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Sauk and Mesquakie Food Consumption in 1808

Introduction

Central Iowa's environment has been more altered over the past 200 years than most other ecosystems in this country. Virtually all of the prairies and many of the woodlands and savannas have been plowed and now grow corn and soybeans. With this transformation, huge amounts of biodiversity have been lost, and soil erosion is a major problem. At the same time, modern American diets are generally seen as unhealthy. Therefore, I think that looking at the food system of the Sauk and Mesquakie 200 years ago in Central Iowa could provide some clues as to how to produce food in a healthier, more sustainable way. I also think that this study could be particularly useful for the Mesquakie who still live in central Iowa and whose forced departure from the traditional diet has led to major health problems.

History

In order to give context to the food systems of 1808 in the Grinnell area, I will give a brief description of the history of the area around Grinnell between 1709 and 1808. I will limit the area described to counties within 40 miles of Grinnell within what is now the Western Corn Belt Plains, including the modern counties of Hardin, Grundy, Black Hawk, Story, Marshall,

Tama, Benton, Polk, Jasper, Poweshiek, Iowa, Warren, Marion, Mahaska, and Keokuk.

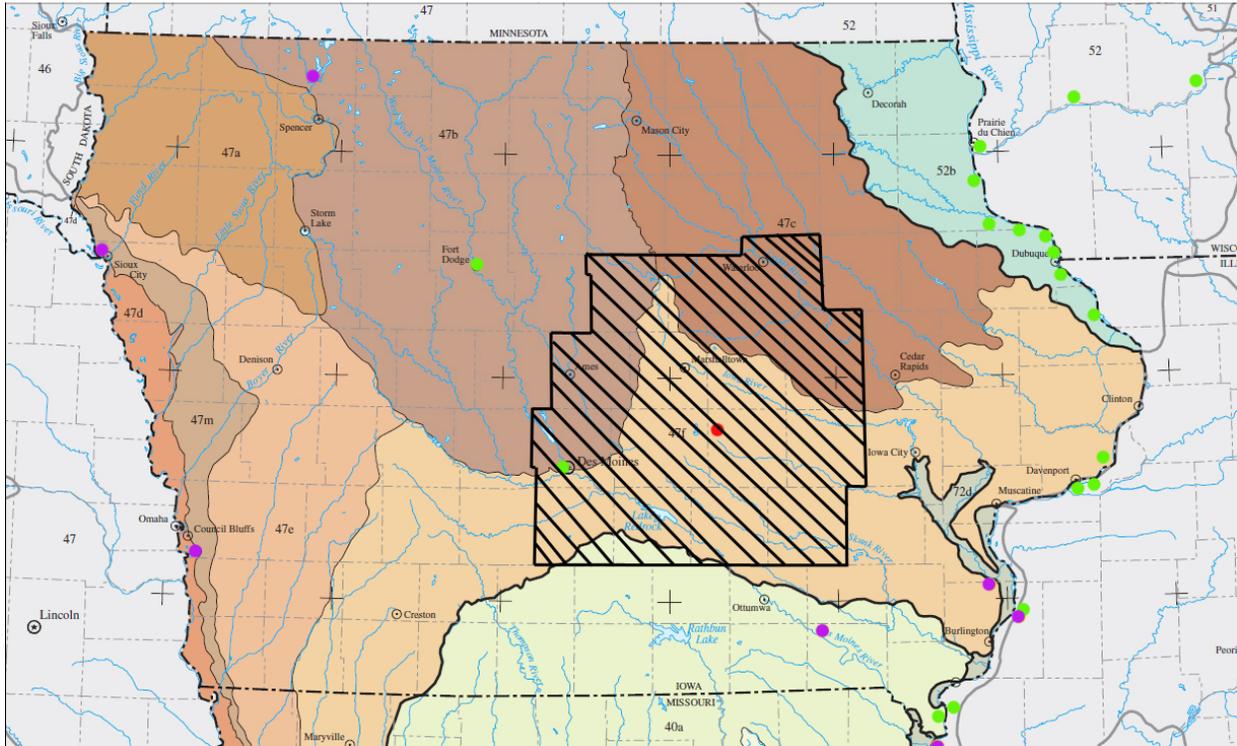


Figure 1: Villages used by Indians between 1709 and 1808. Grinnell is the red dot, Sauk and Mesquakie villages are green dots, Baxoje (Ioway) village sites are purple dots. (Tanner 40 & 56; Gussow 61)

Many of the nations of the tallgrass prairie region, including the Baxoje (also known as Ioway), Otoe, Missouriia, Hochunk, Omaha, Ponca, Kansa, Osage, and Quapaw are descendants of the prehistoric people known to archeologists as the Oneota who lived in the Upper Mississippi and Lower Missouri River Valleys between 900 and 1700 AD (Blair 7-8). The Oneota culture depended on farming corn, beans, and squash in the floodplains as well as hunting in upland areas (Blair 7). The Oneota occupied sites along the Des Moines River in the second half of the 13th century but there were no villages in our area of interest by the time of first European contact (Alex 198)

The descendants of the Oneota who were the main inhabitants of Iowa 300 years ago were the Baxoje (mostly known to whites as the Ioway). The first documented contact between the Baxoje and Europeans comes from 1676, when 7 or 8 Baxoje families lived for a year among the Hochunk (also known as Winnebago) who had a French missionary living among them (Blaine 17). At this time, the Baxoje families traded buffalo robes for French merchandise (Blaine 17). By 1685, "Their [Iowa] eagerness to obtain French merchandise induced them to go away to hunt beaver during the winter," leading them to trap as far from their villages in northeast Iowa as the headwaters of the Des Moines and Blue Earth Rivers (Gussow 36-37). These pelts were traded to the French at a fort near the present site of Trempealeau, Wisconsin, on the Mississippi River (Gussow 36). Starting in 1700, they started trading at a closer trading post at the confluence of the Blue Earth and Minnesota Rivers (Gussow 37).

In 1709, Baxoje villages were in what is now Western Iowa in the Missouri River Basin (shown on the map) (Gussow 39-40). They may have moved there in the late 17th century from what is now northeastern Iowa to avoid the many conflicts around the Mississippi River (Blaine 26-27). From these western villages they hunted only as far east as the Des Moines River, leaving their influence only on the fringes of our area of interest, leaving the majority of the area only minimally hunted on (Gussow 53). At the same time, the Sauk and Mesquaki, who were closely related to each other, were living in what is now the state of Michigan (Gussow 60). At this time the entirety of what is now the United States west of the Appalachians was controlled by the French, who traded manufactured goods to the Baxoje and the Sauk and Meskwaki in exchange for hides and furs at trading posts on the Mississippi River as well as at Green Bay (Tanner 54-55; Blaine 25-26; Bonvillain 41).

However, the Mesquakie were sworn enemies of the Lakota who had to pass through Mesquakie territory in order to reach French trading posts on Lake Superior (Bonvillain 41). In response to the Mesquakie impeding the travel of Lakota and other tribes, the French attacked the Mesquaki in 1714 (Blaine 29). The French and the Mesquakies were at war off and on between then and 1737 (Bonvillain 42). The Mesquakie were almost annihilated by the French, leading the Sauk to grant them refuge in 1733, leading the French declared war on them too (Blaine 36). In order to escape from the French fury, the Sauk and Mesquakie moved south and west, with the Sauk establishing a village on the east side of the Mississippi approximately across from modern Burlington and with the Mesquakie establishing a village either at the location of modern Des Moines or modern Fort Dodge with the uneasy permission of the Baxojos (locations on map) (Blaine 36; Gussow 61; Tanner 40). After they reached peace with the French, the Sauk and Mesquakie moved back to what is now Wisconsin but farther southwest than their previous location near Green Bay: they settled along the Wisconsin River (locations on the map) (Tanner 40, 41).

