



THE LAND USE TRACKER

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Did you know...

...only 13 states have not made and are not currently pursuing significant statewide planning reforms, all other states are or have...

...Wisconsin included.

*See Planning for Smart Growth,
Feb 2002, www.planning.org*

This is the site for the Wisconsin Chapter of the American Planning Association.



www.wisconsinplanners.org

Siting rural development— to protect lakes and streams and decrease road costs

by Lynn Markham

The first two articles in this series discussed how impervious surfaces such as roads and rooftops increase stormwater and pollutant runoff and decrease water quality and wildlife habitat, and then provided a list of actions to minimize those impacts. This article explores how to site rural development and its associated impervious surfaces in a way that will achieve the goals of protecting lakes and streams AND decreasing costs for roads.

Rural areas by definition have more undeveloped space than urban areas. Consequently, planners, developers and local officials have more choices when they are deciding where to locate new development.

Water highways to roadways

Historically, people located their homes and businesses near lakes and streams for a number of practical reasons including transportation of people, furs, logs and other products; drinking water for people and animals; power for mills and industry; fishing; and recreation. As times have changed so have the requirements for homes and businesses to be located near lakes and streams. For instance, logs are now hauled by truck or rail, water is delivered to cows in free stall barns, and businesses are generally powered by coal or gas-fired power plants.

Public costs of transportation

Transportation has also seen large changes in Wisconsin from the days when river corridors were the main transportation routes to today with 112,362 miles of highways, roads, and streets in the state, all impervious surfaces. These roads are necessary for many people to travel to work, school, or recreational areas. In 2000, vehicles traveled 57 billion miles in Wisconsin, which works out to 10,261 vehicle miles per person; 105% of the national average.

Roads and transportation constitute a significant portion of municipal spending. As a percentage of total expenditures in 1999, this spending in Wisconsin amounted to:

- 41% for towns,
- 18% for villages,
- 16% for cities, and
- 9% for counties.

*Part 3 of a
series about
impervious
surfaces*

(Continued on page 3)

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What's New at the Center

On the web: click on "What's New at the Center" on our homepage.

Land Use Internship Program

The Student and Employer Guides have been added for the Land Use Internship Program. Since the fall of 2001, UWSP is requiring all incoming Land Use Planning undergraduate students to earn credits in an internship experience. The goal of this internship is to gain valuable professional and practical experience in the field of land use planning. This internship will primarily be done in their junior year of college. This is a wonderful opportunity for students and potential employers alike. The Student and Employer Guides have been added for the Land Use Internship Program on our website at www.uwsp.edu/cnr/landcenter/. Since the fall of 2001, UWSP is requiring all incoming Land Use Planning undergraduate students to earn credits in an internship experience. The goal of this internship is to gain valuable professional and practical experience in the field of land use planning. This internship will primarily be done in their junior year of college. This is a wonderful opportunity for students and potential employers alike.

WAPA 2002 Workshop, "Sustaining Great Communities"

More information is now available for Wisconsin Chapter of the American Planning Association (WAPA) 2002 workshop, "Sustaining Great Communities," is to be held on Thursday, September 26, in Madison, at the Exhibition Hall, Alliant Energy Center. 8:30-9:00 registration, 9-5 workshop, 5-6 reception. You can find the workshop brochure at the WAPA web site (pdf format) at www.wisconsinplanners.org/events/APA9_02.PDF.

For other land use events, visit our website at www.uwsp.edu/cnr/landcenter and follow the link to the calendar.

