PLANNING PROCESS: NEED AN OVERVIEW

Careful Planning Equals Success

People value land for many different reasons. The housing developer and the farmer have a different perspective on what a certain property can or cannot do for them. A family who plans to build a house on their land but who also want to attract wildlife may have a different point of view. No matter how you intend to use your land, you should always have some kind of plan or strategy. When the family is ready to build that house, for example, they would not have a builder order materials without first deciding what kind of house they want to build. An accurate plan helps the builder know what kind of materials and how much of each are needed. It also helps to determine the cost of materials and labor. Through careful planning, you will have a good idea if your project will succeed even before you begin.

When managing your land for wildlife, the planning process should involve five steps: (1) evaluating the land, (2) setting goals, (3) considering alternatives, (4) writing a management plan, (5) implementing the plan and monitoring the results. This chapter introduces the overall process to you, and the chapters in this section will explain in greater detail how to accomplish the process, step by step.

Key Terms

Before the planning process begins, you should be familiar with a few key terms that will aid in understanding your land and its potential for wildlife. These terms are briefly explained here as an overview of the factors involved in providing habitat.

Habitat Components

There are four basic habitat components needed for a species to survive. These are food, water, cover, and space. Even though all species need these components, the amount and type of each differs by individual species. Knowing the specific needs of each species will allow you to provide the correct habitat components. For more information on specific species refer to the section on **Species Management**.

Limiting Factors

When one or more habitat components is lacking and insufficient, this component is considered a limit to the amount of wildlife that can exist there, or a limiting factor. Each species has specific habitat component requirements, and therefore will have different possible limiting factors. Being aware of the limiting factors present on your land may help in providing better quality habitat.

Carrying Capacity

All habitats have a maximum carrying capacity; that is, they will only support or carry a certain number of a wildlife species within a particular area. Usually, a limited supply of one component will control how many animal species the habitat will support. Thus, when there are no longer habitat components that a species can use, the land has reached its carrying capacity. Land managers, by providing or removing key habitat components, can affect carrying capacity thus increasing or reducing wildlife populations.

Trade-offs

It is important to understand that you may not be able to manage for all of the goals that you may have in mind. When managing for specific species, there will always be other

species that habitat is not provided for. Therefore, when managing for certain species you will eliminate other species from your land. However, when planned properly, managing for a group of species, instead of one particular species, will most likely provide the least amount of trade-offs. Managing for a diversity of species, however, will reduce the number of any one species.

Planning Steps

1. **Evaluating the Land**

Before you manage your land for wildlife, it is important to learn as much as possible about the animals that live on your property, and their specialized habitat needs. It is also important to determine the kinds and amount of habitat on yours and surrounding properties. The best way to obtain this information is to become familiar with your property by studying it during different seasons and making separate inventories of the plants and animals you are able to identify. Also, look for physical changes that may vary by season. For example, where is it sunny or shaded; are there seasonally wet areas, what happens after a major rainfall or snowstorm? Additional information that may help in managing your land is available from many sources, including chapters in this guide, local libraries, videos and television programs, adult education courses, and individual experts. Some of these experts may be neighbors, former owners of your property, or local people such as biology teachers or naturalists who have specialized knowledge. Further, consider consulting with a professional land manager, such as a wildlife biologist.

In addition, think about how your property fits into the local landscape. Do your woods, for example, merge with your neighbors'? Do fencerows connect your land to other properties? What land-use practices are occurring on land around yours, and what impacts do they appear to have on local wildlife? Finding answers to these questions will help you to decide what you'd like to do with your property and whether or not your expectations are realistic. For more information, see the chapter on **Evaluating the Land**. You may also find the following chapters, within this Habitat Planning section, to be helpful: **Presettlement/Past Vegetation Types; Edges and Fragments; and Knowing Your Soils**.

2. **Setting and Prioritizing Goals**

Setting management goals is an exciting part of the planning process because you are now thinking about what measurable differences you can make for wildlife. Problems will occur, though, when landowners do not think the process through to a logical conclusion. For example, the desire to attract pheasants, which are grassland birds, is not realistic if the land you wish to manage is a 40-acre woodlot. You should become familiar with the habitat needs of the desired species, and be realistic in your appraisal of whether you can meet those needs. Think, too, about the values you ascribe to your land. Do you want it to produce income, provide hunting or other recreation, or are you more interested in aesthetic returns such as creating natural beauty, providing wildlife habitat for viewing pleasure, or protecting rare species?

To accomplish a goal, it is often useful to break it into smaller subgoals or objectives, and then identify actions to be completed. While a goal is generally broad in scope, objectives are more specific measurable outcomes and actions are very task-oriented. Your goal, for example, might be to attract bluebirds to your property. A review of your property suggests nesting structures and foraging habitat are lacking. One objective might be to have enough nest structures to attract three nesting pairs within three years. The action needed to achieve that objective may include constructing and placing six nest boxes in suitable locations within the next two years. A second objective might be to pro-

Setting goals involves breaking your ideas into goals, objectives, and actions. Below is a flow chart outlining how to accomplish your goals.

Ideas
- Goal
  - Objective 1
    - Action 1
    - Action 2
    - Action 3
  - Objective 2
    - Action 1
    - Action 2
    - Action 3

vide two acres of high quality foraging habitat within three years. Specific actions, such as mowing a portion of an old field, might be used to achieve the objective.

By thinking about goals in a broad sense, and then moving through objectives and actions, you can focus your efforts into smaller, timely pieces that fit well together. Too often you may want to take action without thinking adequately about an overall goal or the "big picture." The result is often a set of mismatched pieces that have to be redone or eliminated. On the other hand, you may be overwhelmed by the "big picture" and do not know where to begin. Moving from broad goals to specific actions is a good way to avoid wasted time, effort, and financial resources.

Once your goals are set, prioritize their importance and determine whether they can be realistically achieved. Prioritizing your goals is a way to view the "big picture" in small, organized pieces. This will help you to plan accordingly and complete the most important goals first. For more information on this and the following step refer to the chapter on **Setting Goals and Considering Alternatives** in this section.

3. **Considering Alternatives to Meet the Goal**

There is usually more than one way to achieve a goal, and wildlife managers in particular often have to sort through many options to find the best method. Every decision made will affect wildlife and wildlife habitat in some way, but some impacts may be beneficial to your goal while others are harmful. The successful manager is one who tries to anticipate how each decision will make a difference and which decision is the best one to meet the goal.

There may be many alternatives to choose from. Once you have determined an array of alternatives that would meet your goal, you must decide which one is the best for your situation. You must consider cost, time involved, and impacts on neighbors and on other forms of wildlife before choosing an alternative. In other words, choosing the alternatives with the least amount of trade-offs is usually the best option. Consider how much time and money you have to spend, what kind of equipment might be needed, and the impacts your decisions will make on your neighbors, the local landscape, and other kinds of wildlife besides the types you wish to attract.

4. **Writing a Management Plan**

Once you have decided on your goals and examined all possible alternatives, it is time to write a management plan. The purpose of this plan is to outline the steps that will be taken in order to reach your goals. These steps include creating a project map (that will highlight types of habitat and management projects), determining management actions, and creating a timeline to implement these actions. For more information on this and the following step refer to the chapter on **Writing a Management Plan.**

5. **Implementing the Decision, Monitoring the Result**

Once you have finished writing the management plan, you will implement the decisions you outlined. Monitoring the results of those decisions, is a way to determine if your goals have been met, or if the management project needs to be altered. Do not expect the results to occur instantly; be patient as sometimes it takes two or more years for results to become apparent.

However, conditions may change, and it may be necessary to revise a goal. For example, in the planning process, a landowner decides to establish a 40-acre field of warm season grasses, beginning in three years. When it comes time to start, seed prices have risen and the landowner can only afford to prepare and seed 20 acres. Twenty acres of warm season grasses are planted, and the other 20 acres revert to an old field. This decision allowed the landowner to stay within the set budget, but did not provide the amount of grassland cover for pheasants that was originally planned. However, the landowner was pleased with the number of rabbits that used the 20-acre old field.

Working with Neighbors

Working in partnership with other landowners is often an exciting alternative to doing everything yourself. As Michigan wildlife habitats become more fragmented due to the selling and dividing of land, small property owners sometimes find themselves wondering what they can reasonably expect to do with their

backyard, part of a former pasture, or sliver of woods. The answers may lie in providing one component of wildlife habitat and letting your neighbor provide another component. For example, the wetland on a neighbor's property and the upland field on your land can be co-managed for the benefit of birds and mammals that rely on these habitats. The chapter on **Working with Neighbors** offers more information and examples.

In summary, the planning process for land management begins with an evaluation of the property and a personal appraisal of what you would like to do with it. Establishing realistic goals will help you to choose specific objectives for meeting the goals. Along the way, a constant evaluation of the progress made and the alternatives that appear will assure that the goals remain realistic, even though they may have changed. Once the goals are achieved, you must decide whether to maintain the project, alter it in some way, or start a new cycle of management. Although this entire planning concept may appear complicated, it is in reality a logical, step-by-step way to assure that your land lives up to the expectations you have for it.

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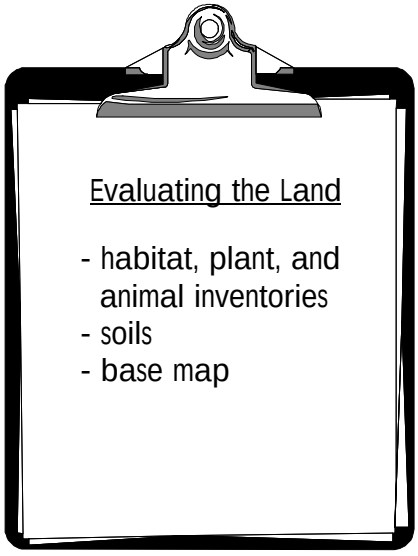
Private Land Partnerships: This partnership was formed between both private and public organizations in order to address private lands wildlife issues. Individuals share resources, information, and expertise. This landowner's guide has been a combined effort between these groups working towards one goal: Natural Resources Education. We hope this guide provides you with the knowledge and the motivation to make positive changes for our environment.

FOR ADDITIONAL ASSISTANCE: *CONTACT YOUR LOCAL CONSERVATION DISTRICT*

EVALUATING THE LAND



The first step in the planning process is to evaluate the current types of habitat, wildlife residents, and plant life on your property. Finding out what plants and animals live on your land will help you understand their habitat needs and how you can better manage for those needs. Also, it is important to look at your surrounding landscapes and determine how your land fits into the bigger picture. Your inventory will yield clues as to what degree of success you can expect to achieve, and it will provide information that is useful in working with your neighbors. Finally, the information you compile in this inventory will be useful in writing your overall management plan. Keeping a journal of information throughout the planning process will simplify your efforts.

Before you begin, you may have broad ideas of what you want to do with your land. Evaluating your land enables you to make these ideas more concrete, or even find that they are not feasible. After this evaluation, you should be able to set goals that are appropriate for your land. For more information refer to the chapter on **Setting Goals and Considering Alternatives.**

By taking such a broad initial view of your land and surrounding landscapes, you can begin to get a perspective of its suitability for attracting wildlife. It is also important to gain a historical perspective of the land's past uses. Do you have agricultural fields that have been tiled? Do you have forests that have been logged in recent memory? Was your grassland pastured some time ago, can you find out how long ago? Did farming practices over the years change the soil's pH? The more information you find about your property, the more you will learn of its wildlife-producing history, suitability and potential. Ask these questions of longtime neighbors and former owners. Search the local library for historical information about farming practices, flooding incidents or area fires that might have involved your property. It is also helpful to obtain a pre-settlement map that will give you clues as to what habitat types were present before European settlement. See the chapter on **Presettlement/ Past Vegetation Types** for more information.

Make a Habitat Inventory

Many of the chapters in this manual will help you understand the different types of habitat and what species of wildlife use them. Try to assess the condition of the property and how it is being used. As you learn about your land's attractiveness to wildlife, begin to classify the types of habitat found there. What follows are the five broad kinds of Michigan habitats. The questions below may be useful in an initial evaluation of your land.

•Is your property largely farmland, grassland, woodland, wetland, brushland, or a combination of two or more types?

•What habitat surrounds your property?

•What type of soils do you have? Are they sand, clay, or muck? Wet or dry?

•Are there exotic species present? If so, what species?

Woodland

•What type of forest exists? Is it young, mature, or mixed? How large is it?

•Is it fragmented by trails or openings?

•Is the understory open or is there a lot of growth such as brush and shrubs?

•Are there dead or decaying trees? How many? Where are they located? Are there stumps?

•Has the forest been logged or pastured, and, if so, how long ago?

•Is the stand even- or uneven-aged?

Wetlands

•What type of wetland is present?

•Is there a stream present? If so, what is the stream's origin?

•Is the wetland permanent or temporary (seasonal)?

•Is the wetland isolated or part of a larger complex?

•Is there open water present?

•How large or small is the wetland?

•Has the wetland been altered by draining, grazing, or mowing?

•Do trees, brush/shrubs, cattails, grass, or sedges dominate the wetland?

•Are adjacent uplands being fertilized?

