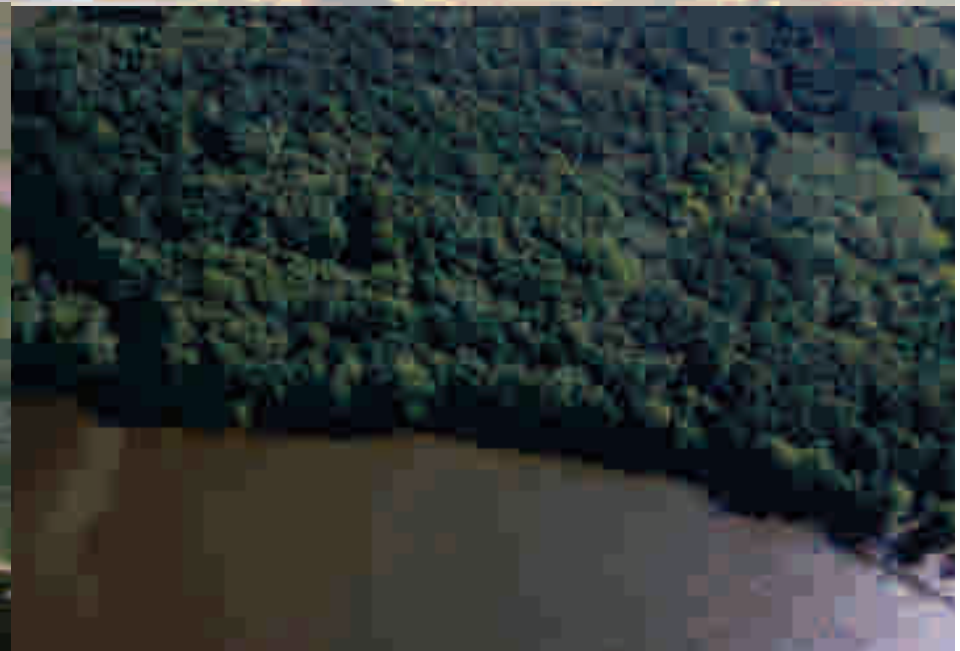


# Stewardship

Stewardship means doing what I can to conserve what does not belong to me alone, holding in trust that which exists before, during, and after my time, caring for, to the best of my ability, what is beyond and greater than myself.

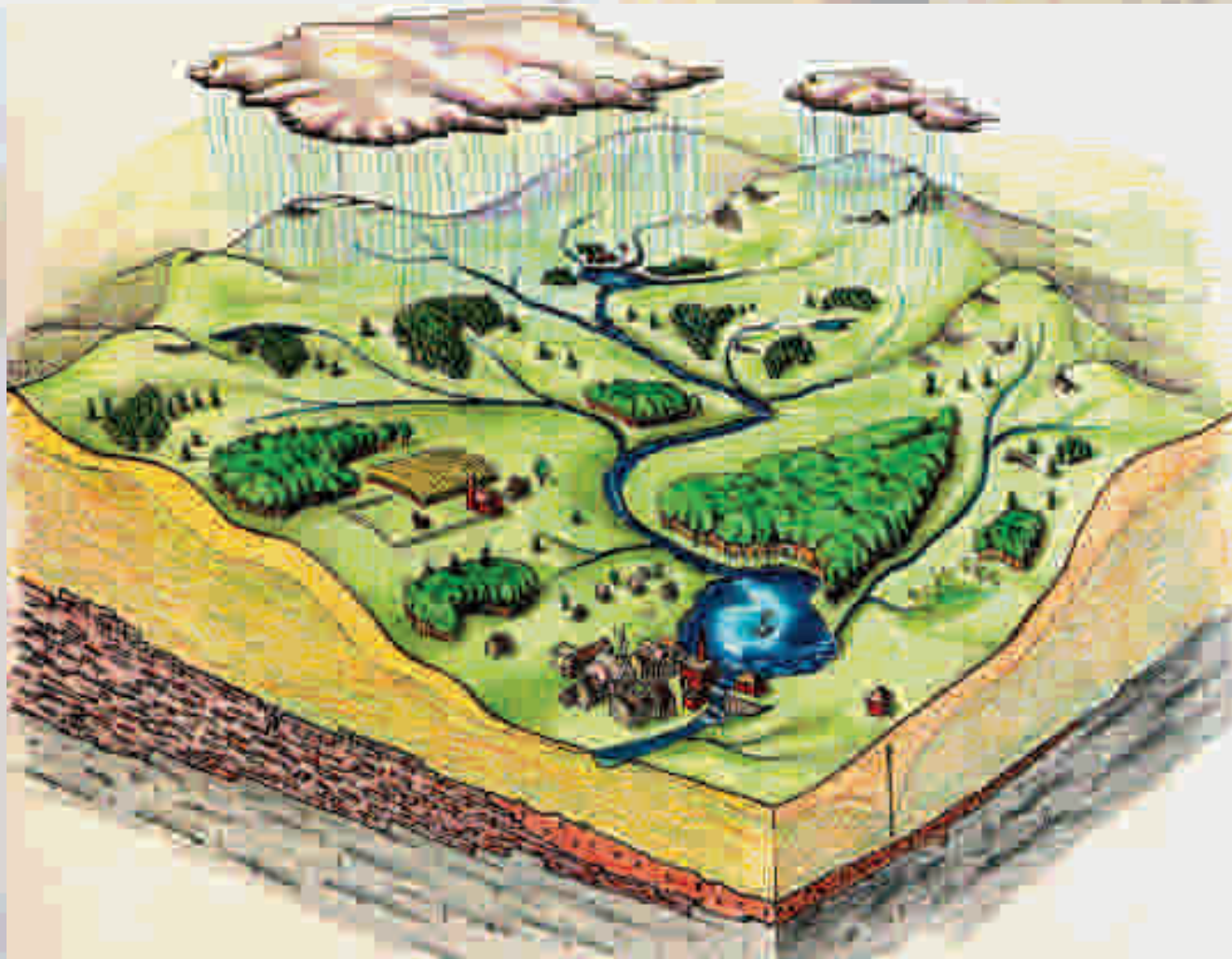
## OBJECTIVES

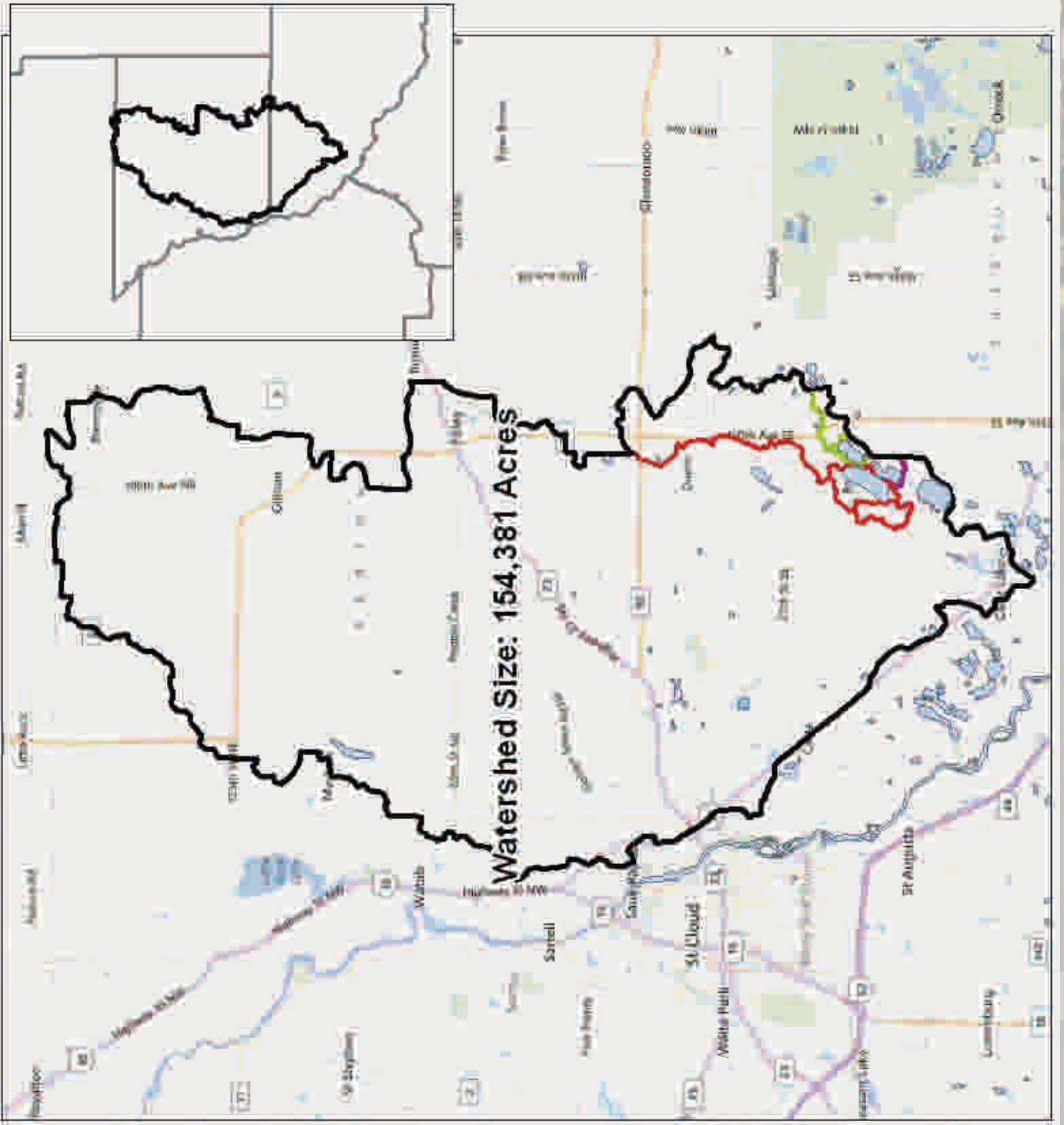
- Understand the cumulative consequences of residential development on water quality
- Gain knowledge of practices to stop or reverse human impacts
- Expand on shoreline buffer process



# *Everyone Lives in a Watershed*

A watershed is an area of land that drains to a lake or river. Runoff carries sediment and pollutants to our lakes and streams.





# IMPERVIOUS SURFACE

A surface that does not permit the absorption of fluids

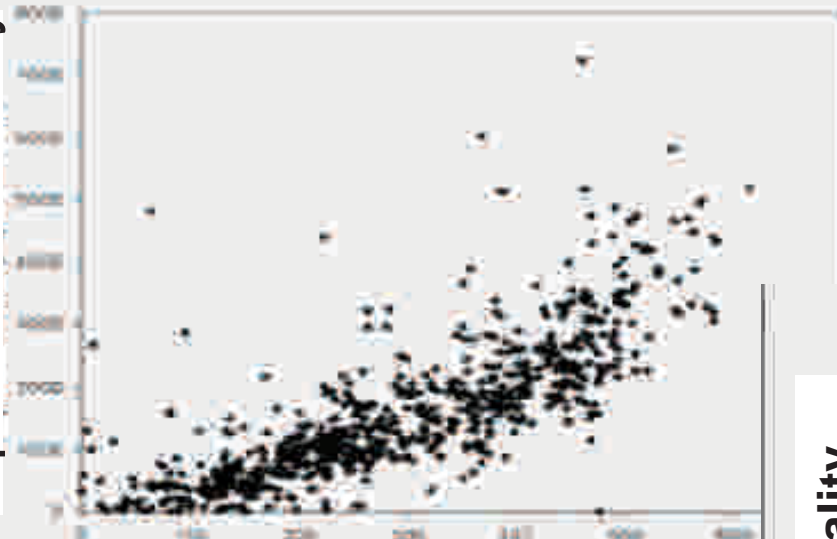
**Such as: Rooftops, walkways, patios, driveways, parking lots, lawns**

- i Eliminate rainwater infiltration and groundwater recharge (increases runoff)**

