THE IMPACT OF LOGGING ON WHITE-TAILED DEER DURING THE 1800S



NORTHWOODS WISCONSIN CASE STUDY

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"The decline of Wisconsin wildlife since 1840 is no simple process of recession. It is a process of ebb and flow, gain and loss, and it is comprised of at least two major movements in which a dozen groups of species played diverse and sometimes contradictory parts." --- Aldo Leopold

In this quote, Leopold was referring to all of the wildlife in Northern Wisconsin; his statement, however, could not be truer for the northern white-tailed deer in the nineteenth century. Today, most people probably think that deer were always abundant and frequently observed in northern Wisconsin. After all, today there are over 1.5 million deer in Wisconsin. In 1999 alone, 44,897 deer were killed by automobile accidents, 92, 302 were hunted by bows, and 402,179 were shot. White-tailed deer also have substantial economic value to the state of Wisconsin.

State hunters spend about \$380 each per season (on lodging, food, transportation, equipment, licenses, land leased or owned for hunting), totaling an estimated \$255 million per year and supporting an equivalent of 8,000 jobs. Figured this way, if hunting were a single business it would rank among Wisconsin's 15 most profitable companies.³

The white-tailed deer, however, is significantly more plentiful today than when Euro-Americans first settled northern Wisconsin. "Pre-settlement forests had relatively low deer numbers – about 4 to 10 deer per square mile"; whereas, current densities are as high as 20 to 30 deer per square mile. After Euro American colonization, deer populations rapidly began to plummet to near extirpation, from profound anthropogenic ecological disturbances, such as logging and increased, unregulated hunting. In addition, the white-tailed deer population became subject to unnatural variability after humans irreversibly altered northern ecosystems; this variability still plagues wildlife managers today. [See Appendix I.] In short, the white-tailed

¹ Wisconsin Department of Natural Resources. <u>Keeping Wisconsin Deer Healthy</u>. http://www.dnr.state.wi.us/org/land/wildlife/whealth/issues/deerhealth.htm

² Wisconsin Department of Natural Resources. <u>Vehicle Killed Deer in Wisconsin Fiscal 99 Report.</u> http://www.dnr.state.wi.us/org/land/wildlife/hunt/deer/99car%2Ddeer.htm and WDNR. http://www.dnr.state.wi.us/org/land/wildlife/hunt/deer/99harv.htm

³ Nelson, Richard. <u>Heart and Blood: Living with Deer in America</u>. Random House Inc.: New York, 1997. p. 223. ⁴ Bradner, Tom, Dr. Donald Waller and Dr. William Alverson. Aldo Leopold Chapter: Society for Conservation Biology. <u>Too Much of a Good Thing: When Common Species Crowd Out Others</u>. Madison http://gaia1.ies.wisc.edu/partners/alc-scb/wiscbiod/EXCSDEER.HTM

deer's history and population dynamics were completely different in the 1800s than they are nowadays.

Thus, the current persistence of white-tailed deer population fluctuations cannot be understood without fully analyzing and appreciating northern Wisconsin's environmental history, particularly logging-induced population fluctuations. The timber industry powerfully illustrates the detrimental, lasting impact of one single human activity on a relatively defenseless species, the white-tailed deer. Wildlife managers, conservationists, politicians, Native Americans, hunters, nature-lovers and citizens, should all take notice of the profound ramifications of logging, which began more than one hundred years ago, and recognize the lasting impacts simple human activities can have on the population dynamics of wildlife species.

The Historical Setting and Introduction

Starting in the early 1800s, thousands of Euro-american pioneers started to flock to the northern Wisconsin forests to utilize its abundant wood resources. [See Pictures p. 49 - 50] The logging industry by the middle of the nineteenth century began to boom, creating incentives for even more lumberman to come and more mills to open. Wisconsin's rivers were turned into enormous lumber transportation networks and its forests were turned into expansive timber mines. In other words, settlers came to the northwoods for its economic benefits, completely ignoring the ecological constraints of unhindered logging.

Logging directly impacted the northern white-tailed deer, through a complicated set of interactions that, at times, adversely affected deer populations and at other times, beneficially affected the species. The timber industry directly affected deer by fragmenting habitat, causing migration routes to be destroyed; increasing aggregate habitat in northern Wisconsin; facilitating the fur and venison trade, via the railroad; and increasing and easing hunting. Logging also

impacted northern Wisconsin deer through indirect impacts, such as increased population pressures, fire, and predator eradication. These impacts are indirect only in the sense that they are relatively less connected to the logging industry than the direct impacts.

The white-tailed deer were also under numerous other pressures during the nineteenth century. The early 1800s fur trade, conducted by both indigenous people and Euro-american settlers, was still a very profitable industry, making deer increasingly vulnerable to the impacts of lumbering. The fur trade directly extirpated species such as the Fisher (*Martes pennanti pennanti*) and the Marten (*Martes americana americana*).⁵ It also made large predators, such as the cougar and bear, vulnerable because it caused the population decline of many of their prey species.⁶ The fur trade thus adversely affected the white-tailed deer because many of northern Wisconsin's ecological systems and processes were driven out of balance. When prey species, such as the white-tailed deer, rebounded from human hunting, they no longer had natural predators to ensure population checks. Accompanying the fur trade was also the dominant mentality that wildlife was only valuable economically because of the worth of their meat and pelts. Thus, northwoods history identifies that the fur trade both autonomously killed thousands of deer and laid the foundation for further vulnerability and extirpation by logging and logging related activities.

In this thesis, I want to first illustrate the characteristics and distinct habitat required by the white-tailed deer. It is critical to understand the sources of subsistence for deer to elucidate some of the reasons why they became increasingly vulnerable to extirpation during the 1800s. Then, I want to describe the logging industry in northern Wisconsin, revealing the destructive nature of the industry to northwoods habitats. I will thoroughly describe who was logging, what

⁵ Barger, N.R. Wisconsin Mammals. Wisconsin Conservation Department: Madison, 1954, p. 12.

⁶ Barger, p. 12.

means they utilized, and the total quantity of timber harvested to illuminate the entire picture of ecological destruction in the nineteenth century. In addition, understanding the context of deer population declines is crucial to reasoning that this process is both repeatable and applicable to current policy. Finally, I want conclude with an analysis of the impacts of logging on Wisconsin's deer populations, highlighting both the direct and indirect impacts of deforestation. Ultimately, the Northern Wisconsin logging industry, combined with settler's attitudes, the fur trade, and climate fluctuations, led to the initial variability and then temporary, but precipitous, decline of the northern white-tailed deer.

Part I: The White-Tailed Deer: Background

Northern white-tailed deer (*Odocoileus virginianus borealis*) prefer brushy and partially forested habitats and agricultural landscapes.⁷ Prior to the 1800's, white-tailed deer preferred Southern Wisconsin to Northern Wisconsin because of its greater amount of edge habitat. Edge regions, such as at the edge of forests, meeting marshes, bogs, and swamps contain the most abundant brushy species, which is the deer's most common source of subsistence.⁸ For example, the white-tailed deer often [eat] whitecedar, balsam fir, oak, and the Canada yew.⁹ Before the nineteenth century, deer were much less common in Northern Wisconsin because pine, hemlock, and northern hardwoods dominated its vegetative communities. These communities are much less conducive to sustaining deer because they have less edge habitat, explaining deer prevalence in Southern Wisconsin prior to the logging era. Otherwise, the white-tailed deer often managed to thrive along streams and rivers in the northwoods.

Another key component to understanding the population dynamics of deer is to understand their reproductive cycle. The breeding season for the white-tailed deer is between October and December. Deer usually become sexually mature during their second year and an average doe can give birth to one to three fawns, depending on food availability. The gestation period lasts between 196 to 201 days per year. During the "rut" bucks typically define their territory and mate with several does. The white-tailed deer's high fertility, in essence, guarantees high populations unless humans, natural predators, or severe winters constrain their populations. One source identified deer as "its own worse enemy" because deer are capable of

⁷. Barger, p. 12.

⁸ Swift, Ernest. A History of Wisconsin Deer. Wisconsin Conservation Department: Madison, 1946. p. 8

⁹ Zouwen, Bill Vander. Wisconsin Natural Resources Magazine. http://www.wnrmag.com/stories/1996/aug96/herd.htm. August 1996. and Kouba, Theodore F. Wisconsin's Amazing Woods: Then and Now. Wisconsin House, Ltd. Madison, 1973. p. 14.

reproducing to a point that threatens their own habitat and future numbers.¹¹ Similar mammal species are much less vulnerable to such dramatic population fluctuations. For example, mule deer have much less swift reproductive processes; "94 percent of whitetails and only 68 percent of mule deer become pregnant as yearlings."¹² Thus, deer population variability can be dramatically increased by habitat alteration; increased habitat means deer can rapidly fill the niche, potentially overpopulating the area. Habitat destruction can cause the populated or overpopulated deer to experience forage shortages and result in starvation.

Logging did not commence in the northwoods until the 1800s; nonetheless, deer still suffered many forms of predation, namely from wolves, indigenous peoples, and Euro-american settlers. For example, in Northern Wisconsin, deer were rigidly confined to geographic spaces and overall less mobile, making them especially vulnerable to timber wolves during severe winters.¹³ Thus, wolves originally were thought to have a profound impact on deer population numbers.

More current research, however, tends to refute the dependence of wolves on white-tailed deer populations. One study emphasizes that wolf impacts are usually only noteworthy during times when "ungulate populations are also stressed by severe winters, habitat deterioration, and/or overharvest." Another study argues that deer did not remotely play a substantial role in regulating the white-tailed deer population. Therefore, wolves are currently proven to have a negligible impact on white-tailed deer. In the nineteenth century, on the other hand, locals commented that wolves had a significant impact on deer populations. For example, hunters at

¹⁰ Wise, Sherry. The White-Tailed Deer. Wisconsin Department of Natural Resources. June 1998.p. 3.

¹¹ Rue III, Leonard Lee. The Deer of North America. Outdoor Life Books: New York, 1978. p. 328.

¹² The White-Tailed Deer. http://www.ngpc.state.ne.us/wildlife/wtdeer.html

¹³ Swift n 8

¹⁴ Wisconsin Department of Natural Resources. Wisconsin Wolf Management Plan. Madison, 1999. p. 58

¹⁵ Schorger, A.W. Wildlife in Early Wisconsin: A Collection of Works by A.W. Schorger. Student Chapter of the Wildlife Society: Stevens Point, 1982. p. 67

Marquette "complained that the wolves were driving away all the deer." This common observation, however, may be attributed to prevalent superstitions about wolves during the 1800s. It is impossible now to say whether the hunters were incorrect; but, it is important to recognize the potentially dynamic relationship between wolf and deer populations over the decades.

Climate also had an astonishing role in deer population dynamics prior to the logging era. As early as the middle of the 1600s, there were frequent accounts by explorers of the white-tailed deer being profoundly affected by severe winters.¹⁷ Deep snow, in many northern Wisconsin winters, prevented deer from being able to travel to locate food sources and escape humans or large predators. For example, in the severe winter of 1856-57, with over six feet of snow on the ground, observers in Pepin County (in northwestern Wisconsin) recorded that hundreds of deer either starved or were clubbed to death.¹⁸ In 1857, deer that were originally reported to be abundant in Richland County were scarce after the deep snows.¹⁹ Thus, even before logging proliferated throughout northern Wisconsin, deer populations were constantly fluctuating, with occasional harsh winters playing a consistent role.

