

Wildlife and Your Land

a series about managing your land for wildlife

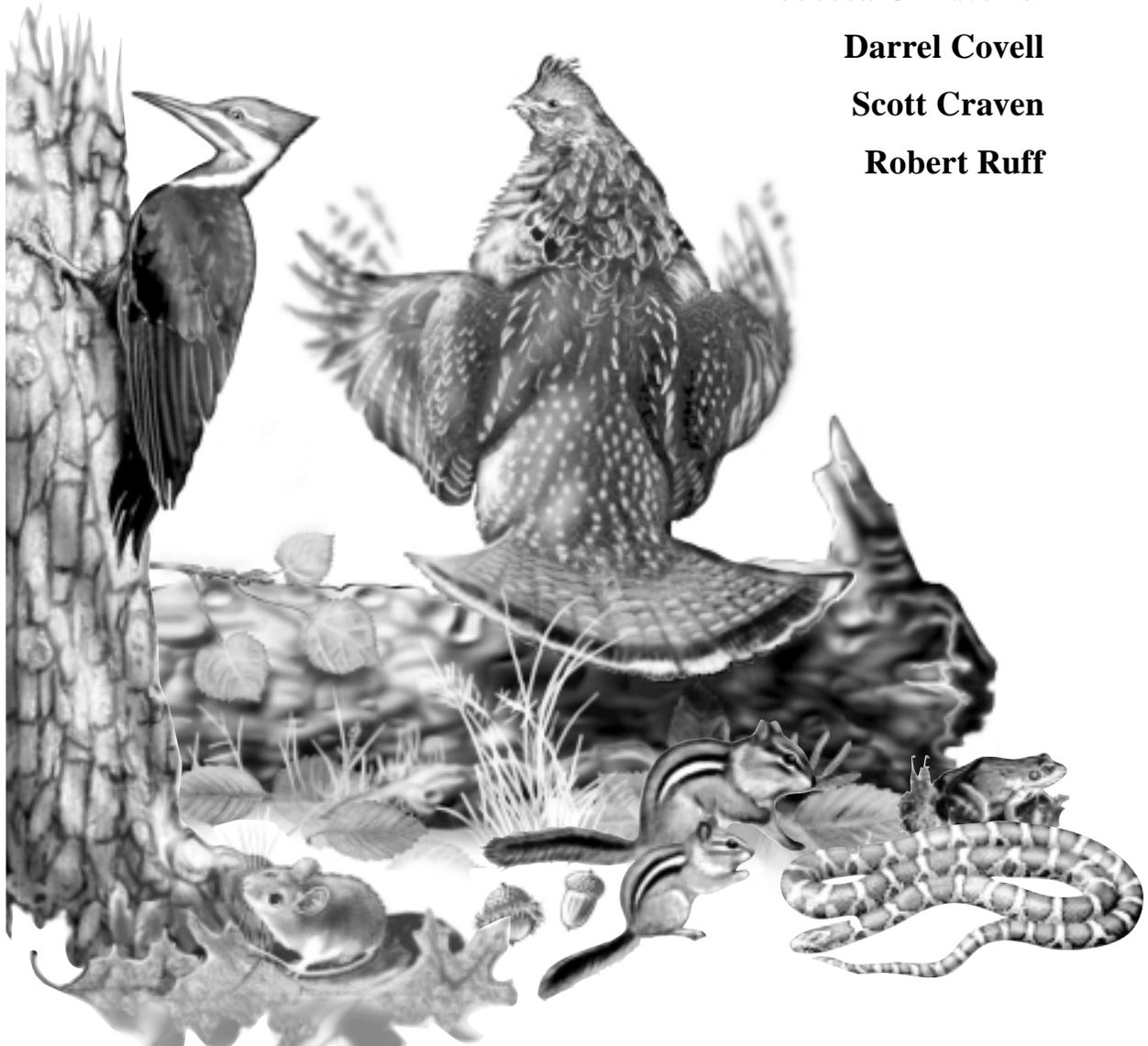
How to
**Inventory and Monitor
Wildlife on Your Land**

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How to Inventory and Monitor Wildlife on Your Land



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Overview



Why survey wildlife?

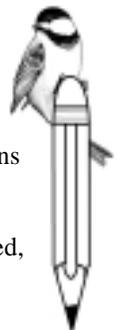
Many people, especially private landowners, want to better understand their environment. The sight and sound of a grouse flushing inspires all kinds of questions. “How many grouse do I have? Where are they most abundant on my property? Do I have as many birds as my neighbors?” Most landowners appreciate the diversity of animals on their property. Some engage in identifying and keeping lists of the species they see. This is the first step in completing an inventory. Once you are able to identify various species of wildlife, then you are ready to begin to monitor the wildlife on your property. This opens the door to a whole new understanding of your property’s potential as a home to wildlife. Population monitoring enables you to see what habitats are favorable to certain wildlife and how your habitat management efforts affect the species living on your land.

Surveying wildlife not only provides you with a measurement of your land’s potential to attract and hold wildlife, but it can also provide others with a bigger and clearer picture of Wisconsin’s wildlife abundance. The foundation of the excellent program of wildlife management in Wisconsin today is the availability of accurate, current information on wildlife abundance. Such information is not easy to obtain, especially on Wisconsin’s private lands. You can help! If you choose to participate in one of the many wildlife monitoring programs, the information you collect can be shared with others in Wisconsin, the Great Lakes, and even the nation. A better understanding of selected species’ overall population health can be achieved when coordinators of these monitoring programs combine many people’s information. For example, wildlife populations can be affected by local events (e.g., a timber harvest on your property) which you may detect in surveys, or they can be affected by more regional or global events (e.g., climate change, an invasion of goshawks that impacts a region’s entire grouse population) which would be more apparent from pooled information. For this reason, we encourage you to share your wildlife survey data with others. Participating in a wildlife monitoring program is good for the wildlife and it helps you understand the bigger picture by comparing your results with those of others.

