

CONDENSED VERSION

IMPERVIOUS SURFACES

How They Impact Fish, Wildlife and Waterfront Property Values



Healthy lakes, rivers and streams are truly the basis for creating fond memories of time spent near the water, like walleye fishing on a crisp fall morning, swimming with the kids in the afternoon, and entertaining friends on the evening shoreline. Healthy fish, abundant wildlife and clear, clean water all depend on the individual decisions that we make about our waterfront properties.

Virtually any form of shoreland development leads to more impervious surfaces, which are hard, manmade surfaces such as roof tops, driveways, parking areas and patios. This publication was developed for waterfront property owners and local officials to focus on impacts from impervious surfaces to:

- 1. Fishing**
- 2. Wildlife**
- 3. Waterfront property values**

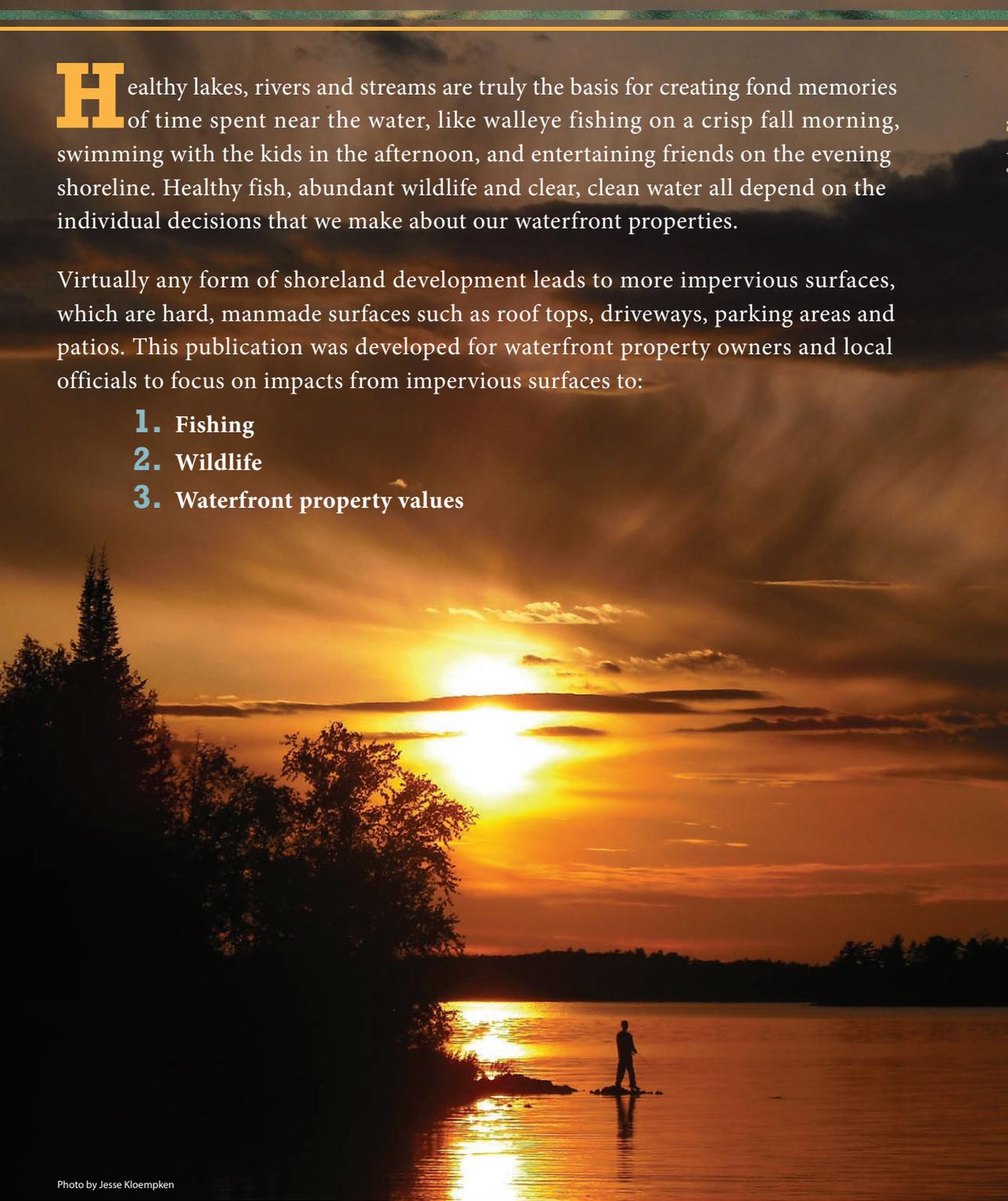
A photograph of a sunset over a calm lake. The sun is low on the horizon, creating a bright orange and yellow glow in the sky and reflecting on the water. A person is silhouetted against the water in the distance, standing on a small rock or pier. The foreground shows the dark silhouettes of trees and bushes on the left side.

