

INTRODUCTION TO WILDLIFE & HABITAT MANAGEMENT



Wildlife are the animals that live freely in the natural environment. Wildlife includes all species--game and non-game. Songbirds are wildlife. So are snakes, toads, butterflies, and fish. These wildlife species and numerous others provide us with beauty, recreation, economic opportunities, and maintain our quality of life by regulating and modifying how our ecosystems function.

What Is Habitat?

Wildlife needs a place to live. For people, such a place is called "home." For wildlife, the place is called "habitat." But wildlife habitat is not just trees, shrubs, grass, or crops. It is a complex mixture of plant communities, water, weather, animals, and other environmental features that provide the cover and food that wildlife need.

Landowners who want to improve habitat for wildlife must realize there is a great deal to learn. Fortunately much is known, thanks to more than 100 years of research by natural resources schools within our colleges and universities and by state and federal agencies charged with natural resources management. Landowners should also know there is a push for every pull. Changes that produce more ducks, for example, may not produce more deer. Changes which help squirrels may not help certain songbirds.

The chapters throughout this guide will help you to understand the relationship between wildlife and their varied habitats. The brochures will explain the options available for managing your land for wildlife, and they will offer detailed and specific practices to help you do it successfully.

garter snake

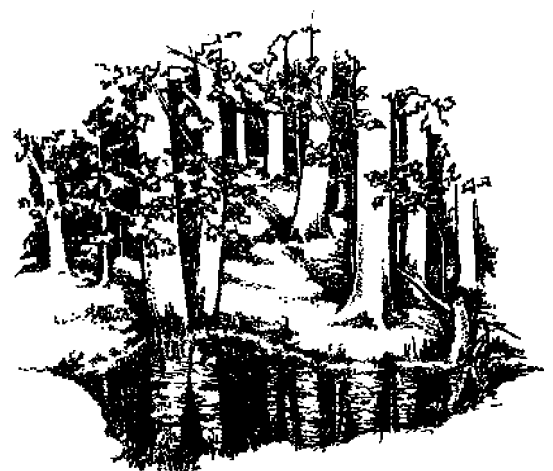
The Components of Habitat

Habitat can be broken into four parts: food, water, shelter, and space. When all parts blend together, wildlife not only survives, they thrive. Remove any one of the four and wildlife must travel to find the missing component. As human populations increase, so does our impact upon the natural environment. When habitats are isolated or destroyed, wildlife are crowded into smaller areas, or they are forced to find a new area. These conditions put wildlife at risk, including vulnerability to predators, parasites, accidents, and starvation. Some types of wildlife are not very mobile and local populations may be easily extinguished when habitat is destroyed or significantly altered.

Food needs occur year around, and yet habitat may produce food only on a seasonal basis. For example, cottontail rabbits eat the inner-

bark of young trees and shrubs in fall, winter, and spring when cold weather has eliminated green leafy food. Food sources available one year may not be available the next. Certain varieties of acorns may feed deer, squirrels, and wood ducks but only in those years when there is a crop. Planting trees, shrubs, grasses, and flowers and installing bird feeders are ways that landowners can help provide food for wildlife. More than 50 species of birds, for example, will eat sunflowers. Almost as many kinds of birds eat the berries of silky dogwood.

Water is needed by every living thing on earth. Wildlife's water needs are met by rivers, creeks, ponds, springs, seeps, and other wetlands. Some birds, like bobwhite quail and pheasants, can survive on moisture content from insects, seeds, berries, and dew. Maintaining existing water

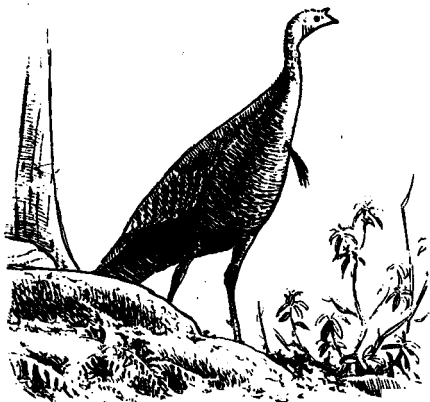


forested wetland

resources on your property may be enough to help wildlife. Restoring wetlands and increasing the amount of water available, such as building ponds, are bigger challenges to consider.

Most kinds of wildlife need shelter to protect themselves from predators and, especially during winter, from severe weather. Other types of wildlife, such as ground-nesting birds, require a safe place to lay eggs and to raise their young. Shelter can be as basic as a hollow tree used by a screech owl to rear its young or as complex as a large stand of switchgrass where a pheasant can survive a severe snowstorm.

