Framework for a Lake Management Plan for Canadarago Lake

By Jill Eichler
Department of Earth Sciences – Faculty sponsor - Les Hasbargen
State University of New York, College at Oneonta

In March of 2008 a grant was awarded through the SUNY-Oneonta Research Foundation for the development of a framework for a lake management plan for Canadarago Lake. The framework is a required precursor to a lake management plan and acts a road map for the plan. Canadarago Lake residents need and will benefit from a lake management plan as it will address issues that concern lake residents. In a recent survey of lake residents both lake level management and water quality were both cited as major concerns.

The adjoining picture was taken in June 2006. Though this picture depicts the worst flood event along Canadarago Lake, certain low lying properties along the shore flood to some degree every spring with the severity increasing in recent years. Flooded septic systems also raise the issue of water quality.

Introduction

Canadarago Lake is situated in Northern Otsego County, New York and is part of the Upper Susquehanna Drainage Basin. The Towns of Richfield, Exeter and Otsego border the lake and it is recognized by the residents as a valuable resource. It contributes to the area's economy by way of its recreational uses. Ecologically the lake, its streams and wetlands provide habitats to countless flora and fauna. The protection of these habitats is of concern to many who enjoy the pristine environment. There are many issues that concern lake residents but the most pressing is that of seasonal flooding of low lying properties which has caused property damage and compromised septic systems. Therefore the flooding can potentially pose a health threat as well as negatively impact the lake with nutrient loading.

A lake management plan will address the issues, provide an avenue for correction and lead to grant opportunities. The lake management plan will be created by the Canadarago Lake Improvement Association as they are the primary stakeholders. Before a lake management plan is created though, a state of the lake report and a framework for a lake management plan needs to be in place.

Purpose of the Framework

- To create a document that is to be used by the Canadarago Lake Watershed Council to create a management plan.
- To identify and address the component of the management plan.
- To develop a network of agencies to assist the Council and the Lake Association in the development and implementation of the management plan.

CANADARAGO LAKE IMPROVEMENT ASSOCIATION, INC.

The Need for a Framework

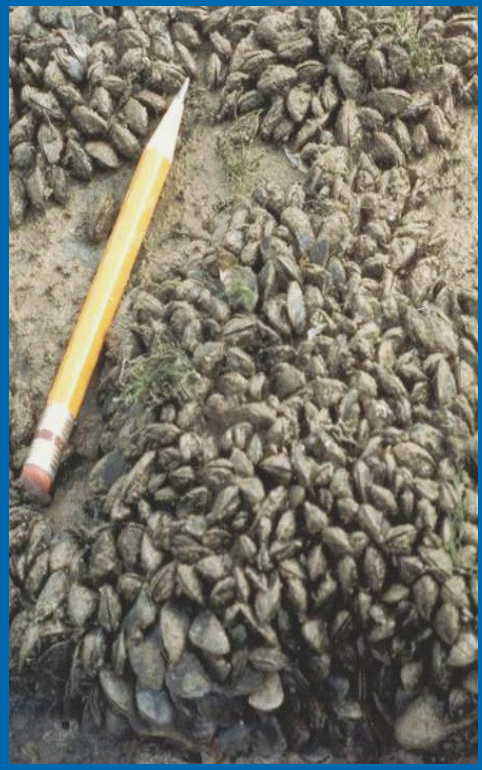
- The framework is the foundation for the management plan.
- The framework, management plan and the state of the lake report work together as documentation of the lake and its issues.
- Each allow funding agencies to understand the lake and award grants to reach goals set forth for the lake and its watershed.

Management Goals

- Protect shoreline properties from flood damage.
- Protect water quality.
- Preserve the Lake pristine state and its viability as a natural resource and as a tourist attraction.
- Protect the Lake's fishery.
- Ensure the safety of recreational users of the Lake.

