

Area History

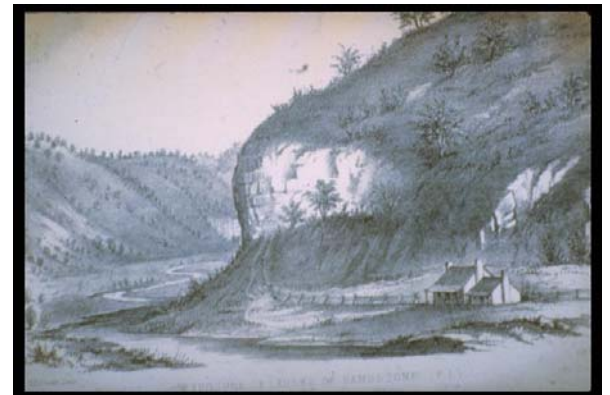
Historical Prologue of Our Region – Southwest Wisconsin

Before Euro-American settlement the Landscape was dramatically affected by Native American culture and their activities. Native Americans occupied western Wisconsin since the last glacial period, utilizing the abundant food resources of the area, cultivating crops on the fertile floodplains, and building settlements on higher landforms. Fires were set by Native Americans to aid in hunting and to provide habitat for the game they desired and plants they used. These fires prevented forests from expanding and kept the landscape in prairie, oak savanna, and open oak woodland. A map of southwestern Wisconsin published by Chandler in 1829 states that “not more than a tenth is covered by timber in detached groves, the remainder being prairies” (Schorger 1954). When European settlers arrived in the early to mid-1800s, fires were stopped and forests quickly expanded. By 1854, Daniels (1854) stated only one third of southwestern Wisconsin was prairie. He attributed this rapid change from prairie to timber to the cessation of fires and rapid growth of young trees on the open prairie.

Land Use Impacts

Historical impacts – (excerpted and paraphrased from the: “State of the Bad Axe-La Crosse Basin Report” 2002). There have been dramatic changes in the land use and land cover in this Landscape. Settlers plowed the prairies on the ridge tops and valleys for farmland, cut trees on the steep slopes for building homes and barns, and grazed the slopes with cows. The Landscape went from a primarily open structure of prairies and oak savanna at the time of Euro-American settlement to the current patchwork of agricultural fields on the ridges and valleys and second growth forests on the steeper slopes and other places that could not be tilled. Less than 0.1% of the prairies and oak savannas remain today.

During and after settlement most of the area was farmed resulting in large-scale soil erosion and flash flood events. Crop fields were mostly rectangular on this highly dissected landscape, and plowing was often done up and down slopes. Steep wooded slopes that couldn't be farmed were grazed by cows compacting the soil and removing the under story plants that prevented runoff. Millions of tons of topsoil moved from hilltops and hillsides to valley floors. An average of 12 to 15 feet of topsoil was deposited in the valley floors in the Bad Axe-La Crosse Basin, burying roads and bridges. Deep gullies were common where water washed away the soil. By the 1930s, after nearly eighty years of cultivation and grazing, virtually every rainstorm resulted in flash floods. By this time, farming in the Bad Axe - La Crosse River Basin developed into a frustrating venture with every new rainstorm washing away valuable crops, pasture and soil. The once crystal clear streams which held brook trout were now shallow, wide,



Painting of typical Coulee region land cover in the early 1800's. WDNR 2002.

warm and full of silt. The tons of sediment that reached the valley floor buried many springs and seeps, causing many perennially flowing streams to become intermittent, flowing only after rainstorms. Streams became braided meanders with their channel lost to the massive amounts of sediment now in the valley. In-stream fish habitat was lost, and the cold water brook trout were replaced by warmwater species such as suckers, carp, chubs and other minnows.

In 1934, the Federal Soil Erosion Service launched the Coon Valley Erosion Project in the Coon Creek Watershed. Men from the newly founded Civilian Conservation Corp (C.C.C.) planted trees, fenced livestock off of steep slopes, reconfigured fields to follow the hills' contours, planted grassed waterways, and stabilized gullies. Efforts to restore streams were also attempted by adding wood and rock deflectors to force floodwaters away from streambanks toward the stream's center, and planting vegetation on streambanks. These land management practices were successfully adopted and most are still in use today.



Gullies common around the 1920's in southwestern Wisconsin. WDNR 2002.