Grassland

•Is your grassland an old field, pasture, hayfield, or forest opening?

•Are there any remnant native plant species present?

•How much invasion is occurring from shrubs, trees, or other woody plants?

•Has your grassland been hayed, mowed, or used for pasture? How long ago?

•Do you mow the roadside ditches? If so, how often?

Farmland

•What is the recent crop history?

•What kinds of herbicides, insecticides, or other chemicals were recently applied?

•Are there livestock present? How many?

•What type of farming operation (if any) is occurring? Is it small grain, row crop, dairy, or other livestock?

•Is it flat or rolling farmland?

•Is the farmland being cultivated right up to the fences?

•What type of irrigation practices are being used? Are the fields ditched or tiled?

•Are there areas of cropland that will not grow, or muddy places where equipment gets stuck? These areas may be former wetlands.

Brushland or Shrubland

•Are shrubs large or small, in clumps or individuals?

•Are they fruit producing?

•Can you determine the stage of succession (is it closer to the forest or grassland stage)?

•Do the plants growing there favor a wet or dry environment?

•What types of habitat surround the brushland?

•Are there fencerows or hedgerows present?

Make an Animal Inventory

Knowing what animals currently live on or around your property is a starting point for your animal inventory. If you are already familiar with your property, take time now to write down as many kinds of wildlife as you can recall. Separate them into categories such as mammals, birds, reptiles, and amphibians--even fish and insects if appropriate. Indicate where and when you have seen them. If you do not know the names, simply describe them, or sketch them if you can.

If you're not familiar with your property, take walking tours as often as possible. Armed with a notebook and a good field guide, look and listen for animals. Try to sharpen your evidence-gathering skills. For example, a small, chipmunk-sized burrow or a large woodchuck den in the side of a hill are clues as to what lives there. Hoof or paw prints in the mud or snow are evidence of the presence of wildlife. Brambles whose branches have been nipped could be the work of a rabbit or deer. The persistant smell of a skunk may let you know of this animal's presence. You may be surprised at all the wildlife that exist on your property, even if you never actually see them.

Become a wildlife detective and see how many of the following ani-

Example worksheet:			
Area (Habitat Type):	Grassland		
Animal species	Plant species	Invasive plant species	Practices present (logged, drained, tiled, etc.)
Quail	Orchard grass	Quack Grass	None
Goldfinch	Timothy grass	Sweet Clover	
Sparrow	Smooth brome		
Meadowlark			
Rabbit			
Pheasant			
Red-winged blackbird			
Deer Mouse			

mal signs you can find. Add them to your animal inventory as you discover them.

- Young trees with bark rubbed off in autumn by a buck deer polishing his antlers.
- A large stick nest high in an oak tree, which may be home to a red-tailed hawk or great-horned owl. Similarly, a large leafy nest may indicate the presence of fox or gray squirrels.
- Holes in dead trees may be a home for a woodpecker or black-capped chickadee.
- Furry pellets, or hairballs, regurgitated by an owl.
- Runways through a field of grass made by small rodents.
- Black walnuts cracked in half by fox or gray squirrels.
- Pine cone "cobs" left behind by red squirrels.
- Porcupine droppings (they are orange) at the base of a tree.
- Hickory nuts nibbled on the edges by deer mice.
- A mud nest under a house or barn eave made by cliff swallows or barn swallows.
- Last year's bird nests.
- Dusting bowls made by pheasants used for delousing.
- Scattered feathers or fur from a predator's meal.
- Spider webs, or other such insect signs.
- An ant mound.
- A butterfly chrysalis or moth cocoon.
- The call of sandhill cranes, loons, or Canada geese in the distance.
- The trill of courting toads.
- Tracks or droppings created by mammals and birds.

Because not every animal will be visible on any given walking tour, be sure to periodically walk your property during different seasons and times of day. Keep notes on what you observe and when. Try to determine if the wildlife are feeding, seeking shelter, building nests, or using your property for some other purpose. Your journal will help you to accurately describe your land and will become the basis for writing a wildlife management plan. The more you walk your land, the better you'll get to know it and its inhabitants.

Make a Plant Inventory

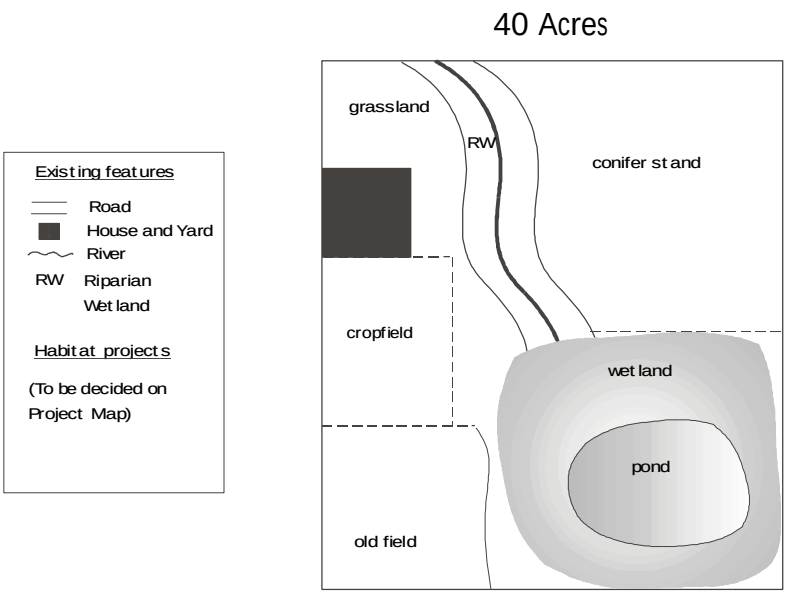
What grows on your property determines what wildlife will live there. While walking your land, begin to develop a list of existing plants along the way. Again, field guides to trees, shrubs, flowers, and grasses will be a big help. Sketch, describe, or photograph plants that you are unfamiliar with. As you read, check sources and ask questions, your experience and confidence will grow.

Management recommendations are often based on the predominant plant species in an area. Therefore, make observations about the predominant species that are present in each habitat type on your land. For example, is your forest predominantly Beech/ Maple, or Oak/Hickory? Note if the species present are native or exotic. This helps you to determine the condition of your land. For example, if your grassland possesses species such as big bluestem, little bluestem, and switchgrass, it may be a remnant of a native prairie. Note any species that you think may be rare. In addition to this, identify nuisance weeds such as purple loosestrife, glossy buckthorn, autumn olive, honeysuckle, and others, and plan for their elimination.

Soils

Learning about the soils on your property will help you to know what may and may not grow there. Sandy, light soils, for example, allow water to drain readily. Therefore, they are usually low in nutrients and tend to be more acidic than other types. Heavy, clay soils consist of small, tightly packed soil particles. Rich in nutrients, they have a high capacity to hold water. Loamy soils are intermediate between clay and sand. Composed of many different sized soil particles, they combine fertility and moisture-holding capacity with good drainage. Each soil type grows its own particular kinds of plants. For more information, including how to sample your property's soils, see the **Knowing Your Soils** chapter.

In addition to the soils, learn everything you can about the hydrol-



After land evaluation, create a base map featuring the habitats present on your property. Outline any special features such as den sites, bird feeders, travel lanes, fencerows, etc. This map will serve as the base to the project map created later in the planning process.

ogy, or water resources, of your land. For example, swamps, marshes, and streams are obvious wetlands. But spring seeps, potholes, or wet meadows dry out during part of the year and are not easily identified as wetlands. Clues are waterlogged soil, peat, or muck. Willows, cottonwoods, green ash, buttonbush, sedges, cattails and smartweed are typical of plants that grow in wet places. For more information, see the introductory chapter on **Wetland Management.** If you find evidence of wetlands, either current or former, your property may have the potential for attracting many types of wildlife.

Creating a Base Map

A base map is a layout of your property that shows each type of habitat and any special features that need to be taken into consideration. It includes such components as forests, grasslands, wetlands, streams, lakes or ponds, shelterbelts, hills, drainage ditches, buildings, fencerows, logging roads, cultivated fields, and roadways. Also, highlight those features of special importance to wildlife: ground dens, dead trees, living trees with large cavities, bird feeders, nest boxes, mature nut trees, major travel lanes, and more. The base map provides the basis for your management projects, and will later be used in writing the management plan. Make sketches of your property as you increase your knowledge about it. It may be helpful in creating a base map to obtain aerial photos and topographic maps of your property. Aerial photos are available at your local USDA agency office. The more you learn, the easier it will be to focus on specific areas for habitat improvement.

Put Your Inventory Into Context

Keep in mind that everything is connected. The plants on your property, for example, can act as seed sources for your neighbor's land and vice versa. Animals using your site do not know the meaning of a property boundary. So, it is important to remember that the landscape around you determines what you can realistically expect to do on your property. And the reverse is also true: what management decisions you make on your land will affect the landscape around it. The chapter **Working with Neighbors** gives more information.

In summary, it will help tremendously if you understand what plants and animals you can reasonably expect to flourish on your property before you set goals, write a plan, or begin to make management decisions. Working within the context of your land and surrounding landscapes will help you to create a successful wildlife management plan.

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PRIVATE LAND PARTNERSHIPS
WORKING TOGETHER FOR WILDLIFE

SETTING GOALS & CONSIDERING ALTERNATIVES

Some landowners have very clear ideas about what they want to do with their land. Most, however, have vague goals or no goals at all. In some cases landowners are not aware of the range of opportunities available to them. Once they become aware, they may begin to change their plans. The process of decision making includes understanding what trade-offs will occur, what constraints certain actions may place on the land, what is realistically possible on the land, and what commitments of time and cost are involved. The more knowledgeable a landowner becomes, the more realistic the landowner's goals often become. Therefore, clear, well-defined goals, are necessary for a successful plan.

A goal is essentially what you want to do with your land, a wish to be fulfilled. Although setting goals may seem like a simple process, it is often complex and constantly changing. Planning and goal setting is a continual process in which the results of your first decisions influence all management options. Your goals will often overlap, and do not necessarily need to be seen as mutually exclusive. In other words, it is possible for your property to be managed to enhance conservation, provide recreational enjoyment, and produce income at the same time. This chapter will focus on how to set goals, how to accomplish these goals, and what to consider when creating a feasible management plan.

Setting Goals

To create management goals for your land, begin by making a list of what you value about your property and how it may be valuable to others. These values will reflect what you expect from your land, and essentially your prospective goals. Try to prioritize the goals from what you think is most important to least important. Arranging your goals by priority, and reviewing them periodically, will help you to plan the step-by-step process toward achieving them. Don't worry if you don't know. Simply listing your views may help you to think about what you know and don't know about your property and what it can--or cannot do--to satisfy your interests.

The land's capabilities define the limits of management possibilities. Thus, the goals that you set will depend on your property and the surrounding landscape. You will also need to know the habitat requirements and life history of the wildlife

GOALS TO CONSIDER

Conservation Goals
- Stop erosion
- Restore wetlands, grasslands, or forestlands
- Create windbreaks
- Promote habitat diversity
- Manage for the greatest variety of wildlife species or for rare species
- Increase the health of the landscape

Recreation Goals
- Increase one or more species for hunting
- Increase wildlife viewing opportunities
- Enhance aesthetic value
- Create nature trails for hiking

Economic Goals
- Timber and firewood harvesting, which may improve habitat for squirrels
- Farm and graze, which may enhance grassland birds
- Allow access to others such as hunters or tourists
- Create conservation easements to save tax dollars
- Enroll in state and federal conservation programs

Social Goals
- Leave something behind for family/society
- Leaving land "better" than you found it
- Improve environment for others
- Make the land aesthetically pleasing

LIMITATIONS TO CONSIDER

1. What possibilities of attracting wildlife does my land have?
2. To what degree could I manipulate my land to attract more wildlife?
3. What possibilities do the adjoining properties have for attracting wildlife?
4. Will my goals enhance or detract from those possibilities?
5. What trade-off associated with my management goals may occur?
6. Do I have the time and the financial resources to carry out the goals I have set?

you intend to manage. Once you determine what you will need to support the species you desire to attract, you must determine if the habitat is there, if it can be created there, and if you could sustain it there. For example, it is not possible to manage for species that require hardwood forests if you have no hardwoods on your property. In addition to this, you must also determine what limiting factors are there, the carrying capacities of your land, and what trade-offs are involved. For such information on the specific needs of wildlife, see the chapters in the **Species Management** section.

Considering your neighbors is another important aspect of determining goals. It is possible to manage for larger areas if you and your neighbors have similar goals and can combine management efforts. For example, if both you and your neighbor want to attract a large diversity of woodland birds, you could create a management plan that incorporates both properties.

Because other activities conducted on your land will also affect wildlife, you should try to anticipate those effects when making your management goals. When improving habitat for wildlife, you can usually combine wildlife management with timber management and agricultural practices. However, for best results, you may need to modify these practices to benefit wildlife. In most cases, timber and farming activities help some wildlife species but may harm others. You will need some understanding of these effects if your management goals are to be realistic. As a general rule, for example, timber harvest benefits deer, rabbits, grouse, and certain songbirds such as towhees and indigo buntings, that get food and cover from low-growing plants. On the other hand, some forms of timber harvest can harm forest wildlife species like barred owls or woodpeckers that use den cavities, or squirrels and turkeys that rely on mast-producing hardwoods. The degree of management practiced and any tradeoffs in timber, agriculture, or wildlife values will be your decision.