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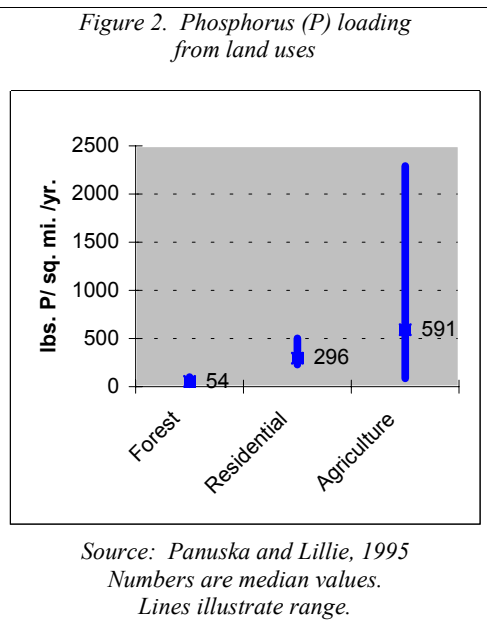
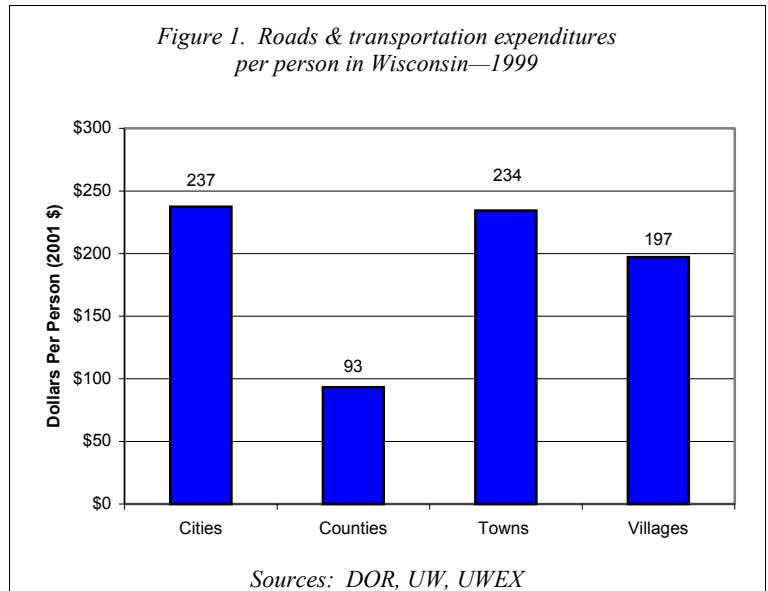
(Continued from page 1)

Figure 1 illustrates the dollars spent for roads and transportation per person in Wisconsin. Based on this information, governments in our state pay an average of \$316 per person annually for roads and transportation (Average expenditures per person = average expenditure per person for city, town and county + average expenditure per person for county).

An example will be presented later in this article that decreases road costs and protects lakes and streams.

Natural resource costs of transportation

The path water takes from the time it hits the ground to when it enters a lake or stream determines what pollutants are transported to the waterway. For instance, if water runs across a road it may carry oil or antifreeze and if it seeps through the ground near a septic field it will carry nutrients such as nitrogen and phosphorus.



In more than 80% of Wisconsin’s lakes, phosphorus is the key nutrient. Adding more phosphorus causes more algae and weed growth. The same is generally true in streams, although shading, flow and other factors also play important roles in plant growth. Research based on 35 watersheds, mostly in southern Wisconsin, found that the amount of phosphorus carried from the land into lakes and streams varies widely depending on land uses as shown in Figure 2. The most phosphorus per area was delivered to lakes from agricultural lands and the least from forested lands, with residential lands falling in the middle. This trend suggests that phosphorus loading increases with increasing nutrient applications and land disturbance – a logical finding since phosphorus is often bound to soil particles that are washed into waterways upon land disturbance. Ditches, storm sewers and other direct pathways for water can transport soils and nutrients long distances to a waterbody.

that groundwater supplies a large portion of water for seepage lakes. To learn more about the relationship between residential development and groundwater, see the new fact sheet ‘Residential Development and Groundwater Resources’.

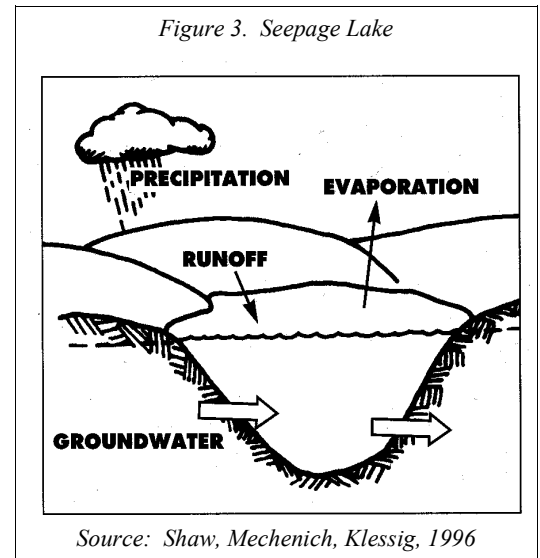
Strategies to reduce impervious surface impacts on lakes & streams