# POPULATION V.S. IMPERVIOUS SURFACE

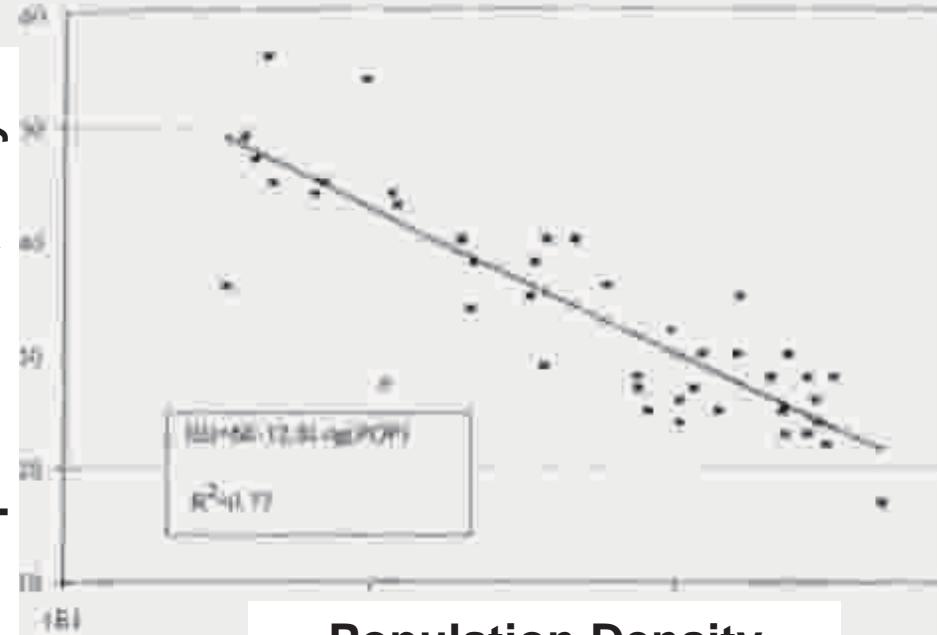
Population Density

Residential Impervious Surface



Aquatic Life Quality

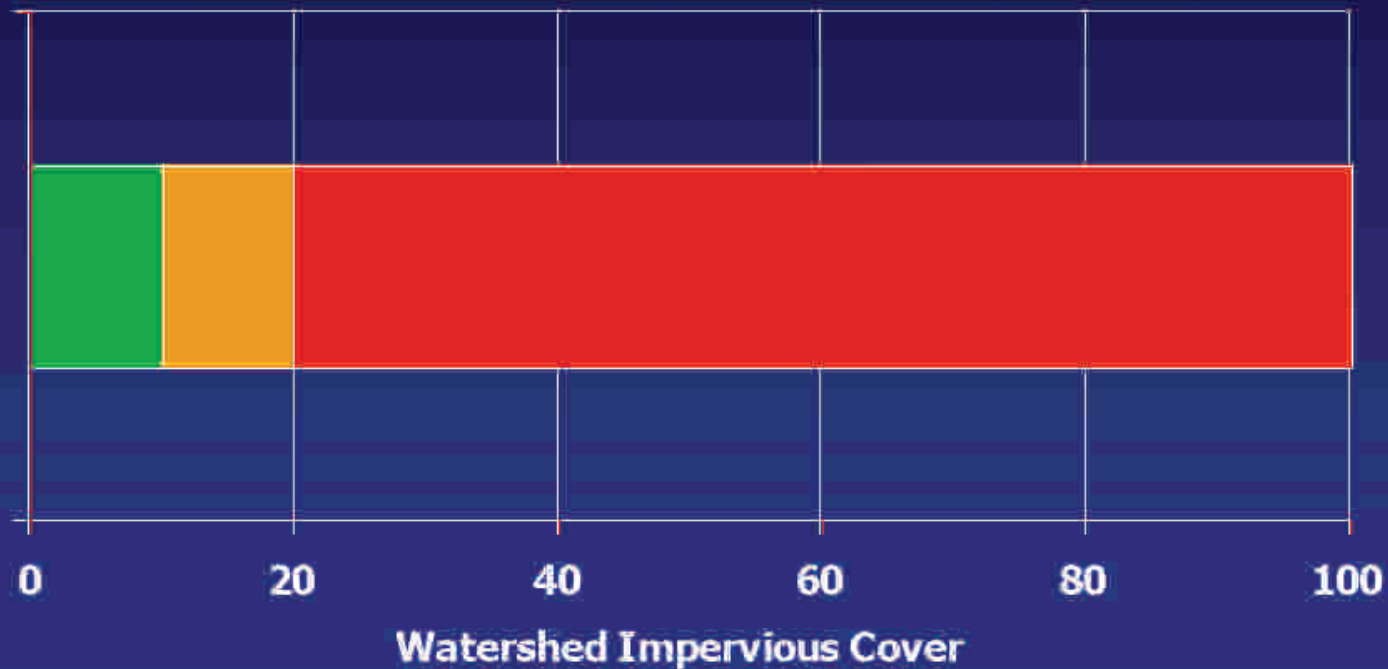
Population Density



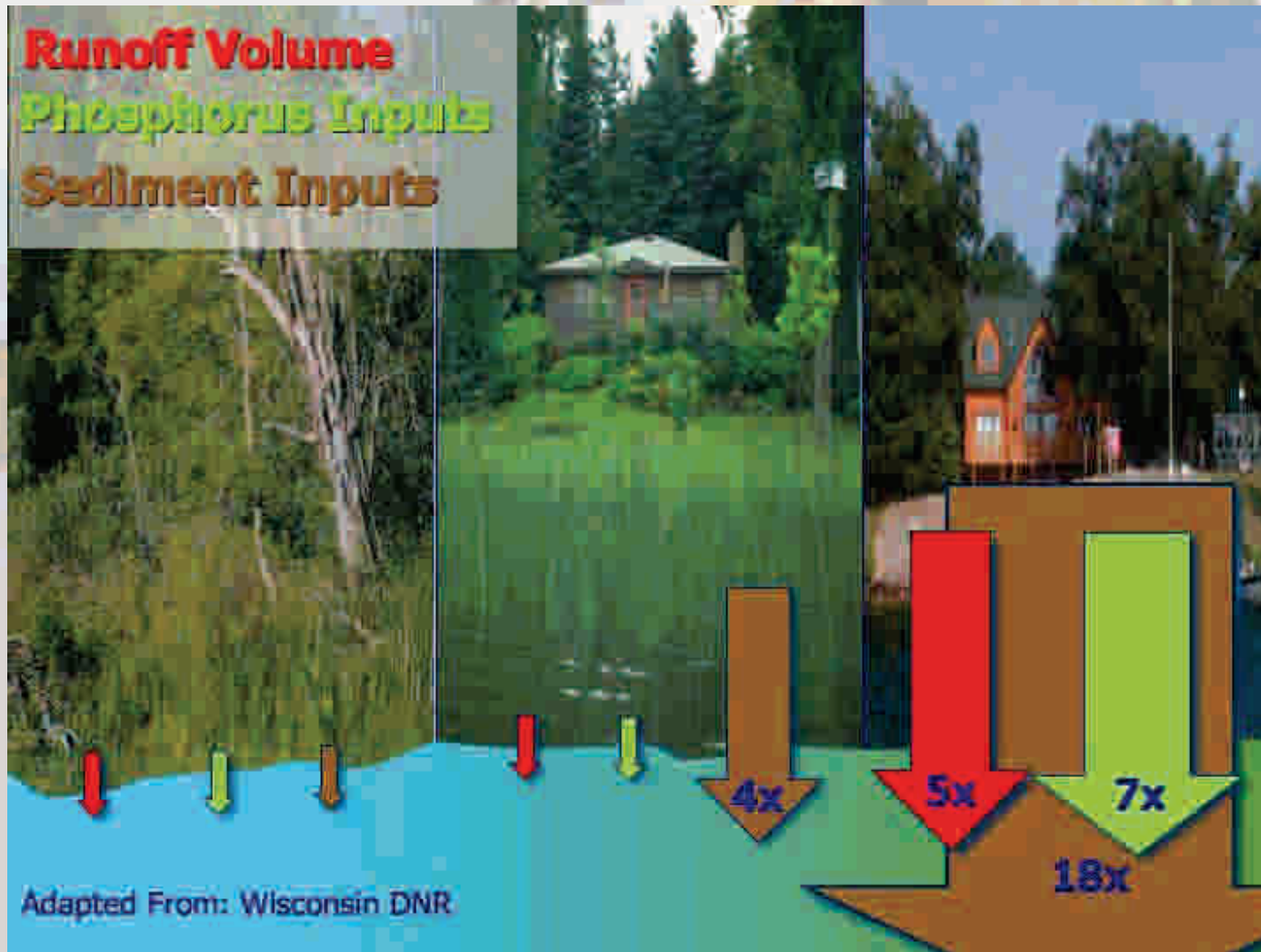
Level at which significant impact is Observed:  
Impervious Surface Coverage: 10-20%  
Housing Density: > 1 unit/acre

## Cumulative Impacts of Impervious Cover

Protected Impacted Degraded



# Natural vs. Developed Land Use



**7 X more Phosphorus after Development**



# CALCULATING IMPERVIOUS SURFACE



Parcel: 1.1 Acres  
Impervious: .36 Acres  
32% Impervious

Use Beacon Website  
<http://beacon.schneidercorp.com/>

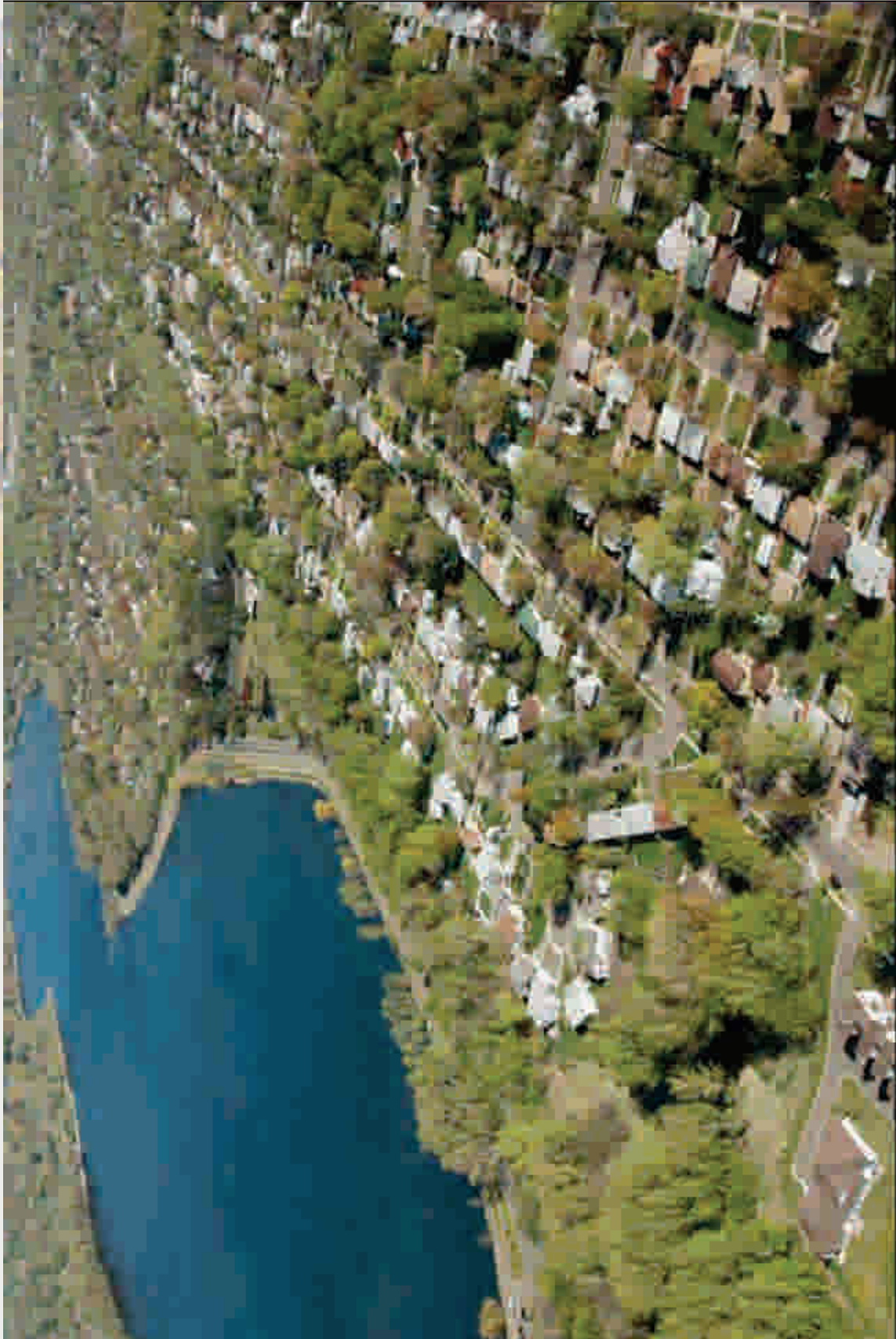
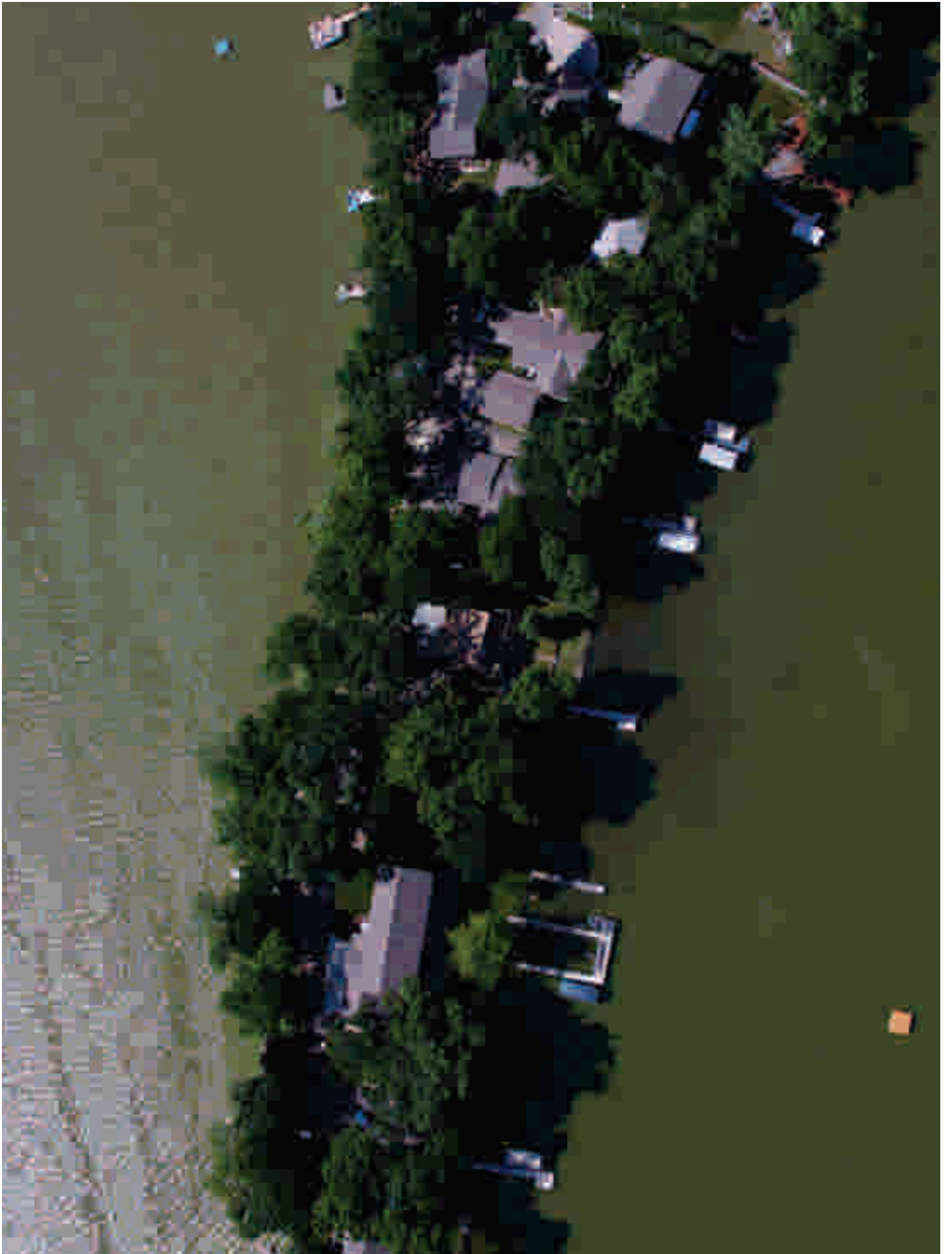


Image from the Metropolitan Design Center Image Bank.  
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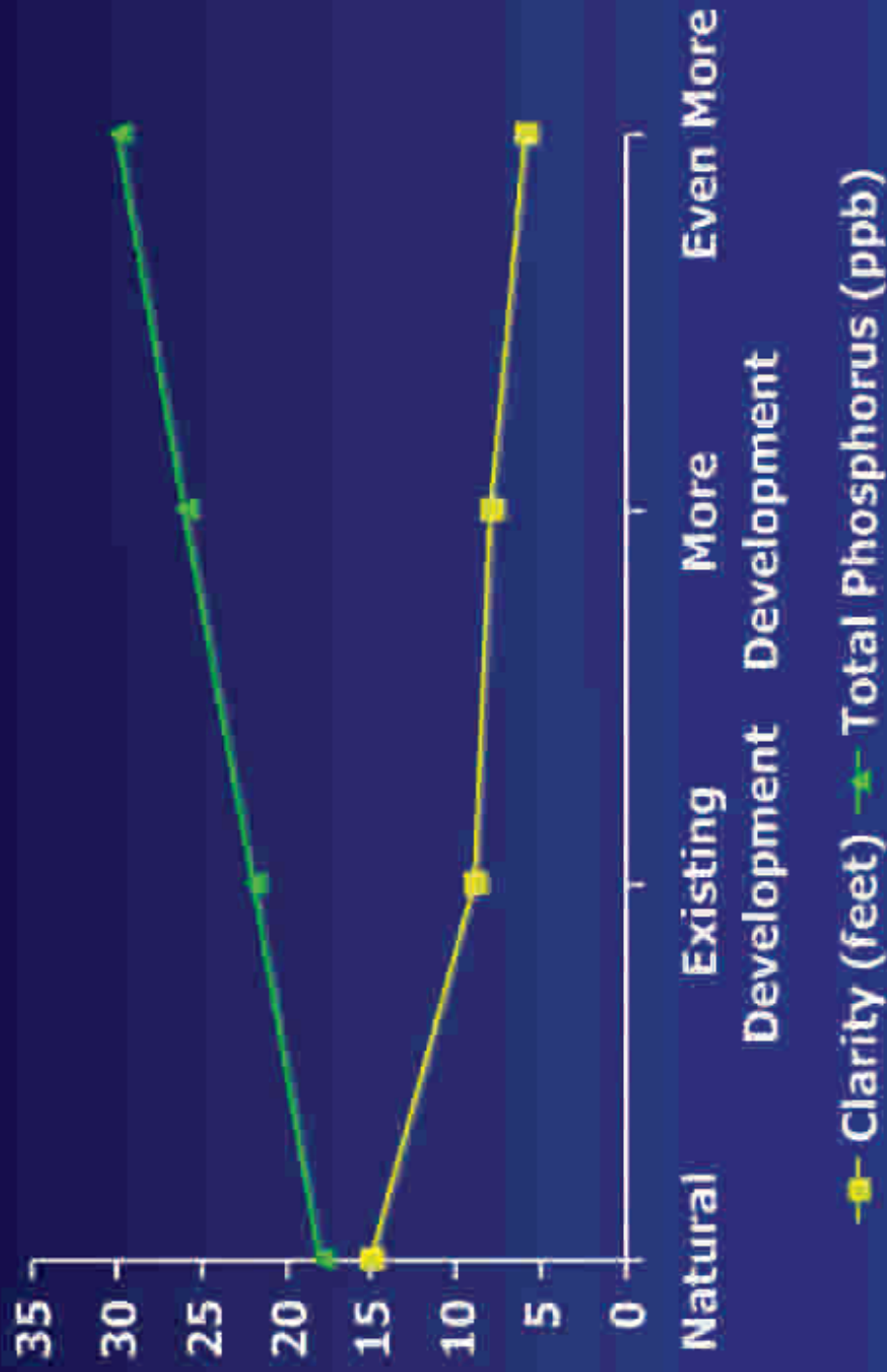