Another source of significant deer impacts were Native American populations residing in northern Wisconsin. Early explorers, starting in the 1600's, commented of widespread Native American, representation, utilization, and hunting of the white-tailed deer. Henry Alexander, an eighteenth century traveler, commented in 1765 that he found Many Native Americans donning deer-skin at Chequamegon Bay.²⁰ In addition, many tribes reportedly partially subsisted off of deer meat. Lt. Allen reported that the indigenous people of the Lac du Flambeau region killed a

¹⁶ Schorger, p 54.

¹⁷ Schorger, p. 64.

¹⁸ Schorger, p. 65

¹⁹ Schorger, p. 65

substantial amount of deer in the vicinity of the Chippewa River.²¹ The Ojibwa utilized rope nooses, sharp stakes, dogs, and bow and arrows to kill deer for clothing, ceremonial purposes, and food.²² Many Native American tribes built converging fences and would drive deer into the narrow aperture or pound.²³

In fact, the Ojibwa word for lake was "Mitchigan," (thus the name Michigan) which meant 'a wooden fence to catch deer near its banks.' The origin of the word, "fence", in naming Fence Lake in the Flambeau area of Vilas County, can be traced to the Winnebago word describing a deer fence near the water. 24

Through hunting and fishing, northern Wisconsin native people had a substantial impact on white-tailed deer populations prior to the 1800s. Although there is no definitive historical record as to the exact numerical impact of indigenous people, certain accounts from explorers regard their impact as profound. Frenchmen in 1728 (around the Green Bay area) observed the deer populations declining, which at the time were perhaps thought to be due to starvation or slaughter by natives.²⁵ Undoubtedly, their observations were unfeasible to verify; however, their comments still provide a window into historical deer population fluctuations.

Even though Native American numbers in Wisconsin remained relatively low compared to present-day human populations, their extensive involvement in the fur trade with white settlers also had intense impacts on deer herds. In one year, the Northwest Fur Trade Company collected more than ten thousand deer furs from the current Iron, Oneida, and Vilas counties. Francois Malhiot, a trading post owner recorded that on one day in the fall and winter of 1804-05, he traded for 528 deer skins on a Lac du Flambeau lake. To illustrate how expansive the fur trade actually was in Wisconsin, in 1835 one trading firm, the American Fur Company, collected

²⁰ Schorger, p. 53.

²¹ Schorger, p. 55.

²² Schorger, p. 57.

²³ Schorger, p. 58.

²⁴ Bersing, Otis. S. A Century of Wisconsin Deer. Wisconsin Conservation Department: Madison, 1966. p. 1.

²⁵ Bersing, p. 3.

²⁶ Bersing, p.4.

7.610 pounds of deerskins in Green Bay and 3.232 pounds in Milwaukee.²⁸ In addition, deer tallow was an important commodity of northern Wisconsin, with thousands of pounds being shipped on one route alone.²⁹ The net result of human pressures caused the gradual decline of the white-tailed deer, from approximately 1634 to 1836.³⁰ Although Native Americans often initially gathered the deerskins, their markets were usually Euro American settlers. Ultimately, the early 1800s marked a transition from Native Americans to Euro American settlers both in terms of land tenure and most substantial role in white-tailed deer population dynamics.

Ultimately, exact deer populations prior to the 1800s were unknown. Some sources regard deer as quite abundant, while others commented that deer populations seemed to be fairly exhausted prior to 1850.³¹ One estimation of Wisconsin deer populations prior to 1800 was illustrated in an unembellished map made in 1931. [See p. 52] The map partitions Wisconsin into three awkward regions based on 1930s estimations of maximum and minimum deer populations for similar habitats. The northern Wisconsin hardwood evergreen forest had "probably less than 10 deer per square mile." The northeastern evergreen forest, interspersed with swamps and marshes had probably 10 to 15 deer per square mile. Southern Wisconsin's oak – maple forest frequently interspersed with prairie openings was estimated to have 20 to 50 deer per square mile.³² In northern Wisconsin, increased deer populations were largely attributed to the geographic frequency of edge habitat, which was defined then as the relationship of swamp acreage to timber stands.³³ The map, based on another distribution map of native vegetation in Wisconsin, although antiquated, helps elucidate potential deer populations prior to

²⁷ Schorger, p. 55.

²⁸ Schorger, p. 63

²⁹ Bersing, p. 4.

³⁰ Dahlberg, Burton L. and Ralph C. Guettinger. The White-tailed Deer in Wisconsin. Wisconsin Conservation Department. Madison, 1956. p. 18.

³¹ Schorger. p. 53.

the logging era. In addition, the map is very useful in conveying the prevalent ideologies in the 1930s about the geographical location of white-tailed deer populations.

Individual settler accounts are also quite informative about both past deer population estimations and fluctuating knowledge about deer habitat. For example, one of the first English travelers saw sparse populations of deer around the Chippewa, Mississippi, and Wisconsin Rivers, and abundant deer populations around the Wisconsin River portage.³⁴ In Brown. Douglas, Juneau, St. Croix, and Waupaca Counties, deer populations were reportedly abundant around 1850.³⁵ Another description of northern Wisconsin deer was recorded by I.A. Lapham in 1846; he "mentioned that 'the Indians in the North where game is scarce and agriculture has not been introduced, live almost exclusively upon fish."³⁶ With increased settlement commencing in the early nineteenth century, however, deer populations began moving north, directly into the heart of fur-trade and eventual logging country. Some sources, however, argue that populations in southern Wisconsin began to burgeon because of increased farming throughout the region. Unfortunately, census information during the 1800s is unavailable.³⁷

 $^{^{32}}$ Dahlberg and Guettinger. p. 14 - 15.

³³ Dahlberg and Guettinger. p. 15.

³⁴ Bersing, p. 3.

³⁵ Bersing, p.7.

³⁶ Dahlberg and Guettinger, p. 16.

³⁷ Leopold, Aldo. Game Survey of the North Central States. Sporting Arms and Ammunition Manufacturers' Institute. Madison, 1931. p.194.

Part II: Nineteenth Century Logging

The Wilderness and Settlement via Waterways

When the nineteenth century commenced, Wisconsin nearly 6/7ths of Wisconsin was covered with predominantly virgin forest, totaling more than 30 million acres.³⁸ [See p. 57 & p. 60 – 61] Logging began around the 1840s, in northern Wisconsin, quickly surpassing the fur trade in terms of total economic value to the state.³⁹ The primary means that lumberman utilized to reach northern Wisconsin was via the river transport networks.⁴⁰ Rivers were also, in the early to mid-1800s, the most economically pragmatic means for transporting natural resources such as timber out of northern Wisconsin. Moving goods and services over land was almost always more expensive and rarely profitable.

Most Euro American settlement thus followed the transportation networks progressing their way into northern Wisconsin. In addition, since logging was pragmatically the only source of income in the early 1800s, besides the fur trade, almost every northwoods city grew up as a lumber town.

The first permanent settlement in Wood County . . . was made at Whitney's Rapids, the present site of Nekoosa, in 1831-32, where a sawmill was erected. The first sawmill erected within the present site of Grand Rapids was in 1838. [. . .] Less than 30 people, it is recorded, were living in Portage County in 1840. Steven's Point was first settled about 1843. [. . .] Wausau was first settled in 1845 and Merrill in 1847. Taylor County appears to have received no permanent settlers until the Wisconsin Central Railroad reach it in 1873. 41

Ultimately, Euro American settlement, along with natural resource exploitation, initially followed an intricate web of rivers and streams (and eventually railroads) into northern Wisconsin.

³⁹ Wisconsin Logging History. Wisconsin Northwoods. http://www.wisnorthwoods.com/wislogs.html

³⁸ Bersing, p. 3.

Weidman, Samuel. Ph.D. Soils and Agricultural Conditions of North Central Wisconsin. Published by the State: Madison, 1903. p. 56

⁴¹ Weidman, p. 57.

The first Northern Wisconsin forests to be exploited were along the rivers because of the abundance of white-pine forests along their shores and the difficulty of transporting timber across land. Shores along northern Wisconsin rivers had ideal soil conditions and microclimates for extraordinary white-pine growth. In addition, trees were cut in close proximity to northern Wisconsin rivers because of economic profitability. Timber greater than five to ten miles from the stream bank would not pay the cost of hauling. The paucity and antiquated nature of roads and trails precluded any other economically viable form of transportation from being utilized by pioneers until railroads were developed.

Roads were little more than winding trails, and they were made for horses, oxen, and wagon traffic only. In 1850, a primitive road was built from Green Bay to Wausau, and ten years later a tote road was built through wilderness from Wausau to Lac Vieux Desert on the Vilas County and Michigan line.⁴⁵

Thus, the entire lumber industry, until the development of railroad networks, was predominantly centered around river networks in the northwoods. Consequently, the ecological impacts of logging were also primarily located along the rivers in the early 1800s.

Euro-American settlers were predominately focused on the white pine in the 1800s because of its economic value. The Eastern White Pine (*Pinus strobus*) grew rapidly on "intermediate" to more fertile, sandy soils and "when mature, varied from 2½ feet to over 4 feet in diameter, and become fully mature at 200 years." White pine was also ideal because it was abundant, light, and workable, making it suitable for most building purposes. "Some areas furnished as much as a million and a half board feet per forty-acre tract, almost forty thousand

⁴² Merk, Frederick. <u>Economic History of Wisconsin during the Civil War Decade</u>. State Historical Society of Wisconsin. Madison, 1916. p. 59

⁴³ Weidman, p. 56.

⁴⁴ Whitney, Gordon. <u>From Coastal Wilderness to Fruited Plain: A History of Environmental Change in Temperate North America 1500 to the Present</u>. Cambridge University Press: Cambridge, 1994. p, 182.

⁴⁶ Geo<u>logy of Wisconsin</u>: Survey of 1873-1879: 3: Madison, 1880. pp. 326-327.

feet per acre."⁴⁷ Up until the 1890s in northern Wisconsin, "lumbering' meant almost exclusively 'white pine lumbering' to the people of the region."⁴⁸

Other species of trees that were logged along the rivers include Norway pines, which grew on lighter, sandy soils, and a myriad of hardwood species, such as hard maple, yellow birch, beech, and hemlock.⁴⁹ Thus, the forests along the northern Wisconsin rivers were logged first because of their easy accessibility and their ubiquitous presence of economically valued tree species.

Because of the importance of northern Wisconsin rivers to the lumbering industry, the state was divided into six river districts, prior to the railroad era. [See p. 51] These districts included the St. Croix, Chippewa, Black, Wisconsin, Green Bay-Menominee, and Wolf River Districts. Around the beginning of the Civil War, all six districts experienced frequently logging; however, at this time, the Black, Chippewa, and St Croix pineries were still relatively undeveloped and were often categorized as only one district. These districts are extremely useful in illustrating a general geographic history of logging. [See Table I.]

⁴⁷ Geology of Wisconsin: pp. 326-327.

⁵¹ Merk, p. 60.

⁴⁸ Rector, William G. <u>Log Transportation in the Lake States Lumber Industry</u>: 1840 – 1918. Arthur H. Clark Company: Glendale, 1953. p. 44.

