SHORELAND ADVISORS 101:

Lawns to Lakes: There is a Connection

Working to protect and improve
Hubbard County's lakes and rivers

Karen Terry, Water Resources Educator

29 September 2020

WHAT DO WE MEAN BY "SHORELAND ADVISORS?"

- Coaching program run by Hubbard Co. COLA
- Goal: improve and protect area lakes and rivers by pairing volunteer advisors with property owners
- How? By exploring alternative lawn practices
- Voluntary on both sides

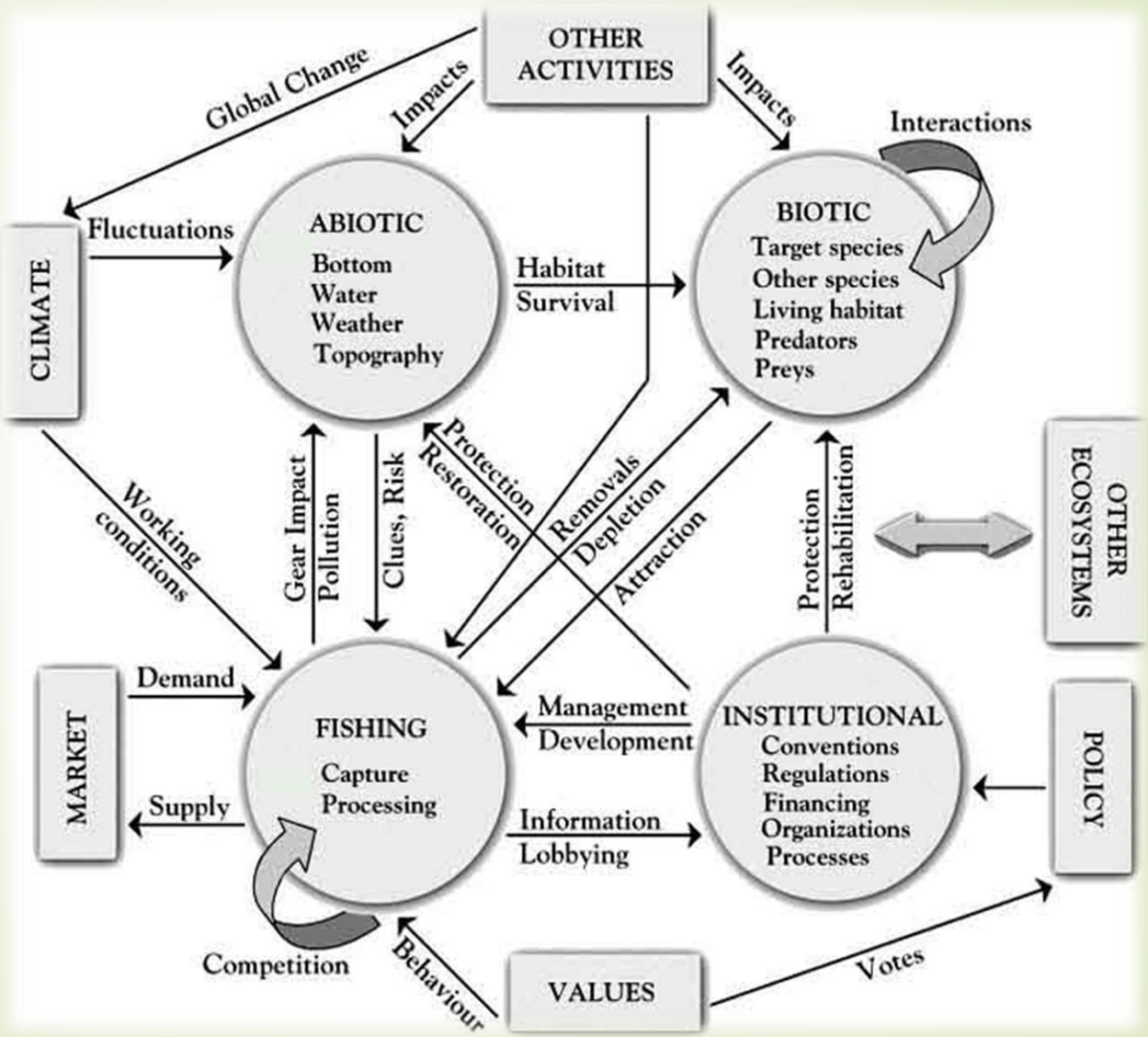
ROLES AND RESPONSIBILITIES

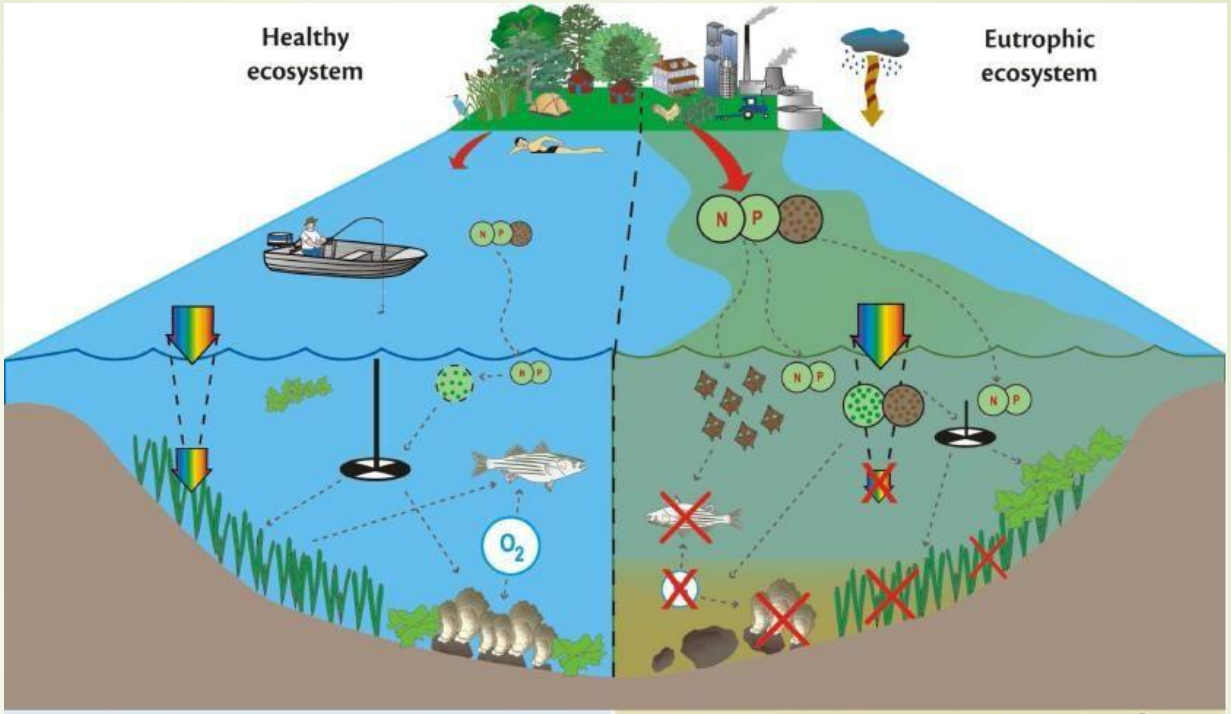
- Sign up with HC COLA
- COLA will connect you with property owners
- Communicate via email first, then meet one-on-one on site
- Provide advice and resources
- Short term commitment

BIG CONCEPTS

- Systems thinking
- Biodiversity
- Cumulative effects

(ECO)SYSTEMS THINKING





In healthy ecosystems, nutrient inputs, specifically nitrogen and phosphorus, occur at a rate that stimulates a level of macroalgal and phytoplankton (chlorophyll *a*) growth in balance with grazer biota. A low level of chlorophyll *a* in the water column helps keep water clarity high, allowing light to penetrate deep enough to reach submerged aquatic vegetation. Low levels of phytoplankton and macroalgae result in dissolved oxygen (O_2) levels most suitable for healthy fish and shellfish so that humans can enjoy the benefits that a coastal environment provides.

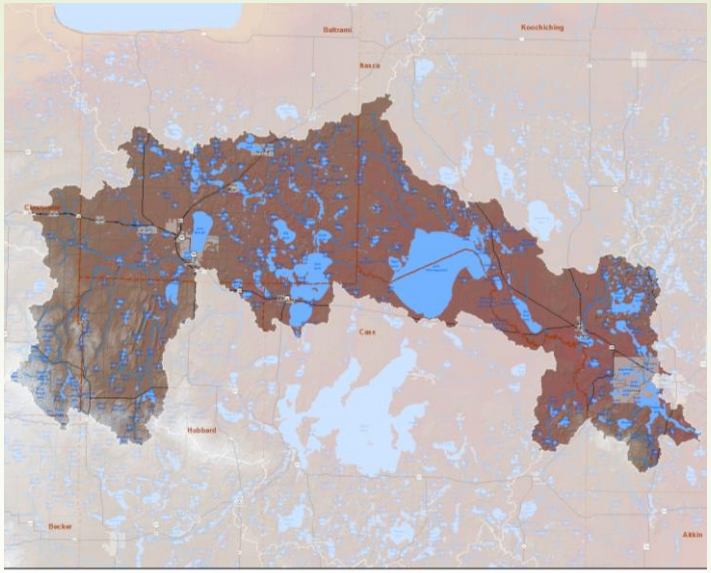
In a eutrophic ecosystem, increased sediment and nutrient loads from farming, urban development, water treatment plants, and industry, in combination with atmospheric nitrogen, help trigger both macroalgae and phytoplankton (chlorophyll *a*) blooms, exceeding the capacity of grazer control. These blooms can result in decreased water clarity, decreased light penetration, decreased dissolved oxygen, loss of submerged aquatic vegetation, nuisance/toxic algal blooms and the contamination or die off of fish and shellfish.