What is this publication all about?

This book is about giving you an opportunity to better understand the wildlife on your land. In our work with private landowners, we have found that *people are intensely curious about the wildlife on their lands, but they are often unsure about how to systematically find out more about the animals on their property.* Landowners are also looking for a way to assess their land management activities. *By monitoring key species or species that are of personal interest, landowners are provided with a barometer of the outcomes of their management activities and the ecological health of their land.* This book was assembled in response to those landowners who wanted to know how best to inventory and monitor wildlife on their lands, with the ultimate goal of being the best possible stewards of their land.

To produce this publication, we did three things: 1) asked natural resources agency and conservation organization members which wildlife species and techniques should be included in such a guide, 2) asked a sample of landowners which wildlife species and techniques were of special interest to them, and 3) reviewed many inventory and monitoring programs and techniques for inclusion. This publication is a composite of those three sets of information. In order to make this guide useful, relevant and of manageable size, we prioritized wildlife species and survey techniques to provide better focus. Hence, this is not a comprehensive manual on how to conduct wildlife surveys; rather, it is a subset, prioritized according to what agencies, organizations and landowners believe are important species groups and practical methods for surveying them. If you find species or techniques of interest missing, we have provided numerous references for more information. You can use many of the techniques listed to survey any group of organisms in which you are especially interested, and much of your survey work can be accomplished incidental to other land use activities on your property. The most powerful tool that you can use is your power of observation whenever you are out on your land.

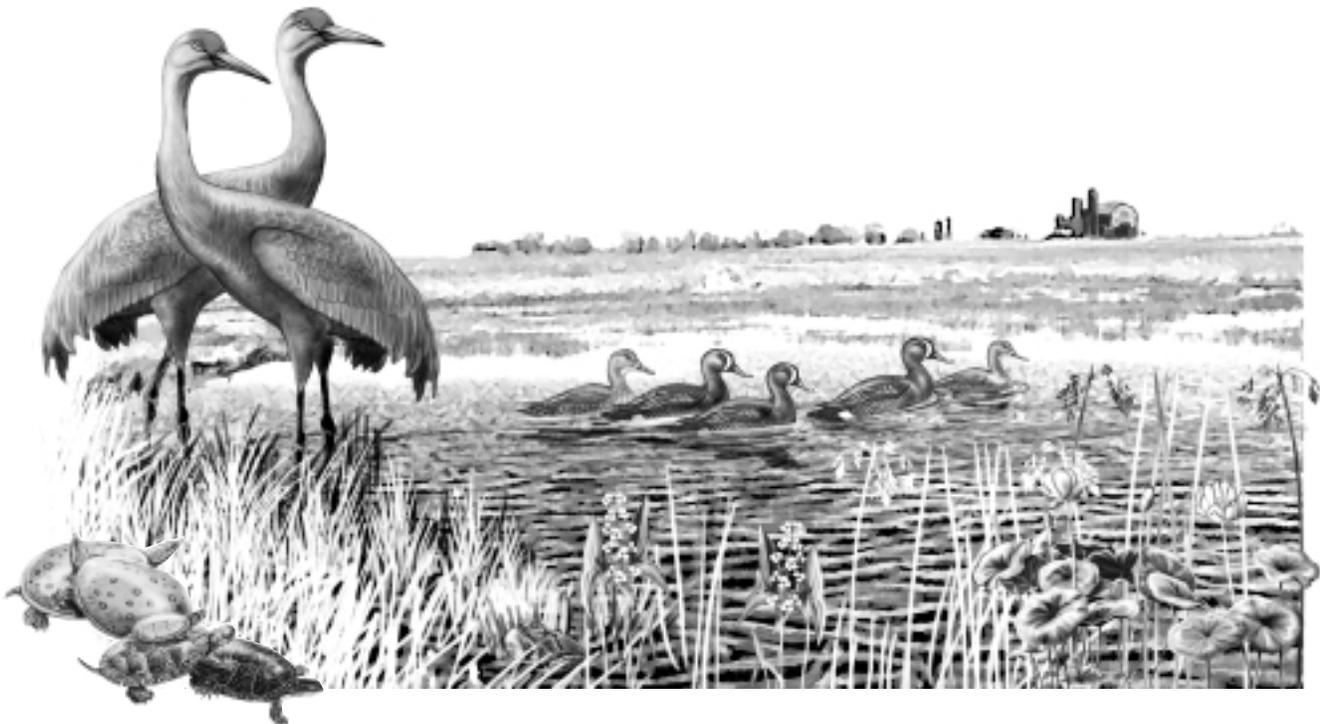


How is this publication organized?

First, we describe the ecoregions and habitats of Wisconsin. By becoming familiar with these landscape classifications you can both place your land in the context of the state as a whole, and have a starting point for the inventory of species on your land. Please read the appropriate ecoregion description for your property and the 2–3 habitat descriptions that apply to your land. You can then turn to the appropriate section on inventorying and monitoring.

Second, we describe the process of inventorying and monitoring in general, and then go over each of the specific techniques we believe you will find useful. Approximate dates are listed under each technique for its use, but it should be noted that these are average dates based on a typical year, and these may differ according to the current year's phenology. Finally, we provide the mechanics of additional references, key contacts and data sheets for your use.

What are you waiting for? Go see what's out there!



Wisconsin Ecoregions and Habitats

Habitats are the plant communities in which animals live. Every plant community has an animal community associated with it. In Wisconsin, there are animals that are associated with the northern forest such as fishers and pine martens, while the typical animals found in southern agricultural lands include cottontail rabbits and opossums. On a more local scale, there are animals that are habitat specialists such as the pickerel frog, which is found in certain types of wetlands fed by cold-water springs. To know the habitat is to know the animals that could or should be present. Various inventorying and monitoring techniques allow you to verify a species' presence, evaluate its abundance, and use that information to plan management, or to measure its success.