⁴⁹ Report of the Wisconsin Commercial Forestry Conference Held at Milwaukee, March 28-29. <u>Forestry in Wisconsin: A New Outlook</u>. George Banta Publishing Company, 1928.

⁵⁰ The Wisconsin Cartographer's Guild. <u>Wisconsin's Past and Present: A Historical Atlas</u>. University of Wisconsin Press. Madison, 1998. p. 41.

		Table I	
Total Product of Northern Wisconsin Forests*			Amount of Timber Standing**
River	1856-1857	1871-1872	1880
Logging			
Region			
Black	40,000,000	300,000,000	900,000,000
Chippewa	60,000,000	436,000,000	15,000,000
Green Bay	60,000,000	300,000,000	unavailable
St. Croix	40,000,000	105,000,000	2,500,000,000
Wisconsin	90,000,000	200,000,000	10,000,000,000
Wolf	75,000,000	180,000,000	600,000,000
All measured	d in board feet	t	

^{*}Source: Frederick Merk's Economic History of Wisconsin During the Civil War Decade, 1916 **Source: Charles S. Sargent's Report on the Forests of North America (Exclusive of Mexico), 1880

Logging Methods

The felling of a tree combined with its transportation to the rivers and eventually to the mills was extremely detrimental to the environment. A lumberman "falled" a tree (colloquial term) by creating a "notched undercut" at the base of a tree in the direction that they desired the tree to fall. Two men alternately chopped at the tree; then, two lumbermen on the opposite side of the tree began sawing with a crosscut saw towards the undercut. Finally they drove an iron wedge into the side of the tree they had been previously sawing to fell the tree. All of this work was extremely dangerous for the lumberjack and their mortality was often quite high. This work was also deleterious to surrounding tree species because often, felled trees would get caught upon neighboring trees and take them down or strip them of their branches.

Transportation of the felled trees from the stump to the river was arguably the most environmentally damaging process of all. Tree felling was predominantly conducted during the

⁵² Kouba, p. 72.

winter to utilize frozen waterway and freezing temperatures for constructing skidways. Thus, sawyers felled the tree, swampers trimmed off the limbs, and the bucker cut the trunk into logs.⁵³

Horses and oxen were utilized to skid the logs to "rollways, so that the sleds could move easier" from the forest to the river." Logs were then stacked "with a block and tackle" onto enormous logging sleds by a banker.

A logging sled consisted of two pairs of runners with a 'bunk' on each set, which together constituted a bed for the logs. The whole was held in place by binding chains. The loads were often of enormous size, and a loaded sled coming down the road was a veritable 'moving building.' A single team would pull from five to twelve, even seventeen thousand board feet. Even with iced roads it was sometimes necessary to use pulleys and cables to overcome inertia and get a sled started.⁵⁵

The result of the logs being dragged across the landscape was significantly altered forest floor and river ecosystems. Logs were dragged miles across the landscape as land along river bands was cleared. Numerous plants were torn from the ground during the process. In addition, soil was compacted due to the skids, creating erosion paths, which dramatically increased sediment loads in surrounding waterways. Overall, logging was incredibly detrimental to the health of forests ecosystems, and those species that were dependent upon the forest.

The Government, Indigenous People, and Changing Ideologies

The government was also an active participant in dictating where logging occurred and where settlement occurred; it strongly supported the influx of settlers seeking economic profits by logging the white pine. Logging pioneers were even encouraged to reside on indigenous people's land. For example, "after 1830, it became a common practice of the secretary of war to issue permits to log on Wisconsin Indian lands." Consequently, relations between settlers and indigenous people immediately soured, resulting in the Black Hawk War in 1832. Prior to 1837,

Moede, Ila. Logging and Early Shawano. Proceedings of Thirteenth Annual Meeting of Forest History
 Association of Wisconsin, Inc., October 1, 1988. p. 9.
 Fries, Robert F. Empire in Pine: The Story of Lumbering in Wisconsin, 1830-1900. The State Historical Society

⁵³ Kouba, p. 77.

³⁵ Fries, Robert F. Empire in Pine: The Story of Lumbering in Wisconsin, 1830-1900. The State Historical Society of Wisconsin. Madison, 1951. p. 31.

from about 1810, logging operations were sporadic around northern Wisconsin. From 1837 on, permits issued to northern Wisconsin loggers helped create the largest industry in the state.⁵⁷ The first established loggers included: "Jacob Frank in the Green Bay district; Colonel John Shaw on the Black River; Constant Andrews, Hardin Perkins, James Lockwood, and James Rolette in the Chippewa River region; and Daniel Whitney on the Wisconsin river." The resulting change in land tenure from indigenous people to Euro Americans marked a dramatic ideological shift about land, resources, and wildlife.

The forests of northern Wisconsin were also exploited in the 1800s because of the pervasive Euro American attitudes about nature and natural resources. During the settlement years of the northern forests, two philosophies had powerful impacts upon the land. "The lumberman looked upon the forests as an article of wealth and commerce, the farmer regarded them as a hindrance to the plow and hoe." This attitude of nature as a commodity, was an insidious but powerful driving force of the heedless exploitation of the timber resources in the northwoods. This anthropocentric view of the northwoods also caused Euro Americans to ignore and remain ignorant about the extremely deleterious impact logging had on the normal ecological dynamics of northern Wisconsin. They were almost completely blind to the consequences the timber industry had for the white-tailed deer, as will be elucidated in later sections.

Substantial development of commercial logging in northern Wisconsin, however, did not develop until settlement in northern Illinois and southern Wisconsin created a burgeoning

⁵⁶ Fries, p. 9

⁵⁷ Fries, p. 9.

⁵⁸ Fries, p. 10.

⁵⁹ Rector, p. 54.

demand for timber products.⁶⁰ After 1837, when the Chippewa and Winnebago tribes were forced to cede their land, mills immediately began to spring up in those territories.⁶¹ Almost all of the Indians were relocated to reservations west of the Mississippi River and in northern Wisconsin.⁶² Coinciding with the treaties between the government and the Native American tribes was the heightened land speculation with eastern capital. "By December, 1836, settlers and speculators had bought nearly nine hundred thousand acres of land."⁶³ In 1850, when a decline occurred in the eastern pine forests, the final and most significant influx of lumberman arrived in Wisconsin. [See p. 62 – 63]

Geographical Location of Logging and Timeline

The logging industry was a very dynamic business in the 1800s because it was profoundly affected by economic boom and bust cycles. Consequently, lumbering impacted social, economic, and environmental spheres dramatically differently from year to year.

In a period of boom immigrants pouring in upon newly opened lands required large amounts of lumber for their homes, barns, and fences; rapidly growing cities and villages sent out their calls for ever more building material; and railroads, hurrying their lines across the prairies, consumed quantities of ties and bridge timbers.⁶⁴

Following the Black Hawk War, prior to 1837, there was aggressive land speculation throughout Wisconsin. One of Wisconsin's first major economic panics in 1837, ultimately lead to the demise of the uncontrollable speculation.⁶⁵ The fledgling lumber industry prevailed and boomed from 1850 to 1856 with increasingly greater lumber prices; however, in 1857, a panic caused an economic downturn for the timber industry that plagued the pineries for three years.⁶⁶

⁶¹ Fries, p. 11.

⁶⁰ Rector, p. 56.

⁶² Bersing, p. 5.

⁶³ Fries, p. 10.

⁶⁴ Merk, p. 60.

⁶⁵ Merk, p. 60

⁶⁶ Merk, p. 61.

In 1860, the lumber market recovered only to plummet once again until 1863.⁶⁷ The mid1860s then began to see the early stages of northern Wisconsin's reign as a major player in the
national lumber industry. Low water levels in northwestern Wisconsin hindered the lumber
industry; but, northeastern Wisconsin's timber industry boomed, providing along with western
Michigan, more than half a billion feet of pine to Chicago mills.⁶⁸ Lumber mills overall
experienced increasing prosperity throughout the late 1860s though the early 1870s, until 1873,
when another financial panic caused the price of lumber to collapse again.⁶⁹ Therefore,
throughout the 1800s, the timber industry was extremely variable and dynamic in northern
Wisconsin; economics and environmental factors united to create dramatically fluctuating timber
harvests between logging regions and seasons. [See Table I & Appendix II.]

During the middle of the nineteenth century, water was the dominant form of transportation. Eventually, however, railroads replaced water as the dominant form of log transportation because they enabled lumberman to both exploit resources inaccessible and uneconomical by water and to incorporate new markets into their trade scheme. [See map p. 64 – 65] Mills still remained located along riverbanks, however, because they still necessitated sources of power. In addition, many lumber mills began to concentrate with the inception of railroads, because it was economical to place mills at locations with efficient transportation.

Railroads also facilitated the acquisition of timber resources previously unavailable with only water transportation, expanding the total lumbering area. Valuable timber that was originally impossible to acquire because it was too expensive to transport to waterways was

⁶⁸ Merk, p. 62.

⁶⁷ Merk, p. 61.

⁶⁹ Fries, p. 16.

⁷⁰ Fries, p. 84.

quickly available with the inception of railroad transportation.⁷¹ "The foundation for the first lumber-carrying railway in Wisconsin had been laid in 1860 with the extension of the Chicago and Northwestern line from Oshkosh to Green Bay."⁷² The most important lumbering railroad, the Wisconsin Central came in 1877 with a line from Milwaukee to Ashland with branches from Green Bay to Portage.⁷³ Land grants by both the federal and state government were also instrumental in the development of railroad networks. For example, "land grants to the new Wisconsin Central Railroad developers of every alternate public land section² had totaled 2,387,000 acres, selling off at \$1.00 to \$5.00 per acre."⁷⁴ The railroads served as an effective transport network, which served to streamline the logging process in the northwoods.

Exhaustion of white pine timber resources was slow and inefficient in the early 1800s. With implemented changes in lumber technology in the late 1860s, however, the timber industry became dramatically more efficient-and detrimental. Steam replaced manual labor in handling logs from mill ponds to the sawmills; ultimately, this technological innovation alone allowed sawmills to realize doubled gains in productivity and capacity. Logging reached its peak of production in 1880 to 1890, when northern Wisconsin experienced virtual exhaustion of the white pine. The same statement of the same st

... Filbert Roth, special agent for the Department of Agriculture, computed the original stand of white and red pine in the twenty-seven counties of northern Wisconsin to have been 130 billion feet, of which only 17.4 billion feet remained standing in 1898. Of the original stand it was thought that twenty billion feet had been cut between 1840 and 1873, sixty-six billion feet between 1873 and 1898, while twenty-six billion feet were believed to have been destroyed by fires or natural causes. To [See Table II]

⁷² Fries, p. 86.

⁷⁷ Rector, p. 51.

⁷¹ Fries, p. 87.

⁷³ Fries, p. 86.

⁷⁴ Connor, Mary R. <u>A Century with Connor Timber: Connor Forest Industries 1872 – 1972</u>. Worzalla Publishing Company: Stevens Point, 1972. p. 7.

⁷⁵ Merk, p. 71.

⁷⁶ Horn, Stanley. <u>This Fascinating Lumber Business</u>. The Bobbs-Merrill Company: New York, 1943. p, 64.

Jeanne Sheahan May 2001

The ecological ramifications of nineteenth century loggers reducing the northern Wisconsin timber stand from 130 to 17.4 billion feet seem almost unimaginable, even by today's standards. Deer, not surprisingly, were incredibly vulnerable to almost all of the anthropogenic impacts of logging.

