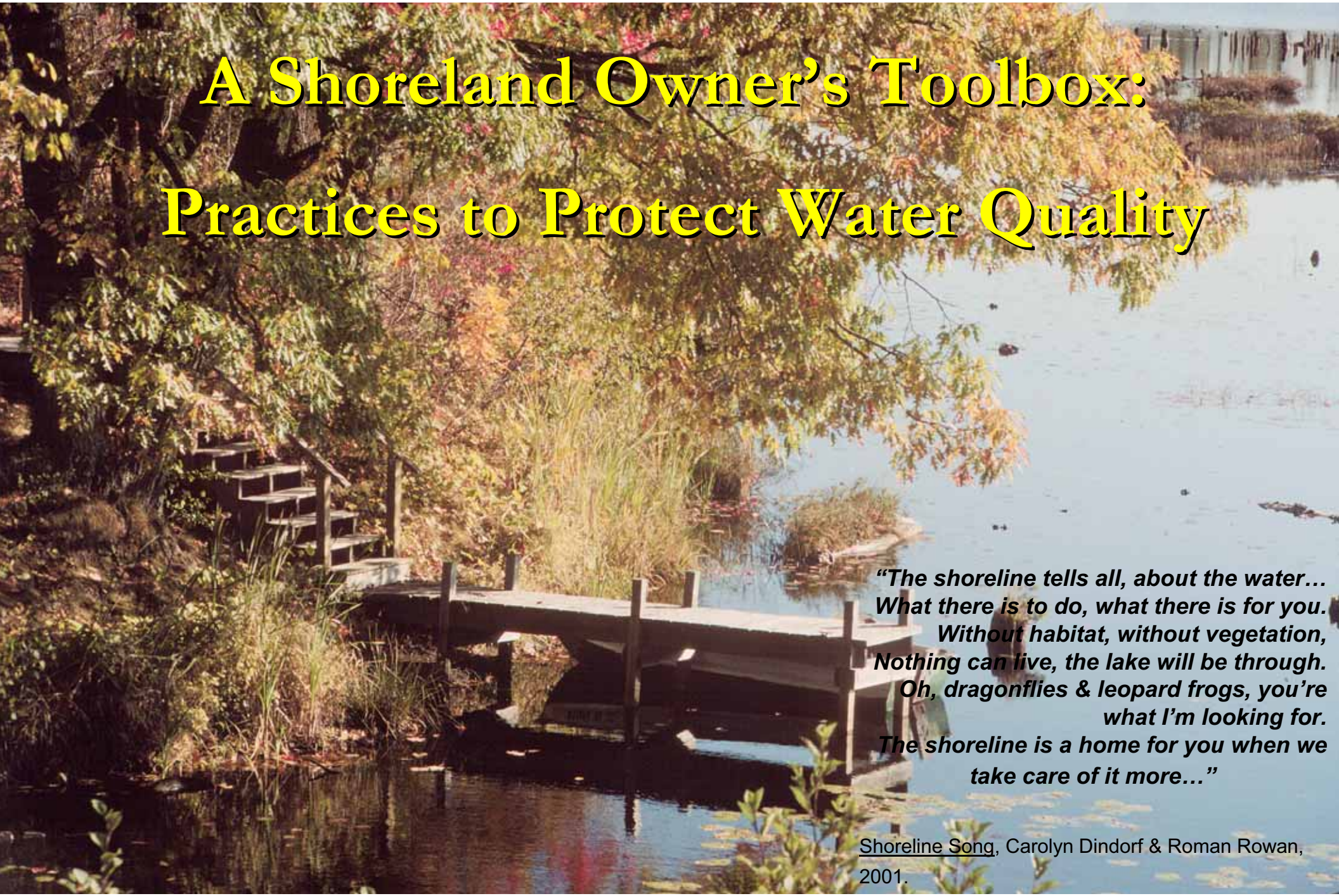


# A Shoreland Owner's Toolbox:

# Practices to Protect Water Quality

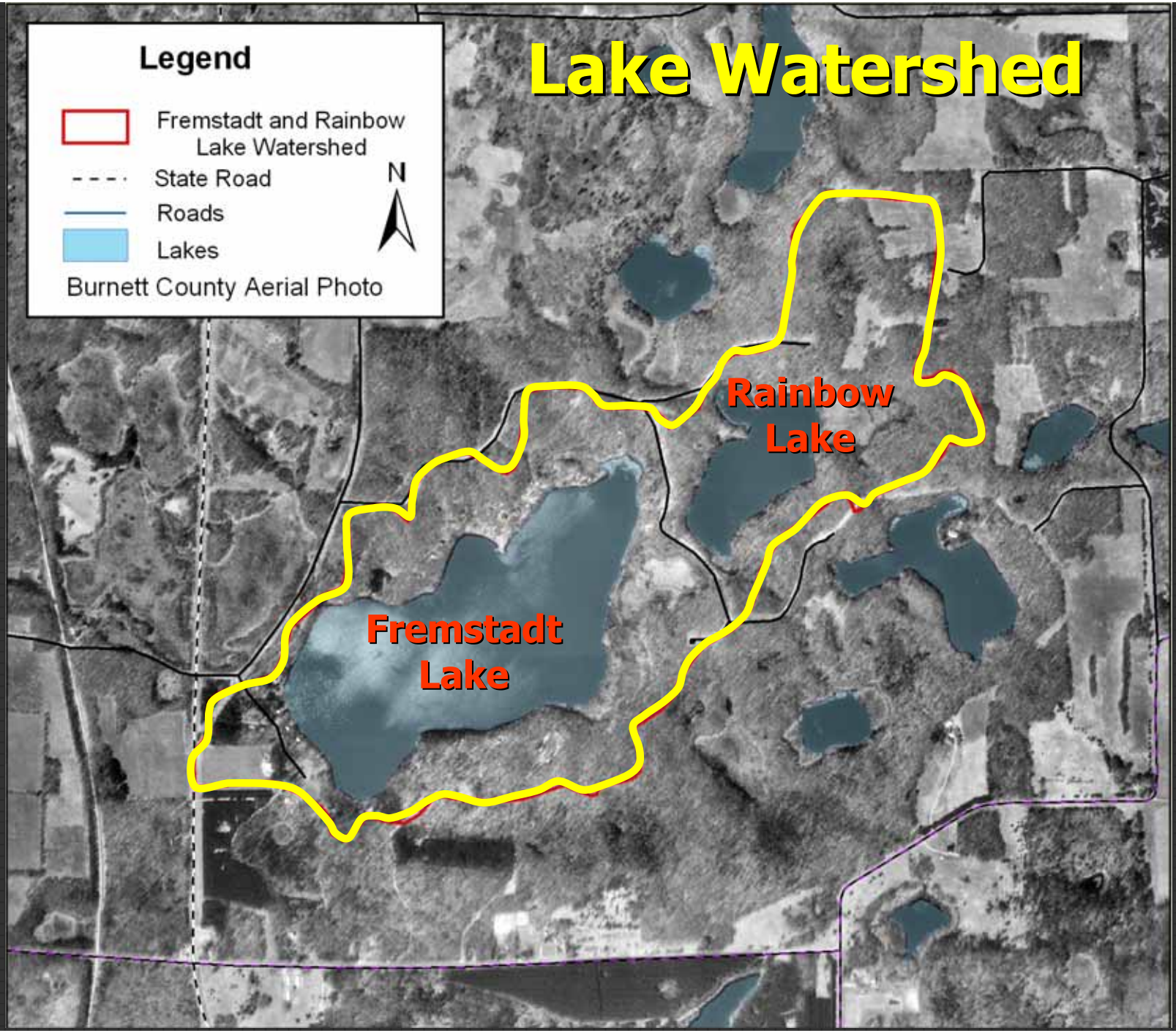
***"The shoreline tells all, about the water…***
***What there is to do, what there is for you.***
***Without habitat, without vegetation,***
***Nothing can live, the lake will be through.***
***Oh, dragonflies & leopard frogs, you're***
***what I'm looking for.***
***The shoreline is a home for you when we***
***take care of it more…"***

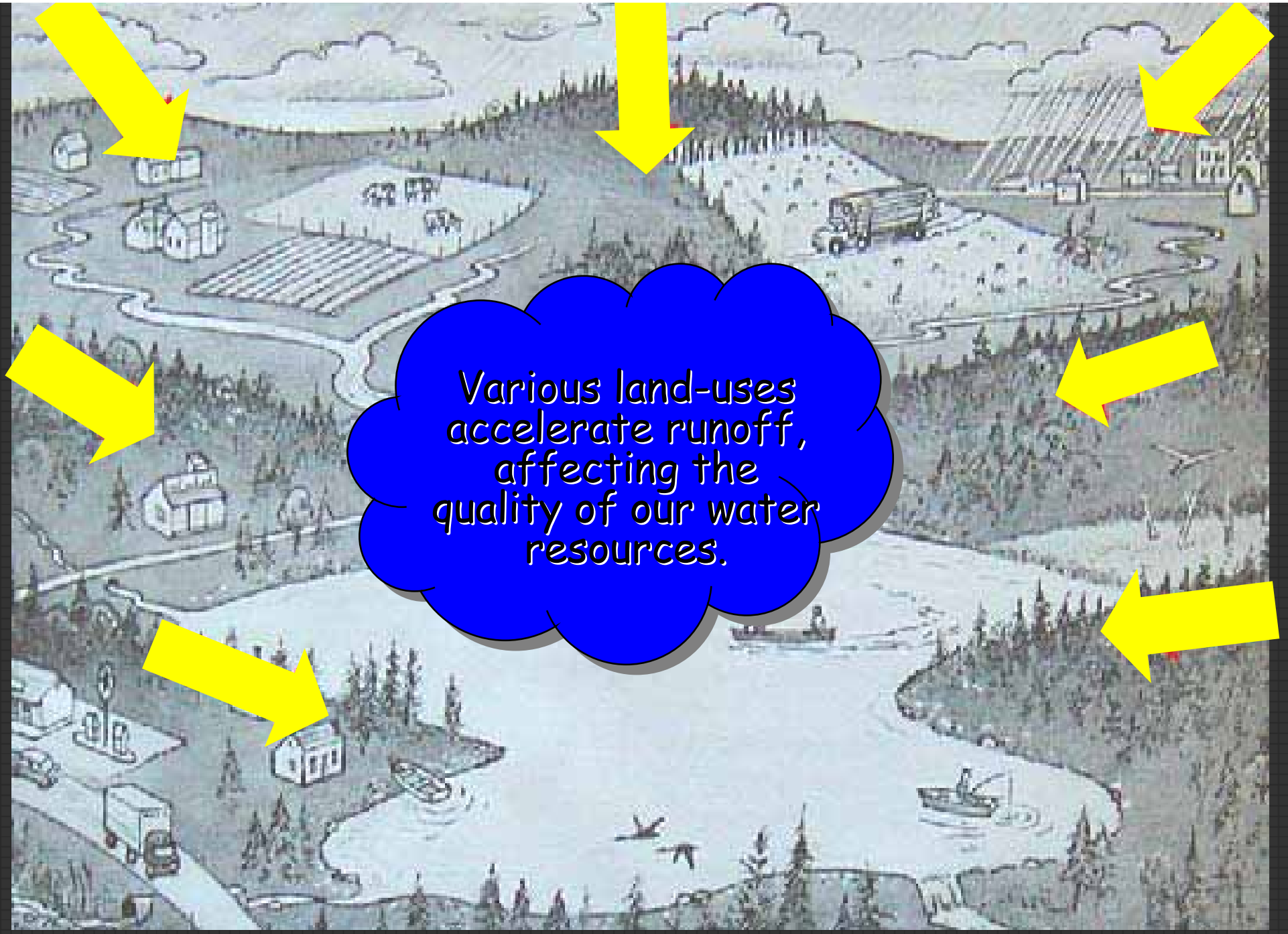
Shoreline Song, Carolyn Dindorf & Roman Rowan, 2001.

The quality of our lakes and streams is ultimately a reflection of how we use and maintain the nearby land.

Lakefront owners, recreational users, and landowners within the watershed, collectively all can play a positive role in improving and maintaining the quality of our waterways.

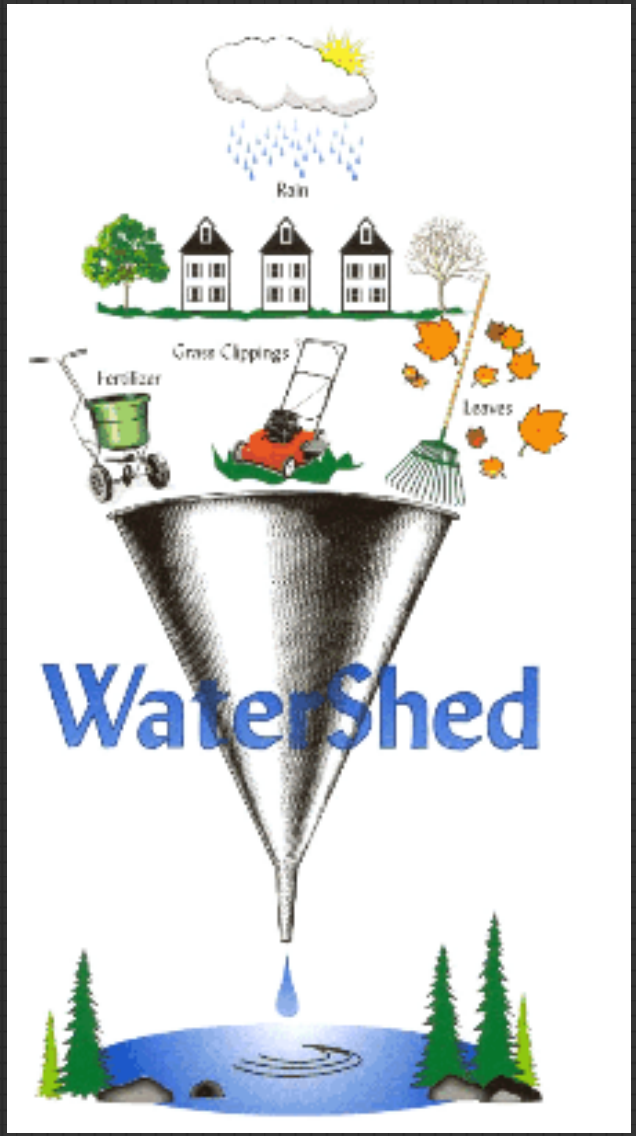
This program is designed to help you best manage your WHOLE property to protect the lake you care about.


Legend
Fremstadt and Rainbow Lake Watershed
State Road
Roads
Lakes
Burnett County Aerial Photo
N
Lake Watershed
Rainbow Lake
Fremstadt Lake


Various land-uses accelerate runoff, affecting the quality of our water resources.