Try to be realistic about the time involved in carrying out your plans. Consider low-cost, low-maintenance projects and think in terms of the many shorter steps required to achieve a long-range goal.

BEFORE SETTING YOUR GOALS, THINK ABOUT THE FOLLOWING . . .

1. Does wildlife use your property to connect other habitat nearby?
2. Do your woods, for example, stand-alone or do they form the core of a large forested area owned by your neighbors?
3. Is restoring a wetland going to flood your neighbor's land?
4. How is your neighbor managing his/her land?
5. Would your neighbor(s) be interested in managing their land cooperatively with you?
6. Have significant alterations been made to the land surrounding your property?
7. Would these changes affect your ability to suceed with your goals?

Objectives

A landowner who has evaluated the land, identified their goals, and determined which goal is the most feasible and important, can then determine what objectives are required to achieve this goal. Writing objectives is a way of turning your ideas, or goals, into tangible strategies. One way of determining your objectives is to decide what important elements are missing from the land. In other words, ask what features can be enhanced, and always consider what is feasible on the land. For example, during evaluation of the land, you sighted several grassland birds. It was determined, from information gained on the habitat components needed by grassland birds, that your land only provides winter cover, and not nesting habitat or a reliable food source. Because having grassland birds was an important goal in this instance, an objective to achieve this goal would be to consider the creation of year-round habitat. In other words, in finding what your objectives are, you must determine what is needed to fulfill your goal.

Actions

Once the objectives required to achieve the goal are determined, the actions needed to fulfill the objectives must be decided. Actions are what are needed to obtain your objectives. For example, an action to help fulfill the objective mentioned

above (to maintain year-round habitat for grassland birds) would be to plant vegetation that would provide nesting cover and a food source. This action would take care of an objective that was needed to fulfill your goal. Once you are at this level, fulfilling one action at a time will break up a seemingly overwhelming task into smaller, manageable pieces.

Creating Alternatives

Looking at alternatives to meet your goals, and perhaps even redirecting your goals may become necessary as you continually evaluate what you have in relation to what you want. There are two different times to look at alternatives. The first is before you set your management plan into action, and the second is after your plan has been implemented.

Before Implementation: Different Options

Before you implement any plan, it is wise to consider different options to achieving your goal. Sometimes these alternatives can save money, work, and time. You should not jump at the first option made available, as it may not be the best for your situation. It is best to weigh several options and choose the one that is the least expensive and takes less time, but achieves the same goal.

After Implementation: How Goals Change Over Time

Landowners whose land has changed, or who have run out of time, money, or patience may need to consider alternative goals for their Management Plan. In some cases, when property is sold or subdivided, or natural disasters such as fire or flooding occur, the plan may need a major overhaul or be completely rewritten. Furthermore, the habitats you are trying to protect or improve for wildlife change with the seasons and the years. Expect your goals to change over time as surrounding landscapes change. When your plans finally become reality, you may notice that you have created partial habitat for wildlife species you may or may not have wanted to attract. Encouraging or discouraging the new wildlife, or getting rid of non-native nuisance plants, may mean an adjustment in your goals. Land-owners who become confused or frustrated when their goals suddenly seem unreachable can still make a positive difference for wildlife if they learn to be flexible. Keep in mind that your road map, the management plan must be flexible in order to be successful. Even wildlife managers can not always predict what will happen when they begin to manipulate habitats.

In summary, management options are always based on the goal, but deciding what to do can be difficult at times as there are many things to consider. If you break down the process into goals, objectives, and actions, it makes it easier to determine what you are looking at in your plan, and what you need to do to get there. Some practices are more expensive and take more time than others. Considering alternatives is always wise as it may prevent problems that you might have overlooked. Remember, the management plan is never static, and your goals may need to be changed as your land or circumstances change, but there are usually many ways of obtaining your goals.

RE-EVALUATE YOUR ORIGINAL GOALS

The following 10 factors will assist you in evaluating your original goals, and should be asked before you implement your plan. Evaluating these considerations from time to time will also help you to consider alternatives that are available and to redirect goals as necessary.

1. Do I have the necessary funds to complete my management plan?
2. How much time do I have to do the work involved?
3. What kind of equipment is needed and where do I get it?
4. Can I provide the maintenance required once the goal is achieved?
5. What impacts to wildlife would my plan create?
6. How long will it take to achieve the results I want? Are there alternatives that are faster, less expensive and less time-consuming?
7. What impacts will my decisions have on my neighbors?
8. How have my neighbors' management practices affected me?
9. Will any legal implications occurr as the result of my management?
10. Are there any future ramifications I can reasonably expect?

GOALS, OBJECTIVES AND ACTIONS

This is an example of how to outline goals, objectives, and actions based on the habitat types outlined on the base map within the Evaluating the land chapter.

Goal: To attract pheasants and other grassland birds

Objective one: Create year round food source
- Action one: leave corn stubble
- Action two: plant fruit producing shrubs
- Action three: plant cool season grasses and clovers
- Action four: plant warm season grasses and forbs

Objective two: Create travel corridors
- Action one: plant shrubs

Objective three: Create winter cover
- Action one: plant switchgrass
- Action two: plant warm season grasses and forbs

Objective four: Create nesting and brood rearing habitat
- Action one: plant cool season grasses and clovers

Objective five: Create artificial nesting sites
- Action one: build and place nest boxes

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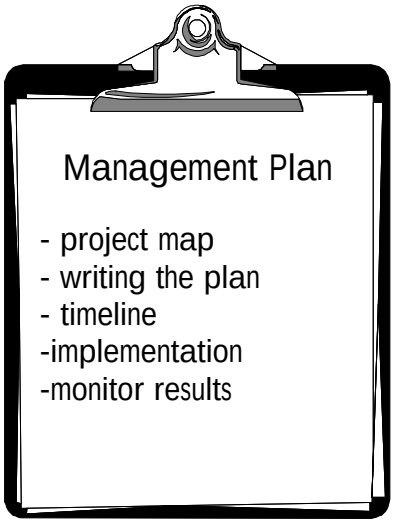
WRITING A MANAGEMENT PLAN



The Management Plan is a document that describes what you want to do for wildlife on your property, and how it will be accomplished. It is a step-by-step formula for what you want to do on your land, and when, where, and how you will accomplish the plan. The plan provides a timeline, which can project future phases of improvement, management, or maintenance. Further, it can be a record of what you have already done. As you write down the differences your efforts have made, you will most likely also realize impacts you probably could not have predicted. Such realizations will help you to consider changes in your plan, new goals and objectives, and alternatives for achieving them.

Although some people dread actually writing the plan, it does not have to be difficult. For smaller projects it can be as simple as a quick sketch and a few notes. Larger projects may be more complex with maps, photos, drawings, references, and detailed outlines of habitat improvement projects as time and energy allow. As you might expect, the management plan is a clear reference that will guide you to accomplishing your goals. This chapter will show you how to write a management plan that is focused, realistic for your expectations, and --most importantly-- doable.

Creating a Project Map

The other chapters in this section on Habitat Planning explain the many considerations that you must ponder before writing the plan. Now that you've decided on one or more specific projects, you can write your management plan. A good way to visualize your plan, before actually writing it out, is to create a project map. The project map will help you to see where you've been and where you want to go next. This map is dependent on the Base Map created in the first step of the planning process, **Evaluating the Land**, which shows how to make inventories of habitat types, plants, and animals that already exist on your property. The Base Map includes the major existing habitats and land features. This information helps you determine what you could reasonably expect to do within the context of the surrounding landscape.

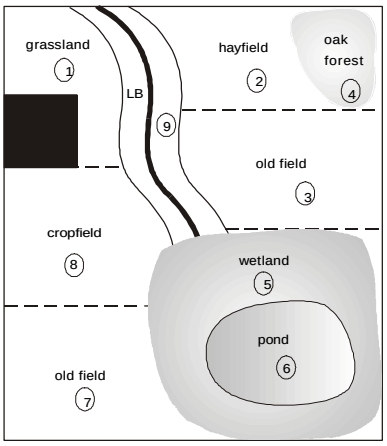
To create a Project Map, use the Base Map as the foundation, and for each habitat, or site, write in the habitat projects that will be implemented. This entails either leaving existing features that already benefit wildlife, enhancing them, or replacing non-beneficial existing features with the management action you decided on in the previous planning steps. Numbering each site on the base map before creating the Project Map will help in writing the management plan as it will organize the areas into workable units. The example maps shown on the next page illustrate this process.

Writing Out the Plan

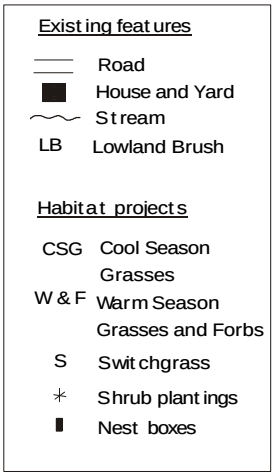
The next step to writing a management plan is to actually write out the final draft of the plan. This includes listing your goals along with the objectives and actions that will take place at each site. A good way to organize your final draft is to write out your habitat projects by site. Under each site, list in detail the objectives that will be fulfilled, the actions that are required, and when they will be implemented. Be as specific as possible as this is the write-up that you will refer to for details. Please see the accompanying example of a written management plan on the last page of this chapter.

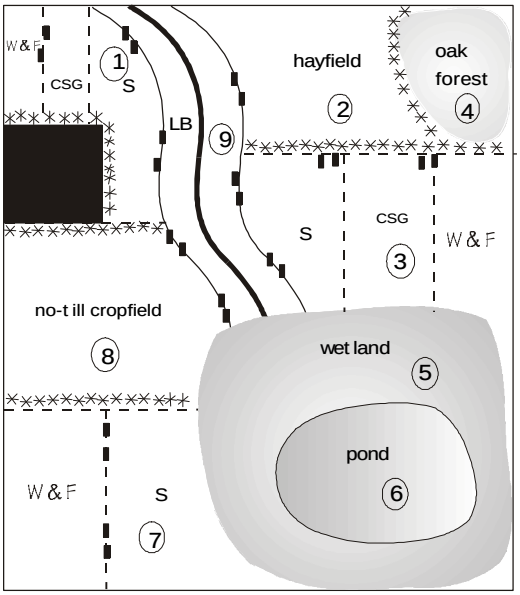
Since maintenance is also a key part of any management plan, consider adding a maintenance schedule to your plan. For example, your

40 Acres



Base map created during evaluation of the land. Sites are numbered for organizational purposes





Once you have decided on what projects will be completed, create a project map from the base. This map will show where the projects will take place and is used as a visual reference to the written management plan.

field of switchgrass for winter cover may require mowing or burning every three years, or perhaps you have adopted a rotational maintenance schedule where you treat one third of the field each year. Writing down maintenance schedules will help you to plan your time, and is also the best way to remember the important things that need to be done. Ignoring the necessary maintenance will prevent you from enjoying the full benefit of your habitat plan.

This is also a good time to review your plan to determine which goals are short-term and which are long-term. In other words, it is important to know which projects may produce immediate results, and which may not show results for years. Because long-term projects may take years to implement, you may also want to plan some activities that will produce immediate results, such as building nest boxes for certain bird species. Remember to be patient, most management plans require several years before tangible results can be seen. Wait for vegetation to become established. After that, wildlife should move into the habitat you have created.

Creating a Timeline

A supplemental tool to your management plan is a timeline that consists of your management activities. This year-by-year list of actions will help you to stay organized, and to keep track of what action must occur when. A timeline is another way of writing out your plan as it allows you to view the actions chronologically, rather than site-by-site. While keeping track of the overall big picture, a timeline helps you focus on the step-by-step process one task at a time. Not only will this give you a sense of accomplishment along the way, but it will also make the overall plan less overwhelming. Please see the example timeline.

Implementation and Monitoring your Results

Once you have written your plan, it is time to implement it. Implementation means turning your plan into reality as you begin to accomplish your goals. During implementation, follow your plan and timeline carefully, but realize that changes can always be made if problems arise. Flexibility is important in a good management plan.

After you have implemented your plans, it is important to monitor your results and determine if you have accomplished what you wanted. Sometimes, unexpected results occur, such as changes in

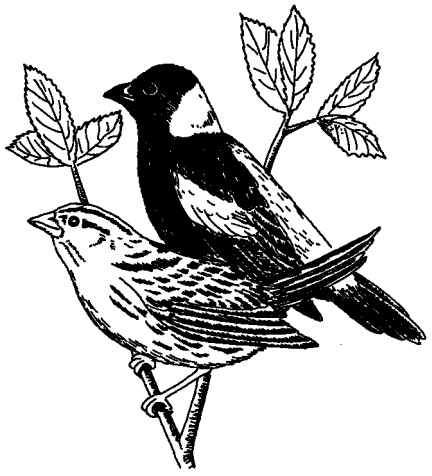
Timeline

This is an example of a timeline for completing habitat projects based on the example project map. Following a timeline will break the project up into workable pieces, and allow you to visualize both the short and long term results.