All creatures need room to roam, and many establish territories to defend from others of their kind, especially during the breeding season. This type of habitat requirement is called living space or simply, space. The exact needs and the arrangement of space differ according to species. Red squirrels, for example, can usually find enough seeds and den sites to survive in an acre or less of pine, spruce or balsam fir trees. Wild turkeys require 500 to 2,000 acres of mature woods mixed with open fields. White-tailed deer need a



eastern wild turkey

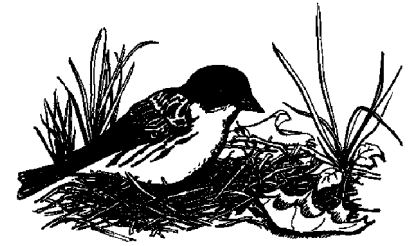
several square miles of mixed-aged woodlots, brush, and openings. The home territory of a gray wolf pack is 50 to 150 square miles of mostly forest and other undeveloped land.

What Is Wildlife Management?

Wildlife management is the "manipulation" of populations and habitat to achieve a goal. The goal is usually to increase populations but can also be to decrease or sustain them. Wildlife managers may try to change habitat in a way that benefits not only wildlife but also helps people, as well as the habitat itself. Although the definition of wildlife management includes the word "manipulation," wildlife managers realize that this includes natural changes or manipulations that may occur over a lifetime.

Improving habitat for a particular kind of wildlife means understanding what the animal needs to live. It also means knowing how changing habitat to increase one kind of wildlife will affect other forms of wildlife.

Most of the land in Michigan is privately owned. In the southern half of the Lower Peninsula, where most of the people live, over 95 percent of the land is privately owned. Most property owners--large and small--want to do good things for wildlife, and they have several options for managing their land. When two types of wildlife with different habitat needs are desired and it is not possible to manage for both within the boundaries of your land, long-term plans may then be necessary. Often, initial work favors one species while the overall objectives favor others.



Kirtland's Warbler

What Is Biodiversity?

Usually, the more varied the habitat conditions are over a large area, the greater the variety of wildlife will be. "Biodiversity" is the term used by scientists to describe the variety of living organisms (plants, animals, and even microorganisms) upon the earth and the interactions and environments they form. Biodiversity can be viewed in numerous ways and in varying levels. For example, locally, there is the diversity of genetic stocks of a rare animal; regionally, the maintenance of a viable population within a certain species; and globally, the concerns focusing on the loss of a unique plant and animal community.

One way to conserve biodiversity is to develop "structural diversity" in habitat projects. Structural diversity can be either vertical (layers of vegetation such as woods with an understory of shrubs) or horizontal (patchiness: scattered openings within a forest or, conversely, large tracts of trees).

Creating structural diversity is possible within most types of habitat. For example, a landowner who wants to thin a mature woodlot might leave a poor-quality black cherry tree for the fruit it offers to birds and animals. A hollow, dead portion of the same tree becomes a home for a chickadee and provides



insects for insect-foraging birds such as nuthatches and woodpeckers. A heavy limb that fell years earlier is now a drumming log for a ruffed grouse. Finding habitat under the limb is a salamander; later, a garter snake may move in. When a tree eventually dies and a trunk cavity forms, a raccoon will claim it as its own although a swarm of honeybees may have a different idea.

Habitats, large and small, are governed by both natural occurrences and disturbances and cultural changes. Hydrology, geology, and soil types all influence how habitats develop while roads, fences, and property boundaries modify this development. Wildlife habitat may vary in size from "macrohabitats" containing hundreds of acres of trees or crops to "microhabitats" such as the bank of a brook or a single boulder occupying only a few square feet. The black cherry tree described above is actually several microhabitats, each of which helps support a certain wildlife species.

How Habitats Change

Most habitats are not stable, and they change over time. Before people settled Michigan, new habitats were created and others changed by glaciers, wildfire,

floods, windstorms, and the natural birth-to-death process of trees and other plant communities. In less than 200 years humans have dramatically altered habitat--destroying some and creating others--in ways that may have never occurred naturally. The axe and the plow are tools often mentioned as the most destructive. But properly applied, the axe and the plow, along with the chainsaw and controlled fire, can also lead to healthier habitat.

What You Can Do

Wildlife is a product of land and water, and anyone who owns land or is charged with its responsibility is a manager, or manipulator, of habitat. The decision to do nothing with your land can have as big an impact on wildlife--because of the changes that occur naturally--as a detailed management plan. Farmers who plant crops or choose not to plant crops affect wildlife. Homeowners who plant shrubs and maintain lawns manage wildlife, just as those who feed backyard animals and erect bird houses do.

To make a positive difference, one that helps wildlife the most, you should have a plan; even if you wish to allow the landscape to take care of "itself". The first steps are to understand what wildlife in your area need and to identify the kinds of habitat on your property (as well as on adjacent land). Even if your property is only a small backyard, by providing a single component of habitat--food, water, shelter, or space--you can help wildlife. Working with your neighbors on a combined management plan will help even more.

What Are the Benefits?

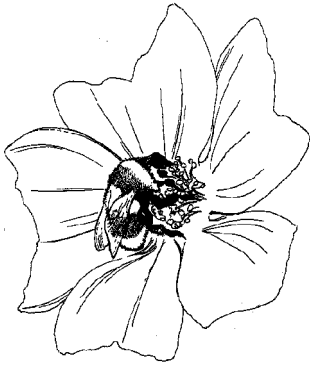
Americans' fascination with wildlife can be traced to the explorers and settlers, the pioneers and market hunters. The days when bison blanketed the plains and passenger pigeons darkened the skies are no more, of course, but another kind of "good old days" is occurring. Today, people better understand their relationship to the environment, and many accept the responsibility that modern conservation practices require. They care about wildlife and the habitats that support them, and they want to help. But why?