Table II Wisconsin Lumber Production*						
1899	2,842,912	519,031	3,389,166			
1904	2,285,658	337,499	2,623,157			
1909	1,399,398	625,640	2,025,038			
1914	864,360	526,641	1,391,001			
1919	594,125	522,213	1,116,338			
1924	453,183	563,323	1,016,506			
1929	354,098	488,716	842,814			
1934	185,872	233,290	419,162			
1939	141,843	194,954	336,797			

^{*}Thousands of Board Feet

^{**}Includes only lumber production of mills cutting more than 50,000 board feet annually.

^{***}Source: The White-Tailed Deer in Wisconsin

Part III: Logging and the White-Tailed Deer

Logging during the nineteenth century in northern Wisconsin was both adverse and beneficial to the white-tailed deer through direct and indirect impacts. Direct impacts include fragmentation of deer habitat, destruction of migration routes, increased overall habitat in edge areas, increased hunting from logging camps, facilitation of the fur trade and venison trade via logging railroads, and increased efficiency of hunting. Indirect impacts of the logging industry include fire and predator extirpation.

The white-tailed deer, however, is an opportunistic, resilient species. Their population numbers during the nineteenth century reflected a complex interplay of their reproductive capabilities, increased anthropogenic predation, increased vulnerability, decline in southern Wisconsin habitat, and overall increased habitat area, predominantly in northern Wisconsin. Although it is almost impossible to isolate logging as a single activity and attribute deer decline to deforestation, clear logging and white-tailed deer relationships are easily identified throughout Wisconsin's history. Logging the in the 1800s dramatically altered the pre-Euro American white-tailed deer population dynamics and characteristics, leading to the increased variability and near extinction of deer in Wisconsin by the early 1900s. [See p. 54] The extreme variability of current deer population dynamics, causing challenging management problems, are unquestionably predicated on the complex environmental history of northern Wisconsin generated by logging activities.

^{**}Reference maps pages 52 - 54 to gain a more detailed understanding of deer population dynamics over this time period.

Direct Impacts of Logging on Deer

Habitat Fragmentation and Destruction of Migration Routes

One unintended consequence of logging activities was the fragmentation of white-tailed deer habitat by railroads and railroad fencing, causing the deterioration of natural migration routes. Barbed wire fences were invented and inexpensively mass-produced for utilization on America's prairies and along railroads. Barbed wire fences in the nineteenth century were frequently the most economical solution to enclosing rangeland, protecting crops, and preventing wildlife from interfering with livestock production. The everlasting consequence of barbed wire fence construction was the fragmentation of native fauna habitats in Wisconsin. For the white-tailed deer, the enclosed and fragmented habitat was a powerful impetus for the disruption of annual migrations. In Northern Wisconsin, many early settlers and Native Americans often described extensive and reoccurring deer migrations.

Early in May, as soon as the depth of the snow permitted travel, thousands of does worked their way north traveling alone in a broad belt along the south shore of Lake Superior, where a few weeks later the fawns were born. The bucks came more leisurely but by early June the migration was over. ⁷⁹

In 1877, another Sportsmen's Guide also recognized the existence of veritable fall migration routes running from northern to southern Wisconsin.⁸⁰ Another account stated that deer in Northern Wisconsin used to be seen migrating from regions west and north of the Wisconsin River to the southern tier of counties.⁸¹ George Shiras, recorded in the National Geographic Magazine in 1921 that there once had been a migration in northern Wisconsin that maintained all the characteristics of a true migration, but that it had ceased more than 35 years ago.⁸² He

⁷⁸ Whitney, p. 256.

⁷⁹ Schorger, p. 61.

⁸⁰ Bersing, p.6.

⁸¹ Bersing, p.7.

⁸² Leopold, p. 193 and Shiras, George 3rd. "The Wild Life of Lake Superior, Past and Present." National Geographic Magazine, Vol. XL, No. 2 pp. 113-204. August 1921.

recorded the longest deer migration as being approximately 75 miles (120 kilom.).⁸³ If his observations were correct, deer migrations effectively ended around 1885.

Several Native American tribes during the 1800s observed what they felt were deer migrations. Captain Cram in his accounts of the surveying between the State of Michigan and the Territory of 'Wiskonsin' in 1841, recorded that "Indians of the Lac Vieux Desert region moved southward 'following the deer for the winter hunt.""⁸⁴ In the 1870s and 80s, expansive barbed wire fences were constructed, particularly along railroads. These fences are believed by some observers to have caused the ending of severe winter deer migrations in northern Wisconsin.⁸⁵ Unaccounted for in the literature, however, was whether or not the white-tailed deer were capable of jumping the fences.

Whether or not deer migrations occurred during or prior to the nineteenth century is difficult to verify, given that the northern Wisconsin ecosystem is completely altered; however, after the early 1900s, the issue of whether deer migrate or not has become somewhat contentious. Some scientists began to doubt the authenticity and accuracy of deer migration claims. Certain experts began to attribute observations of deer migration to individual deer traveling unusually long distances. For example "in 1954, a deer from the Barksdale Powder Plant released at Drummond was killed by a car west of Spooner, a distance of 56 air miles from the release point."

Other scientists, however, believed deer perhaps migrated according to the availability of food sources based on the season.

Availability and quality of particular forages will differ at different times of year between winter and summer ranges for those species or populations which undertake a season migration between distinctly

84 Schorger, 60.

⁸³ Roe III., p. 257.

⁸⁵ Bersing, pp. 6-7.

⁸⁶ Bersing, p.7.

different geographic areas (as do some populations of reindeer for example) . . ., even for residents in tropical or temperate areas. 87

Temperate species of deer, such as the white-tailed deer, may have migrated to increase the nutritional value and quality of food they consumed. Therefore, even though food may have been relatively abundant, the quality of food varies significantly in different seasons. ⁸⁸

Another source, written by Leonard Rue III, concretely stated not only that deer migrations did exist during the nineteenth century, but also that they abruptly ended after 1870 due to the timber industry in northern Wisconsin.

As the virgin timber was cut off, the second-growth sprouts provided unlimited year-round deer food. After twenty years, much of this food had grown beyond the deer's reach. But since the migration pattern had been broken, from that time on the deer yarded locally each winter. 89

In other words, Rue attributed the termination of whitetail deer migration to logging not because barbed wire fences fragmented deer habitat, but because second growth provided abundant food supplies even during the winter months. Thus, both the existence of whitetail deer migrations and why those migrations ended are currently controversial issues.

Regardless of whether deer migrations were actually a prevalent phenomenon prior to logging or not, the white-tailed deer's mobility was dramatically altered by the lumber industry. A distinct possibility is that deer migrations were pervasive prior to Euro American settlement, logging, and other detrimental anthropogenic impacts. Leonard Rue III states that "most whitetail deer do not migrate today. There is a shifting of the northern whitetails from summer areas to winter yarding areas, but this is usually less than 10 miles (16 kilom.)." If indeed deer migrations were common during severe winters, than logging and logging related activities had a remarkably devastating impact on deer herd mobility and natural population dynamics. Natural

⁸⁷ Putman, Rory. The Natural History of Deer. Comstock Publishing Associates: Ithaca, 1988. p. 50.

⁸⁸ Putman, p. 51.

⁸⁹ Roe III., p. 257.

⁹⁰ Roe III., p. 257.

migrations prevented deer from starving when food sources were inadequate during the winter; because these migrations could no longer continue, deer in northern Wisconsin were increasingly vulnerable to lack of food abundance and/or quality. This vulnerability to regional food supplies persists today since migration routes can no longer be restored.

Creation of Edge Habitat

Another impact logging had on deer was the substantial increase in habitat acreage and edge regions, due to the felling of vast tracks of forest. Many white-tailed deer, for example, partially subsisted off of exotic grass species that grew on the tote trails and sleigh haul roads utilized by lumbermen. Deforestation itself also rapidly increased edge habitats by replacing the aggregate geographical coverage of virgin forests, with clear-cut or partially cut brushy areas. In other words, "good deer habitat is characterized by forested areas with some young, brush stands and scattered openings, or agricultural areas with a combination of crop fields, woodlots, and wetlands," which epitomized post-logging regions. The opening of the wilderness of virgin pine, never a habitat for deer, provided both summer and winter food, and cover as well. Successional vegetation, prior to widespread logging activities, was actually quite rare, explaining the temporary growth of deer populations in the portions of northern Wisconsin that were logged.

Unfortunately, even though deer actually acquired more edge habitat from logging, increased settlement pressures throughout the state and hunting pressures in northern Wisconsin kept the total deer population on the decline. In 1850, the extensive lumbering initially led to a great increase in population due to increased edge regions; however, increased accessibility to

⁹¹ Swift, p. 14.

⁹² Wise, Sherry.

⁹³ Bersing, p. 9.

remote areas significantly augmented the amount of deer hunted annually. For example, more than eighty thousand deer were killed annually from 1879 to 1881 [within 10 miles of Lake Superior] because of hunting pressures. Prior to the 1880s, deer were able to seek refuge from these pressures in unsettled areas beyond the heavily logged river edges. Counties such as "Bayfield, Sawyer, Iron and Vilas had inaccessible wilderness regions, some large, some small, that had extremely high populations of deer." After the 1880s, however, the wilderness was increasingly penetrated for economic resources. The end result was that logging related activities, such as railroads and increased settlement, drove deer to habitats infested with human hunters, subjecting them to rapid population declines. Deer reached their lowest population numbers around 1900, with overshooting being one of the dominant culprits. Property of the sample of the dominant culprits.

Anthropogenic Predation

Another substantial consequence of logging being introduced to the northwoods was increased anthropogenic predation of the white-tailed deer. Many loggers and logging camps, during the 1800s, subsisted off of deer and venison for spans of time, causing a thinning of deer populations. Even though the logging industry was just spawning in the 1860s, many outfits began to hire hunters to hunt local fauna. The local hunt may also have been driven by the extremely high transportation costs associated with bringing traditional Euro-American staples to the logging camps. For example, "between 1853 and 1857 pork cost from twenty-five to thirty-five dollars a barrel, and spring wheat flour from six to nine dollars a barrel," which was argued by experts to be more than anytime thereafter. Many logging companies therefore hired

⁹⁴ Schorger, p. 67.

⁹⁵ Swift, p. 13.

⁹⁶ Swift, p. 17.

⁹⁷ Schorger, p. 67.

⁹⁸ Bersing, p. 7.

⁹⁹ Fries, p. 15.

woodsman to hunt deer for venison; if no deer were available, they would begin logging and lure in deer to hunt with the new edge. ¹⁰⁰ For example, in the winter of 1868-69:

James Terry engaged to hunt for John Sterling who had two camps on the North Fork of the Eau Claire River. He received his board and \$4.00 per deer. Up to the first of January of this winter, he killed 38 deer and two bears." ¹⁰¹

Most logging companies, however, usually relied on imported sources of food, such as pork, beans, bread, and tea; but, the source of those commodities were the detrimental railroads. 102

Some regions of northern Wisconsin were able to feed their lumbermen with relatively abundant venison productions. In other regions of northern Wisconsin, however, by the 1880s, the white-tailed deer were already becoming scarce. Up until the 1860s, hunter, trappers, and loggers were almost the sole cause of anthropogenic impacts on deer in the northwoods; during those years, "only 3% of the state's population lived in the northern areas [then] comprised of about 24 counties. By the 1880s, locals were observing a substantial decline in deer. For example, in the 1880s, a market hunter told a Game Warden at Clam Lake, Burnette County (in northwestern Wisconsin) that the deer population was too insufficient to supply surrounding lumber camps. These seemingly conflicting stories illustrate that already in the 1880s, the deer population was a story of dynamic fluctuations and variability throughout northern Wisconsin.