# Build-out Predictions





# Leaking/Failing Septic Systems

- Excess nutrients
  - nitrogen and phosphorus

Standard septic systems are designed to remove pathogens NOT nutrients



# Impacts of Motorized Watercraft on Lakes

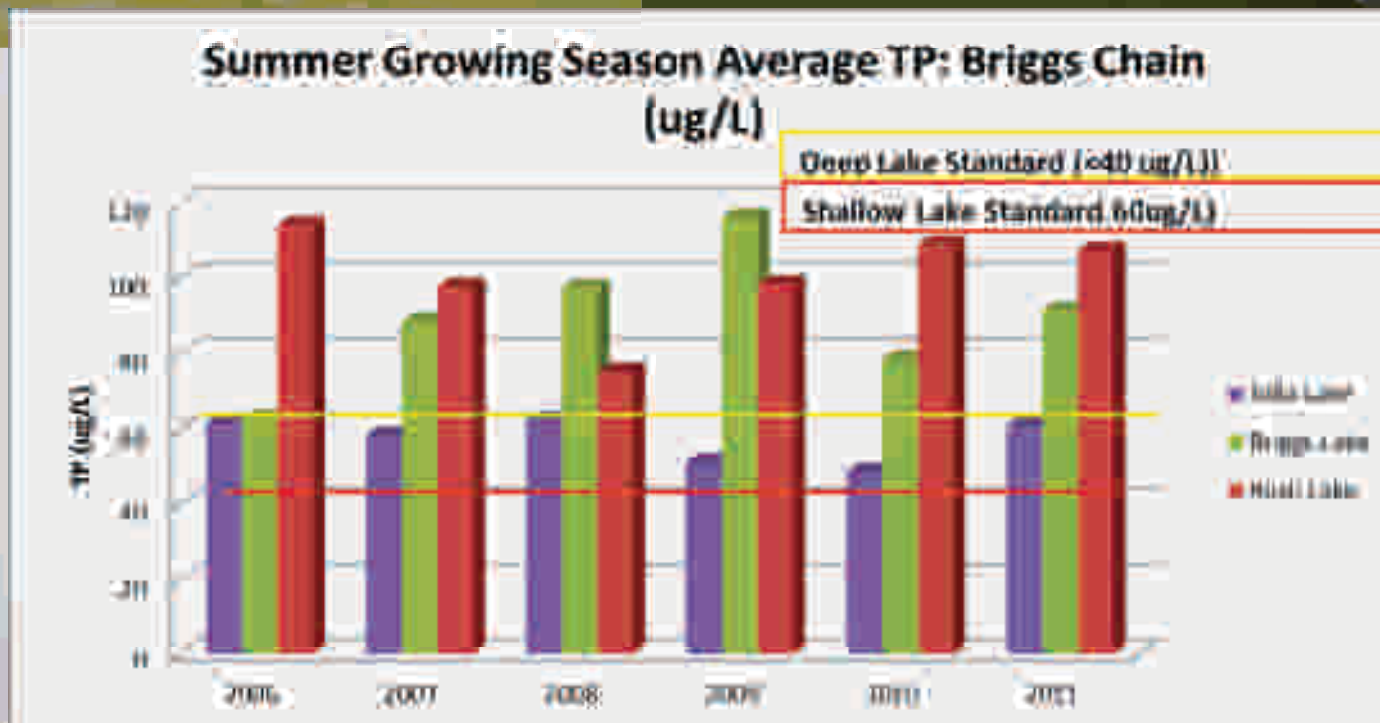


Effective Mixing Depth

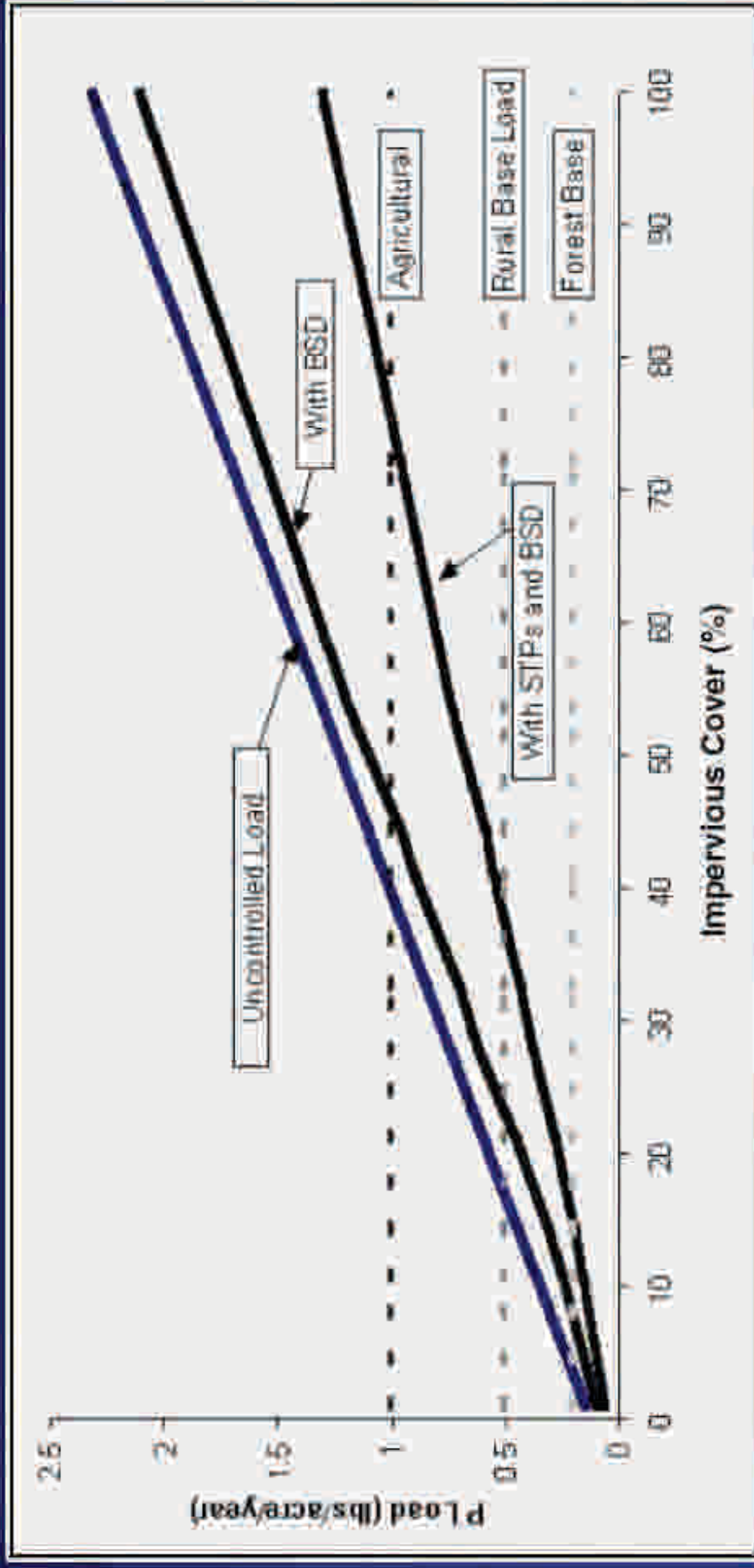
Horse-power	Mixing Depth (feet)
10	6
28	10
50	15
100	18

MN State Impaired Waters:  
Julia Lake  
Briggs Lake  
Rush Lake  
Big Elk Lake

TOO MUCH NUTRIENTS



# Phosphorus Pollution increases with % Impervious Cover



# GUIDE TO STEWARDSHIP

- | **Shoreline Buffers**
- | **Minimize Impervious Surfaces**
- | **Runoff Control (Rain Gardens, berms, infiltration trench, swales, cistern)**
- | **Septic System Maintenance**
- | **Boating Guidelines**
- | **Filter Strips**
- | **Others**

# Natural Shoreland Buffers with Native Plant Communities

**Buffers are areas or strips of land maintained in permanent vegetation to help control pollutants and other environmental problems. Native plants are recommended.**

# Buffers - Shoreline Revegetation with Native Plant Communities

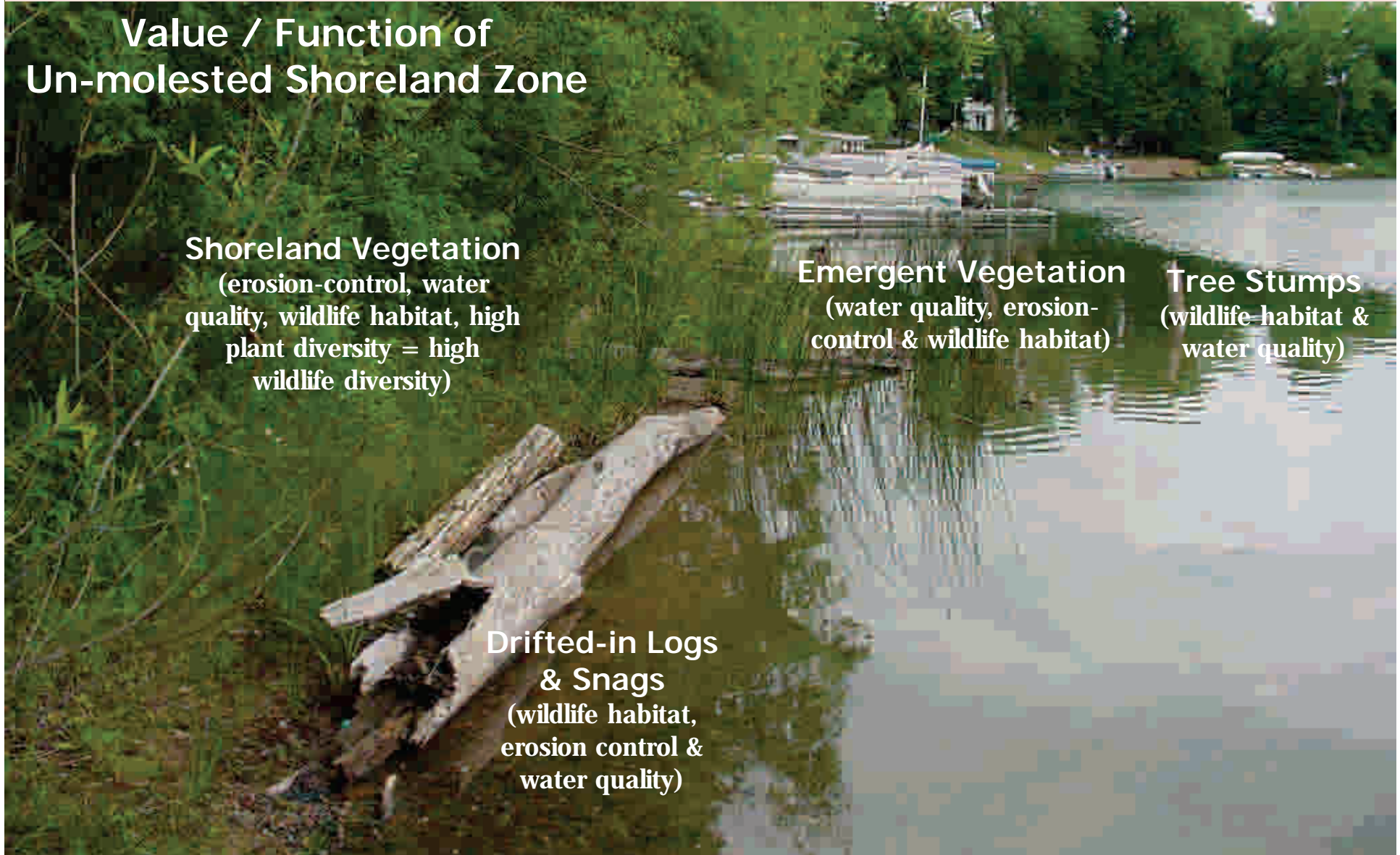
## Value / Function of Un-molested Shoreland Zone