Some of Wisconsin's wildlife is commonly found throughout the state. These animals are primarily generalists, species that adapt readily to various habitats and disturbances, and

are not particularly fussy about their diet. Amphibians found throughout the state include green frogs, mudpuppies, American toads, spring peepers, and northern leopard frogs. Reptiles found statewide include snapping turtles, painted turtles, and eastern garter snakes. Some mammals are common throughout Wisconsin such as short-tailed shrews, cottontail rabbits, white-tailed deer, coyotes, raccoons, gray squirrels, beavers, white-footed mice, meadow voles, muskrats, Norway rats, house mice, red foxes, and striped skunks. Some birds can be found statewide for at least part, if not all of the year. These include Canada geese, wood ducks, mallards, blue-winged teal, turkey vultures, northern harriers, Cooper's hawks, kestrels, Virginia rails, soras, sandhill cranes, killdeer, mourning doves, great horned owls, barred owls, northern saw-whet owls, common nighthawks, ruby-throated hummingbirds, belted kingfishers, and downy and hairy woodpeckers.

ECOREGIONS

NORTHERN HIGHLAND

LAKE SUPERIOR LOWLAND

The most northern ecoregion in Wisconsin, the Northern Highland/Lake Superior Lowland area was dominated by northern mesic (of moderate moisture—not wet and not dry) forests in pre-European settlement times. Large areas of barrens habitat were present in the northwest and the northeast. Other habitat types included pine forests, conifer swamps, bogs, boreal forests, large sedge meadows, lowland hardwood forests, and some southern oak forests. This area is peppered with an abundance of lakes.

Animals present include: Red-backed salamanders, mink frogs, wood turtles, Blanding's turtles, northern prairie skinks, northern ringneck snakes, northern red-bellied snakes, northern water snakes, water shrews, star-nosed moles, snowshoe hares, least chipmunks, woodland deer mice, northern flying squirrels, woodland jumping mice, porcupines, timber wolves, pine martens, fishers, common loons, ospreys, sharp-tailed grouse, and broad-winged hawks.

SOUTHWESTERN UPLAND

The Southwestern Upland area of Wisconsin has not been glaciated recently; thus, it is hilly. Prior to European settlement, this area was dominated by oak savanna. Savanna is a combination of grassland and forest, in which most of the land is covered by grasses and a few shrubs but which also has widely spaced tall trees, usually of one species in a given area. Scattered areas of prairie, oak forest, lowland hardwood forests, and southern mesic forests were also present. A few areas in the northeast consisted of pine forest and pine and oak barrens. Barrens also occurred along two major rivers, the Chippewa and Wisconsin. Wetlands are not common in the Southwestern Upland, though there are some lakes in a pothole area in St. Croix County.

Animals present include: Four-toed salamanders, blue-spotted salamanders, Blanchard's cricket frogs, chorus frogs, spring peepers, eastern gray treefrogs, pickerel frogs, wood frogs, musk turtles, wood turtles, Blanding's turtles, map turtles, midland and spiny softshell turtles, six-lined racerunners, bullsnakes, blue racers, black rat snakes, prairie ringneck snakes, timber

Wisconsin Ecoregions



Figure 1. Natural Divisions of Wisconsin, as described by Hole and Germain (1994).

rattlesnakes, eastern moles, little brown bats, northern bats, eastern pipistrelles, big brown bats, red bats, 13-lined ground squirrels, prairie voles, pocket gophers, pine voles, great egrets, wild turkeys, northern bobwhites, eastern screech owls, long-eared owls, red-bellied woodpeckers, pileated woodpeckers, blue-gray gnatcatchers, loggerhead shrikes, Bell's vireos, lark sparrows, orchard orioles, prothonotary warblers, Louisiana waterthrushes and Kentucky warblers.

CENTRAL PLAINS

The Central Plains were glaciated about 10,000 years ago, and the area was once covered by Glacial Lake Wisconsin. This area is characterized by extensive areas of very sandy soil. Oak savanna and oak and pine barrens were the primary habitat types prior to European settlement. Other habitat types present included sedge meadows, pine forests, southern oak forests, conifer swamps, prairies, and lowland hardwood forests.

Animals present include: Tiger salamanders, blue-spotted salamanders, chorus frogs, spring peepers, Cope's gray treefrogs, eastern gray treefrogs, pickerel frogs, wood frogs, Blanding's turtles, western slender glass lizards, five-lined skinks, eastern hognose snakes, smooth green snakes, fox snakes, DeKay's snakes, northern red-bellied snakes, massasauga rattlesnakes, snowshoe hares, 13-lined ground squirrels, Franklin's ground squirrels, fox squirrels, southern bog lemmings, red-backed voles, meadow jumping mice, porcupines, western harvest mice, wild turkeys, northern bobwhites, common snipes, eastern screech owls, red-bellied woodpeckers, blue-gray gnatcatchers, and clay-colored sparrows.

LAKE MICHIGAN SHORELAND

The Lake Michigan Shoreland was an extensively forested area prior to European settlement. It was covered primarily by northern mesic forests. Boreal forests covered northern Door County. Other habitats present included conifer swamps, pine barrens, pine forests, sedge meadows, lowland hardwood forests, southern mesic forests and oak savannas.

Animals present include: Spotted salamanders, red-backed salamanders, wood frogs, spring peepers, eastern gray treefrogs, fox snakes, northern water snakes, big brown bats, red bats, snowshoe hares, 13-lined ground squirrels, double-crested cormorants, black-crowned night herons, gadwalls, common snipes, Caspian terns, Forster's terns, common terns, blue-gray gnatcatchers, golden-winged warblers, cerulean warblers, mourning warblers, and clay-colored sparrows.

SOUTHEASTERN RIDGES AND LOW LANDS

The Southeastern Ridges and Lowlands area of Wisconsin was glaciated most recently about 10,000

years ago, and is fairly flat. This area was dominated by oak savanna and southern mesic forest prior to European settlement. Interspersed in these habitats were patches of prairie, sedge meadow, oak forest, conifer swamp and lowland hardwood forest. This area contains plentiful lakes and other wetlands.