Even after the various conservation measures, the Landscape was degraded, and flash floods continued to damage land and property in the basin. From the 1940s to the 1960s, farms on marginal land in the basin did not succeed, and the land reverted back to more natural conditions. In the 1970s, many farming operations went deeply into debt, overvalued land prices fell, and interest rates remained high. In the early to mid 1980s, many producers were forced to financially dissolve their farms. Large amounts of farmland were purchased by hobby farmers who were not interested in raising livestock or growing crops as their source of income, and these farms reverted to natural vegetation.

The Food Security Act of 1985 required compliance with farm specific conservation plans in order to receive any kind of government subsidy. From 1983 to 1988, land under conservation tillage in the area increased over 700%. The Conservation Reserve Program (CRP) was an incentive to remove highly erodible land from crop rotation and replace it with perennial vegetative cover.

Conditions have improved with these conservation actions. Infiltration of rain and snowmelt into the soil has reduced runoff. Conservation practices such as contour farming have reduced soil erosion. CRP has taken highly erodible land out of crop production. Streams are recovering, many once again becoming narrow, deep, and cold. The Landscape still has the highest percentage of southern forest types in the state and has many rare and significant features. However, the landscape is dramatically altered from its original condition; for example, millions of tons of soil were permanently relocated from hilltops and hillsides to other areas such as the valley floor

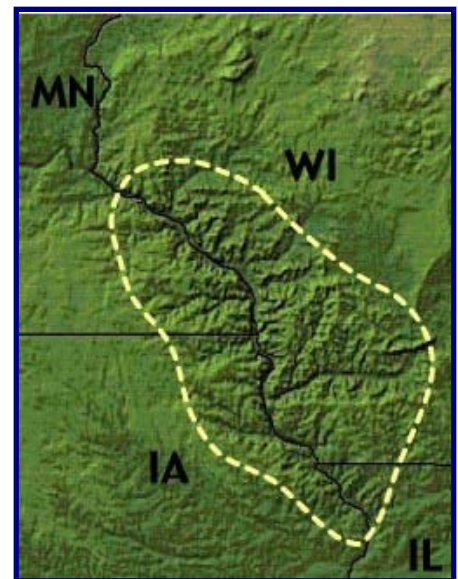
Current impact - Current disturbances in the Landscape are largely due to human activities, primarily agriculture, timber production and harvest, and cessation of fire. Human disturbance also includes the long-term conversion of land to houses, roads, agriculture, impoundments, and utility corridors.

In Freeman Township, the frequent use of “prescribed” fire continued long after it stopped in many other areas of western Wisconsin. Farmers understood its value for keeping brush out of pastures, stimulating and increasing the nutritional value of pasture plants, and in some cases “just to get rid of the rattlesnakes”. Evidence of this is commonly found in the form of fire scars on the uphill side of trees in many areas of the township. Fred Hogan of Lansing IA remembers “the river bluffs on the Wisconsin side of the river burning every year” (Fred Hogan personal communication) as a young man. Jake Sandry of DeSoto stated “the river bluffs always got burned, sometimes being lit by the Native Americans that lived just south of town” (Jake Sandry-personal communication). The fires set by locals up into the 1960’s helped maintain some of the rarest habitat in the United States; prairie and oak savanna, and helped to give our township the unique opportunity to restore and maintain these types that is nearly unmatched.

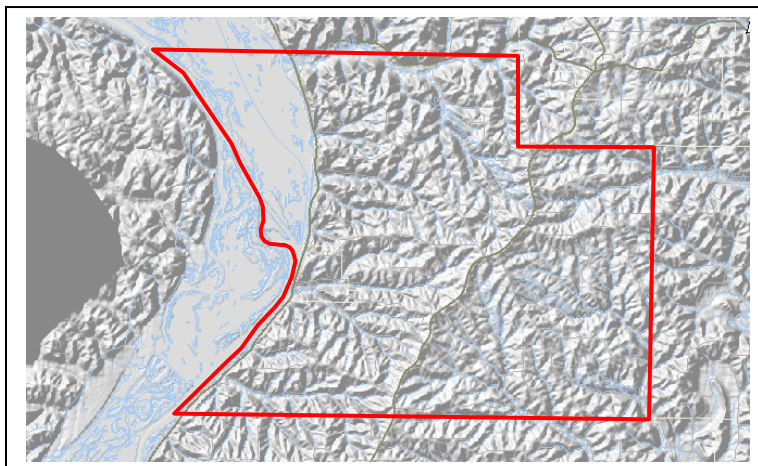
GEOLOGY AND TOPOGRAPHY

The Town of Freeman is located in the “Driftless Area” of southwestern Wisconsin, an area unique in North America. The upper Midwest has undergone multiple periods of glaciation. Thick continental ice sheets have moved from Canada southward in various lobes at various times, leveling high areas of the landscape. The Driftless Area survived these glacial episodes, even though areas completely surrounding it for hundreds of miles were at one time covered with glaciers.