10 Major Basins

80 Major Watersheds

Leech Lake River Watershed

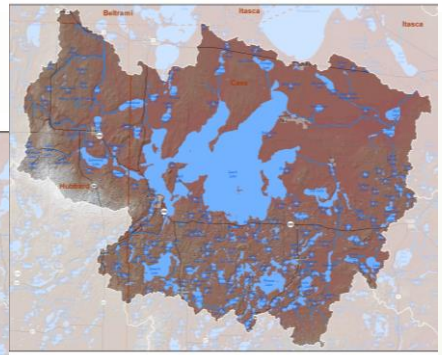
- 854,659 acres
- Includes parts of Beltrami, Cass, and Hubbard counties
- Major cities: Laporte, Benedict, Walker, Federal Dam, Boy River, Whipolt, Longville, and Hackensack and the Leech Lake Reservation (Leech Lake Band of Chippewa)
- 277 river miles and more than 750 lakes equaling 166,374 acres



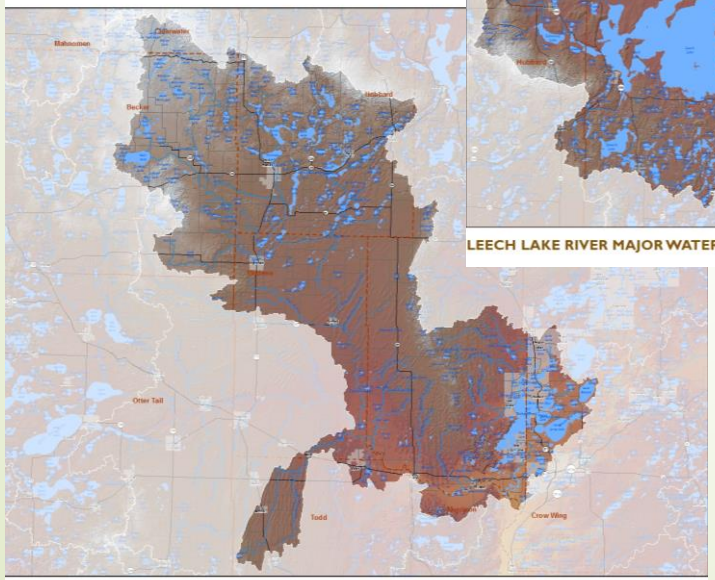
MISSISSIPPI RIVER - HEADWATERS MAJOR WATERSHED

Mississippi River-Headwaters Watershed

- 1,255,105 acres
- Includes parts of Becker, Beltrami, Cass, Clearwater, Hubbard, and Itasca counties
- Largest city: Bemidji
- Other cities in the watershed include Cass Lake and Deer River
- 685 river miles and over 1,000 lakes equaling 180,375 acres



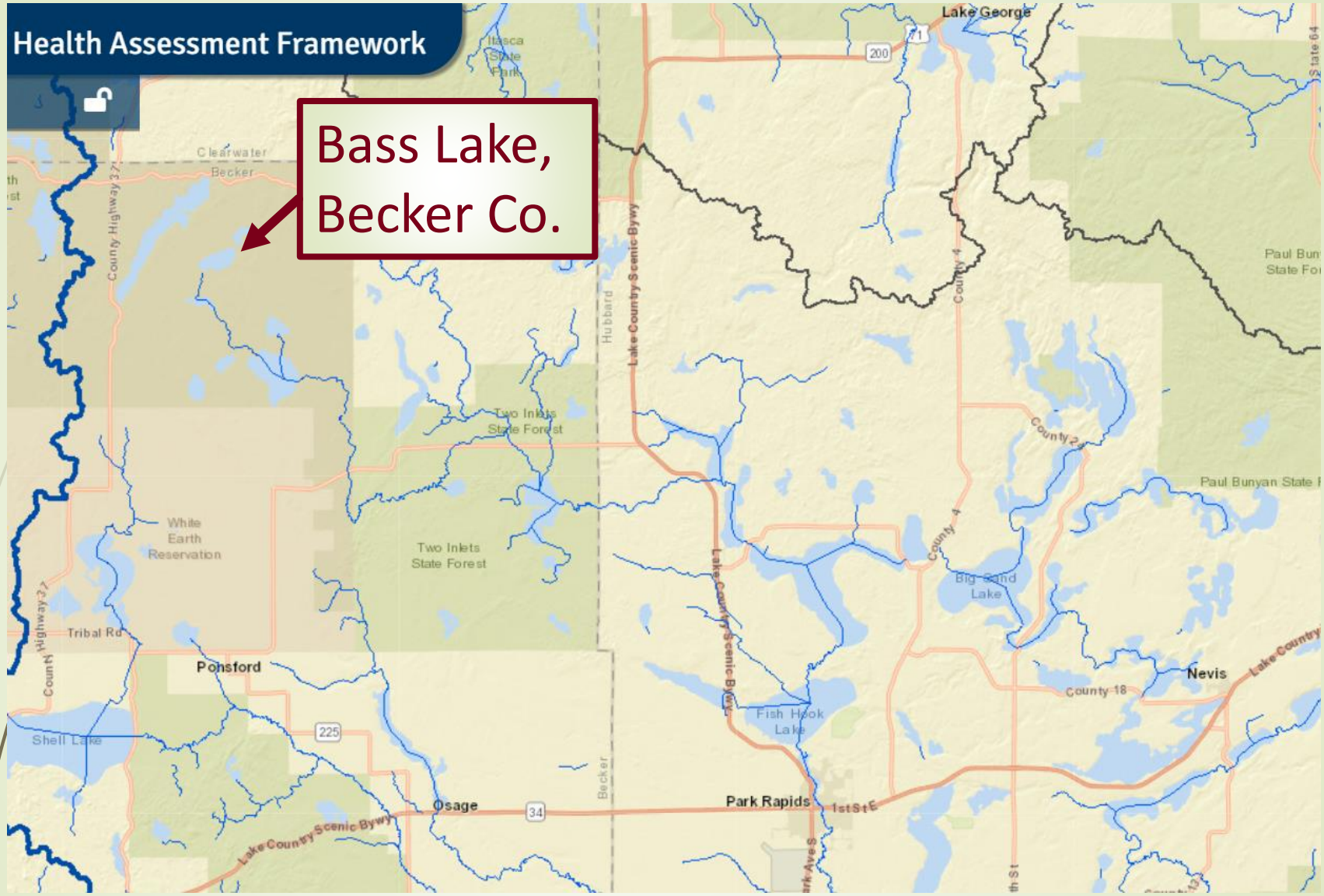
LEECH LAKE RIVER MAJOR WATERSHED



CROW WING RIVER MAJOR WATERSHED

Crow Wing River Watershed

- 1,245,214 acres in size
- Includes all or parts of Becker, Cass, Clearwater, Crow Wing, Hubbard, Morrison, Otter Tail, Todd, and Wadena counties
- Major cities: Park Rapids, Staples, and Nisswa
- More than 627 lakes and 1,653 river miles


Health Assessment Framework
Bass Lake,
Becker Co.
Lake George
Clearwater
Becker
Two Inlets
State Forest
White
Earth
Reservation
Two Inlets
State Forest
Tribal Rd
Ponsford
Shell Lake
225
Osage
34
Park Rapids
1st St E
Fish Hook
Lake
Big Sand
Lake
Nevis
County 18
Paul Bunyan State
Lake Country Scenic Bywy
Hubbard
Becker
County 4
County 2
200
71

CUMULATIVE EFFECTS

Changes to economic, environmental, and social values caused by the combined effect of present, past, and reasonably foreseeable actions or events.

Actions or events can have either positive or negative effects on values.

Contents lists available at ScienceDirect

Ecological Economics

journal homepage: www.elsevier.com/locate/ecolecon

Analysis

The effect of an aquatic invasive species (Eurasian watermilfoil) on lakefront property values

Congwen Zhang *, Kevin J. Boyle

Department of Agricultural and Applied Economics, Virginia Tech, USA

ARTICLE INFO

Article history:
Received 13 February 2010
Received in revised form 16 July 2010
Accepted 10 September 2010
Available online 2 November 2010

Keywords:
Aquatic invasive species
Eurasian watermilfoil
Economic costs
Hedonic property values

ABSTRACT

Invasive species are one of the major threats to ecosystems. One of these "invaders", Eurasian watermilfoil, can crowd out important native aquatic plants, decrease habitat and diversity of native species in a lake, and interfere with water-based recreation. This study uses a hedonic property-value method to estimate the effect of Eurasian watermilfoil on lakefront property values at selected Vermont lakes. Results indicate that as the primary component of total aquatic macrophyte growth in a lake Eurasian watermilfoil significantly and substantially affects lakefront property values. As Eurasian watermilfoil infests a lake, adding to the total macrophyte growth, property values can diminish by <1% to 16% for incremental increases in the infestation level. Hence, policies that successfully prevent infestations have significant economic benefits to owners of lakefront properties and local communities.

Water Quality Affects Property Prices: A Case Study of Selected Maine Lakes

Holly J. Michael
Kevin J. Boyle
and
Roy Bouchard

This study uses hedonic analysis to estimate the effects of a common aquatic invasive species—Eurasian watermilfoil (milfoil)—on property values a
n the northern forest region of W
by recreational boaters, and since boat
ables indicating the presence of milf
g an identification strategy based o
on, results indicate that lakes invaded
e in land values *after* invasion *(JEL Q5*

f Regents of the University of Wisconsi

g this article

amics of the Economic Impacts of an
pirical Analysis
cs February 1, 2019 95:1-18
ull Text (PDF)

Modeling the Property Price Impact of Water Quality in 14 Chesapeake Bay Counties