Issues to be Addressed

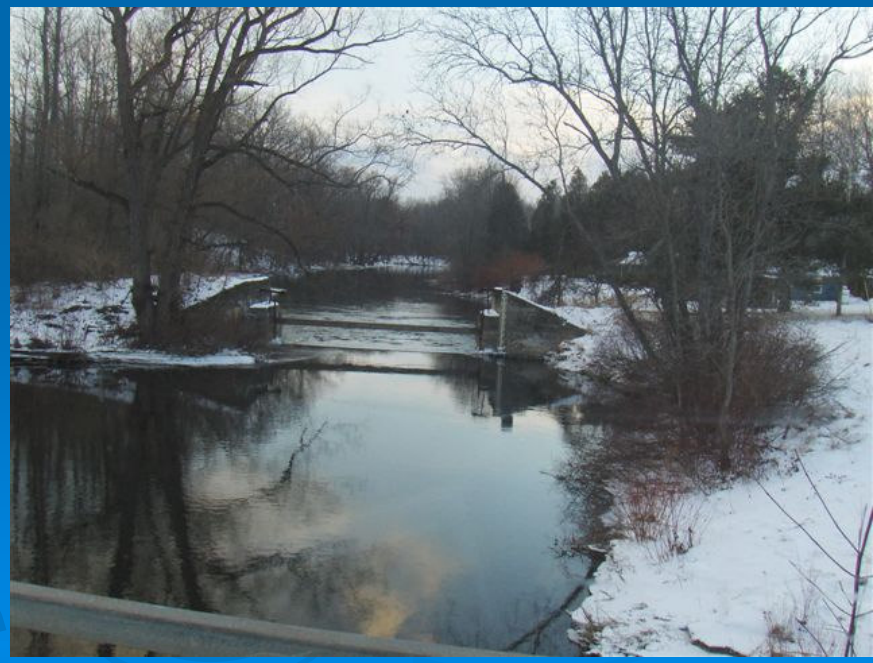
- Lake level management
- Invasive species
- Sedimentation
- Water quality
- Shoreline erosion
- Eutrophication
- Nutrient levels
- Excessive Weeds