Between 1709 and 1755, the relationship between the Baxoje and their Lakota, Oto, and Omaha neighbors along the Missouri had soured, leading them to move east of the Mississippi River between 1755 and 1765 (locations on map) (Gussow 40; Tanner 58). By this time the Sauk and Mesquakie had villages along the Mississippi as far south as modern day Davenport and hunted in eastern Iowa in addition to their lands in western Wisconsin and Illinois (Tanner 58; U.S. Indian Claims Commission 53). With the eastern movement of the Baxoje, our area of interest finally received significant hunting pressure (Tanner 58).

Starting in 1763, all what is now the United States west of the Mississippi was controlled by Spain with the land east of the Mississippi controlled by England (Tanner 54-56). Saint

Louis (San Luis) then became the hub of Indian trade in the Mississippi River basin west of the river, although British traders crossed the Mississippi illegally to trade with Indians for furs (Blaine 54). In the last decade of the 18th century, Spanish influence on the Baxoje, Sauk, and Mesquakie waned with Spanish power and ability to provide quality manufactured goods; the people of what is now Iowa instead turned to British traders who illegally entered from the north and east (Blaine 74).

Starting in 1760, the Sauk and Mesquakie started hunting and trapping west of the Mississippi and eventually abandoned their villages on the Wisconsin River (Gussow 63-64; U.S. Indian Claims Commission 53). As game became more and more scarce close to the Mississippi, Sauk and Mesquakie hunters had to hunt further and further west, to the point that in 1810 some Mesquakie men started deciding to largely give up hunting because of the distances involved and instead work in the lead mines near Prairie du Chien (Gussow 101). Baxoje hunting pressure on our area of interest probably also increased in the period as they moved their villages from the Mississippi to the Iowa and Des Moines Rivers in 1770 (located on map). Therefore, in the last quarter of the 18th century and the first decade of the 19th century, our area of interest was probably being hunted by both the Sauk and Mesquakie (primarily the eastern section) and the Baxoje.

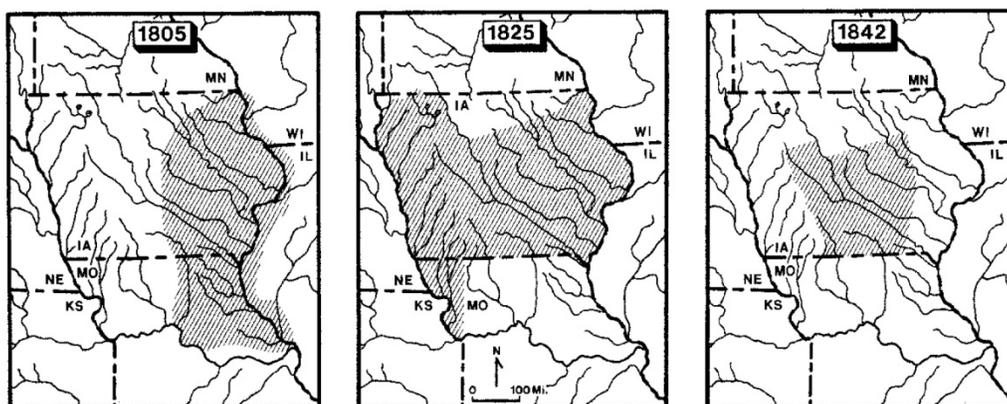


Figure 2 *The shape of Sauk and Mesquakie territory changed during the first half of the nineteenth century.* (Kurtz 1991, 59)

Napoleon negotiated the retrocession of the Louisiana territory from Spain in 1800 (Blaine 77). However, there was a transition period of 3 years, meaning that France never actually took control of the territory, selling it to the United States first (Whitaker 186). For a variety of reasons including a failed attempt to recapture Haiti from rebellious slaves, Napoleons dreams of the reestablishment of France's New World empire disappeared and he sold Louisiana to the Americans, including all of modern Iowa (Whitaker 235-236). The Americans tried to wrest Indian trade from the British after the Louisiana Purchase but had not succeeded by 1808 (Blaine 97). In fact they only built their first official trading post on the Mississippi (called a factory) in 1808 (Blaine 102).

Population estimates for the three nations throughout the period are: Sauk: 750 (1736); 1,000 (1759); 2,000 (1766); 2,250 (1783); 2,850 (1810); Mesquakie: 1,500 (1768); 1,200 (1805); Baxoje: 1,000 (1768); 800 (1804) (Hodge, Swanton, Tanner 66).

Taxonomic Analysis

I will now analyze the use of various taxonomic groups in the Sauk and Mesquakie diet. Some of my quantitative estimates could be flawed because they assume that all of the meat associated with skins sold to traders was eaten by the Sauk and Mesquakie. In reality they may have traded some meat to other Indian nations and to American soldiers and could have fed some to their dogs. However, I have absolutely no way to estimate those quantities. Also, the amount of meat estimated to have been consumed, although large, is not unreasonable. I also make assumptions based on what percentage of hunters were hunting which animals during the spring hunt based on one figure for muskrats. Although the numbers are fairly arbitrary, the amounts of meat eaten by the various groups I designated are also reasonable. In spite of these flaws I think

that there is value in getting a rough estimate of percentage of various foods consumed in Iowa 200 years ago.

Plants

Magnoliids

Piperales

Aristolochiaceae

Asarum canadense (wild ginger): The root of this woodland plant was a very important seasoning and was especially used to mask unpleasant flavors such as that of mud catfish or unfresh meat. The seasoning was used year-round. (Smith 255) It was probably gathered in the fall, when plant roots are largest after the plant went dormant (Hurteau).

Piperaceae

Piper nigrum (black pepper): This spice, along with salt, was the only food imported by the Sauk and Mesquakie in 1808 (Kurtz 176). In 1809 food imports were 1% of goods sold (Kurtz 174).

Monocots

Alismatales

Alismataceae

Sagittaria latifolia (broad-leafed arrowhead): The tubers of this wetland plant can be collected anytime between late summer and early spring whenever there is no ice on the water (Elias & Dykeman 213). Mesquakies harvested these primarily in the late summer and fall and dried them for consumption during winter (Smith 254; Elliott 116). Meskwakies would try to find the

caches of the corms made by muskrats for winter food to spare themselves the trouble of digging them themselves (Smith 254).

Liliales

Smilacaceae

Smilax herbacea (carrion flower): The fruits of this woodland vine were apparently “relished” by Meskwakies, even though some white people find them too bitter (Smith 262). The fruit ripens in late August and can be eaten raw but could have been cooked into sauces by Meskwakies as well (Smith 262; Freitas & Haberman 67).

Liliaceae

Lilium philadelphicum (wood lily): The root of this lily of prairies and savannas was gathered to be eaten as a “potato” (Smith 262). Times of year for harvest and consumption were not mentioned but it may be assumed that wood lilies were harvested in the fall after they had shifted most of their energy to their roots. They were consumed in the winter.

Asparagales

Alliaceae

Allium canadense (wild garlic): This small bulb of the prairie may have been the most loved wild plant food of the Meskwakies, well valued for its sweet taste (Smith 262). It was gathered around the end of May and dried for winter use and for seasoning throughout the rest of the year (Smith 262; Edible Wild Plants).

Allium tricoccum (wild leek): This woodland bulb is larger than *A. canadense* but is less sweet (Smith 262; Elias & Dykeman 61). It was gathered in the summer and fall and dried to be cooked with deer meat (Smith 262; Elias & Dykeman 61).