Three ways to minimize the negative effects of impervious surfaces are to:

- Locate impervious surfaces farther from waterways & sensitive areas
- Minimize the amount of impervious surfaces
- Filter and absorb runoff from impervious surfaces

These approaches are most effective when applied on a watershed scale and on a site design scale.

Next comes an example of rural development that decreases road costs AND protects water quality.



Planning pays off

The design of a rural subdivision can do much more to reduce runoff and nutrient loads than best management practices (BMPs; in this case stormwater sewers and a sediment pond), as shown in Table 1. Utilizing BMPs reduced nutrient loading by less than 5% in this study, whereas switching from a conventional subdivision design to an open space subdivision decreased nutrient loading by 40-50% by locating impervious surfaces farther from waterways and minimizing the amount of impervious surfaces.

Source:
Center for Watershed
Protection, 1998

	Table 1. Nutrient Loads		
	Conventional Subdivision	Conventional Subdivision + BMPs	Open Space Subdivision
Phosphorus (lbs./yr.)	46	44	23
Nitrogen (lbs./yr.)	274	264	156

In the open space subdivision significant cost savings were achieved by reducing impervious surfaces by 20% by:

- ◆ reducing road widths,
- ◆ reducing driveway lengths & widths, and using a road loop rather than a cul-de-sac.

Tools to protect lakes and streams

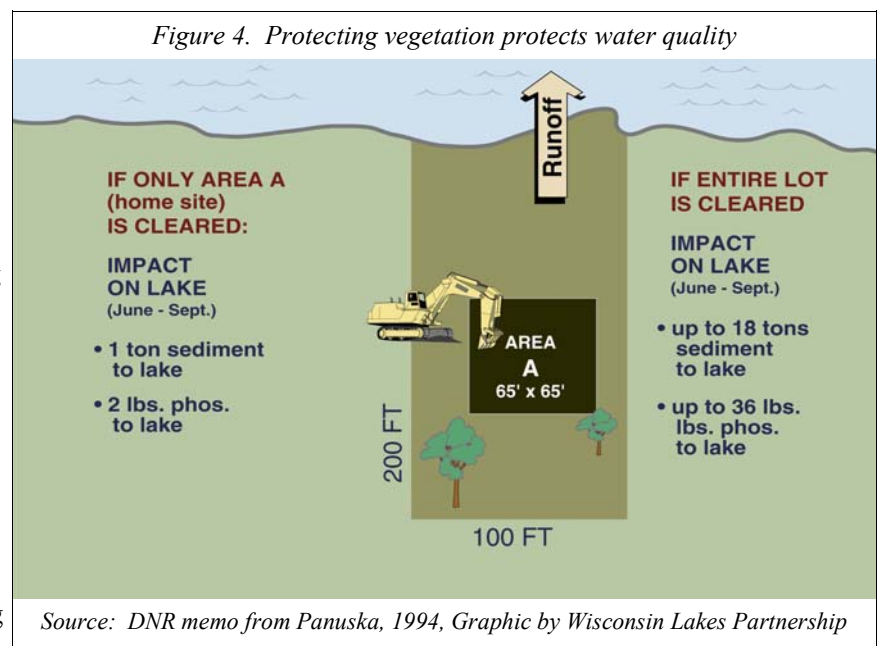
In addition to open space subdivisions, other useful tools for protecting the water quality in lakes and streams include:

- Incentive programs – to protect or restore shoreline buffers, to allow greater development density in open space design, etc.
- Technical assistance – to design open space subdivisions and buffer areas, calculate fertilizer needs, develop markets for water quality friendly crops, etc.
- Conservation easements – to protect sensitive areas like wetlands, high quality habitat areas, bluffs and steep slopes.
- Impact fees – for treatment of stormwater runoff, creating wetlands when natural wetlands are filled, etc.
- Regulations – to limit land uses and intensities in sensitive areas, limit impervious surfaces, require erosion control and stormwater plans, provide setbacks from shorelines and wetlands, etc.
- Educational programs – to identify sensitive areas, promote open space design and best management practices, explain effects of impervious surfaces, etc.