As a result, the area preserves the landscape of what the rest of Wisconsin, as well as northern and eastern United States, would have looked like before the glacial period. Without glacial drift covering the surface, topographic relief is dramatic. Bedrock, consisting primarily of limestone and



The “Driftless Area”



sandstone, is oftentimes close to or exposed at the surface. The thin layers of topsoil in the upper areas of the landscape consist primarily of loess, which is wind-blown material. The land is deeply cut by

streams into a maze of narrow, twisting ridges and valleys. The topography stands in stark contrast to surrounding land from glaciated areas, which shows a gently rolling topography.

The gorge of the Mississippi River provides the most rugged and scenic topography in Wisconsin. Bluffs tower 400 feet above the river in the area. Highway 35, known as the Great River Road, passes through Freeman, hugging the east bank of the river, offering breath-taking views.

The heavily dissected nature of the landscape in Freeman dictates land use. Significant acreage within the town is so steeply sloped that it is only suitable for open space preservation or low-density residential development. Farming for the most part is limited to ridge tops or in some instances valley floors. Crawford County supports some of the best deer and turkey hunting terrain in North America as a result of its topography.

Changes in Wildlife over Time (SOURCE: "WI Ecological Landscapes Handbook-Western Coulees and Ridges Chapter *in draft*, WI DNR)

Wildlife populations have, in some cases, changed dramatically since humans arrived on the landscape, but these changes were not well documented until the mid-1800s. This section discusses wildlife species that were historically documented in the Western Coulees and Ridges Ecological Landscape. Other species for which evidence of past occurrence in the landscape is equivocal or lacking are discussed if suitable habitat exists and recent reintroduction attempts have met with apparent success. Of the latter category of animals, this review is limited to species thought to have been especially important here in comparison to their presence in other Ecological Landscapes. For a more complete review of historical wildlife in the state, see a collection of articles written by A. W. Schorger, compiled into the volume "Wildlife in Early Wisconsin" (Brockman and Dow 1982).

The Western Coulees and Ridges Ecological Landscape was important historically for a number of wildlife species, especially those using oak savanna and oak openings, oak and floodplain forests, prairies, bluffs, caves and rock outcroppings, and large river systems. This Ecological Landscape was particularly important for the elk, bison, Wild Turkey, Passenger Pigeon, Sharp-tailed Grouse, Greater Prairie Chicken, Bobwhite Quail, and both timber and massasauga rattlesnakes. In the mid 19th century, the Landscape was settled by European settlers, wild fires were prevented and controlled, and wildlife populations changed.

Although the distribution of the **Passenger Pigeon** has been described as covering the eastern half of North America (Schorger 1946), its nesting was limited by the presence and abundance of mast (beech nuts and acorns primarily). Schorger (1946) reported from newspaper accounts and interviews that Passenger Pigeons nested by the millions in Wisconsin. With a large presence of oak, this Ecological Landscape was undoubtedly an important nesting area for Passenger Pigeons during years of high mast production.

Passenger Pigeons were shot and trapped during the nesting season and squabs taken from nests and shipped to markets in Milwaukee, Chicago, and cities on the east coast by the trainload (Schorger 1937). Since the Passenger Pigeon was thought to only lay one egg each a year, only nest in communal roosts, and be dependent on abundant

most for nest production, the heavy kill of Passenger Pigeon led to its extinction (Schorger 1937). The last Passenger Pigeon known, died in 1914 at the Cincinnati Zoo. See Central Sand Plains Ecological Landscape chapter for more detailed discussion of the Passenger Pigeon.