The answer is "benefits," which are as varied as wildlife themselves. Tangible rewards--those that we can see--include:

- More animals to watch, photograph, hunt, or enjoy.
- Improved soil conservation resulting from less wind and water erosion



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- Enhanced natural beauty that comes from creating land scapes, planting wildflowers, and growing healthy woodlots
- Better insect damage control through natural predators like bats, swallows, dragonflies, and bluebirds instead of relying on insecticides and bug zappers
- Added income by enrolling land in the federally funded conservation programs
- Improved energy conservation through landscape design that reduces home heating and cooling costs
- Reduced noise, dust and snow accumulation that results from planting shelterbelts
- Higher property values that result from attractive, well-managed land
- Protecting threatened and endangered species or helping to protect a species from becoming rare.

- Increased consumable value. Examples include:
 - (1) properly cutting trees for timber income and firewood;
 - (2) harvesting portions of crops not needed by wildlife;
 - (3) collecting mushrooms, berries, and other wild edibles; and
 - (4) hunting surplus game animals.

Intangible benefits are also important but not as easily identified. A diverse landscape--one that has a mixture of habitat conditions supporting a wide variety of wildlife is less vulnerable to destruction by insects, diseases, and severe weather. Complexity, therefore, will help maintain Michigan's diverse wildlife populations for generations.

Your goal may be to preserve a certain species or to conserve natural resources in general. Either way, managing your land for wildlife helps assure that succeeding generations will be able to enjoy them as you have. To many people, that goal is the most important of all.

FOR ADDITIONAL CHAPTERS CONTACT:

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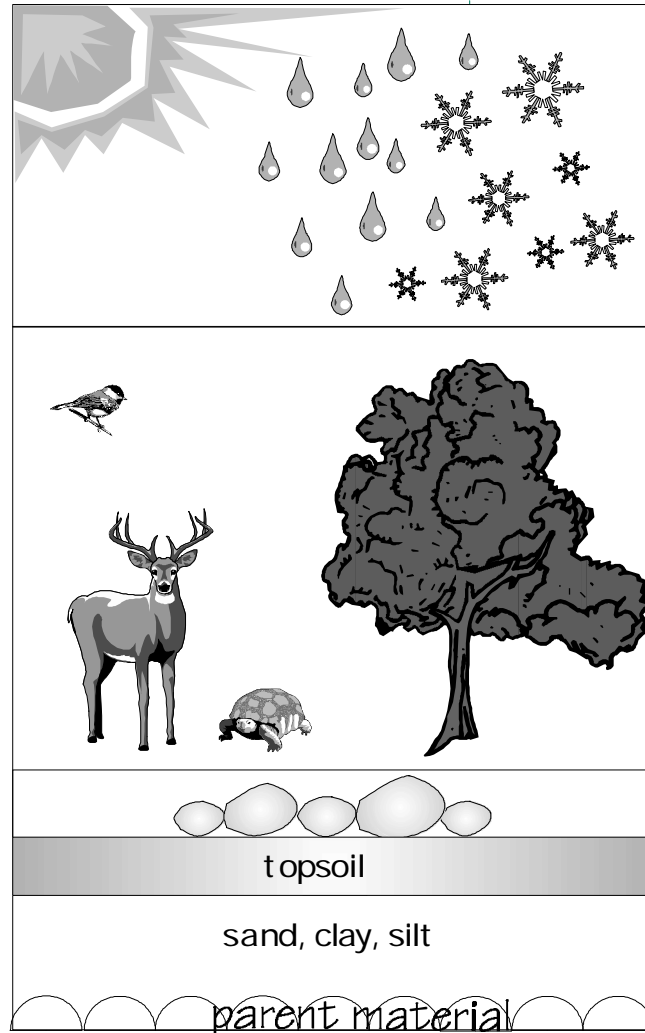
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ECOSYSTEMS, LANDSCAPES, & YOUR PROPERTY



From the large forest tracts of the Upper Peninsula to expansive wetlands of Lake St. Clair, Michigan is a wonderful and diverse place. As a Michigan landowner, your property fits into the big picture, as it is a single piece of the large jigsaw puzzle of the state. Each land parcel, regardless of size, fits with other pieces to form a neighborhood. The neighborhoods then come together and form an ecosystem. Ecosystems collect to form a regional landscape, and these together, in turn, link the State of Michigan with surrounding states and provinces. It is important to understand this concept because what happens on your property--your individual piece of the puzzle--has an impact on your neighborhood, the local landscape, the regional ecosystem, and ultimately the areas surrounding the state. Therefore, the collective set of management practices on a landscape ultimately determines which communities of species will prosper.