Animals present include: Blue-spotted salamanders, tiger salamanders, central newts, chorus frogs, pickerel frogs, Blanding's turtles, musk turtles, smooth green snakes, milk snakes, eastern plains garter snakes, DeKay's snakes, northern water snakes, queensnakes, Butler's garter snakes, eastern plains garter snakes, Arctic shrews, pygmy shrews, little brown bats, silver-haired bats, big brown bats, red bats, hoary bats, 13-lined ground squirrels, Franklin's ground squirrels, fox squirrels, southern flying squirrels, meadow jumping mice, great egrets, northern shovelers, redheads, gray partridges, wild turkeys, northern bobwhites, common moorhens, eastern screech owls, long-eared owls, red-bellied woodpecker, acadian flycatchers, blue-gray gnatcatchers, cerulean warblers, and orchard orioles.

HABITATS



FORESTS

Forests are plant communities dominated by trees. Cutover forests may contain densely packed tree seedlings and saplings. As a forest ages, fewer seedlings are able to survive in the shade of their larger counterparts. The forest floor then becomes available for wildflowers and other herbaceous vegetation. In mature or old-growth forests, there are fewer trees per acre but canopy coverage is complete and few tree seedlings can survive under such shade.

Boreal Forest

Only about 2% of Wisconsin's land area is covered by boreal forest. It is best developed along Lake Superior and near the tip of the Door County peninsula. This habitat is dominated by balsam fir and white spruce, but may also include white pine, white cedar, white birch and aspen and maple species. Fly-honeysuckle and beaked hazelnut are two shrubs commonly found in boreal forest. Common understory plants include dwarf raspberry, Canada mayflower, large-leaved aster, wild sarsaparilla, bluebead lily, and bunchberry.

Mammals associated with the boreal forest include red squirrels, porcupines, southern bog lemmings, meadow voles, hoary bats, least chipmunks, northern flying squirrels, red-backed voles, porcupines, timber wolves, pine martens and lynx. The red-bellied snake is found in boreal forest. Birds found in this habitat include grosbeaks, gray jays, boreal chickadees, spruce grouse,

white-throated sparrows, crossbills, golden-crowned kinglets, ruby-crowned kinglets, Swainson's thrushes, black-backed woodpeckers, Nashville warblers, northern parula warblers, magnolia warblers, Cape May warblers, yellow-rumped warblers, black-throated green warblers, Blackburnian warblers, pine warblers, black and white warblers, Canada warblers, white-winged crossbills, pine siskins, and brown creepers.

Lowland Hardwood Forest

Lowland forests are characterized by very high soil moisture. They frequently receive additions of silt from spring floodwaters, that may arrive as late as mid-June. This habitat type is present along all of the major rivers in Wisconsin. These forests include a number of trees from the South, which have entered Wisconsin along river valleys and are found nowhere else. This includes smooth buckeye, river birch, honey locust and sycamore. This habitat is frequently dominated by cottonwood, swamp white oak, silver maple and American elm. Many of these trees are multi-trunked and support many vines including poison ivy, Virginia creeper, grape, moonseed, hog peanut, parasitic dodder, wild yam, groundnut, carrionflower and bittersweet. Seedling production is low in this habitat due to flooding, and few shrubs are found, though prickly ash is one notable example. Common understory plants include honeysuckle, sweet cicely, black snakeroot, wood nettle, false nettle, and jewelweed.

Mammals found in this habitat include opossums, pygmy shrews, red bats and southern flying squirrels. Many amphibians use this habitat including central newts, blue-spotted salamanders, gray treefrogs, Cope's gray treefrogs, spring peepers, green frogs, and wood frogs. Reptiles using lowland forests include Blanding's turtles, hognose snakes, fox snakes, northern water snakes, and Massasauga rattlesnakes. Many birds live in lowland forest including prothonotary warblers, golden-winged warblers, cardinals, tufted titmice, brown creepers, house wrens, great crested flycatchers, blue-gray gnatcatchers, gray catbirds, orchard orioles, barred owls, red-shouldered hawks, red-bellied woodpeckers, red-headed woodpeckers, pileated woodpeckers, and northern flickers.

Northern Mesic Forest

The northern mesic forest is found widely throughout the northern 2/3 of the state. Prior to European settlement, about 1/3 of the total land area of Wisconsin was covered by this forest type. The leading dominant tree in this habitat type is the sugar maple. Depending on how far west you are in Wisconsin, there may be several other dominant trees. In far eastern Wisconsin, beech is a prevalent component of the forest. Hemlock is an important element in the eastern half of the state. Yellow birch is another common tree in

northern mesic forest, but it drops out in the far western areas. Several other trees are commonly associated with these dominants including hop hornbeam, American elm, red oak, red maple, white birch, white ash and balsam fir. Some shrubs include Canada yew, beaked hazelnut, leatherwood, swamp currant and arrow-wood. Many creeping vines are found here including partridgeberry, bunchberry, and twinflower. The most widespread groundlayer species are Canada mayflower, Solomon's seal and twisted stalk. The understory vegetation in northern mesic forest is relatively low due to the heavy shading of hemlock and beech.

Several Wisconsin mammals make their home in the northern mesic forest including long-tailed weasels, snowshoe hares, hoary bats, northern flying squirrels, red-backed voles, porcupines, wolves, black bears, and fishers. Only a few amphibians make their home in the northern mesic forest. These include four-toed salamanders, blue-spotted salamanders, and wood frogs. Birds associated with this habitat include red-eyed vireos, solitary vireos, ovenbirds, veeries, hermit thrushes, scarlet tanagers, rose-breasted grosbeaks, purple finches, broad-winged hawks, sharp-shinned hawks, Cooper's hawks, goshawks, great horned owls, barred owls, northern saw-whet owls, red-breasted nuthatches, white-breasted nuthatches, whip-poor-wills, brown creepers, least flycatchers, pileated woodpeckers, downy woodpeckers, yellow-bellied sapsuckers, black-throated blue warblers, black-throated green warblers, blackburnian warblers, black-and-white warblers, American redstarts, Canada warblers, and ruffed grouse.