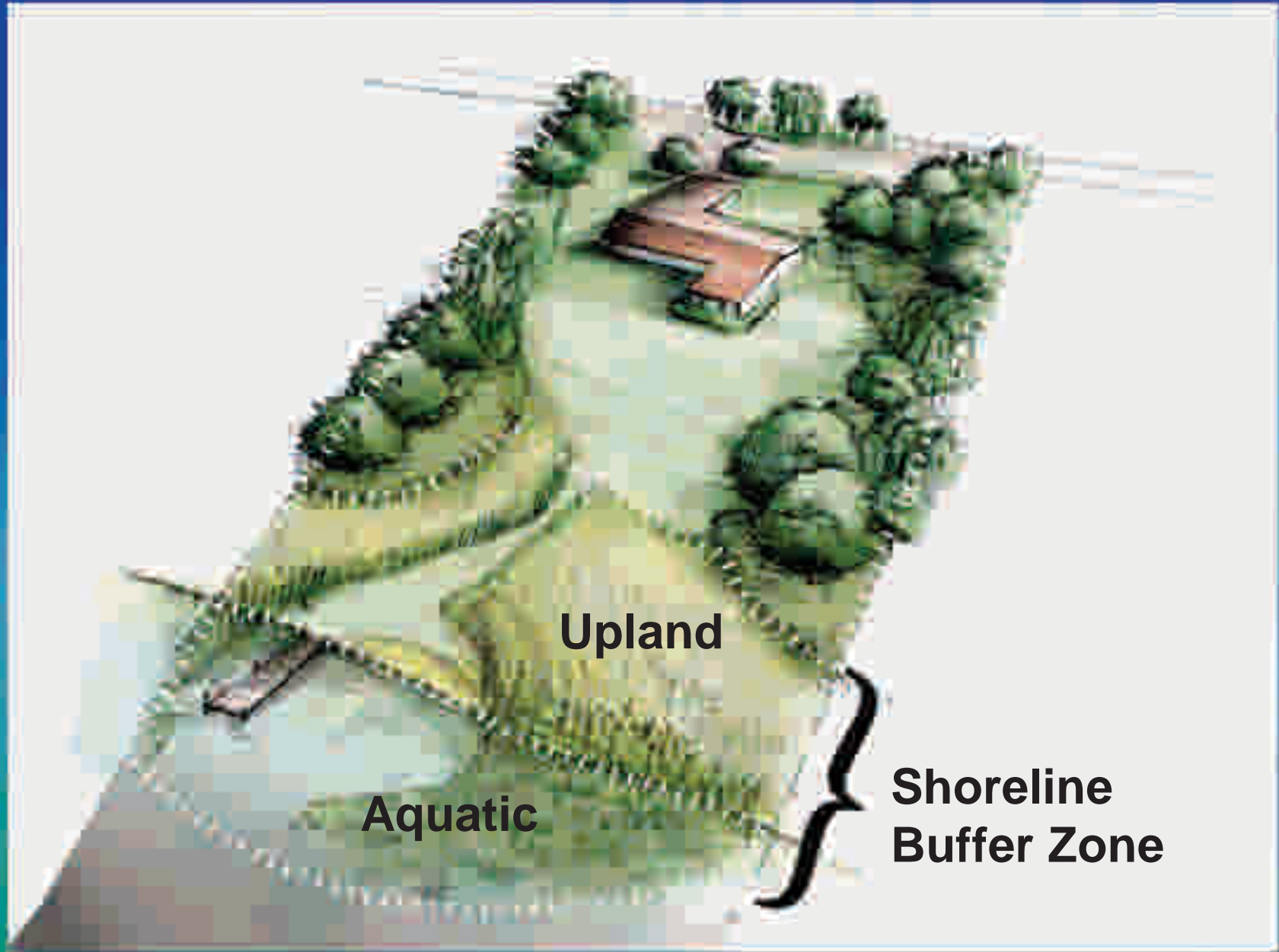
**Shoreland Vegetation**  
(erosion-control, water  
quality, wildlife habitat, high  
plant diversity = high  
wildlife diversity)

**Emergent Vegetation**  
(water quality, erosion-  
control & wildlife habitat)

**Tree Stumps**  
(wildlife habitat &  
water quality)

**Drifted-in Logs  
& Snags**  
(wildlife habitat,  
erosion control &  
water quality)

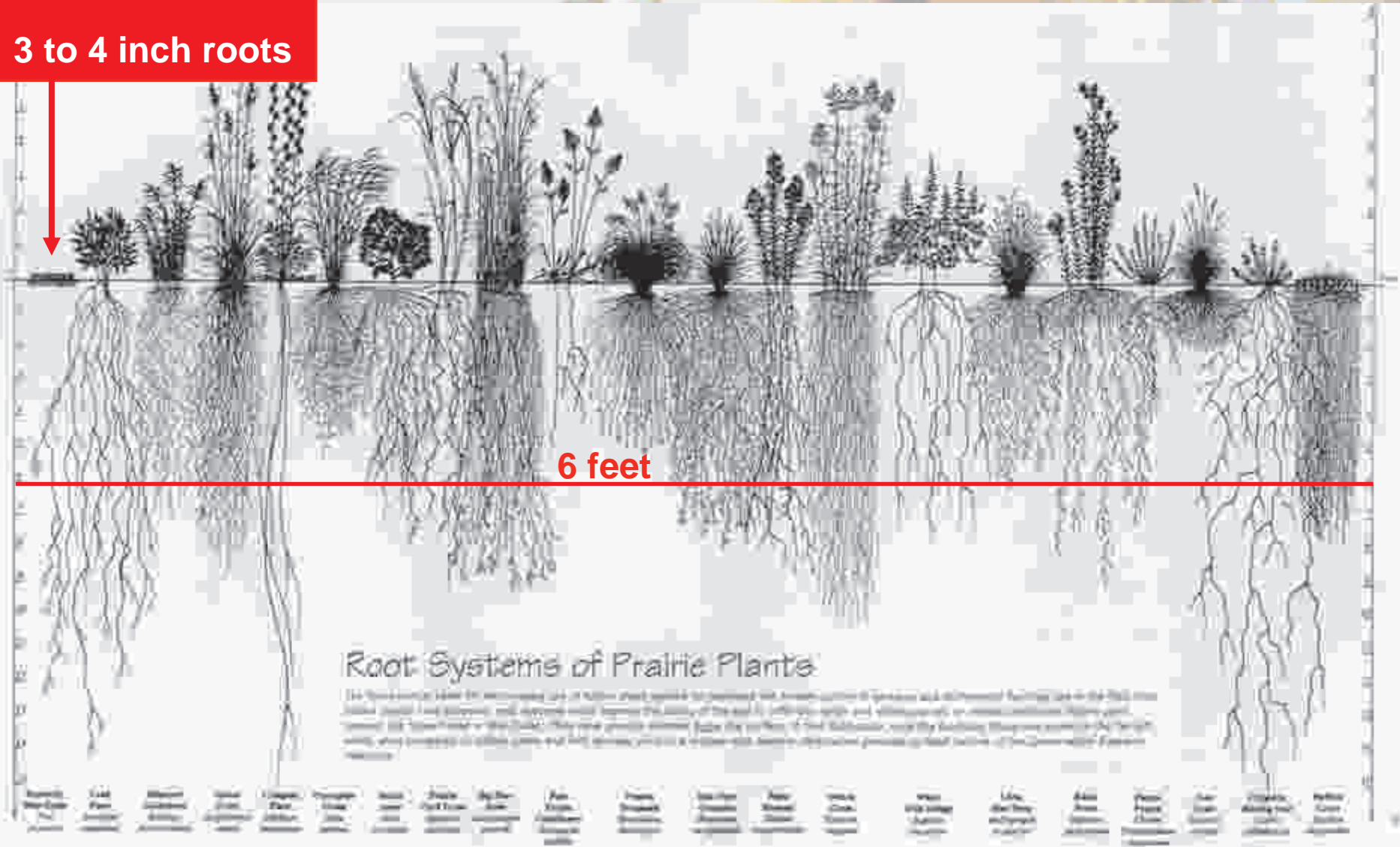






# Why Native Plants?

**Blue Grass**  
**3 to 4 inch roots**



# BENEFITS OF A NATIVE SHORELINE STABILIZATION

- Stabilize shoreline & reduces erosion
- Reduce wave impact
- Reduce impacts from upland runoff
- Traps sediments
- Filter nutrients & pollutants
- Enhances water infiltration and storage
- Increases wildlife habitat
- Acts as a travel corridor for wildlife
- Discourages nuisance levels of wildlife
- Create a natural aesthetic
- Reduces lawn maintenance
- Control insects naturally
- Attracts Frogs, Turtles & Butterflies = Attracts Kids



CMWD



**DO I NEED A BUFFER?**

# HOW WILL I KNOW IF I NEED A BUFFER?



# HOW WILL I KNOW IF I NEED A BUFFER?



# HOW WILL I KNOW IF I NEED A BUFFER?



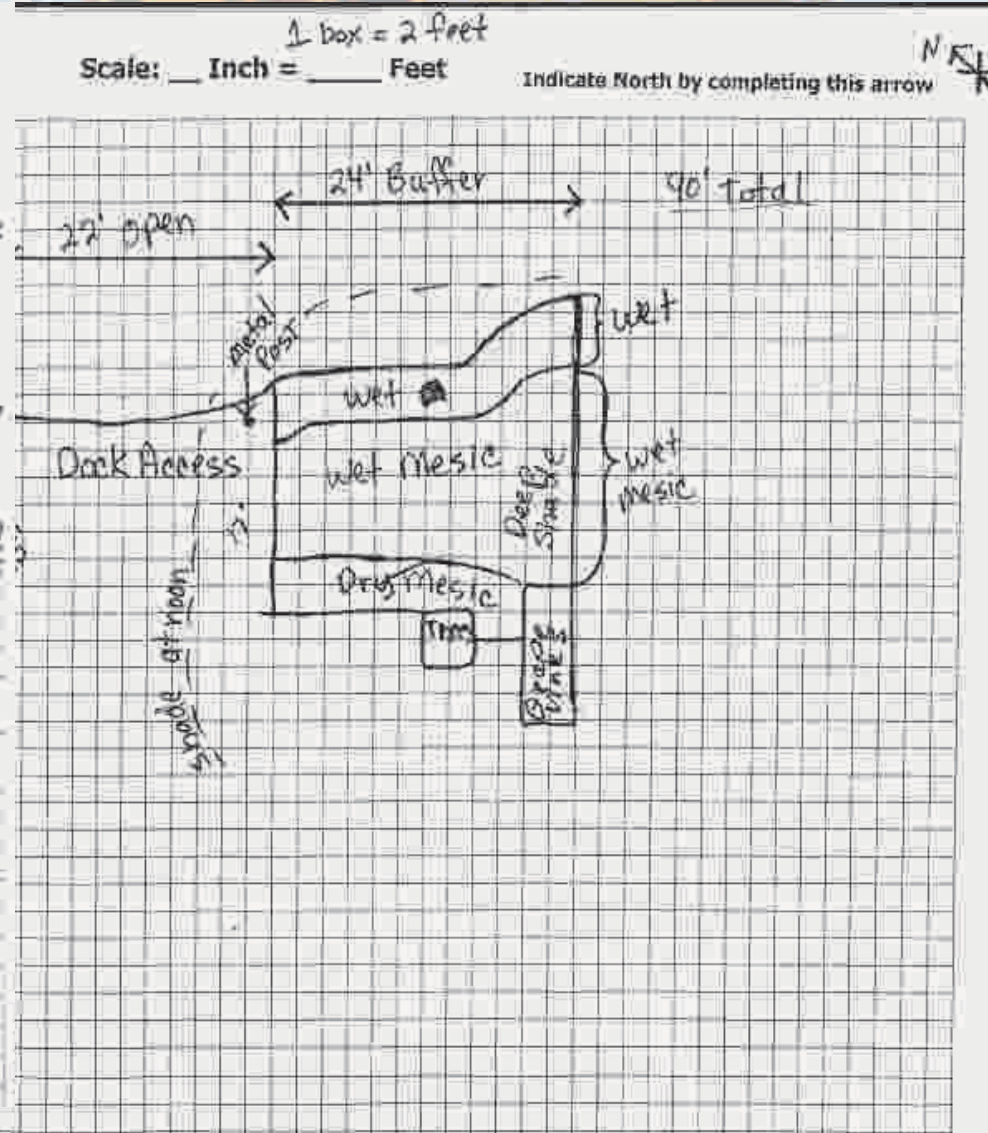
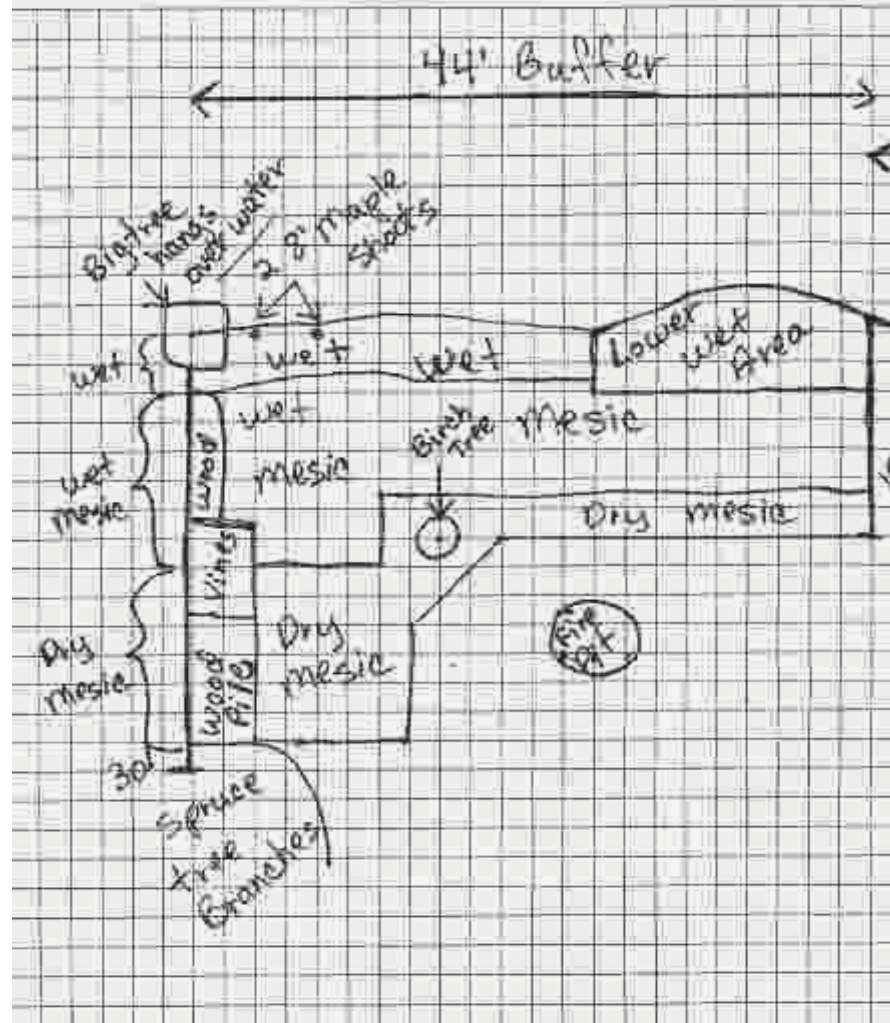
## WHAT TO EXPECT

- **Contact Representative from BLCA or SWCD**
- **Site Evaluation (current and planned design)**
- **Plant Selection & Design (what's your vision?)**
- **Permits**
- **Site preparation**
- **Installation**
- **Maintenance (~3 yrs)**