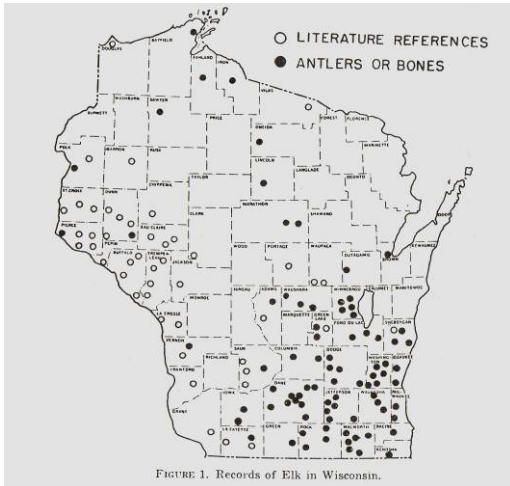


FIGURE 1. Records of Elk in Wisconsin.

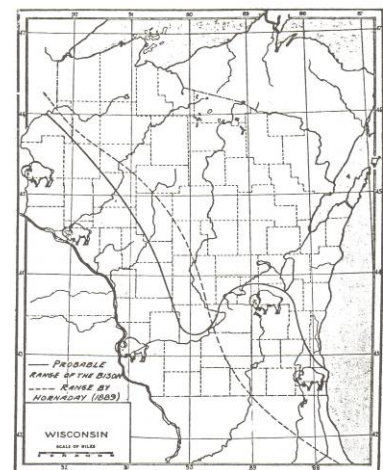
Historic Elk Distribution. From Schorger 1954.

Elk were found throughout Wisconsin but flourished in open woodlands, oak openings, and at the border of grasslands and forests. Elk were most numerous and abundant in the southern and western parts of the state (Schorger 1954) and were especially abundant in this Ecological Landscape. The Chippewa, Kickapoo, Trempealeau, and Mississippi River valleys were often mentioned as having abundant elk populations and there was a report that elk were “astonishingly abundant” around the Platteville area (Schorger 1954). Elk were still abundant in this Landscape during the 1850’s but declined rapidly after that. The last reliable report of elk in Wisconsin is from west of Menomonie in 1866 (Schorger 1954).

Attempts have been made to restore elk in

Wisconsin. In 1917, 41 elk were shipped from Yellowstone National Park and placed at the State Game Farm in Vilas County (Schorger 1954). About half of the elk died immediately following release, but by 1924 they were thought to have numbered 75. By 1954 elk numbers were thought to have been reduced to 35. The population subsequently disappeared from illegal hunting and other causes. Currently, Wisconsin has about 150 elk, all of them in North Central Ecological Landscape from a more recent restoration effort.

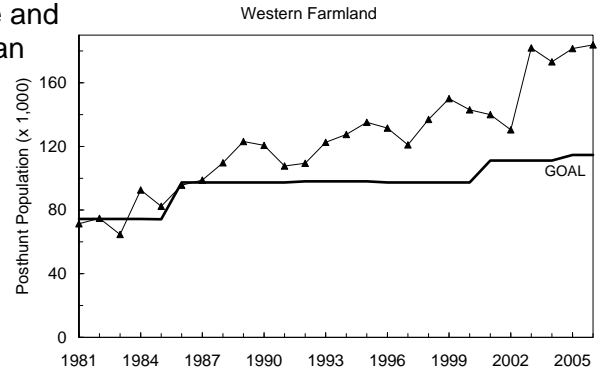
Bison historically occupied the prairie areas of the state and were sporadically abundant in this Landscape. A map of southwestern Wisconsin published by Chandler in 1829 states that “not more than a tenth is covered by timber in detached groves, the remainder being prairies” (Schorger 1954). Daniels (1854) estimated that only one third of southwestern Wisconsin was prairie in 1854. He attributed this rapid change from prairie to timber to the cessation of fires and rapid growth of young trees on the open prairie. Bison occurred from Racine along Lake Michigan to Lake Winnebago to Burnett County in the western part of the state. Both the Wisconsin and Chippewa River valleys are mentioned as having abundant bison populations (Schorger 1937). The last bison was killed near the Trempealeau River in 1832.



Range of Bison in Wisconsin.

Historic Bison Range in Wisconsin. From Schorger 1937.