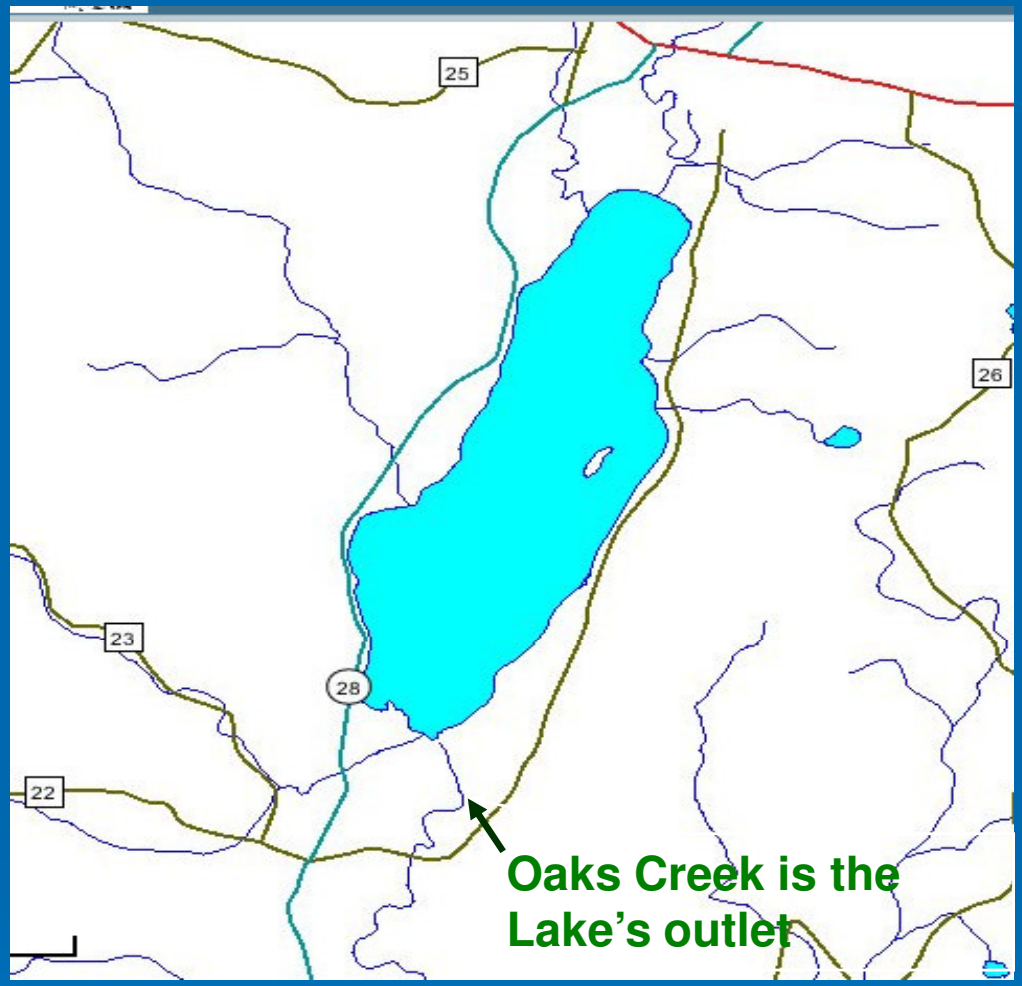
Managing the Level of the Lake

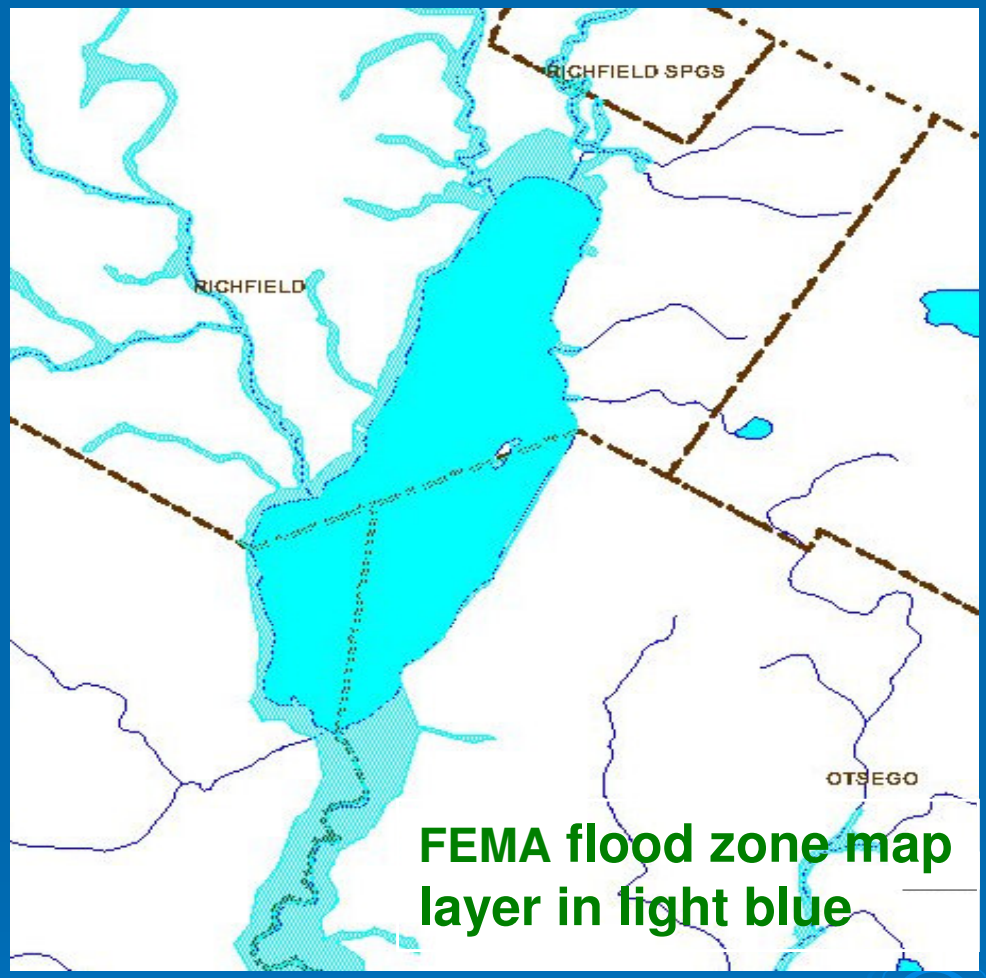
- The severity of flooding has increased in recent years.
  - Combination of factors.
- Greater control over lake level is needed.

  - To better understanding of the hydraulics and hydrology of the system a study is being done by a consulting firm- Malcolm Pirnie.



Overview Maps of Canadarago Lake





- Residential flooding occurs on the western and northern portions of the lake.
- Oaks Creek acts as a limiting factor in terms of the lake's ability to drain especially in the spring.

It is important to identify factors that contribute to the flooding problem in order to address them.