Another adverse consequence of logging on the white-tailed deer was the reality that the logging industry augmented many aspects of the fur and meat trade. The lumber industry provided the initial capital investments to build the railroads. "The local consumption of deer

¹⁰¹ Schorger, p. 62.

¹⁰⁰ Swift, p. 17.

¹⁰² Fries, p. 229.

¹⁰³ Bersing, p. 8.

¹⁰⁴ Leopold, p.194.

was comparatively small until the construction of railroads provided easy transportation to the large cities within and without the state." Railroads, which would not have been possible without eastern business money, provided a much more efficient means of exploiting the resources of the northwoods. For example, "In 1866, the Janesville Gazette tells of 3,000 deer being brought to Eau Claire in three months' time. Deer were said to be plentiful in [markets of] Lincoln, Marinette, and Polk Counties." Venison was copious in Milwaukee markets as observed by numerous locals in the 1850s. 107

Railroads also provided the means for increased illegal shipments of venison.

... Illegal game was flooding the Chicago and Milwaukee markets, and ... game fences in Milwaukee were receiving carloads of venison, and were acting as illegal clearinghouses for shipment to Chicago and St. Louis. A way of evading the law was to ship venison in barrels covered with partridges, and to conceal deer in shipments of Christmas trees." 108

Railroads were even publicizing the northwoods as a land of plentiful wildlife, regardless of the validity of this claim, to aggrandize their revenues. The wasteful and unmanaged killing of deer eventually led to a dramatic population decline of deer in the 1890s. Despite legislation, many market hunters utilized dogs to hunt at night. [See Appendix 1: Deer Conservation Legislation] Then, many were shipped to cities labeled as "mutton" or even sent on railroads in coffins, so officials would think they were human bodies. 110

Another consequence of railroads proliferating across the state was the almost ubiquitous utilization of barbed wire fencing along the railroad tracks. Frequently when hunters were pursuing a deer, the deer would become entangled on the fence and be vulnerable to being

¹⁰⁵ Schorger, p.62.

¹⁰⁶ Bersing, p. 7.

¹⁰⁷ Schorger, p. 62.

¹⁰⁸ Bersing, p.10.

¹⁰⁹ Bersing, p. 10.

¹¹⁰ Bersing, p. 9.

shot.¹¹¹ This threat to the overall white-tailed deer population was relatively low; however, combined with the logging, habitat destruction, market hunting, and large conflagrations, white-tailed deer were on the verge of being totally eradicated from the state.

The amount of deer that were hunted even during the early 1900s is a highly contentious issue because of the discrepancies in information about total legal and illegal kills. During 1928, for example, it is estimated that approximately 13,200 bucks were legally hunted in the state of Wisconsin during a ten-day alternate year hunting season. This figure, however, fails to account for the deer killed for illegal shipments of venison or the number of deer killed by Native Americans and private poachers. This figure also does not account for the number of does that were killed during 1928. Ultimately, this figure is almost as perplexing as it is informative.

Another measurement taken during 1928 was the approximate amount of illegal does taken per legal buck. F.G. Kilp, a forester for the Negoosa Edwards Paper Company, estimated that the ratio of probable illegal does per legal buck, if carcasses were just as thick on an entire area as they were on 1/6th of it was 5:1.¹¹³ Another estimation of illegal does hunted, conducted by Rev B.F. Schoenfeld of Park Falls Wisconsin, indicated that 10 illegal does per 100 legal bucks had been left in the woods. This information is decidedly unscientific, given that it was acquired by surveying only 32 selected deer hunters. This data is very telling, however, in its illustration of the potential high variability of illegal poaching throughout northern Wisconsin. In addition, this information reflects the efficacy of deer reproduction habits to survive the more than likely substantial illegal hunting that was occurring during the turn of the century.

¹¹² Leopold, p. 195.

¹¹¹ Bersing, p. 10.

¹¹³ Leopold, p. 196.

Indirect Impacts of Logging on Deer

Since logging was conducted so rapidly and inefficiently during the early 1800s, the forest was a disaster of slash and waste. Loggers only took the portions of the tree that were going directly to the mills; everything else was left behind as slash. The slash eventually turned into the most effective source of kindling for forest fires. Slightly burned areas were actually beneficial, because lightly charred ground provided ideal conditions for deer forage to grow. Massive, widespread forest fires, however were extremely devastating to all northern Wisconsin flora and fauna; they not only killed thousands of people, but also were extremely detrimental to tree and plant species. In fact, "more good pine timber was burned than ever reached the sawmills." The 1871 Peshtigo fire, for example, burned over 1,280,000 acres of northwoods timber. The Philips fire burned over 100,000 acres in Price County. The Black river, Chippewa, St. Croix, Wisconsin, and Wolf pineries, were said to be a 'raging sea of flame."

Although precise data is unavailable as to the impact of logging-induced fires on wildlife, many local residents observed a plethora of dead, burned animals after the enormous fires. L.D. Gray, who hunted along the Menominee River after the Peshtigo fire recalled seeing numerous deer killed by the fire. "Eight deer were found burned to death at one place." The expansive fires were largely ignored during the late 1800s, however, because of the more obvious focus on the human death toll. For example, the Peshtigo fire alone claimed approximately 1,100 lives. 119

¹¹⁴ Fries, p. 245.

¹¹⁵ Fries, p.246.

¹¹⁶ Bersing, p.10.

¹¹⁷ Bersing, p.7.

Schorger, p.67.

¹¹⁹ Dahlberg and Guettinger, p. 36.

Many loggers also spoke of the tendency of fire to drive deer to new locations, where once again, hunting pressures were much higher. 120

These large conflagrations would not have occurred without the lumbering industry, which combined with market hunting "resulted in a population decline after 1900 with the deer population reaching its lowest point around 1910." Conservation legislation, however, was only promulgated as a result of the public outcry about the human casualties and the loss of economically valued timber, not because of the wildlife or declining deer populations. The forest protection legislation, coupled with changing human attitudes about forests and wildlife in the 1920s, ultimately rescued the plummeting deer herds. Conservation legislation, created in the 1930s, even contributed to the dramatic deer population upsurge that still adversely impacts northern Wisconsin today. 122

Another indirect impact of logging on the white-tailed deer was the decline in predator species, most notably the timber wolf (*Canis lupus lycaon*). The relationship between logging and timber wolf extirpation is seemingly tenuous, but nonetheless evident. Increased hunting access and market transportation routes via railroad guaranteed the decline of many prey species, including the white-tailed deer. Once again, the railroads would not have arrived until much later if not for eastern and logging company capital. The decline in prey and subsequent jeopardy of the timber wolf's subsistence base resulted in wolves increasingly hunting livestock. The increased predation of livestock was the predominant reason that the bounty was placed on wolves. Many 'experts' of the time even felt a bounty should be placed on predators such as the wolf and lynx because they directly were eradicating the deer population. "Deputy Game Warden Mackie thought that the bounty on the wolf and lynx should be increased as they were

¹²⁰ Bersing, p. 10.

¹²¹ Dahlberg and Guettinger, p. 26.

making a great slaughter of the deer." In 1865 the Wisconsin legislature put a bounty on wolves, "offering \$5 for every wolf killed." Wolves were eventually driven to complete extirpation, meaning the loss of an important population check for the white-tailed deer. Thus, the indirect impact of nineteenth century logging on predators resulted in a disruption of the delicate ecological dynamics of northern Wisconsin.

Reactions/Conservation Measures to Deer Population Declines

Conservation efforts were critical to the prevention of deer extirpation in northern Wisconsin. Logging, hunting, habitat eradication, and settler attitudes all combined during the nineteenth century, to pose a serious threat to the viability of the white-tailed deer. As early as 1851, legislation was being passed to mitigate the threats to deer populations. In 1848, the year Wisconsin gained its statehood, the legislature passed a measure to close the hunting season for five months of the year, between February and July of 1851. [See Table] This law only applied to Euro American settlers, however, and not the Native Americans, indicating the significant difference in nineteenth century attitudes of subsistence versus game hunting. ¹²⁶ It is critical at this point to focus on the importance of this first deer conservation law. This piece of legislation marked a dramatic shift in pioneer attitudes of northern Wisconsin from ecologically oblivious to heightened awareness. Ultimately, for the very first time, Wisconsinites were beginning to recognize that their actions were having impacts on wildlife, namely the white-tailed deer, and that legal intervention was necessary to curtail these anthropogenic influences.

¹²² Dahlberg and Guettinger, p. 37.

¹²³ Schorger, p. 96.

¹²⁴ Wisconsin Department of Natural Resources. <u>Timber Wolf (Canis Lupus)</u>.

http://www.dnr.state.wi.us/org/land/er/factsheets/mammals/wolf.htm#History in Wisconsin

¹²⁵Bersing, p. 7.

¹²⁶ Swift, p. 27.

The original deer slaughter legislation remained unaltered until 1859, when the season was shortened slightly; in 1860, the open season was again reduced two months, and "ran from August 1 to January 1.127 (Hunting seasons in fact were continually manipulated throughout the 1800s and are effectively manipulated even today. [See p. 55 – 56]) In 1869, the next noteworthy legislation was passed, prohibiting the use of set-guns while hunting. Thus, settlers and hunter were beginning to recognize that not only when they hunted, but how they hunted had dramatic impacts on the deer population. This shift in mentality also lead to the prohibition of hunting dogs statewide, which was passed in 1876. Already, a timeline of shifting attitudes is emerging, where ecological ignorance was supplanted by the understanding that deer populations were vulnerable to human impacts, particularly hunting seasons. Then, by the 1860s, public awareness was increased about the relationship of particular weapons to aggregate deer kills. The 1870s continued the debates about the means hunters used to kill deer, namely dogs, and by the late 1870s, people revolutionized their consciousness once again to question why so many deer were being slaughtered.

In 1878 and 1879, legislation was passed that prohibited the shipment of venison out of Wisconsin. Although the legislation was again repealed from 1880 to 1882, one must recognize the cultural importance of the original legislation. In general, as a society, Wisconsinites commenced the exploration of the heavily loaded question, "why was the deer population so rapidly declining in northern Wisconsin?" In addition, this time was tremendously groundbreaking because people began to search for the answer to that question in human behavior. Regardless of their overall intentions, they were recognizing that human actions were

¹²⁷ Schorger, p. 68.

¹²⁸ Swift, p. 27.

¹²⁹ Schorger, p. 68.