The activities going on ‘above’ the lake are often what <u>cause</u> many of our water quality problems, it’s a cumulative effect.

Consider your property as a ‘mini’ watershed, it acts like a funnel, collecting all runoff from the drainage area (home, garage, yard, driveway, etc.) and channels it to one place… your beautiful lake.




Everything that happens in the watershed eventually contributes to a surface water body.

# Shoreland Owner's Toolbox Discussion

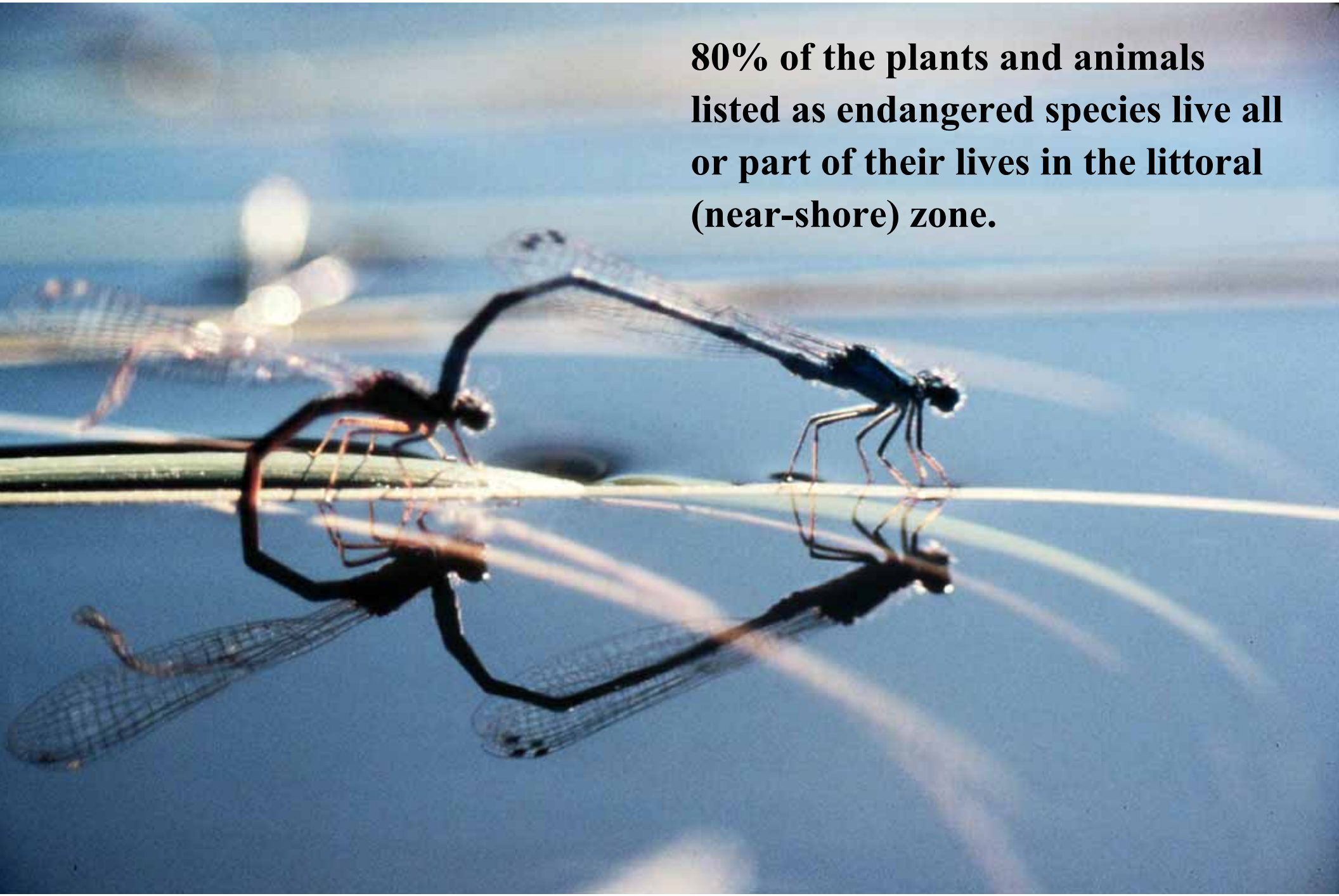
- Why is the water's edge so important?
- What are the ecological impacts of development?
- Simple Practices for you to protect your lake:
  - Aquatic Habitat (below the OHWM-what's that?)
  - Shoreland Buffer (above the OHWM)
  - The Rest of your Property


At the water’s edge….


These sensitive areas are at the
margins of our waters, and are the
place where all life comes together!

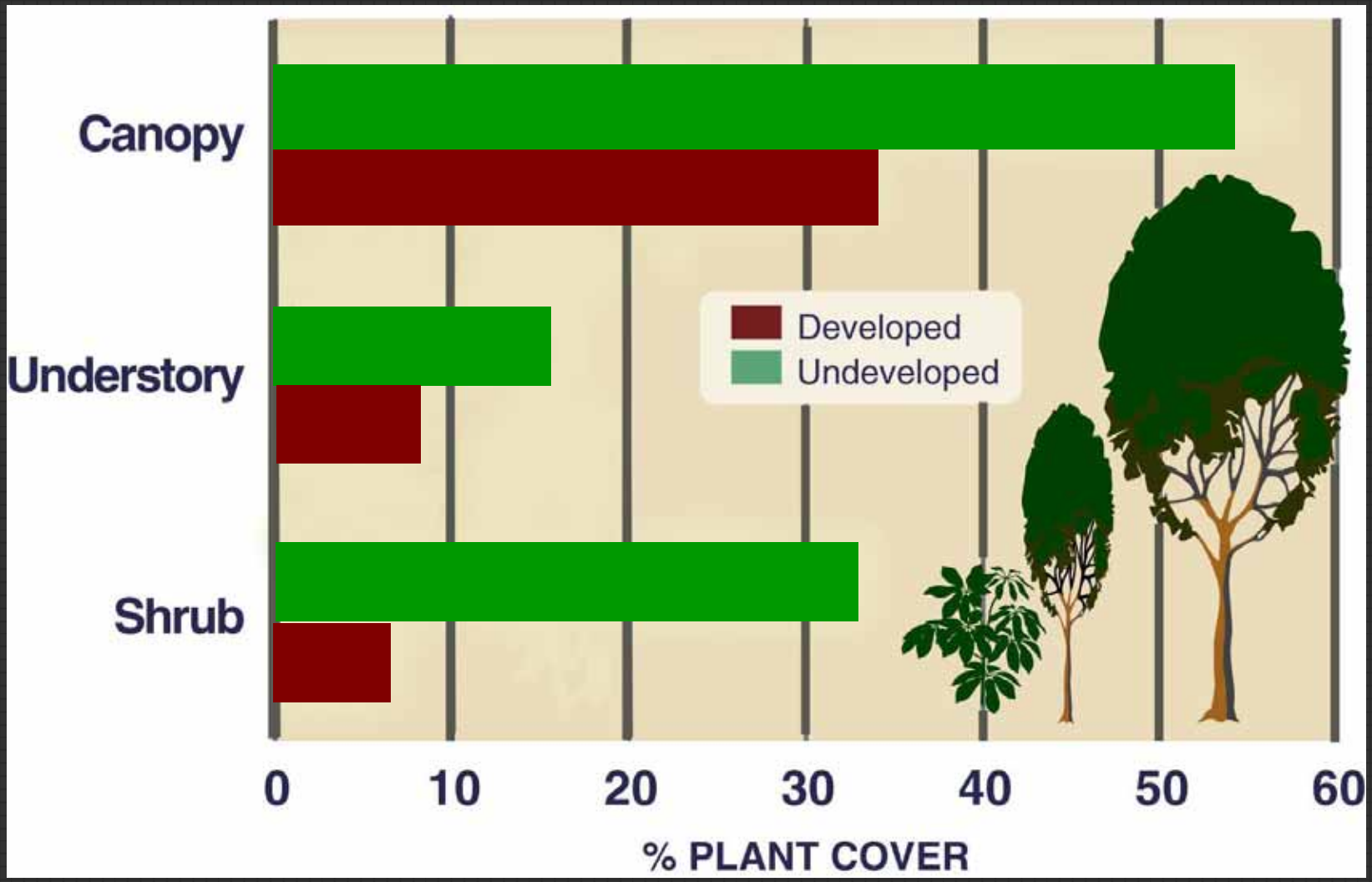
**90% of all lake life is born, raised and fed in the area where land and water meet.**

*(Ontario, Ministry of Natural Resources)*



**80% of the plants and animals listed as endangered species live all or part of their lives in the littoral (near-shore) zone.**

# What's Happened to Shoreland Plants?

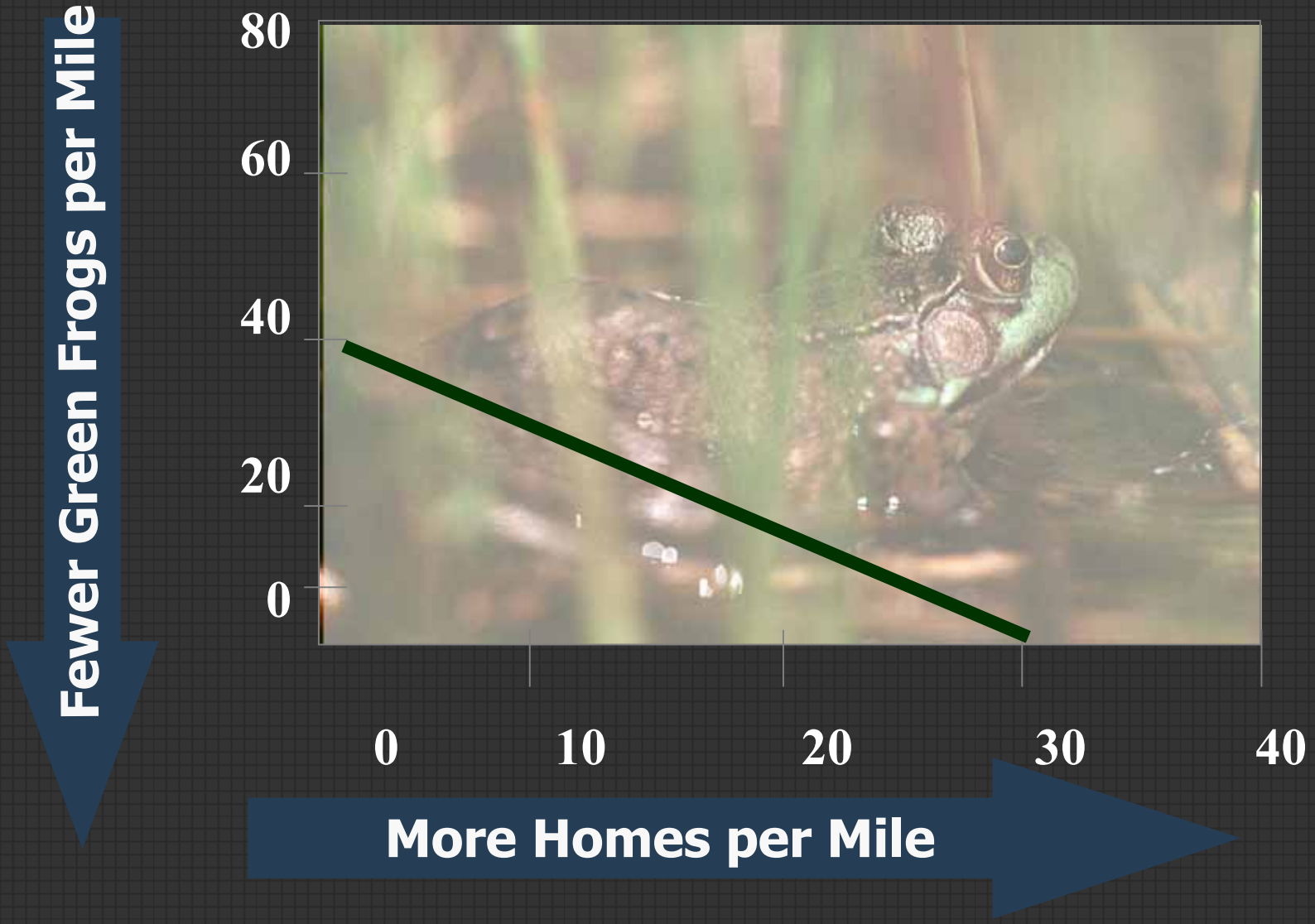



*Source: Wisconsin Dept. of Natural Resources*

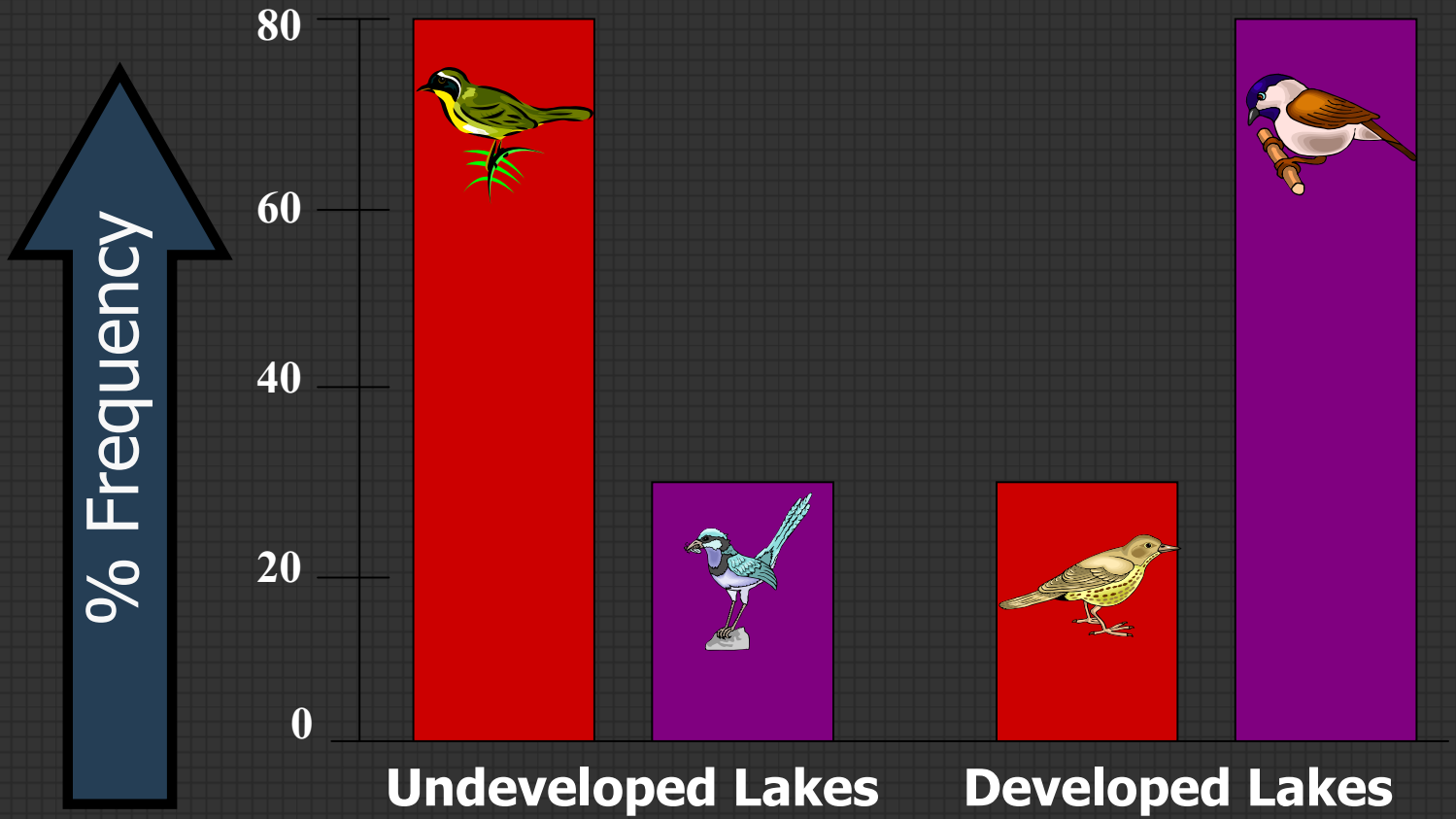
# What's Happened to Aquatic Plants?