# Site Evaluation

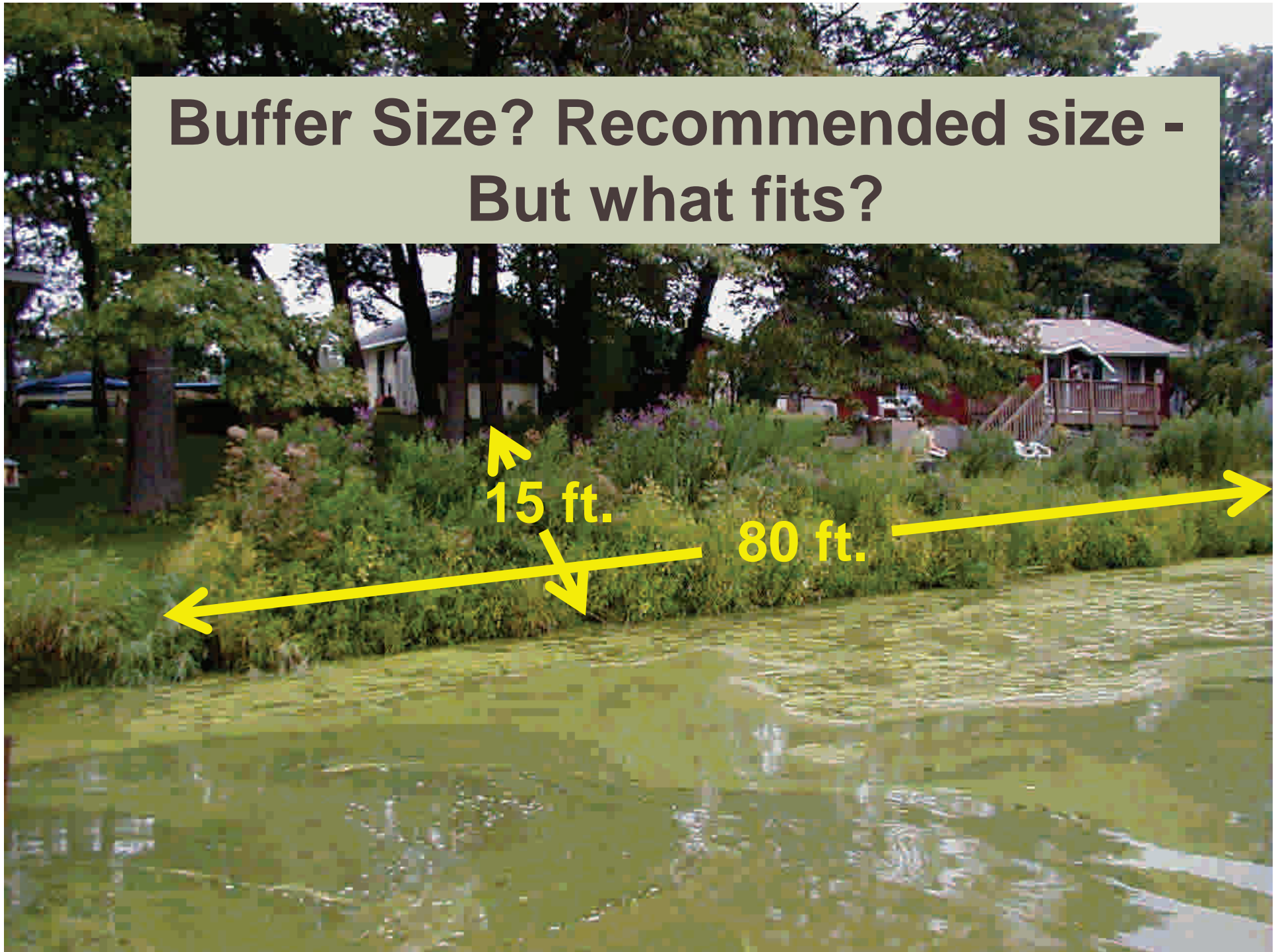
Shoreland sketch (current conditions & your buffer vision)

Shoreline Revegetation Plan - Site Diagram  
 and symbols found on the back of this page to complete the diagram

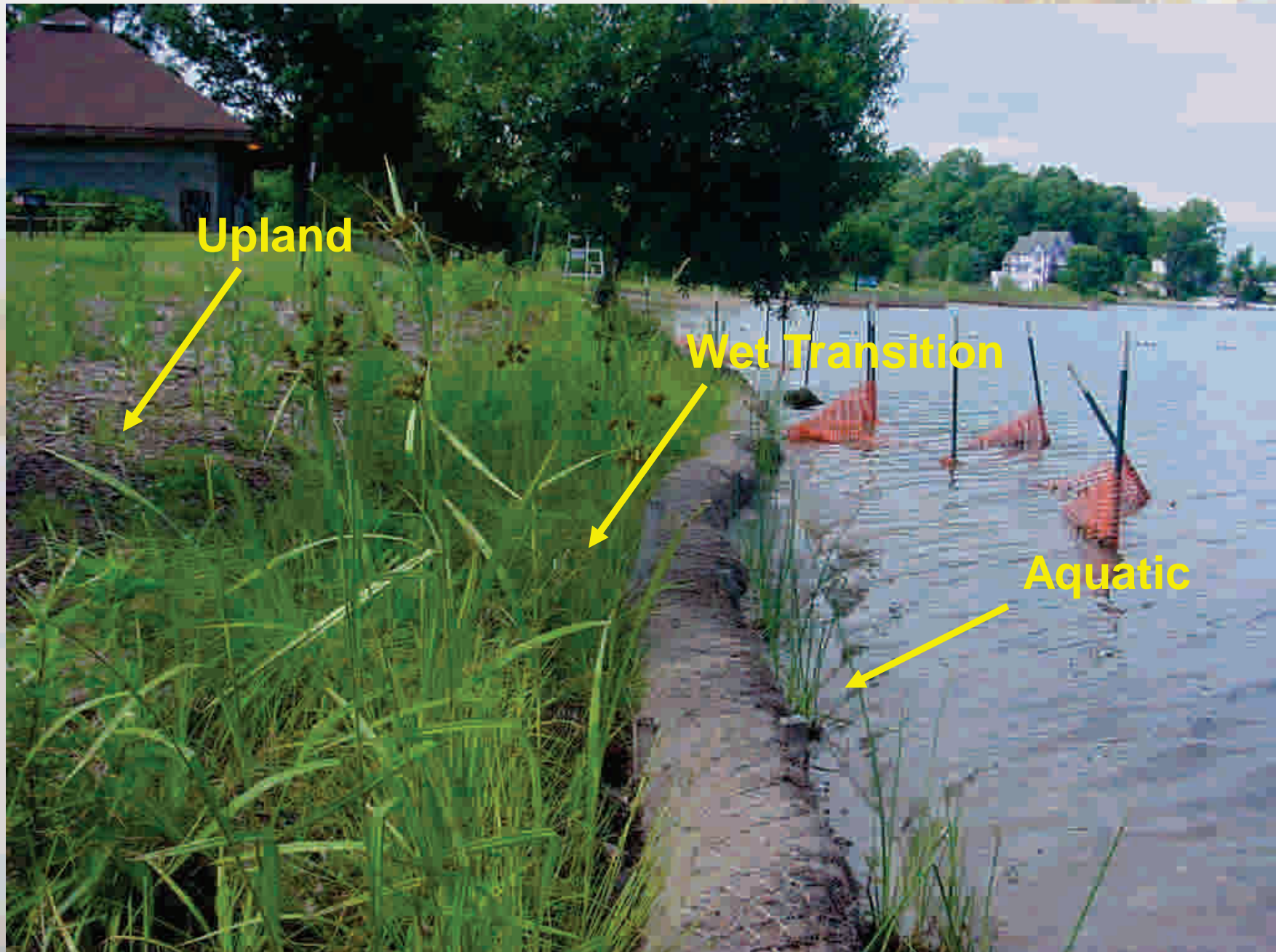




**Buffer Size? Recommended size -  
But what fits?**

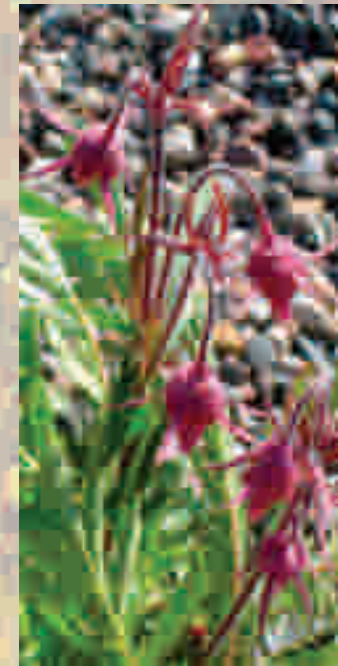
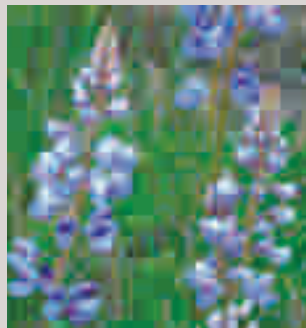


# PLANT SELECTION

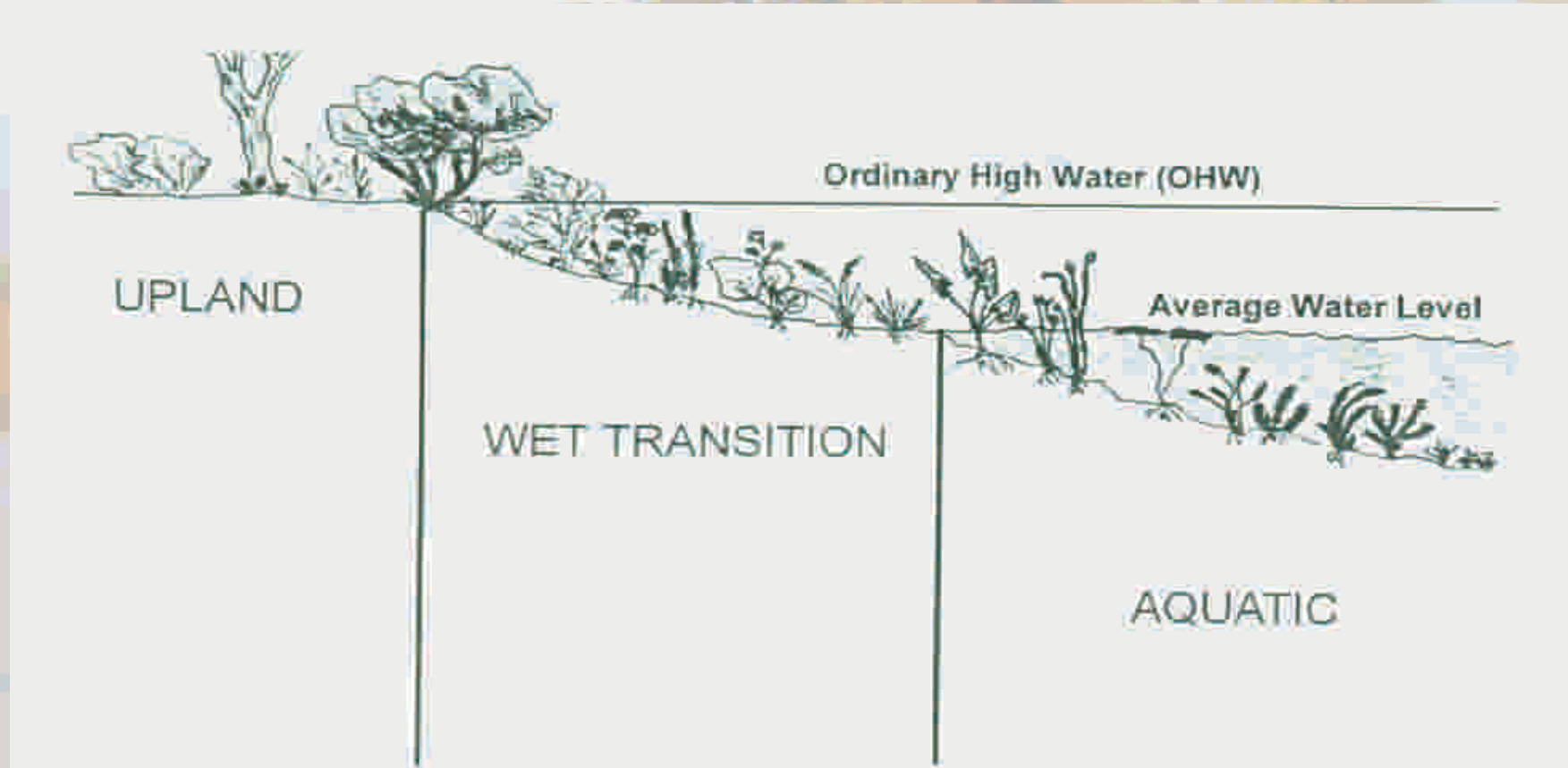


# PLANT SELECTION

- ! A 50/50 mix of grasses/sedges and wildflowers
- ! Inventory the Lakeshore – what native plants are there?
- ! Woody plants should be considered



# PERMITS

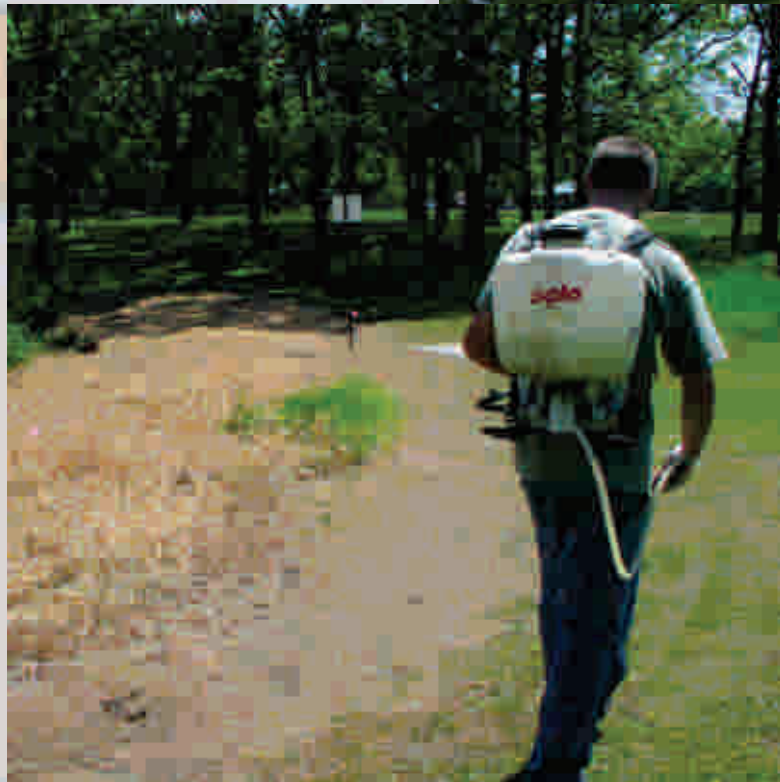


**OHW – The point where vegetation changes from predominantly aquatic to predominantly terrestrial**

# Site Preparation

Eliminate turf grass and non-native vegetation

Glyphosate herbicide – Rodeo required close to water



Apply 2 inches of mulch prior to planting seedling plugs.