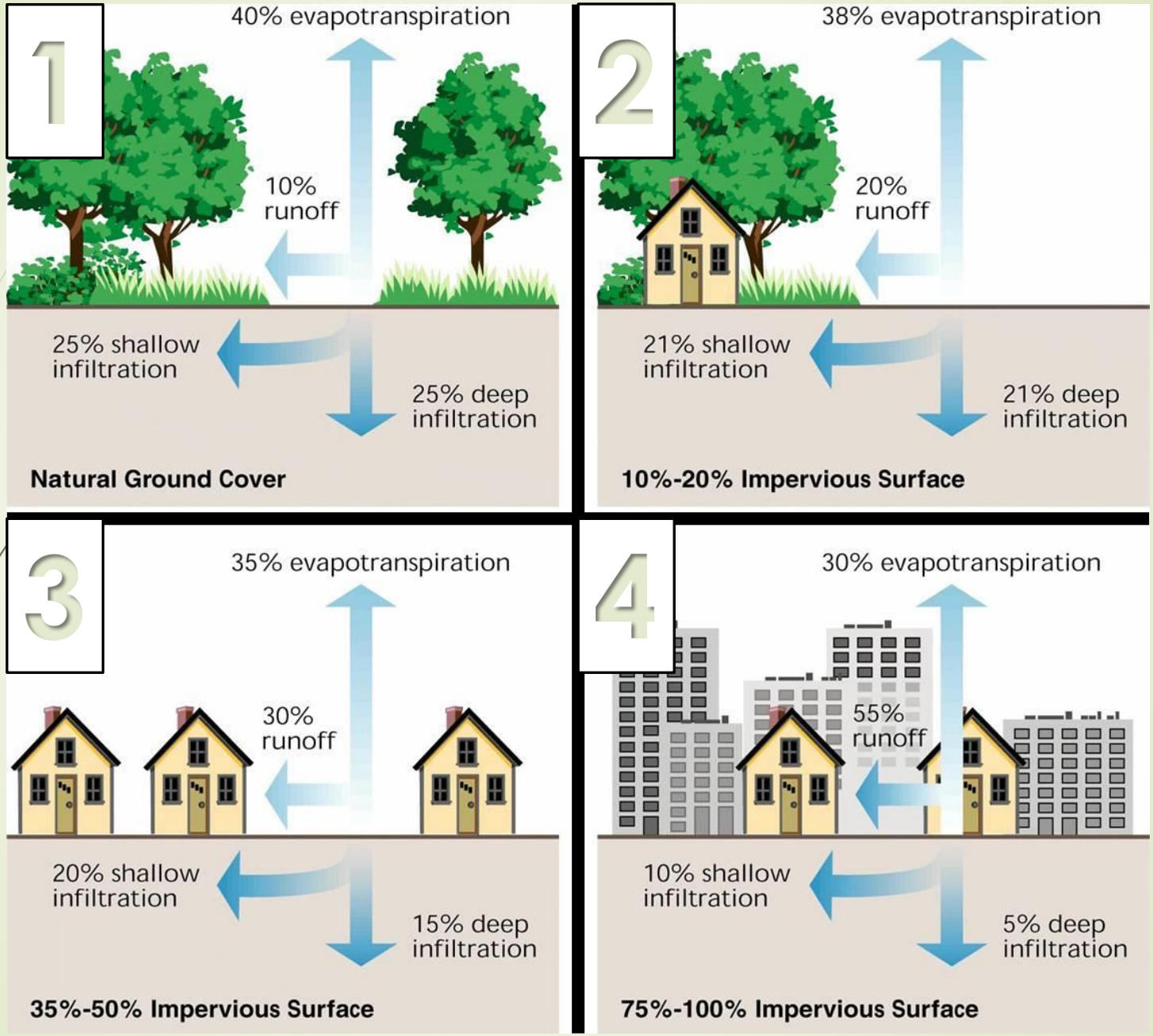
Patrick Walsh, Charles Griffiths, Dennis Guignet, and Heather Klemick

NCEE Working Paper Series
Working Paper # 15-07
December, 2015

"LAKESHORE PROPERTY VALUES AND WATER QUALITY: EVIDENCE FROM PROPERTY SALES IN THE MISSISSIPPI HEADWATERS REGION."

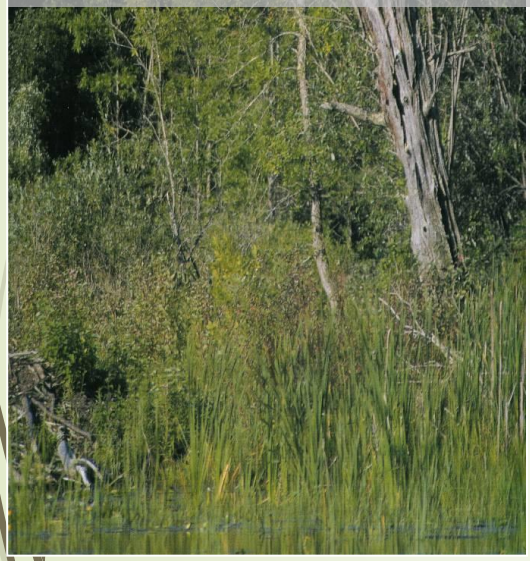
Submitted to the Legislative Commission on Minnesota Resources
By the Mississippi Headwaters Board
and Bemidji State University
(May14, 2003)

BY
Charles Krysel
Elizabeth Marsh Boyer
Charles Parson, Ph D.
And
Patrick Welle, Ph. D


1
40% evapotranspiration
10% runoff
25% shallow infiltration
25% deep infiltration
Natural Ground Cover
2
38% evapotranspiration
20% runoff
21% shallow infiltration
21% deep infiltration
10%-20% Impervious Surface
3
35% evapotranspiration
30% runoff
20% shallow infiltration
15% deep infiltration
35%-50% Impervious Surface
4
30% evapotranspiration
55% runoff
10% shallow infiltration
5% deep infiltration
75%-100% Impervious Surface

Minimize unwanted inputs to the lake

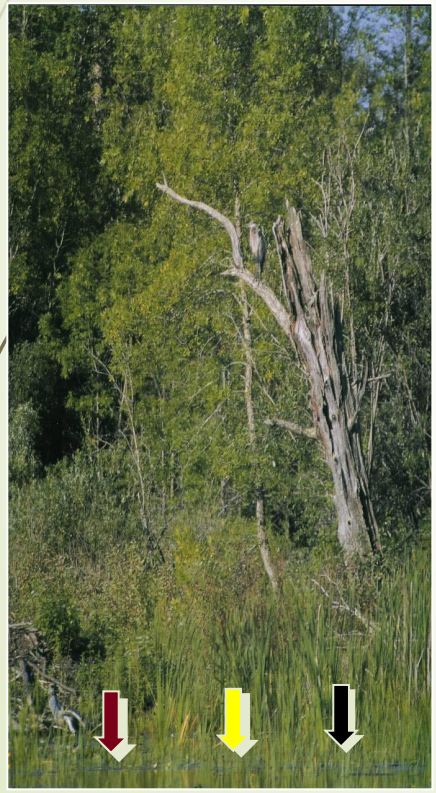
- runoff
- nutrients
- sediment

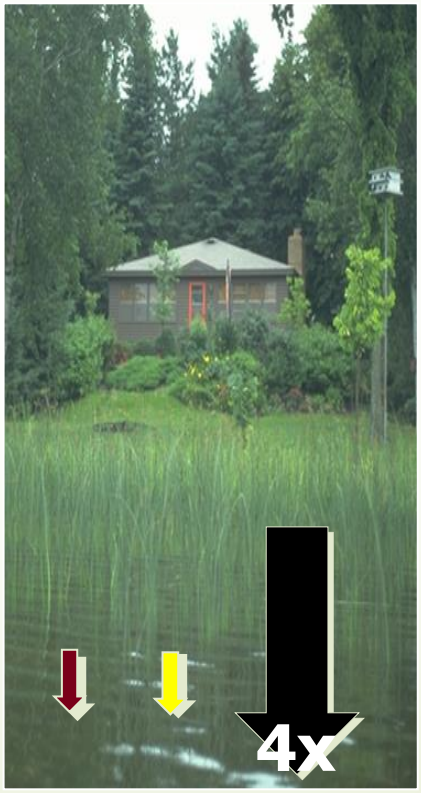


Runoff Volume

Phosphorus Inputs

Sediment Inputs





Slow the water down

Hold it on the landscape

Let it soak in

Use plants to take up the nutrients

The Changing Lakeshore

Keith Manlove - Univ of MN Master Gardener

How did we get here?

Cabin life in MN began in the late 50s.

1954 - 67 Lakeshore cabins in MN increased 88%
Mostly small cabins lightly developed shorelines

1969 MN Shoreland Mg Act Passed
Lot sizes, setbacks, septics

1972 DDT was banned

1967 - 1982 Lakeshore cabins in MN increased 74%
Increase in year-round homes with lawn-to-the-shore landscaping

Continued

1987 Lead Shot is Banned

1989 - MN Shoreland Rules Updated

Inc Ag use, enhanced perf. standards, protections for the shore and bluff zones

1990 - Present

Increase in lakeshore development, (size & qty)

Increase in lake recreation (size & qty)

Decrease in the amount of natural shoreline

Summary

How we use and care for our lakes continues to change

Our lakes are under increased pressure

As we learn more, MN has shown they will take action

2017 DNR introduced the Shoreline Model Ordinance

Increased Shoreline restrictions could be in our future

This is where Shoreland Advisors come in

Comments / Questions

Lakefriendlygardening@gmail.com

Youtube Channel: Lake Friendly Gardening

MEET WITH A LANDOWNER

- During COVID-19
- Walk the property
- Listen to understand their needs and wishes
- Look for changes to their property that will improve/protect the lake
- Provide advice and resources
- You are not expected to be an expert!
- Follow through

WHAT TO LOOK FOR

- Where does the water run?
- Is there erosion?
- Septic issues?
- Types of vegetation? Trees?
- Impervious surfaces?

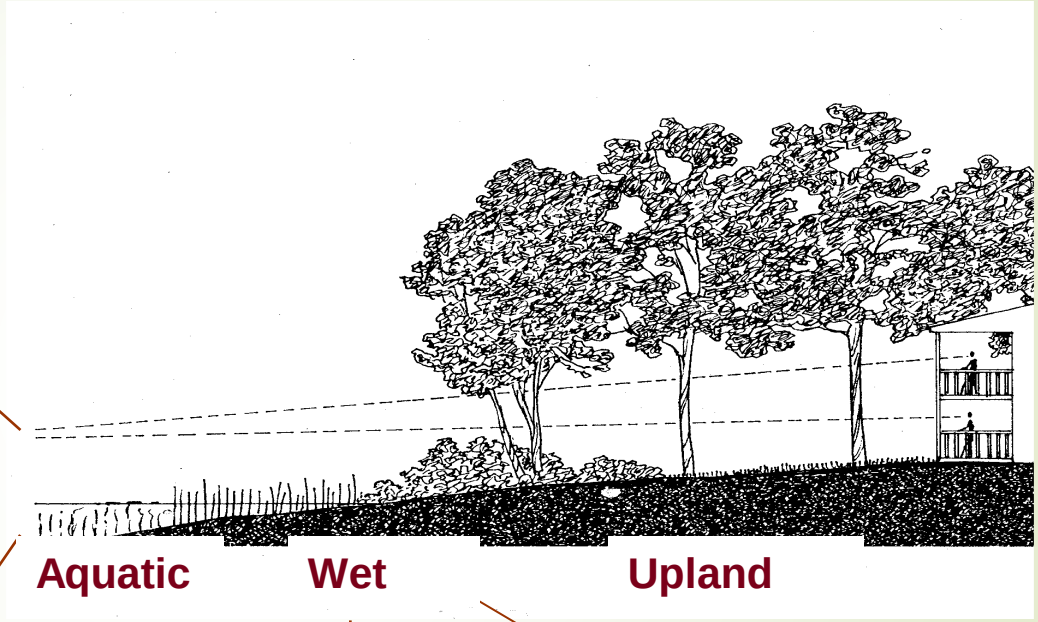
PRACTICES THAT MAY APPLY

- Rain gardens
- Rain barrels
- Shoreline restoration
- Grassed swales
- Pollinator gardens
- Native plants

Intercept the runoff before it reaches the lake

SHORELAND PLANTING ZONES

Line of sight …



Continuously under water. Plants are adapted to survive aquatic conditions.