*Paul Radomski – MN DNR*

# What's Happened to Green Frogs?

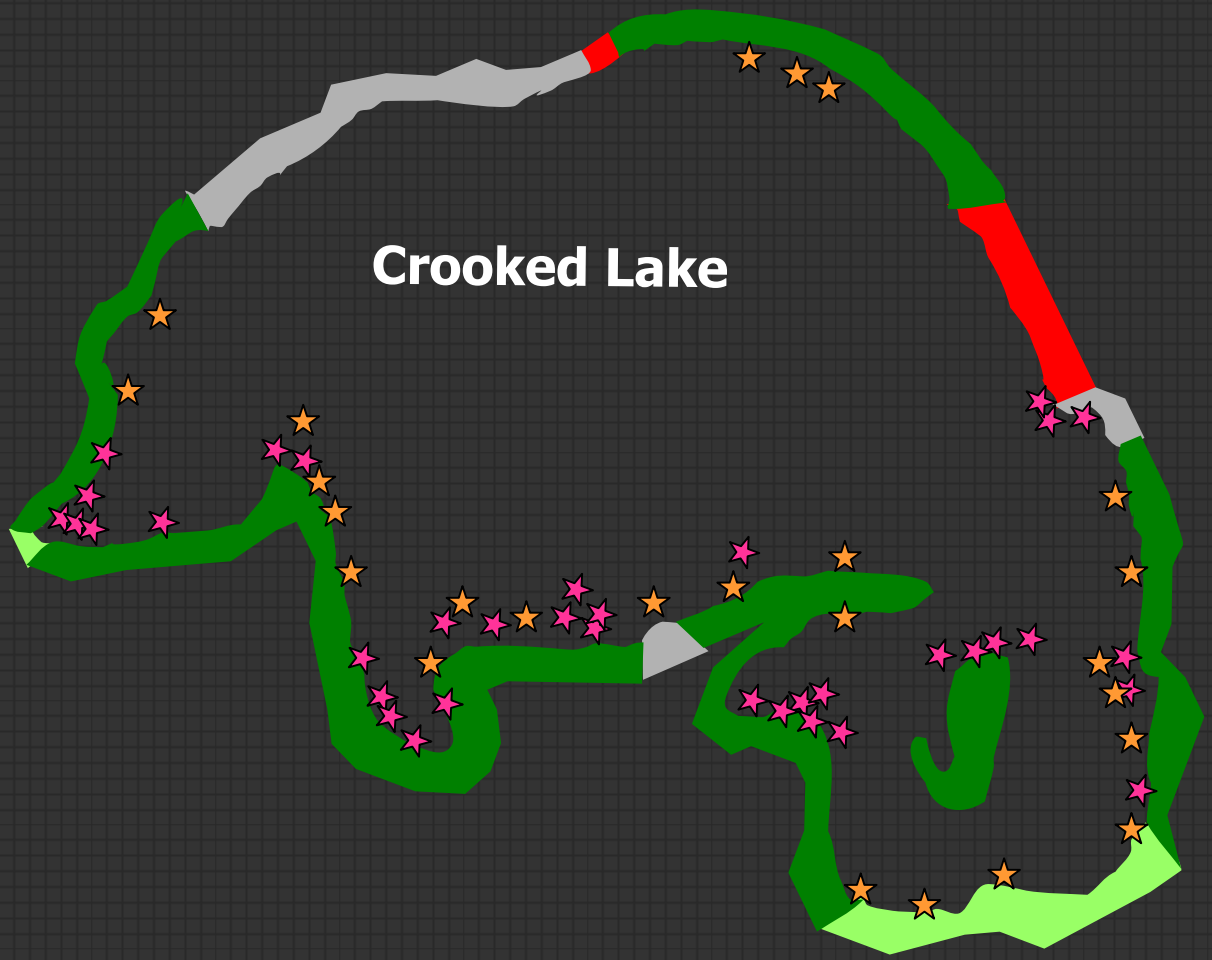


# What's Happened to Songbirds?



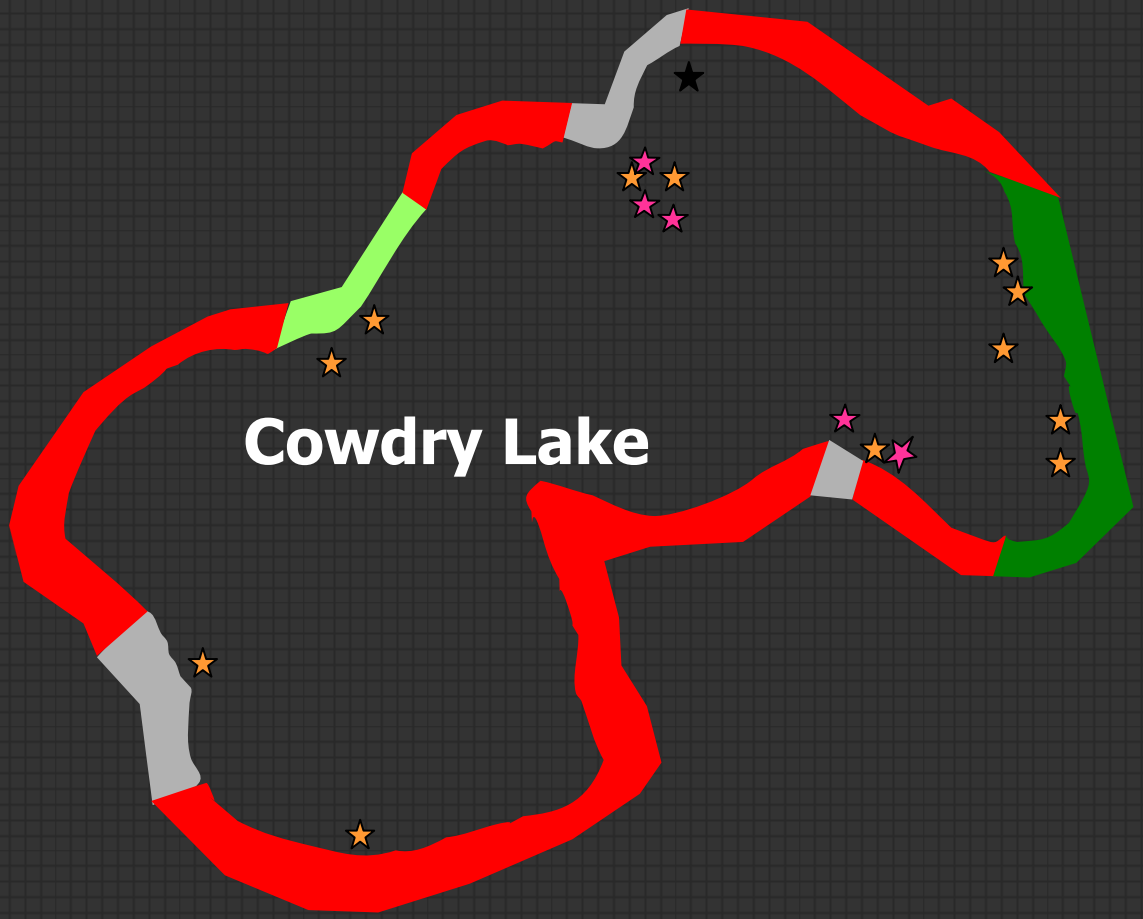

**Uncommon birds** *(Warblers, Thrushes, Vireos, Oven Bird)*

**Common birds** *(Grackle, Catbird, Chickadee, Bluejay, Goldfinch)*





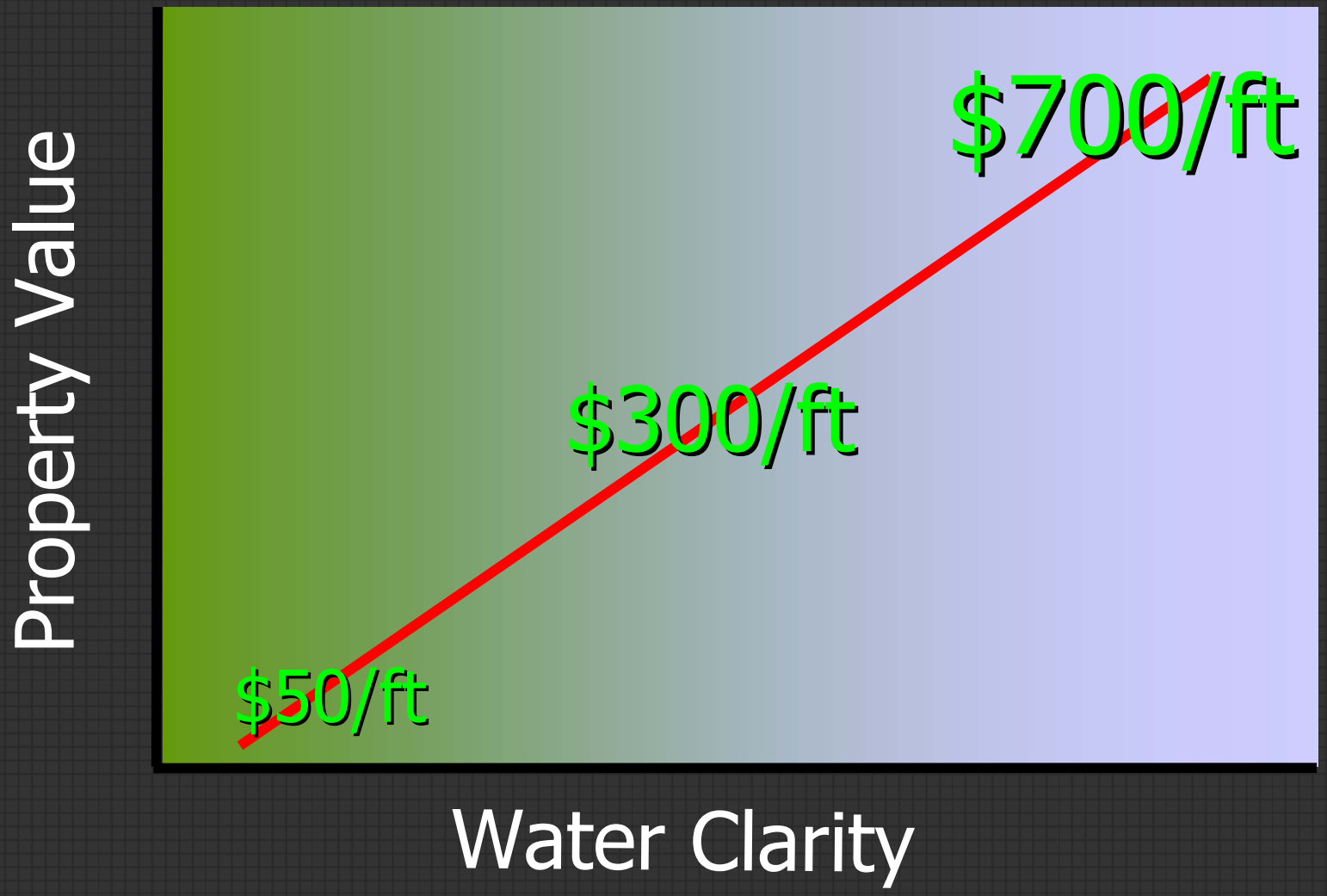
**Shoreline Development Effects on Nest Site Selection by Largemouth Bass and Black Crappie** Jeffrey Reed, Minnesota Department of Natural Resources




**Undeveloped** → **Intensely Developed**

**Shoreline Development Effects on Nest Site Selection by Largemouth Bass and Black Crappie** Jeffrey Reed, Minnesota Department of Natural Resources

# A clean lake = higher property value




*Sources: Mississippi Headwaters Board and Legislative Commission on Minnesota Resources, 2003; University of Maine 1996; Itasca County, MN Assessor's Office 2003.*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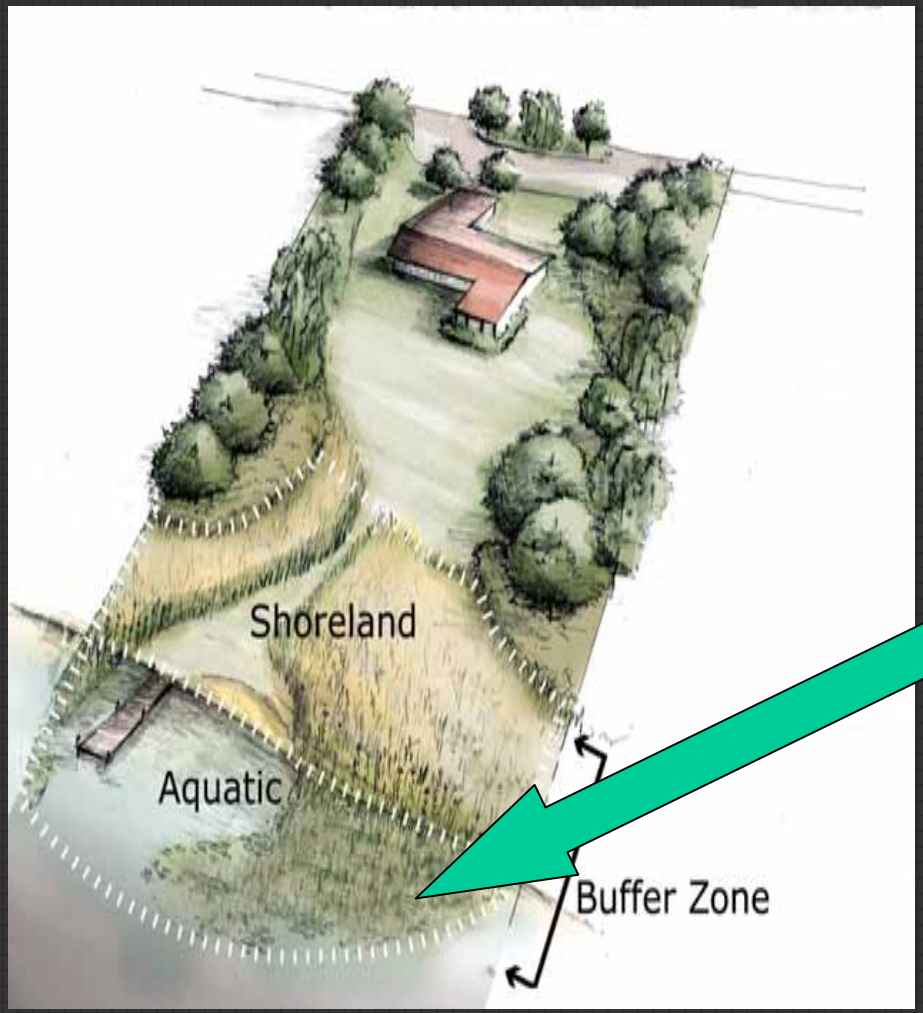
(715) 356-4457
OPEN WATER

Use these practical tips as your tools to protect the health of your lake.