Using these tools during community planning throughout the watershed and during the design of development sites can help achieve the following water protection objectives.

Minimize pollutant sources

- Encourage land uses that deliver less phosphorus and other pollutants like forested lands, and discourage expansion of land uses that deliver more pollutants.
- Maintain native, long-lived, soil-stabilizing vegetation wherever possible to limit erosion. See Figure 4.
- Minimize the amount of land disturbing activity by following natural land contours when planning for roads and buildings.
- Locate development with groundwater pollutant inputs like septic tanks or fertilizers on soils that can effectively treat pollutants. On sandy soils locate the development where groundwater is flowing

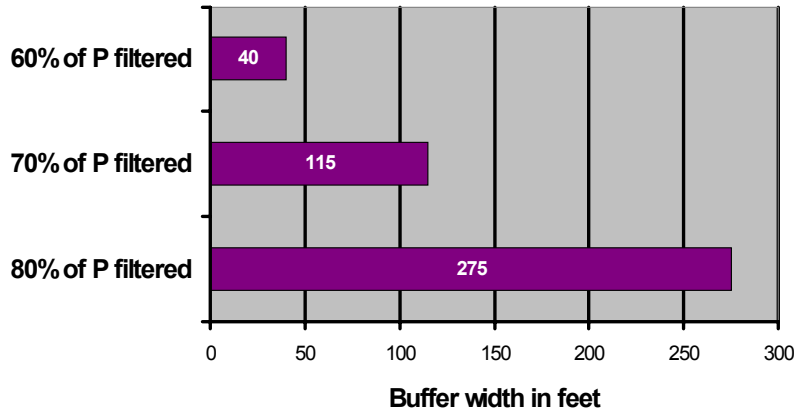


away from nearby lakes and streams.