Seasonally inundated and/or near the water table. Plants will tolerate "wet feet" for part/all year.

OHWL

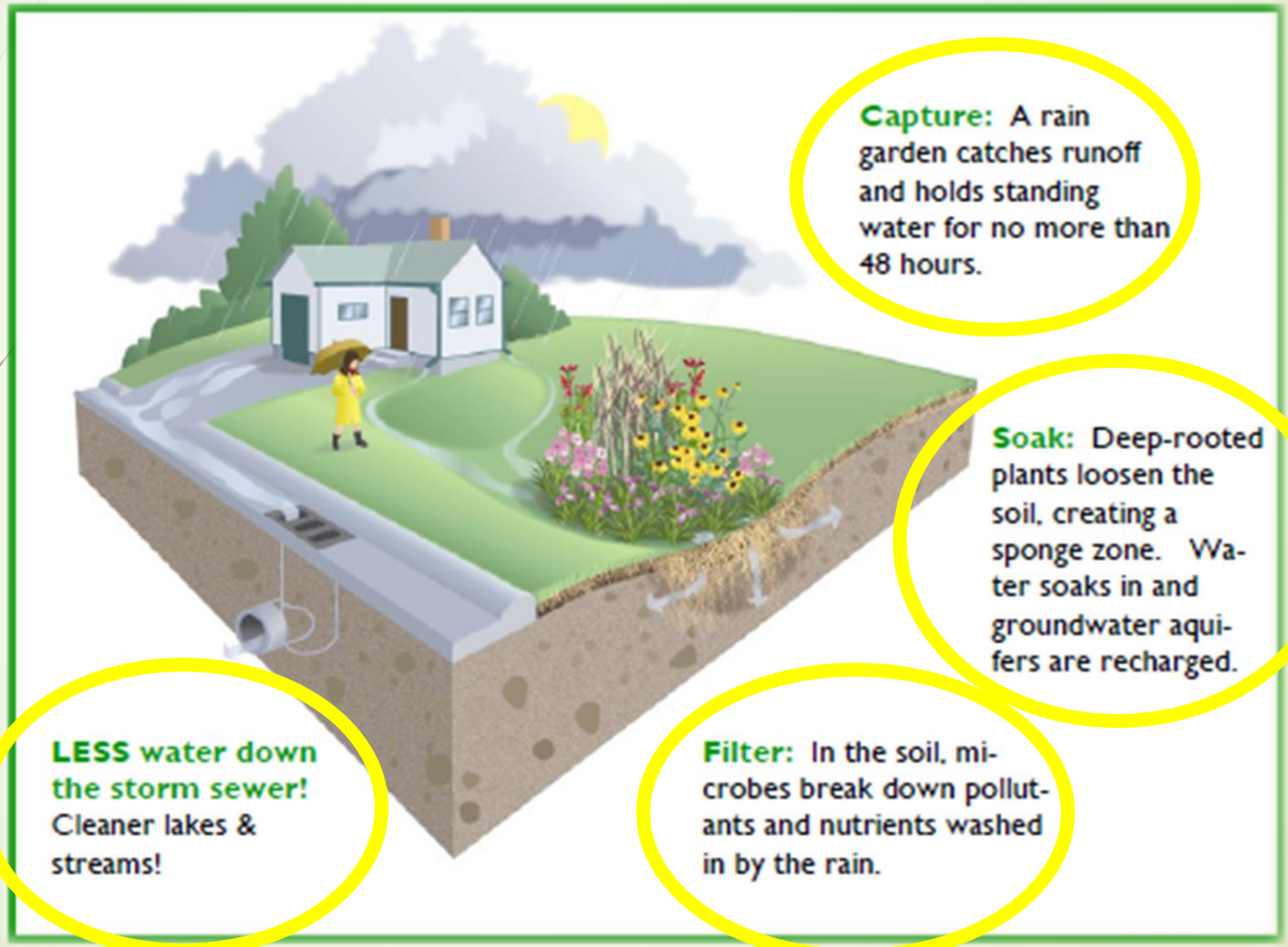
WHAT IS A RAIN GARDEN?

…. A landscaped area designed to collect rainwater and snowmelt, allowing water and pollutants to be absorbed into the soil and by the plants.

a.k.a.

- Infiltration basins
- Bio-retention basins

WHAT IS A RAIN GARDEN?



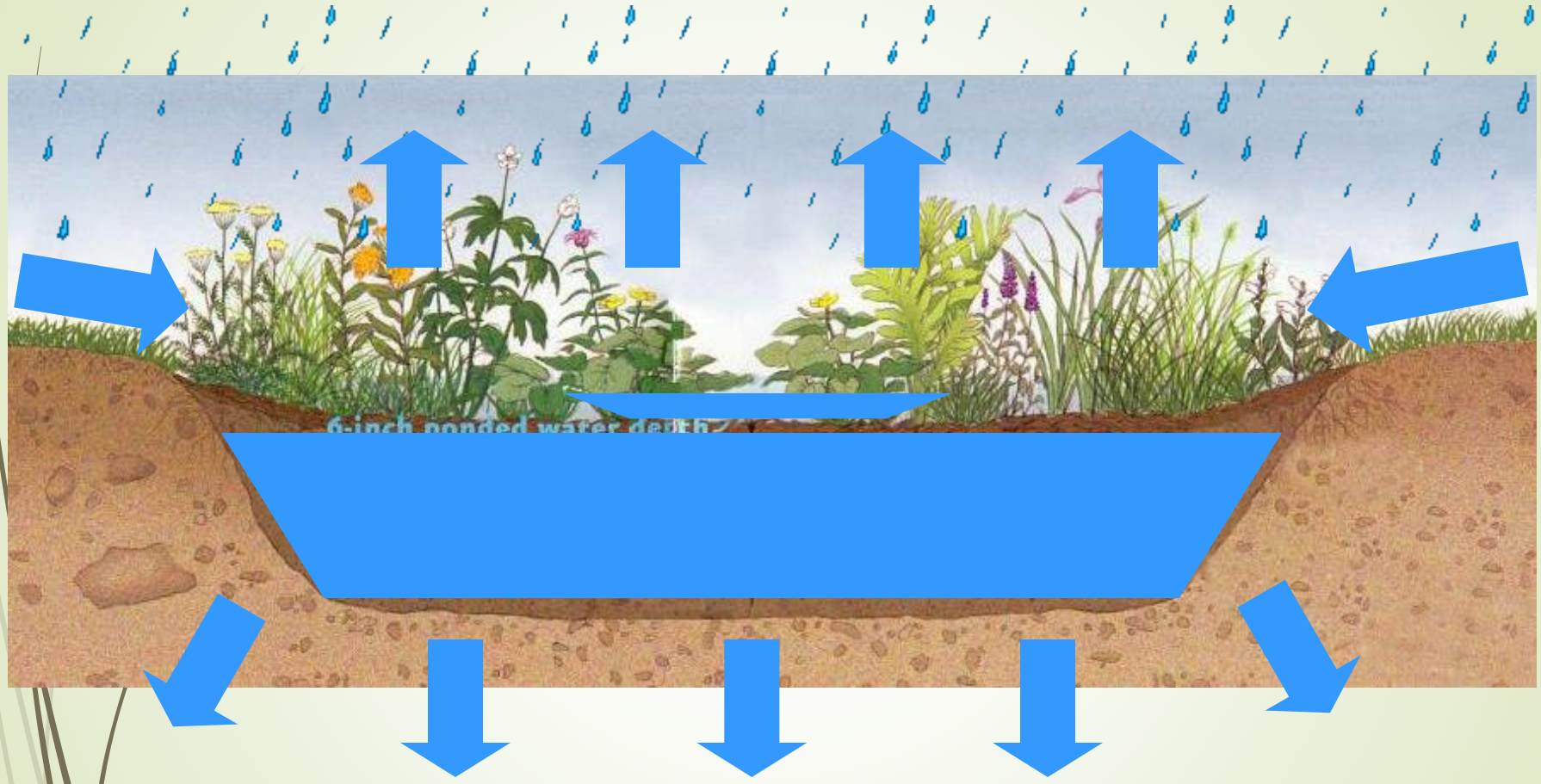
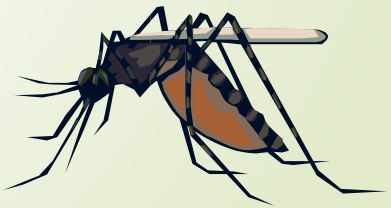
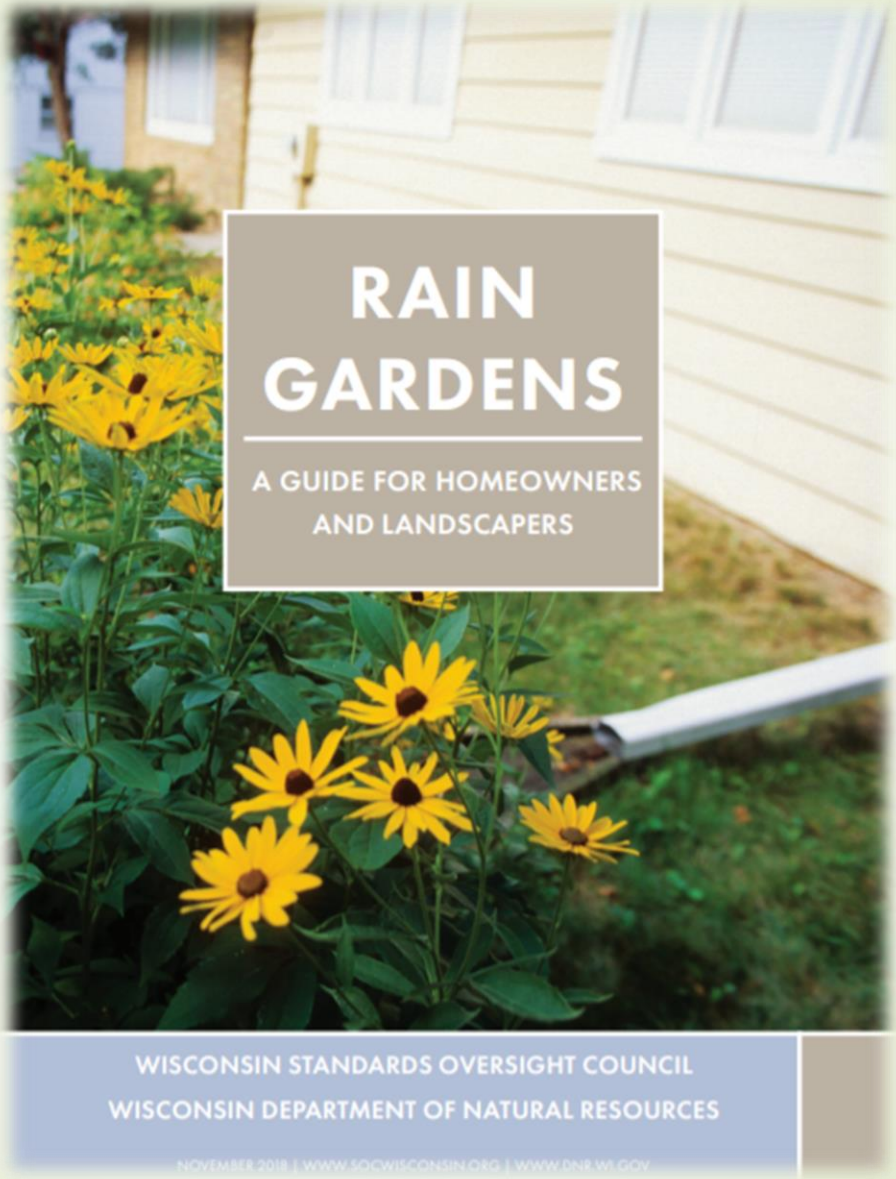