Pine Forest

Pine forests are found in the northern half of Wisconsin and are especially prevalent in Marinette, Vilas, Oneida, Burnett, Washburn, Bayfield, Adams, Juneau, Wood and Jackson counties. Prior to European settlement, over 6% of the land surface in Wisconsin was covered by pine forests. Dominant trees in this habitat include jack pine, red pine and white pine. Some deciduous trees include red maple, trembling aspen, and paper birch. The shrub layer may include blueberry, beaked hazelnut, bush honeysuckle, and maple-leaved viburnum. Common understory plants include Canada mayflower, bracken fern, starflower, and wild sarsaparilla.

Wisconsin mammals inhabiting pine forests include red squirrels, red-backed voles, least chipmunks, pine martens, hoary bats, snowshoe hares, porcupines and timber wolves. Birds found in this habitat type include gray jays, sharp-shinned hawks, common ravens, golden-crowned kinglets, ruby-crowned kinglets, mourning doves, Swainson's thrushes, long-eared owls, northern saw-whet owls,

black-backed woodpeckers, solitary vireos, Nashville warblers, northern parula warblers, magnolia warblers, Cape May warblers, black-throated blue warblers, black-throated green warblers, blackburnian warblers, pine warblers, black-and-white warblers, Connecticut warblers, Canada warblers, and red-breasted nuthatches.

Southern Mesic Forest

About 10% of Wisconsin's acreage was covered by southern mesic forest prior to European settlement. This community is dominated by sugar maple trees, but also includes basswood, slippery elm, red oak, yellowbud hickory and hop hornbeam. Beech may also be found in forests in the eastern counties of Wisconsin, where the largest areas of this habitat were found historically. Shrubs and woody vines are scarce in this forest, but may include Virginia creeper, poison ivy, bittersweet, gooseberries, and bladdernut. This habitat is heavily shaded by sugar maple, and so the groundlayer is dominated by spring blooming plants such as trout lilies, squirrel-corn, Dutchman's breeches, spring beauty, toothwort and false rue-anemone. Other plants include Jack-in-the-pulpit, wild ginger, blue cohosh, hepatica, mayapple and trilliums.

Wisconsin mammals utilizing this habitat include southern flying squirrels. Some amphibians can be found including blue-spotted salamanders, spring peepers, and wood frogs. Many birds are found in southern mesic forests including cerulean warblers, red-eyed vireos, veeries, wood thrushes, rufous-sided towhees, indigo buntings, Acadian flycatchers, eastern wood pewees, ovenbirds, black-billed cuckoos, yellow-billed cuckoos, white-breasted nuthatches, eastern screech owls, great horned owls, barred owls, red-bellied woodpeckers, and pileated woodpeckers.

Southern Oak Forest

Oak forests in Wisconsin are found on well-drained sites on sandy flatlands, south and west hillsides, or on thin soils on hilltops and ridges. About 4% of the state was covered by oak forests prior to settlement, and the greatest concentration was in the west central counties. The dominant trees in these forests are white oak, red oak, and black oak. Other common trees include black cherry, bur oak, Hill's oak, chinquapin oak, trembling aspen, boxelder, big-toothed aspen, red maple, and shagbark hickory. The shrub layer is well developed and may include gray dogwood, American hazelnut, blackberry, gooseberry, witch hazel, and prickly ash. Some common plants in the groundlayer include hog peanut, enchanter's nightshade, lopseed, pointed-leaved tick trefoil and bottlebrush grass.

Mammals inhabiting oak forests include gray squirrels, fox squirrels, southern flying squirrels, eastern chipmunks, cottontail rabbits, woodchucks, raccoons,

opossums, red foxes and white-tailed deer. Some amphibians using this habitat include tiger salamanders, blue-spotted salamanders, American toads, spring peepers, and gray treefrogs. Brown snakes are common residents of oak forests, and black rat snakes may be found in the southwest quarter of the state. Many birds reside in oak forests including scarlet tanagers, black-capped chickadees, downy woodpeckers, wild turkeys, black-billed cuckoos, yellow-billed cuckoos, rose-breasted grosbeaks, cardinals, blue jays, northern orioles, red-headed woodpeckers, northern flickers, pileated woodpeckers, wood thrushes, eastern wood pewees, least flycatchers, eastern screech owls, great horned owls, barred owls, turkey vultures, redstarts, blue-gray gnatcatchers, yellow-throated vireos, ruby-throated hummingbirds, and veeries.



SAVANNAS

In Wisconsin, savanna was one of the most widespread plant communities prior to European settlement. A savanna is a combination of grassland and forest. Trees are a component of this community, but their density is so low that it allows grasses and other herbaceous vegetation to become dominant. Most of the land is occupied by grasses and shrubs.

Oak Barrens

Oak barrens are found primarily on very sandy soils and in the southern half of the state. This habitat consists of widely spaced oaks (20–30 trees/acre) of various kinds, including black oak, bur oak, white oak, Hill's oak, and red oak. Other associated trees include shagbark hickory, black cherry, paper birch, and trembling aspen. Most of the oaks are of grub origin, and usually have multiple trunks but rarely achieve the great size and splendor of isolated bur oaks. Understory plants include American hazelnut, flowering spurge, leadplant, wild rose, starry Solomon's seal, bracken fern, false Solomon's seal, strawberry and frostweed.

Mammals using this habitat include meadow voles and badgers. Wisconsin amphibians found in oak barrens include tiger salamanders, American toads and Cope's gray treefrogs. Many reptiles inhabit the barrens such as western glass lizards, blue racers, hognose snakes, milk snakes, and bullsnakes. Birds found in oak barrens include red-tailed hawks, rough-legged hawks, American kestrels, gray catbirds, brown thrashers, loggerhead shrikes, northern shrikes, indigo buntings, and chipping sparrows.