Minimize pollutant delivery

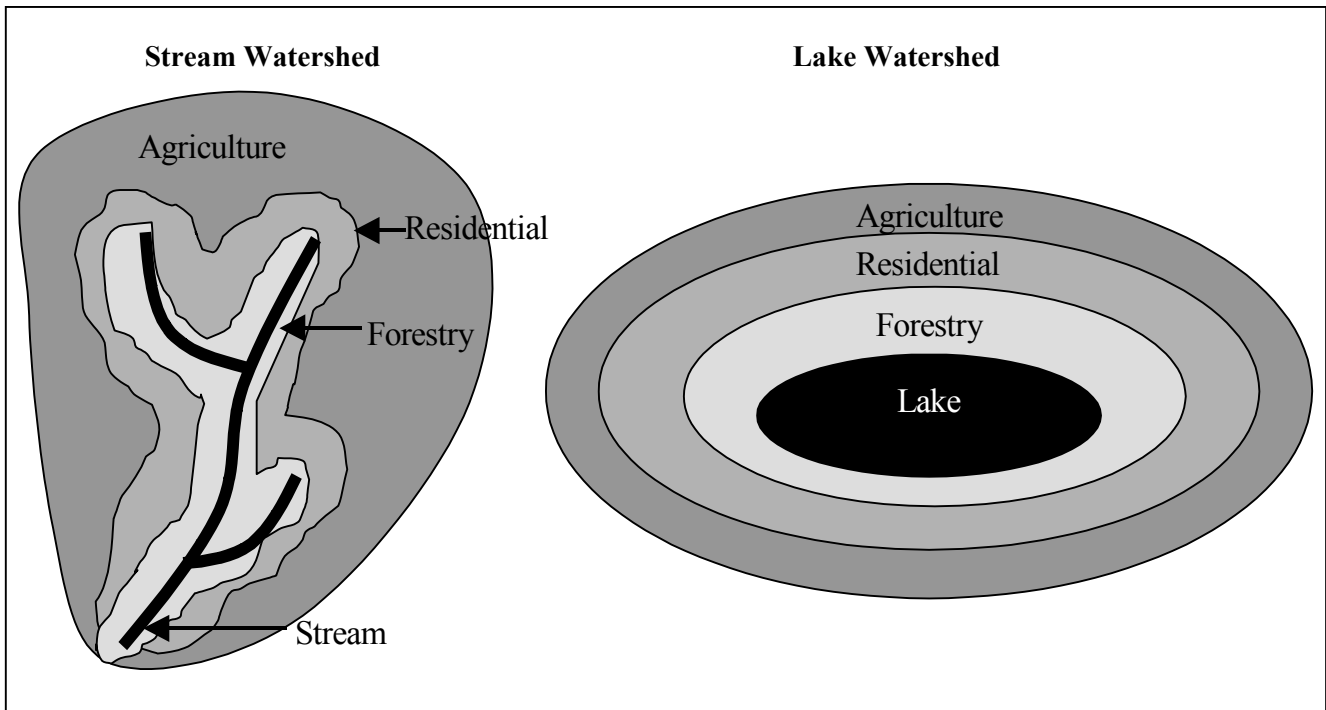
- Protect and restore large, natural shoreline buffers along waterways to filter pollutants from runoff. See Figure 5.
- Protect and create infiltration areas to minimize runoff.
- Minimize the extent and connection of impervious surfaces and compacted areas to the water by:
 - Locating new development adjacent to existing developed areas to minimize road expansion.
 - Constructing multiple story buildings to minimize building footprint.
 - Decreasing road and driveway widths and lengths.
 - Increasing building setbacks from the water.
 - Using shared driveways and parking areas.
- Minimize soil compaction by:
 - Limiting heavy equipment to specified areas.
 - Incorporating compost in soils to reverse compaction
- Encourage land uses like forested lands, which deliver less phosphorus close to waterways, and land uses that deliver more phosphorus or other pollutants farther from waterways. See Figure 6.

Figure 5. Larger buffers filter more phosphorus



Source: Desbonnet, 1995.

Figure 6. Land use patterns to decrease phosphorus loading to waters.



Michael Dresen, Glenn Bowles, Carmen Wagner, Steve Deller and John Panuska have reviewed this article for form and content. Any errors, mistakes and omissions remain the responsibility of the author.

(Continued on page 10)

Wildlife and Habitat in a Comprehensive Plan

by Jennifer Skoloda

What draws tourists by the thousands, cleans our air and water, keeps our soils fertile and soothes our souls? The answer is - wildlife and wildlife habitat! It might be easy to overlook planning for wildlife and wildlife habitat because it is only one “sub-element” of the Agriculture, Natural and Cultural Resource Element required by Wisconsin’s Comprehensive Planning law but wildlife and habitat issues impact our communities and human life on a basic level. A thoughtful examination of wildlife and wildlife habitat can provide much of the information and analysis that a community needs to address, consider, and implement the natural resource portions of its comprehensive plan.

The Center for Land Use Education (CLUE) is producing a 3-part series of presentations to demonstrate the importance of planning for wildlife. The first documents some of the more important values of wildlife and describes techniques for determining community understanding of those values and support for wildlife and habitat protection. The second explains the major threats facing wildlife and presents seven habitat protection guidelines that communities can follow when making planning decisions. The third presentation uses real data and GIS technology to illustrate how a county might use these guidelines to identify important habitat and effective management tools.

PowerPoint presentations will be available October 1. Please contact us if you are interested in presenting them or having them presented. Following are examples of information contained in each of the series.

Part 1: The Values of Wildlife and Habitat

Traditionally when people think of wildlife they think of *vertebrates* - primarily mammals and birds. They might even include reptiles, amphibians and fish. However, a broader definition includes invertebrates and other organisms that make significant contributions to our communities. Think of **wildlife** as: *all organisms living in a natural, undomesticated state* and **wildlife habitat** as: *the ecosystem in which an organism lives and which provides for the organism’s need for food, cover, water, space, reproduction and security* (Johnson, 1999).

