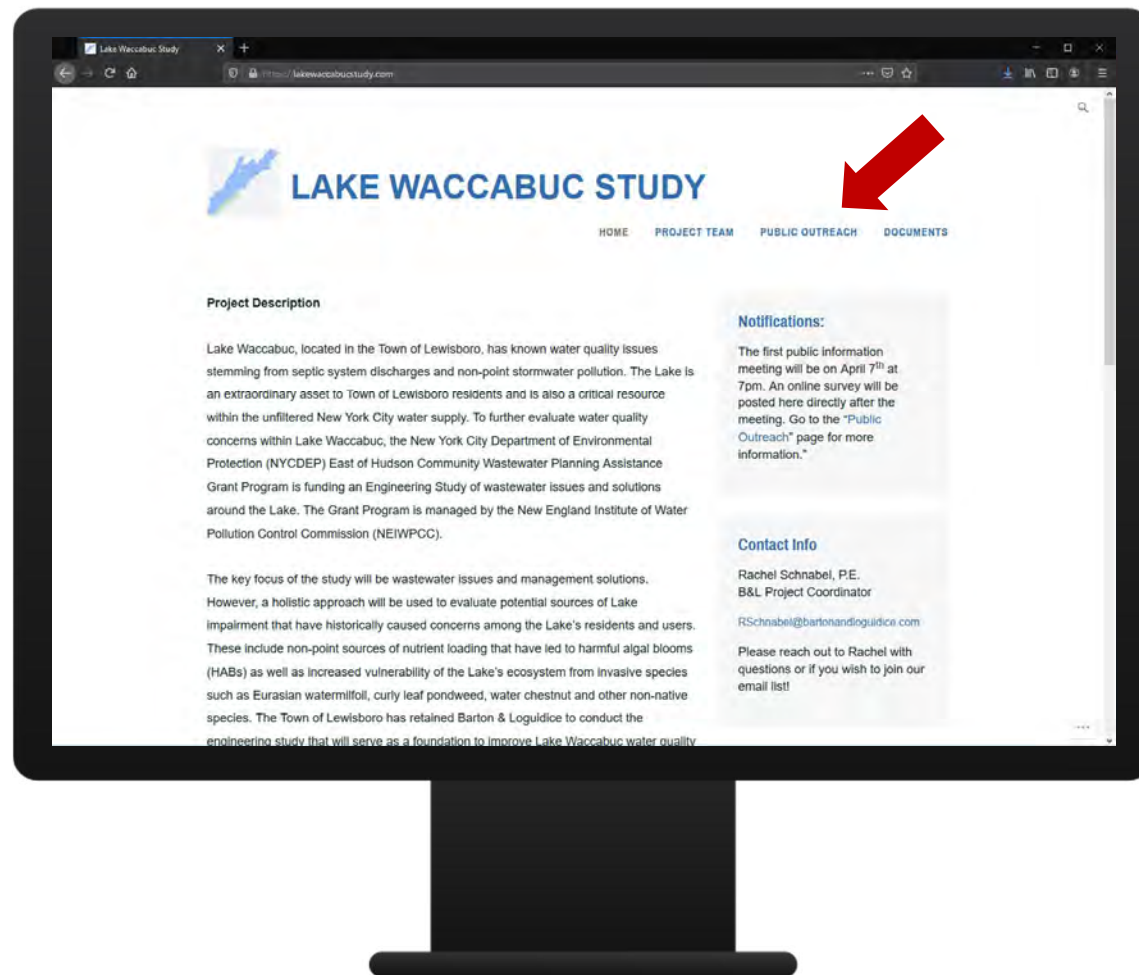
Restoring the water quality of Lake Waccabuc will...

- Protect/repair the ecosystem of the lake
- Allow continued safe recreational use of the lake
- Protect/improve the value of properties in the study area
- Protect drinking water for residents in the study area