# STAKE EROSION BLANKET OVER MULCH IN FLOOD PRONE SHORELAND

straw erosion  
blanket





Planting  
seedling  
plugs



**OR STOP MOWING AND SEE WHAT  
COMES IN**





**A FEW THINGS I KNOW**

# GEESE WILL EAT YOUNG PLANTS



# SO WILL MUSKRATS



# Prairie Cord Grass vs. Reed Canary Grass





# BORDERS

Brick Edging

Designed & Installed by:  
**Natural Shore Technologies**



“Bullet” Edging



Trench-Master  
(Edging Trencher)

**Before**

**Briggs Lake**

**No home for  
wildlife here**



**After**



Phelps, Lake Julia







Schnell, Briggs

Tucker, Big Elk

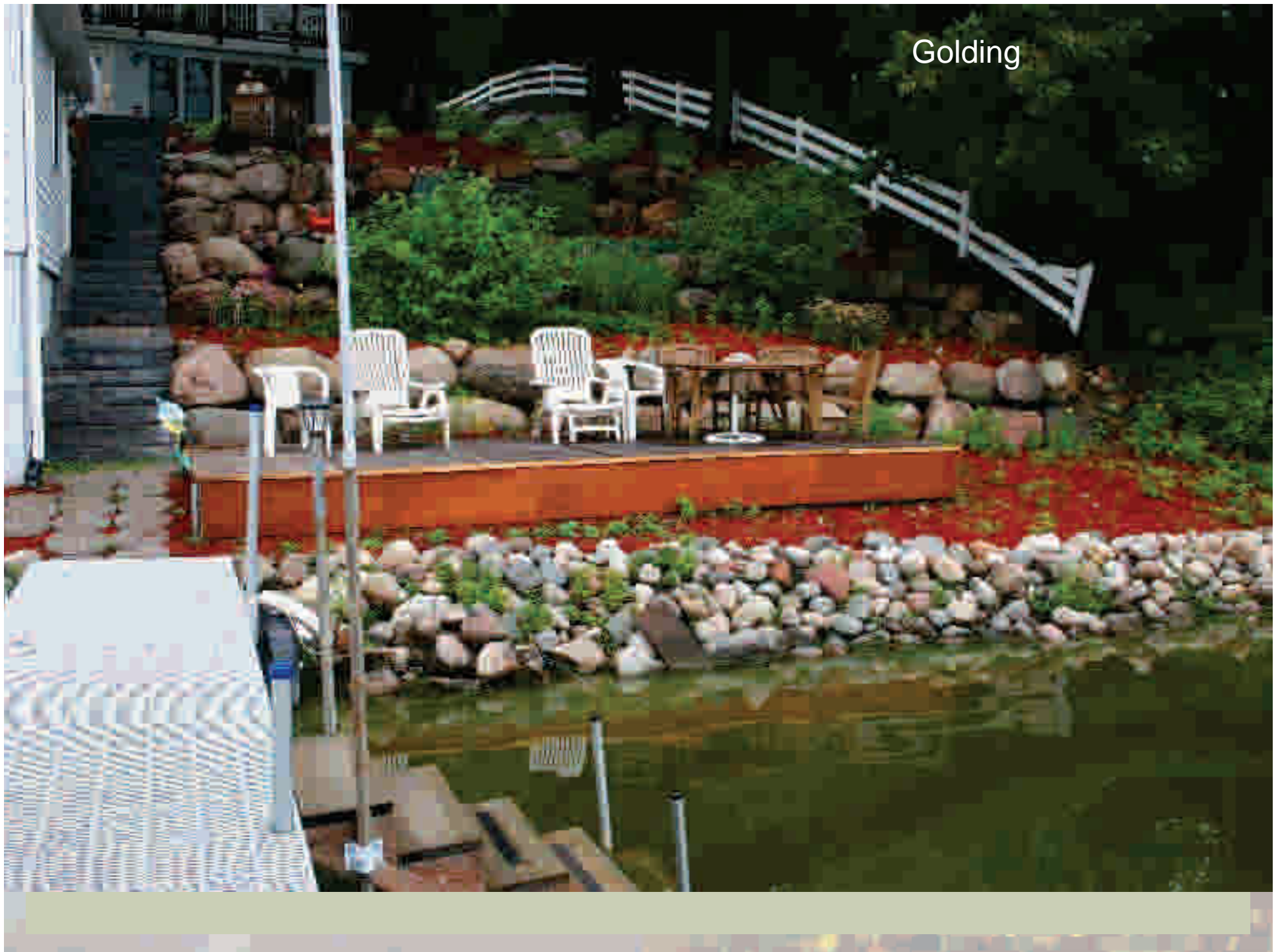


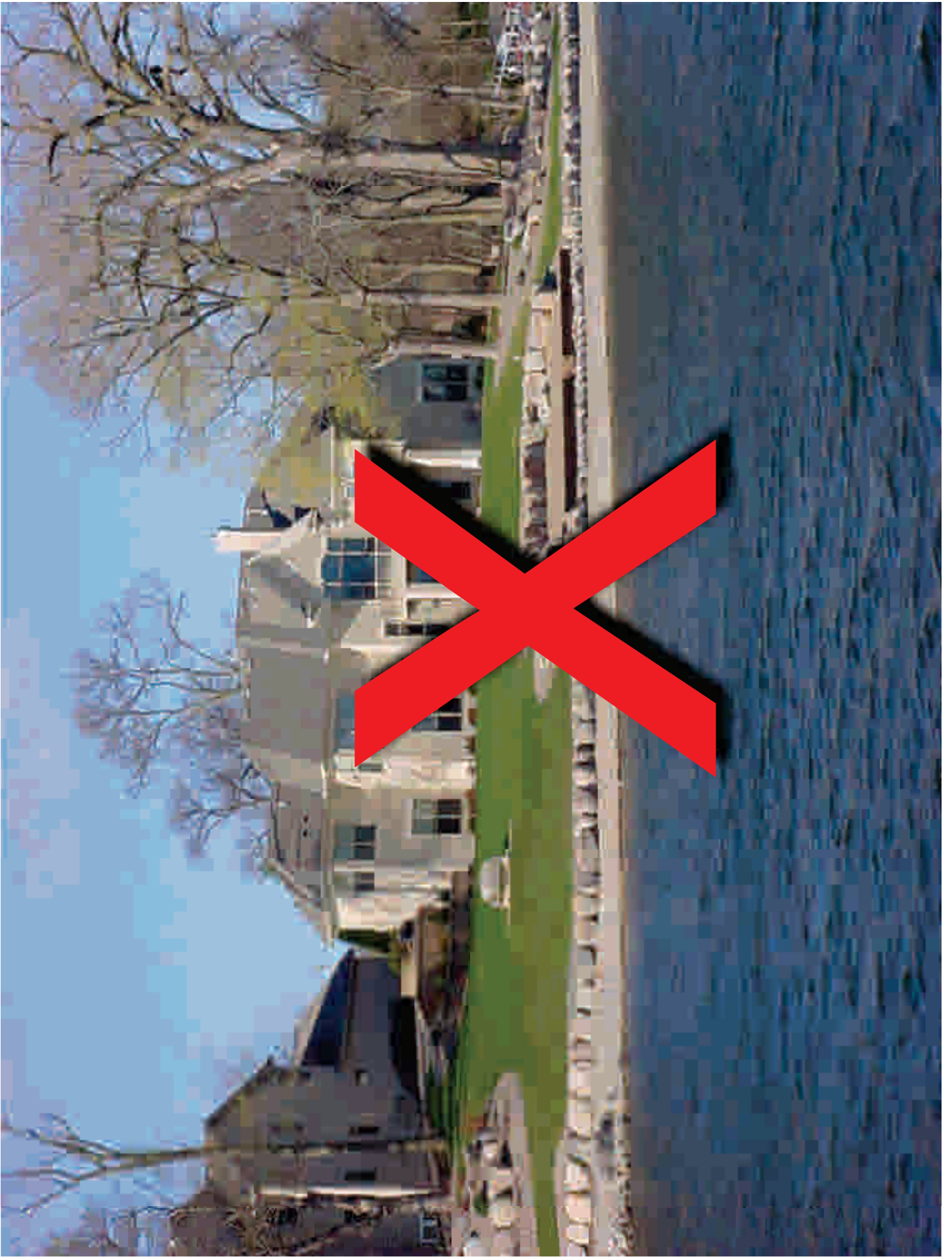
Koontz, Briggs Lake



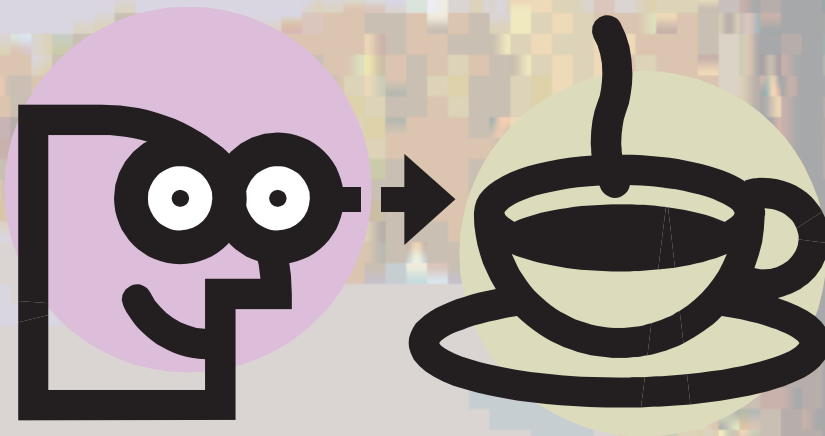


Golding





**MOVING ON....**



# MINIMIZE IMPERVIOUS SURFACE

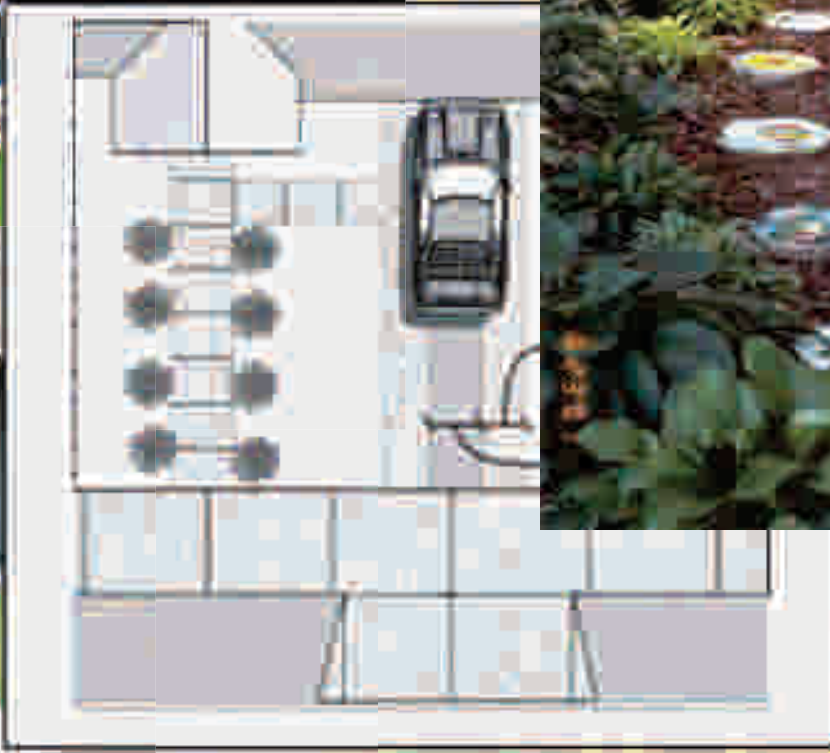


Parcel: 1.1 Acres  
Impervious: .36 Acres  
32% Impervious

**Use Beacon Website**



# PERVIOUS PAVERS/ASPHALT



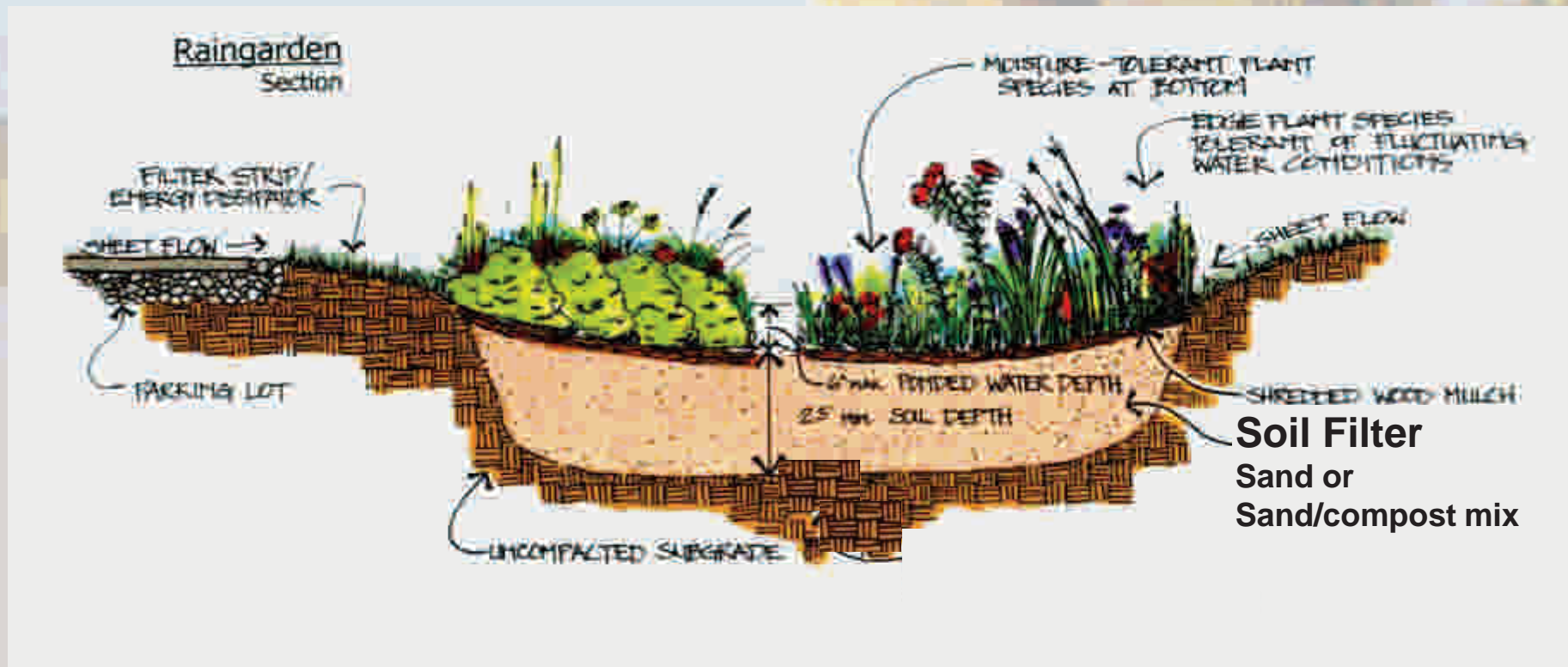


# RAIN GARDENS

- | Natural Landscape Features
- | Captures runoff from impervious surfaces
- | Protects and preserves nearby lakes, streams and wetlands

# Rain garden - Runoff Treatment

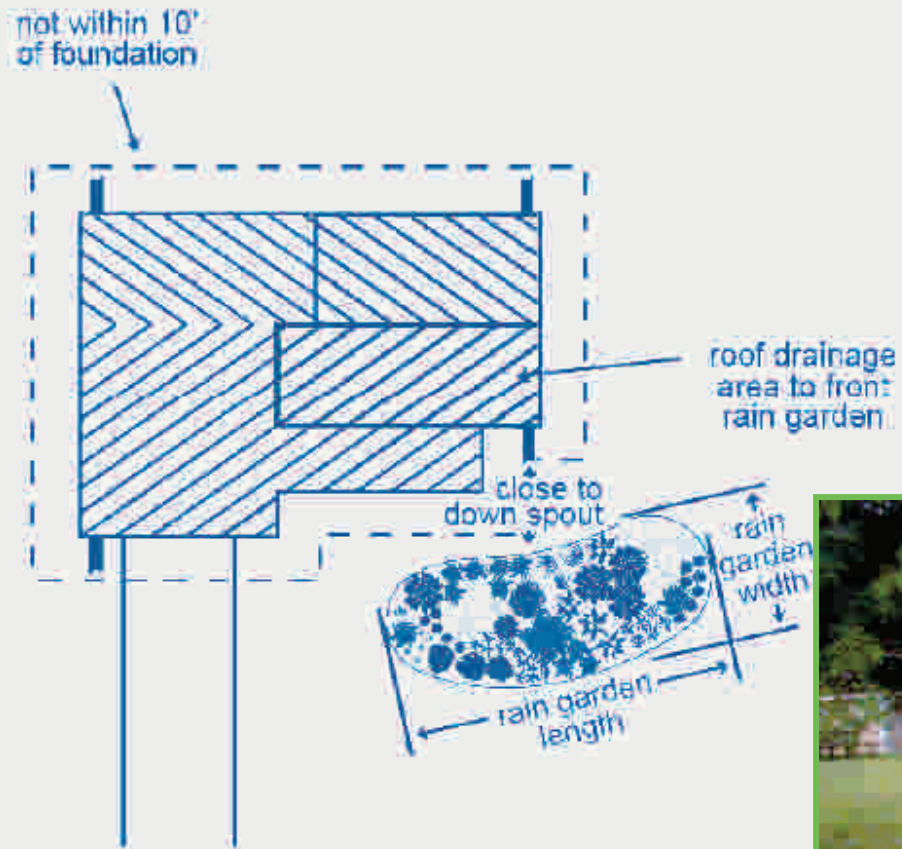
## Evapo-transpiration (Treatment by Plants)