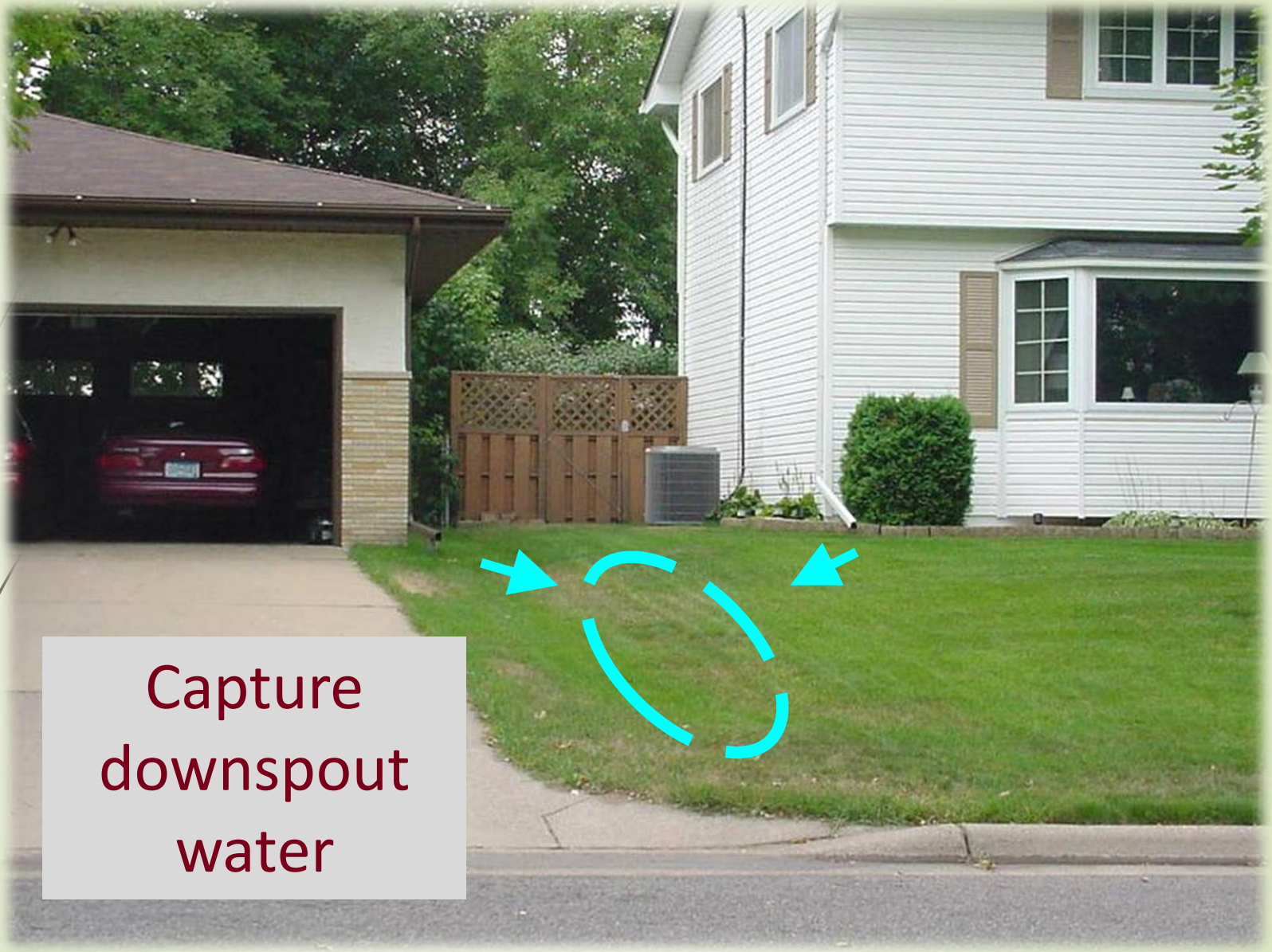
Illustration by Taina Litwak

RAIN GARDENS ARE ***NOT:***

- Water gardens or ponds
- Solution for poorly drained areas
- Mosquito breeding hot spots



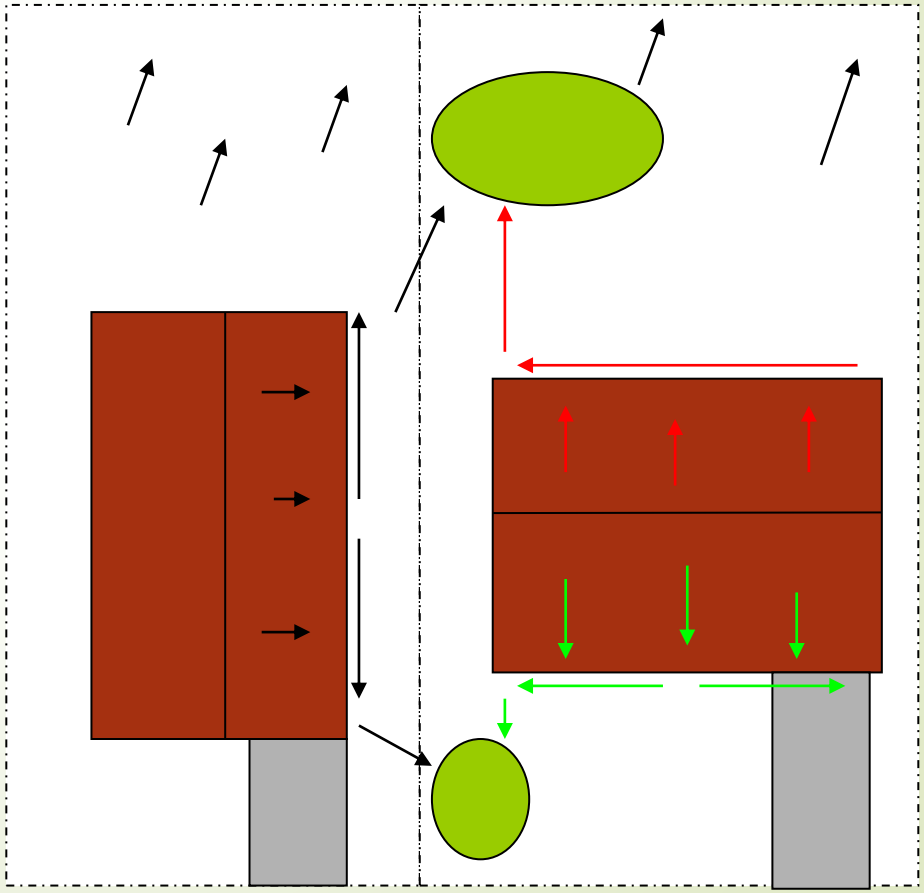

RAIN
GARDENS
A GUIDE FOR HOMEOWNERS
AND LANDSCAPERS
WISCONSIN STANDARDS OVERSIGHT COUNCIL
WISCONSIN DEPARTMENT OF NATURAL RESOURCES
NOVEMBER 2018 | WWW.SOCWISCONSIN.ORG | WWW.DNR.WI.GOV


Capture downspout water

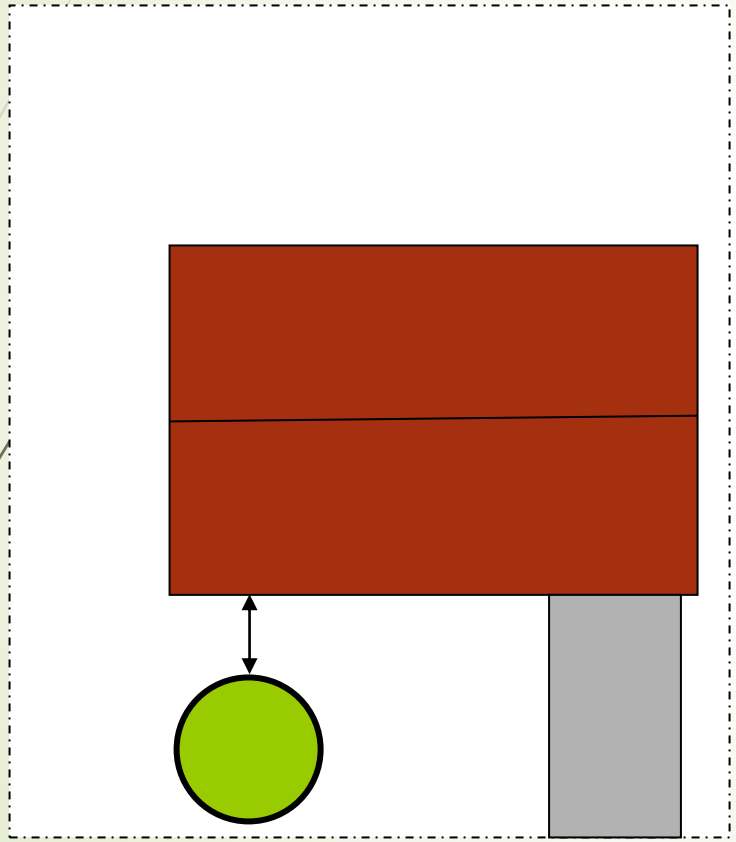
IDENTIFYING POTENTIAL SITES

You may need more than one rain garden!