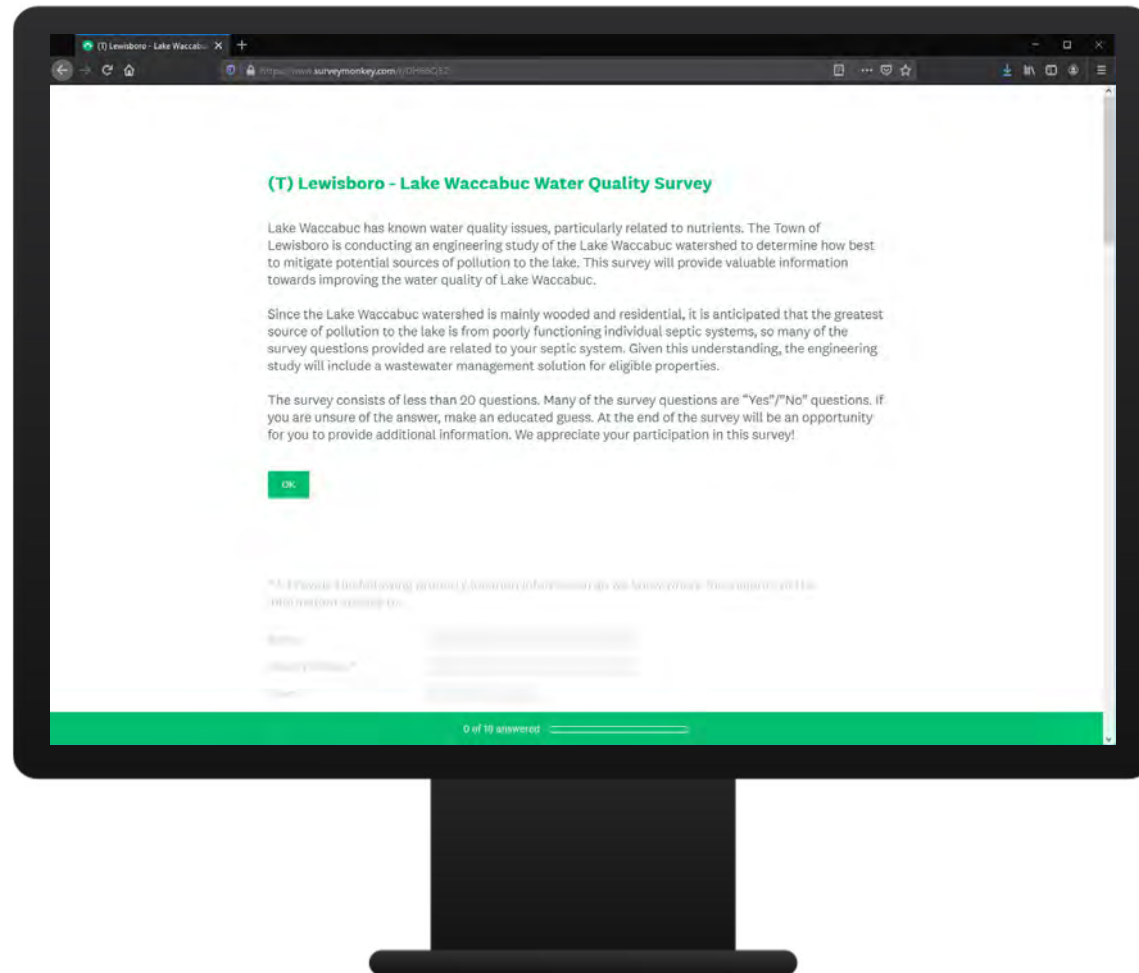
How You Can Help

- Go to the project website:
<https://LakeWaccabucStudy.com/>
- Click on the Public Outreach tab



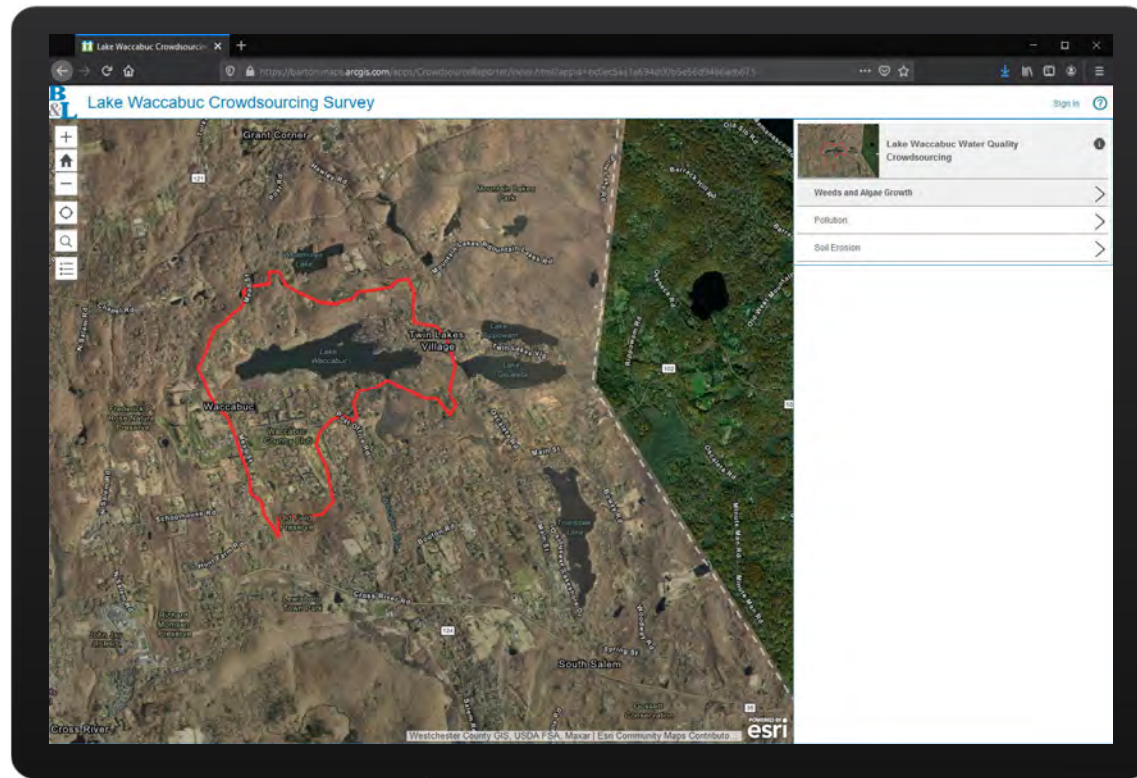
How You Can Help

- Take the public survey
 - Focuses on your individual property
 - Will help to determine which properties should be included in the wastewater management solution



How You Can Help

- Fill out the crowdsourcing survey
 - Allows you to locate sources of pollution that you have observed in the study area
 - Will give the full picture of pollutant sources to the study area



How You Can Help

Both surveys should be available on the project website now and will close at the end of the day on April 21st!



Thank you for your time tonight and we hope that you participate in the surveys!

<https://LakeWaccabucStudy.com>

The experience to
listen
The power to
solveSM

BartonandLoguidice.com