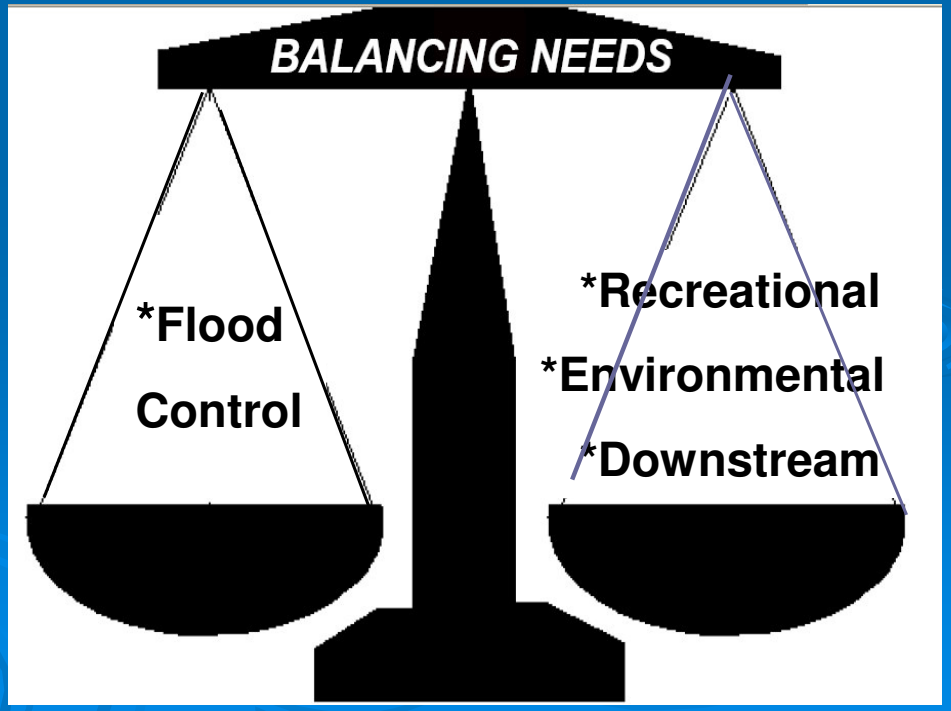
1. **The southern end of the lake drains by way of Oaks Creek. One mile downstream on Oaks Creek is a dam that was constructed by the lake association in 1964 to control the level of the lake. The dam is in disrepair and is narrowing the stream.**
2. **Log jams may also be contributing to the Lake's inability to drain properly. The CLIA has started to remove some to the log jams. Also Liddle and Phinney Creeks may be factors.**
3. **Also at the southern end of the lake is Herkimer Creek which as created a sandbar (which is actively eroding its banks in the below picture) in front of the mouth of Oaks Creek. The elevation of the sandbar is one foot higher than the dam with the "I" in place and is acting as a dam and requires dredging.**

Questions Regarding Lake Level Management

- **Right now we have a general understanding lake level management.**
  - The CLIA has a dam policy.
  - Lake level and amount of precipitation records have been taken.
- **Determination of the following is needed in order to address lake level management…**
  - Accurate models created by the consulting firm to determine how much the lake needs to be lowered for a particular storm event and how much in advance we need to do this. The study will address other similar questions and a management plan can be developed.