"Ecosystem" refers to the relationship between a community of plants and animals and its living and non-living environment. This relationship includes the rain, sun, wind and elements of the atmosphere; the plants and animals, including people, on the land and in the waters; and the soil, geology and water that occurs on or in the land. Interacting together, these diverse environmental factors form an ecosystem. Each ecosystem



Climate, heat,
and precipitation

Plants
and animals

Rocks
and soils

can be defined both as an individual, self-contained complex, and as part of larger ecological systems.

Ecosystems can be as small as several square feet around a fallen log in a forest, or as large as the Great Lakes region. Size of the ecosystem is not nearly as important as the interactions within the ecosystem. The bacteria, fungi, and insects on the log help to

decompose the log into a soil-enriching humus, which some day will support a new tree. The currents and water temperatures of the Great Lakes will impact the growth and location of invertebrates, which will in turn impact the entire food chain, including people. Again, it is the relationships within the ecosystem, and not its size that defines it.

Ecosystems change over time. Even habitats that have been badly damaged or destroyed may restore themselves, or new habitats may be created instead. Part of the process of habitat creation or restoration is the succession of plant communities. For example, a once-bare crop field left fallow for years will first support annual weeds and flowers. Later, perennial plants invade, followed by shrubs and trees, which some day may make a forest. Natural disturbances may also cause the succession to move backwards, such as a fire returning a forest to bare ground.

As lakes age, over thousands of years, they may fill with sediments and grow warm and shallow. Eventually cattails and other wetland plants may invade, and the lake could become a marsh, or swamp. Someday, it may turn into upland habitat and may later support a forest. Nothing remains static in the world, and that is why the composition of ecosystems are always changing.

Michigan's Four Regional Landscapes

Many observers think of ecosystems as a hierarchical arrangement, where one system fits naturally within another. For example, the rotting log ecosystem may be part of a larger complex of lowland evergreens, embedded in a northern hardwood forest ecosystem, which stretches from Wisconsin to the southern Michigan ecosystem, all of which are modified by the Great Lakes ecosystem. Taken logically to its conclusion, Planet Earth is an ecosystem. There are other ways to look at this fascinating phenomenon, too. Looking at cover types or wildlife habitats, for example, offers another lens through which to view ecosystems on the scale of landscapes. In this way, ecosystems can be wetlands, woodlands, grasslands, brushlands, or farmlands.

Ecosystems also vary geographically. In Michigan, each part of the state is dominated by different landscapes, each of which functions differently, and will respond differently to management. Biologists and ecologists have divided Michigan into four major geographic landscapes: the southern Lower Peninsula, the northern Lower Peninsula, the eastern Upper Peninsula, and the western Upper Peninsula. Below is a



brief description of each region to help you understand how your property fits into these bigger pictures.

Southern Lower Peninsula

Southern Michigan is characterized with a warmer climate and a longer growing season than elsewhere in the state. This region receives more precipitation in spring than in fall, with total amounts more variable than other regions of Michigan. The geology of this region is soft limestone covered by glacial deposits. The topography has an elevation of less than 1,200 feet and features low, flat plains with hilly areas in the southwest and also along a line from Hillsdale to Lapeer. Predominant soils include loams and clays in variations of dry or wet environments, and sandy soils near Lake Michigan and near hilly areas.

Prior to European settlement in the southern Lower Peninsula, oak-hickory forest, beech-sugar maple forest, oak-savanna, wetlands, and deciduous swamps were the dominant land types. Today, agriculture, homes, businesses, and roads have replaced most of these original land types. Scattered woodlots remain mainly in areas with moist or wet soils, which are harder to



drain and convert to other land uses. In many areas over half of the pre-settlement wetlands have been drained, and a few isolated oak-savannas remain.

Northern Lower Peninsula

Even though the geology of this northern area is similar to southern Michigan, with its soft limestone bedrock covered by glacial deposits, the climate, soils and cover types begin to change north of a line from Muskegon to just north of Bay City. This line marks a transition or "tension zone" that separates the Lower Peninsula into north and south ecosystems. The topography of the northern lower peninsula is mainly hilly with elevations as high as 1,600 feet, but features relatively flat areas in the central portion and along the eastern Lake Huron shoreline. The climate of this region is cooler and more variable than in southern Michigan.

Prior to European settlement in the northern Lower Peninsula, the major cover types were northern hardwoods, oak-pine barrens, pine forests, and conifer swamps. Today, this regional landscape is

still covered with forest, although in some areas agriculture and homes have replaced the forest. Also, because of past and present timber harvest methods, there has been a rapid increase in aspen across the region. There has also been a conversion of conifer swamps into swamp brushlands.

Eastern Upper Peninsula

This area is characterized by limestone and dolomite bedrock, which is softer than the underlying deposits of the western Upper Peninsula. The overall flat eastern end is characterized by elevations under 800 feet and climates that are greatly influenced by the Great Lakes. The frost-free period and the growing season are short compared to southern Michigan. Major soil types in this region are wet sands, clays, and organic soils.