White-tailed deer were found throughout the state and were likely more abundant in southern Wisconsin than in the northern part of the state (Schorger 1953) at the time of Euro-American settlement. Deer were reported as plentiful in southwestern Wisconsin in 1830's (Schorger 1953) and Hoffman (1855) reported that that he saw "large herds" on the prairies in February 1834. However, as settlers arrived in southwestern Wisconsin in subsequent years, they depended on venison for food and professional market hunters sent tons of venison to the eastern large cities. The severe winter of 1856-57 caused many deer to starve or be easily killed by settlers in southwestern Wisconsin (Schorger 1953). Snow 6 feet deep was reported in some places with a thick ½ inch crust making movement of deer very difficult. Deer seemed to recover somewhat within a decade and were reported as numerous again in southwestern Wisconsin in the mid-1860's. Subsistence harvest, together with market hunting, likely reduced the deer population to its lowest level late in the 19th century. Deer were considered uncommon throughout southwestern Wisconsin from 1900 through the 1960s. However, since the early 1980s deer populations have increased dramatically in this Landscape and deer are now very abundant. Today, deer are an important game species but are cause crop damage, vehicle accidents, damage to forest regeneration, and impact many forest herbs.

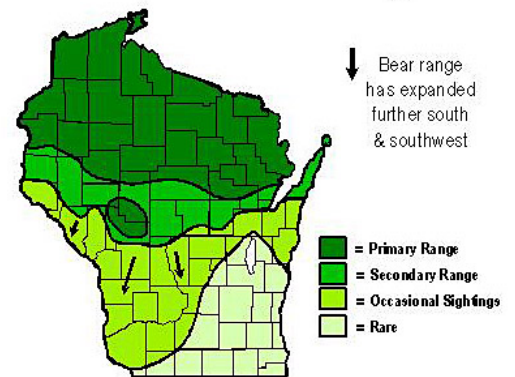


Deer population size in relation to population goals in the Western Farmlands.

The **gray wolf** was found statewide prior to EuroAmerican settlement. Wisconsin wolf numbers then declined gradually due to loss of food sources, shooting, trapping, and poisoning. By the early 1960s they were thought extirpated from the state. The wolf population has since reestablished itself and expanded from northwest to northeast and into central Wisconsin. No wolves are resident in this Landscape at this time.

Black bears were historically found throughout the Landscape but were probably more abundant in the more wooded areas in the northern part of the Landscape. The last appearance of black bears in this Landscape was from the early to mid-1900s (Schorger 1949). Today the black bear range is expanding south and southwest in the state. The northeastern edge of the Landscape in Dunn, Chippewa, and Eau Claire Counties are considered secondary range for the black bear, and northeastern Jackson County is considered primary range. Occasionally black bears are sighted in other parts of the Landscape.

Wisconsin Black Bear Range



Black bear range in 2008. WDNR 2008.

The historic range of the **Wild Turkey** was in southern Wisconsin below a line from Green Bay to Prairie du Chien (Schorger 1942). However, since the Wild Turkey was at the northernmost part of its range, the number of turkeys close to this line fluctuated in response to severe winters. Wild Turkeys were most abundant in southwestern Wisconsin and in the southern part of this Landscape. In 1816 James Lockwood stated "It was not an uncommon thing to see a Fox Indian arrive at Prairie du Chien with a hand sled, loaded with twenty to thirty wild turkeys for sale, as they were very plentiful about Cassville, and occasionally killed opposite Prairie du Chien" (Schorger 1942). Due to persistent hunting by settlers for food, change of habitat, and the severe winter of 1842-

43 Wild Turkeys were rare by 1860. The last documented Wild Turkey was seen in Lafayette County in 1881(Schorger 1942).

There were a couple of attempts by private individuals to reintroduce the Wild Turkey into Wisconsin during the late 1800s (Schorger 1942). These flocks persisted until the early 1900s. Between 1929 and 1939, the State of Wisconsin released about 3,000 pen-reared Wild Turkeys in Grant and Sauk Counties (Brown and Vander Zouwen 1993). These birds frequented farmyards and were quite tame. They persisted until 1958 when the last Wild

Turkey was reported dead near Grand Marsh in Adams County. In the early 1950s the Wisconsin Conservation Department stocked Wild Turkeys in the Meadow Valley-Necedah Area in the Central Sand Plains. That flock, a cross between game farm hens and wild gobblers, originated from Pennsylvania. During 1954-57, 827 birds from Pennsylvania were released on the Meadow Valley Wildlife Area-Necedah National Wildlife Refuge. Although appearing successful at first, the flock encountered disease and severe winters. The flock persisted but never expanded its range significantly (Brown and Vander Zouwen 1993). It wasn't until 1976 that the Wild Turkey became reestablished in Wisconsin when 45 Wild Turkeys trapped in Missouri were obtained in a trade for 135 Ruffed Grouse trapped in this Landscape and released in Vernon County.. Other reintroduction followed, and a total of 334 Missouri Wild Turkeys were released in Buffalo, Iowa, Sauk, Trempealeau, Jackson, La Crosse, Vernon, Dane, and Lafayette Counties. Once established in these areas, the department trapped and relocated Wild Turkeys throughout the state (Brown and Vander Zouwen 1993). Although the Wild Turkey is now established in all 16 Ecological Landscapes, the Western Coulees and Ridges Ecological Landscape has the highest densities for this bird in Wisconsin , providing excellent hunting and wildlife viewing opportunities.