Year One	
Spring:	Planning process
Fall:	Remove encroaching trees and brush
	Prepare site 1 for planting (could include mowing, Round-up, plow and removal)
	Begin no-till farming in site 8
	Erect nest boxes
Year Two	
Spring:	Plant NWSG and wildflowers in section 1, site 1
	Plant CSG and clover in section 2, site 1
	Plant switchgrass in section 3, site 1
	Plant shrubs on site 1 and around house
Fall:	Prepare site 3 for planting
	Check nest boxes and repair any damage
Year Three	
Spring:	Plant switchgrass in section 1, site 3
	Plant CSG and clover in section 2, site 3
	Plant NWSG and wildflowers in section 3, site 3
	Plant shrubs on site 3 and around site 4
Summer-Fall:	Prepare site 7 for planting
	Mow hayfield between July 15 and August 31
	Apply selective herbicide to NWSG if necessary to remove competition
	Check nest boxes and repair any damage
Year Four	
Spring:	Plant NWSG and wildflowers in section 1, site 7
	Plant CSG in section 2, site 7
	Plant switchgrass in section 3, site 7
	Plant remaining shrubs
	Burn NWSG on 1/4 to 1/3 annual rotation
Summer-Fall:	Mow CSG in section 1 on ¼ to 1/3 annual rotation
	Check nest boxes and repair any damage
	Evaluate management plan and consider alternatives if necessary

the land or attraction of unwanted species, and additional actions will need to be planned. Not every project will be successful, of course, and if the changes are unwanted you may have to start the process over and determine a new goal. However, often your goal is obtained, and monitoring your success is a way to keep in touch with your land after the planning process is complete. Keeping a journal is a good way to keep track of your progress, and will help you to see the differences you have made on the land. This may also help you determine potential problems and possibly catch them before they occur.

Monitoring your results is often the most rewarding part of the planning process. You will be able to see what you have accomplished through your hard work and careful planning. The landscape developments that occur and the new sightings of wildlife you observe will bring much satisfaction. Simply writing down the day you saw the first pair of bluebirds setting up a household in the nesting box you installed is a memorable event that is fun to record. You will realize the same enjoyment when the purple coneflowers you planted in the butterfly garden begin to bloom, or that spring morning you heard a cock pheasant crow.



WRITING A MANAGEMENT PLAN

Wildlife Management Plan
Final Draft

Goals: To attract pheasants and other grassland birds

Acres: 40 acres

Site 1
Nesting, brood rearing, winter cover, and food producing areas will be developed on this site at locations identified on the project map. This site will be divided into three sections. Each section should be planted in north to south strips, and should be at least 60 ft wide. Travel corridors will also be established.

The first section will be planted to native warm season grasses and forbs. This includes a mixture of big bluestem, little bluestem, indian grass, and a variety of native wildflowers. This area will be used as winter cover and as a food source.

The second section will be planted to cool season grasses and clovers which consists of a mixture of timothy at 2 lbs / acre, orchard grass at 2 lbs / acre, white sweet clover at 2 lbs / acre, and medium red clover at 2 lbs / acre. This area will be used for nesting, brood rearing, and as a source of food.

The third area will be planted to switchgrass at a rate of 4-6 lbs / acre. This will be used as a wintering area.

Chemical and mechanical methods should be used to control competing grasses and weeds within the planting areas. This site will be prepared in the fall of the first year, and planted in the spring of the second year. The cool season grasses will be mowed on a one third annual rotation starting the third year after planting between July 15 and Aug 31. The warm season grasses will be burned on an annual rotation starting the third year after planting. Prescribed burns will be conducted in the spring before the new growth is 1-3 inches tall and before bird nesting begins. This stand will be burned every 3-5 years. Remember to notify local fire department before burning.

To provide travel corridors and an additional source of food, fruit producing shrubs such as highbush cranberry, dogwood, and crabapple will be planted along the south perimeter of the site, and around the home site. Two rows of shrubs will be planted 8 feet apart and 8 feet between rows, with the trees staggered between rows.

Nest boxes will be installed and maintained as indicated on the project map the fall of the first year. They will be checked and maintained annually.

Site 2
This area provides valuable wildlife habitat and will be left undisturbed. However, a mowing rotation will be established at year four and mowed on a one quarter rotation.

Site 3
Nesting, brood rearing, winter cover, and food producing areas will be developed on this site at locations identified on the project map. The site will be divided into three sections and planted to warm season grasses, cool season grasses and clovers, and switchgrass. This area will be prepared the fall of the second year, and planted in the spring of the third year. It will be planted and maintained as described in site 1. Fruit producing shrubs will also be planted on the north border of the site to provide a travel corridor and a food source.

Site 4
The oak trees found on this site provide valuable wildlife habitat. This area will be left undisturbed. Fruit producing shrubs will be planted along the perimeter of this site to lessen the impact of predators in the grassy areas by reducing the existing harsh edge created by the forest.

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WORKING WITH NEIGHBORS

To meet the needs of wildlife species it may be necessary for neighbors to work together to improve habitat on adjoining properties. Although Michigan has more public land than any state east of the Mississippi River, millions of acres also belong to thousands of private landowners. If wildlife populations survive in Michigan, it will be largely due to habitat management on private lands. Especially in southern Michigan where more than 95 percent of Michigan's land is privately owned.

Many of these private properties include small parcels of one to 20 acres each, and many more are backyards less than an acre in size. As more and more land is converted to houses, highways, and shopping centers, wildlife habitats become fragmented and isolated. This fragmentation makes it difficult for wildlife to find the right combination of habitat components necessary for their survival. Even in northern Michigan, where large blocks of public forest occur, fragmentation and human development of land continues to increase.

Landowners can make a difference for wildlife, and lessen the impact of this fragmentation, by creating habitat on their land. However, landowners working together can make an even bigger difference by providing larger tracts of land for wildlife. No matter what size your lot is, you can still improve your plan by working with your neighbors. This chapter explains how to work with your neighbors to develop a better habitat management plan.

Begin a Dialogue with Your Neighbors

The habitat, animal, and plant inventories you made on your land (described in the chapter on **Evaluating the Land** in this section) have helped you to understand the habitats that wildlife use, and to identify what habitats you have and do not have to offer them. Animals do not understand human boundaries such as fences, roads, drainage ditches, and rights of way (although they may be attracted to them if key components of habitat are provided). They readily respond to natural habitat--wetlands, woodlands, and grasslands. Unless you own a large amount of land that is diverse in habitat types, you may not be able to manage for some species. Hummingbirds, for example, won't be attracted to your sugar-water feeder unless there is a wooded area nearby where they can nest and find shelter. Deer might be attracted to the clover in your lawn but only if there is brushland shelter nearby in which to escape and raise their young. In addition, some species require larger blocks of one type of habitat, such as some grassland and woodland birds.

Opening a dialogue with property owners near you is an important part of your overall management plan. Your neighbors' goals may be the same as yours or altogether different. Either way, it is good policy to find out as soon as possible. Working with your neighbors can make your goals more attainable. Your neighbors may have one or more important components of habitat that you do not have. If you plan together, you may be able to provide all of the necessary components needed to obtain your goal.

It is always best to make your contacts long before your decisions have the potential to impact property that is not your own. If you think that your plan will directly affect someone else's property, seek their approval before you take any action. Your plan to restore a wetland, for example, may alter hydrology on adjacent lands. The water you impound

may spread to another's property and create a problem. Your neighbors may take any mishaps that might occur a lot better if they were involved in, and agreed to, your plans.

Your goals could also threaten a neighbor's plan for their land. If your neighbor earns income from farming, the deer population you have attracted to your property may eat the crops the farmer has planted. If you had taken the farm into consideration when planning, you could have planted preferred foods on your land to reduce your neighbor's crop damage. Other decisions you make could alter property values, make access difficult, or be in direct conflict with your neighbors' goals. The gains you make could cancel out your neighbors' improvements and vice versa.

Sharing Ideas and Combining Efforts

Sitting down with your neighbors to discuss short-term and long-term goals is the best way to avoid these problems. As you share plans, you may learn how much you have in common. The woodlands or wetlands you own may be connected to the woodlands or wetlands owned by your neighbor. Perhaps together you can manage shared habitats for the common good. You may discover that the idled farm field you own and the cattail marsh your neighbor owns can be managed as a single unit. The grassland can provide nesting and brood-rearing cover, and the wetland can provide secure protection from storms and predators for mallards, pheasants, red-winged blackbirds, and bluebirds.

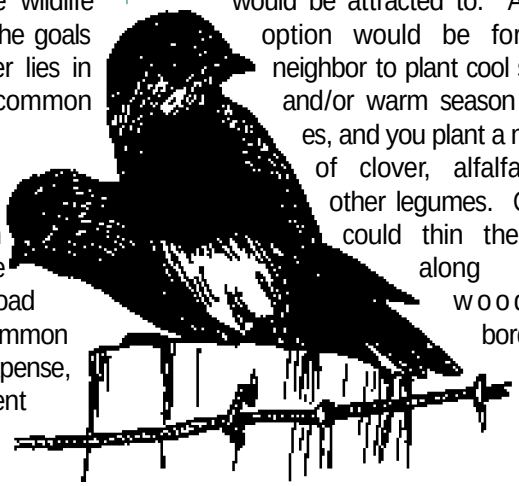
There are many advantages to communicating your ideas and goals with neighbors. One or more local property owners may be able to furnish valuable information about your land and its history. What grew there, how the property was used, what birds and mammals lived there at one time, when the timber was last harvested, and what farming practices were carried out are examples of useful information that will help you to set goals and objectives that could be mutually beneficial. Cropping patterns, pesticide and herbicide use, tiling and drainage programs, and fertilizing and grazing are all important things to know as you write your overall Management Plan.

Sharing your plans with your neighbors and asking for their ideas in return opens the door for good relations and may lead to complementary agreements. Although there is no guarantee that subsequent owners will share your mutual interests, it is the best assurance you can expect for long-term management goals. The reality is that if either of you sells your land, there is no way to know if future owners will be wildlife friendly. What happens when the goals are contradictory? The answer lies in negotiating to find some common ground.

Creating, enhancing, and maintaining wildlife habitat can be hard work that costs time and money. Sharing the workload with neighbors who have common interests can save time and expense, and add to the overall enjoyment that comes from making a difference for wildlife. Two people can create a brushpile for rabbits in half the time it takes one person to do the job. The work of cutting trees for firewood while thinning a woodlot is not so difficult if you have a partner to help. Also, sharing tools and specialty equipment like chain saws, mowing machines, tractors, and farming implements is a good way to save money.

You might even find ways to cost-share certain projects such as creating food plots, windbreaks, wetland or prairie restorations, pruning wild-apple trees, planting fruit-bearing shrubs, timber cutting for commercial sale, building nesting platforms for ducks, and houses for birds and bats. Perhaps you will manage the sharp edge between grass and tall trees by each person planting a row or two of fruiting shrubs like elderberry or highbush cranberry. Besides benefiting wildlife that live in the diverse habitats you and your neighbor are managing, the shared plantings reduced costs.

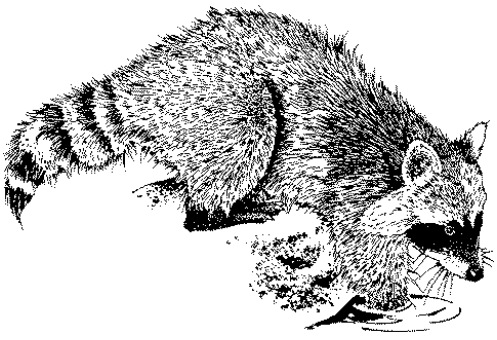
Boundary lines offer a great opportunity to work together for wildlife. Fencerows, for example, can be widened through the joint planting of trees, shrubs, and grasses. If each of you planted one row of evergreens and one row of fruit-producing shrubs, you would create a living fencerow that many species of birds and mammals would be attracted to. Another option would be for your neighbor to plant cool season and/or warm season grasses, and you plant a mixture of clover, alfalfa, and other legumes. Or, you could thin the trees along your woodland border to



WORKING WITH NEIGHBORS

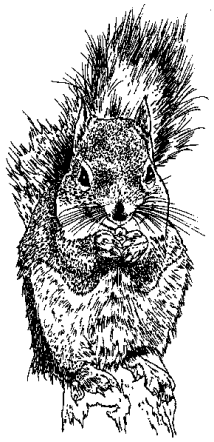
provide more sun for your neighbor's wildflowers.

If you do not know who your neighbors are, you can find out by consulting a county plat book, available through your local library, county courthouse, township government office, or Michigan State University Extension office. Sometimes landowners may have little or no interest in wildlife. Yet other neighbors may be public land managers who are keenly interested in helping you develop plans that support their interests. If your property borders a township park, state wildlife or recreation area, or state or federal forest, a management plan for wildlife may exist. In that event, you might be able to tailor your goals to complement a plan already in effect.