Prior to European settlement, the region was covered with northern hardwood forests, conifers, conifer-hardwood swamps, aspen-birch, peatlands, and vast marshes along the Great Lakes. Today, many of the Great Lake marsh-

es have been lost, some forest areas have been converted to agriculture, and areas once supporting mixed pine have been converted to red pine plantations.

Western Upper Peninsula

In the western Upper Peninsula, the underlying hard and erosion-resistant bedrock of granite is responsible for the area's rugged, hilly terrain, which includes the only mountainous area in Michigan. Elevations in the Huron and



Porcupine mountains reach more than 1,800 feet. The climate is less influenced by the Great Lakes, as it is impacted more by the inland land bases of Wisconsin and Canada. The winters are very cold due to northern winds that are not buffered by the Great Lakes. Predominate soils in this region include loams, thin loam over bedrock, clay and wet clay. This area receives more precipitation than the eastern Upper Peninsula.

Prior to European settlement, the western Upper Peninsula was dominated by northern hardwood forests, jack pine and red pine-jack pine forests, and shrub and conifer swamps, and bogs. Today, much of this area is still forested, though present timber management methods have reduced the forest diversity.

Looking at Local Landscapes

To understand how your property fits into the landscape as a piece of a puzzle, you must imagine a bigger picture. If you have become familiar with your land by taking inventory during walks (see the chapter on **Evaluating the Land** in the Habitat Planning section for information), you may already have an understanding of how the pieces of your property fit together. This understanding can be obtained by asking yourself a few questions about the surrounding areas. What is the landscape in your neighborhood, township, and

county comprised of? Is it mostly woodlands, grasslands, wetlands, or brushlands? Are certain areas large or small? Are they being farmed, and if so, how?

You can further your understanding of the landscape by observing what species are seen there. The type of wildlife you see in your part of the county is determined by habitats in your local landscape. When travelling to places that surround your property, if you see pheasants, bobolinks, and meadowlarks, the landscape most likely is comprised of grasslands. The presence of ruffed grouse, scarlet tanagers, least flycatchers, or snowshoe hares indicates that landscapes are probably more forested. Agricultural landscapes often support American kestrels, killdeer, and woodchucks. Brushland habitats attract ruffed grouse, indigo buntings, deer, and cottontail rabbits. And in areas where you see ducks, geese, herons, grebes, or kingfishers, the landscape is mostly wetland-related.

The general habitats in your area can provide you with guidance on the types of wildlife you are most likely to attract with habitat projects on your land. For example, if your property is in southeast Newaygo County, the local landscape is comprised of oak forest with a scattering of old fields. Historically, this area was comprised of oak forest, oak-pine forest, and white pine-hardwood forest mixed with prairies. You could manage your woodlands for oak by

adopting specific timber-management recommendations. Further, you could manage old fields as tall-grass prairies. These decision might help you to attract deer, wild turkeys, and grassland and woodland birds as well as the rare Karner blue butterfly.

Now that you have an idea how your property fits into the bigger picture, you can also look more critically at the types of habitat on the land next to yours and the parcels that make up the neighborhood. Wildlife species do not understand human or political boundaries such as property lines, roads and counties. By evaluating your neighbors' land and surrounding properties, you can get an idea as to which wildlife habitat components are available and which are missing. In conjunction with the land next to yours, and in the extended neighborhood, you may be able to provide all of the habitat components that are necessary. Perhaps you and your neighbors can manage these shared habitats for a common goal.

In summary, ecosystems involve relationships between plant and animal communities and their environments. For this reason, everything in the natural world is part of an ecosystem. No ecosystem stands alone, as it is part of a larger natural order to which it both contributes and is dependent upon. Learning to look at how your property fits into local neighborhoods, area landscapes, and regional ecosystems will help you to develop wildlife habitat goals that will be

successful. By taking such an approach you will be able to more easily attract and benefit wildlife. Understanding and appreciating your part of the big picture will help wildlife on your land and beyond.

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GLOSSARY

Acidic - Soil reaction with a pH value less than seven on a scale of 1 to 14.

Acre - A unit of land equal to 4,840 square yards, or 43,560 square feet.

Aesthetic - Pertaining to the natural beauty of an area or subject.

Alkaline - Soil reaction with a pH value greater than seven on a scale of 1 to 14.

Altruistic - Concerned with the welfare of others.

Annual - A plant with a life cycle which includes germination, growth, flowering and fruiting, then dying, all taking place in one year.

Backfire - A purposely ignited slow burning fire on the downwind side of the field often used in conjunction with other burn methods.

Baffle - Cone usually made of metal used with a bird feeder to help deter squirrels.

Barren - An area of droughty, sandy soils dominated by grasses, sparsely inhabited by low shrubs and small trees.

Bedrock - Rock substrate that underlies all soil, sand, clay, gravel, and glacial material on the earth's surface.

Berm - A narrow embankment along a slope often used as dike or dam.

Biennial - A plant that normally takes two years to reach sexual maturity, producing leaves in the first year, blooming and producing fruit in its second year, and then dying.