Poales

Poaceae

Zea mays (corn): This cultivated grain was the plant staple of the Meskwakies. Using records of how much land was being farmed by the Sauk and Mesquakie, estimated yields (22 bu/acre), population censuses, land fallowed and devoted to other crops, and trade Royce Kurtz estimates that the average daily amount of corn eaten by Sauk and Mesquakie to be .75 pounds (113-116). At 1,610 calories per pound, this comes out to 1,200 calories a day (Kurtz 116). However, this means that excluding any other plant materials, Sauks and Mesquakies were eating on average 3,000 calories a day. This may be a realistic figure for hunters but seems unrealistic as an average which includes women, children, and the elderly. Since corn consumption has such a great range of possibilities (2.0-11.5 bushels per person) and since hunting can be approximated fairly precisely based on trade records, I am inclined to believe that Kurtz is more off in his guess for corn than for animals. Thomas Forsythe, a fur trader turned Indian agent described how about 5 bushels of corn were brought into the interior for the fall and spring hunts (October-March) ("Memoirs" 151). This comes out to .4 pounds of corn (600 calories) per person per day. It is reasonable to assume that corn consumption stayed fairly constant throughout the year since Thomas Forsythe described the Sauks as "always miserable without corn even in the midst of meat" ("Account" 221). This figure of .4 pounds per day fits pretty well with the lower end of the possible corn production: 1/3 of a pound per person. Forsythe also said that "The Indians in this country eat but a few roots, as they raise an immensity of corn," showing the importance of corn in the Sauk and Mesquakie diet ("Account" 221).

Corn was also consumed in the form of whiskey brought in illegally by traders (the US government banned the sale of alcohol to Indians, which was routinely ignored by unlicensed traders) (Kurtz 160-162). Because this was an illegal trade we do not have records of quantities

consumed. In the late 1700s, only old men drank whiskey and that only occasionally (Black Hawk 89). However, by 1808, the culture may have started to shift towards alcoholic young men as Black Hawk described as being the case in the 1820s (98). Even if young men also drank alcohol by this point, it was probably fairly infrequently because of the expense of whiskey. Therefore, I expect that the amount of whiskey consumed was probably small enough in 1808 to not be a significant source of calories.

Zizania aquatic (wild rice): Being from Wisconsin, Mesquakies were fond of wild rice but little grew in southeast Iowa, meaning they ate little of it (Smith 259, Forsyth “Account” 222). However, Sauks and Mesquakies would sometimes trade Ho-chunk or Menominee for wild rice (Forsyth “Account” 222).

Eudicots

Ranunculales

Berberidaceae

Podophyllum peltatum (may apple): This woodland fruit was gathered in July and was eaten raw or cooked (Smith 256).

Proteales

Nelumbonaceae

Nelumbo lutea (yellow lotus): The tubers of this aquatic plant were gathered in the fall and were dried for winter consumption (Smith 262; Elias & Dykeman 210). In the winter they are “soaked and cooked with meat or corn or beans” (Smith 262). Seeds were also gathered in the late summer or fall and were cooked with corn (Smith 263; Elias & Dykeman 210).

Core Eudicots

Saxifragales

Grossulariaceae

Ribes (gooseberry and currant): The fruits of these bushes were gathered between June and July and were cooked with maple sugar as a desert (Smith 264).

Vitales

Vitaceae

Vitis vulpine (frost grape): These fruits were “prized” as desserts after the first frost had turned them sweet, usually in October (Smith 265).

Rosids

Fagales

Fagaceae

Quercus (oak): Acorns were gathered in the fall and soaked in lye (wood ash) to remove the tannins. The lye was then washed away and the acorns dried and then ground into meal. This meal was either cooked into a mush to be eaten or was scorched and made into a sort of coffee. White oak acorns were preferred. Smith gives no reference to time of year when acorns were eaten. Since they were consumed largely like corn, one may assume they were eaten year-round. (Smith 257)

Betulaceae

Corylus Americana (hazelnut): Hazelnuts were gathered from July when they were in their milk phase to September when they were fully ripe (Henry & Kaiser 1; Smith 256). Some of the ripe nuts were saved for winter, while the others were eaten at the time of harvest (Smith 256)

Juglandaceae

Carya (hickories): Nuts were gathered in the fall for winter consumption.

Juglans (walnuts): Nuts were gathered in the fall for winter consumption.

Cucurbitales

Cucurbitaceae

Citrullus lanatus (watermelon): This introduced crop was loved by the Sauks and Mesquakies (Smith 257). It was planted in May and harvested in September (Jauron & Nelson).

Cucumis melo (muskmelon): This introduced crop was loved by the Sauks and Mesquakies (Smith 257). It was planted in May and harvested in August (Jauron & Nelson).

Cucurbita pepo (squash and pumpkin): Squashes were harvested in August and dried for winter consumption and pumpkins were harvested in September (Kurtz 108; Smith 257).

Rosales

Rosaceae

Crataegus succulenta (pear thorn): These fruits were eaten fresh and sometimes were cooked (Smith 263). They were harvested in September (Freitus & Haberman 287).

Fragaria virginiana (wild strawberry): These fruit were harvested in June and eaten fresh. In the 1900s they preserved large quantities as jam, so perhaps they also had a cooked version in the 1800s (Smith 263).

Malus ioensis (prairie crab apple): These fruits were gathered after the first frost, usually in October and were dried for winter consumption (Smith 263; Freitus & Haberman 83)

Prunus americana and nigra (Canada and wild plums): These were eaten fresh. In the 1900s they preserved large quantities as plum butter, so perhaps they also had a cooked version in the 1800s (Smith 263). They were harvested in July and August (Elias & Dykeman 203).

Prunus virginiana (chokecherry): These were “eaten avidly when fresh,” with women and children taking whole branches to their places of work to snack on when they were ripe late July – August. The bark was stripped to make a drink. (Smith 264; Marrone 104)

Rubus allegheniensis (highbush blackberry): These fruits ripen in August and are eaten fresh or are sun-dried and saved for winter use (Smith 264).

Rubus occidentalis (black raspberry): These fruits ripen in July and are eaten fresh or are sun-dried and saved for winter use. The root bark was sometimes stripped to make a tea. (Smith 264)

Rhamnaceae

Ceanothus americanus (New Jersey tea): The leaves of this prairie subshrub were brewed as a tea (Smith 263). It could be harvested throughout the growing season, but was best harvested when in bloom late June – mid July (Kindscher 77; Christiansen & Müller 156).

Celtidaceae

Celtis occidentalis (hackberry): The berries were gathered in September or October and were ground for being made into a mush (Smith 265; Krajicek & Williams). No seasonality was mentioned but since hackberry’s use seems to have mimicked that of corn, it may have been eaten year-round.

Fabales

Fabaceae

Amphicarpaea bracteata (hog peanut): Mice gather the underground nuts of these woodland/savanna plants in the fall. These heaps of nuts were taken by the Mesquakie to be eaten. (Smith 259).

Apios americana (groundnut): These forest plants have roots with tubers like beads running along them. “These potatoes are peeled, parboiled, sliced, and dried for winter use,” when they were cooked with meat. (Smith 260) They were harvested in July (Edible Wild Plants).

Gymnocladus dioica (Kentucky coffee tree): The ripe seeds of this tree were gathered in October and roasted and eaten. Some seeds were roasted longer than usual, ground up, and boiled into coffee. (Gymnocladus dioica; Smith 260)

Phaseolus lunatus (lima bean): These cultivated beans were planted in May or June and were harvested in September (Jauron and Nelson).

Phaseolus vulgaris (common bean): The Mesquakie had many kinds of beans which were planted in May or June and were harvested in August as green beans and in September when fully ripe (Jauron and Nelson).

Oxalidales

Oxalidaceae

Oxalis stricta (wood sorrel): This common plant was eaten “often” for its acidity (Smith 271). Whether this means it was just grabbed and eaten while walking around or whether it was also used to flavor food, I do not know. Wood sorrel grows from April to October (the entire growing season) (Kindscher 159).

Sapindales

Anacardiaceae

Rhus glabra (smooth sumac): The berries of this shrub could be gathered in August and September and along with maple sugar were made into a cooling drink akin to lemonade (Smith 255; Elias & Dykeman 185). Some people saved the fruits for winter drinks as well, presumably by drying (Smith 255).

Sapindaceae

Acer saccharum (sugar maple): People tapped the sugar maple trees from mid-February to mid-April and used the sugar from it all year for seasoning most of their food (Smith 255). It was also added to water to make a flavored drink (Spencer 26).