In summary, few landowners are able to improve wildlife habitat without in some way affecting nearby property owners. Sharing information and ideas may be mutually rewarding and create partnerships that can last a lifetime. Whenever you combine efforts with neighbors, you increase the benefits to wildlife.

WORKING WITH NEIGHBORS



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PRE-SETTLEMENT/ PAST VEGETATION TYPES

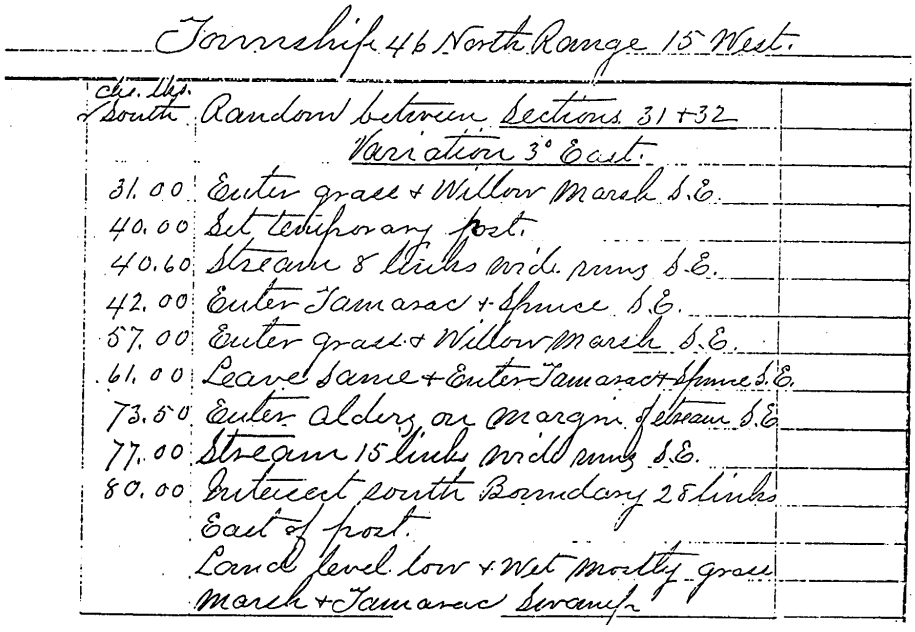
Pre-settlement vegetation is the vegetation that occurred across Michigan's diverse landscapes at the time of European settlement. Before settlement, elk, bison, wolf, moose, and woodland caribou were abundant and Native Americans inhabited Michigan. Imagine the county or township where you live without roads, supermarkets, power lines, retention ponds, industrial parks, subdivisions, strip malls, golf courses, or large monocultures of corn or soybeans. Picture having only the sun to guide you through a sea of grasses that stretched to scattered pockets of large, wide-spreading oaks and bison grazing in the distance. Imagine your backyard filled with 500-year-old white pines that seemed to touch the sky, trees so wide that even two people could not put their arms around them. In your mind's eye, see wetlands that stretched as far as sight allows, living marshlands filled with the sounds of thousands of waterfowl as they settle in for the evening. It is likely that this is what early settlers saw when they first arrived in Michigan.

Knowing where such landscapes occurred historically helps in habitat planning today. A pre-settlement vegetation map allows us to see this. It describes the landscape when Michigan was first surveyed, and it shows where distinct plant communities occurred. This map is a tool that improves our understanding of patterns and processes across landscapes. This information offers insights for managing lands as large as state forests or as small as your backyard. Knowledge of the type, location, and ecological context of Michigan's native vegetation helps landowners choose effective land management goals. Today's patterns of land-use, wildlife distribution, wetland water levels, and ecosystem functions are far more meaningful when placed in a historical context.

This historical information becomes very important when you begin writing a management plan for your property. What you can learn about the land's history will help you develop management goals, decide specific habitat projects, and plan for stewardship now and in the future.

How Are Pre-settlement Vegetation Maps Made?

Before land in Michigan could be sold for the first time to settlers, the federal government required that it be surveyed. Deputy surveyors from the General Land Office visited Michigan prior to the logging era between 1816 and 1856. These surveyors' township plat maps and transcribed field notes provide the best available record about Michigan's native landscape. The General Land Office required surveyors to note the loca-



Township 46 North Range 15 West.

ch. lks.	
South	Random between Sections 31 + 32
	Variation 3° East.
31.00	Enter grass + Willow Marsh S.E.
40.00	Set temporary post.
40.60	Streams 8 links mid. runs S.E.
42.00	Enter Tamarac + Spruce S.E.
57.00	Enter grass + Willow Marsh S.E.
61.00	Leave same + Enter Tamarac + Spruce S.E.
73.50	Enter Alders on margin of stream S.E.
77.00	Stream 15 links mid runs S.E.
80.00	Intersect south Boundary 28 links East of post.
	Land level low + Wet mostly grass marsh + Tamarac Swamp

Actual field notes from when Michigan was first surveyed.

tion of wetlands, lakes, and streams; to comment on the agricultural potential of soils; and to note the quantity and quality of timber resources. The surveyors recorded recently burned areas, beaver floodings, windthrows from storms, and Native American settlements. At each section corner and half-mile point they pounded a wooden post into the ground. These markers would later be used to establish legal property boundaries. The measuring tools they used were a compass and a "chain." A chain contained 100 links and was 66 feet long. A total of 80 chains marked a mile. The surveyors left markers to indicate township and section borders for the first private property owners. They also recorded enough land resource information for the settlers to make sight-unseen purchases, and to help them find the parcels they bought.

Recently, ecologists from the Michigan Natural Features Inventory (MNFI) used information from these original field notes and plat maps to compile pre-settlement vegetation maps for Michigan's 83 counties. Because the surveyors took information only along section lines and because small plant communities such as 20-acre wetlands were not included, the MNFI ecologists also relied on other references. They studied surface geology maps, soil maps, and other technical data to make the pre-settlement maps as accurate as possible.

From these and other resources they determined that more than 80 different native plant communities historically occurred in Michigan. These communities ranged from pockets of unique wetlands that depended on fluctuating water levels, to tracts of hardwood-conifer forests that stretched over several counties. Ecologists combined all 83 counties into a statewide pre-settlement vegetation map.

Regions

There are four major regions that differ in Michigan: the southern Lower Peninsula, northern Lower Peninsula, eastern Upper Peninsula, and western Upper Peninsula. These regions are primarily based on climate and geology, which in turn determines the types of vegetation present. Understanding these areas will help you to determine what has historically grown in your area, and what may feasibly grow there now.

Southern Lower Peninsula

The southern Lower Peninsula was a diverse landscape of oak-hickory forest, beech-sugar maple forest, oak-grassland areas called savannas, and hardwood swamps. Beech, sugar maple, walnut, hickory, and tulip trees grew on well-drained soils and dominated the landscape. Areas with well-drained sandy soils supported mosaics of oak-hickory forest and oak-savannas. These drier sites allowed periodic wildfires to occur which promoted the establishment of oaks, hickories, prairie grasses, and wildflowers. These fires were often started by lightning strikes and Native Americans.

Hardwood swamps of red maple, ash, swamp white oak, and elm grew in lowland depressions and poorly-drained areas. Along the eastern edge of southern Michigan near the Great Lakes, large areas of wet prairies and oak openings prevailed and were greatly influenced by water-level fluctuations and fire. The vast area around Saginaw Bay and its wet clay plain were covered with lowland hardwoods, hemlock, and white pine. The shoreline supported wet prairies and Great Lakes marshes, as it did along Lake Erie and Lake St. Clair.

Today, the landscape looks dramatically different. Major losses to forests and wetlands have occurred due to agriculture and urbanization. Large portions of marshlands on the Great Lakes were destroyed by development of ports and marinas, as well as by farming activities. Native grasslands, both prairies and oak-savannas, were among the first areas to be plowed because they contained few trees. Dry conditions and poor soils later caused some of these farmlands to be abandoned. Many converted to forests of oak and, if fire was suppressed, eventually to stands of beech-maple. Only a few small remnants of native grasslands remain.

Northern Lower Peninsula

Northern hardwoods, oak-pine grasslands, pine forests, and conifer swamps originally covered the northern lower peninsula. There were more conifers as you went north due to the colder climate. However, northern hardwoods, which were comprised of sugar maple, beech, white pine, hemlock, basswood, and yellow birch dominated. Pockets of aspen and birch occurred in this system where local disturbance such as wind or fire opened the forest canopy to allow regeneration of these early-successional trees.

In the central portion, a mix of pine forests and barrens developed

because of the sandy, dry soils and the high frequency of fire. Jack pine prospered on the driest sites, and forests of white and red pine grew in other places. Some of the poorest quality sites burned often enough to support communities called barrens, which are grasslands that contain a few oaks, pines or a mixture of both. Northern white cedar, black spruce, and tamarack grew in poorly drained areas.

When loggers removed the red pine and white pine forests in the late 1800s, much of the region converted to stands of aspen and oak. Although previously logged northern hardwoods have regenerated, the composition today favors red oak, red maple, and paper birch, and thus fewer hemlock and white pine. Past and present timber harvest methods have increased aspen coverage from 100,000 acres originally to more than 1.5 million acres today. Large amounts of conifer swamps that once held cedar, tamarack, and spruce have converted to hardwood swamps and swamp brushlands of dogwood and alder. The loss of conifer swamps is a very significant change since pre-settlement and should be taken into account when managing these areas. Furthermore, due to the suppression of fire during the last century many of the historical barrens and dry-sand prairies have been lost.

Eastern Upper Peninsula

When the first settlers arrived, the eastern Upper Peninsula appeared similar to the northern Lower Peninsula. Northern hardwoods dominated the landscape, and conifer and conifer-hardwood swamps also occurred. Aspen-birch forests were more prevalent than in the northern Lower Peninsula due to the shallow, poorly drained, sandy soils. Compared to the rest of Michigan, however, this area contained large expanses of peatland, muskegs, and boreal (northern conifer) forests of fir, spruce, and cedar. Vast marshes fronted Lakes Huron and Michigan. A unique grassland community called alvar occurred on Drummond Island, the Garden Peninsula, and along the north shore of Lake Huron where flat, limestone bedrock lay close to the surface.

Since settlement, one of the biggest changes has been the loss of the Great Lakes marshes. This was caused by habitat alterations and fluctuations in water levels from timber harvest, roads, highways, and quarries. Though boreal forests and northern hardwood forests still cover a large part of the region, these too have been impacted. In many cases drainage and logging have allowed some landowners to convert forests to farmland. Even in areas allowed to regenerate to northern hardwoods, there is a lack of hemlock and white pine. Other property owners have converted areas that once supported red pine-white pine and red pine-jack pine forests, among others, to red pine plantations.

Western Upper Peninsula

Originally the western Upper Peninsula was dominated by northern hardwood forests of sugar and red maple, hemlock, yellow birch, and beech. Jack pine and red pine-jack pine forests dominated dry areas, and shrub swamps, bogs, and conifer swamps containing balsam fir, spruces, tamarack, and white cedar occurred in poorly drained depressions. Heavy logging and out-of-control fires that raged through harvested areas have greatly reduced the regeneration of hemlock and white and red pine.

Although the area remains largely wooded, current harvest activities have tended to reduce forest species diversity and have increased the relative abundance of sugar maple. Also, early-successional species such as aspen and birch are more abundant today.

How To Use Pre-settlement Maps

The native plant communities shown on your county pre-settlement map were the ones best adapted to the soils, land forms, and climate. Because the vegetation existed for thousands of years before European settlement, ecologists point out that managing for original cover types should be low maintenance and cost-effective. Further, it should provide a wide diversity of habitat for wildlife. However, many things have changed since Michigan was settled, and these changes sometimes make such management goals difficult, if not impossible, to achieve. Also, such goals may not be part of the landowner's plan.

Even if your goal is not to attain pre-settlement conditions, pre-settlement vegetation maps can help with any goal by answering questions like:

- "Is restoration of this wetland or this prairie a good idea?"
- "How do the management plans for my property fit in with what grew here 200 years ago?
- "What kinds of changes have occurred and over how long a period?"
- “What plants and animals naturally occurred here?”
- “Are there any rare plants or animals historically present

that should be looked for?"
•"What disturbances were most likely required (i.e. fire) to sustain the types of vegetation historically present?"

Answering these questions will help you to understand the changes that occurred in your area, and help you to fit your property in with the surrounding landscape. The more you learn about your property's history, the more you will understand its limitations and its potential.

Consider, for example, how natural disturbances of fire, wind, and erosion played important roles in creating and altering the patterns of Michigan's native landscape. The ability to clarify the type, location, and impact of a wildfire, or a wind storm hundreds of years ago helps wildlife researchers to develop ecological models. These models can then be used to plan management strategies that will mimic the natural processes, with the goal of restoring former habitats or creating new ones.

