PRE-SETTLEMENT/ PAST VEGETATION TYPES

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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 pro-

jects, 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.

Chs. 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	Stream 8 links wid. 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 wid. 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 grass-lands 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 con-verted to stands of aspen and oak. Although previously logged north-ern 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 har-vest methods have increased aspen coverage from 100,000 acres origi-nally to more than 1.5 million acres today. Large amounts of conifer swamps that once held cedar, tamarack, and spruce have con-verted 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 bar-rens 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 hard-woods 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 peat-land, muskegs, and boreal (north-ern 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, high-ways, and quarries. Though bore-al 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 north-ern 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 bal-sam fir, spruces, tamarack, and white cedar occurred in poorly drained depressions. Heavy log-ging and out-of-control fires that raged through harvested areas have greatly reduced the regenera-

tion 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-succes-sional 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-settle-ment map were the ones best adapted to the soils, land forms, and climate. Because the vegeta-tion existed for thousands of years before European settlement, ecolo-gists 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 set-tled, and these changes sometimes make such management goals diffi-cult, 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-set-tlement vegetation maps can help with any goal by answering ques-tions 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 nat-urally 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.