The **Sharp-tailed Grouse** (*Tympanuchus phasianellus*) was considered widely distributed in the state in open and brushy habitats during pre-EuroAmerican times and was likely common in this Ecological Landscape, primarily occupying the extensive oak openings and barrens (Schorger 1944). Sharp-tailed Grouse in this Landscape probably expanded into additional areas as young trees created brushy habitat with the cessation of fire. Sharp-tailed Grouse later declined, likely due to the growth of oak openings into dense forests, as well as the expansion of intensive agriculture. Today Sharp-tailed Grouse are absent from the Landscape.

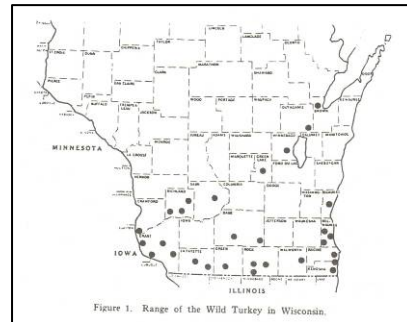


Figure 1. Range of the Wild Turkey in Wisconsin. From Schorger 1942.

The **Greater Prairie-chicken** (*Tympanuchus cupido*) was found throughout southern Wisconsin in pre-Euro-American days, although the Sharp-tailed Grouse may have been more abundant (Schorger 1944). The Greater Prairie Chicken was considered abundant through the 1850s in southern Wisconsin but later declined. Agriculture seemed to lead to an increase in the Greater Prairie Chicken population, initially, but populations declined as agriculture became more intensive and the prairies disappeared. The Greater Prairie Chicken was forced north as prairies were plowed for agriculture in the south and forests were cleared in central and northern Wisconsin (Schorger 1944). As forests regrew in the north, the range of the Prairie Chicken was constricted to its present size of primarily being found in the Central Sand Plains Ecological Landscape in central Wisconsin. The Greater Prairie Chicken is not found in this Landscape today.

The **Bobwhite Quail** must have been distributed widely throughout the open areas of the state (Schorger 1946) in widely fluctuating populations, depending on winter severity. Bobwhite Quail were especially abundant during a period of mild winters from 1846 to 1857 and reached peak numbers in 1854. During this time, it was said that a good shot could “readily bag 50 to 75 in a day” in Madison (Schorger 1946). Shipments of quail from Beloit to the eastern cities amounted to 12 tons in 1854-55. A shipment of 20,000 quail from Janesville was received in Philadelphia in 1856 (Schorger 1946). Bobwhite Quail declined quickly thereafter due to unregulated trapping and adverse weather. The winters of 1854-55 and 1855-56 were severe, but trapping continued with “tons of quail and other game hanging in the yard of the Capital House in Madison.” The Bobwhite Quail population was much reduced from its former numbers by the fall of 1857. The population recovered through the 1860s but never achieved the 1854 levels. From 1870 to the 1940s the Bobwhite Quail population remained relatively stationary (Schorger 1946).



FIGURE 1. Probable original range of the quail in Wisconsin.

Historic Bobwhite Quail Range in Wisconsin. From Schorger 1946.

At the close of the 19th century the Bobwhite Quail population increased temporarily in the Mississippi Valley. Schorger (1946) noted that “they were abundant in 1896 at Prairie du Chien and more numerous than usual at Trempealeau ...”. The increase continued through 1900 and they “were to be found everywhere in the country districts at Prairie du Chien for the first time in many years” (Schorger 1946). Bobwhite Quail populations have decreased dramatically since 1900 due to changes in land use and other causes, but this Landscape has the best populations remaining in the state. The Department made an effort to increase Bobwhite Quail habitat and populations in this Landscape during the 1970s and 1980s by planting hedgerows and winter food plots on private land. These efforts met with little success because habitat was not maintained by private landowners. Up to 60% of annual variability in Bobwhite Quail numbers could be explained by winter severity (Petersen 1997).