Learning as much as we can about the past also helps us to better understand present uses of the land. The reason, for example, that celery grows so well on the neighbor's black soil is because the land was originally a muck-bottom wetland that a former owner drained. The soil type and the presence of moisture dictated what grew there then and what grows there now. Another example of a lost landscape is the prairie. If you live on a sandy, relatively flat area in west-central Michigan, you may own a remnant prairie. By studying pre-settlement vegetation maps and present-day soils maps, you might find areas that historically harbored grassland species such as big bluestem, Indiangrass, butterflyweed, or black-eyed Susan. You could even discover a rare species or two that may still persist and that could benefit from a prairie restoration.

To use the pre-settlement map in your management plan, start by studying the map and making a list of the native plant communities that were historically found on and near your property. Check with your local library, area historical society, older neighbors, or former landowners as they may also have helpful information. Use reference books and information in this guide to make a list of plants and soils that are associated with each plant community you can identify. Then search your property to see if any pre-settlement plants or communities are still growing there.

Pre-settlement vegetation maps help guide landowners to search for things they might not have known existed. This newfound knowledge can be added to other pieces of information to write a dynamic management plan that considers soils, surface water, ground water, current land cover, surrounding land use and habitats, and wildlife present.

County pre-settlement maps are currently available through the Michigan Department of Natural Resources for a nominal fee. Ask for the Michigan Resource Information System (MIRIS) unit. In addition, the Natural Resource Conservation Service (NRCS) or Conservation District (CD) office located in most counties will have a full-color county pre-settlement map for reference use only.

In summary, everything you can learn about your land, past and present, is a valuable asset toward writing a management plan aimed at improving wildlife habitat. The Michigan pre-settlement vegetation maps offer important clues to what you can and can not expect to accomplish on your property.

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PRIVATE LAND PARTNERSHIPS
WORKING TOGETHER FOR WILDLIFE

KNOWING YOUR SOILS

What does your property's soil have to do with wildlife? In a word -- everything. Life on land begins with soil. The type of soil, along with climate, determine what plant communities will grow in an area. Together the soils and plant communities provide the habitats that give animals the requirements they need to survive: food, shelter, space, and water. All plants and animals need minerals and nutrients to survive, and wildlife obtain them from food. Plants absorb minerals and nutrients from the soil, which then pass through the food chain to plant eaters and eventually to meat eaters.

Michigan's diverse landscapes are the result of many different kinds of soil. The Natural Resources Conservation Service (NRCS) has categorized in wetlands alone about 2,000 different soils within the United States, and these wetland soils support some 5,000 different kinds of plants. This chapter will help you to identify three major soil types that may occur on your property. Included are suggestions for creating wildlife habitats based on soil characteristics.

Soil Systems

The reason that the supply of minerals in nature never runs out is because they are constantly being recycled. When plants and animals die they decompose. Organisms like mushrooms and other fungi, as well as bacteria, feed on the dead material and help to break it down until it is released to the atmosphere and soil. This decomposition process eventually creates topsoil, which is the richest in minerals and nutrients. The process takes a long time, creating only an inch of topsoil every one hundred years. The minerals and nutrients in the topsoil are leached into the subsoil where the roots of long-lived plants find them and store them into their tissues providing the base of the food chain.

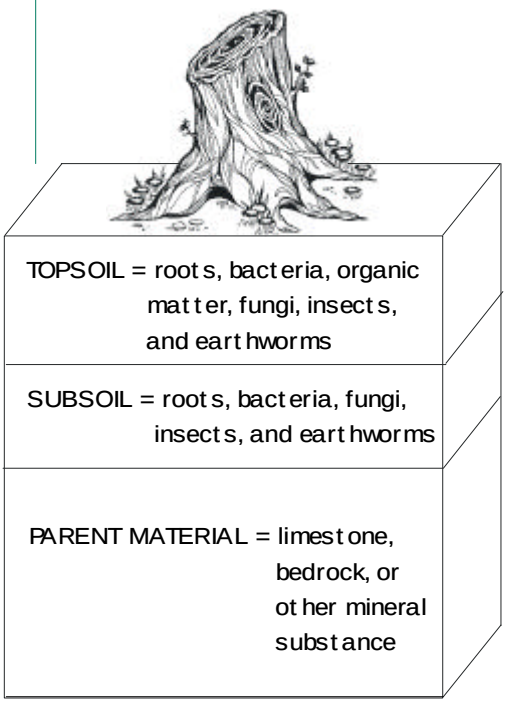
This natural process sustains ecosystems and the well-being of all wildlife. Therefore, soil is much more than dirt. It is a living ecosystem. The soil of a typical acre of grassland habitat, for example, will include 15,000 pounds of plant roots, 400 to 4,000 pounds of bacteria, 500 to 5,000 pounds of fungi, 250 to 1000 pounds of earthworms, and 10 pounds of insects, all of which interact to sustain life.

However, soils and plant communities are easily abused through careless management that allows erosion to occur. The natural process may also be upset by the improper use of herbicides that destroy plants, and insecticides that may kill certain soil organisms that act as decomposers which provides a key part of the food chain.

Soil Textures

The soils that comprise your property developed slowly over a long period of time. The physical and chemical composition of the parent material played a major role in what kind of soils developed. The the effect of climate and the plants and animals that lived and died there are other contributing factors.

Although soil contains many living things, it is also composed of non-living matter such as minerals, water, and air. How much water and air found in soil depends upon weather, water uptake by plants growing there, the lay of the land, texture of the topsoil and subsoil, and groundwater levels. As weather, seasons, and land-use change, the level of the groundwater and soil moisture fluctuates. Wet sand in spring, for example, may be dried out in fall. Moisture content of topsoil also depends on the type of subsoil.



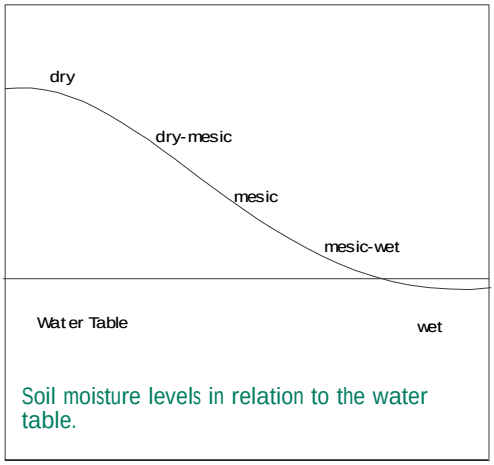
soil profile

A rich loam topsoil, for instance, may not be especially productive if the subsoil is moisture-leaching gravel.

Texture is also a common way to classify soils. It is determined by the amount of sand, silt, and clay found in the soil. Sand particles are the largest, and clay particles are the smallest. Silt particles fall between sand and clay for size. As you might expect, clay is capable of holding much more water than sand because the clay particles are so much smaller and do not leave as many spaces for the water to leach through.

Sandy soils are loose, light soils that are easy to work with. They usually drain water readily and are low in nutrients. Sandy soils dry out quickly as they do not hold water. Instead they absorb it, at a rate of more than two inches of water per hour, and it leaches through to lower layers. Therefore, sandy soils support drought-resistant vegetation such as that found in Jack pine barrens, savannas, and dry prairies. They are also generally well suited for planting wildflowers, native grasses, and pine trees in open-land or woodland habitats.

Clay soils are heavy soils rich in nutrients but difficult to work with. They absorb less than a quarter-inch of water per hour, and therefore are capable of holding a lot of water. Therefore clay soils are associated with vegetation communties that tolerate high water content in the soil such as swamps and floodplain forests, and plant species such as bulrushes, smartweed, duck potato, and pondweed.



Soil moisture levels in relation to the water table.

Loamy soils are intermediate between sands and clays. Composed of many different-sized soil particles, they combine fertility with moisture-holding capacity (a quarter-inch to two inches of water absorption per hour). Therefore, these soils are able to support a wide variety of vegetation, especially hardwood forests and, in a few favored sites, prairies. Areas with these soils offer many management possibilities.

Here's a simple test to determine soil texture on your property: Squeeze a moist (but not muddy) ball of soil in your hand. Then rub the soil between your fingers. Sandy soil feels gritty and loose. It won't form a ball and it falls apart. Clay soil, on the other hand, is smooth and sticky and has a somewhat plastic feeling. It forms ribbons when pressed between fingers. Loamy soil is a combination of clay and sand particles. It is smooth, slick, partially gritty and sticky, and forms a ball that crumbles easily.

For most soils, the amount of organic matter comprises less than five percent of its total weight. Exceptions are peats and mucks, which are special classifications of soil that contain more than 80 percent organic matter. Although high in nitrogen, such wet soils are often low in other nutrients. Frequently drained for growing vegetables or mining peat, these organic soils at one time supported wetland habitats, including bogs and fens. Unfortunately, these communities may be very difficult to restore and should be protected whenever possible.

Most of Michigan's counties now have a published Soil Survey which is available from your local Conservation District office. The survey contains maps that describe soil types on your property along with potential uses including food and cover needs for wildlife.

Soil Fertility

What the maps won't tell you, however, is how fertile your soil is. This information is obtained by taking soil samples from your property. Information about your soil fertility is important if you want to improve soil that has been degraded to produce wildlife habitat. First, though, it helps to know what you are looking for.

Soil pH is a measurement of relative acidity. In the soil pH scale, each number represents a ten-fold increase or decrease in acidity from the number before or after it. For example, a soil with a pH of 5 is 10 times more acid than a soil having a pH of 6. The pH range for most Michigan soils is 4 (acid) to 9 (alkaline), with 7 being neutral. It is important to know the pH of your soil because too much acidity or alkalinity in the soil prevents plants from absorbing nutrients. Maximum availability of most nutrients for plants occurs when the pH falls within the neutral range (6 to 7). Soil pH can be raised or lowered to desired levels by applying either lime or specific fertilizers. These applications, when applied to degraded soils, will increase the activity of microbes, improve nutrient availability, and improve overall soil structure. The pH of acidic soils can be raised by apply-

ing lime. The pH of alkaline soils can be lowered by adding specific fertilizers. Therefore, it is important to know the pH of your soil before applying anything to improve it. For example, adding fertilizer to soil with a pH of 5 won't help most plants to grow any better.

Soil fertility is measured by the amount of nitrogen, phosphorus, and potassium present. If the soil needs them, adding these nutrients as fertilizer at the correct rates helps plants to grow to their maximum potential. Commercial fertilizers are labeled according to the content of elemental nitrogen, available phosphorus, and soluble potash (potassium). The analysis of a blended fertilizer, for example, might read 12-12-12. The figures refer to the percent of nitrogen, phosphorus, and potash (in that order), which is contained in the fertilizer. In the above example, each 100-pound bag contains 12 pounds each. If a soil analysis calls for 24 pounds of nitrogen per acre for the crop or vegetative cover you intend to plant, you would need to apply 200 pounds at the rate in the example. Secondary nutrients of calcium, magnesium, and sulfur are supplied naturally in soil or may be added to soil as needed. Plants also need small amounts of boron, iron, zinc, manganese, copper, molybdenum and chlorine, all of which usually occur naturally. The only way to know what your soil needs is to do a soil test.

In addition to this, it is helpful to know the requirements of the plants you are trying to grow. Clover, for example, grows best in soils with a pH of 6.5 to 7.0. Prairie grasses and wildflowers are not as restrictive--

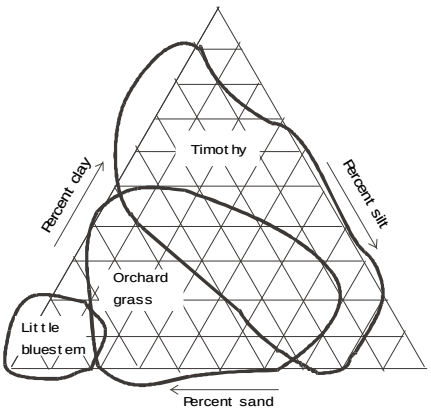


Chart showing the optimal soil texture for three common Michigan grasses.

they will grow in a pH range of 5.0 to 7.5.