## Infiltration

(Treatment by Plants & Soil Microbes)

# Rain Garden Guidelines

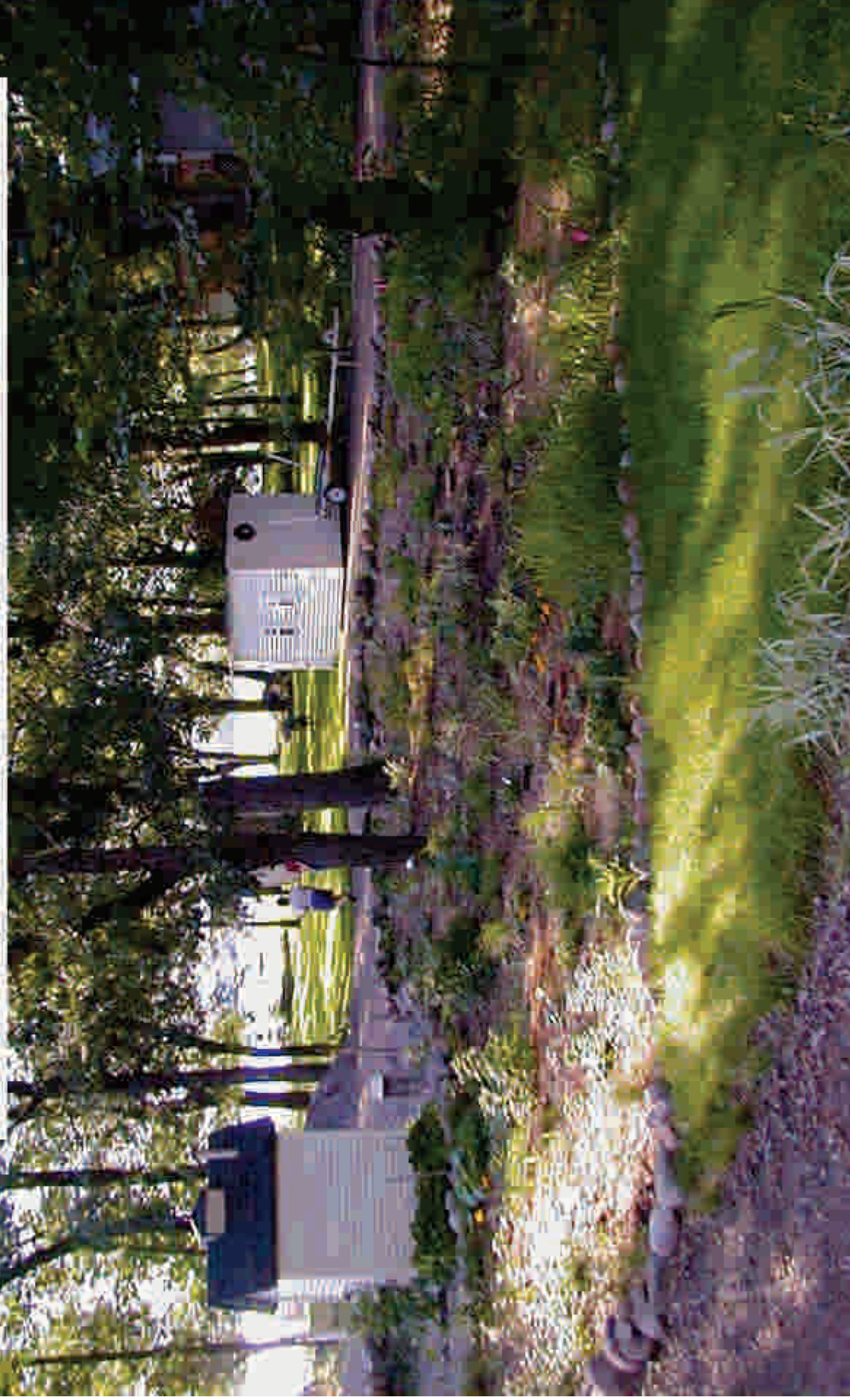


# Filtering sediment - flow over turf



# Tucker Rain Garden – Big Elk Lake

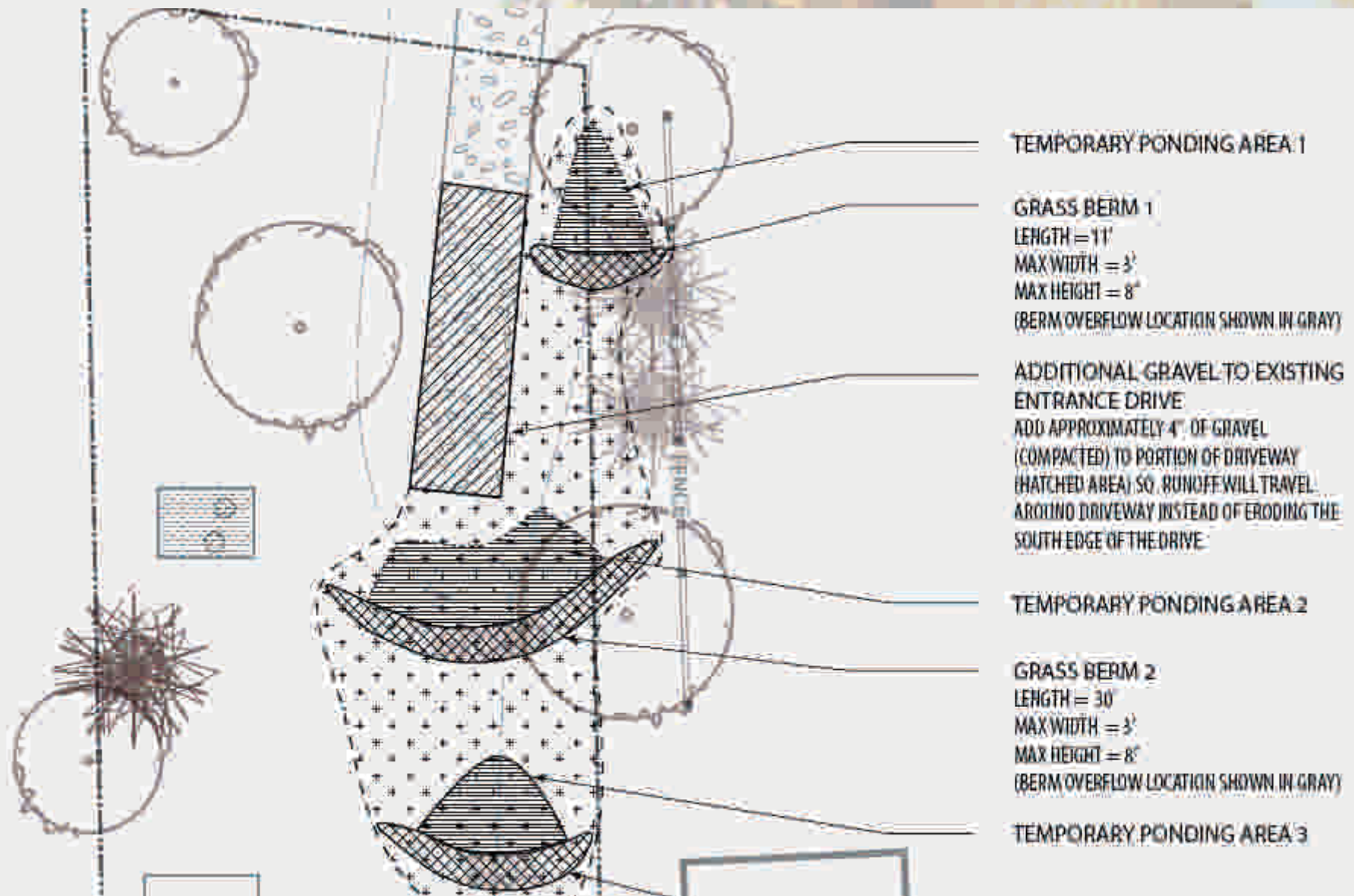
natural depression – no digging due to trees