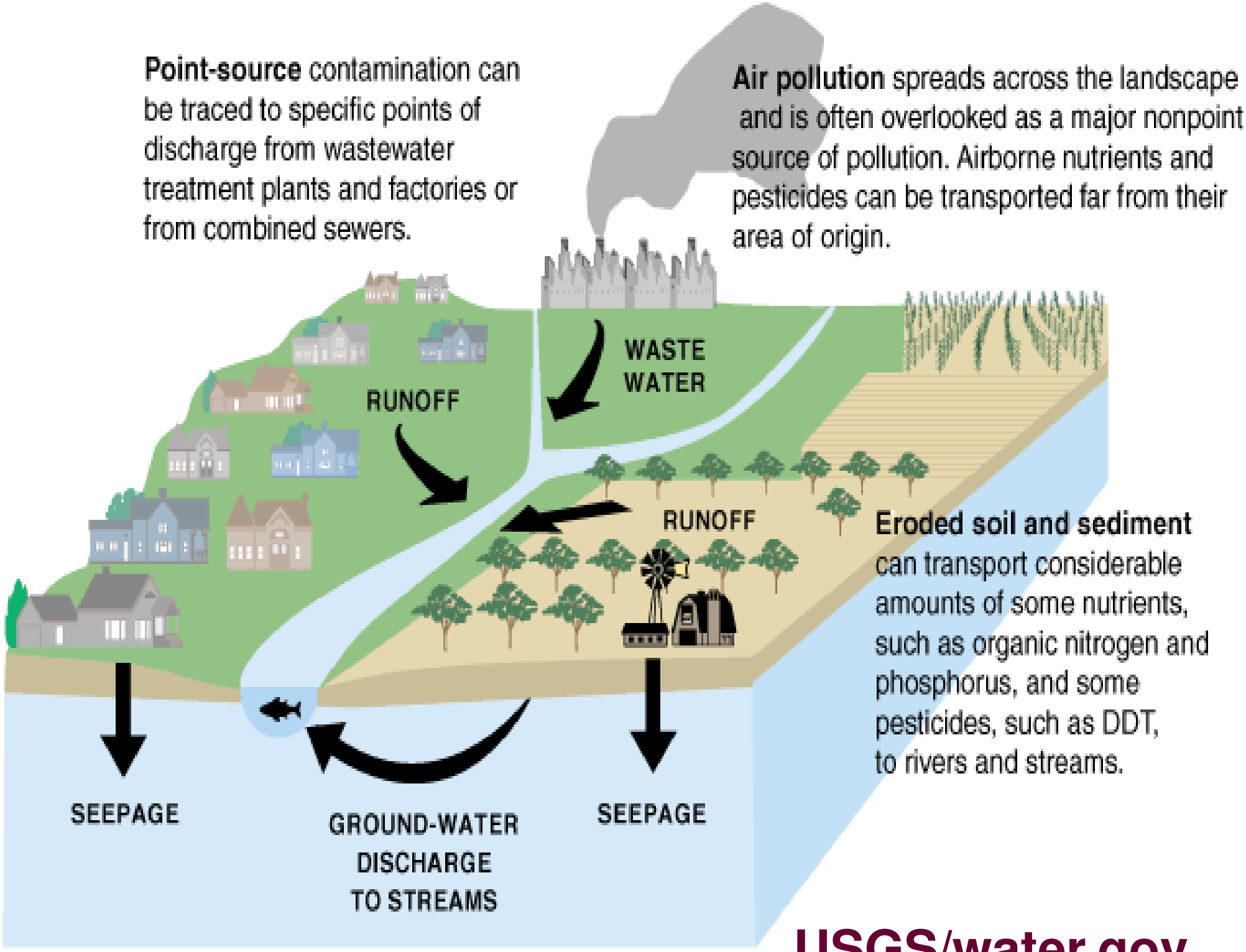
Framework and Plan Considerations- Lake Level Management

- **Balancing needs**
- **Lowering the lake in anticipation of spring flooding. Dam/lake level lowest for winter months.**
- **Lowering the lake in anticipation of a summer storms event. Adjusting according to weather predictions and from modeling done in the study.**



Managing Nonpoint Source Pollution to Protect Water Quality

- Needed for ….
  - Public bathing
  - Aquatic life/habitat
  - Recreation
- Potential sources
  - Agriculture
  - Failing onsite systems
  - Runoff from lawns, roofs and drains
  - Sedimentation from storm events, natural processes
  - Roads and bridges



USGS/water.gov

Water Quality

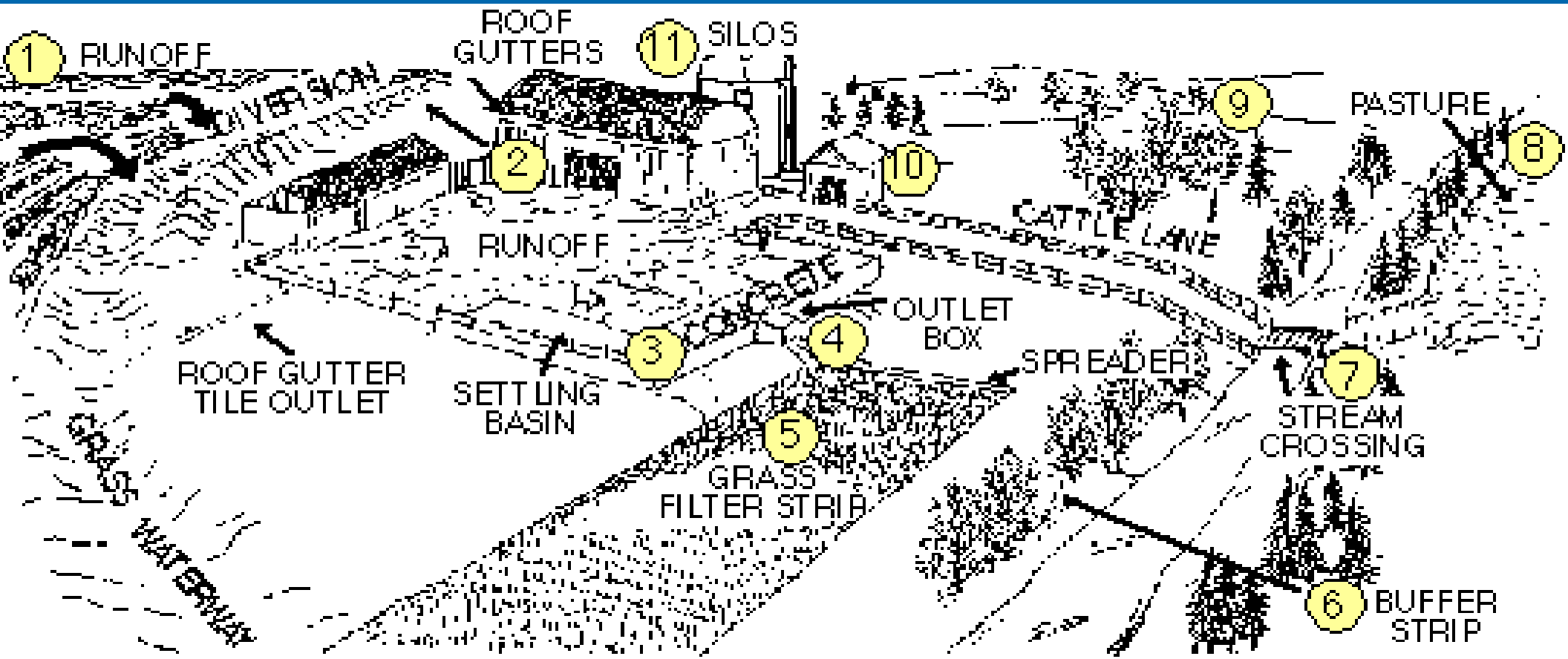
- Citizen Statewide Lake Assessment Program (CSLAP) – 1994 found the following…
  - Recreational uses were thought to be threatened by nutrient levels leading to weeds/algal blooms
  - Aquatic life was considered threaten by low dissolved oxygen
- Priority Watershed List- Assessments of the Susquehanna Basin will be done in 2010.
- Information used for State of the Lake Report.
- May be different due to zebra mussels.