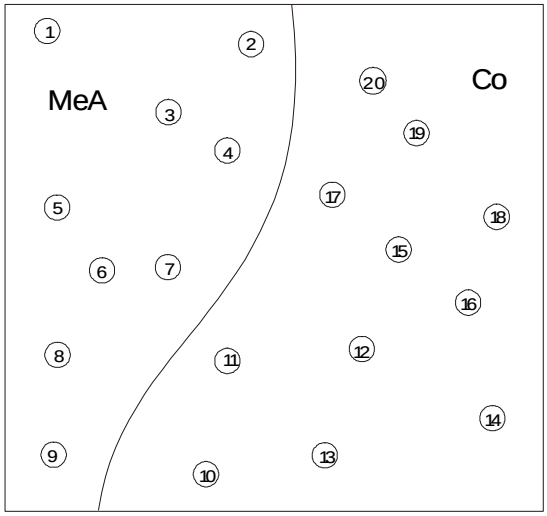
Soil ph

pH ranges for some Michigan plants (1-6.9 is acidic, 7 is neutral , 7.1-14 is basic)		
Type of vegetation	Species	pH
Grasses & legumes	Big bluestem	5.5-7.0
	Little bluestem	5.5-7.0
	Switchgrass	5.5-7.0
	Indian grass	5.5-7.0
	Alfalfa	>7.0
	Red Clover	6.0-7.0
	Orchard grass	5.5-7.0
Shrubs	Chokecherry	6.5-7.5
	Crabapple	5.0-6.5
	Nannyberry	6.1-7.5
	Red-osier Dogwood	<7.5
Hardwoods	Aspen	7.5-8.0
	White Ash	5.0-7.5
	Green Ash	6.1-7.5
	Red Maple	6.5-7.0
	Sugar Maple	3.7-7.3
	White Oak	5.5-7.5
	Red Oak	4.8-6.5
Conifers	Hemlock	6.0-8.0
	Jack Pine	4.6-6.5
	White Pine	4.5-6.5
	White Spruce	4.5-7.5
	White Cedar	<7.0

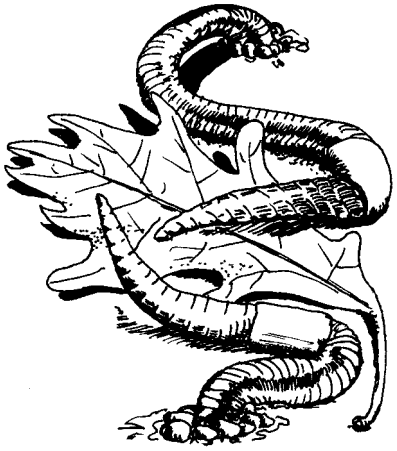
Testing Your Soil

Planting anything on your land without first getting a soil test is like trying to create a new meal without a recipe. It is impossible to know, for example, why a certain site will not grow grass or sunflowers without first sampling the soil for nutrients and pH. Depending on the size of your management site, be sure to collect several samples because different locations may be the same soil type but vary widely as to fertility.

Before testing your soil for fertility, consider its recent past history. For example, the use of pesticides may have greatly reduced the amount of micro-organisms. Nutrient value of the soil may be somewhat depleted if the land was used to produce row crops for many years. If the property was a long-time pasture, the soil structure might be tightly impacted due to animals walking over it. These considerations will help to explain why the test results come back the way they do, and they will also help you to understand the range of your management options.



Sample soil survey map of a 10 acre backyard with soil test sites.



On the Soil Survey map of your property, or on a sketch you've prepared yourself, divide your land into soil types. Plan to take twenty to thirty samples for each 10-acre site. If your property is an acre or less, two to four samples might be sufficient. Backyards and other small parcels might require a single sample. Number all site samples and record them on the map or sketch.

Use a soil probe, spade or trowel, and a clean plastic pail to take from each site soil samples 6 to 8 inches deep (no grass, sod or other plants are needed). Mix the sample thoroughly in the pail and collect one pint for testing and take it to your county Michigan State University Extension office, which will charge a nominal fee for analysis. Furnish site information on any history of cropping, liming and fertilizing, and include the soil type listed in the Soil Survey. You should also explain what you want to plant because recommended fertilizer rates vary widely for different food plots and habitats.

Soil test results can be interpreted by knowledgeable people at the Michigan State University Extension office, Conservation District office, or farm supply dealer. Keep the results with your wildlife management plan and refer to it before future plantings. The success of your overall plan depends greatly on how well you know your soils and what they can and cannot do for wildlife habitat.

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PRIVATE LAND PARTNERSHIPS
WORKING TOGETHER FOR WILDLIFE

EDGES AND FRAGMENTS

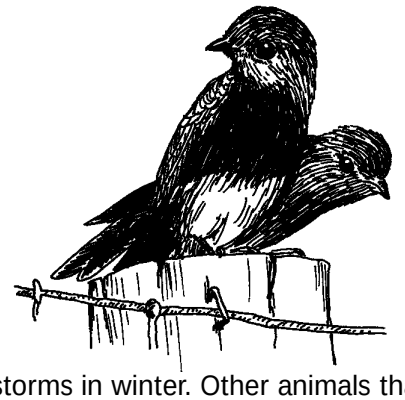
Edges and fragments are key pieces of the habitat puzzle. In order to properly manage for wildlife, it is important to understand edges and habitat fragments and their potential impacts on wildlife. Edges are places where two cover types come together, such as a wetland next to a field or a young stand of aspens next to an older stand of aspens. Edges benefit a large variety of wildlife but can also harm other species. Habitat fragments are remaining pieces of larger habitats that have been broken up, either by natural causes such as wildfire or storms, or by human disturbance such as roads, housing developments, and pipelines. Habitat fragments often contain a lot of edge, and may be too small to provide quality habitat for certain kinds of wildlife.

Before European settlement, Michigan's historical ecosystems included edges and fragments. However, today there is a large amount of habitat fragmentation, especially in the Lower Peninsula, due to the addition of nearly 10 million people to the state. As a result of habitat fragmentation, many edge-loving species have become abundant, while edge-sensitive species have reduced in numbers.

Knowing the positive and negative impacts that edges and fragments have on wildlife will help you decide on the best management options for your land. Options can range from doing nothing to intensive manipulation of habitats. Because of the large amount of habitat fragmentation in Michigan, one of the best management goals for wildlife is to enhance existing edges and minimize fragmentation. This chapter discusses such options to managing edges and fragments on your property.

Edges - Pros and Cons

Edge is important to wildlife that require plants from two kinds of habitat to provide their food and cover needs. Many species will nest in one habitat, and feed or find shelter in another. For example, a grassland and a wetland next to each other can provide year-round habitat for pheasants. The grassland provides nesting and brood-rearing cover in spring and summer, while the wetland provides security from predators and



storms in winter. Other animals that thrive along habitat edges include ruffed grouse, bobwhite quail, wild turkeys, deer, rabbits, raccoons, and foxes. Song sparrows, brown thrashers, gray catbirds, flickers, indigo buntings, bluebirds, cardinals, and red-tailed hawks are also active along edges. Because of the large amount of edge in Michigan, many of these species are now abundant. However, edges can often become too narrow to benefit these species. With the proper edge enhancements, they may be relatively easy to attract to your land.

Other species shun edges, and prefer the interior of one type of habitat to provide their food and cover needs. They rely on larger tracts of habitat and, due to large amounts of habitat fragmentation, they are becoming less abundant in Michigan. Woodland birds that are sensitive to edges are wood thrushes, ovenbirds, broad-winged hawks, pileated woodpeckers, yellow-throated vireos, American redstarts, veeries, and Blackburnian, yellow-throated, cerulean, mourn-

ing, and hooded warblers. Grassland birds that shun edges include northern harriers, sharp-tailed grouse, upland sandpipers, bobolinks, and savannah and Henslow's sparrows. Certain species of salamanders, frogs, and butterflies also thrive best away from edges. One reason that these species can not survive along edges is that they do not posess defenses against edge-roaming predators such as snakes, foxes, raccoons, opossums, skunks, blue jays, and feral housecats. These predators pose serious threats to these edge-sensitive species as habitat fragmentation increases.

Another serious threat to these edge-sensitive species is the brown-headed cowbird, which is a nest parasite that thrives along the edges of woodlands. The cowbird does not build its own nest, but instead lays its brown-speckled eggs in another bird's nest, leaving them for the host bird to hatch and raise. The cowbird chicks, which are larger and more voracious than the host's chicks, hatch earlier than most host species do and are able to out-compete the host's chicks for food and space. This bird has grown abundant in Michigan because of habitat fragmentation,

cowbird chick in host nest

and is becoming a large problem for woodland birds. In some fragemented forests of the central United States, 60 percent of all bird nests in those forests contained cowbird eggs. Other species that are feeling the impact of cowbird parasitism are Kirtland's warblers, wood thrushes, yellow-throated warblers, chipping sparrows, scarlet tanagers, red-eyed vireos, and eastern phoebes.

Managing Edges

Many people think of edges as wasted areas. However, the shrubs and grasses found there provide good food and nesting cover for many species of wildlife. Bobwhite quail, for example, relish giant ragweed seeds and poison ivy berries, American goldfinches savor bull thistle seeds, monarch butterflies rely on milkweeds, black-capped chickadees peck out insect larvae from the swollen stems of goldenrod, and meadowlarks and bobolinks nest in the herbaceous cover. Small, permanent openings in forests are edges that provide good sources of food, nesting sites, and escape cover for ruby-throated hummingbirds, broad-winged hawks, deer, black bears, red foxes, chipmunks, and other wildlife.

Michigan has an abundance of edge, which is mostly associated with farming, timber harvesting, and urban development. Much of these edges can be improved to benefit edge-loving wildlife, as well as lessen the impact of predation on edge-sensitive species. When edges are narrow, they do not provide enough habitat for many species as they contain little escape cover and make it easy for predators to find nests. Woodland openings, fencerows, hedgerows, and roadsides are also examples of edges that are often too narrow and can be enhanced to benefit wildlife. In addition to this, broad fields of row crops have forced many species to nest along field edges, windbreaks, ditches, travel lanes, and anywhere else they can find suitable shelter. These areas, when enhanced can provide essential food and cover for nesting and travel.

The first step to managing edge is to identify any edges that already exist on your property. Then, you must decide if these edges can be improved. As you walk along the edge, determine if the transition between the two habitats is abrupt. Generally, the wider and more subtle and blended the edge is, the better it will be for wildlife habitat. You can therefore

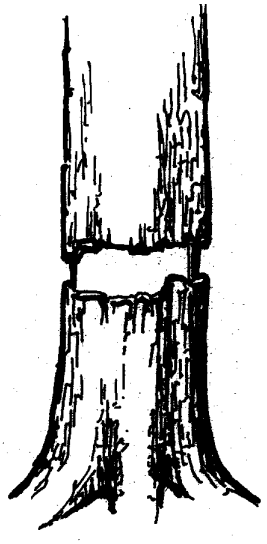
improve habitat by creating a more gradual transition between cover types.

There are two ways to do this. Either option will provide habitat for edge-loving species, as well as lessen the impact of predators on edge-sensitive species. One option is to let nature take its course and allow vegetation to grow. If the edge on your property is 30 feet or wider, doing nothing may be the best option. A 30-foot-wide strip of field next to your woods will slowly revegetate on its own.

Another option, if you have time and are willing to invest a little money, is to create a gradual transition by planting shrubs along the edge. Wildlife friendly shrubs include dogwood, highbush cranberry, nannyberry, ninebark, serviceberry, hazelnut, wild plum, and crab apples. They provide berries, seeds, fruit, browse, and insects for wildlife. To protect the shrubs from hungry deer and rabbits, you may have to place chicken wire, hardware cloth cages, or plastic tree guards around the new plantings. This option can be costly, but it will provide enhanced habitat relatively quickly.

If you farm and are concerned about taking valuable field space out of crop production, consider that crops planted to within 20 feet or more of an abrupt woodland edge often grow poorly because adjacent tree roots compete with crops for moisture. By creating a gradual edge, you can produce good wildlife habitat without much, if any, crop loss.

When removing field acreage from crop production is not an option, consider widening the edge into adjoining woodlots by removing some trees. Try to not remove more trees than is needed to create an edge that totals 30 feet wide. To encourage stumps to resprout into a lush tangle of branches, cut some of the trees off at ground level. To prevent regrowth of less desirable trees such as box elder, carefully spot- treat cut ends with brush killer. If you are conducting a commercial timber sale, always put your wildlife plans in writing before signing a contract. Mark those trees you want preserved for wildlife and relay this information to the logger. It is also important to leave wildlife shrubs and native vines, such as grape, bittersweet, and Virginia creeper, that may be clinging to trees.



You can also create a more gradual transition between forest and field by girdling some of the trees within a 30-foot-wide span from the forest edge. To girdle a tree, which will eventually kill it creating a snag, remove a three- to four-inch strip of bark completely around the tree, making certain to penetrate the first layers of wood. Creating snags will open the canopy allowing shrubs and groundcover to develop. Besides cavity-type homes, these snags yield insects for chickadees, nuthatches, and many kinds of woodpeckers. They also provide perches for hawks and owls.

As mentioned, fencerows can leave wildlife vulnerable to predation if they are narrow and contain little protective cover. Widening them to increase the amount of cover and diversity of plants growing there will have an immediate positive impact on many species. For example, to improve a fencerow separating a crop field from a pasture, widen it to 25 to 50 feet by planting the area on either side of the fence with mixed native grasses and wildlife trees and shrubs. To increase diversity, leave occasional gaps in the tree and shrub plantings, plant vines to grow on the fence, and possibly build brush piles.

To enhance roadsides, which can serve as travel corridors and cover for many species, plant them to grasses, or allow existing grasses to grow. Mow between July 15 and August 31 when ground-nesting birds are no longer sitting on eggs. Mow between 8 to 12 inches in height to provide nesting habitat for the following spring. If you must apply herbicides, spot-treat problem weeds instead of spraying the whole area.

You can create edge by planting hedgerows of shrubs or a mixture of shrubs and evergreens. Planting windbreaks around your home and outbuildings is often a wise energy-conservation activity, which has the added benefit of providing nesting, rearing, roosting and escape cover for wildlife. When creating these living screens to make your home or property less conspicuous, consider mixing in conifers (evergreens). Neighbors can work together to create valu-

Image not yet available.

