

THE IMPACT OF NATIVE AMERICANS ON PRESETTLEMENT VEGETATION IN SOUTHEASTERN WISCONSIN

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Abstract

Indians occupied southeastern Wisconsin long before European settlement, utilizing and influencing native vegetation. The magnitude of this influence was studied using the General Land Office surveyor's notes and historical, ecological and archaeological literature. About 15,000 Potawatomi and Winnebago Indians lived in SE Wisconsin immediately before European settlement. Their summer villages and associated winter camps occupied about 1500 acres of cleared land (0.06% of the region). There is little evidence in the surveyor's notes of direct impact on vegetation but other references note Indian fires and dispersal of favored plant species. Other evidence indicates that lightning fires occurred in the region. Apparently, native Americans in presettlement southeastern Wisconsin had little direct impact on the landscape but their indirect influence through fire was probably appreciable.

INTRODUCTION

The influence of native Americans on natural vegetation has been examined in several parts of North America. Day (1953) examined the role of Indians in the northeastern U.S. and concluded that their use of fire had a major effect on presettlement vegetation. However, Martin (1973) reviewed the historical record in the same region and concluded that lightning was a more likely cause of fire since eastern tribes appeared to lack fire-setting rituals. Russell (1981) noted the infrequent occurrence of Indian clearings in early descriptions and surveys of northern New Jersey. Lewis (1980) reported on the ritualistic use of fire by several western Canadian Indian tribes. Barrett (1980) described the impact of Indian fires on vegetation in western Montana. In Wisconsin, Curtis (1959) noted several historical references to Indian-caused fires and concluded that Indian fires determined the presettlement vegetation in south-

ern Wisconsin, especially by maintaining prairies and savannas. Hibbard (1904) noted a 400 acre corn field of the Sauk and Fox tribes in Sauk City along the Wisconsin River. This report describes settlement patterns of native Americans in southeastern Wisconsin just before extensive European settlement and Indian impact on the vegetation through land clearing, fire and other activities.

METHODS

Information on Indian village and campsite location, population sizes, and patterns of subsistence and resource utilization were needed to examine the impact of Indians on vegetation. Historical and archaeological publications were reviewed. Information on modern lightning fire frequency was obtained from the Wisconsin Department of Natural Resources publications. The General Land Office (GLO) surveyor's notes from 1836-37 were used to develop detailed vegetation maps (see Dorney 1980 for details). These