Water Quality and Zebra Mussels

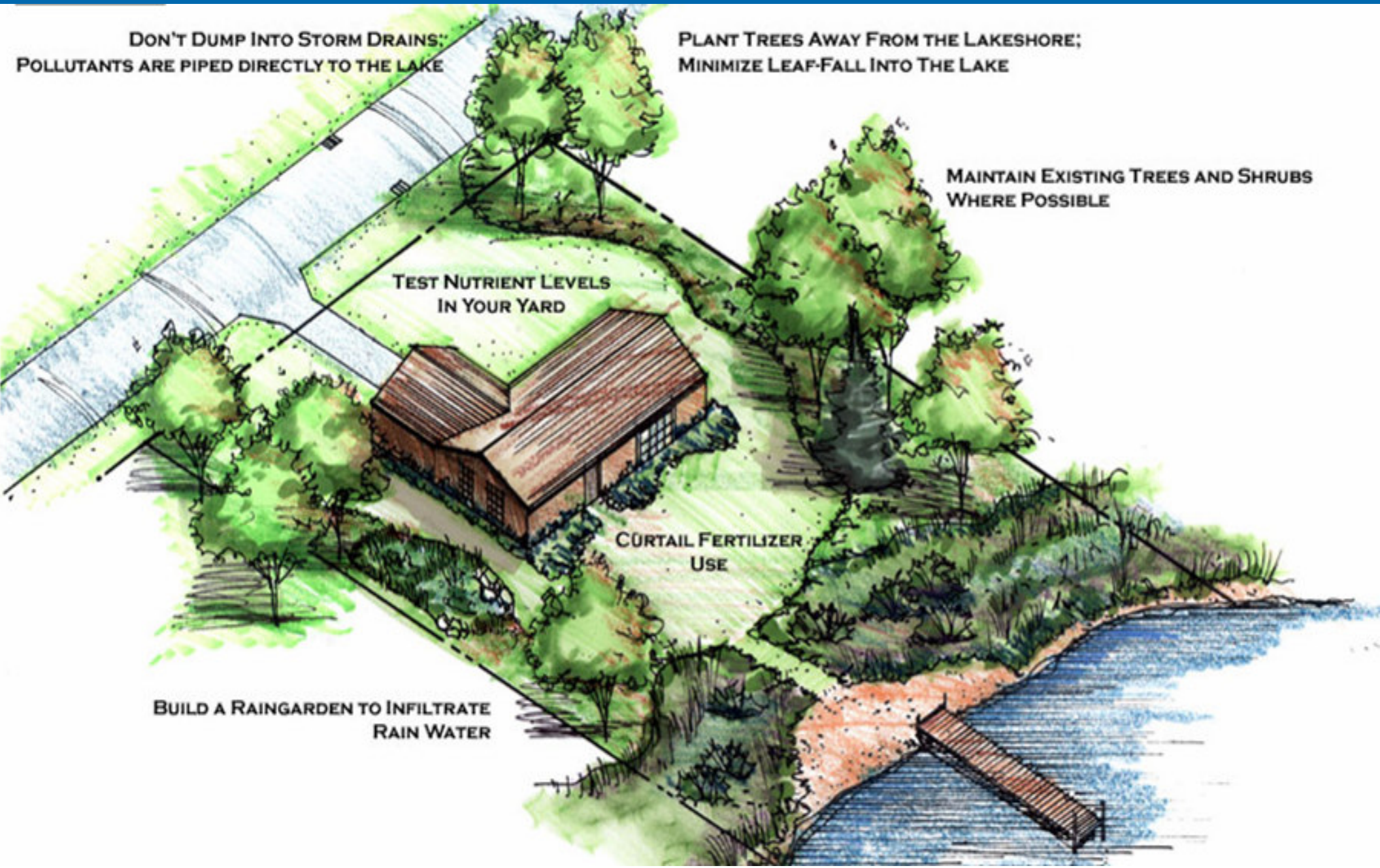
- Increase in water clarity has lead to benthic plant growth.
- Plant diversity is healthy (17 species identified thus far with only two being nonindigenous, BFS)
- Future concern for blue green algal blooms.