Photo by Jesse Kloempken

***SHORELAND ZONING is in place to protect our lakes and rivers.
See your county zoning office for more information.***

***A video with more details about impervious surfaces is at
youtube.com/watch?v=UPjPnaGNB1c&t=6s***

3 REASONS TO MINIMIZE IMPERVIOUS SURFACES

1 Fishing

Many of Wisconsin's lakes and rivers are prime destinations for catching walleye, bass, musky, or crappies – making this a popular pastime. Runoff from impervious surfaces carries sediments, nutrients and other pollutants into lakes and streams leading to decreased populations of those fish we enjoy catching.

This is largely because:

- **More nutrients** result in less oxygen in the water, which fish need to survive.
- **More sediments** and algae growth make it difficult for some predator species that hunt by sight to find their food.
- **More sediments** cover spawning beds of fish such as smallmouth bass, walleye, and crappie, potentially inhibiting reproduction.

More Impervious Surface = Less Fish

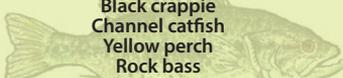
Fish found in streams when impervious surface in the watershed was:

Less than 8%

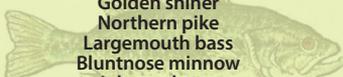
8 - 12%

Greater than 12%

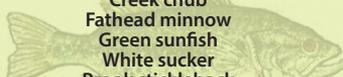
More Impervious Surfaces in Watershed



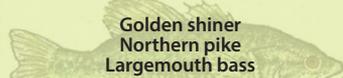
Iowa darter
Black crappie
Channel catfish
Yellow perch
Rock bass
Honeyhead chub
Sand shiner
Southern redbelly dace



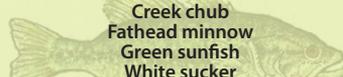
Golden shiner
Northern pike
Largemouth bass
Bluntnose minnow
Johnny darter
Common shiner



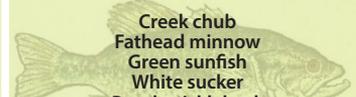
Creek chub
Fathead minnow
Green sunfish
White sucker
Brook stickleback



Golden shiner
Northern pike
Largemouth bass
Bluntnose minnow
Johnny darter
Common shiner



Creek chub
Fathead minnow
Green sunfish
White sucker
Brook stickleback



Creek chub
Fathead minnow
Green sunfish
White sucker
Brook stickleback

Fewer Species of Fish

The number of different stream fish species declines as the effects of impervious surfaces kill off more sensitive species.

SPECIES HIGHLIGHT: **Walleye**

Wisconsin is walleye country. Impervious surfaces can reduce walleye reproduction by causing soil erosion which leads to sedimentation. Although impervious surfaces aren't the only cause of sedimentation, when sediments cover spawning grounds, the spaces between the rocks and gravel become blanketed with silt. This can quickly cause walleye eggs to die because of inadequate water flow and oxygen deprivation. Adult walleyes are often able to cope under these conditions, but harming the success of eggs and embryos puts the survival of a healthy walleye population at risk.

Walleye

Walleye typically spawn between mid-April and early May in Wisconsin when spring runoff is highest. Rock and gravel covered bottoms are their preferred spawning grounds due to the requirements of their sensitive eggs and sedimentation.



Photo by Eric Engbretson

2 Wildlife

The shoreline is a busy place. Northern pike, bluegills, bass and other fish spawn in the shallow water along the shore. Loons, ducks, geese and other water birds nest along the banks. The creation of impervious surfaces removes essential habitat for numerous species. Driveways, cemented paths and other impervious surfaces can be thought of as biological deserts where animals cannot find food or shelter.