Aquatic Habitat




Aquatic Habitat includes plants and fish & wildlife in the near-shore water, or littoral zone.

# Ordinary High Water Mark (OHWM)

*The point on the bank/shore where water leaves a distinct mark.*

* Maintain as much of the natural aquatic vegetation as possible.

* Remove any existing aquatic invasive species.

* If you want to enhance the aquatic zone, use only native species.

* Get a DNR PERMIT, any permanent placement (including plants) on the lakebed requires a permit!

Safe & Healthy Native Aquatic Plant Ideas:

Submerged or floating plants:

- Water lilies (Nuphar or Nymphaea species)
- Coontail (Ceratophyllum demersum)
- Native pondweeds (Potamogeton species)
- Water celery (Vallisneria americana)

Pickerelweed

Emergent or wetland/ shoreline plants:

- Pickerelweed (Pontederia cordata)
- Native sedges (Carex species)
- Native Bulrushes (Scirpus species)

White water lily

Wisconsin State Herbarium website: www.botany.wisc.edu/wisflora/

# Bad guys to note

Parrot feather

The following plants should NEVER be planted in or near the lake , not even in a water garden:

- Flowering rush *(Butomus umbellatus)*
- Frog-bit *(Hydrocharis morsusranae)*
- Giant water fern *(Salvinia molesta)*
- Hydrilla *(Hydrilla verticillata)*
- Mosquito fern *(Azolla pinnata)*
- Parrot feather *(Myriophyllum aquaticum)*
- Water hyacinth *(Eichorina crassipes)*
- Water lettuce *(Pistia stratiotes)*

Hydrilla

* Identify non-native, invasive plants, & undesirable plants to be removed.

EWM, Pondweed, Loosestrife, Zebra Mussels, & Rusty Crayfish are exotics that wreak havoc on lakes.

Purple Loosestrife

Poison Ivy

Eurasian Water Milfoil

# Exotic Species

Why are they a problem?

*** Aggressive and prolific**

*** Mature quickly**

*** Leave behind diseases, parasites, predators, and competitors**

# Eurasian Water-milfoil

Photo courtesy of
Jane Alden Stevens

- Forms dense mats
- Displaces native plants
- Degrades food, shelter, and nesting sites for fish
- Limits swimming and boating

# Curly-leaf Pondweed


*Vermont, USA, photo by A. Bove, Copyright 2002 Ann Bove*

- Forms dense mats.
- Displaces native plants.
- Degrades food, shelter, and nesting sites for fish.
- Limits swimming and boating.
- Dies back in summer leading to decaying plants on shore & an increase in phosphorus & algal blooms.

# Rusty Crayfish

- Displaces native crayfish.
- Competes with fish for food.
- Raids fish nets.
- Devastates aquatic plant communities.

# Zebra Mussels


- High reproduction rate.
- Clog water intake valves.
- Reduces available food for fish.
- No known predator!

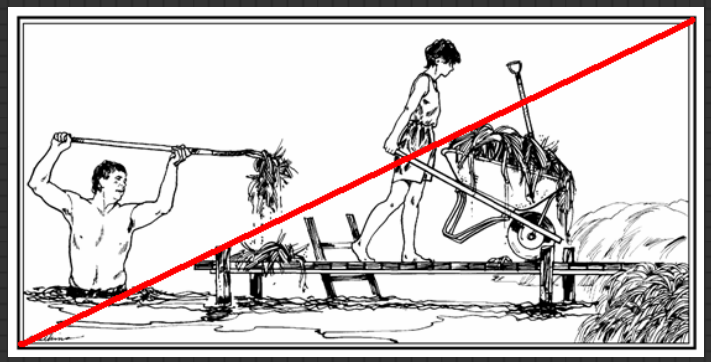
# Purple Loosestrife

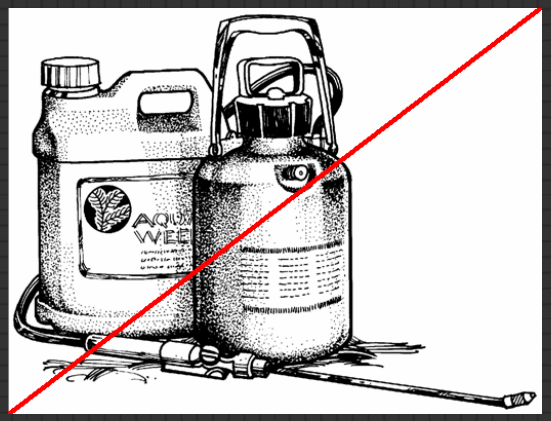
- hardy perennial
- rapidly invades
- diminishes wildlife habitat

* Avoid cutting native aquatic vegetation.

* Avoid dredging native aquatic vegetation.

* Avoid use of chemicals in the lake.





These are the best ways to prevent aquatic exotic species from invading.

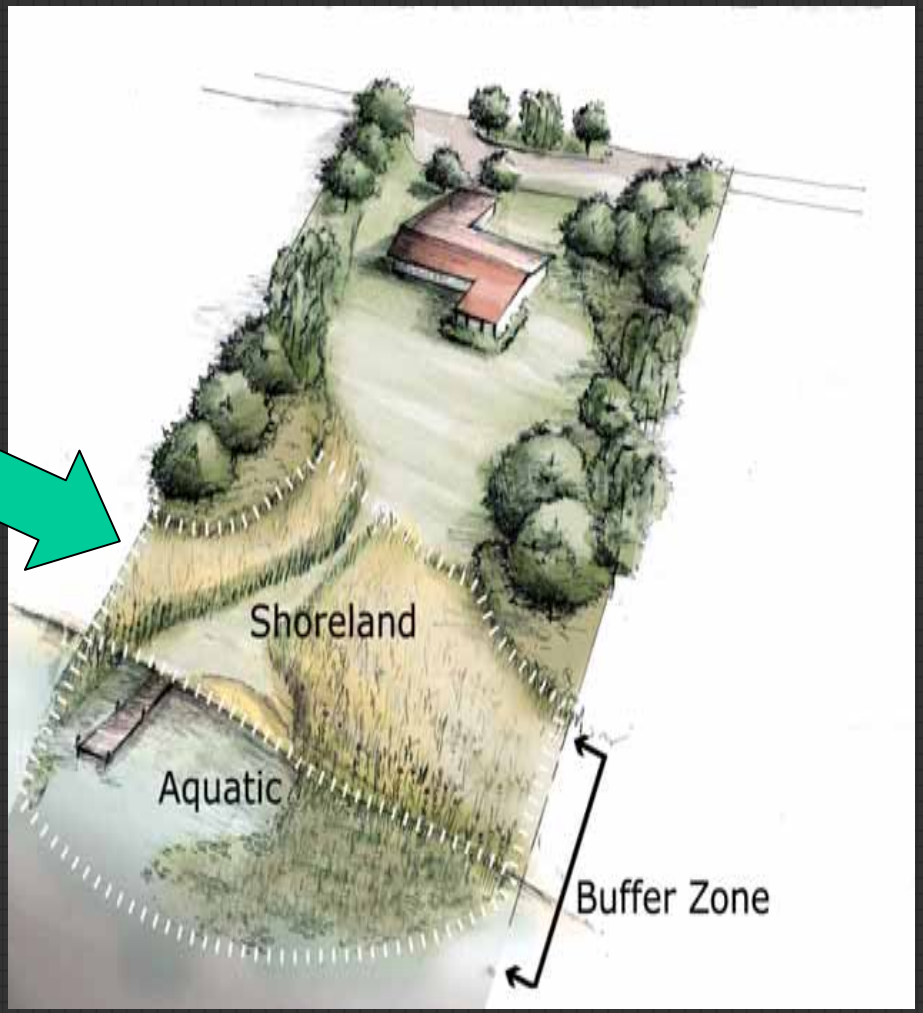
* Remove aquatic plants from boat bottom, boat trailer, & all fishing gear.
* Wash boat & all fishing gear with hot water, or
* Thoroughly dry- leave outside in the sun- for 5 days.
* Drain all the water from the boat, motor, bilge, live wells, and bait wells.
* Dispose of leftover bait in the trash.


*Picture from: Protect Our Waters, Sea Grant*

Use these simple & practical tips as your tools to protect the health of your lake.

Shoreland Habitat

Shoreland Habitat begins at the water's edge, OHWM, and extends inland 35' or more.



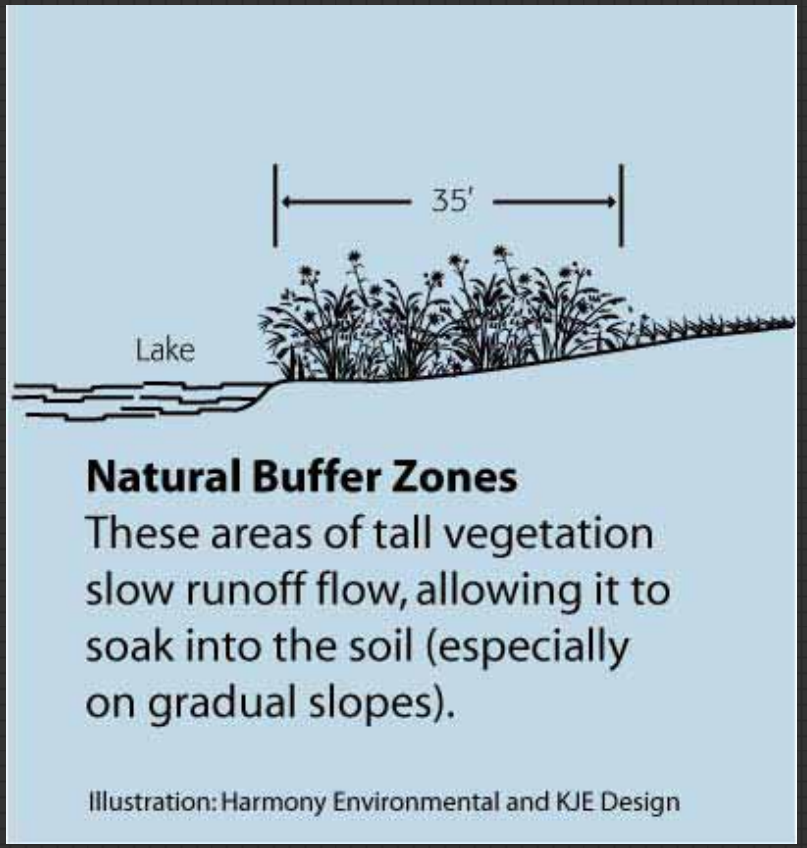
* Use your property as an example to other shoreland owners.

* If you have a lawn up to the water's edge simply stop mowing.

* Maintain a shoreland buffer from the OHWM inland at least 35'.

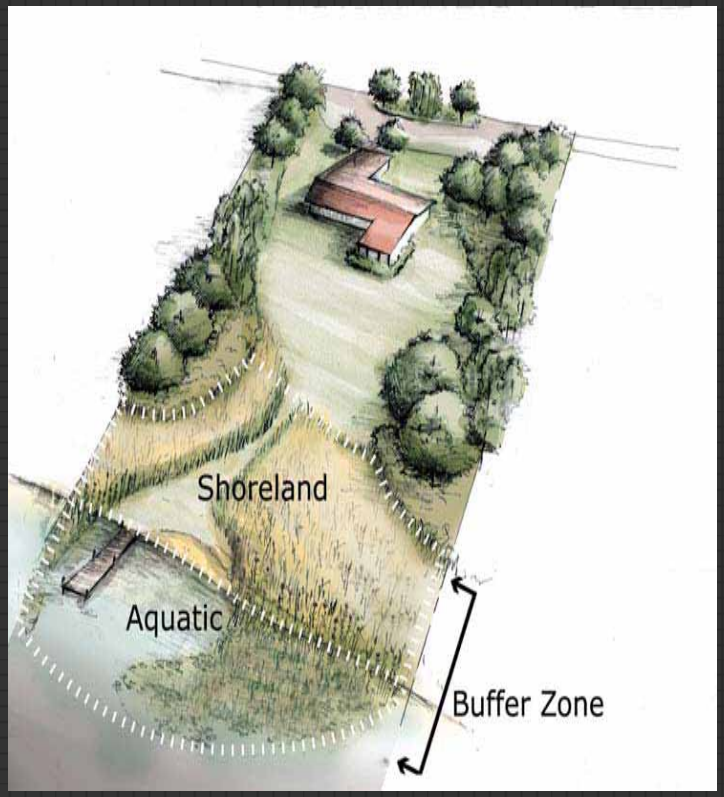
Natural Shoreland Buffer:

- Vegetated with native groundcovers, shrubs, AND trees.
- Corridor between upland & aquatic ecosystems.
- Performs many important functions.