¹³⁰ Bersing, p. 8.

having a devastating impact on deer, through such everyday activities as hunting and logging. Demand for venison, in such distant markets as Chicago and St. Louis, was driving the rapid slaughter of deer hundreds of miles away in northern Wisconsin. In 1883 and 1894, shipment of venison out-of-state was again prohibited, solidifying the late nineteenth century attitude that the unhindered slaughter of the white-tailed deer was wrong or at least, preventable. By the 1890s, there was even a movement to prohibit deer hunting for five years. 133

The efficacy of deer conservation and hunting laws were dubious during approximately the first forty years because enforcement was almost impossible. One man in 1908, while commenting on the gradual decrease of deer in northern Wisconsin, said "The cause of this decrease is not inefficient legislation, but it is because of inefficient protection from wolves and law-breakers." In 1887, the first two game wardens were appointed to mitigate the influence of poachers on deer populations. Unfortunately, they too were ineffective in precluding illegal hunting of deer because they were appointed and focused more on politics than wildlife conservation. Even up until the 1920s, hunting with dogs was frequently reported in remote sections of the state. 137

Finally, in 1897, the State of Wisconsin took a relatively strong stance toward ameliorating the substantial threats to the white-tailed deer population. The nuances of the law are found in the Deer Conservation Legislation figure [Appendix III.]; however, the essence of the new legislation was to severely punish those individuals who illegally poached deer with

¹³¹ Bersing, p. 8.

¹³² Bersing, p. 8.

¹³³ Bersing, p. 10.

¹³⁴ Schorger, p. 67.

¹³⁵ Bersing, p. 9.

¹³⁶ Bersing, p. 9.

¹³⁷ Swift, p. 28.

cumbersome financial penalties.¹³⁸ More specifically, to be legal, a resident had to have a license and then, one was only allowed to kill two deer during the open season, unless for subsistence purposes.¹³⁹ In addition, the transportation or marketing of venison was still prohibited. Deer populations by 1900 were alarmingly low in both southern and northern Wisconsin.¹⁴⁰ [See p. 53 & 54] This legislation represents a turning point in people's mindsets about the rapidly declining deer population and the most effective means of mitigating the severe problem.

Between 1900 and 1925, white-tailed deer populations in Wisconsin reached abysmal levels. [See p. 55 - 56] By utilizing more effective enforcement measures and progressive management schemes, however, deer populations recovered by the 1930s. [143]

Efficient forest protection, which provided a young second growth of food and cover, began to be effective in the 1930s throughout the entire North; the conservation wardens formed an efficient organization in game law enforcement; hounding of deer, market-hunting, and some other illegal deer-hunting methods, disappeared in the 1920s; and restrictive hunting regulations were in force, particularly the one-buck law which was designed to save the deer but actually insured an increase in the herd. 144

In fact, by the 1930s, problems that continue to plague Wisconsin today first emerged, such as deer overpopulation, starvation, crop damage, and forest damage.¹⁴⁵

Conclusions

The nineteenth century in northern Wisconsin was a time of profound change: socially, demographically, economically, and ecologically. Population dynamics of the white-tailed deer, characterized by increased variability and vulnerability, were a direct result of the historical interplay of these phenomenon. Socially, northern Wisconsin experienced irreversible changes

¹³⁸ Bersing, p. 28.

¹³⁹ Swift, p. 28.

¹⁴⁰ Dahlberg and Guettinger, p. 28.

¹⁴¹ Dahlberg and Guettinger, p. 28.

¹⁴² Bersing, p. 11.

¹⁴³ Bersing, p. 13.

¹⁴⁴ Bersing, p. 13.

¹⁴⁵ Bersing, p. 14-15.

as Euro American settlers, driven by their attitudes and economics, drove the indigenous people to reservations. Demographically and economically, northern Wisconsin was dramatically changing from a sparsely populated, forested region to an increasingly populated, fur and timber hub. Ecologically, humans, wreaking havoc on all of northern Wisconsin's flora and fauna, irreversibly altered the entire region's dynamics. The white-tailed deer, a relatively resilient species, almost was completed extirpated, due to these complex interactions. More interestingly, however, deer were almost eradicated not in a predictable pattern of consistently declining numbers; instead, they experienced erratic, unpredictable population oscillations that were dependent upon specific historical events.

The logging industry, during the 1800s, was a major impetus for everlasting ecological changes that substantially contributed to vicious white-tailed deer population fluctuations. Timber harvesting was essentially ubiquitous, causing significant modifications in almost all deer populations throughout northern Wisconsin. Initially, logging was beneficial to the white-tailed deer population because it increased the aggregate amount of habitat. More partially forested, open, brushy areas meant northern Wisconsin could sustain a larger number of deer, both in summer and winter. Unfortunately, increased deer forage meant deer no longer needed to migrate to meet their dietary needs, so they increasingly remained in northern Wisconsin. These impacts started to emerge as early as the 1840s. Railroads and barbed wire fences, funded by timber capital from the 1860s, traversed the state, permanently destroying the migration routes. The destruction of the white-tailed deer's migratory routes made them significantly more vulnerable to other anthropogenic impacts of the 1800s because their food source area was irreversibly limited and because hunting could be increasingly efficient.

In the 1850s, the lumber industry provided an economic incentive for Euro American settlers to permeate the northwoods. Railroads in the 1860s also provided increased accessibility and facilitated the increased movement of people from southern to northern Wisconsin in search of economic opportunities, related to the fur and timber trades. Increased settlement often resulted in frequent hunting, which had devastating impacts on the deer herds. If the white-tailed deer could have escaped the augmented hunting pressures, the population probably could have continued to be relatively stable. If railroads had not been utilized around the state to transport timber, venison, and furs to progressively more demanding markets, then the hunting impacts may have not been so profound. Combined with the destruction of the migratory routes, however, hunting and venison marketing, via railroad, were severely detrimental to the white-tailed deer. By the 1880s, many locals around the state began observing a precipitous decline in the deer population.

Also in the 1870s, forest fires and large conflagrations began having a notable impact on deer, amplifying the variability of deer. Small fires were beneficial to the deer population because the slightly charred soil created increased forage. Large conflagrations, however, were deleterious to deer populations because they destroyed vast areas of valuable habitat. Conservation legislation, starting in the late 1800s, was the predominant reason why the frequency of forest fires was curtailed in Wisconsin. Once again, the occurrence of forest fires illustrates how deer population variability was contingent on the interplay of specific historical events occurring in their destructive sequence. Fires alone would not have ravaged numerous deer herds; destruction of migration routes, increasingly fragmented habitat, persistent hunting, and fluctuating aggregate habitat resulted in the increased vulnerability and massive destruction of the deer population.

Finally, the destruction of valuable predator species, related to logging activities, also adversely affected the white-tailed deer by failing to provide essential natural population checks. Although these effects only played a notable role after the deer population had already recovered from conservation measures in the 1920s and 1930s, the eradication of predators illustrates the lasting impacts of logging related activities. The white-tailed deer continues to experience volatility in its population dynamics because northern Wisconsin is void of any consistent, predictable population checks.

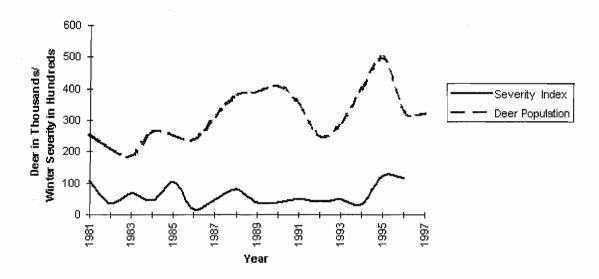
The historical timing of these impacts is crucial to understanding how deer were almost extirpated because no one factor could have had such a dramatic impact on the deer population without its historical context. The interplay and timing of the white-tailed deer resiliency, destruction of deer migration routes, increased habitat through logging, decreased habitat through fires, increased hunting via railroads, and decreased predictable population checks illustrate the complex impacts individual historical factors can have on one species.

In addition, the multi-causal nature of deer eradication elucidates how historical factors can persist over long spans of time. Many of the logging-related impacts on the white-tailed deer that almost lead to its eradication around the early 1900s, continue to impact deer today. The white-tailed deer continues to be a resilient species that now leads to its overpopulation, creating a plethora of problems for wildlife managers. Although hunting is often utilized to control the deer population, without sufficient natural population checks, deer overpopulation continues to be a plaguing issue. Also, because deer can no longer migrate, due to habitat fragmentation, regional starvation becomes a significant problem when overpopulated areas are void of adequate forage; this phenomenon even leads to crop and forest damage when deer are increasingly forced to search for food.

Other phenomenon that adversely affected the deer population in the 1800s no longer continue to play a substantial role in deer population dynamics today. Logging is no longer the dominant force in aggregate deer habitat, although it still plays a notable role. Hunting does not continue to threaten the deer population anymore; in fact, often hunting is utilized as an effective strategy for deer population management. Finally, fires do not have nearly as substantial of an impact on the white-tailed as it once did in the past. Nonetheless, all of the logging-related factors continue to impact the present deer population, whether in small or dramatic ways.

One task of environmental history is to relate current environmental phenomenon with their ecologically informative pasts. Through this process, environmental historians hope to discover a "chain of events" that illuminates causation and explains the complexity of current environmental issues. Deer management problems continue to burden Wisconsin's residents, hunters, motorists, and lawmakers because of the legacy the logging of timber during the latter part of the nineteenth century left behind. The volatility and vulnerability of deer populations presently is a direct result of anthropogenic activities more than one hundred years ago. Thus, resource-managers and conservationists could use this invaluable information to realize two important realities. Firstly, they must understand that the historical utilization of resources in northern Wisconsin had profound impacts on deer populations, both in the past and in the present. Secondly, and perhaps most importantly, they must recognize that the current utilization of resources in northern Wisconsin can have substantial, lasting impacts on the natural ecological dynamics of the northwoods. The importance of these lessons is critical and cannot be overstated.

Appendix I: Northern Forest Deer Population compared to Winter Severity Index



Source: Department of Natural Resources: Northern Forest Deer Population compared to Winter Severity Index

		Appendix II					
	Wisconsin's Leading Lumber Firms*						
	(in million board feet)						
	1875-79	1888	1898				
1	Knapp, Stout & Co., Menomonie – 71.4	Knapp, Stout & Co., Menomonie – 74.3	Knapp, Stout & Co., Menomonie – 83.9				
2	Eau Claire Lbr. Co., Eau Claire – 41.2	Chippewa Lbr. & Boom Co., Chippewa Falls – 48.2	Northwestern Lbr. Co., Eau Claire – 75.0				
3	Union Lumbering Co., Chippewa Falls – 30.0 ²	North Wisc. Lbr. Co., Hayward – 43.0	Chippewa Lbr. & Boom Co., Chippewa Falls – 59.4				
4	Ingram, Kennedy & Co., Eau Claire, W – 23.8	Northwestern Lbr. Co., Eau Claire, 41.7	Ross Lbr. Co., Arbor Vitae – 45.1				
5	C.L. Coleman, La Crosse – 15.0	A.A. Bigelow & Co., Washburn – 35.5	North Wisc. Lb r. Co., Hayward – 44.5				
6	Daniel Shaw Lbr. Co., Eau Claire – 13.4	White River Lbr. Co., Mason – 31.9	C.A. Goodyear, Tomah – 42.3				
7	Northwestern Lbr. Co., Eau Claire – 12.9	John Paul Lbr. Co., La Crosse – 30.3	A.A. Bigelow, Washburn – 39.9				
8	John Paul Lbr. Co., La Crosse – 11.4	D.A. & C.A. Goodyear, Tomah – 30.0	White River Lbr. Co., Mason – 39.9				
9	La Crosse Lbr. Co., La Crosse – 10.7	Shell Lake Lbr. Co., Shell Lake – 30.0	Keystone Lbr. Co., Ashland – 39.6				
10	Bosworth & Reilly, Stevens Point – 9.9	Eau Claire Lbr. Co., Eau Claire – 29.0 ³	Shell Lake Lbr. Co., Shell Lake – 35.0				
11	J. & A. Stewart, Wausau – 8.8	Merrill Lbr. Co., Merrill – 28.0	C.L. Coleman, La Crosse – 32.5				
12	John Edwards Co., Port Edwards – 8.6	McDonald Bros., La Crosse – 28.0	Alex Stewart Lbr. Co., Wausau – 30.0				
13	Meridean Mill Co., Meridean – 8.3	C.L. Coleman, La Crosse – 27.3	Flambeau Lbr. Co., Lac du Flambeau - 30.0				
14		Rust – Owen Lbr. Co., Drummond – 26.0	C.C. Thompson Lbr. Co., Washburn – 30.0				
15		T.B. Scott Lbr. Co., Merrill – 25.3	Bradley Co., Tomahawk – 29.5				
16		P.S. Davidson Lbr. Co., La Crosse – 25.0	Stearns Lbr. Co., Odanah – 29.2				
17		Alex Stewart Lbr. Co., Wausau 25.0	Rice Lake Lbr. Co., Rice Lake – 29.0				
18		Brooks & Ross Lbr. Co., Schofield – 24.1	R.D. Pike Lbr., Bayfield – 28.8				
19		Sawyer & Austin Lbr. Co., La Crosse – 24.0	W.R. Durfee, Ashland – 28.7				
20		Empire Lbr. Co., Eau Claire – 22.9					
21		Superior Lbr. Co., Ashland – 22.0					
22.		Valley Lbr. Co., Eau Claire – 22.0					
23		Mowatt, Thompson & Co., Washburn – 21.4					