- Located down-slope (at least 1% slope) from downspouts, patio, driveway or other hard surfaces
- Meet set-back criteria



RAIN GARDEN SETBACKS

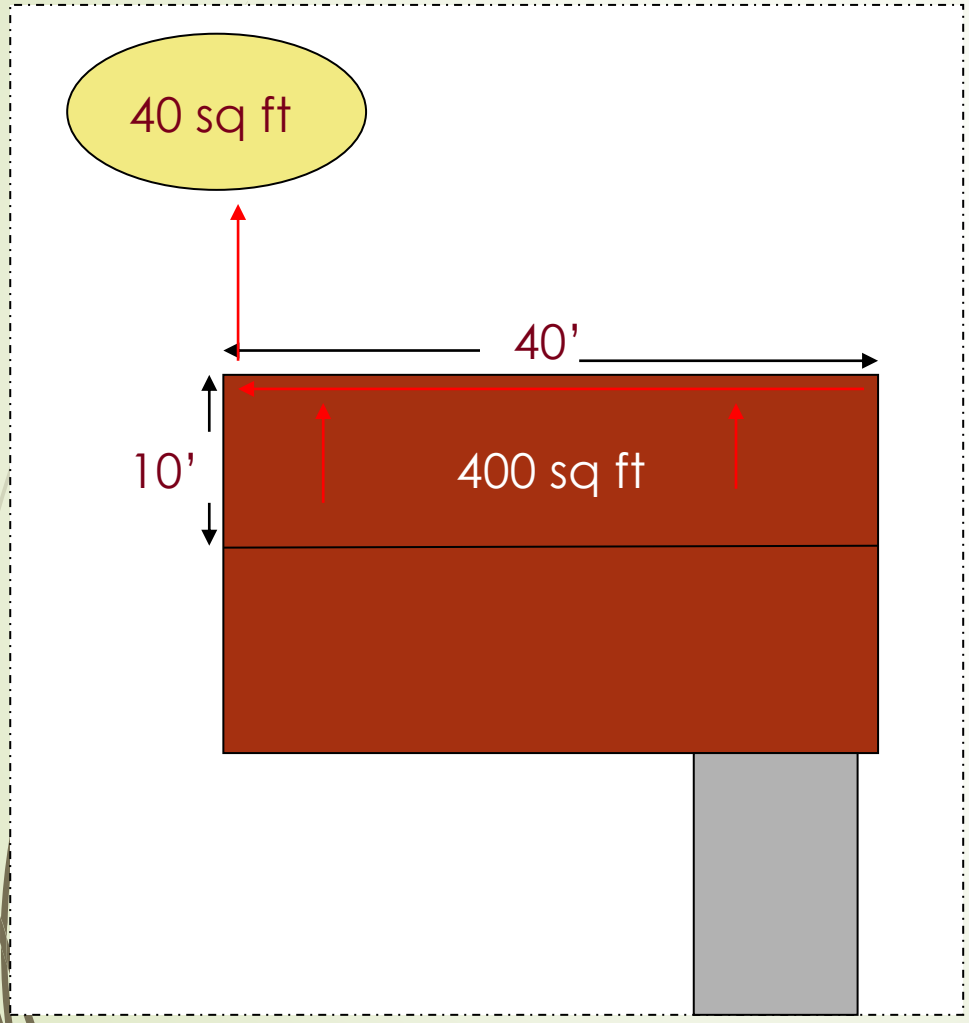


- Wellhead – 50’
- Septic field – 35’
- Foundation/slab – 5’
- Basement – 10 to 25’
- Property line – 10’
- Utility lines – *call Gopher One*

OTHER CONSIDERATIONS

- Slope – gentle, less than 20%
- Depressions - avoid areas of natural ponding or flooding
- Water table/bedrock – must be at least 3 feet below the rain garden
- Soil – avoid areas of compacted and/or clay soils

DETERMINING SIZE



- Calculate the area from which water will be collected (in square feet)
- The rain garden should be approximately 10% of this area (5-30%)

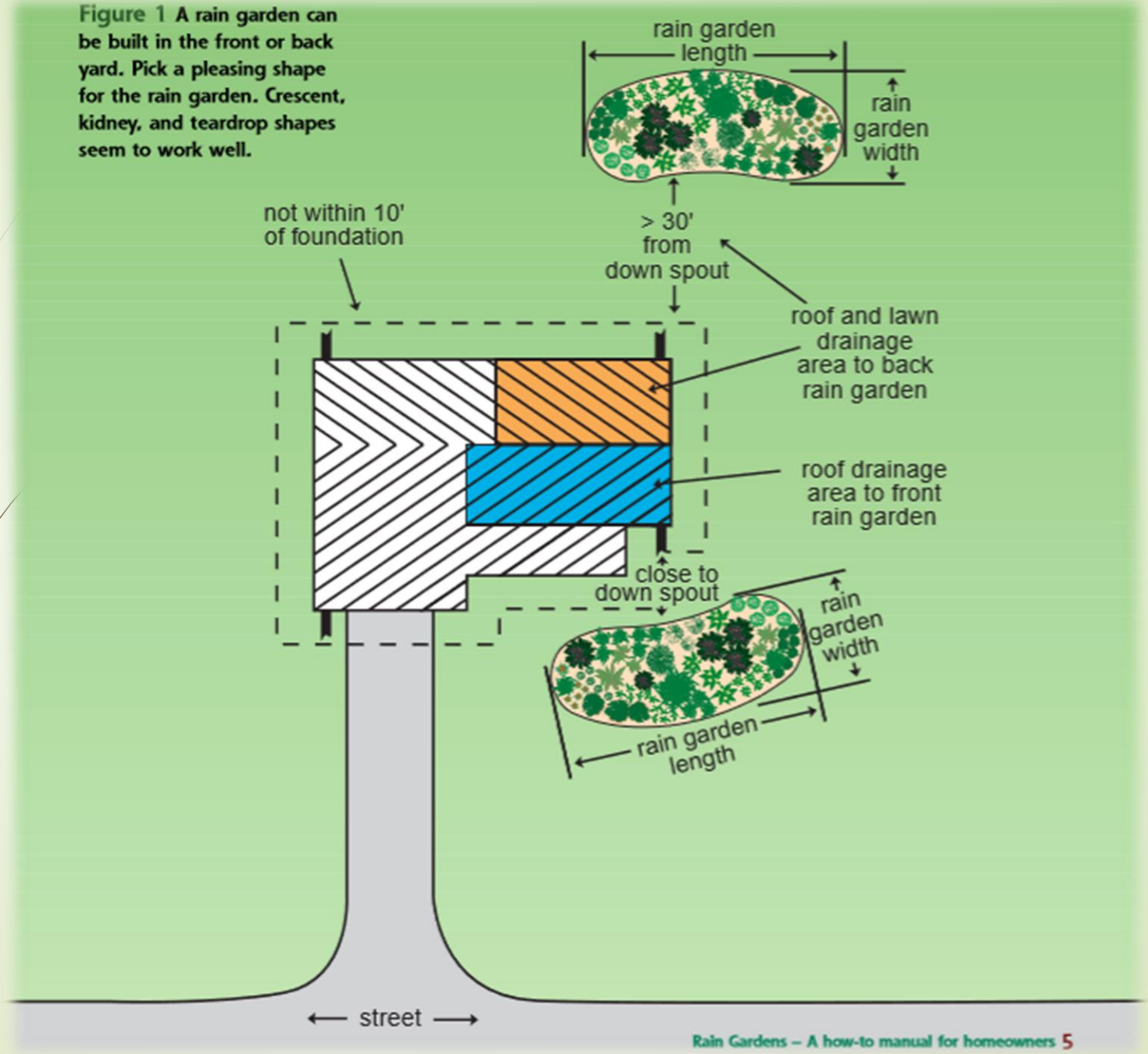
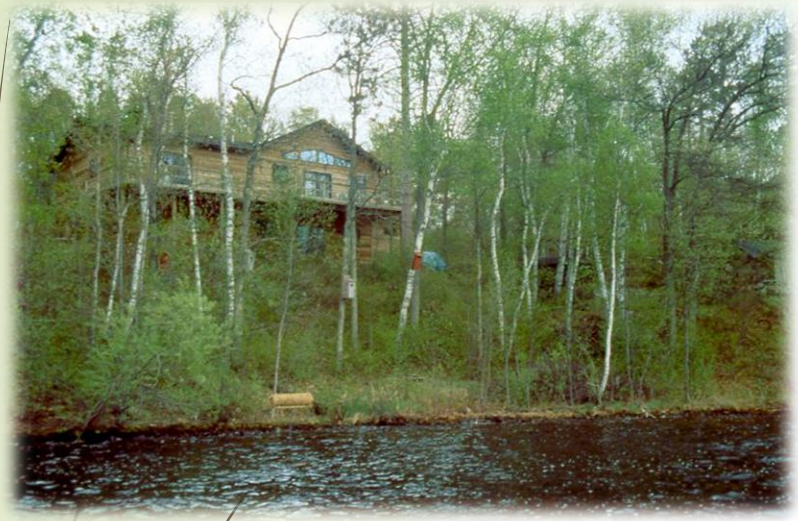


Figure 1 **A rain garden can be built in the front or back yard. Pick a pleasing shape for the rain garden. Crescent, kidney, and teardrop shapes seem to work well.**

WHAT IS A SHORELAND BUFFER?

…. A landscaped area along a shoreline (any water body) designed to slow runoff before it enters the water body so that some of the pollutants – and some of the water – can infiltrate the ground.

STRATEGY #1: EDIT



Preserve existing vegetation

Trim or remove trees and shrubs only as needed

STRATEGY #2:
NO MOW –
LET IT GROW
IS IT A WEED BED OR A GOLD MINE?

- most effective in wet fringe zone

NO-MOW STRATEGY

- Stake or mark the boundary of no-mow zone
- For a more natural look use a curved boundary
- As your no-mow area begins to grow, identify plant species coming in:
  - Ask local plant expert for help with identification
  - Watch for undesirable species, e.g., reed canary grass, thistle, buckthorn, stinging nettle, purple loosestrife, sweet white clover
  - If you find undesirable species, refer to fact sheets and resources for treatment recommendations
- Timeframe – allow one to two years to determine effectiveness of this strategy

FIRST YEAR THEY SLEEP, SECOND YEAR THEY CREEP, THIRD YEAR THEY LEAP.