Oak Savanna

A savanna is a blend of grassland and forest. Most of the land's surface is covered with grasses and some shrubs, but widely spaced tall trees are also present, and these are usually of just one species in any given place. Savanna was one of the most widespread communities in Wisconsin prior to European settlement, covering 5.5 million acres. Currently, an oak savanna with an intact groundlayer is the rarest Wisconsin plant community. The trees within the savanna are generally all of the same size and age, although the age may range from under 50 years to over 200 years. Frequently, the large lower branches hang down close to the ground and extend a long way from the base of the tree. The most commonly found trees on the savannas were bur oaks, white oaks, or black oaks. Other species occur rarely but include shagbark hickory, large-toothed aspen and black cherry. The groundlayer is much more well developed than the overstory and may include leadplant, hog peanut, big bluestem, little bluestem, thimbleweed, spreading dogbane, New Jersey tea, gray dogwood, American hazelnut, showy tick trefoil, flowering spurge, wild bergamot, purple prairie clover, poison ivy, wild roses, oxeye, hoary puccoon and northern bedstraw.

Mammals inhabiting Wisconsin's savannas include fox squirrels, pine voles, and meadow voles. Amphibians found on savanna include tiger salamanders, American toads, and Cope's gray treefrogs. The savanna is used by many reptiles such as western glass lizards, blue racers, eastern hognose snakes, milk snakes and bullsnakes. Birds using savanna include rough-legged hawks, American kestrels, bluebirds, northern shrikes, loggerhead shrikes, warbling vireos, chipping sparrows, and orchard orioles.

Pine Barrens

This habitat type is found in the northern half of Wisconsin, and is concentrated in areas of very sandy soil. Like the oak barrens of southern Wisconsin, the pine barrens of northern Wisconsin contains widely spaced trees (2–8 trees/acre on average). The most common tree on pine barrens is the jack pine, but there may also be red pine present. Hill's oak is often found on pine barrens as grubs or as a scattering of larger trees. Other trees are sometimes present such as bur oak and big-toothed aspen. The shrub layer is very well-developed in pine barrens and includes redroot, huckleberry, American hazelnut, blueberry and sweet fern. Common groundlayer plants include wild lupine, hoary puccoon, spreading dogbane, flowering spurge, wild strawberry, dwarf raspberry, Canada mayflower, wild roses, false Solomon's seal, and starry Solomon's seal.

Mammals inhabiting Wisconsin's pine barrens include meadow voles, prairie voles, timber wolves,

black bears, and badgers. Birds using pine barrens include magnolia warblers, Connecticut warblers and Kirtland's warblers.



SHRUB COMMUNITIES

There are 2 plant communities in Wisconsin which are dominated by shrubs 1.5 to 3 meters tall. These are alder thickets and shrub carrs, described in detail below. These communities are distributed throughout Wisconsin; alder thickets are scattered in northern Wisconsin, while shrub carrs are found in the southern half of the state. In some cases, a shrub community can cover an extensive area of land.

Alder Thicket

Alder thickets occur mainly along cold creeks and streams, and are generally found in the northern two-thirds of the state. This habitat is dominated by speckled alder clumps reaching 10–15 feet in height. The soil is usually a wet muck, made up of decomposed plant and animal matter. The understory is rich, and is provided with nitrogen via the alder which fixes nitrogen in its leaves that are later shed on the ground in autumn. Common groundlayer plants in alder thickets include asters, bluejoint grass, marsh bellflower, spotted joe-pye weed, jewelweed, blue flag, sensitive fern, arrow-leaved tearthumb, meadowsweet, marsh fern, cattails, and bulrush.

Wisconsin mammals inhabiting alder thickets include snowshoe hares, star-nosed moles, black bears, and white-tailed deer. Many birds are found in alder thickets such as American woodcocks, common redpolls, black-capped chickadees, ruffed grouse, alder flycatchers, eastern kingbirds, common yellowthroats, and yellow warblers.

Shrub Carr

A shrub carr is a dense shrubby community that occurs mainly along cold creeks and streams. It is dominated by tall shrubs other than alder, and has an understory intermediate between a meadow and forest. The most common shrubs are red-osier dogwood, and various willows. Other shrubs found in this community include silky dogwood, currant, red raspberry, elderberry and nannyberry. Many vines are present such as virgin's bower, wild cucumber, Virginia creeper, bindweed, and poison ivy. Understory plants include swamp milkweed, asters, bluejoint grass, horsetail, spotted joe-pye weed, jewelweed, blue flag, water horehound, bugleweed, Canada goldenrod, meadow rue and cattails.

Mammals found in Wisconsin's shrub carrs include Franklin's ground squirrels, prairie mice, meadow jumping mice, masked shrews and the short-tailed weasels. Amphibians such as pickerel frogs and leopard

frogs can be found in shrub carr. Reptiles found in this habitat include milk snakes, water snakes and in the southeast corner of the state, queensnakes. Many birds reside in shrub carr such as northern bobwhites, willow flycatchers, eastern kingbirds, brown thrashers, cedar waxwings, golden-winged warblers, yellow warblers, chestnut-sided warblers, American redstarts, northern waterthrushes, common yellowthroats, indigo buntings, rufous-sided towhees, American tree sparrows, clay-colored sparrows, dark-eyed juncos, brown-headed cowbirds, and American goldfinches.



PRAIRIES

The word “prairie” comes from the French word for meadow.

Wisconsin is the northeastern boundary of the American prairies. This habitat type is most apparent in the southwest corner of the state but was commonly found throughout the southern half of Wisconsin prior to European settlement. Prairies are

plant communities that are dominated by grasses and contain less than one mature tree per acre. A tremendous variety of forbs live on prairie due to light and nutrient availability. These forbs provide an individual with the opportunity to revisit an area on a weekly or bi-weekly basis during field season, and always have a new and beautiful vista for viewing. Prairies can vary greatly in plant composition due to changes in soil, topography, and temperature. In this guide, prairies have been divided into three distinct types; the dry prairie, mesic prairie, and the wet prairie.