Biodiversity - The variety of living organisms (plants, animals, and micro-organisms) upon the earth and the interactions and ecosystems they form and are part of.

Bog - A peatland that receives water primarily from rainfall and is dominated by sedges, sphagnum mosses, low shrubs, and evergreen trees.

Brambles - Any prickly shrub or bush, such as raspberry.

Broadcaster - Equipment used to scatter seeds.

Brood - The young of certain animals; especially, young birds and fowl hatched at one time and cared for by the same mother.

Browse - Leaves, young shoots, and other vegetation that serve as food for animals; the act of eating such food.

Buffer - An area surrounding a sensitive habitat such as a wetland, which lessens or absorbs the shock of an impact.

Calcareous - Containing calcium carbonate, calcium, or lime, which typically causes an alkaline condition, (a pH greater than 7).

Canopy - Any high covering that creates an umbrella of foliage.

Carnivore - Any flesh-eating or predatory organism.

Carrying-Capacity - The number of wildlife individuals or a population size that can be supported within a particular area.

Catkins - A dense, often drooping flower cluster, consisting of small scale-like flowers aggregated into short, tubular spikes.

Clearcutting - A technique used in even-aged timber management that involves one cut, and which may remove an entire stand.

Clutch - The number of eggs produced or incubated at one time.

Colony - A group of the same kind of animals or plants living or growing together.

Community - A group of plants and animals living in a specific region living under relatively similar conditions; and the region or habitat in which they live, i.e., forest community.

Conifer - Any of various predominately evergreen, cone-bearing trees and shrubs such as a pine, spruce, hemlock, fir, and juniper or yew.

Conservation - Human use and stewardship of the environment such that natural resources and biodiversity are self-sustaining.

Conservation District (CD) - A local government office which provides advice and assistance to landowners regarding land use practices.

Conservation Reserve Program (CRP) - A federal program that offers annual rental payments and cost-share assistance to establish long-term vegetative covers on eligible land.

Cool Season Grasses - Grasses that develop most rapidly during spring and fall when cool nights follow warm days.

Competition - A variety of plants or animals vying for certain resources, such as food, moisture, nutrients, or sunlight.

Corridor - A tract of land forming a passageway; an ecological connection between two areas.

Cover (Shelter) - Part of an animal's environment that enhances survival or reproduction, such as winter or nesting cover.

Creosote - A yellowish to greenish-brown oily liquid obtained from coal tar and used as a wood preservative and disinfectant.

Cultipacker - Equipment used to firm and press the soil before planting. May also be used to push seeds into ground after broadcasting.

Cultivate - To improve or prepare land as by plowing; to till; to loosen soil around growing plants.

Culvert - A drain crossing under a road or embankment

Deciduous - A woody plant that sheds or loses foliage at the end of the growing season.

Department of Environmental Quality (DEQ) - A state agency with the legal mandate for management and protection of the state's environment.

Department of Natural Resources (DNR) - A state agency with the legal mandate for management and protection of the state's natural resources.

Dibble Bar - A pointed tool or bar used to make holes in soil; used most often for planting tree or shrub seedlings, bulbs, and plant sets.

Dike - An embankment of earth and rock; especially, a levee built to hold water.

Disking - A technique that breaks-up the soil in preparation for planting.

Ditch Plug - Filling a portion of the drainage ditch to natural ground level.

Diversity - Variety.

Dormant - In a relatively inactive or resting condition in which some metabolic processes are slowed down or suspended.

Draw-Down - Remove or decrease water levels within a wetland.

Drumming Log - A fallen log on which a male ruffed grouse performs his courtship display.

Duff - A build-up of organic material, such as dead grass, leaves, conifer needles, and other plant parts.

Ecology - The study of the relationship between organisms and their environment.

Ecosystem - An ecological community together with its physical environment considered as a unit.

Edge - Where two different vegetation or community types meet, i.e., woodland and grassland. Also called an ecotone.

Emergent Vegetation - Aquatic plants which have some portion of the plant extended out of the water.

Endangered Species - A species in danger of becoming extinct within a portion or all of its range.

Environment - The living and non-living components that comprise one's surroundings.

Erosion - Process by which soil or rock material is worn or broken down and transported by water, ice, wind, or gravity.

Even-aged Timber Management - Type of forest regeneration management practice that creates stands consisting of shade intolerant trees of the same age class. Includes clearcutting, seed tree, and shelterwood techniques.

Evergreen - Having foliage that persists and remains green throughout the year, such as pine, spruce, or juniper.

Exotic Species - A plant or animal that is not native to a particular area.

Fallow - Plowed and tilled but left unseeded during a growing season.

Fauna - Animals

Fen - A type of peatland that receives mineral-rich inputs of ground or surface water dominated by sedges, other grass-like vegetation, and woody plants such as larch, white cedar, and shrubby cinquefoil.

Fencerow - Rows of trees, conifer, shrubs, or groundcovers that provide food and cover for wildlife.

Feral - Existing in a wild or untamed state; especially having reverted to such a state from domestication, i.e., feral cat.