^{*}Fred W. Kohlmeyer's Timber Roots: The Laird, Norton Story, 1855-1905, p. 162-163

	Appendix III.				
Deer Conservation Legislation					
March 10,	Laws of WisconsinChapter 171				
1851	"An Act to prevent the killing of Deer in certain months of the year. The People of the State of Wisconsin represented in Senate and Assembly, do enact as follows:				
	SECTION 1: No person in this state, except Indians, shall kill any wild buck, doe, or fawn, during the months of February, March, April, May or June.				
	SECTION 2: Any person violating any of the provisions of this act shall, upon conviction thereof, be fined a sum not more than ten nor less than five dollars and costs of suit.				
	SECTION 3: The penalties prescribed in this act shall be sued for and recovered by and in the name of the Overseers of the Poor of the town where the offence was committed, in an action to be commenced within three months after the commission of the offence, and shall be applied for the use of the poor of said town.				
	Frederick W. Horn, State of the AssemblySamuel W. Beall, Lt. Governor and President of the Senate ¹⁴⁶				
1859	Hunting season slightly shortened 147148				
1860	Open season reduced by 2 months, and ran from August 1 to January 1 ¹⁴⁹				
1867	Hunting season increased by half a month, and ran from August 1 to January 15 ¹⁵⁰				
1869	Hunting with set-guns prohibited 151152				
1876	Use of dogs for hunting prohibited statewide; later local exceptions were made 153				
1877	Open season reduced and ran from September 15 to January 1. 154				
1878 & 1879	Open season remained unchanged				
	Shipment of deer or venison out of state prohibited statewideDeer shining prohibited 155				
1880 – 1883	Shipment of deer outside state permitted again 156				
1881	Open season throughout the state ran form September 15 to January 1 ¹⁵⁷				
1883	Out of state shipment was prohibited again. 158				

¹⁴⁶ Swift, p. 27.
147 Schorger, p. 68.
148 Swift, p. 27.
149 Schorger, p. 68.
150 Schorger, p. 68.
151 Schorger, p. 68.
152 Swift, p. 27.
153 Schorger, p. 68.
154 Schorger, p. 68.
155 Bersing, p. 8.
156 Schorger, p. 68.
157 Schorger, p. 68.
158 Schorger, p. 68.

1887	First two game wardens appointed by the governor salary of \$50.00/month
	Open season shortened and ran from October 1 to November 10. 160
1891	Open season shortened again and ran from November 1 to December 1
	Sale of venison illegal if conducted 8 days after the close of the season 161
1897	License law passed\$1.00 for residents, \$30.00 for non-residents. 162
	The penalty for hunting without a license was from \$50.00 to \$200.00; illegal transportation, \$100.00 to \$500.00. ¹⁶³
	Licensed nonresidents could take legal deer out of the state 164
	Bag limit established for the state; 2 of either sex or any size (more allowed to be
	killed for family or neighbors, but not for sale) 165
	Owner had to accompany any carcass being transported
	Possession of fawn skins, or skins in the red was illegal
	Open season occurred from November 1 to November 20
	Killing of deer on ice or in the water prohibited.
1891	The office of the State Fish and Game Warden was created. 166
1899	Illegal to sell venison during the first six days of the season or ship/sell six days
	after the season closes. 167
1900	The Lacey Act – federal law that prohibited the interstate shipment of game birds and animals (including deer) ¹⁶⁸
1909	Forest protection plan developed; first fire lanes created. 169
1926-28	Biennial Report of Conservation Commission "indicates that \$40,352.45 were expended for fire protection." ¹⁷⁰
1932	Twelve big-game refuges created, totally 235,137 acres and 11,562 acres in 14
	state parks ¹⁷¹
1940	"Federal Aid Project (W-4-R) known as the 'Deer Management Research Project'
	was authorized to study Wisconsin's deer problems. 172
	tial deer legislation not made until 1900s
	tury of Wisconsin Deer, Wildlife in Early Wisconsin, The White-Tailed Deer in
Wisconsin, and	A History of Wisconsin Deer

¹⁵⁹ Bersing, p. 9.
160 Schorger, p. 68.
161 Schorger, p. 68.
162 Swift, p. 27.
163 Swift, p. 28.
164 Schorger, p. 68.
165 Schorger, p. 68.
166 Dahlberg and Guettinger, p. 33.
167 Schorger, p. 68.
168 Swift, p. 11.
169 Bersing, p. 11.
170 Dahlberg and Guettinger, p. 36.
171 Dahlberg and Guettinger, p. 33.
172 Dahlberg and Guettinger, p. 33.
173 Dahlberg and Guettinger, p. 34.

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Jeanne Sheahan May 2001

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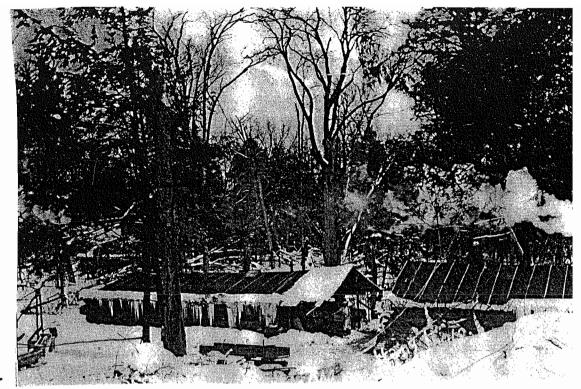
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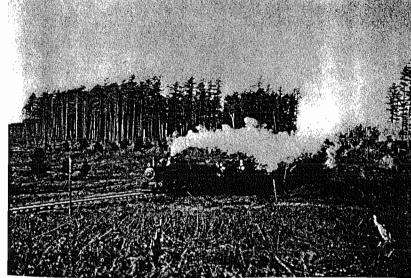
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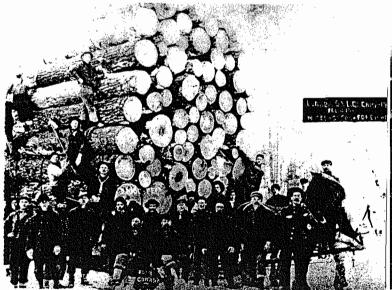


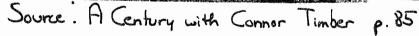
Source: The White-Tailed Deer in Wisconsin p. 22



LOGGING Scenes

· Source: Empire in Pine p.97

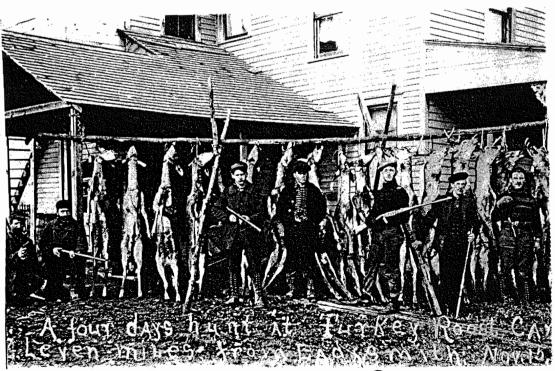




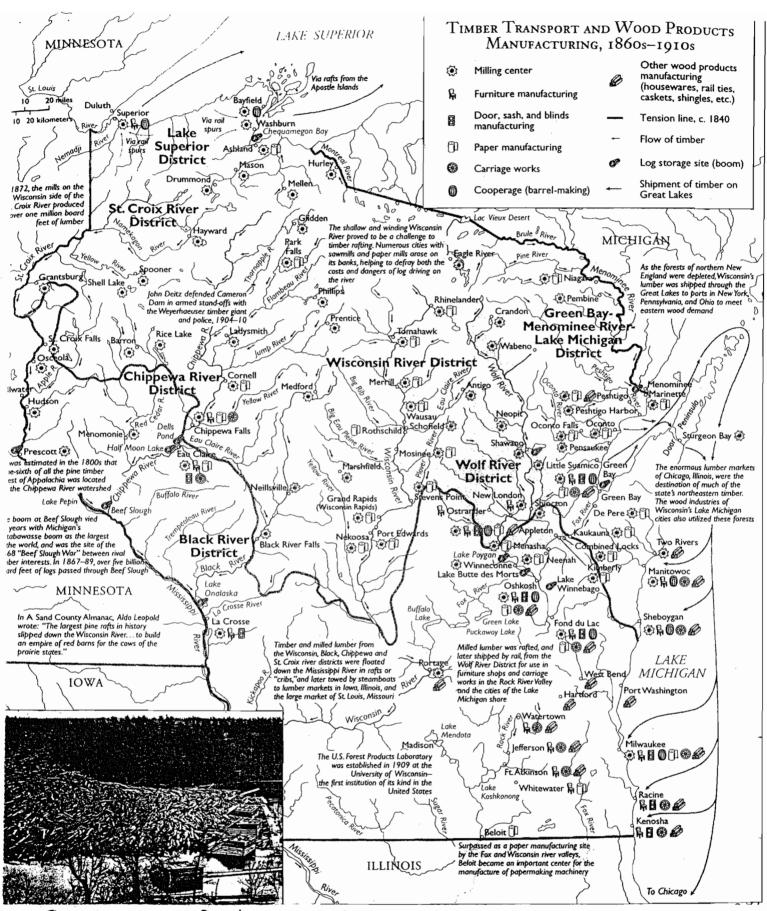




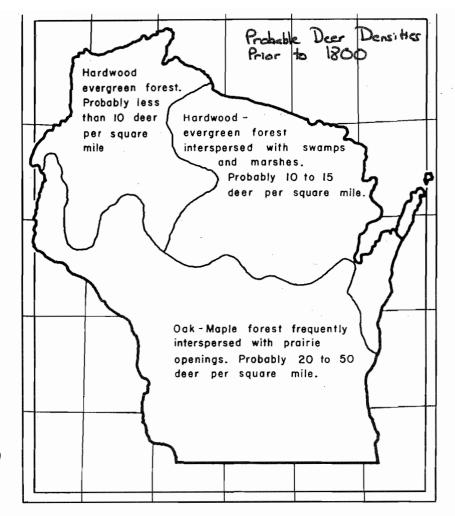
OGGING SCENES (continued)