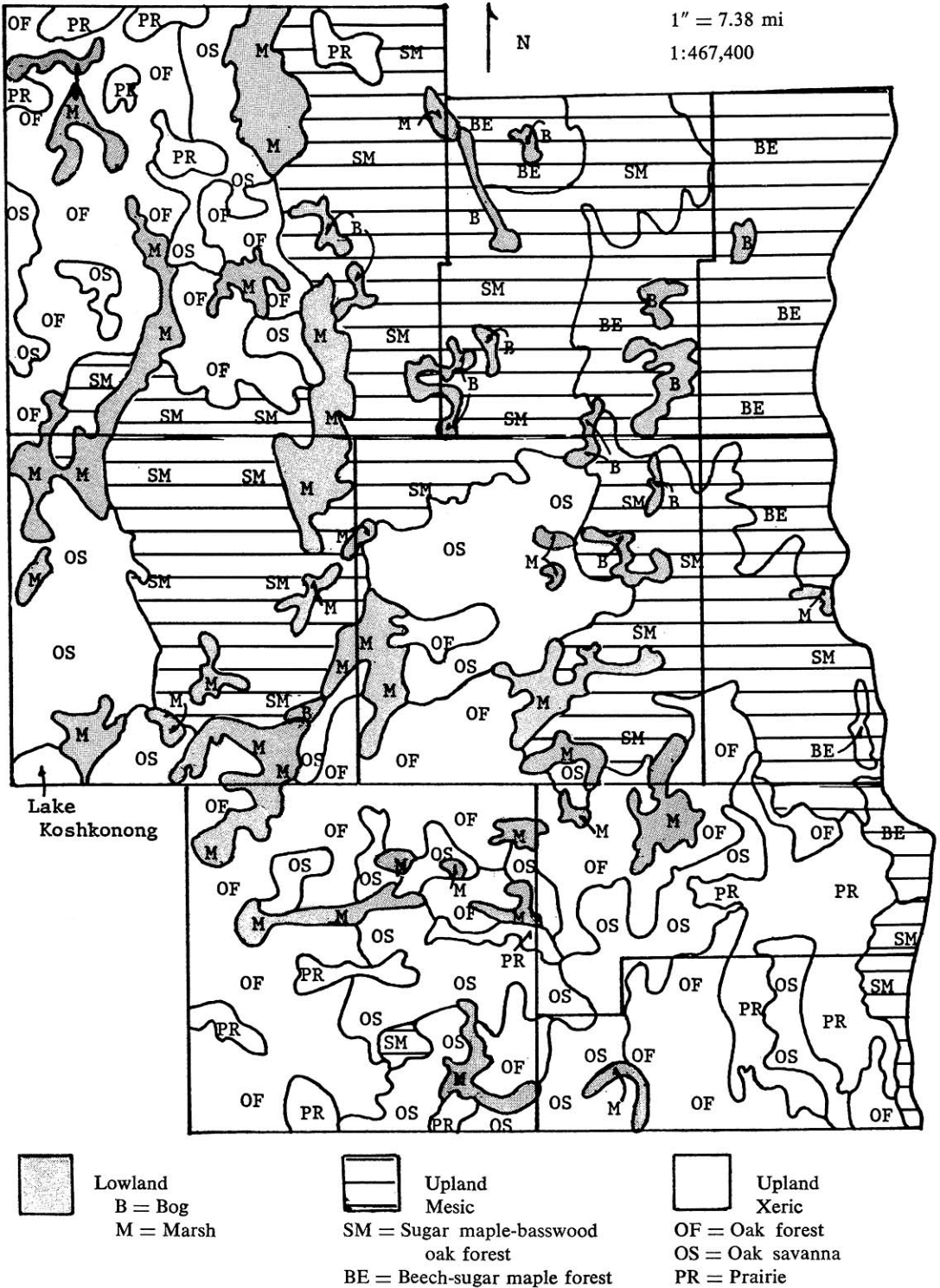
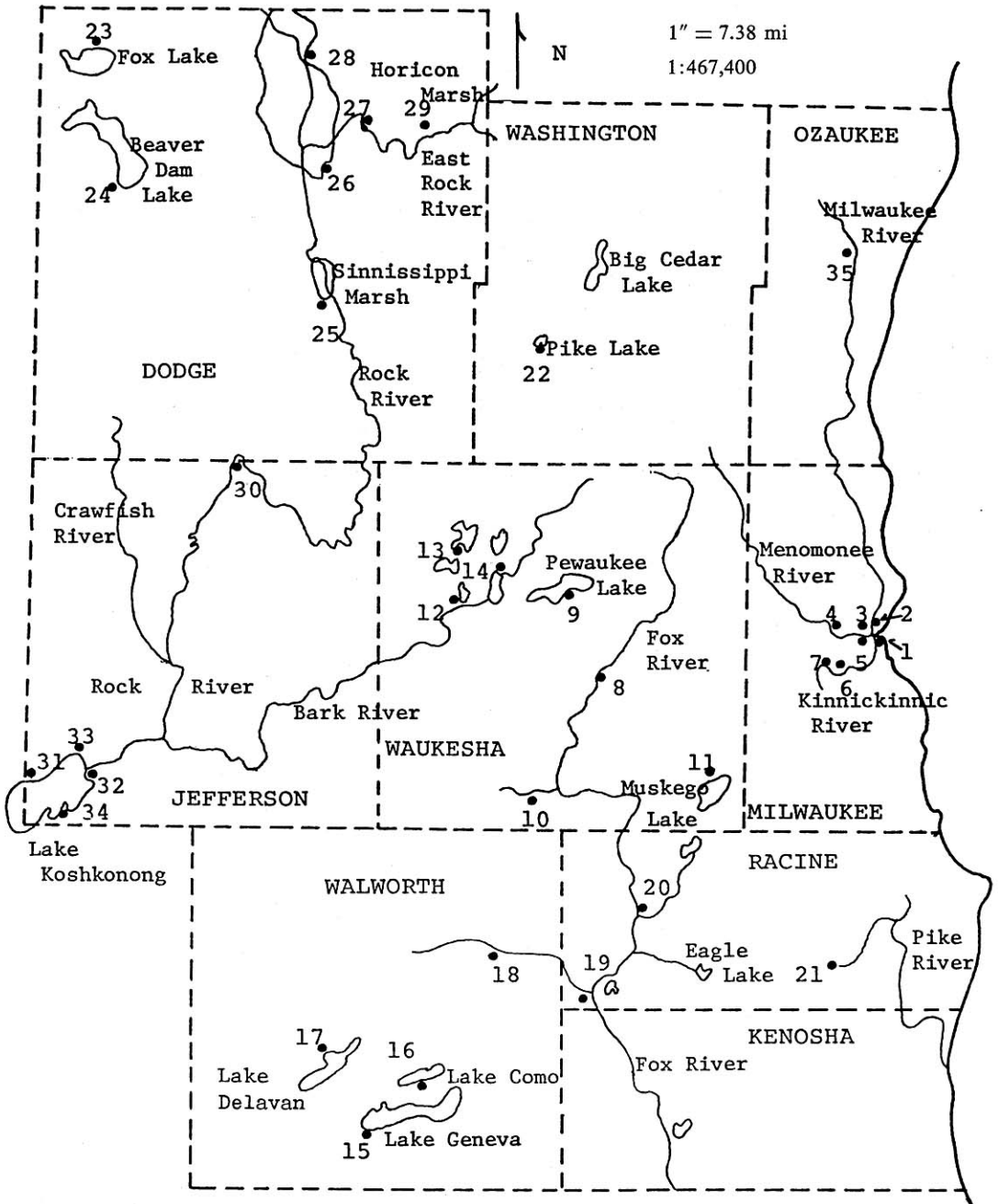