Dry Prairie

The majority of dry prairie remnants in Wisconsin are found on steep rocky hillsides that slope toward the southwest. This aspect facilitates soil warming, and leads to dryer conditions than the surrounding area. Dry prairies are also found in valleys with very sandy soils. This is the shortest and most sparsely vegetated prairie in Wisconsin. Common plants include pasque flower, side oats grama grass, fringed puccoon, silky aster, big bluestem grass, little bluestem grass, leadplant, common milkweed, wild bergamot and gray goldenrod.

Mammals inhabiting Wisconsin’s dry prairies include 13-lined ground squirrels, Franklin’s ground squirrels, pocket gophers, prairie voles, western harvest mice, and badgers. A multitude of reptiles use this habitat including ornate box turtles (state-endangered), six-lined racerunners, milk snakes, blue racers, bullsnakes, and timber rattlesnakes. Many birds can be found in dry prairie such as prairie horned larks, dickcissels, grasshopper sparrows, Henslow’s sparrows,

bobolinks, American goldfinches, Brewer’s blackbirds, and eastern and western meadowlarks.

Mesic Prairie

Mesic prairies are found on flat or gently rolling land, and on richer soils than dry prairie. It is easy to get disoriented in this habitat late in the summer or autumn due to the great height (>2m) and density of the grasses. Plants found in this habitat include big bluestem grass, Indian grass, smooth aster, wild indigo, Illinois tick trefoil, rattlesnake master, compass plant, gray-headed coneflower, wild roses, spiderwort, pale purple coneflower (state-threatened), and shooting star.

Wisconsin mammals found in this habitat include badgers, striped skunks, prairie moles, pocket gophers, 13-lined ground squirrels, western harvest mice, and prairie voles. Reptiles may include blue racers, bullsnakes, smooth green snakes, and plains garter snakes. Many birds inhabit mesic prairie including red-tailed hawks, rough-legged hawks, American kestrels, upland sandpipers, cliff swallows, barn swallows, dickcissels, vesper sparrows, savannah sparrows, grasshopper sparrows, Henslow’s sparrows, LeConte’s sparrows, bobolinks, ring-necked pheasants, eastern and western meadowlarks, and Brewer’s blackbirds.

Wet Prairie

Wet prairies are usually located on lowlands that are subject to floodwaters from nearby streams or that are subject to heavy rains. Many of these prairies are located on the beds of extinct glacial lakes, and many have artesian springs or wells that keep the moisture level up even during times of drought. These prairies are closely related to sedge meadows, but the plants in wet prairies are primarily grasses instead of sedges. Plants found in this habitat include big bluestem grass, bluejoint grass, wild rye, cordgrass, New England aster, bottle gentian, yellow star grass, blazing star, stiff goldenrod, azure aster, Virginia mountain mint, black-eyed susan, Turk’s-cap lily, and prairie dock.

Mammals inhabiting Wisconsin’s wet prairies include Franklin’s ground squirrels, prairie voles, and least weasels. Many amphibians are found in this habitat such as Cope’s gray treefrogs, western chorus frogs, American toads, central newts and tiger salamanders. Reptiles in wet prairie include Blanding’s turtles, painted turtles, and the eastern hognose snakes. Many birds are found in wet prairie such as greater prairie chickens, bobolinks, northern harriers, red-tailed hawks, rough-legged hawks, American kestrels, sandhill cranes, common snipes, marsh wrens, dickcissels, Henslow’s sparrows, savanna sparrows, and Brewer’s blackbirds.



WETLANDS

Wisconsin is home to a variety of wetlands, habitats in which water covers the ground for part or all of the year. Wisconsin wetlands include bogs, conifer swamps, lakes, marshes, sedge meadows, streams, wet prairies, and woodland ponds. You will find detailed information on each of these wetlands below except for wet prairie, which was described in the previous section.

Bog

Bogs are characterized by a spongy mat of wet, nutrient-poor, acidic peat. Atop the peat is a carpet of sphagnum moss in which bog-hardy plants and shrubs grow. This habitat type is generally found in the northern half of the state. Many bogs were formed when the last ice age ended, developing in kettle-shaped lakes where large ice chunks were left and melted. Temperatures tend to be lower (as much as 20–30 F) in bogs than in the surrounding uplands, thus enabling some more arctic loving plants to survive there. Some bogs are young enough that there are few or no trees present. In others, black spruce and tamaracks are the dominant trees, but they can sometimes be joined by various pines. Shrubs found on the bog may include bog birch and bog holly. Groundlayer species include Labrador tea, bog Rosemary, leatherleaf, bog laurel, cotton grass and blueberries. Bogs are particularly known for the insectivorous plants inhabiting them including pitcher plants and sundews.

Some mammals that are commonly associated with bogs include minks, muskrats, meadow voles, masked shrews, snowshoe hares, southern bog lemmings and short-tailed shrews. Amphibians include leopard frogs, American toads, and four-toed salamanders. Painted turtles, garter snakes and ribbon snakes are found in bogs. Some birds that use bog habitat include swamp sparrows, song sparrows, palm warblers, and black-backed woodpeckers.

Conifer Swamp

Conifer swamps are found in the northern half of Wisconsin, and cover over 2 million acres (6.4%) of land surface. The greatest concentration of swamps are found in southern Iron County, northern Forest County, Price and Oconto counties. These swamps are distributed on the landscape as small discrete bodies, rarely covering any extensive contiguous areas. The dominant trees in this habitat are white cedar and balsam fir, but other species such as hemlock, yellow birch, black ash and American elm may also be present. Shrubs found in this habitat include winterberry, Canada yew, and speckled alder. Lots of berry bushes (which provide food for wildlife) are found in conifer swamps including poison sumac, blueberries, cranberries, snowberry, wintergreen,

dogwoods, gooseberries and dewberries. The groundlayer may include dwarf raspberry, wild sarsaparilla, jewelweed, starflower, naked mitrewort, sweet-scented bedstraw and fancy woodfern. There are often various orchids present.