SPECIES HIGHLIGHT: **Mallard**

During the first two weeks of a mallard duckling's life, its diet is comprised almost exclusively of aquatic insects. The same dietary needs also hold true for many other species of ducks. When soil is washed into our waters, aquatic insect densities tend to decrease. Without an adequate food source, ducks will not be able to successfully raise their young.



Photo by Mark Lasnek

Mallard

SPECIES HIGHLIGHT:

Common Loon

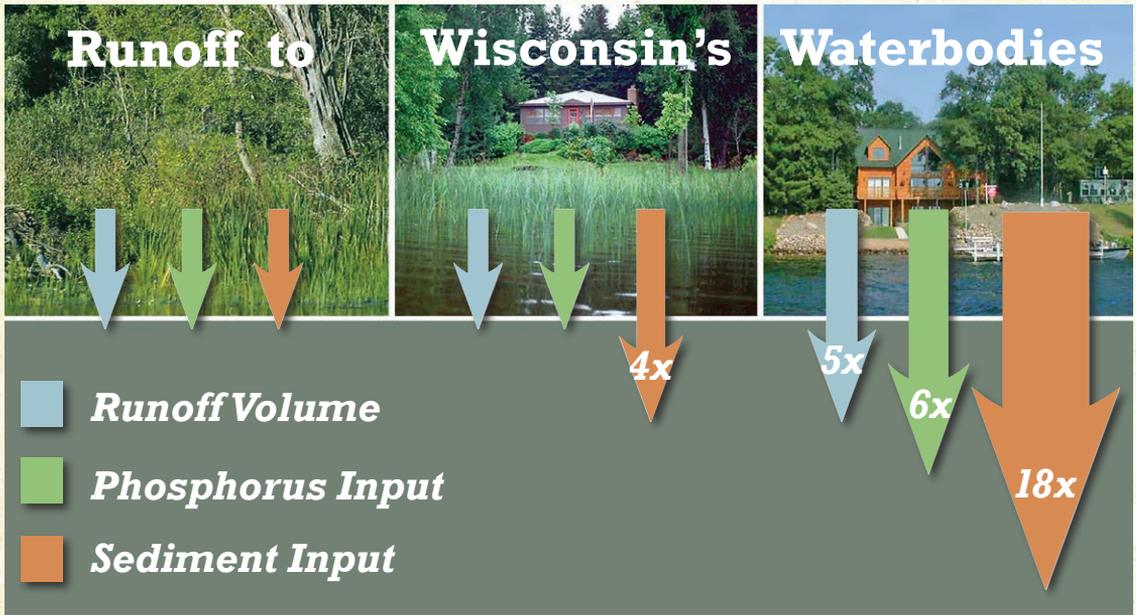
Common loons evoke a true sense of the Northwoods. Historically, loons have been pushed northward, in part due to the effects of shoreland development. Loons can be impacted by runoff from impervious surfaces that turns clear water murky. Loons search for fish from the water's surface, making clear water key to finding food. Because of this, loon pairs appear to favor lakes with clearer water.



Loons nest near the water on either solid ground or floating vegetation.

3 Waterfront Property Values

While many opinions exist over what the perfect shoreline looks like, most of us agree that clear water is desirable. A recent study that tracked over 1,000 waterfront property sales in Minnesota found that when all other factors remained equal, properties on lakes with clearer water commanded significantly higher property prices. A similar study conducted in Maine found that changes in water clarity of three feet can change lakefront property prices by as much as \$200 per frontage foot. This means that a three foot increase in water clarity could increase the property value by as much as \$20,000 on a lot with 100 feet of water frontage. Perhaps more important, the amount for an identical decrease in water clarity would decrease property values by significantly more than \$20,000.



The far left picture above indicates a half-acre undeveloped shoreland lot characterized by minimal runoff, phosphorus and sediment inputs. The middle picture portrays a typical 1940s shoreland development, with approximately 8% impervious surface coverage. The picture to the right has approximately 20% impervious surface coverage. Notice how sediment inputs drastically increase with impervious surface coverage.

Photo by John Haack





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