STRATEGY #3: ADD PLANTS

Add to existing vegetation for additional color, layers, or diversity

Totally replant bare ground and pre-existing lawn areas

VISUAL APPEARANCE: PRIVACY SCREEN

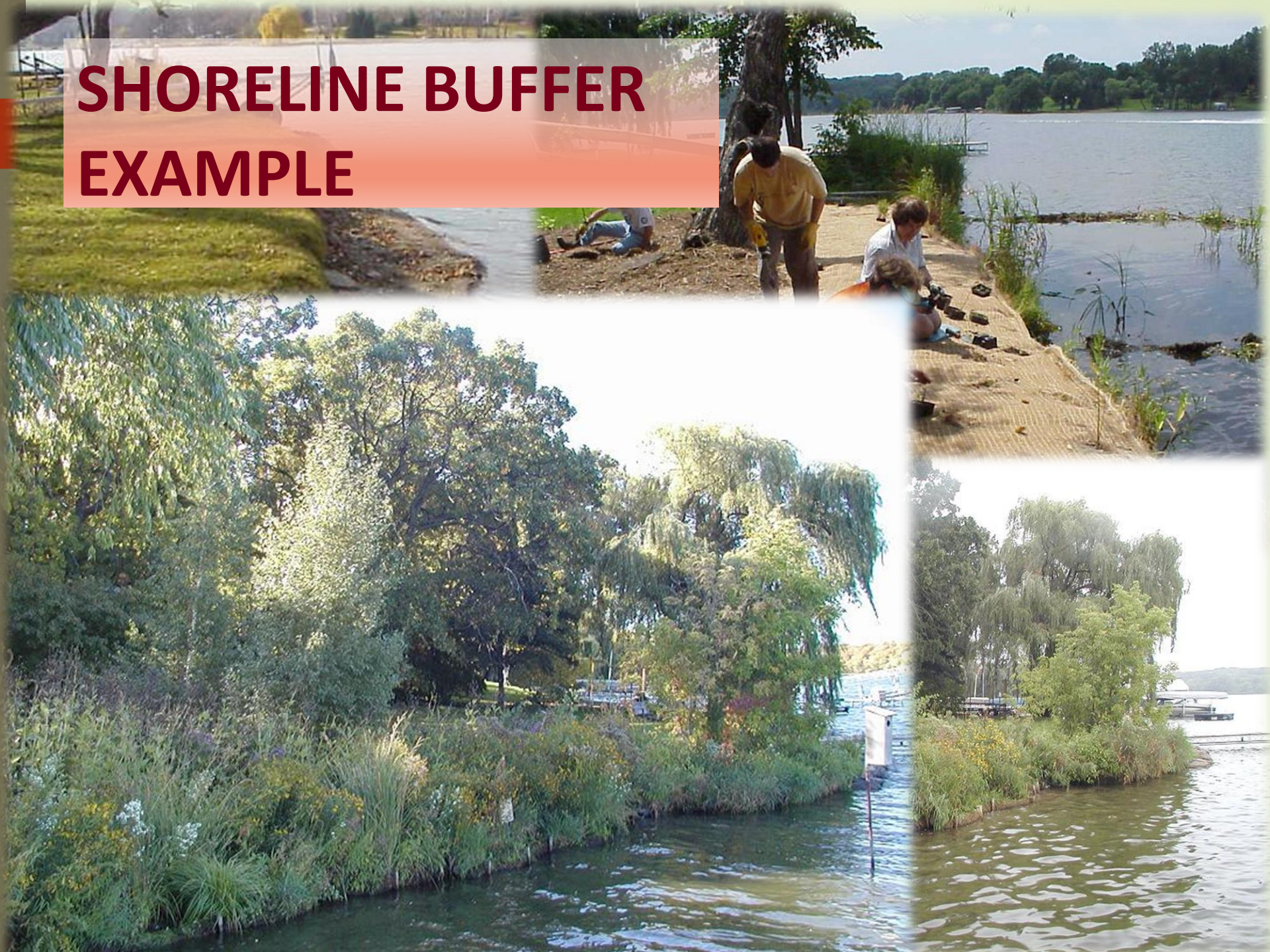
VISUAL APPEARANCE: ROCK RIP RAP

VISUAL APPEARANCE: STYLE

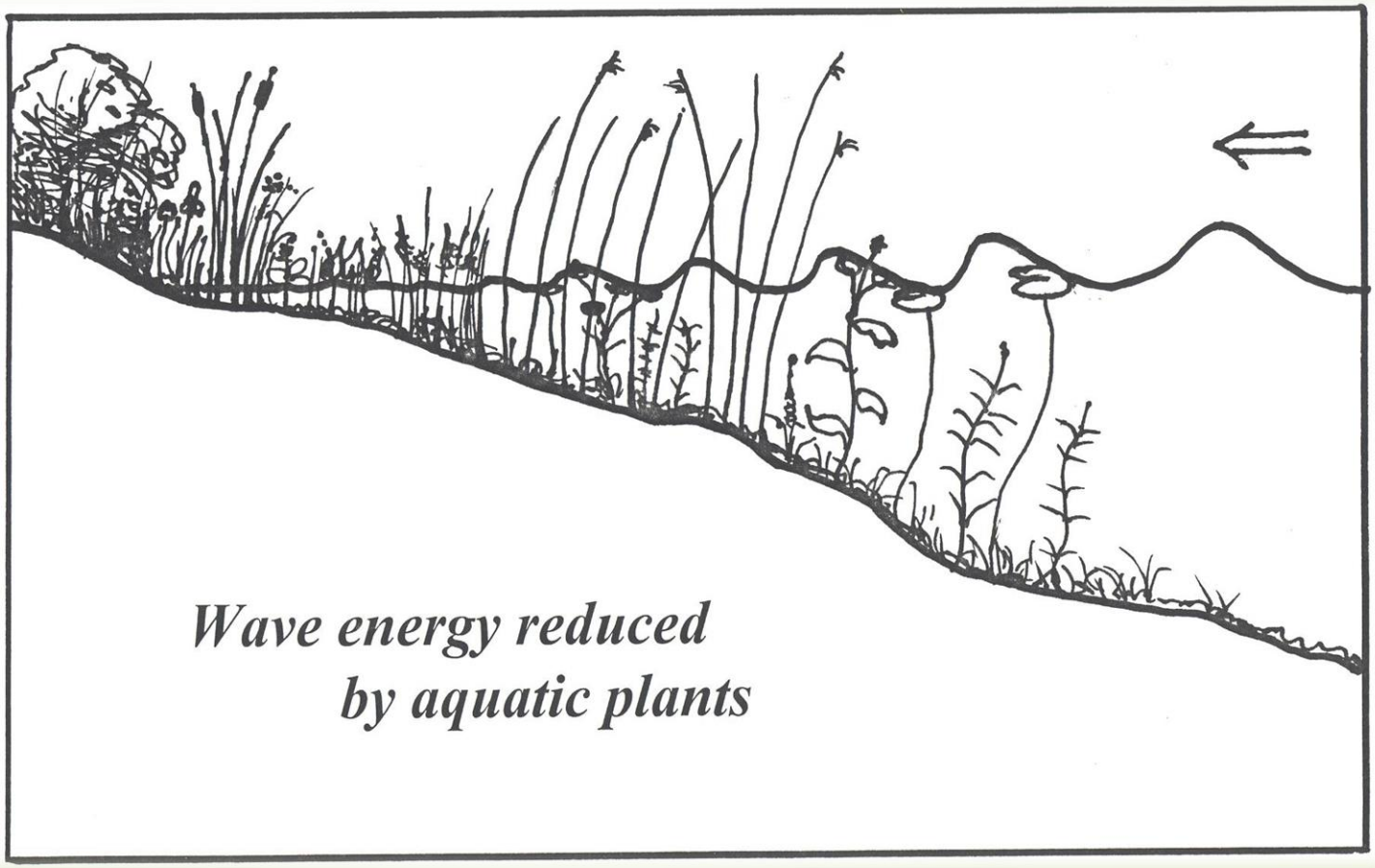
WILLOW WATTLES

AQUATIC PLANTING

SHORELINE BUFFER EXAMPLE



NATIVE PLANTS PROTECT SHORELINES FROM EROSION



BULRUSH AS WAVE BREAK

ICE RIDGES

Make Friends with the Ice Ridge

Ice ridges are formed by the pushing action of the lake's winter ice sheet against the shore. Cracks form in the ice because of different contraction rates at the top and bottom of the ice sheet, and it is especially pronounced in years when there is little insulating snow cover. Ice cracks also develop because the edges of the ice sheet are sometimes firmly attached to the shore. Then, as the water rises in cracks and freezes, the ice sheet expands slightly and exerts thrust against the shore.

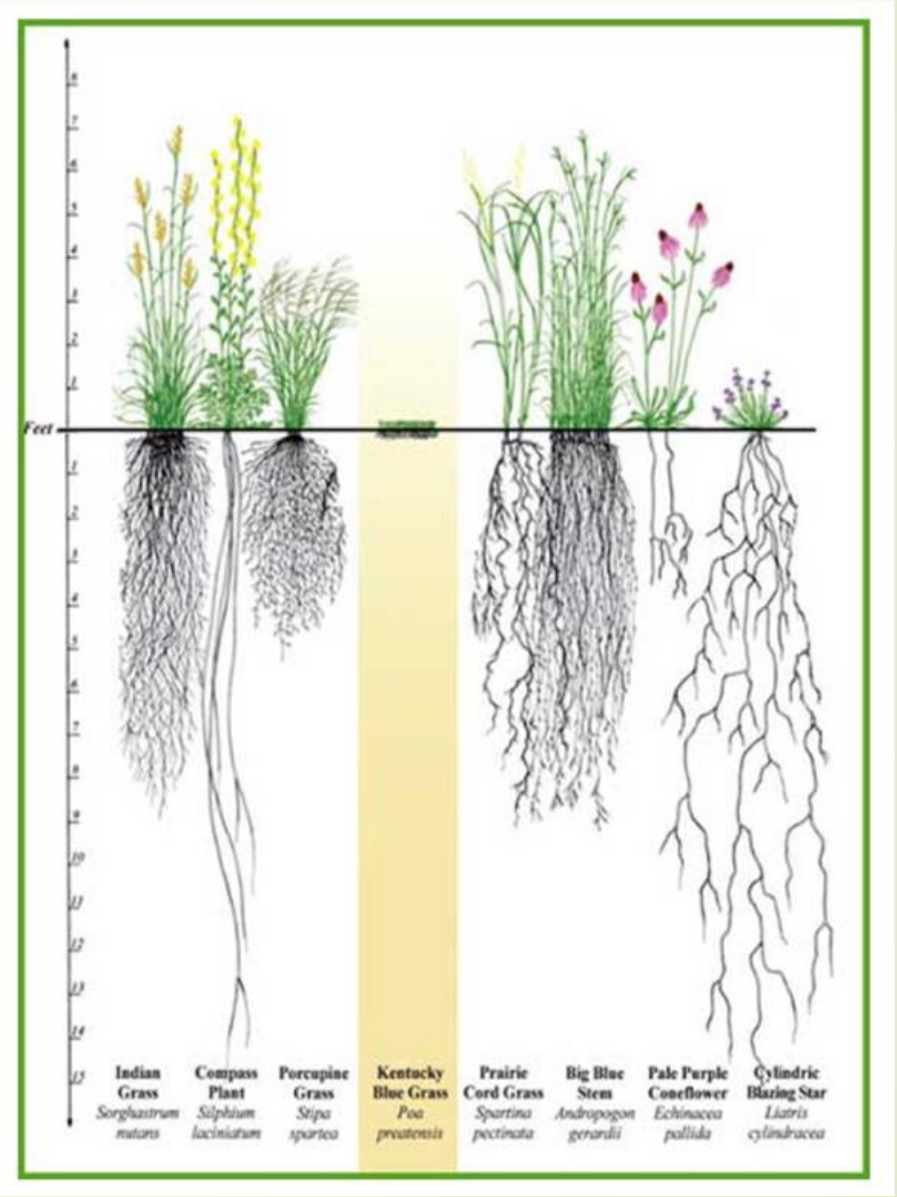
Unless the ice ridge is impeding your use of the lake or access to your dock area, consider making friends with the ice ridge and leave it alone. An ice ridge has many benefits to the lake, such as creating a natural berm to protect the lake from nutrient runoff. Nutrients collect on the landward side of the mound, producing fertile soil where trees and plants thrive and provide roots to hold the soil in place. If you do want to remove an ice ridge, you must follow the Hubbard County requirements. Historical ice ridges are a feature of many lakes and are protected by state law as a valuable resource to prevent runoff into the lake.