VALUES

Wildlife and habitat encompass a wide variety of resources that have huge impacts on human life. Humans appreciate wildlife for both utilitarian and intrinsic values:

- ◆ Ecological processes (See Box 1)
- ◆ Recreation
- ◆ Economics
- ◆ Aesthetics
- ◆ Spiritual values

Part 1 also includes suggestions for a public opinion survey to catalog values held by the public and public understanding of the role of wildlife in our society.

Part 2: Threats To Wildlife And Guidelines For Habitat Planning

The biggest threats to wildlife are loss of habitat quantity and quality. Part 2 illustrates local impacts on habitat caused by:

- ◆ Fragmentation
- ◆ Invasive species
- ◆ Pollution

FRAGMENTATION

Fragmentation is the breaking up of larger “patches” of habitat into smaller ones. It impacts wildlife by decreasing population sizes, isolating habitat patches and creating more edge.

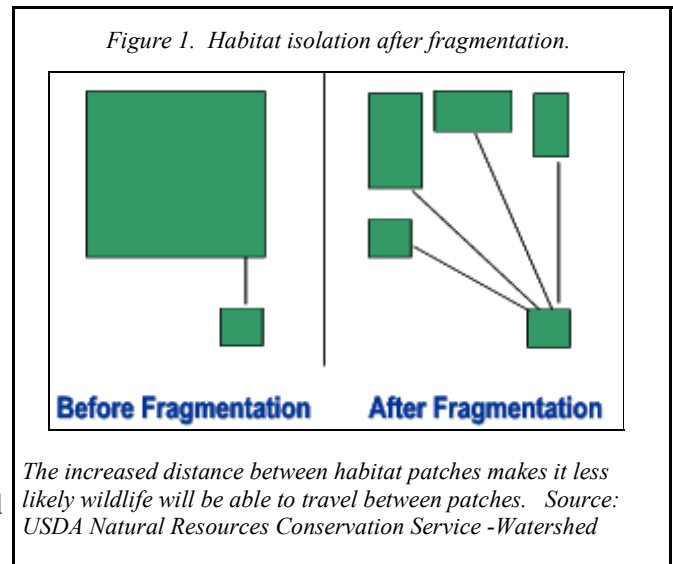
Box 1: IMPORTANCE OF ECOLOGICAL PROCESSES

We rely on wildlife or wildlife habitat for our most basic needs. Wetlands filter the water we drink. Natural vegetation regulates surface runoff to reduce flooding, trap pollutants and maintain groundwater recharge and stream flow. Forests filter the air of pollutants and produce the oxygen we breathe. Insects, birds and bats pollinate our crops and forests. Small mammals, worms, insects, microbes and fungus decompose waste and fertilize our soils.

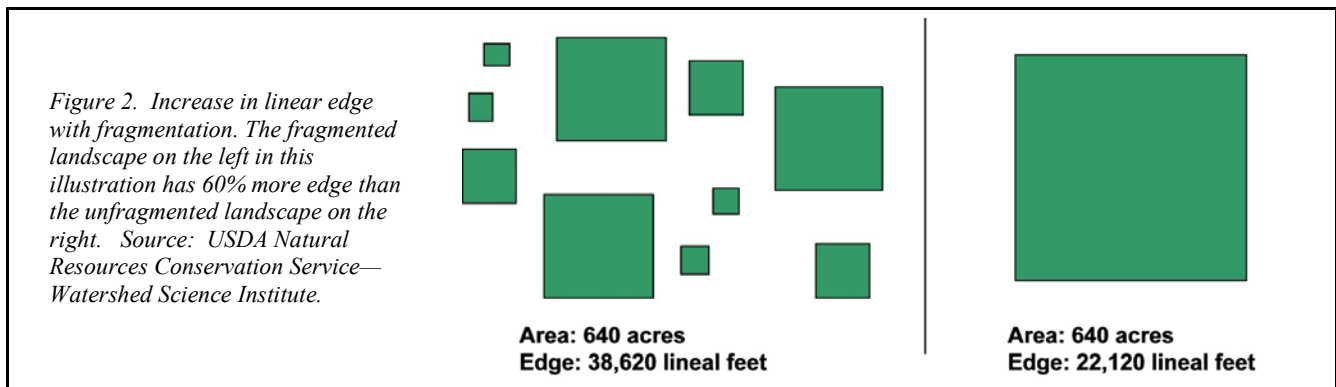
Smaller populations A decrease in habitat patch size results in smaller wildlife populations that are less likely to persist/survive for a long time than larger populations because smaller populations are more susceptible to catastrophic events (like disease or habitat destruction by fire) than larger populations.