Fig. 1. Presettlement vegetation of southeastern Wisconsin (from Finley 1976).



POTAWATTOMI VILLAGES	1-21
WINNEBAGO VILLAGES	22-34
OJIBAWA VILLAGE	35

Fig. 2. Indian Village Sites in S.E. Wisconsin: late 1820's and 1830's.

notes were also examined for mention of Indian village sites.

RESULTS

Presettlement Vegetation

Oak forest was the predominant vegetation type in SE Wisconsin before European settlement and occupied 18.5% of the region (Fig. 1). Sugar maple-basswood-oak forest (17.9%) was predominant in the north but toward the south was restricted chiefly to locations adjacent to Lake Michigan. Beech-sugar maple forest (8.5%) was present along Lake Michigan. Oak savanna (14.9%) and prairie (8.3%) were also common especially on the southern and western portions of the region. Open marsh (12.3%) was the most common lowland vegetation type. Tamarack bogs (3%) were present on organic soils mostly in the northern part of the region.

There was no significant correlation between vegetation and soil properties such as drainage class, slope, texture, or available soil water, based on a multivariate discriminant analysis among major vegetation types. For instance, oak and sugar maple forest occupied similar soils. Most of these forests occurred on sites with slopes less than 6%, on well drained clay loams and silty clay loams and on sites with four to six inches of available soil water (Dorney 1980). Instead, the vegetation pattern reflected differing degrees of disturbance, primarily caused by fire. Fire dependent vegetation such as prairie and oak savanna were generally found west of fire barriers formed by wide marsh/river complexes, such as the Rock River. The predominance of prairie, oak savanna and forest in Racine, Kenosha and Walworth Counties apparently resulted from the absence of effective fire barriers. Soil differences can be ruled out since silt loams occupied by prairie and oak savanna were similar to those supporting sugar maple-basswood-oak forest in the northern part of the region (Dorney 1980).