Agriculture

- Natural Resource Conservation Service (NRCS) – programs available to preserve water quality….
  - Best management practices
  - Nutrient management plan
  - Highly erodible land plan



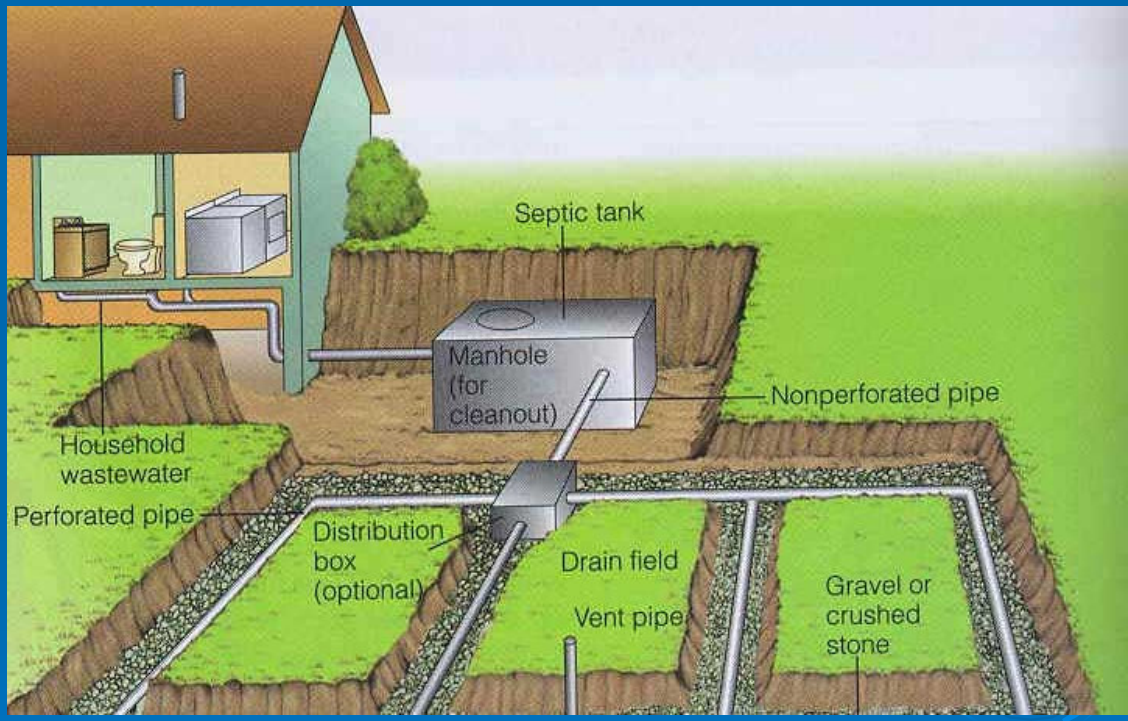
Management Techniques for Dealing with Runoff from Residences



Onsite Wastewater Treatment and Water Quality

Why is knowledge of proper onsite treatment important?