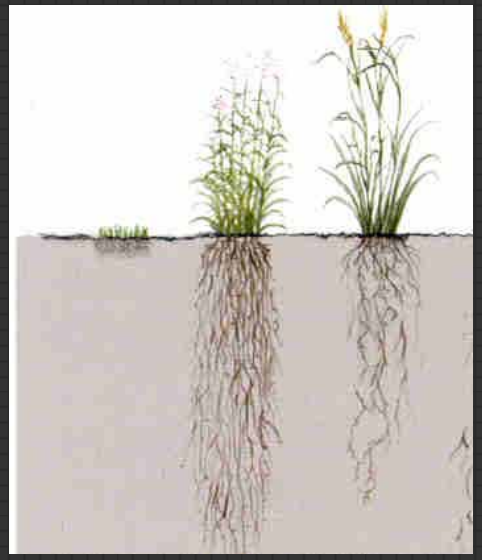
# Functions:

Water quality protection
- Filters sediments
- Reduces erosion/runoff
- Takes up nutrients
- Increases infiltration & groundwater recharge




Provides essential habitat
- Offers food & shelter
- Keeps out invasive species

Preserves natural shoreline



Kentucky bluegrass on left is a nonnative common turf grass.

* Avoid soil compaction in the shoreland buffer by avoiding use of heavy or wheeled equipment.

* Minimize erosion & runoff by maintaining trees and shrubs.

* Utilize organic materials (fiber erosion blankets, biologs, etc) combined with plants for erosion control when possible.

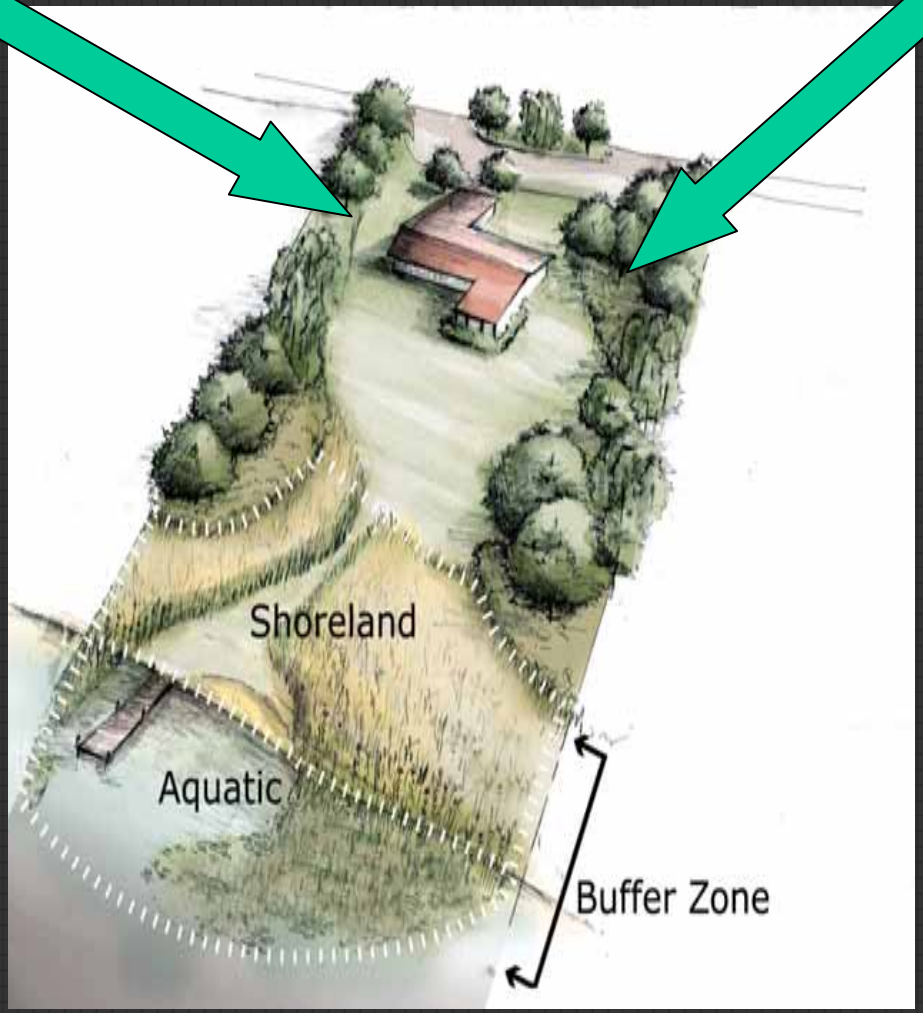
* Use properly sized riprap (specified gradations of rock along shore) only if organic materials are not effective for the site.

* Preserve downed trees that have fallen into the lake.

“The Rest of Your Property”

1) Diminish Runoff  2) Reduce Pollution  3) Capture & Cleanse

‘The rest of your property’ is just that. It includes your house, garage, side yard, buildings, woods, etc.



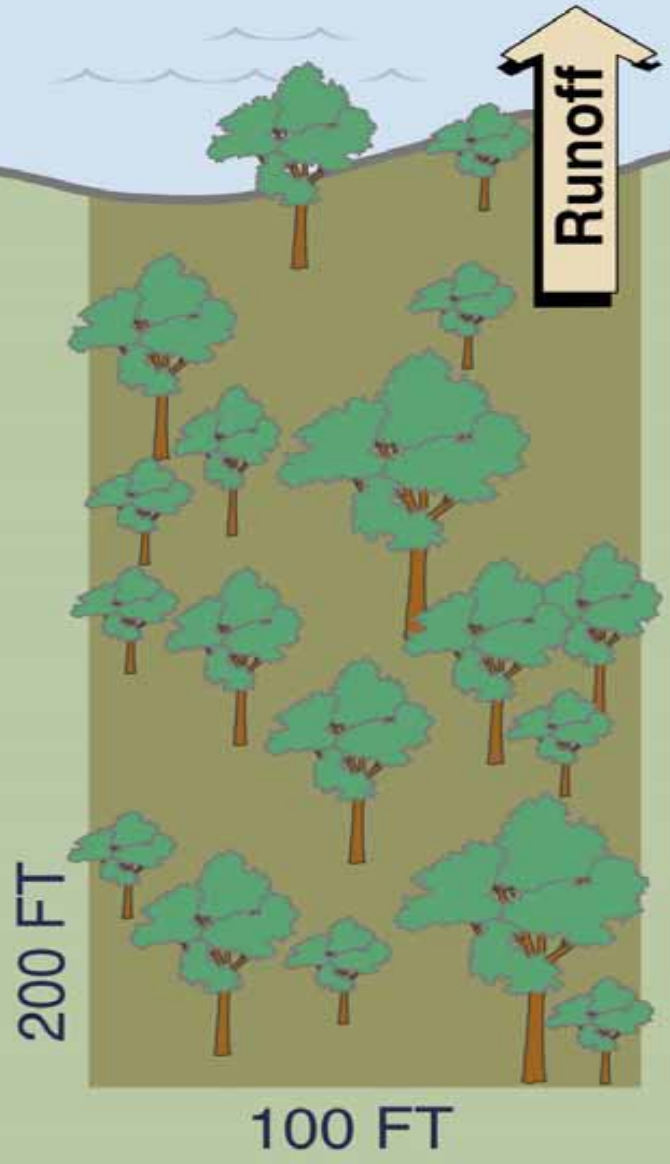
Diminish Runoff:

* Minimize impervious surfaces.

Concrete, asphalt, roofing, and compacted soil prevent percolation of runoff into the ground.

# Undeveloped – Apr.-Oct. phosphorus/sediment runoff model

- maple-beech forest
- 6% slope to lake
- sandy loam soil




**IMPACT ON LAKE**
(April - Oct.)

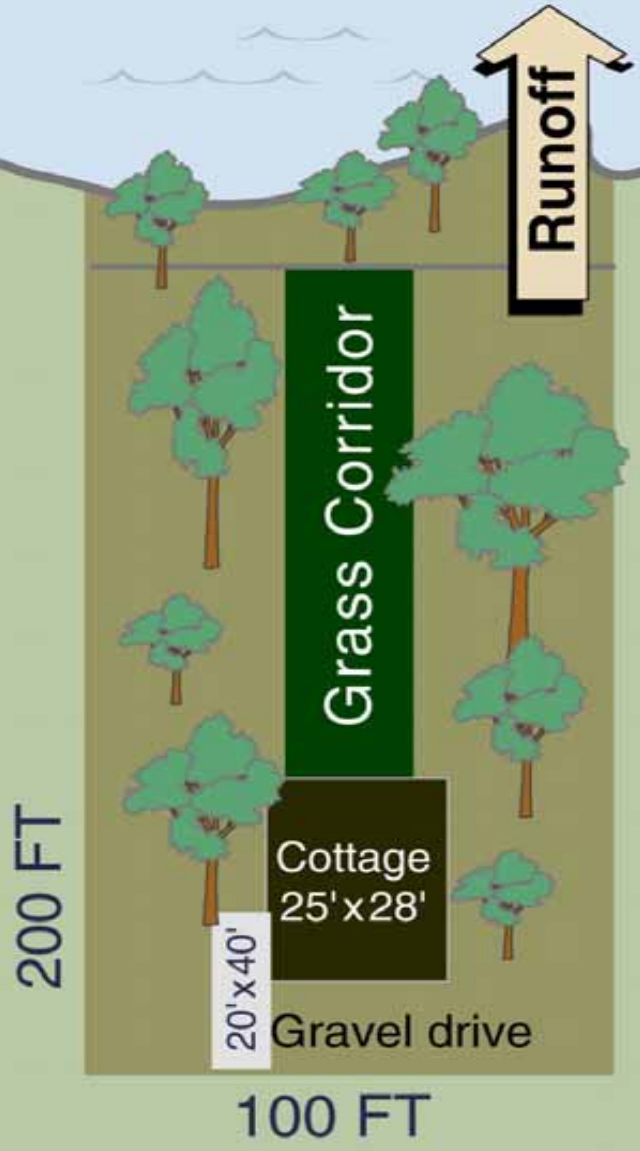
- 1,000 $ft^3$ runoff to lake
- 0.03 lbs. phos. to lake
- 5 lbs. sediment to lake

Source: Wisconsin Dept. of Natural Resources

The Wisconsin Lakes Partnership

# 1940s development – Apr.-Oct. phosphorus/sediment runoff model

- maple-beech forest
- 6% slope to lake
- grass corridor 20'-wide
- cottage 700 ft$^2$ perimeter
- gravel drive 800 ft$^2$
- 35'-wide buffer strip




**IMPACT ON LAKE**
(April - Oct.)

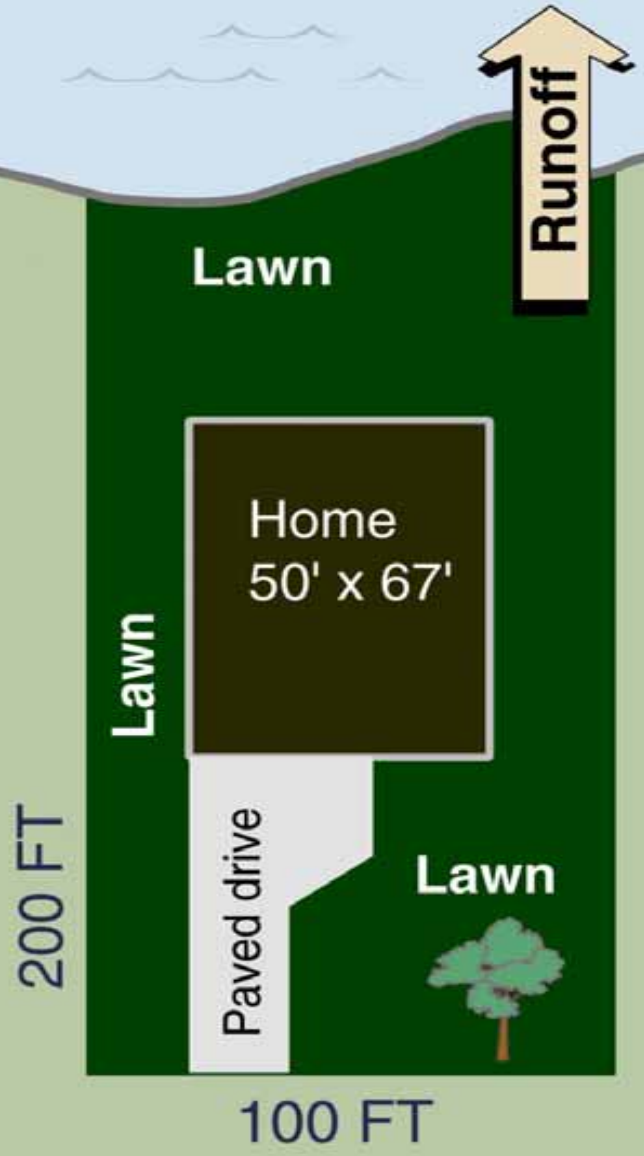
- 1,000 ft$^3$ runoff to lake
- 0.03 lbs. phos. to lake
- 20 lbs. sediment to lake

Source: Wisconsin Dept. of Natural Resources

The Wisconsin Lakes Partnership

# Current-style development – Apr.-Oct. phosphorus/sediment runoff

- maintained lawn, soil graded
- 6% slope to lake
- home 3,350 ft²  perimeter
- paved drive 770 ft²