Both **timber and massasauga rattlesnakes** were historically abundant in this Ecological Landscape. Timber rattlesnakes were found in the uplands, especially where there were rock outcroppings and rock crevices where they could hibernate. They are restricted to southwestern Wisconsin and have never been found east of Madison. Massasauga rattlesnakes were found in marshy areas, lowland prairies, and along streams and have been found throughout southern and central Wisconsin. Populations of both rattlesnake species have been dramatically reduced by land use changes and continued persecution. The Cooke family killed 150 rattlesnakes during their first year near Gilmanton in 1856 (Cooke 1940). Messeling stated that he killed a thousand rattlesnakes for their bounty each year (Messeling 1953). As late as the mid-1960s, Crawford County paid a bounty for 10,000-11,000 rattlesnakes a year. Early settlers also used pigs, which kill and eat snakes, to control rattlesnakes on their farms (Schorger 1967). The massasauga rattlesnake is more sensitive to habitat changes and now is listed as a State Endangered Species and is a formal candidate for federal listing. It still occasionally is found along the Chippewa and Black River valleys in this Landscape. The timber rattlesnake population has also been reduced; it is a Special Concern species in Wisconsin and is protected from harvest by state law. This is the only Landscape in the state that has timber rattlesnakes and where management for this species can occur.

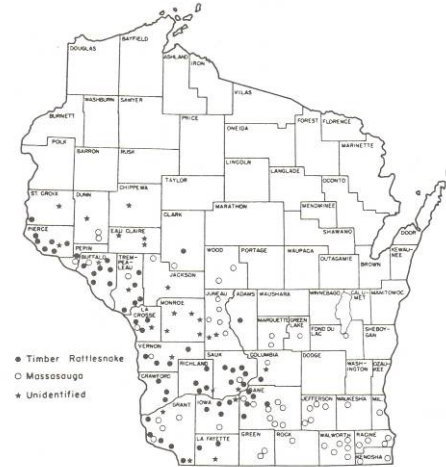


FIGURE 1. Range of the Timber Rattlesnake and Massasauga.

Historic timber and massasauga rattlesnake range in Wisconsin. From Schorger 1967.

Socially Significant Fauna – Species such as white-tailed deer, Wild Turkey, Ruffed Grouse, and American Woodcock are all important for hunting and wildlife viewing in this Landscape, as are many other species of birds. The larger rivers support waterfowl and other waterbirds that are popular for hunting and wildlife viewing. The warmwater fishery is significant and supports populations of sauger, walleye, small and largemouth bass, bluegill, perch and other panfish that are sought by anglers. Abundant coldwater streams provide habitat for native brook trout, as well as introduced brown and rainbow trout.

Forests/Forestry (SOURCE: "WI Ecological Landscapes Handbook-Western Coulees and Ridges Chapter in draft, WI DNR)

The drier forests are often dominated by oaks and were affected by a somewhat different group of characteristic disturbances, especially fire and drought. Periodic wildfire formerly affected many, if not virtually all, oak forests. Besides facilitating establishment of the oaks, fires reduced the densities of shrub and sapling cover and prevented the establishment of and dominance by more mesophytic species. Native grasses, legumes, and composites may be well-represented in stands that have not been heavily disturbed by agents other than fire. From a conservation perspective, noteworthy plants of the oak forests include autumn coral-root (*Corallorhiza odontorhiza*), upland boneset (*Eupatorium sessilifolium* var. *brittonianum*), great Indian plantain (*Cacalia muehlenbergii*), and ginseng (*Panax quinquefolius*).

Dry-mesic and mesic hardwood forests are widespread and well-represented in the Western Coulees and Ridges Ecological Landscape. Southwestern Wisconsin's oak-dominated upland hardwood forests possess high ecological, economic, aesthetic, and recreational values. Sustainable management of the oak forests, in particular, has proven to be highly problematic as most, if not all, of the methods used have had only limited and local successes. (maybe something about "highgrading" which exacerbates the situation)

Sugar maple-basswood forest (aka 'Southern Mesic Forest' or sometimes simply 'northern hardwoods') may support exceptionally rich understory vegetation, especially in areas with loess soils and/or areas that are underlain by dolomites or limestones. Mesic hardwood forests may support distinctive assemblages of species not present in other forest communities. Additional conservation attention for this often overlooked type is needed, especially for rich sites that adjoin other forest types.