Conifer swamps are often used as yarding areas by white-tailed deer during winter. Other mammals including black bears, arctic shrews, short-tailed weasels, star-nosed moles, snowshoe hares, red-backed voles and muskrats also inhabit these areas. Birds that inhabit conifer swamps include double-crested cormorants, bald eagles, winter wrens, veeries, hermit thrushes, alder flycatchers, palm warblers, northern waterthrushes, Connecticut warblers, Lincoln's sparrows, swamp sparrows, white-winged crossbills, pine siskins, and purple finches.

Lake

Wisconsin might as easily have become known as the "land of 10,000 lakes" as Minnesota. Most of Wisconsin is covered with a multitude of lakes, especially in the northeast. Most lakes in Wisconsin are of glacial origin, and the only area bypassed by the last glacier was the southwest quarter, where lakes are scarce. (Lakes are defined as deeper than 6 feet deep, and greater than 10 acres in size.)

Some mammals that are affiliated with lakes include minks, river otters, beavers, silver-haired bats and muskrats. Amphibians that use lakes include bullfrogs, mudpuppies, green frogs, and cricket frogs. Reptiles found in lakes include snapping turtles, spiny softshell turtles, garter snakes and northern water snakes. Many birds inhabit Wisconsin's lakes including common loons, several duck species, great blue herons, belted kingfishers, pied-billed grebes, great egrets, green-backed herons, ospreys, bald eagles, black terns, and double-crested cormorants.

Marsh

Marshes provide one of the richest habitats for plant and animal life (marshes are formed in shallow basins and contain 0.5–3 feet of standing water throughout much of the year). Most Wisconsin marshes are located on extinct glacial lake beds. Prevalent marsh plants include cattails, reeds and other grasslike plants. However, many other plants are commonly found in marshy areas including arrowhead, duckweed, pickerelweed, spike-rush, bur-reed, bladderwort, wild rice, and blue flag.

Wisconsin mammals inhabiting marshes include meadow voles, least weasels, minks, pygmy shrews, muskrats and star-nosed moles. Many amphibians use marshes including western chorus frogs, leopard frogs, American toads, central newts, and tiger salamanders. Marsh reptiles include Blanding's turtles and eastern

garter snakes. There is an abundance of marsh-dwelling birds in Wisconsin including several duck species, coots, gallinules, Canada geese, red-winged blackbirds, sora rails, Virginia rails, king rails, common snipes, yellow-headed blackbirds, marsh wrens, swamp sparrows, American bitterns, and pied-billed grebes.

Sedge Meadow

Sedge meadows are formed where the ground lies just above the permanent water table. The substrate is peat, and is covered primarily by sedges. The soils often produce marsh gases such as methane. Sedge meadows are found throughout Wisconsin, but they are restricted to small areas in the north. Sedge meadows in the north tend to be acidic and therefore nutrient-poor. Southern sedge meadows tend to be alkaline and nutrient-rich.

Prevalent plants found in southern sedge meadows besides sedges include Canada anemone, swamp milkweed, bluejoint grass, horsetail, spotted joe-pye weed, jewelweed, blue flag, water horehound, Canada goldenrod, cattails, boneset, meadow rue and angelica.

Plants found commonly in northern sedge meadows in addition to sedges include bluejoint grass, spotted joe-pye weed, blue flag, bugleweed, sensitive fern, arrow-leaved tearthumb, meadowsweet, cattails, and marsh fern.

Wisconsin mammals inhabiting sedge meadows include meadow voles, arctic shrews, southern bog lemmings, muskrats, meadow jumping mice and the least weasel. Many amphibians can be found in this habitat such as northern leopard frogs and western chorus frogs. Reptiles using sedge meadows include Blanding's turtles, eastern garter snakes, smooth green snakes, and eastern Massasauga rattlesnakes. Many birds are found in sedge meadows such as sedge wrens, LeConte's sparrows, common snipes, sora rails, sandhill cranes, Wilson's phalaropes, American bitterns, short-eared owls, ring-necked pheasants, and northern harriers.

Stream

Streams constantly change as they flow down a gradient. These water bodies provide habitat for many of Wisconsin's wildlife species.

Mammals utilizing streams in Wisconsin include water shrews, silver-haired bats, river otters, raccoons, minks, white-tailed deer, black bears, opossums, beavers, muskrats, woodland jumping mice, fishers, and short-tailed weasels. Some amphibians found along streams include bullfrogs, green frogs, Blanchard's cricket frogs and northern leopard frogs. Pickerel frogs and four-toed salamanders may be found in or along spring-fed streams. Several reptiles use streams such as northern water snakes, wood turtles, and painted turtles. Birds found streamside include northern waterthrushes,

wood ducks, bald eagles, rough-winged swallows, winter wrens, cedar waxwings, eastern phoebes, bank swallows, belted kingfishers, and spotted sandpipers.

Woodland Pond

Woodland ponds are bodies of water found in forests of any sort that are under 10 acres in size and less than six feet deep. These water bodies provide important habitat for many of Wisconsin's wildlife species.

Mammals found in woodland ponds include beavers, minks, river otters, eastern pipistrelle bats, skunks, raccoons, water shrews, star-nosed moles, and muskrats. Some amphibians utilizing these ponds include blue-spotted salamanders, central newts, green frogs, spring peepers, wood frogs, and eastern gray treefrogs. Reptiles utilizing woodland ponds include Blanding's turtles and northern water snakes. Many birds use these ponds such as wood ducks, mallards, green-winged teal, blue-winged teal, red-winged blackbirds, Virginia rails, marsh wrens, and black ducks.

Now that we are familiar with habitats and the animals most likely to be found in them, let's get to the fun part; finding, inventorying and monitoring!