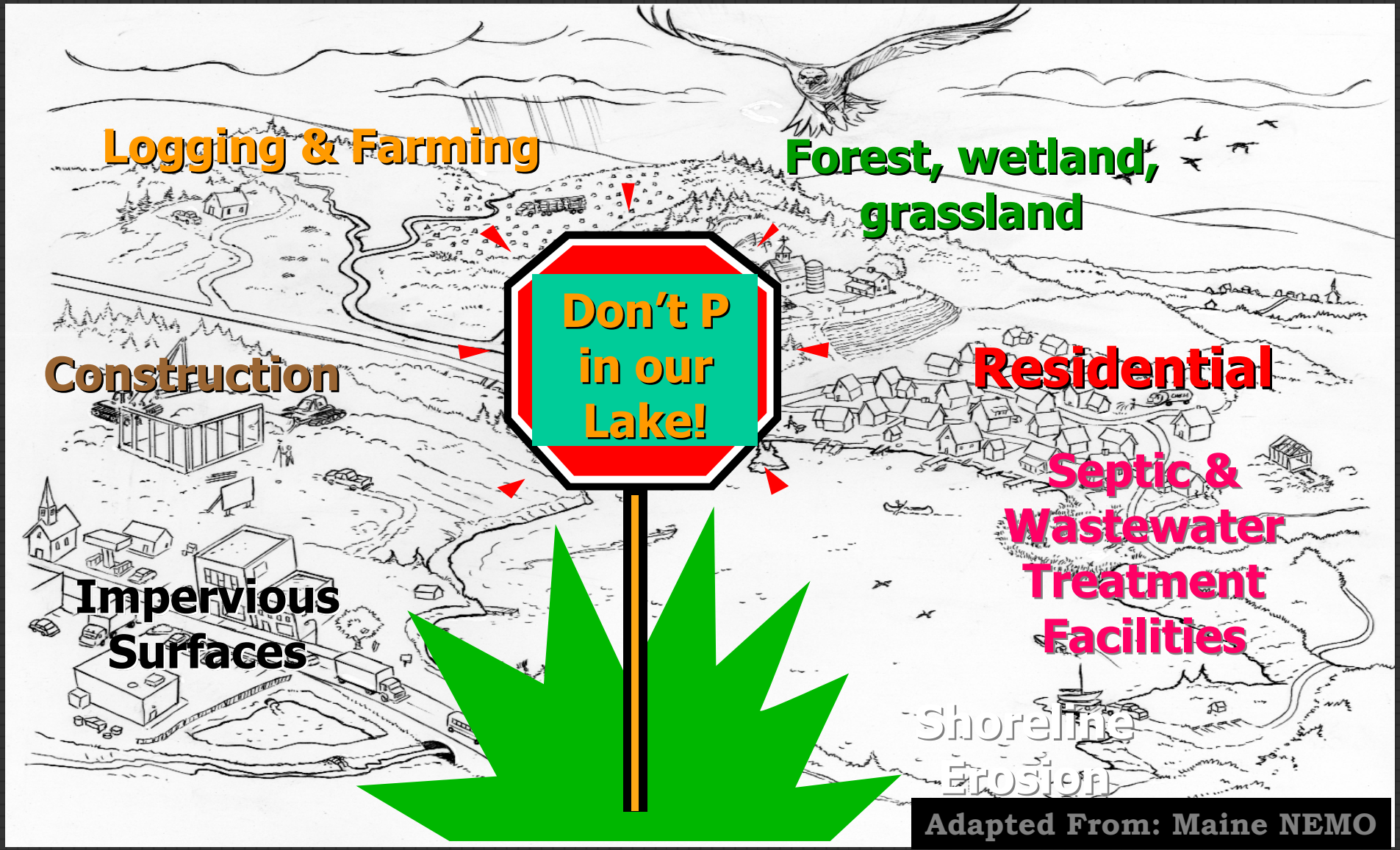

**IMPACT ON LAKE**
(April - Oct.)

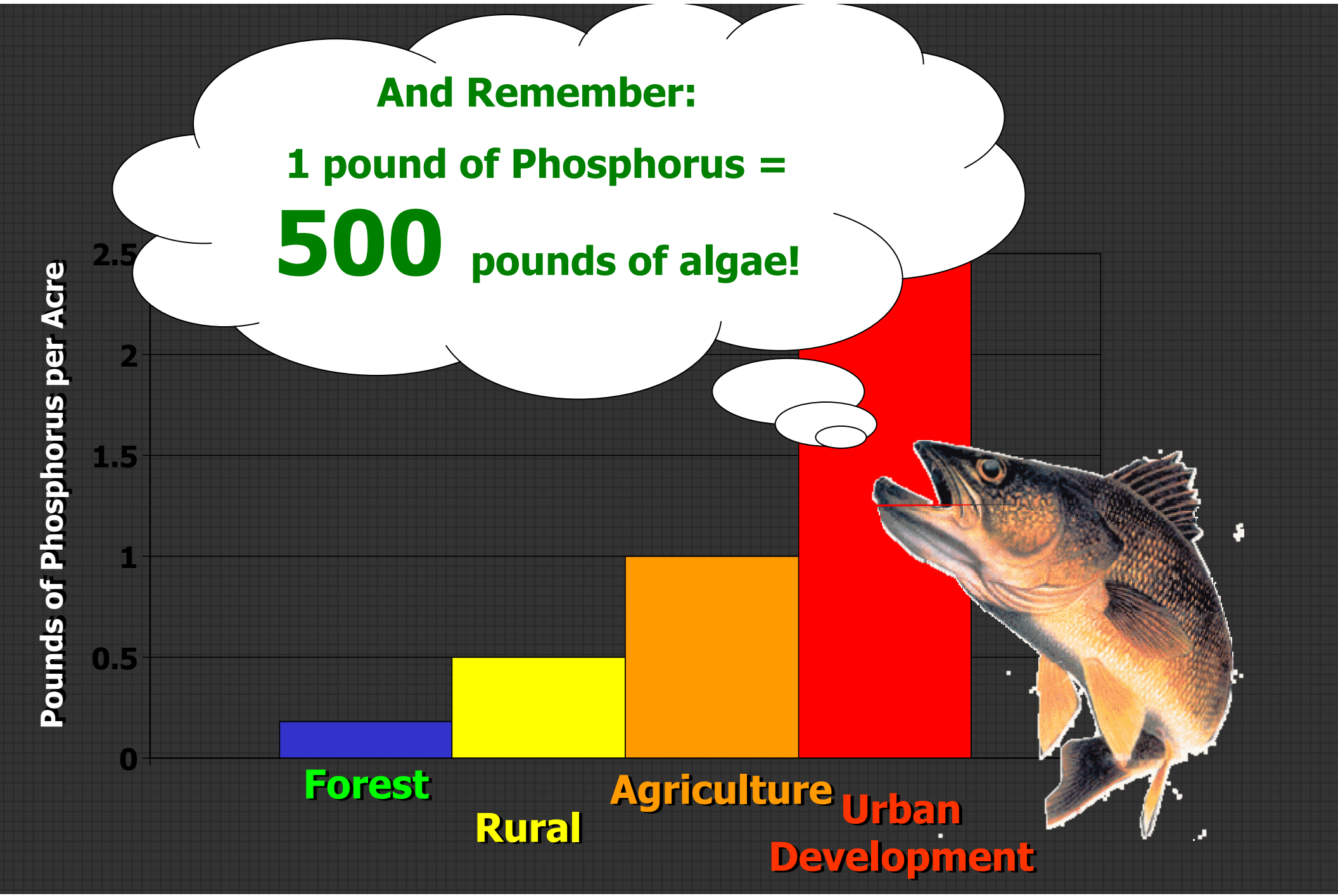
- 5,000 ft³ runoff to lake
- 0.20 lbs. phos. to lake
- 90 lbs. sediment to lake

Source: Wisconsin Dept. of Natural Resources

The Wisconsin Lakes Partnership

# Where does all that P come from?




And Remember:
1 pound of Phosphorus =
500 pounds of algae!
Pounds of Phosphorus per Acre
2.5
2
1.5
1
0.5
0
Forest
Rural
Agriculture
Urban Development

Diminish Runoff:

* Consider alternatives to cement for your drive & sidewalks.

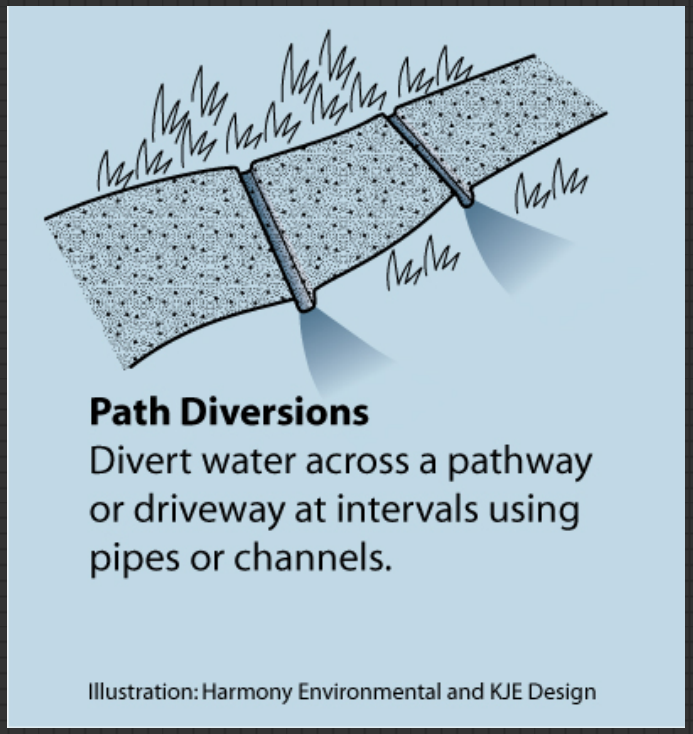
* Such as pervious pavers, stepping stones or gravel.

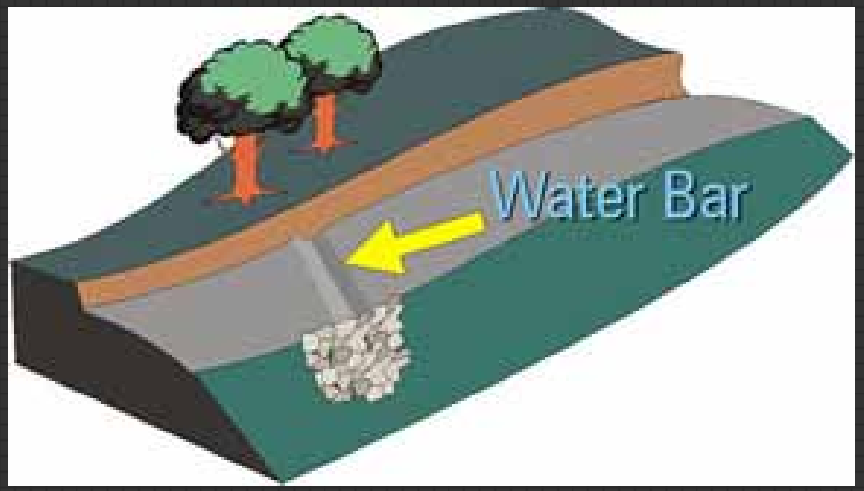
## Diminish Runoff:

* Divert downspouts, or direct flow, towards wooded or well vegetated areas of your yard & away from hard surfaces such as a driveway or sidewalk.

* Use Path Diversions to divert water away from paths.

* Install water bars on driveways.



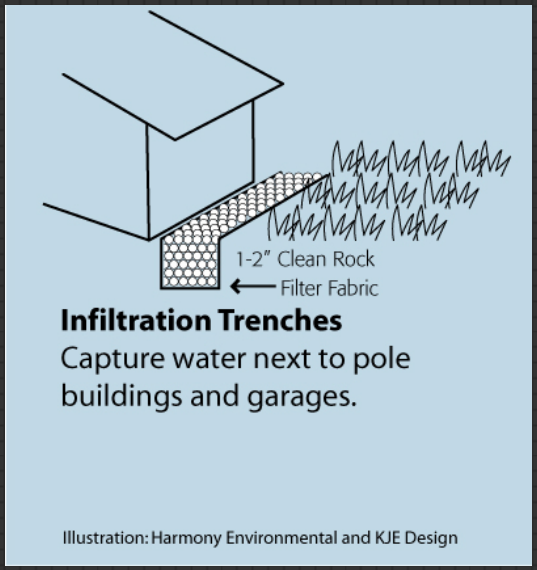




Water bar- a shallow trench with a berm that encourages cross drainage.

# Diminish Runoff:

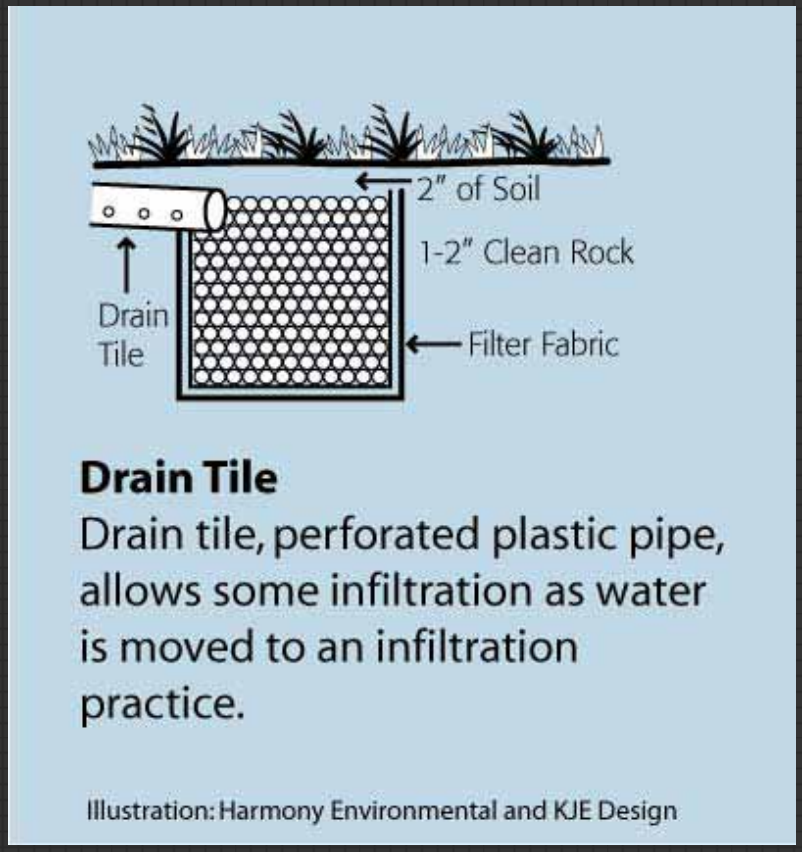
* Utilize infiltration trenches or basins to capture and filter runoff.

* Use drain tile to disperse water underground.