Source: The White-Tailed Deer in Wisconsin p.17 (Top) p. 26 (Bottom)

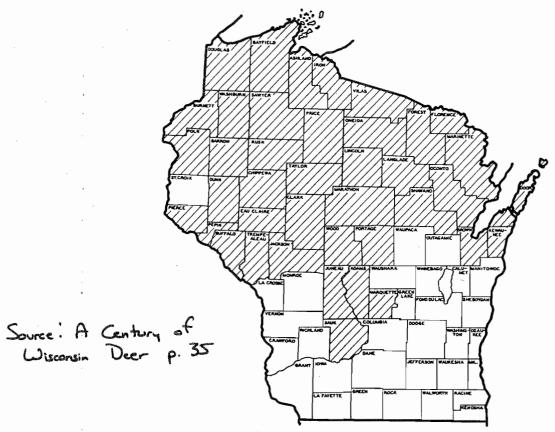


Source: Wisconsin's Past! Present: A historical attes

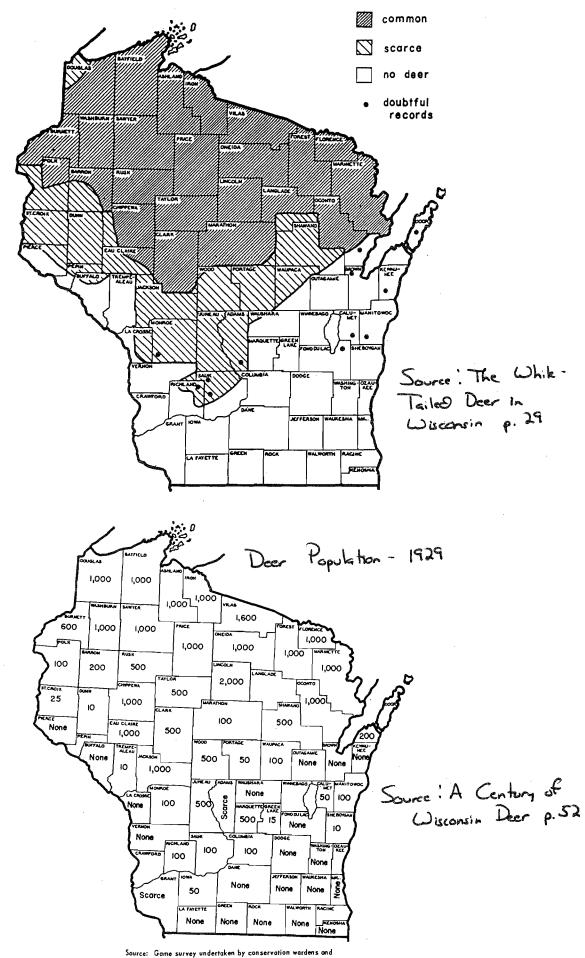


Source: The White-Tailed Deer in Wisconsin p. 15

COUNTIES FREQUENTED BY DEER IN 1897

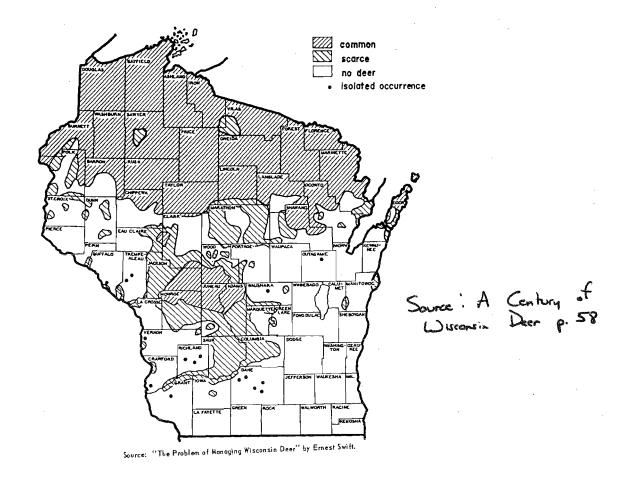


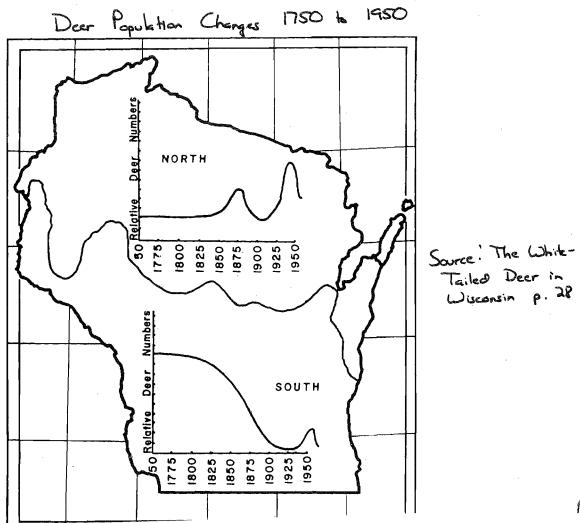
Wisconsin Deer Range About 1912



selected sportsmen in 65 counties.

p. 53





COUNTIES CLOSED TO DEER GUN HUNTING 1850-1964

	Total No.	71 (7) - 0 - 3 4
County	of Years	Years Closed*
Adams	30	1907 through 1936
Ashland	6	1925, 1927, 1929, 1931, 1933 and 1935
Barron	6	1925, 1927, 1929, 1931, 1933 and 1935
Bayfield	6	1925, 1927, 1929, 1931, 1933 and 1935
Brown	48	1907 through 1954
Buffalo	34	1909 through 1942
Burnett	6	1925, 1927, 1929, 1931, 1933 and 1935
Calumet	54	1901 through 1954
	6	1925, 1927, 1929, 1931, 1933 and 1935
Chippewa	12	1922, 1925 through 1935
Clark	35	1905 through 1939
Columbia		1907 through 1942; 1944, 1946 and 1950
Crawford	39 42	1907 through 1942; 1945 through 1950
Dane	44	
Dodge		1907 through 1950
Door	41 .	1907 through 1910; 1913 through 1949
Douglas	6	1925, 1927, 1929, 1931, 1933 and 1935
Dunn	31	1917 through 1947
Eau Claire	9 6	1925; 1927 through 1933; 1935
Florence		1925, 1927, 1929, 1931, 1933 and 1935
Fond du Lac	56	1897 through 1950; 1952 and 1953
Forest	6	1925, 1927, 1929, 1931, 1933 and 1935
Grant	37	1907 through 1942; 1947
Green	53	1907 through 1959
Green Lake	42	1907 through 1942; 1944 through 1947; 1949, 1950
Iowa	36	1907 through 1942
Iron	6	1925, 1927, 1929, 1931, 1933, and 1935
Jackson	19	1925, 1927, 1929, 1931, 1933, and 1935 1903, 1904; 1919 through 1935 1907 through 1954
Jefferson	48	1907 through 1954
Juneau	21	1907, 1908; 1917 through 1935
Kenosha	52	1907 through 1958
Kewaunee	48	1907 through 1954
La Crosse	40	1903 through 1942
Lafayette	50	1907 through 1955; 1959
Langlade	6	1925, 1927, 1929, 1931, 1933 and 1935
Lincoln	6	1925, 1927, 1929, 1931, 1933 and 1935
Manitowoc	54	1901 through 1954
Marathon	17	1919 through 1935
Marinette	6	1925, 1927, 1929, 1931, 1933 and 1935
Marquette	38	1907 through 1942; 1944; 1947
Menominee**		
Milwaukee	58	1907 through 1964
Monroe	33	1903 through 1935
Oconto	7	1922, 1925, 1927, 1929, 1931, 1933 and 1935
Oneida	6	1925, 1927, 1929, 1931, 1933 and 1935
Outagamie	44	1907 through 1950
Ozaukee	48	1907 through 1954
Pepin	38	1909 through 1946
Pierce	21	1925, 1927, 1929, 1931; 1932 through 1948
Polk	8	1915, 1916, 1925, 1927, 1929, 1931, 1933 and 1935
Portage	34	1909 through 1942
Price	6	1925, 1927, 1929, 1931, 1933 and 1935
Racine	53	1907 through 1959
Richland	37	1907 through 1942; 1948
Rock	51	1907 through 1957
	/-	
		- 85 -

Source: A Century of Wisconsin Deer p. 85 Counties Closed to Deer Gun Hunting (continued)

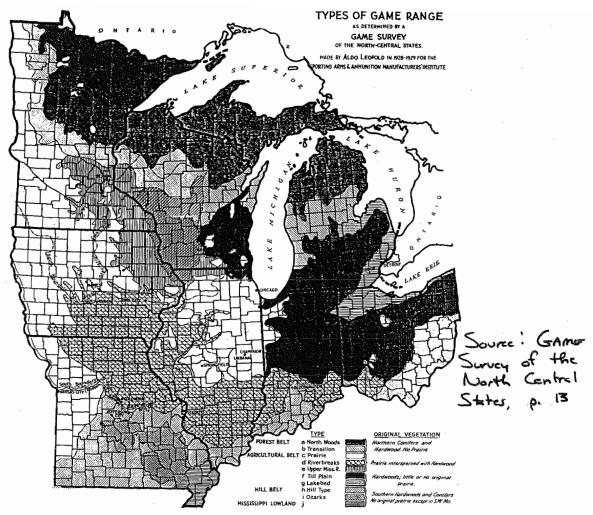
Total No.			
County	of Years	Years Closed*	
Rusk	6	1925, 1927, 1929, 1931, 1933 and 1935	
St. Croix	18	1925, 1927, 1929, 1931, 1932 through 1943;	
Jo. CIOIX	10	1945, 1947	
Sauk	37	1905 through 1939; 1942, 1945	
Sawyer	6	1925, 1927, 1929, 1931, 1933 and 1935	
Shawano	14	1909, 1910, 1922, 1925, 1927 through 1936	
Sheboygan	59	1895; 1897 through 1954	
Taylor	9	1925 through 1931; 1933, 1935	
Trempealeau	28	1903 through 1906; 1919 through 1942	
Vernon	48	1903 through 1950	
Vilas	6	1925, 1927, 1929, 1931, 1933 and 1935	
Walworth	51	1907 through 1954; 1956 through 1958	
Washburn	6	1925, 1927, 1929, 1931, 1933 and 1935	
Washington	47	1907 through 1953	
Waukesha	48	1907 through 1954	
Waupaca	40	1909 through 1948	
Waushara	37	1907 through 1942; 1944	
Winnebago	47	1907 through 1950; 1952 through 1954	
Wood	16	1913 through 1916; 1922; 1925 through 1935	

- * All counties were closed during the years 1925, 1927, 1929, 1931, 1933 and 1935
- ** New county created from parts of Shawano and Oconto Counties in 1961.

Source: A Century of Wisconsin Deer p. 86



Source: Wisconsin's Part : Present : A historical etles



MAP 1: Types of Game Range.