Asterids**Solanales****Solanaceae**

Physalis (ground cherries): These berries were eaten raw. They were preferred after first frost (October) but were presumably also eaten in September. (Smith 264)

Gentianales**Apocynaceae**

Asclepias (milkweeds): All species of these prairie plants except for *A. tuberosa* (butterfly milkweed) were gathered when in bud if possible and if not, in bloom (June - August) (Christiansen & Müller 22-27). These were cooked with meat and sometimes with cornmeal mush. In the late spring/early summer the main meats were turkey, fish and dried venison, meaning that these were probably seasoned with milkweed. Since the summer hunting was for buffalo and elk on the prairie, these were probably also seasoned with milkweed. Some milkweeds were also dried for winter use, when they would be used to season white-tail deer. (Smith 256)

Asterales**Asteraceae**

Helianthus tuberosus (Jerusalem artichoke): The roots of this prairie plant were gathered after the first frost for winter consumption (Smith 256; Elias & Dykeman 210).

Taraxacum officinale (dandelion): In the 1900s Mesquakies cooked the leaves of this non-native weed with pork in the spring (Smith 257). We do not know if dandelions had spread to Iowa by 1808 but it is doubtful that they were abundant since they do not compete well in intact native habitats. Also, the time of spring where dandelions are growing is after the spring hunt but before the summer hunt, meaning there would be no fresh meat to cook with the dandelions although they could have used dry meat or fish. For these reasons I believe dandelions were not eaten by the Mesquakies in 1808 although it is possible.

Apiales

Apiaceae

Heracleum maximum (cow parsnip): The roots of this plant were eaten as potatoes, presumably being gathered in the fall and eaten in the winter (Smith 265; .

Dipsicales

Adoxaceae

Sambucus Canadensis (American elderberry): These berries were eaten raw. In the 1900s they were also cooked into a conserve without sugar. Perhaps they were also cooked in the 1800s. (Smith 256) The fruit ripens in July or August (Freitus & Haberman 103).

Viburnum prunifolium (black haw): The berries of this woodland shrub were eaten raw. In the 1900s they were also cooked into a jam. Perhaps they were also cooked in the 1800s. The fruit is gathered after the first frost (October). (Smith 256; “Viburnum prunifolium”)

Animals

Terrestrial Vertebrates

Mammalia

Rodentia

Castoridae

Castor canadensis (beaver): Beavers were not as common in eastern Iowa as they were to the north or far to the west but their furs were very valuable (Kurtz 88-89). Therefore, they were a focus of the spring hunt (furs were thickest in the late winter and early spring) (Kurtz 87). Based on fur trade records, the average annual Sauk and Mesquakie beaver meat consumption between 1822 and 1826 was about 9,250 pounds (Kurtz 100)¹. About 3,500 Sauk and Mesquakie lived in areas that would have supplied this particular trading post, meaning that about 2.6 pounds of beaver were eaten per person per year (Kurtz 96-97). Assuming that the American Fur Company controlled only 75% of the trade in the 1820s, 3.5 pounds were eaten per year – still a small portion of the diet (Kurtz 98). I will somewhat arbitrarily assume that 15% of hunters (130 men) were dedicated to beavers since 25% were dedicated to muskrats, since beaver were less common than muskrats, and since there is narrative evidence which seems to indicate that fewer men trapped beavers than muskrats (Kurtz 88-89). Therefore if these 130 men were killing about 675 beavers a year, they killed on average 5 beavers each. Since a certain percentage of the population including widows and men too old to hunt was neither a hunter nor directly attached to one like women and children were, I will assume it was only 10%

¹ Although the figures used for these calculations are from the 1820s, they would probably reflect patterns similar to those of the first decade of the century because although game was more depleted in Eastern Iowa in 1825, the Sauk and Mesquakie had gained control of lands in Western Iowa in the mean time, which had received less hunting pressure (see figure 2). Also, Zebulon Pike described the Sauk and Mesquakie as having hunted primarily in river valleys and selling primarily deer pelts (Kurtz, 91, 59). Also, the proportion of game animals probably would not have changed greatly since the bison in Western Iowa would have been as depleted in the 1820s as they were in Eastern Iowa in 1808.

of the population that was eating beaver. This means that this group ate 35 pounds of beaver per year – a significant contribution to the diet.

Cricetidae

Ondatra zibethicus (muskrat): Muskrats were killed for the fur trade in the late winter/spring hunt because that is when their furs were thickest. 25% of hunters dedicated their efforts to hunting muskrats. The spring hunt began when the muskrat houses were no longer frozen. Hunters used a rat spear to catch the rodents while they were in their houses. Once the ice thawed, muskrats were hunted with guns and traps. As the weather warmed muskrats became inedible so it is uncertain how many of the furs represent meat that was simply thrown away. (Kurtz 87-88) Based on fur trade records, the average annual Sauk and Mesquakie muskrat meat consumption between 1822 and 1826 was about 28,600 pounds (Kurtz 100). About 3,500 Sauk and Mesquakie lived in areas that would have supplied this particular trading post, meaning that about 8 pounds of muskrat were eaten per person per year (Kurtz 96-97). Assuming that the American Fur Company controlled only 75% of the trade in the 1820s, 11 pounds were eaten per year (Kurtz 98). Only a quarter of hunters were off ratting (about 220 men). If these men were killing about 31,500 muskrats a year, they killed on average 145 muskrats each. Since not everyone was a hunter or attached to one, I will assume 20% of people primarily ate muskrats (Kurtz 88). These people then ate about 55 pounds of muskrat a year. This represents a significant contribution to the diet even considering that some that meat may have been left for the coyotes.

Carnivora

Canidae

Canis lupus (wolf): The domestic dog (the same species as the wolf) does not seem to have been a mainstay of the Sauk and Mesquakie diet, their consumption seems to have played a ceremonial role. In negotiations with a Dakota party over hunting territories the high priest gave small slices of roasted dog to each of the warriors present starting with the two chiefs (Petersen 45). Dogs were also feasted upon in cases of sickness (Forsyth "Memoirs" 234)

Ursidae

Ursus americanus (black bear): Bear were hunted in both the end of the fall hunt (December) and the spring hunt (Sac & Fox Moons; Kurtz 89). Based on fur trade records, the average annual Sauk and Mesquakie bear meat consumption between 1822 and 1826 was about 30,200 pounds (Kurtz 100). About 3,500 Sauk and Mesquakie lived in areas that would have supplied this particular trading post, meaning that about 8.6 pounds of bear were eaten per person per year (Kurtz 96-97). Assuming that the American Fur Company controlled only 75% of the trade in the 1820s, 11.5 pounds were eaten per year (Kurtz 98). I will somewhat arbitrarily assume that 25% of hunters (220 men) hunted bear (25% were dedicated to muskrats). If these men were killing about 500 bears a year (including cubs), they killed on average 2.25 bears each. Since not everyone was a hunter or attached to one, I will assume 20% of people primarily ate bears, meaning they ate about 55 pounds of bear meat per year. This represents a significant contribution to the diet (Kurtz 89).

Mustelidae

Lontra canadensis (river otter): This animal's pelts were highly prized for turbans and pouches although it was somewhat uncommon in Iowa (Kurtz 88). I don't know if Sauk and Mesquakie ate them or not but the quantities harvested were small anyway.

Procyonidae

Procyon lotor (raccoon): Raccoons were hunted in the spring hunt by the same 25% of hunters who hunted muskrats (Kurtz 87-88). Based on fur trade records, the average annual Sauk and Mesquakie raccoon meat consumption between 1822 and 1826 was about 32,750 pounds (Kurtz 100). About 3,500 Sauk and Mesquakie lived in areas that would have supplied this particular trading post, meaning that about 9.4 pounds of raccoon were eaten per person per year (Kurtz 96-97). Assuming that the American Fur Company controlled only 75% of the trade in the 1820s, 12.5 pounds were eaten per year (Kurtz 98). Only a quarter of hunters (220 men) were off ridding. If these 220 men were killing about 8,400 raccoons a year, they killed on average 38 raccoons each. Since not everyone was a hunter or attached to one, I will assume 20% of people primarily ate raccoons (Kurtz 88). This group then ate about 60 pounds of raccoon a year. This represents a significant contribution to the diet.