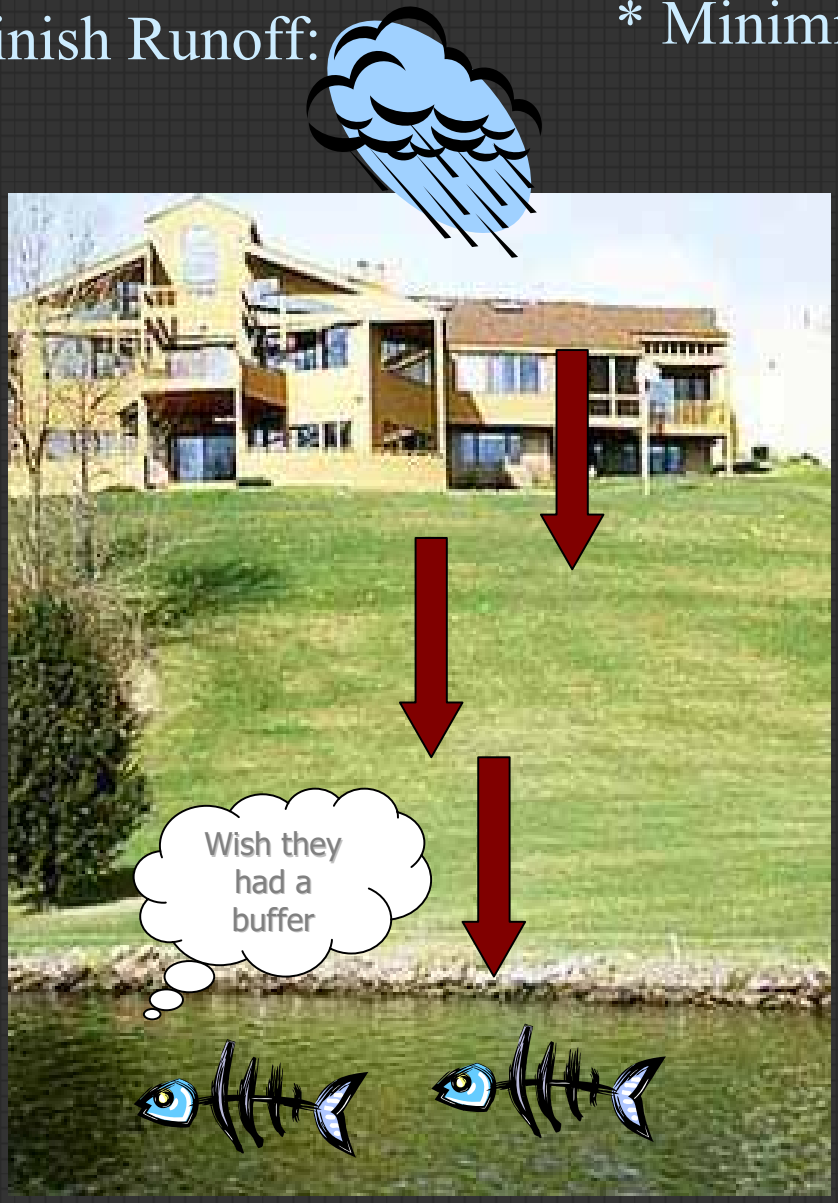

# Diminish Runoff:

* Use drain tile to disperse water underground.




Keeping the water on your property & encouraging infiltration helps to solve some of the water pollution problems.

# Diminish Runoff:




* Minimize your lawn.

WI study found runoff from lawns carries 8x more P to the lake than similar sized wooded lots.

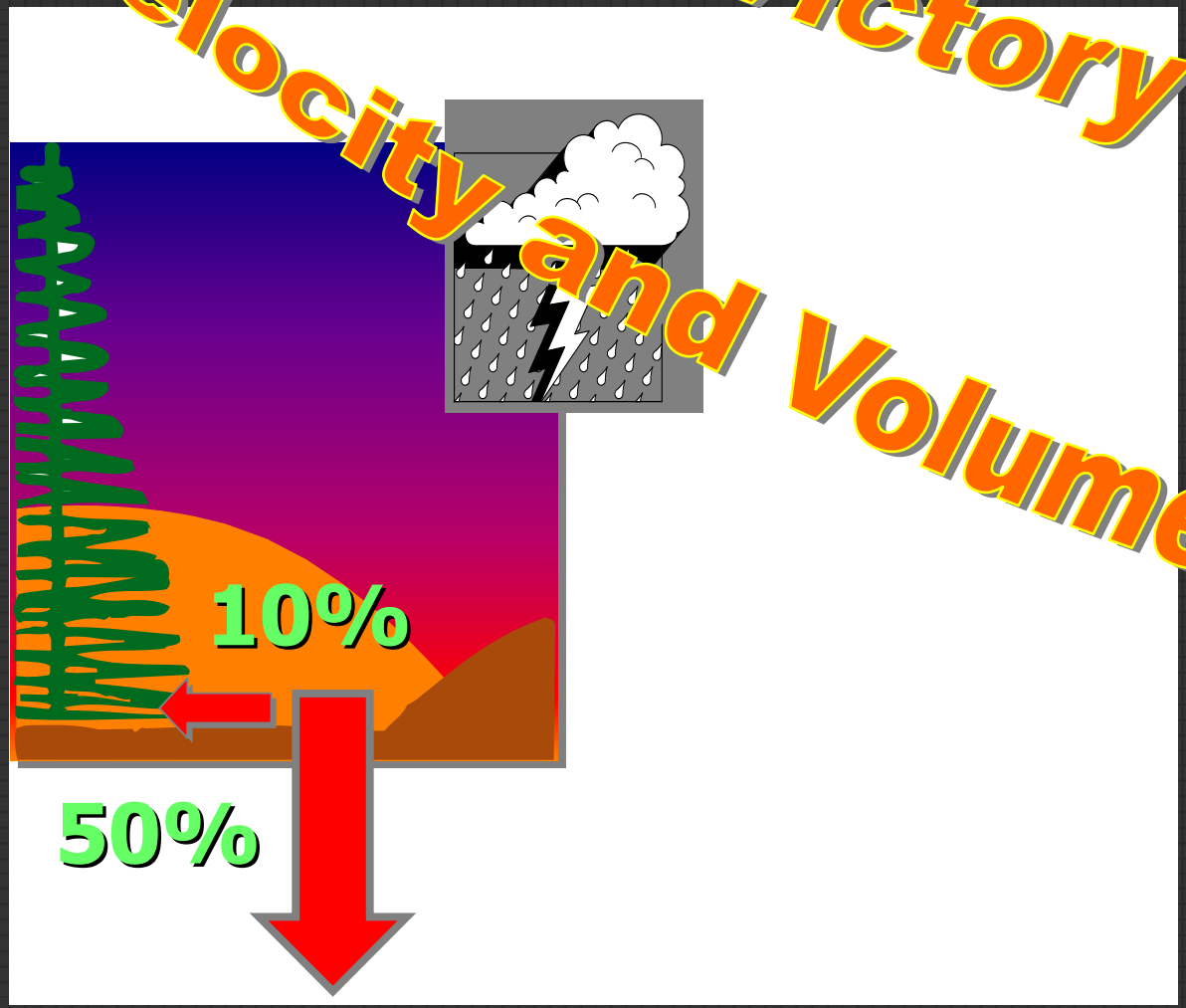
- Grading a lot often removes natural detention depressions & it concentrates the flow to the lake.

- Heavy equipment usually compacts the soil during & after construction.

- Removal of trees & shrubs allows more rain to hit the ground in the first place & then diminishes avenue for infiltration.

…will reduce runoff velocity and volume

Victory = Velocity and Volume Control

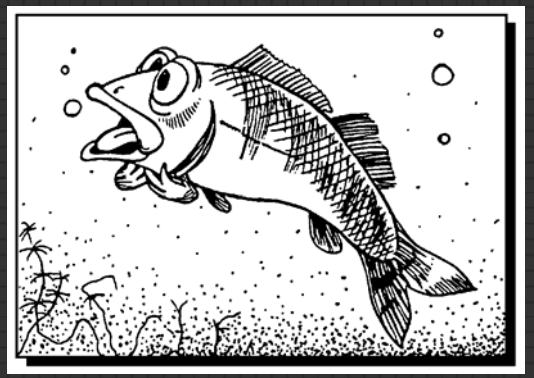



## Reduce Pollution:
## * Avoid fertilizer use, or use phosphorus-free fertilizer.

A study of 236 lawns in Dane Co. found that P concentration was 4x higher than needed to maintain a healthy lawn.

From "Protecting Your Waterfront Investment"





In most WI lakes, P triggers rapid weed & algae growth, decreasing water clarity and depleting $O_2$ so fish can no longer thrive.

One pound of P in runoff: 500 pounds of algae growth!!!!

**> $5 billion/ year on fertilizers**
**30-60% urban fresh water used for watering**
**Converted 20 million acres to lawn**

Reduce Pollution during & after construction:

* Develop an Erosion Control Plan when planning construction.

* Use & maintain erosion control practices, such as silt fence.

# Reduce Pollution during & after construction:

* Minimize land disturbance at one time.

* Divert runoff away from disturbed areas.

* RE-VEGETATE immediately.

Erosion rates during construction with bare soil & uncontrolled runoff can be 1000x more than on a natural, vegetated site.

Reduce Pollution:

* Remove pet waste.

* Keep yard waste & grass clippings out of the lake.

* Utilize Clean Sweep to dispose of chemicals, paints, etc.

* Use phosphorus-free detergents for washing clothes, dishes, & vehicles.

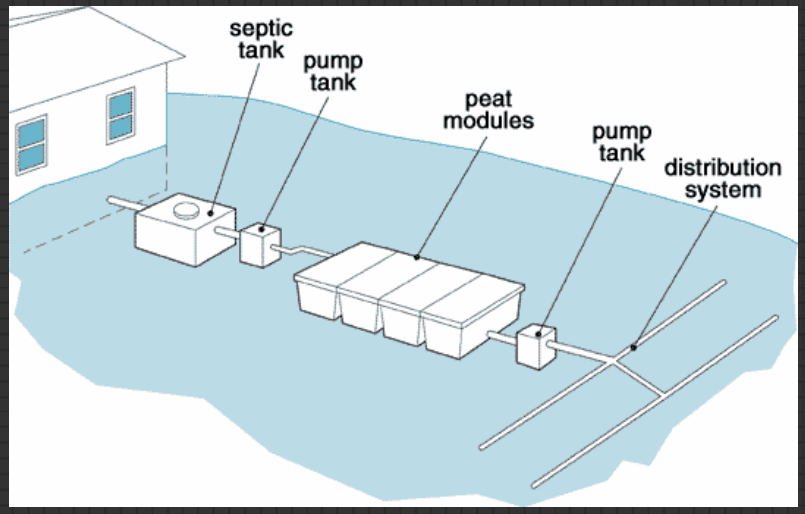

From "Protecting Your Waterfront Investment"

Reduce Pollution:

* Inspect & pump your septic system at least every 3 years.

* Don't dump toxic products down your drain.
* Divert surface water away from the drainfield.

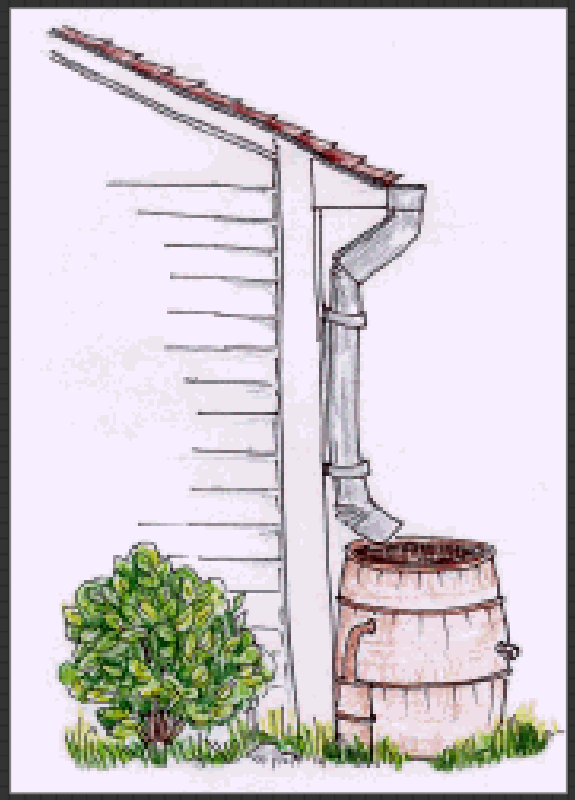
* Avoid flushing food products, cooking grease, diapers, tissues, etc. down the drain or toilet.




* Use natural remedies as alternatives to toxic household cleaning products.
* Avoid driving or parking on the drainfield.
* Keep deep-rooted plants away from the septic.

# Capture & Cleanse:

* Install rain barrels at downspouts to collect rain water.



From “Protecting Your Waterfront Investment”

Collect water from your downspout to water your plants, yard, or garden.
The barrel should be covered to keep out leaves and mosquitos.

# Capture & Cleanse:

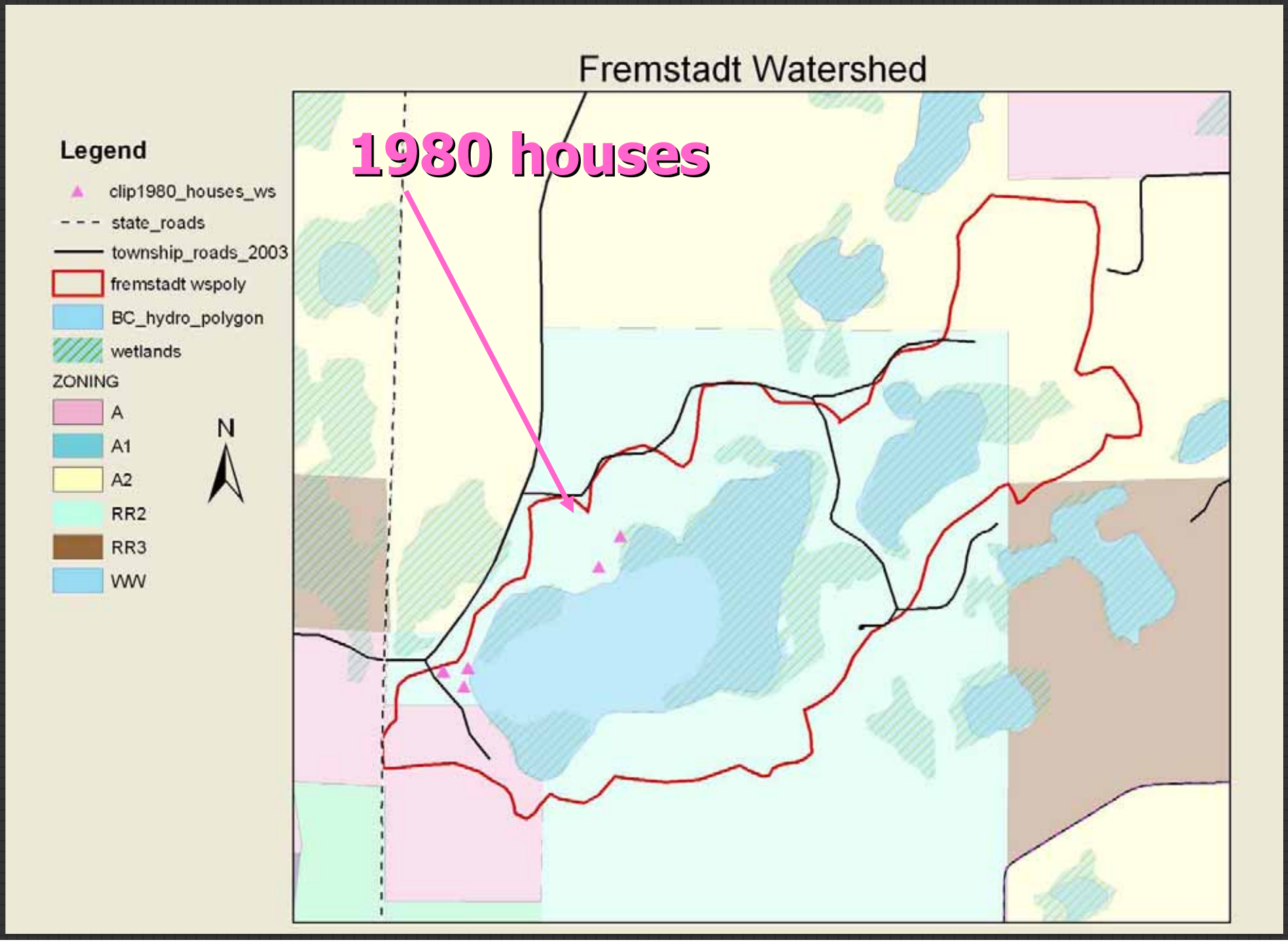
* Create a rain garden.