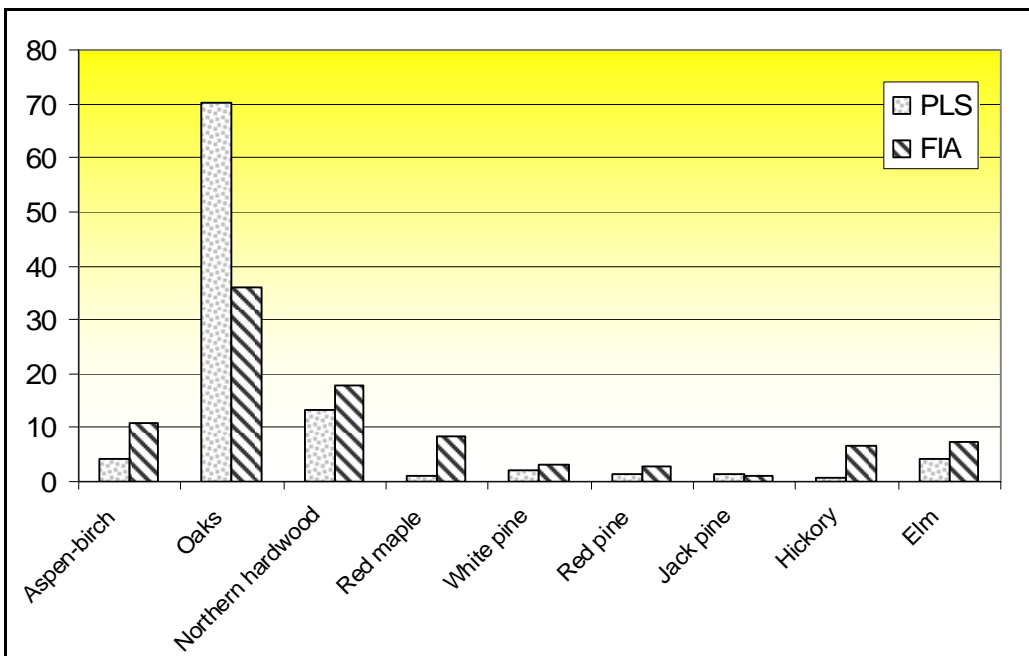


Figure 4. Comparison of tree species' relative importance value (average of relative dominance and relative density) during the mid-1800s, when General Land Office Public Land Survey (PLS) data were collected, and in 2004 based on Forest Inventory and Analysis (FIA) data. Each bar represents the proportion of that forest type in the data set (totals equal 100). Trees of less than 6" diameter were excluded from the FIA data set to make it more comparable with PLS data.

Current forest vegetation (based on RIV) is primarily oak species (36% of RIV), northern hardwood (18%) and aspen-birch (11%) (Figure 4). Aspen RIV has increased from 4.1% to 10.9% since pre-European settlement, while red maple has increased from 0.9% to 8.3%. Hickory has also increased (from 0.9% of RIV to 6.6%), as has elm (from 4.2% to 7.5% of RIV).

The overall RIV for oaks has decreased from over 70% to 36% and the RIVs of the individual species within that group have also changed widely (Figure 5). The RIVs of black, bur and white oaks have decreased dramatically, while red oak RIV has increased from 2.6% to 12.9%.

Forestry - One potential land use change in this Landscape is the decline of the oak resource in upland habitats, especially on dry-mesic and mesic sites. In the absence of fire, and under pressure from unsustainable logging practices, grazing, browsing by white-tailed deer, and the spread of invasive species, oaks and oak forests are declining. Oak is very important not only as commercial timber but as the dominant genus of trees for a whole community of plants and wildlife that depend on it. Currently, we are living on the legacy of fires that occurred more than a hundred years ago and produced and maintained our oak resources in this area. With the cessation of fire, when oak is logged today it often accelerates the conversion of the stand to another forest type, especially on the richer sites. "High-grading," the practice of preferentially removing the trees (usually the large oaks, and the largest red oaks in particular) with the greatest commercial value, can further accelerate the decline of oak in these stands and lead to a conversion to other less desirable (ecologically and economically) forest types. The introduction and spread of invasive species (Eurasian honeysuckles and buckthorns, garlic mustard) has prevented oak from regenerating in some areas. More research is needed to learn techniques to restore not only the oak trees but also maintain the entire oak community in this Landscape. Use of more prescribed fire may be productive, but the logistics can be problematic, and there is a lack of experience in using fire in forested ecosystems on an operational scale Wisconsin