Presumably, fire was more frequent westward and southward where fire dependent prairie and savanna were more abundant. Other ecosystem properties such as tree density and abundance of fire tolerant species also indicated frequent fires. Based on present weather data, tornadoes were infrequent events with a calculated return time of 2930 years. In contrast (based on vegetation types present), fire showed an estimated average return time of 16 years west of fire barriers and 112 years east of them (Dorney 1980).

Indian Population and Settlement Pattern

Southeastern Wisconsin (like the rest of the state) experienced numerous changes in Indian populations, tribes and settlement locations. This became especially evident after the fur trade began in the 1700's. The fur trade may have caused a considerable change in Indian lifestyle and settlement patterns (Kay 1977). The Iroquois wars also had a major influence on Indian settlement. These wars drove the Potawatomi from Michigan and Indiana to eastern Wisconsin. There they initially occupied the western shore of Lake Michigan and gradually spread southward and westward into the Milwaukee area (Lawson 1920).

By the late 1700's and early 1800's, the Potawatomi controlled the Lake Michigan shoreline from Kewaunee to Kenosha and inland to Walworth County (Fig. 2). To the west, mostly along the Rock River drainage, the Winnebago were numerous. Menomoni and Chippewa were also present in smaller numbers often living in Potawatomi villages where the city of Milwaukee now stands.

The Potawatomi and Winnebago were semi-sedentary people who lived in semi-permanent summer villages. In the winter, they left these villages for smaller, more numerous hunting camps. By the early 1800's the population had increased and village fragmentation occurred (Kay 1977). In the winter, the Winnebago hunted in the

Madison area while the Potawatomi usually camped within 20 miles of their main village (Kay 1977). Summer villages had extensive agricultural fields where corn, tobacco, beans and squash were grown. Pumpkins, melons and potatoes are also mentioned (Jones 1974).

In the spring, Indians gathered at sugar maple camps for the spring "sugaring"; later, they moved to summer villages to plant crops. Summers were spent in the village tending gardens while hunting and gathering nearby. Harvest of crops and wild rice in the fall was followed by a communal deer hunt. Village groups then broke up into smaller winter camps for trapping and hunting. Fishing was a common activity, especially for coastal tribes (Kay 1977). The impact of European settlers on this pattern is not clear. Kay (1977) believed that disruption of settlement patterns and lifestyle was dramatic; for example, fall fishing camps were abandoned in favor of fall trapping. Spector (1974) thought that the Winnebago lifestyle changed little after contact.

Population size varied considerably as a result of tribal boundary changes, trading post locations and disease. Population estimates were provided for most of the villages mentioned in the historical literature. However, there were no estimates for 14 of the 35 villages cited. It was assumed in this analysis, that these villages were small and

arbitrarily assigned a population of 50 people. Evidence suggests that between 1820 and the late 1830's, about 14,700 Indians lived in SE Wisconsin; of these, 8700 were Potawatomi and 5950 were Winnebago (Table 1). There was one small Ojibawa village in Ozaukee County. Milwaukee, Waukesha and Dodge Counties had the highest populations, a result of association with the fur trade and favorable environmental features such as extensive marshes, rivers and large lakes.

Indian Impact on Their Environment

Settlement locations were fairly well documented, especially in the *Wisconsin Archaeologist* (Brown 1906, 1908, 1909, 1911, 1925 and 1926a,b,c). Sizes of the settlements and agricultural fields were not always recorded and density varied. Thwaites (undated) referred to a Potawatomi village on the Manitowoc River stating that "It must not be understood that all this described territory [the village site] was densely [sic] covered by lodges . . . rather [it] was occupied by detached groups of greater and smaller size as well as solitary huts here and there." Actual cleared areas associated with villages are unknown. Therefore, it was assumed that the entire village site was cleared. This yields a maximum estimate for cleared land which was probably not achieved.

Acreage and population data were avail-

TABLE 1. Location and size of Southeastern Wisconsin Indian villages in the late 1820's and 1830's.