Habitat isolation Fragmentation isolates habitat patches (figure 1); wildlife movements between patches decrease. As movements decrease, inbreeding and catastrophic events can cause populations to decline or disappear over time. Smaller more isolated patches also support less diversity (fewer numbers of species) than larger patches.

Edge Effects “Edge” is where two dissimilar habitats meet. For example, the interface between forest and grassland or farm field is an edge.



When habitat patches are fragmented, the linear feet of edge increase favoring species that prefer edge habitat and often increasing predation and parasitism that need core habitat species (figure 2).



INVASIVE SPECIES

Invasive species successfully establish themselves in, and then overcome, native ecosystems after being purposely or accidentally relocated/ introduced (See Box 2). Invasive species can prey on or out compete native species, or may introduce pathogens and parasites or may disrupt feeding/nutrient uptake by native species.

POLLUTION

The contamination of soil, water, or the atmosphere by the discharge of harmful substances can impact wildlife by causing direct mortality, weakening the health of individual animals, destroying habitat or producing reproductive consequences such as infertility and birth defects.

Box 2: THREATS FROM INVASIVE SPECIES

- **Gypsy Moth** – defoliation harms native ecosystems and reduces value of lumber.
- **Eurasian Water Milfoil** – clogs waterways, destroys fish habitat and shades out native plants
- **Zebra Mussels** –replaces native mussels and blocks water intakes.
- **Purple Loosestrife** – Harms wetland ecosystems by replacing native vegetation, provides little value to wildlife in food or cover.

SEVEN GUIDELINES FOR WILDLIFE AND HABITAT PROTECTION

- 1) Maintain large, intact areas of native vegetation
 - 2) Maintain habitat redundancy(duplication)
 - 3) Protect/provide corridors between habitat patches
 - 4) Protect rare/critical habitats
 - 5) Link local and regional habitat plans
 - 6) Maintain ecological processes (fire, flood) in natural areas
 - 7) Balance human use and wildlife needs in protected/natural areas
- (Modified from Duerksen et. al., 1997.)

Guideline 1: Maintain large, intact areas of native vegetation

Large reserves/patches typically capture and preserve a greater diversity and quality of habitats. In addition, species with large home ranges, interior dwelling species, and larger populations can be supported in large patches, unlike smaller patches.

Guideline 2: Maintain habitat redundancy (duplication)

Redundancy is an essential component of healthy ecosystems. If several reserves/patches exist in an area, one of them may be disturbed or lost without seriously threatening the integrity of the wildlife community.

Guideline 3: Protect/provide corridors between habitat patches

Corridors increase the amount of habitat available to species by allowing movement between patches – providing for seasonal movements and dispersal of offspring. This increases the effective population size for a species and reduces likelihood of local extinctions caused by genetic problems resulting from inbreeding.

Guideline 4: Protect critical and rare landscape elements

Protect less common vegetation types or landscape features such as wetlands and shorelines because these habitats contribute disproportionately to habitat diversity. The diversity of species in an area depends on a diversity of habitats.

Guideline 5: Link local and regional habitat plans

Knowing the status of species and habitat beyond political boundaries is important for good planning because species that are rare locally may be regionally abundant and species that are locally abundant may be rare regionally. Plan linkage also allows units of government to cooperate in program funding and administration.

Guideline 6: Maintain ecological processes in protected areas

Passive protection against development is often not enough to maintain native communities of plants and animals. Disturbance is a fundamental part of the life cycle of many native species. For example, prairie species need fire or grazing to maintain species composition, Jack Pine needs fire to open its cones and spread seed, floodplain forests need floods to remove competing vegetation. Invasive species threaten native plants, animals and communities. To maintain these native communities invasive species need to be controlled.