Artiodactyla

Bovidae

Bos bison (bison): The bison hunt started in late June, after the second hoeing of the corn fields, and lasted about 40 days (Kurtz 90). Bison were more common in western and northern Iowa than in southeast Iowa where the Sauk and Mesquakie had their villages, so hunting expeditions travelled to the headwaters of the Skunk, Iowa, and Cedar rivers to hunt them (Petersen 36-37). Only men who had horses went on the buffalo hunt because of the distances involved – the rest fished or worked in the lead mines near Prairie du Chien (Kurtz 90). The hunt took place in summer because this was “when the buffalo were fat and their hair thin,” meaning the quality of the meat was highest and the hides were easiest to tan “for the making of clothing, shields, bags, ropes, snowshoes, tents, and boat covers” (Petersen 34). The hunt was undertaken on horseback

with bows, even though virtually all Sauk and Mesquakie men had guns at this point for the deer hunt (Petersen 46). Petersen states that they used bows because it was a greater honor to kill a buffalo with a bow than with a gun (46). Although this may have been true, it probably helped that the distance from a bison was fairly low when hunting a herd of buffalo in the open on horseback and that the bow was easier to fire on horseback and had a far more rapid reload than a rifle.

The best cuts of meat belonged to the hunter who killed the animal along with the hide and were probably eaten fresh at the hunting camp (Petersen 48). The rest of the meat was shared with everyone present especially the “poor and disabled,” cut into strips and dried on wooden racks and bundled in rawhide packs for winter consumption (Petersen 48). Bone marrow was preserved in bladder skins and tallow (rendered fat) was kept in skin bags (Petersen 48). Sinew was turned into bow strings, threads, and ropes, horns became spoons and cups, and hair was woven into belts. No buffalo hides were turned in to Farnham’s trading outfit on the Rock River in the early 1800s indicating that the Sauk and Mesquakie used all of the hides for themselves, perhaps because they were thicker than deer hides (96-97). We know that the hides were not thrown away because almost all of the buffalo was utilized by the Sauk and Mesquakie because it was not as common as farther west (Petersen 48). Plus, why would hides have been granted especially to hunters along with the best cuts of meat if they were not highly valued? However, the lack of fur trade records removes a useful source on quantities of bison taken.

Fortunately, we know from an 1833 expedition to the headwaters of the Iowa that 80 bison were taken, although this could have been different from the 1820s when there were fewer horses (the Black Hawk War was considered the tipping point between the dominance of the canoe and the dominance of the horse in Sauk and Mesquakie society) (Petersen 35). The

dominance of the horse could have emphasized bison rather than elk because horses made hunting the bison which formed large herds (in the case of the 1833 hunt 300 animals) much easier. The average bison bull weighed around 2,000 pounds while the average cow weighed around 700 pounds (Dary 30-31). A hunted population showed an adult sex ratio between 34 and 41% male between 1977 and 1983, while unhunted herds were around 40-60% male (Brodie 10). However, the modern method of hunting with a rifle can probably discriminate much more among specimens to take, with males being more desirable because of their size. Therefore, I will assume the herd was around 50% male and that hunters took about equal numbers of cows and calves. This gives an average live weight of 1,350 pounds, yielding a total harvest of 108,000 pounds of meat. The yield of bison meat as percent of live weight is 54% (Halloran 214-215). About 2-3% of cattle live weight is bone bone marrow (Field 29). Therefore, we can expect a meat yield of 57% or about 61,500 pounds of meat.

Unfortunately, we do not know how many people shared this food. Peterson describes how the meat would help feed the refugee Sauk who had just lost the Black Hawk War and seems to refer to the Sauk and Mesquakie as one unit (33). Keokuk had been elevated to principal chief of the Sauk and Mesquakie by the US government at the end of the Black Hawk War in 1832 (Jung 187-189). Therefore, it may be that the meat was to be shared between the two nations. In 1834, the Sauk population was 2,500 and the Mesquakie around 1,200 (Hodge). This means that the average annual bison consumption was about 16.6 pounds, which represents a low to moderate portion of the diet.

Cervidae

Cervus elaphus (elk): The consumption of this ungulate is something of a mystery. The time corresponding with the summer hunt is called the elk moon rather than the bison moon, implying

a greater importance of elk (Sac and Fox Moons). Also, the mix of tallgrass prairie and savanna that was Iowa 200 years ago made elk far more abundant in Iowa than bison (Dinsmore 25-26). Nonetheless, fur trade records show only 31 elk skins being sold between 1822 and 1826. However, 27 of these are from 1825, with 1822 through 1824 having no elk on record at all (Kurtz 100). Also, Petersen does not mention elk in his description of Keokuk's summer hunt in 1833. However, I believe this to be due to the shift towards horses following the Black Hawk War which made hunting bison (which forms large herds) much easier.

I will assume that it was elk and not deer skin which the Sauk and Mesquakie used for their leggings and moccasins because elk skin is thicker. Although they were reported to have used both deer and elk skins aboriginally for leggings, as they moved south and west, the abundance of elk would have increased, meaning they could have used the superior leather more readily (Paterek 72). This would explain why in some years they gave no elk skins to the traders: it was too valuable for their own use. Kurtz calculated that in the 1820s, when skins were only being used to make moccasins and leggings, the demand for deerskins for personal clothing use of the 3500 Sauk and Mesquakie providing furs to Farnham's Rock Island trading post was 5,400 skins. However, since the average deerskin is only 9 square feet and the average elk skin is 21 square feet, we can adjust the number of skins accordingly (Wegner 200; "Leather Elk"). This means that Sauk and Mesquakie would have killed about 2,300 elk for their own use.

The weights of elk killed in Iowa seem to have been around 500 pounds (Dinsmore 28). If a typical meat to live-weight ratio is 50%, the average amount of meat per elk would have been about 250 pounds (Kurtz 102). This would mean a total annual elk consumption of about 575,000 pounds (Kurtz 103). This is a vastly different conclusion than that based only on the number of elk explicitly named in the fur trade records, which would show a consumption of

only a few thousand pounds of elk a year (if any) (Kurtz 100). About 3,500 Sauk and Mesquakie lived in areas that would have supplied this particular trading post, meaning that about 164 pounds of elk were eaten per person per year, representing a very large contribution to the diet (Kurtz 96-97).

Odocoileus virginianus (white-tailed deer): White-tailed deer were hunted in large numbers, as is shown in trade records. They were primarily hunted in the fall (Kurtz 97). This meat was eaten fresh but was primarily dried for eating in the winter and spring, since it had to provender for January when no hunting was occurring as well as April, May, and June between the spring and summer hunts. Some deer were also killed in the summer as evinced by the 10% of deer skins sold at the trading posts which were “red” (deer’s summer coats were called red) (Kurtz 102). Based on fur trade records, the average annual Sauk and Mesquakie deer meat consumption from the fall hunt between 1822 and 1826 was about 865,200 pounds². If this is only 90% of the deer killed, the total deer consumption was about 932,500 pounds (Kurtz 100). About 3,500 Sauk and Mesquakie lived in areas that would have supplied this particular trading post, meaning that about 266 pounds of deer were eaten per person per year (Kurtz 96-97). Since all hunters (875 men) were involved in the deer hunt, and since they killed about 19,100 deer, each hunter killed about 22 deer. Assuming that the American Fur Company controlled only 75% of the trade in the 1820s, 355 pounds were eaten per year (Kurtz 98). Therefore, deer represent the biggest meat contribution to the Sauk and Mesquakie diet, to the point it could be called a major staple.