<i>Tribe and Village Location</i>	<i>Population</i>	<i>Village Size</i>	<i>Surrounding vegetation</i>	<i>Reference</i>
<i>Potawatomi</i>				
Milwaukee County				
1. Jones Island	200 to 500	21 acres	Marsh	2
2. East Water Street	200	13 acres	Sugar maple forest	2
3. Kenozhaykum's Camp	100	6 acres	Sugar maple forest	2
4. Lime Ridge (Bread's)	2000	24 acres	Sugar maple forest	2
5. Pauchkenan's (Walker's Point)	1200	n.a.	Sugar maple forest	2
6. Muskego Avenue	150 to 200	n.a.	Sugar maple forest	2
7. Layton Park	200	n.a.	Sugar maple forest	2

<i>Tribe and Village Location</i>	<i>Population</i>	<i>Village Size</i>	<i>Surrounding vegetation</i>	<i>Reference</i>
<i>Waukesha County</i>				
8. Waukesha City	2000	14 acres corn 121 acres village	Sugar maple forest	5, 10, 12
9. Pewaukee	540	n.a.	Oak savanna	5, 10, 12
10. Muckwanago	300 to 500	n.a.	Oak forest	5
11. Muskego Lake	300 to 400	n.a.	Sugar maple forest	5
12. Nemahbin Lake	50 ^a	n.a.	Oak savanna	4
13. Oconomowoc Lake	50 ^a	n.a.	Sugar maple forest	4
14. Nagawicka Lake	50 ^a	n.a.	Oak savanna	4
<i>Walworth County</i>				
15. Lake Geneva	500	n.a.	Oak forest	8
16. Lake Como	50 ^a	n.a.	Sugar maple forest	6
17. Lake Delavan	50 ^a	n.a.	Oak forest	9
18. Spring Prairie	50 ^a	n.a.	Oak forest	1
<i>Racine County</i>				
19. Burlington	50 ^a	n.a.	Prairie	15
20. Waterford	50 ^a	n.a.	Oak forest	15
21. Skunk Grove	50 ^a	n.a.	Prairie	1, 15
<i>Winnebago</i>				
<i>Washington County</i>				
22. Pike Lake	50 ^a	n.a.	Sugar maple forest	7
<i>Dodge County</i>				
23. Fox Lake	86	n.a.	Oak forest	7, 11
24. Beaver Dam Lake	150	several acres of corn	Prairie	3, 11
25. Hustisford	10	n.a.	Oak savanna	11
<i>Horicon Marsh Area</i>				
26. Site 1	2000	n.a.	Sugar maple forest	1
27. Site 2	50 ^a	n.a.	Sugar maple forest	1
28. Site 3	1500 to 1800	n.a.	Sugar maple forest	1
29. Theresa	50 ^a	n.a.	Sugar maple forest	1
<i>Jefferson County</i>				
30. Watertown	400	10 acres corn	Sugar maple forest	13
<i>Lake Koshkonong Area</i>				
31. Carajou Point	1200	n.a.	Oak savanna	14
32. Burnt village	167	10 to 15 acres	Oak savanna	14
33. Site 3	21	n.a.	Oak savanna	14
34. Site 4	50 ^a	n.a.	Oak savanna	14
<i>Ojibawa</i>				
<i>Ozaukee County</i>				
35. Port Washington	50 ^a	n.a.	Sugar maple forest	1

^a Populations estimated

n.a. Data not available

Tribal Totals

Potawatomi	8,900 to 8,690 people
Winnebago	6,034 to 5,734
Ojibawa	50
Total	14,984 to 14,474 people

References

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| 1. Brown 1906 | 7. Brown 1926 ^c | 11. Lawson 1920 |
| 2. Brown 1916 | 8. Brown and Brown 1928 | 12. Porter 1902 |
| 3. Brown 1922 | 9. General Land Office Surveyor's
Notes, 1836 | 13. Sohrweide 1926 |
| 4. Brown 1923 ^a | 10. Haskins 1909 | 14. Stout and Skavlen 1927 |
| 5. Brown 1923 ^b | | 15. West 1903 |
| 6. Brown 1926 ^b | | |

able for 10 of the 35 villages. These data suggest ratios of 15.2 people/acre for village sites and 35.1 people/acre for agricultural fields. Thus, SE Wisconsin summer villages and fields occupied about 970 acres from 1820 to 1830. Winter camp acreages (for which no data are available) were estimated by subtracting the acreage of agricultural fields from that of summer villages. On this basis, about 1500 acres of land were cleared by Indians in SE Wisconsin just before settlement or about 0.06% of the region. These clearings were concentrated near Milwaukee (403 acres), Waukesha (370 acres) and Horicon Marsh (428 acres). About 80% of the population lived in these three areas.