Guideline 7: Balance human use and wildlife needs

Wildlife is sensitive to human activity and expends energy avoiding human contact. This can be detrimental to animals especially during stressful times of the year - particularly breeding season and when they are caring for their young. Consider limiting or excluding high impact, disruptive uses during vulnerable/critical times of the year.

Part 3: An Example Wildlife And Habitat Protection Plan – Geographic Information Systems

Part 3 of the series will demonstrate, using real data from a Langlade County planning cluster, how mapping GIS data layers can be used to create a habitat protection plan that is integrated with other aspects of a comprehensive plan. To begin, areas that fulfill the seven guidelines from Part 2 will be identified and mapped (See Box 3). Then, other elements from the Comprehensive planning law that are relevant to wildlife, either as compatible uses or uses that exclude wildlife, will be identified and mapped. Areas can then be targeted for protection or development as appropriate. Areas that fulfill the requirements for wildlife protection (the seven guidelines) and contain benefits for other elements can be targeted/prioritized for protection, while development can be directed to areas that are identified as of lesser value to wildlife.

Box 3: GIS layers to be mapped

- State managed lands (state forests, parks and trails, natural areas, fisheries, wildlife areas, rivers)
- Federal lands (national forests, refuges, parks)
- County forests
- Private lands enrolled in CRP or Forest Tax Programs
- Land cover (vegetation community types)
- Wetlands, shorelines/aquatic habitats
- Natural Heritage Inventory data – Threatened, endangered and special concern plants, animals and ecological communities.
- Lakes and streams classified as Outstanding and Exceptional Resource Waters
- Unique natural features

In applying the seven guidelines, consider these two steps:

Step 1: Determine what is already protected/in existence.

Step 2: Determine what areas need to be improved, expanded or created in order to effectively protect wildlife and habitat. (*Note: CLUE will suggest processes and resources communities can use to select criteria for making these determinations.*)

And for each guideline, consider the following:

Guideline 1: Maintain large reserves (intact areas of native vegetation)

First determine whether there are any reserves, the size and dimensions of the reserves and their level of protection. Then determine if these areas might need to be expanded or created and where this would be possible. Criteria for this should be decided on by each community with the help of local experts.

Guideline 2: Maintain habitat redundancy

From the areas mapped above determine which habitat types are or are not represented more than once in currently protected areas. If there are habitat types that are not represented or are under-represented determine possibilities for protection.

Guideline 3: Protect/provide corridors between habitat patches

Examine the connections between existing reserves and identify areas that do not connect with any other reserves.

Guideline 4: Protect critical and rare landscape elements

Establish locations of critical and rare species, communities or other unique landscape elements and evaluate whether they are sufficiently protected/represented in protected areas.

Guideline 5: Link local and regional habitat plans

Demonstrate relevance to other regional plans. Look at Regional Planning Commission and state ecosystem plans or corridor plans.

Guideline 6: Maintain ecological processes in protected areas

Note which protected areas will need active management. Identify habitat types that need floods or fire. Select criteria to identify areas where these processes are economically and socially/politically acceptable.

Guideline 7: Balance human use and wildlife needs

Evaluate types of recreation allowed and level of use within protected areas. Make sure there are appropriate low use areas reserved for wildlife.

Other elements to include/consider from the Comprehensive Planning Law:

Housing - Use maps/knowledge to steer development away from areas important to wildlife. The maps may also be useful in locating areas suitable for conservation developments.

Transportation - Route roads and other transportation corridors through the least sensitive habitats and provide corridors over or under multi-lane highways to facilitate the movement of wildlife.

Utilities - Strategically located habitat reserves can also function as storm water detention or infiltration areas to protect surface water and groundwater supplies.

Parks and Open Space - Incorporate wildlife habitat in parks and open space in urban settings.

Historical and Cultural Resources - Look for opportunities to protect habitat associated with historical or cultural resources.

Merritt Bussierre, Michael Dresen, Anna Haines and Pat Robinson have reviewed this article for form and content. Any errors, mistakes and omissions remain the responsibility of the author.

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SUBMIT ARTICLES!

Please submit an article to our newsletter.

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- ◆ And address a land use issue.



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