Aves

Anseriformes

Anatidae (ducks, geese, and swans)

² Although the Sauk and Mesquakie territory had changed over the

Waterfowl were hunted in the spring, both at the maple camps and between the spring and summer hunts (Black Hawk 73, 80). Based on my above calculations of the percentages of the population hunting bear, muskrats, and beaver, about 50% of people should have been at the sugar camps eating waterfowl. Kurtz tries to estimate the amount of bird meat eaten using fur trade records for the number of feathers brought in but this seems flawed to me (100-102). Unlike in the case of furs and hides, we have little reason to believe that some feathers were not thrown away. Also, I am not sure that the feathers sold to traders were the down of waterfowl – they could well have been the bright plumage of Carolina parakeets or of many other brightly colored birds which were probably not eaten. Kurtz’s estimates fluctuate greatly from year to year, implying that the feathers sold probably varied depending on American markets rather than Sauk and Mesquakie subsistence patterns. Nonetheless, we may be able to extrapolate the importance of waterfowl based on calories, below.

Galliformes

Phasianidae (Pheasant Family)

Meleagris gallopavo (wild turkey): Black Hawk mentions the eating of “wild fowl” which could refer to both water fowl and turkey (73). Forsythe describes how, “sweet corn boiled with fat venison, ducks or turkeys are delicious in the extreme (“Accounts” 221). I will assume that the Sauk and Mesquakie turkey season was similar to the modern Iowa spring turkey season (mid-April – mid-May) since this is when turkeys are mating, making them easy to hunt and since hunters were busy with hunting deer in the winter and fall and with furbearers in the early spring (2008-09 Iowa Hunting Seasons and Bag Limits).

Ray Finned Fishes

We have no concrete data for the amount of fish consumed by Sauk and Mesquakie 200 years ago. No parts of the fish were traded or used for clothing. The only archaeological site from the historical era (Saukenauk) was excavated before the techniques were invented which would have detected fish bones (Green). However we do know that people fished in the late spring and summer, starting when the ice was fully melted in April (Sac & Fox Moons). People fished in the rivers adjacent to their summer villages (Black Hawk 71). Fishing intensity was especially high during the summer hunt: while some families went to the interior prairies to hunt, others stayed and fished and gathered plants for making mats for winter, and some old men and women went to the lead mines at Prairie du Chien; at the end of the summer hunt, the 3 parties reconvened at the village and traded the goods they had gathered (Black Hawk 76). In spite of the lack of hard quantitative data, we may be able to extrapolate the importance of fish based on calories, below.

Insects

The Ft. Edwards trade records of 1820 show 422.5 pounds of beeswax sold, implying that there must have been bees in Sauk and Meskwaki territory by this time (Kurtz, 1986, 132). 100 pounds were sold in 1809 (Kurtz, 1986, 131). I do not know how much honey they were consuming, but they were eating some.

Seasonal Analysis

In this analysis I make several assumptions about how much meat was eaten fresh and how much was preserved for later seasons. I do not assume that meat was preserved when the primary sources make no mention of it being preserved or being eaten out of season. This is particularly the case for furbearers which represent a huge percentage of hunters' diets during the

spring hunt. It may be that they were preserved for the late spring but I do not make that assumption without evidence. The estimates on how much of the meat was preserved for later generally followed a pattern of half as much in later seasons as during the season during which the animal was killed or in the non-hunting season directly following it as in later seasons. This is a totally arbitrary decision, but the numbers generally worked out (meaning that the estimated number of calories eaten during any given period was not unreasonable). Where the numbers did not work out, I tweaked the ratio of short-term to long term consumption.

The Fall Hunt and Winter (October – Mid-February)

Around the beginning of October, people would break down into small bands of around 400 people (100 hunters) and move several hundred miles west from their villages near the Mississippi to their winter hunting grounds (Kurtz 81-85). Thomas Forsythe, a fur trader turned Indian agent described how about 5 bushels of corn were brought into the interior for the fall and spring hunts (October-March) (“Memoirs” 151). The rest of the left over harvest was stored in hidden pits 5 to 6 feet deep to prevent Ho-chunk (Winnebago) or animals from stealing it and to prevent it from spoiling; no mention of gender roles was made for this process (Spencer 30-31). The same areas were not hunted every year, but were cycled every 2 or 3 years (Kurtz 85). Hunters would break into smaller groups of 3 to 30 and hunt smaller river valleys as the season progressed primarily for deer but also for furbearers (Kurtz 86, 97). This hunt continued until the end of December, when the weather became too cold (81).

For the sake of simplicity I will assume that the deer with their winter coats were killed only in the fall and that furbearers were killed only in the spring because this is when they were primarily killed. If about 355 pounds of white tail deer were eaten per person per year, about 320 pounds were from the fall hunt. This was eaten fresh over three months and dry over 5.75

months, 1.5 of which were during the spring hunt and 2.5 of which were during fishing season. I will assume that the consumption of deer meat was 2 times higher than during the spring hunt when it was in season and 2.5 times higher when no other fresh meat besides fish was in season (October – mid-February) because of the effort involved in drying meat and the superior texture of fresh meat and because fishing does not seem to have been as important in the spring as in the summer (Black Hawk does not even mention it in the spring and Forsythe says they preferred other meat over fish and ate it only of necessity) (Black Hawk 76; “Account” 222) Using these assumptions, we get the equation $320=3*2x+1.5x+4.25*2.5x$ where x is the pounds of venison eaten per month during the spring hunt $\rightarrow x=17.7$. Therefore during the fall hunt Sauks and Mesquakies ate about 35.3 pounds of venison a month, 17.7 pounds per month during the spring hunt, and 44 pounds per month between the spring and summer hunts.

Therefore Sauk and Mesquakie ate about 1.2 pounds of white-tail per day during this season. As calculated in the summer hunt section below, they ate 1.3 pounds of bison and 16 pounds of elk per month during the fall hunt. We also know from Forsythe that they were eating about .4 pounds of horticultural products (primarily corn but also lima beans, common beans, pumpkins, and dried squash) a day. Other than mammals and crops, they were eating dried fish, wild potatoes (arrowhead, wood lily, yellow lotus, groundnut, Jerusalem artichoke, and cow parsnip), and wild grains/ legumes (wild rice, acorns, hickory nuts, walnuts, hackberries, hog peanuts, and Kentucky coffee tree beans). Kentucky coffee tree beans were gathered in October. Also in October (after the first frost), frost grapes, prairie crabapples, ground cherries, and black haws were harvested for consumption raw or cooked. The prairie crabapples were also dried and could be eaten throughout the winter along with dried blackberries and black raspberries. Dried smooth sumac berries were used to make a lemonade-like drink by some. Wild garlic and wild

leek were cooked with meat. Wild ginger, salt, pepper, maple sugar, and dried milkweeds were used for seasoning.

If we assume white-tailed deer killed in the fall or winter have about 15% fat content, their meat is 1000 calories per pound (Kurtz 105). With 1.2 pounds being eaten a day this means white-tailed deer contributed 1,200 calories a day. Although this is an amazing figure, it is best supported by quantitative historical evidence since we have trade records. If elk are also 1,000 calories per pound, they contributed 250 calories a day. Corn is 1,610 calories per pound which I will use as a proxy for all crops eaten since it was the main one, meaning that crops contributed about 600 calories per day. Therefore, mammals contributed 1,500 calories a day, crops 600 calories a day, and wild plants and fish between 100 and 400 calories a day depending on average daily calorie consumption (between 2,200 and 2,500 calories) (Kurtz 116). For this season only 2,450 because of the cold.