Depending on your goals and the surrounding landscapes, it may be beneficial to wildlife to close gaps or connect fragmented habitats. Above are illustrations of this. In Case 1, the surrounding landscape is predominantly fragmented forests. Therefore, it may be beneficial to close the grassy opening with trees or shrubs. In Case 2, the surrounding landscape is predominatly fragmented grasslands. Therefore, it may be beneficial to connect the two fragments by removing the trees and shrubs separating them.

able wildlife habitat by creating dynamic edges between properties. For example, if each neighbor plants two rows of shrubs, the edge effect will have doubled in width and be much more attractive to many animals.

Creating or enhancing the best edge habitat usually requires some work. Before you decide to take on such a project, determine if you have the time, money, and energy to routinely maintain it. If you do not manage the edge you have created, natural succession will proceed and the habitat will change. Therefore, if you wish to keep the edge on your property, plan to occasionally mow or disk woodland openings and trails to keep the forest from filling in. Expect to mow, disk, burn, or otherwise treat grasslands to keep trees and shrubs from taking over.

Your property may already be fragmented to the point that creating edge is counter-productive to wildlife. Consider the areas surrounding your property to determine what management options may best reduce fragmentation. Connecting two fragmented habitats often best benefits wildlife, and should be considered whenever possible. One way to enhance fragmented areas is to connect forest openings by planting grasses, shrubs, and trees. Trails and roadsides often fragment wildlife habitat and can be improved by planting to grasses or shrubs. If there is an overabundance of fencerows in your area, you may want to consider removing them. However, be aware that this may impact other species that may use fencerows for travel or cover. For instance, a fencerow may join two fragmented forests, while at the same time fragmenting a grassland. To decide which option is best for your property you must determine which habitat needs enhancing more than the other. This can be done by examining the areas surrounding your property. In this instance, if the grassland is surrounded by forest, then it may be best to keep the fencerow and allow the grassland to convert to a forest, thus connecting the forest fragments.

In summary, identifying edges and fragments on your property and understanding their importance to wildlife should be part of your management plan. There are many ways to enhance the existing edges on your property to benefit wildlife. Always examine your surrounding landscape before making any management decisions and, whenever possible, connect fragmented habitats.

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PRIVATE LAND PARTNERSHIPS
WORKING TOGETHER FOR WILDLIFE

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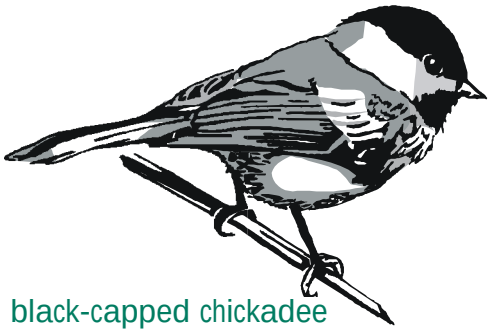
LAND STEWARDSHIP

Land stewardship is the conservation of your property's natural resources and features over a long period of time. The motives of good land stewardship seem to be paradoxical as they are essentially both selfish and altruistic. They are selfish because as a landowner, you want to continue to reap the rewards of your land for many years to come. These rewards may mean quality farm products, high-value timber, songbirds throughout the year, successful wild turkey hunts, large bags of morel mushrooms, peace and solitude, or a great view just to name a few. However, stewardship motives are also altruistic, as you also want to be a good neighbor, one who shares concern for the lands that surround yours and the water that travels downstream from your property. You also want to ensure that the opportunities you enjoy now will continue to be there when your great grandchildren are old enough to appreciate your hard work and dedication.

Many consider the late Aldo Leopold to be the father of modern conservation theory and practice. Leopold believed that land stewardship was not only rooted in conservation but also involved ethics, or the search for a higher meaning. He wrote that all ethics rest upon the single premise "...that the individual is a member of a community of interdependent parts. The land ethic simply enlarges the boundaries of the community to include soils, waters, plants, animals, or collectively: the land." This is to say that once we understand that humans are not separate from, but are part of and depend on the natural community, we will develop an ethic to care for the community as a whole.



black-capped chickadee

Stewardship of your land is the greatest gift you can give to present and future generations. This chapter explains what healthy ecosystems are, and what you can do to help restore and maintain them for the future.

Focus on the Building Blocks

Natural resources refer to all the things that are naturally produced, and include water, air, soils, minerals, plants, and animals. The key to good land stewardship is to ensure that the basic building blocks for healthy ecosystems are taken care of. These basic building blocks are healthy soil, clean water and air, and biological diversity. Soil is the foundation of our plants, whether they are natural communities, tree farms, or food crops. Clean water and air are essential for all living organisms.

Biological diversity is simply the variety or diversity of living organisms. Over the last 500 years many organisms have become extinct or extirpated because of human activities, and many more are currently declining in population. Some of these species play a critical role in our ecosystems, and others offer medicinal, economic, nutritional, and aesthetic values.

For most species we do not have enough knowledge to fully understand what roles they play in our ecosystems or what values they offer. As a good steward, though, making sure that the native plant and animal communities found in your area continue to live is a priority as important as maintaining healthy soils and clean water and air. This is especially true for rare species such as the Karner blue butterfly, which has a hard time recolonizing within other sites.

Stewardship and the Planning Process

Stewardship is not just about getting outside and appreciating your land, it is also closely linked with creating and carrying out of a good habitat management plan. Stewardship includes everything from sitting on a hillside observing which wildlife species visit your property to getting on your tractor and brushhogging the shrubs and trees that are invading your prairie. The key elements to good land stewardship are very similar to the steps in writing the management plan. First you must identify the soils, topography, plants, animals, habitats, and waterways that occur on your property. In addition to this you should try to understand the relationships between these natural features. You can do this

and talking to neighbors or experts. You can then begin developing a plan. Your plan should focus on maintaining the long-term health of your land, and should be done within the context of surrounding lands. After your management plan is implemented, while enjoying your results, you should monitor your progress and identify any problems. If you have thought out your management plan thouroughly, future generations will be able to enjoy the same opportunities that you have.

Understanding What's There

Good land stewardship is built day by day while spending time on your land observing the various events in the natural world. To obtain the most knowledge from your land you must be very observant. Listen to frogs calling in the wooded swamp in spring, watch the brood of wild turkeys hunt for insects in the grassy meadow, view the songbirds in May as they migrate to places farther north, notice trails created by various animals, look for tracks, nests, or other signs of animal activities. Ask yourself questions about your land. Are there any decaying logs or dead trees in the woods that may be potential homes for wildlife? What flowers bloom in early spring, late summer, and early fall? What types of soils occur on your land? Is the stream next to your property still cool and clear, or is it warmer than usual and filling with sediment?

These informative activities should serve as guideposts for future management decisions. What you observe on your land now can teach you about your land's limitations as well as the opportunities that exist. For example, if you live in an area where the soil is predominantly coarse, nutrient-poor sand with very little topsoil, growing a forest of hardwoods will be difficult and costly. On the other hand, this location might be ideal for restoring a mosaic of prairies and savannas. Diligent observation, therefore, is a key toward building good land stewardship. Refer to the chapter on **Evaluating the Land** in this section for more information.

Managing Long-Term Health

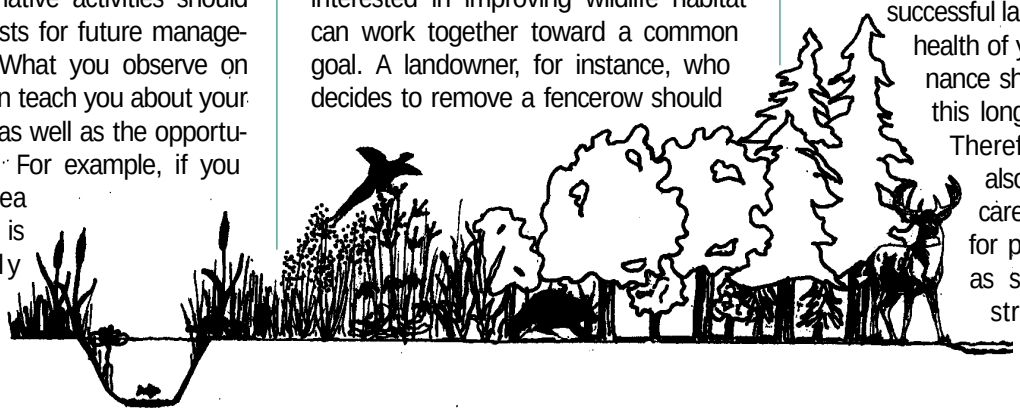
Taking into account the long-term health of your land helps ensure that today's options will exist several generations from now. Health, according to Aldo Leopold, is "the capacity of the land for self-renewal." What you do with your land today will determine the land's future health. Therefore, whether you manage for specific species, manage for diversity, or take a hands-off approach, it will effect the opportunties that will be available on your land in the future. For this reason, it is important to be very careful in making mangement decisions. It is always important to take a critical look at surroundiing landscapes when developing a management plan. For example, if you live in a largely forested area with few scattered old fields, it may be more beneficial to manage for a forest on your land, rather than a prairie which will require more maintenance and have less benefit to wildlife in this setting.

Also, it is important to discuss your plans with neighbors so that everyone interested in improving wildlife habitat can work together toward a common goal. A landowner, for instance, who decides to remove a fencerow should consider the potential impact on the adjacent forests, wetlands, rivers and lakes, and the plants and animals that live there. Perhaps, impacts could be minimized by creating a buffer strip of shrubs, planting a hedgerow, or seeding the area with native grass and wildflowers. Refer to the chapter on **Working with Neighbors** for more information.

Maintenance of Management Goals

Maintaining the habitat you have restored or enhanced will ensure long-term fulfillment of your management goals. Without some maintenance, most habitat plans are doomed to failure. Suppose you own 20 acres of native prairie, which you would like to maintain as such. You will have to do more than merely allow nature to take its course. Historically, prairies were maintained by periodic fires, which were set by lightning or Native Americans. If you want your prairie to be there 10, 20, and even 50 years from now, you will have to take some course of action such as mowing, cutting, grazing, prescribed burning, or applying a selective herbicide. Maintenance also includes smaller-scale activities such as cleaning out bluebird boxes, replacing livestock fencing in disrepair, repairing bird houses and feeders, pruning wild apple trees, and replacing damaged saplings. Maintenance often requires substantial manual labor, but it offers the biggest reward of all--being a good steward.

Because the most important part of successful land stewardship is the health of your land, all maintenance should be crafted with this long-term goal in mind. Therefore, maintenance also means keeping a careful eye on your land for potential threats such as sedimentation in the stream, soil erosion,



pest and disease outbreaks, overbrowsing, overgrazing, ORV damage, and the invasion of non-native species such as purple loosestrife, glossy buckthorn, autumn olive, or multiflora rose.

Landowners should also consider long-term maintenance to ensure that the lands they are managing remain good wildlife habitat far into the future. Unfortunately, land frequently changes due to development and land sales. However, this need can be addressed partially through legalized tools such as conservation easements, donations, and deed restrictions. These tools can prohibit or restrict future development of the property for parking lots, subdivisions, strip malls, or other projects detrimental to wildlife. A conservation easement, for example, is most commonly used because it can be tailored to suit the property's unique characteristics. It can be flexible, and the landowner typically retains ownership and access. For more information about conservation easements, contact the Michigan United Conservation Clubs office or your local Conservation District office.

Monitoring

Monitoring the changes that result from your efforts at improving wildlife habitat brings the stewardship cycle full circle. Now when you go back to observing the wildlife and plants on your property you can see what differences have occurred. Are the management strategies for eliminating an exotic plant in your wetlands working? Are you seeing more of the species that you managed for? How many new species of animals are visiting your property? Is there sufficient water in spring and summer in the marsh you restored for waterfowl habitat? Do ducks use the marsh for feeding, nesting, or simply for resting during migration?

Keeping track of your progress provides the opportunity to make adjustments before too much time, energy, and money have been invested in the management plan. Monitoring is a great chance to become an even better steward of your land because it helps you become more familiar with its ecosystems, the needs of the plants and animals that live within them, and how your actions directly affect their welfare.

Summary

Responsible land stewardship is essential to improving wildlife habitat in Michigan. It is the foundation of a successful wildlife management plan and the cornerstone to its success. Because of the fragmented nature of today's landscape, the need for holistic management plans has never been more important. Stewardship is more than controlling competing vegetation, managing deer populations, restoring overgrazed areas, and putting up fencing to keep out unwelcome ORV traffic. It is also about being a careful observer of your land and surrounding areas, and understanding what is needed to maintain its long-term health. Without good land stewardship, most habitat plans are destined to fail, no matter how well-written they are.

In many ways stewardship is the most rewarding part of doing something positive for wildlife because it requires becoming involved with your land, as well as understanding it. Getting your hands in the soil and your feet in the water often helps in appreciating the fact that it is there. Land stewardship is a journey that lasts as long as you own the property, regardless of whether you make a living off the property, live there, or only visit it occasionally. Stewardship is one of the most rewarding things you will ever do, and it is something that your grandchildren and their children will appreciate and thank you for long after you are gone.

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