# BERMS

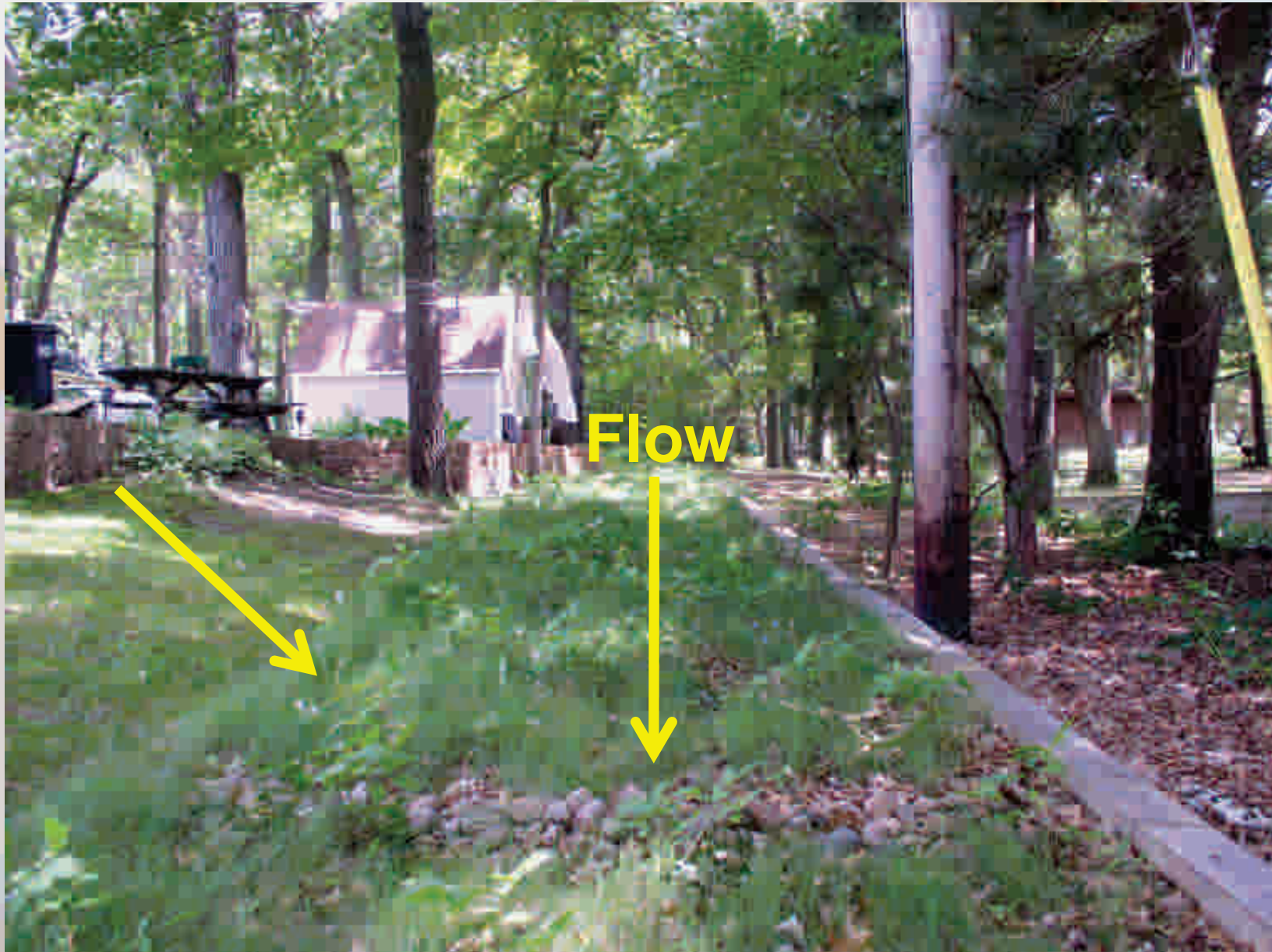


# BERMS





# VEGETATED WATERWAY

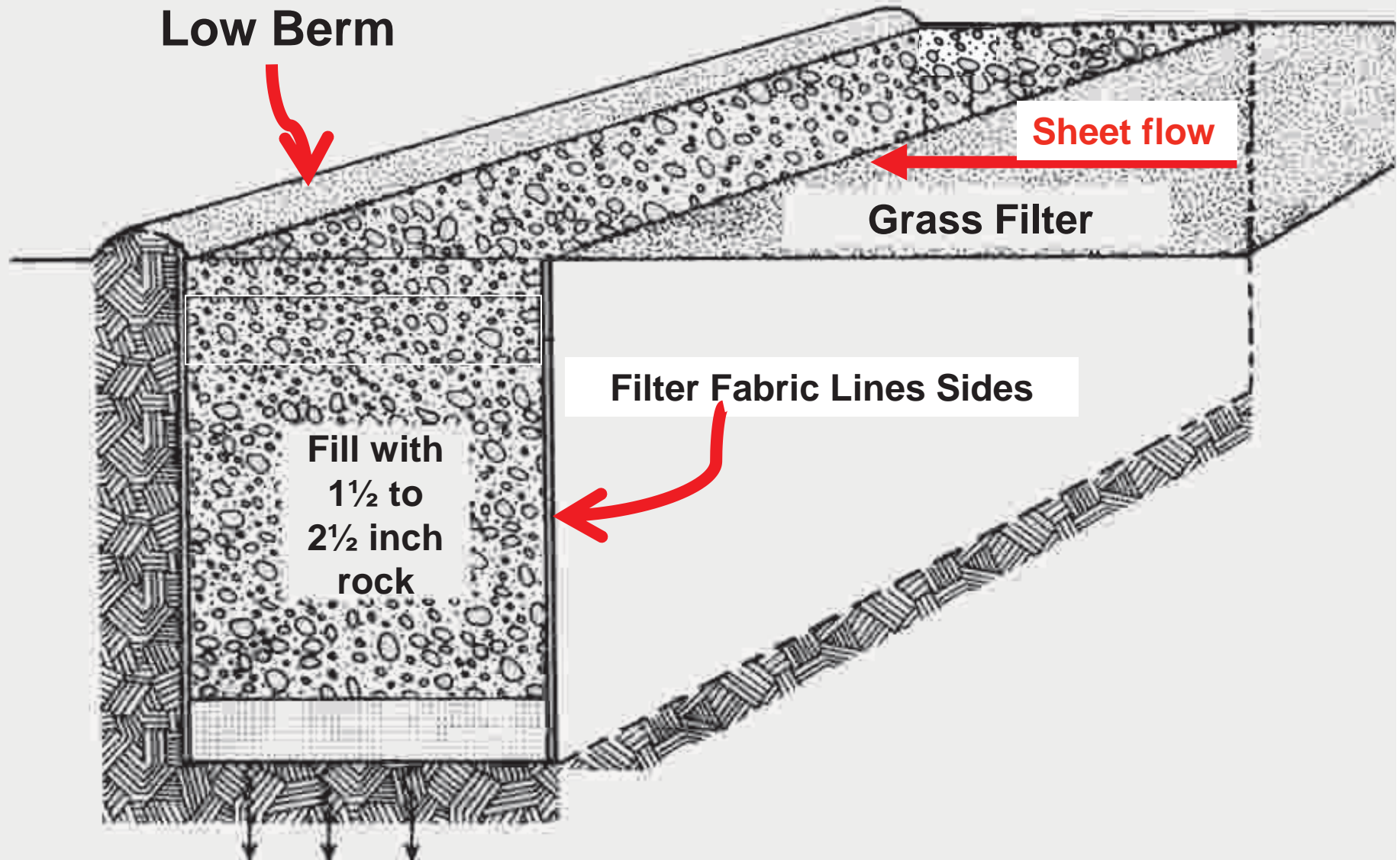


# Filter Strip

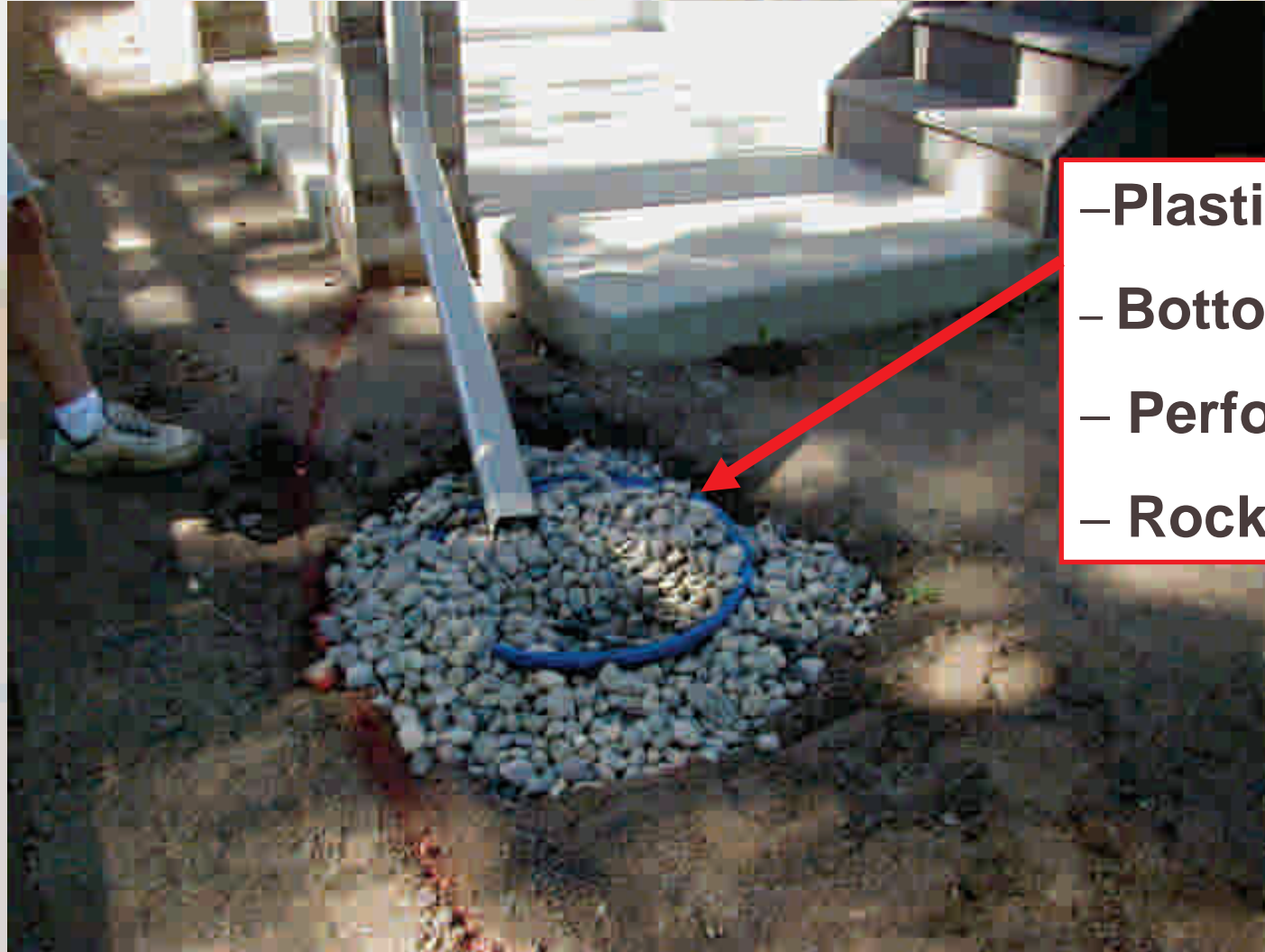


Sheet flow from parking lot

# Infiltration Trench:



# Cistern Example



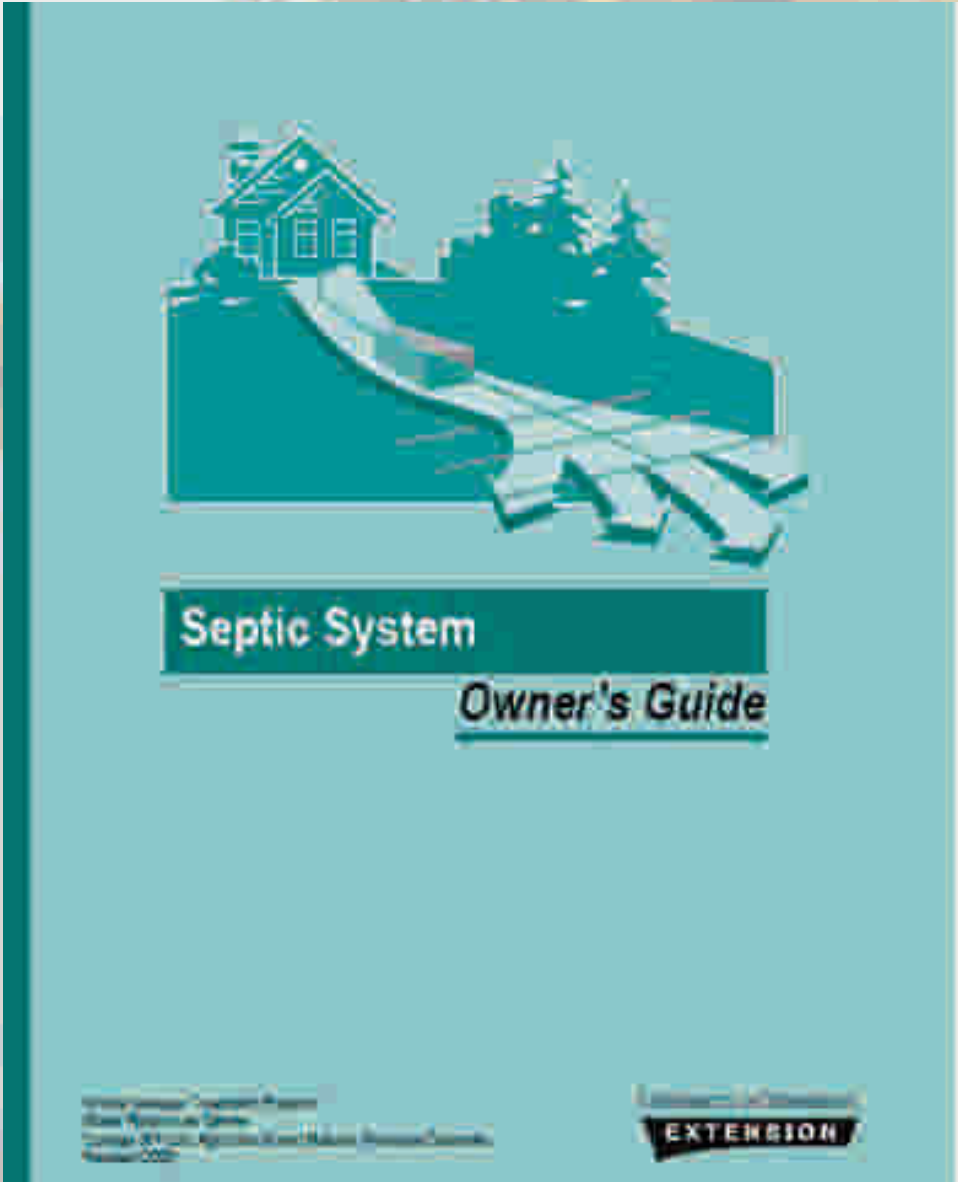
- Plastic Drum
- Bottom removed
- Perforated sides
- Rock filled



# RAIN BARRELS



# SEPTIC SYSTEM MAINTENANCE/UPGRADE



# LOW IMPACT BOATING

- ; **Keep your boat properly trimmed- an engine in the water makes much less noise and creates less wake.**
- ; **Keep your engine well-tuned, it will run more efficiently, pollute less and be quieter.**
- ; **Try an electric motor- it's almost silent and virtually pollution-free.**
- ; **Observe state regulations and be aware of individual, lake specific restrictions**
- ; **What's the hurry? Boating slowly makes less wake, less noise, reduces pollution and is less disruptive to wildlife and other people-plus you'll see more and enjoy the lake longer.**
- ; **When using a motor, stay out of shallow areas where a churned bottom can adversely affect water quality and disrupt vegetation and fish spawning grounds.....**

**U of M Extension: Shoreland Education**

**<http://www.extension.umn.edu/Shoreland/factsheets.html>** (Lake Home and Cabin Kit)

**Tips & Ideas on developing your property**

**[www.lakesuperiorstreams.org](http://www.lakesuperiorstreams.org)**

**Minnesota Shoreland Management  
Resource Guide**

**[www.shorelandmanagement.org](http://www.shorelandmanagement.org)**

**Restore Your Shore**

**<http://www.dnr.state.mn.us/restoreyoursore/index.html>**





Questions???



# Cost Share Available!!!!

**Cost share funds can be used by public or private landowners within Sherburne County to implement projects that assist in one or all of the following:**

- 1) Protect or restore quality of lakes and rivers
- 2) Innovative approaches to treat stormwater at the source

## **Funding:**

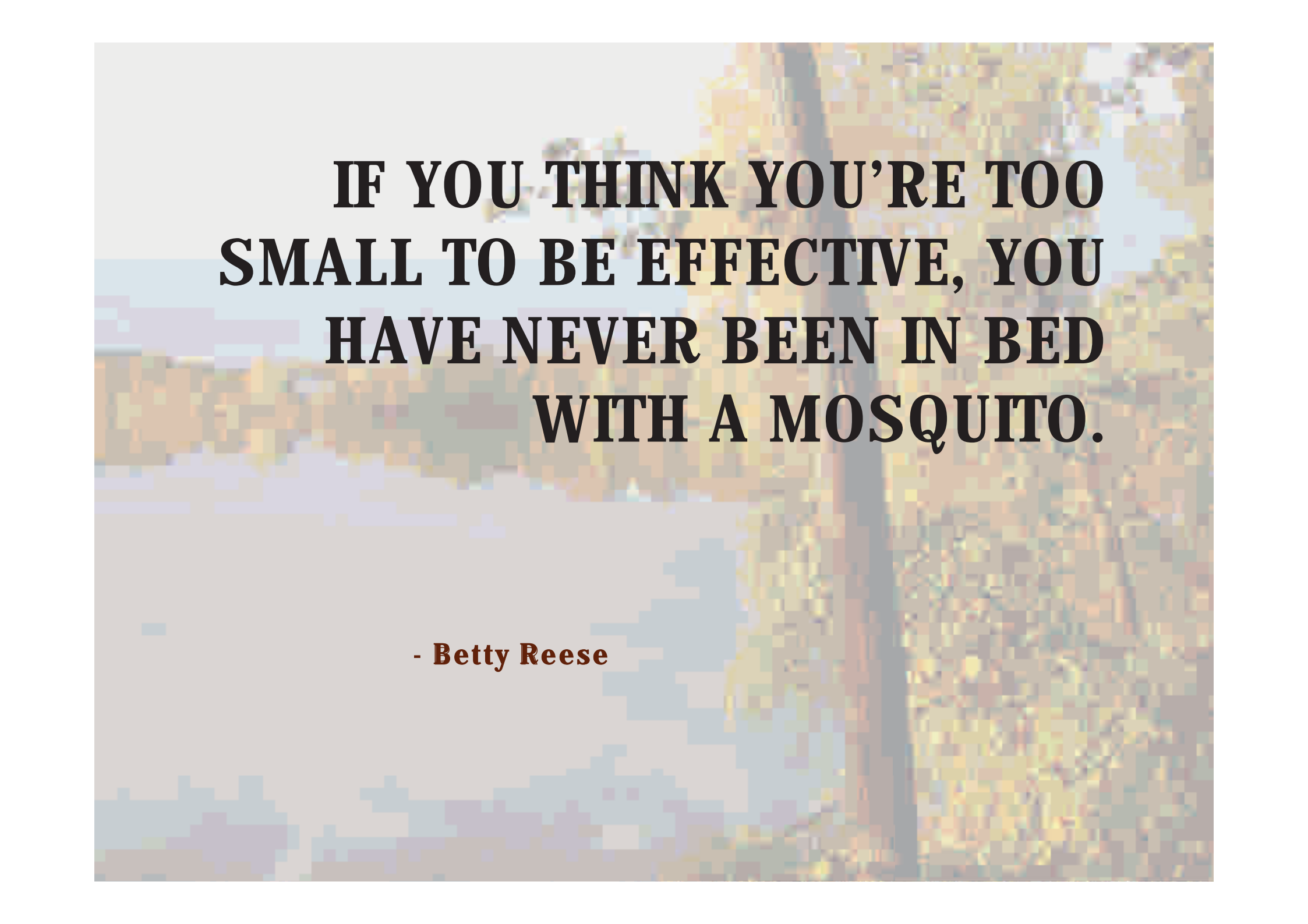
75% match of eligible expenses with a maximum level of \$1,000 per project. In-kind labor done by the home owner can be sued for 25% match at a rate of \$15.00 per hour.

**+ AgBMP  
Low Interest  
Loans for  
SSTS**

**Eligible Expenses:**  
Raingardens  
Shoreline restoration  
Native buffers  
Innovative Stormwater BMPs

# Contact Information

- **Sherburne Soil and Water Conservation District**
  - **14855 Hwy 10**
  - **Elk River, MN 55330**
  - **763-241-1170 ext. 3**
- **[tdeterman@sherburneswcd.org](mailto:tdeterman@sherburneswcd.org)**
- **[www.sherburneswcd.org](http://www.sherburneswcd.org)**



**IF YOU THINK YOU'RE TOO  
SMALL TO BE EFFECTIVE, YOU  
HAVE NEVER BEEN IN BED  
WITH A MOSQUITO.**

**- Betty Reese**

A scenic view of a shoreline. In the foreground, a large, dark tree trunk stands on the right side, with its branches extending towards the center. The background shows a calm body of water reflecting the sky, with a line of trees and vegetation on the opposite shore under a clear blue sky.

## Keeping Our Shores: Shoreland Best Management Practices

<http://www.extension.umn.edu/distribution/naturalresources/components/08307a.html#1>