Field Tiles (Drainage Tiles) Perforated plastic or clay pipes that are buried under the surface of the ground to facilitate drainage.

Flank Fire - A fire ignited on the sides of the burn site parallel to the wind direction.

Floodplain - A plain bordering a river, subject to flooding over various time intervals or cycles, with the areas closest to the river being flooded more often.

Flora - Plants.

Forage - Plant material that serves as food for animals; the act of looking or searching for such food.

Forb - Any herbaceous plant other than a grass, tree, or shrub, i.e., wildflowers.

Fragmentation (Land) - The act or process of splitting land into smaller or different pieces, both physically and ecologically.

Furrow - A long, narrow, shallow trench made in the ground by a plow or other implement.

Germination - The process by which a seed sprouts after being dormant and attaining sufficient moisture to sprout.

Girdling - A method used to kill trees in which two-inch rings are cut around a tree through the bark and growth layer i.e., to create a snag.

Grit - Fine sand or gravel that is swallowed by birds and retained in their gizzards to grind up their food.

Groundwater - Water that exists below the surface of the ground and fills interconnected pores in the soil and cracks in the rocks.

Group Selection - Technique used in uneven-aged timber management that selects groups of trees for harvesting within a stand.

Habitat - The area or type of environment in which a plant or animal or their population normally lives or occurs.

Hardwood - Generally, a tree or shrub with broad, deciduous leaves.

Headfire - A purposely ignited fire burning with the wind.

Hedgerow - Rows of trees and shrubs that form a border and can provide food and cover for wildlife.

Herbaceous - Non-woody vegetation, i.e. grass or forbs.

Herbicide - A chemical used to kill plants.

Herbivore - Any organism feeding on plants.

Hydric Soil - A soil that is water saturated through a significant part of the growing season, or flooded long enough to eliminate oxygen in the root zone.

Hydrology - Distribution and circulation of water within an area; presence of water.
Idle Field - An inactive or fallow agricultural field.

Insecticide - A chemical used to kill insects.

Interseeding - The process of sowing seeds into the existing vegetation.

Intolerant - Unable to withstand or endure adverse environmental conditions, i.e., shade, drought.

Landscape - The aspect or formation of the land characteristic of a particular area or region.

Legume - Pod-bearing plant, characterized by their fruits having a single-cavity ovary, such as peas, beans, and clovers. Legumes contain nitrogen-fixing bacteria in their root nodules.

Limiting Factors - When one or more habitat components are in limited supply, and is not available to support a species, this component is considered a limiting factor.

Marsh - Shallow-water areas that sustain water-loving plants such as cattail, sedge, arrowhead, bulrush, water-lily and pondweeds.

Mast - Soft mast - the berries or fruit of shrubs and trees; Hard mast - the acorns or nuts of shrubs and trees.

Meadow - A tract of grassland, either natural or used as pasture or for growing hay.

Mesic - Soil that is moderately moist, midway between droughty (xeric) and saturated (hydric).

Mineral Soil - Any soil consisting primarily of sand, silt, or clay materials rather than organic matter.

Muck - Dark-colored, finely textured, well-decomposed organic soil with little or no recognizable fiber.

Mulch - A protective covering of various substances, especially organic, placed around plants to prevent evaporation of moisture, freezing of roots, and to control weeds.

Native - A plant or animal originating, growing, or produced in a certain place; Indigenous as opposed to exotic.

Natural Resource Conservation Service - A unit of the federal U.S. Department of Agriculture that provides assistance to landowners to help conserve, improve, and sustain our resources and environment.

No-till Drill - Equipment used for planting crops that require no seed bed preparation. Opens the soil for seed placement at the intended depth.

Nutrient - Any mineral, compound, or element that sustains biological growth or development.

Old-Growth - Generally, a forest stand that has reached a stage of extreme maturity.

Omnivore - Any organism that eats both plants and animals.

Organic - Pertaining to, or derived from living organisms.

Organic Soil - Soil derived from once living organisms, such as peat or muck.

Organism - Any living plant or animal.

Overstory - Crown or canopy of branches and leaves that decreases the amount of sunlight reaching the ground.

Peat - A low density, slightly decomposed, fibrous organic soil composed largely of plant material, such as sphagnum moss, reeds, and sedge.

Perennial - A plant having a life span of more than two years.

Perimeter Fire - A burning method that starts with a backfire, followed by lighting the sides, and finished by lighting the upwind side of the burn site, called the head of the site.

Pesticide - A chemical used to kill fungi, insects, plants, or rodents.

pH - A measure of the acidity or alkalinity of a solution based on a scale from 1 to 14; numerically equal to seven for a neutral solution.

Pioneer Species - An animal or plant species that establishes itself in an environment where it did not exist, or a species that colonizes an area during an early successional phase i.e., aspen establishing itself within an idle field.

Poles (Tree) - A tree 5 to 9 inches diameter at breast height (dbh).

Pothole - A circular depression within a landscape.