Comparison of the presettlement vegetation and Indian settlement patterns (Fig's. 1 and 2) reveals little apparent tribal preference for major vegetation types. The Potawatomi lived mainly east of fire barriers in sugar maple-basswood-oak forest while the Winnebago lived chiefly in oak forest and savanna adjacent to fire barriers such as the Rock River. There were numerous exceptions (Table 1). Winnebago villages near Horicon Marsh were in sugar maple forest while the Potawatomi villages near Waukesha were in oak savanna and those in Racine County were in prairie. The most populous Winnebago and Potawatomi villages were in sugar maple-basswood forest near rivers or marshes. This probably reflects more available food resources in these sites than in oak forests and savannas. There was no association of Indian sites with disturbed vegetation types (such as brush or aspen forest) perhaps reflecting lack of detail available from the GLO surveyor notes. It is also possible that, since most of the regional vegetation reflected frequent disturbance by fire, the effect of Indian settlements was not as easily observable as it would have been in a less frequently disturbed area.

Indirect effects were probably more extensive than land clearing. Indians have been

reported to set fires to maintain open lands, clear agricultural fields and modify wildlife habitat (Day 1953). There is no record of systematic fire-setting rituals in the Winnebago or Potawatomi cultural literature. This is in contrast to the practices of some western Canadian tribes who have an annual fire-setting ritual in the prairie (Lewis 1980). However, it appears that the Winnebago used fire to affect vegetation occasionally. Lathrop (1856) refers to a prairie fire in Racine County in 1835 blamed on the Indians. A prairie and woods fire in the Turkey River area near the Mississippi was set by Winnebago to drive game (Beltami 1828) and other Winnebago's used annual fires to clear brush for hunting (Schafer 1929). Other references to Indian fires in Wisconsin include a grass fire set in 1831 by the Menomoni near Lake Butte des Morts (Porlier 1900).

Data on lightning fire frequency in southeastern Wisconsin are poor, since DNR records are based on information supplied irregularly by local fire departments (E. Trecker, personal communication). Data from northern Wisconsin are collected systematically and are more accurate. They indicate that lightning is a minor cause of forest fires. From 1970 to 1978, 97 lightning-caused fires occurred in northern Wisconsin yielding an average of twelve fires/year or 0.00000198 fires/mi²/year (Wisconsin DNR 1970 to 1978). Thunderstorms are somewhat more frequent in southeastern Wisconsin than in the northern part of the state (U.S. Weather Bureau 1952) and a few lightning-caused forest fires have been reported in southeastern Wisconsin (Wisconsin DNR 1971 and 1977). Applying the northern Wisconsin lightning fire rate would produce an average of five lightning-caused fires per year in SE Wisconsin. The effective rate may have been somewhat lower in non-forested areas but even there lightning can be an important ignition source (Vogl 1974). Based on these data, one can

conclude that lightning-caused fires were present in southeastern Wisconsin before European settlement.

There is evidence that Indians intentionally moved plants useful for medicinal and food purposes. Black (1978) discusses transport of sweet flag (*Acorus calamus*), butternut (*Juglans cinerea*), Canada plum (*Prunus nigra*), chokecherry (*Prunus virginiana*) and wild strawberry (*Fragaria virginiana*) by Algonquian tribes in Quebec. She also mentions gooseberry (*Ribes cynosbati*), *Amelanchier*, hawthorn (*Crataegus* sp.), and wild rice (*Zizania aquatica*) as possible candidates for Indian transport. Yarnell (1964) mentioned evidence for transport of chestnut (*Castanea dentata*), Canada plum, Kentucky coffee tree (*Gymnocladus dioicus*), *Nelumbo*, *Apocyanum androsaemifolium* and *A. cannabinum*, *Asclepias tuberosa* and *A. syriaca* and *Urtica gracilis* by New York and east coast tribes. Beltami (1828) observed a beech tree along the Mississippi River near Minneapolis. It was revered by local Indians and probably planted since this location is far beyond the range of beech. In Wisconsin, Curtis (1959) noted the association of Kentucky coffee trees with some Indian village sites. Smith (1923) mentioned the transport of *Ptelea trifoliata* by Menomini Indians into their reservation from Kansas. It appears likely that Indians moved valuable plants to fulfill their needs.