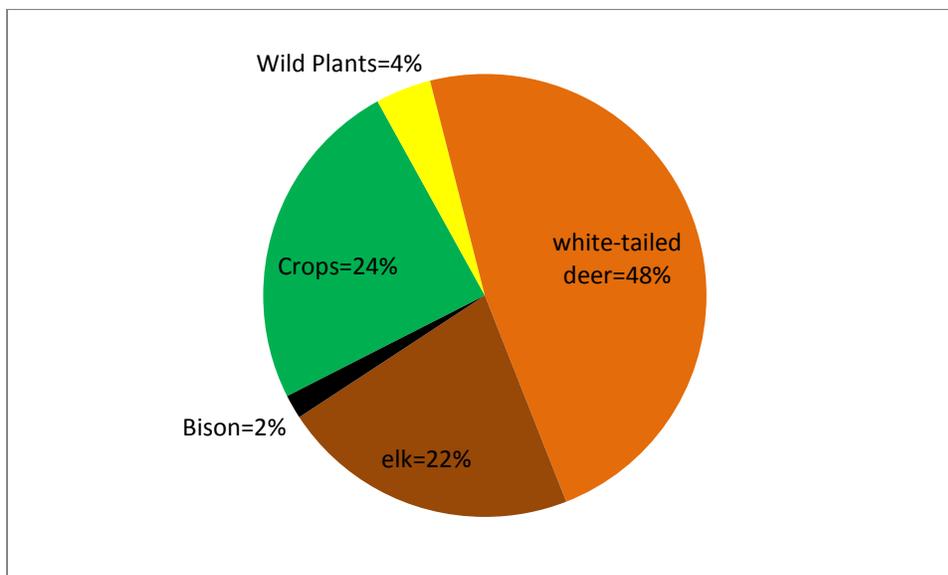


Figure 2: Percentage of calories contributed by various taxonomic groups in the fall hunt and winter based on a 2,450 calorie diet.

The Spring Hunt (Mid-February – Mid-April)

In February or March a second hunt would begin (Kurtz 81). The 5 bushels of stored agricultural commodities were being used on this hunt as well (110). This was the best time to trap furbearers since their furs were thickest, meaning that this hunt focused on beavers, raccoons, muskrats, otters, minks, and bears (Kurtz 87-88). Those who did not hunt furbearers tapped maple trees for their syrup and hunted waterfowl (Kurtz 87). Muskrat were the most important of the furbearers in terms of numbers, but river otter and beaver pelts brought in the best prices (Kurtz 88). There is no mention of meat from the spring hunt being dried for the late spring in Black Hawk's memoirs even though it does say that venison from the fall hunt was eaten in the late spring (73).

In order to make a meaningful description of the food systems of the Sauk and Mesquakie during the spring hunt, we must divide them into four groups: beaver hunters and their families (10% of the population), muskrat hunters and their families (20% of the population), bear hunters and their families (20% of the population), and people at the sugar camps (50% of the population). The beaver group probably ate about 35 pounds of beaver meat per season, or about half a pound per day. The bear and muskrat groups ate about 55 pounds of their respective animals per season, or about a pound per day. Muskrat hunters also hunted raccoons which were 60 pounds per season or about a pound per day. People probably ate on average $\frac{2}{3}$ pounds of white-tail deer saved from the fall hunt per day as calculated above, with muskrat hunters probably eating the least, followed by bear, and then beaver hunters. As in the winter they were eating on average .4 pounds of horticultural products (primarily corn but also lima beans, common beans, pumpkins, and dried squash) a day. Unlike in the winter about half the population was probably eating no wild potatoes (arrowhead, wood lily, yellow lotus, groundnut, Jerusalem artichoke, and cow parsnip), and no wild grains/ legumes (wild rice,

acorns, hickory nuts, walnuts, hackberries, hog peanuts, and Kentucky coffee tree beans). Dried prairie crabapples, blackberries, and black raspberries were also eaten. Dried smooth sumac berries were used to make a lemonade-like drink by some. Wild garlic and wild leek were cooked with meat. Wild ginger, salt, pepper, and maple sugar were used for seasoning. Maple sugar would have been eaten especially in the sugar camps. However, unlike in the fall and winter they probably did not eat dry fish since it had been more than 6 months since the last fishing had occurred.

Beaver meat is about 1000 calories per pound, meaning that people in the beaver group got about 500 calories from beaver per day (“Calories in Beaver Meat”). Raccoon meat is about 1200 calories per pound, meaning that people in the muskrat group got about 1200 calories from raccoon per day (“Calories in Raccoon Meat”). Muskrat meat is about 750 calories per pound, meaning that people in the muskrat group got about 750 calories from muskrat per day (“Calories in Muskrat”). Bear meat is about 1200 calories per pound, meaning that people in the bear group got about 1200 calories from bear per day (“Calories in Bear Meat”). I will guess that deer meat was distributed such that the amount of calories from meat were about even, with people in the sugar camps eating the average $\frac{2}{3}$ pound per day. Since people in the muskrat group had about 2,000 calories worth of fresh meat per day available, I will assume they did not eat any preserved deer meat. Since half of people were at the sugar camps eating the average amount of deer meat, half of the dried deer meat allocated for the spring hunt would have gone to beaver and bear hunters. The average total deer harvest from the fall hunt was 1,120,000 pounds. As calculated above, 18.5 pounds per person per month were eaten over the 2 months of the spring hunt. Out of 320 pounds per person for the whole fall hunt deer harvest then, about 12% of the fall deer harvest was eaten during the spring hunt (130,000 pounds). Half of this is

about 65,000 pounds or 65,000,000 calories or about 1,000,000 calories per day. The bear group was about 700 people and the beaver group about 350 people. In order for these two groups to get about the same number of calories from meat, $x/700+1200=(1,000,000-x)/350+500$ where x is the total number of calories from venison consumed by the bear group per day. $x=540,000$, meaning that the bear group got about 750 calories from venison per person per day while the beaver group got about 1,500 calories from venison per person per day. Therefore, the bear group was getting about 2,000 calories from meat per person per day, as was the beaver group.

However, if people in the hunting groups were eating the same .4 pounds of corn per day (600 calories), this would put them at 2,600 calories per day, which is far too high, even excluding any wild plants. Therefore, some of the furbearers trapped must have been by the people at the sugar camps rather than by the people in the dedicated hunting groups. In order for the hunting groups to get their accustomed 600 calories a day from crops, the equivalent of 250 calories a day of the furbearers must have been taken by the people at the sugar camps. Since the hunting and sugar camp groups were about the same size, this means a total of 250 calories a day in the sugar camp people's diets. Since this was the time when maple sugar was tapped, we cannot assume other food sources were negligible and will therefore assign them the same calorie value from fall/winter (100 calories). Since the equivalent of 17.7 pounds per person per month of venison was being eaten, there is the following equation where x is the amount of calories from venison per day received by people in the sugar camps:

$750*.2+1500*.1+.5x=17.7/30*1000$. x is then equal to 580. Therefore, 2,350 calories – 580 calories from deer – 600 calories from corn – 250 calories from furbearers -100 calories from maple sugar = 820 calories from waterfowl and other food sources. Ducks are about 900 calories

per pound, meaning this is about .9 pounds of duck per person per day (“Calories in Roast Duck”).

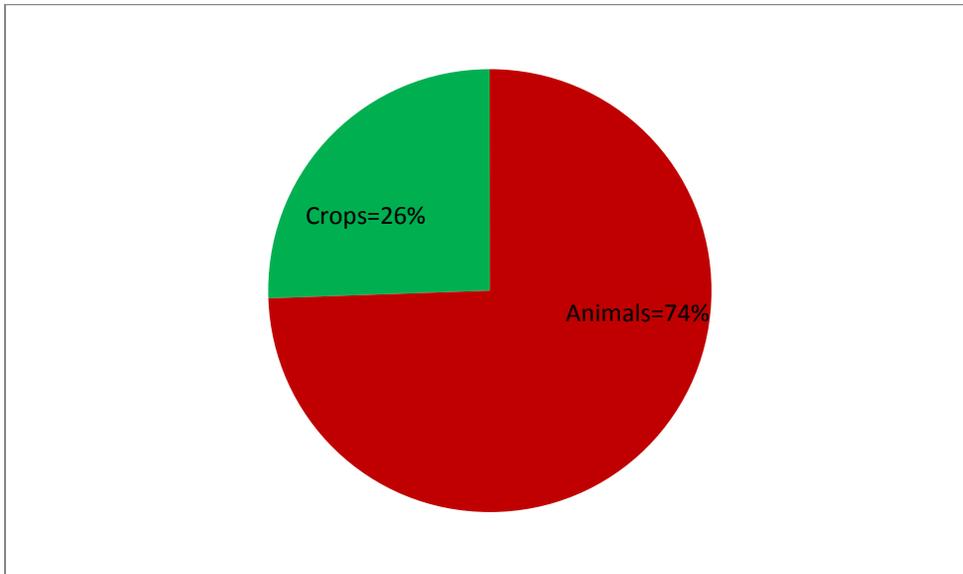


Figure 3: Percentage of calories contributed by various taxonomic groups in the spring hunt for the beaver, muskrat, and bear groups based on a 2,350 calorie diet.