Prairie - An extensive area of flat or rolling grassland, varying from open largely treeless grasslands to savannas, and whose communities are mostly fire dependent for their maintenance.

Predator - An animal that lives by preying upon other animal species.

Prescribed Burn - A planned fire, burning with a specific purpose.

Preservation - To keep in an unaltered condition; maintain in an unchanged form, or to allow to exist subject to natural environmental conditions.

Prey - Any creatures killed for food.

Propagation - Increase or spread by natural reproduction.

Regeneration - The regrowth of lost or destroyed vegetation and ecological communities.

Restoration - The act of putting something back into a prior condition.

Rip-Rap - A layer of medium to large rocks that is used to stabilize banks along ponds, lakes, rivers, and reservoirs.

Riparian - The area of land that is adjacent to a stream, river, or other type of water-course.

Roost - A place where birds rest or sleep.

Sapling - A young tree less than five inches diameter at breast height (dbh) and less than or equal to 20 feet in height.

Savanna - A transitional grassy area with scattered trees and shrubs positioned between a grassland and a forest, an area usually with no more than 50% trees.

Sawtimber (Trees) - A tree ten inches or larger in diameter at breast height (dbh).

Seed Tree Technique - Technique used in even-aged timber management that involves removing an entire stand in one cut, while leaving a number of trees behind to provide seed for regeneration.

Seep - A spot where water slowly trickles out of the ground that often forms a pool.

Shelter (Cover) - Part of an animal's environment that enhances survival or reproduction, such as winter or nesting cover.

Shelterwood Technique - Technique used in even-aged timber management that involves a series of two or more thinnings over 15 to 30 years, and is used to provide protection and shade for the regeneration area.

Shrub - A woody plant usually branched several times at or near the base giving a bushy appearance, usually less than 20 feet tall.

Single-tree selection - Technique used in uneven-aged timber management that selects single trees within a stand for harvesting.

Slash - Branches or other woody residue left on the ground after cutting a tree.

Snag - A standing dead or decaying tree, important for providing nesting, and feeding sites for wildlife.

Space - The area a species needs to survive.

Species - A group of interbreeding populations that are more or less reproductively isolated from all other kinds of organisms.

Spring - Water with a single concentrated source that has a fast discharge rate and flows to the surface, a groundwater source site.

Stand - An area composed of trees that are similar in type, or age, or size.

Stewardship (Land) - To care for and manage land in a way that maintains its ecological integrity for the benefit of present and future generations; an essential element of conservation.

Strip Fire - Series of lit strips burning only one at a time, starting at the downwind side of the site.

Stubble Fields - The remains of stems following the harvest of a field.

Succession - A process in which one habitat or community type changes into a different stage over time.

Sucker (root) - A means of vegetation reproduction in which some trees and shrubs send up new sprouts from their root system or rhizomes.

Submergent Vegetation - Aquatic plants that live and grow entirely below the water surface, such as pondweeds, and coontail.

Suet - High-energy winter food created from fat derived from cattle, sheep or deer.

Swamp - A forested wetland.

Tension Zone - An ecological line running from Muskegon to Saginaw Bay that identifies the change in climate, geology, and soil.

Thatch - The dead tops of clovers, grasses, and wildflowers.

Threatened Species - One that is likely to become endangered in the near future over most of its range.

Tolerant - Able to withstand or endure an adverse environmental condition, i.e., shade, drought.

Topography - Detailed and accurate description of a place or region outlining such landform characteristics as elevation, slopes, and water courses.

Toxins - A substance poisonous to organisms.

Trade-off - Exchange of one thing for another; especially, the giving up of something for another that is regarded as more desirable.

Transpiration - The process in which vapor is released through the pores of plant tissue, simultaneously causing water to be absorbed by the roots.

Understory - Assortment of plants that grow underneath the canopy as ground cover, forbs, and shrubs.

Uneven-aged timber management - Type of forest regeneration management practice that creates stands consisting mostly of shade tolerant trees of the varying age and size classes. Includes group and single tree selection techniques.

United States Forestry Service (USFS) - A unit of the U.S. Department of Agriculture with the legal mandate to manage the nation's national forests.

Upland - A higher area that does not hold water for an extended period of time (less than two weeks).

Vermiculite - A mineral containing mica used as a medium for starting seedlings and root cuttings. The medium supplies plants, water, and air pockets within the soil helpful in growing and developing dense root systems. Also mixed with seeds to facilitate distribution and planting.

Warm Season Grasses - Grasses that develop most rapidly during the summer when warm nights follow hot days.

Watershed - A land region which drains into a river, stream, creek, or body of water.

Weed - A plant considered undesirable, unattractive, or troublesome; a plant growing where it is not desired.

Wetland - An area distinguished by the presence of water at or near the surface, having unique soil conditions, and supporting vegetation adapted to wet conditions.

Wildlife - Wild animals including birds, mammals, reptiles, amphibians, fishes, and invertebrates.

Woodlot - A tract of forest.

Xeric - Pertaining to conditions of extreme dryness.

FOR ADDITIONAL CHAPTERS CONTACT:

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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