Plant harvesting must have produced a widespread effect. Apparently, there has been no attempt to estimate the amount of wood needed to cook and smoke fish and meat, boil maple syrup and warm wigwams, but it was probably considerable. Many native plants were gathered for food, medicine, dyes, cordage and smoking materials. Smith (1923 and 1933) examined the ethnobotany of several Wisconsin tribes and listed the uses of numerous species. Curtis (1959) believed that gathering had little effect on plant populations in the state with the possible

exception of *Psoralea esculenta* which was prized for its fleshy root.

Hunting and trapping may have affected vegetation indirectly. There is good evidence that Wisconsin Indians overtrapped beaver, deer and otter (Kay 1977). The decrease in beaver dams probably reduced the sedge meadow habitat in the region. If deer populations were low, favored browse species (such as Canada yew-*Taxus canadensis*) may have benefited. Indians probably hunted local elk and bison to extinction along the Fox River in northeastern Wisconsin and elk were extirpated from the state before extensive European settlement began (Kay 1977). These indirect impacts probably had a negligible effect on the regional vegetation.

CONCLUSION

Several Midwestern studies have examined the settlement pattern of Indians in relation to vegetation. Dustin (1930) studied Indian sites in Saginaw County, Michigan, and concluded that most villages were near navigable water and marshes where game and food plants were abundant. Sugar maple forests were also favored. Jones and Kapp (1972) examined the relationship of presettlement forest pattern to Indian settlement in Bay County, Michigan. In a bog pollen profile, they found an increase in *Ambrosia*, *Populus* and *Typha* from 35 to 325 A.D. which may reflect an adjacent Indian site occupied at that time. The tribes living in Bay County at the time of European settlement were not discussed but from the maps of Jones and Kapp, it appears that dense sugar maple-beech-hemlock forest was avoided by the Indians in favor of oak-ash forest and proximity to major river valleys. Bowman (1974) working in southern Ontario determined that large white pines present at settlement had developed on abandoned Huron Indian agricultural fields.

In southeastern Wisconsin, most of the 35 villages were located near large rivers and marshes where travel was easy and food

plentiful. Apparently, the tribes showed little preference for different vegetation types. Most Potawatomi villages were in sugar maple-basswood-oak forest but Waukesha area villages were in oak savanna. Winnebago villages were mostly in oak forest and savanna but the villages near Horicon Marsh were in sugar maple forest. The GLO surveyor's notes show no evidence of direct effects of a village on vegetation. However, this may be a reflection of the generally low level of detail available from this source.

Just before European settlement, there were about 15,000 Potawatomi and Winnebago Indians living in southeastern Wisconsin. It is estimated that these people cleared about 1500 acres of land or about 0.06% of the region. Clearings were concentrated near Milwaukee, Waukesha and Horicon Marsh. Although there was no observable relationship between disturbed vegetation and Indian sites, there is strong circumstantial evidence that fire was used especially by the Winnebago tribe. Likewise, the vegetation pattern provides strong evidence of frequent fires especially west of large river/marsh complexes. Other activities such as wood gathering, plant collecting and hunting probably had local impacts. There is also evidence for lightning-caused fires in the region. However, these were infrequent and probably not sufficient in themselves to account for the vegetation pattern. Since the largest villages were in sugar maple forest, this also indicates that Indians were not the sole cause of fire. Fire, the most important disturbance factor in the presettlement vegetation of southeastern Wisconsin, was probably caused by both Indians and lightning.

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