GRASSED SWALES

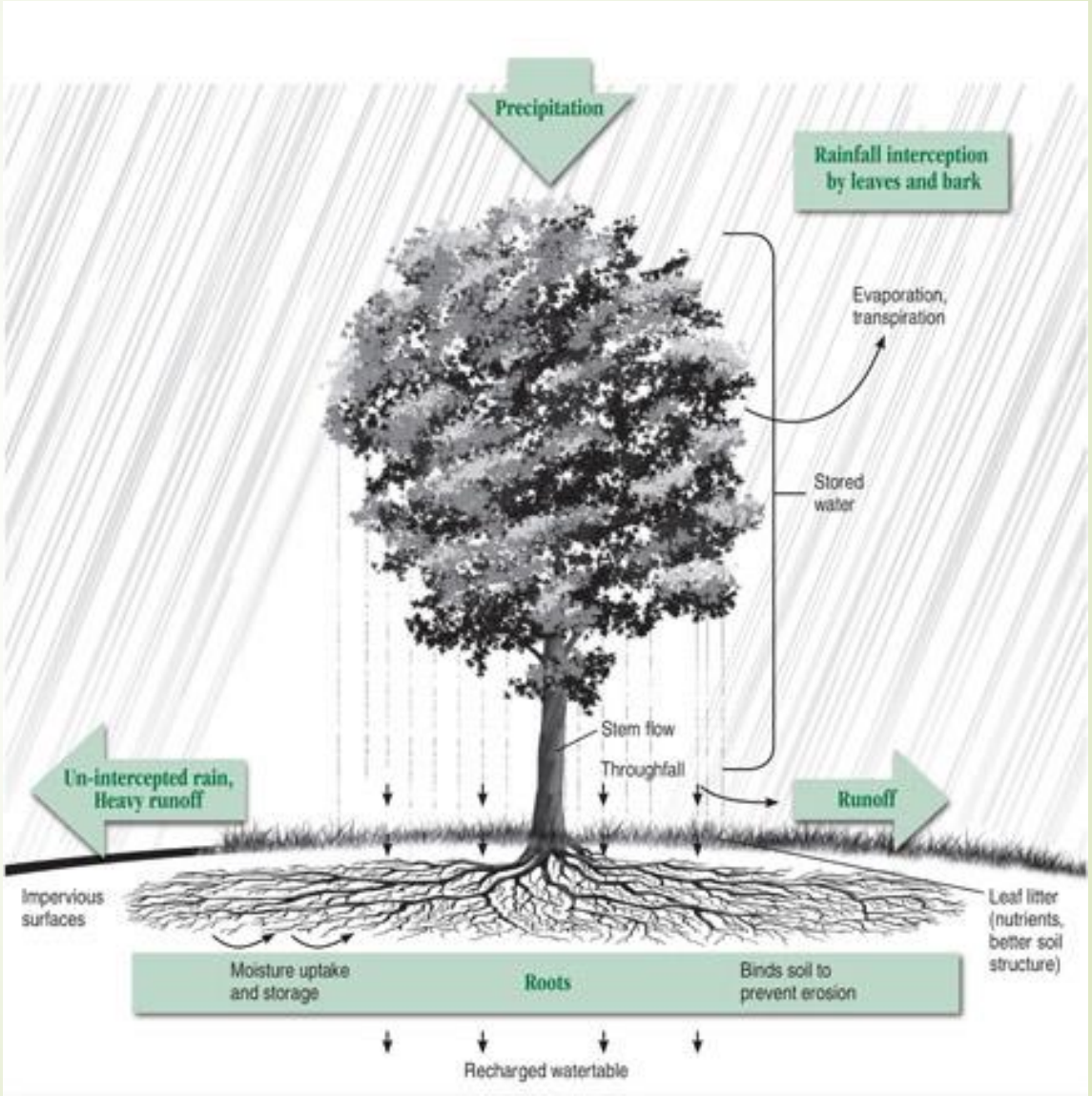
GRASSED SWALES

NATIVE PLANTS

- Were here prior to European immigration; not cultivars
- Are acclimated to our weather extremes
- Filter nutrients and pollution
- Have extensive root systems



NATIVE TREES



RESTORE THE SHORE

- Local program to purchase native plants and supplies
- Deadline is Oct. 23
- Delivery ~ early May 2021

OTHER CONSIDERATIONS

- Contain grass clippings and leaves
- Only zero phosphorus fertilizers
- Maintain septic system
- Remove pet waste
- Hold water on site
- Clean driveway
- Be AIS alert
- Reuse water
- Volunteer

A journey of a thousand miles,

begins with a single step.

ROLES AND RESPONSIBILITIES

- Sign up with HC COLA
- COLA will connect you with property owners
- Communicate via email first, then meet one-on-one on site
- Provide advice and resources
- Short term commitment

VISIT SITES IN YOUR AREA

- South access on Long Lake: rain garden, tree planting
- Pine Haven Camp, grassed swale, pervious surface
- Deerview Road, check dams, rain garden

KEY MESSAGES

- Systems thinking
- Not ‘all or nothing’
- Property owners have responsibilities
- You are not a marriage counselor!
- Slow the flow
- Use native plants
- Lakes are in good shape; let’s keep them that way

Thank you!

Questions?

Karen Terry
218-770-9301
kterry@umn.edu

Shoreland buffers

Shoreland buffers

Shoreland buffers

Shoreland buffers

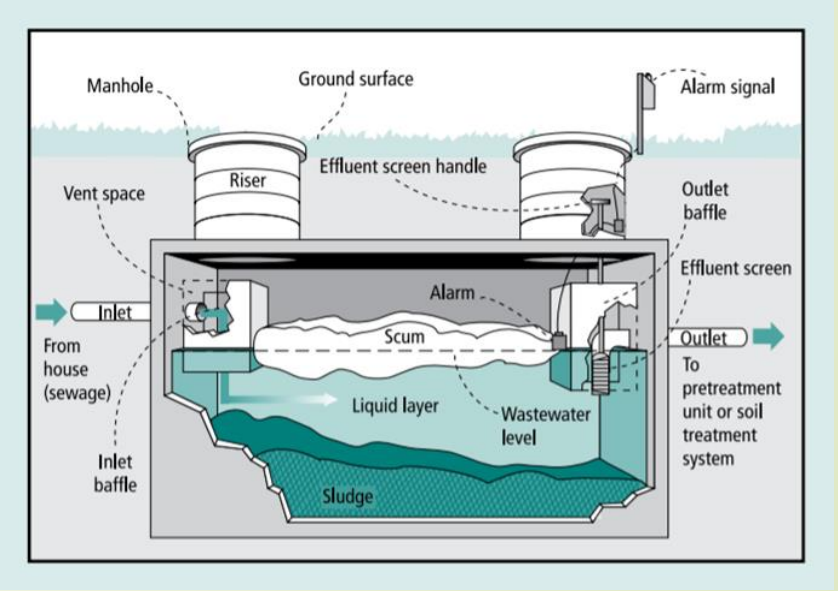
Combination rain garden and shoreland buffer

Grassed swales

Bad Axe	Hubbard	Eurasian watermilfoil	2017
Bender Creek from Bender Creek Road downstream to First Crow Wing (29-0086)	Hubbard	faucet snail	2019
Benedict	Hubbard	zebra mussel	2017
Big Mantrap	Hubbard	Eurasian watermilfoil	2020
Duck	Hubbard	faucet snail	2019
First Crow Wing	Hubbard	faucet snail	2011
Fourth Crow Wing	Hubbard	faucet snail	2019
Garfield	Hubbard	zebra mussel	2017
George	Hubbard	faucet snail	2018
Long	Hubbard	faucet snail	2017
Long	Hubbard	zebra mussel	2020
Second Crow Wing	Hubbard	faucet snail	2011
Third Crow Wing	Hubbard	faucet snail	2018
Upper Bottle	Hubbard	faucet snail	2019
Upper Twin	Hubbard	faucet snail	2009

Septic systems

- ✓ Have tank pumped and inspected regularly
- ✓ Learn how your system works
- ✓ Invest in repairs as needed



Zero-phosphorus law

Apply Fertilizer Sparingly. Use Zero-Phosphorus Lawn Fertilizer—It's the Law in Minnesota

By law since 2005, Minnesota homeowners cannot use fertilizers containing phosphorus, except for exemptions for new lawns or when a soil test indicates a need for phosphorus. In much of Hubbard County, soils are naturally high in phosphorus so lawns generally don't need extra phosphorus.

When shopping for fertilizer, buy a brand that has a middle number of zero i.e. 22-0-15. The law did not prohibit retailers from selling phosphorous fertilizers, and even though most retailers are carrying more zero phosphorus fertilizers, it's up to you to make sure you comply with the law.

If you have left over phosphorus fertilizer, using it on the garden is a good way to dispose of it.

Other herbicide and pesticide precautions to follow:

- Eliminate the use of fertilizers near water or wetlands.
- Before you consider fertilizing your lawn, aerate it first and see if that improves its health.
- Use the minimum amount needed to replenish the soil and apply at the right time of year, usually spring and early fall. Water lightly after fertilizing to ensure absorption by the roots before a heavy rainfall.
- Sweep fertilizer that has spilled on the driveway and other hard surfaces back onto the lawn to prevent runoff.