1. Safety
2. Health risk
3. Potential source of pollution
4. Avoid repairs ($$)



The Septic Tank separates, stores and begins to treat solid wastes
The Distribution Box, which disperses the **liquid effluent over a large area of soil**.
As the effluent moves through the soil it is treated by natural physical, chemical and biological processes.

Importance of Septic Systems Awareness

- Septic systems are one of the three factors that have the potential to negatively impact **WATER QUALITY** (according to DOH and BFS).
  - Septic systems are impacting the lake and any human exposure is considered a health risk.

    Septic system issues will be incorporated into a Lake Management Plan.

- Initial first steps taken include an anonymous Household Wastewater Survey sent out to Lake residents in the "Voice of the Lake" newsletter (spring 2008, page 4). The newsletter also notes the use of self administered dye tablets to check your septic. Though dye testing can only detect major failures, it is a good first step to addressing the issue. As a safety note please have a professional visually inspect your septic to determine the soundness of the system.

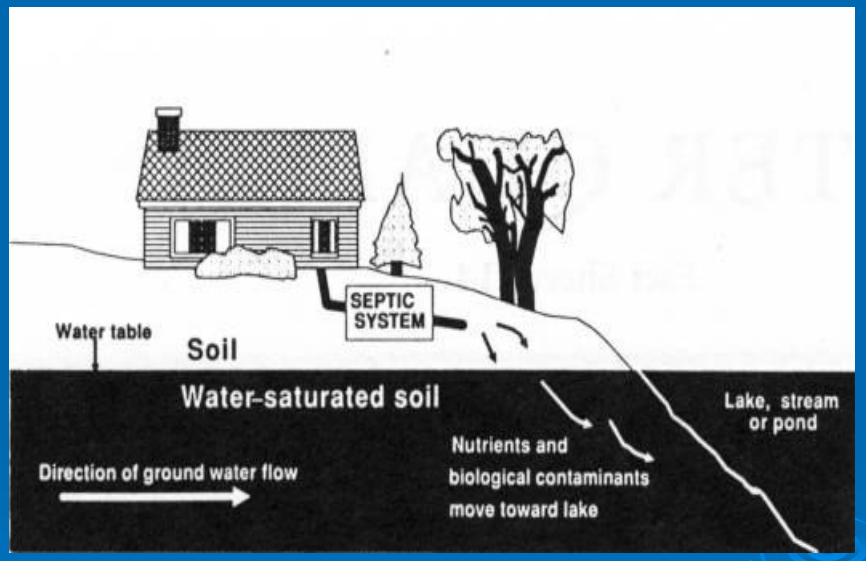
What Happens When Contaminates from a Septic System Reaches the Lake?

- According to the U.S. Environmental Protection Agency, failing septic systems are the second largest cause of **water pollution**.
- The agency estimates that 168,000 viral illnesses and 34,000 bacterial illnesses result every year from contaminated drinking water.
- Though very few drink lake water, near shore recreation could be unsafe. Specific pathogens include…
  - E. Coli (severe illness)
  - Giardia
  - Cryptospordia

    } **(mild intestinal illness but more serious for though with weakened immune systems)**
  - Those transmitted by flies and mosquitoes

Onsite Treatment Along a Lake

- **Special considerations must be make for residential onsite treatment along a lake.**
- Lack of space for the absorption field.
- Proximity to lake.
- Depth to water table and/or depth to impermeable layer.
- Susceptibility to flooding – low elevations.
- Soil saturation due to flooding.



Other Factors to Take into Consideration.

- Camps that are converted to year round residences may put addition stress on a septic.
- Increased use in terms of volume of water from summer rentals may be another septic stressor.
- Old systems or poorly maintained systems potentially pose a threat to the residents and the lake.

Conclusion

- This powerpoint is a partial outline for the for the framework and the completed project will be online soon.
- Water quality and lake level management are top priorities for the framework but other issues will be addressed in order to reach management goals now and in the future.
- The Lake is a valuable resource and important to everyone.
- Questions? Please feel free to contact me at jeandse@yahoo.com.

Acknowledgements

- This research was completed under the assistance and guidance of the
  - Otsego County Planning Department (Terry Bliss, Psalm Wyckoff and Karen Sullivan),
  - SUNY- Oneonta Earth Science Department (Dr. Hasbargen, faculty sponsor, Dr. Castendyk and Dr. Blechman**),**
  - Soil and Water Conservation District (Scott Fickbohm)
  - Biological Field Station (Matt Albright and Holly Waterfield).
  - Canadarago Lake Improvement Association (President- Rod Sluyter)

- Special thanks to **The College Senate Committee on Research** who made this work possible.