- Landscaped area of native flowers & grasses which soaks up water from the roof, sidewalk, lawn, etc.
- Filters pollutants & sediments.
- Encourages 30% more infiltration than a lawn.

* Be an active voice in your lake association.

* Join WAL.

* Remember the cumulative impacts…


Fremstadt Watershed
1980 houses
Legend
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state_roads
township_roads_2003
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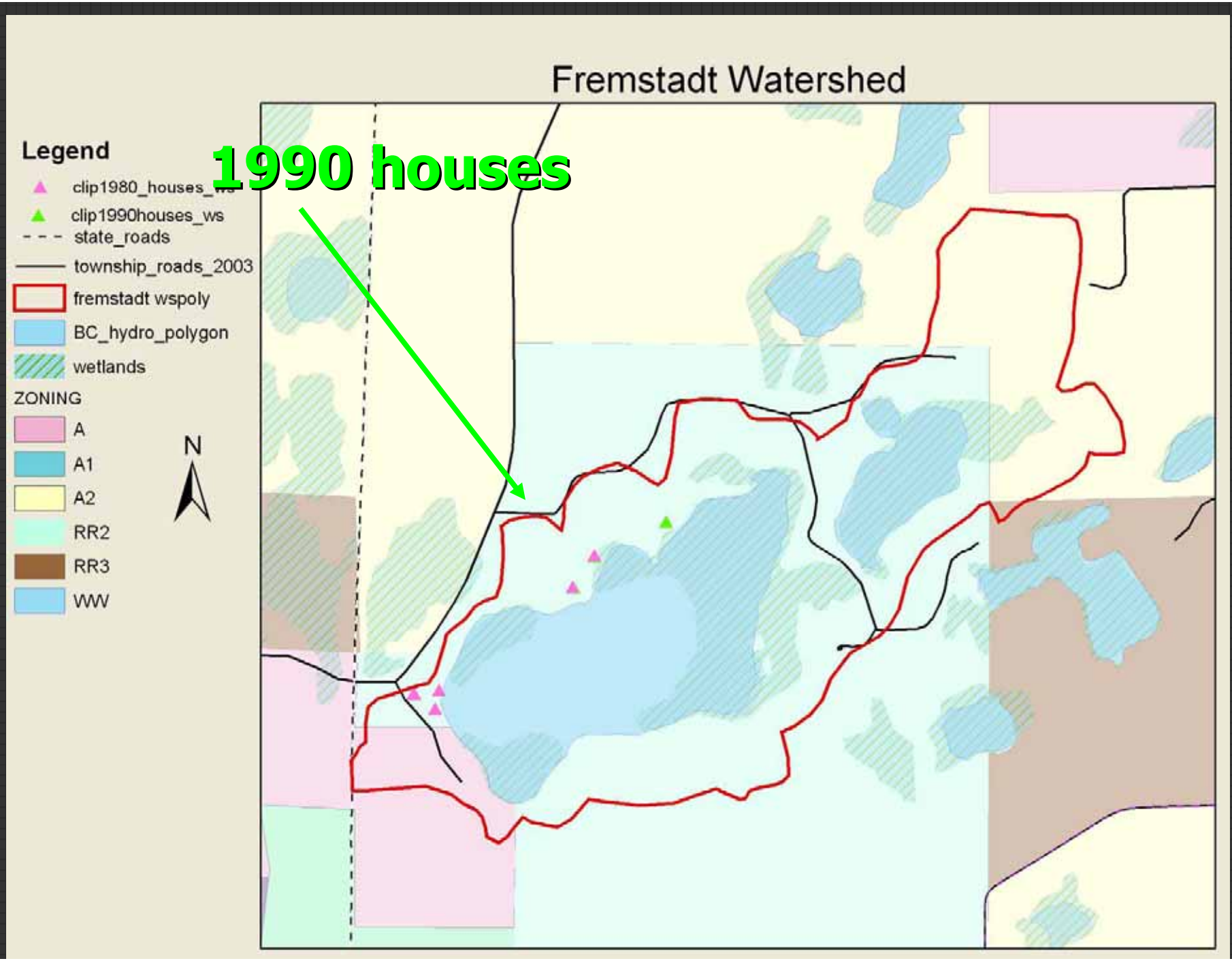
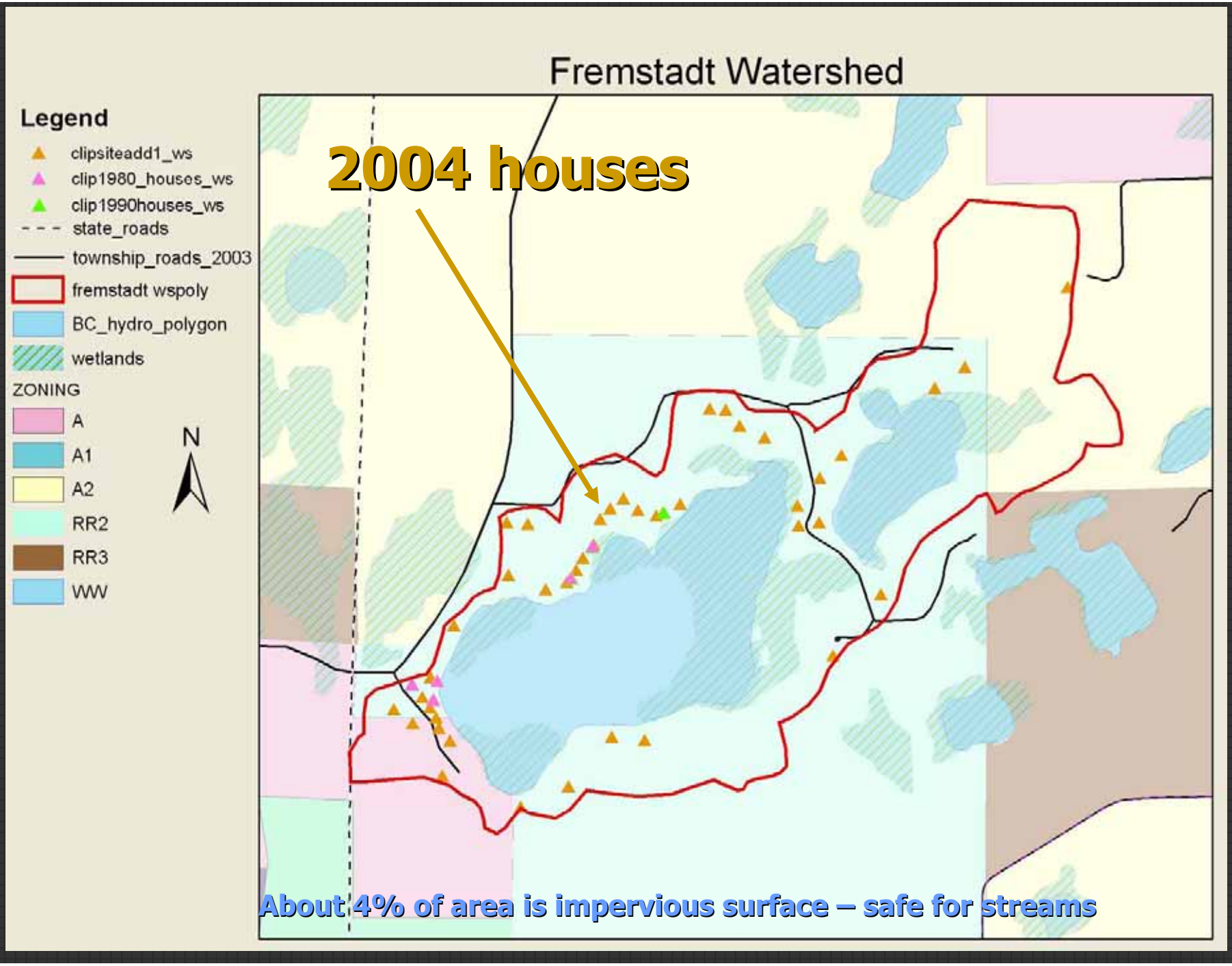
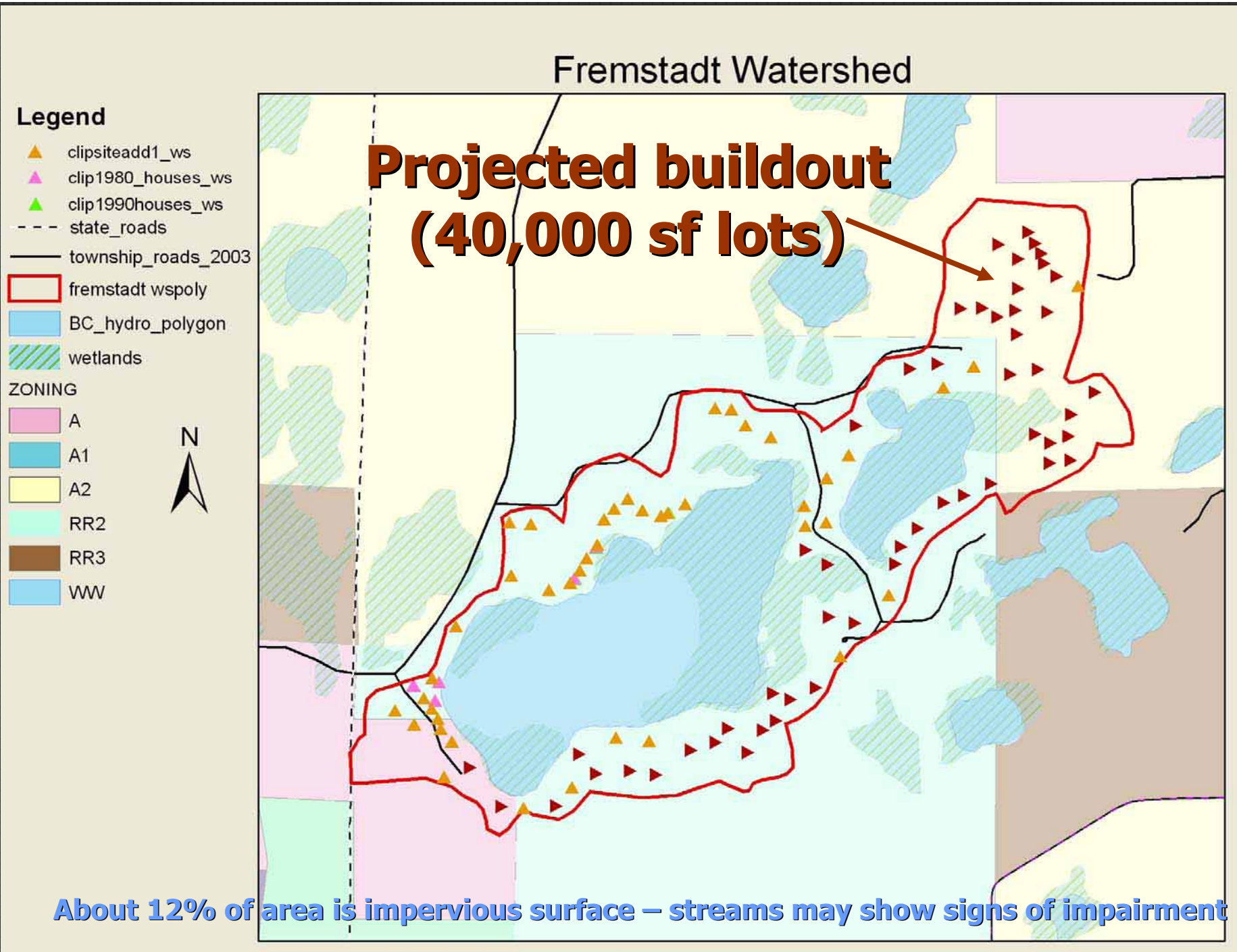
A
A1
A2
RR2
RR3
WW
N


Fremstadt Watershed
1990 houses
Legend
clip1980_houses_ws
clip1990houses_ws
state_roads
township_roads_2003
fremstadt wspoly
BC_hydro_polygon
wetlands
ZONING
A
A1
A2
RR2
RR3
WW
N

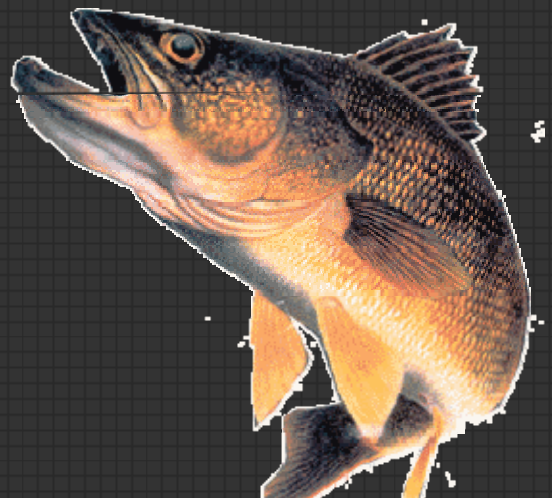

Fremstadt Watershed
2004 houses
Legend
clipsiteadd1_ws
clip1980_houses_ws
clip1990houses_ws
state_roads
township_roads_2003
fremstadt wspoly
BC_hydro_polygon
wetlands
ZONING
A
A1
A2
RR2
RR3
WW
N
About 4% of area is impervious surface – safe for streams




About 12% of area is impervious surface – streams may show signs of impairment

An **OUNCE** of **PREVENTION** is worth a ~~**POUND**~~ **TON** of **CURE**!

# Restoration




*"Never doubt that a small group of thoughtful, committed citizens can change the world. Indeed it's the only thing that ever has."* -Margaret Mead