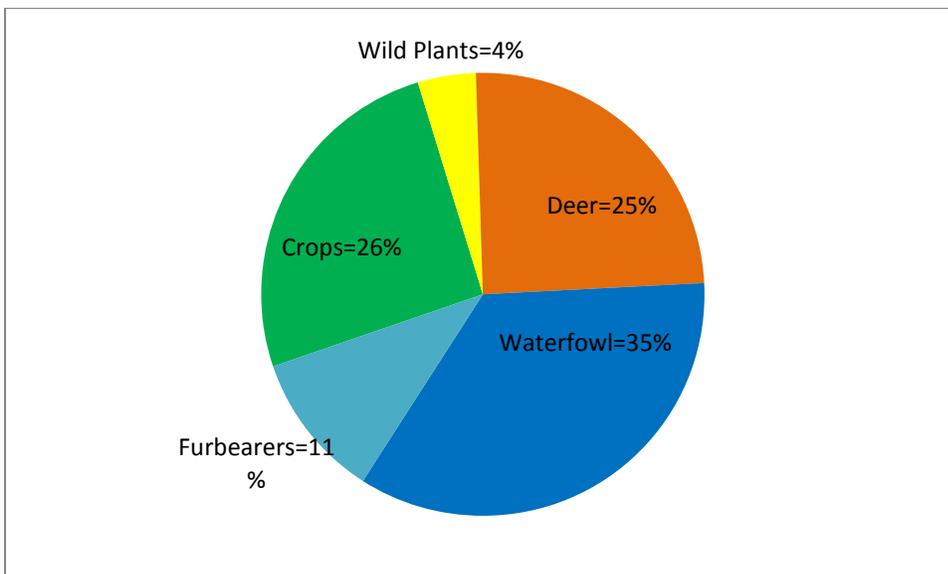


Figure 4: Percentage of calories contributed by various taxonomic groups in the spring hunt for the sugar camp group based on a 2,350 calorie diet.

Late Spring (Mid-April – Late-June)

Around the middle of April, the Sauk and Mesquakie would return to their summer villages on the Mississippi (Kurtz 89). Corn was planted from mid-April to May, depending on the weather (Kurtz 108). Fields were rows of hills 2-4 feet apart, sometimes with corn interspersed with beans or squash (Kurtz 107). Melon fields were kept separate (108). Agricultural work was mostly done by women, although some boys 12-15 and some old men also helped (Spencer 26). Adult men may have helped with the clearing of new fields, as was the case in some other Indian nations but we have no evidence of this for the Sauk and Mesquakie. During this time people ate fish, turkey, stored crops, and dried venison. Black Hawk mentions eating fresh bear meat in the beginning of this period, but I will not remove this from the spring hunt bear consumption since most bear meat was eaten during the spring hunt (73). Seasonings were the same as in winter (wild ginger, salt, pepper, wild garlic, wild leek, and maple sugar) but with the addition of wood sorrel. Wild potatoes were probably not eaten during this time, generally being described as for winter use. Wild grains and legumes such as acorn meal, hackberry meal, groundnuts, and Kentucky coffee tree may have been eaten at this time, though. Starting in May the leaves of New Jersey Tea could be made into a beverage but may not have been gathered until the plants were in flower in late June – mid July. Starting in June gooseberries and currants could be gathered and cooked with maple sugar as a desert. Also in June people harvested wild strawberries which were eaten raw and possibly also cooked.

As calculated above, the white-tail deer consumption during this period would have been about 1.47 pounds per day or 1,470 calories. If crop consumption is the average .4 pounds per day, crops contributed about 600 calories a day. Given that wild plants primarily contributed flavor during this time of year, I think that the rest of the calories consumed were either fish or turkey, probably more turkey mid-April – mid-May and more fish mid-May – late-June since

turkey are easiest to hunt in the former time period.

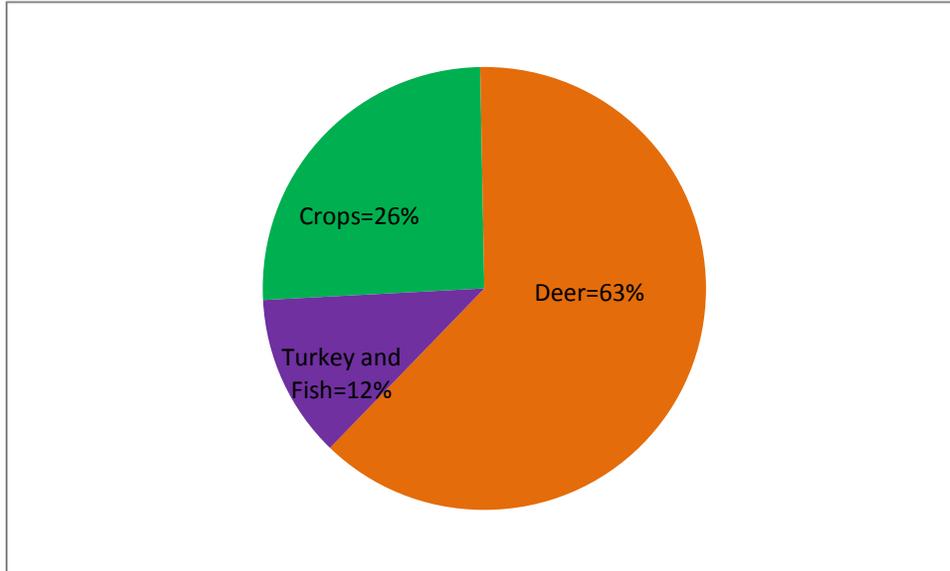


Figure 5: Percentage of calories contributed by various taxonomic groups in the late spring based on a 2,350 calorie diet.

The Summer Hunt/ Fishing/ Lead Mining (Late-June – Early-August)

After two hoeings of the fields (around late June), the people left their fields to go to the prairies to hunt if they had horses, and would fish and gather materials for mats or work in the lead mines near Prairie du Chien if they did not (Petersen 34, Kurtz 90). The last of the previous year's horticultural harvest was used on these trips (Kurtz 110). The only village that was not totally abandoned for the summer hunt was Saukenauk, the main Sauk village; all other villages' fields were heavily predated by wild animals (Kurtz 108-109). On the summer hunt, "deer" and buffalo were hunted (Black Hawk 76). These were probably elk as well as white tailed deer, since the hunt took place on the prairies (Dinsmore 34-35).

Since all the young men and some of their families went on the summer hunt and since only a part of the old people went to the lead mines, I will estimate people who went to hunt on the prairie to be 60% of the population, with 30% fishing, and 10% mining lead. By necessity, I

would expect a similar number of calories from fish for the fishing group as meat from the hunting group. The group of elderly people probably survived mostly on fruits and stored crops but probably also the very last of any dried meat left. Since I do not know this and since they were a fairly small group, I will not make a chart for them.

Above I calculated that Sauk and Mesquakie harvested around 16.6 pounds of bison, 160 pounds of elk, and 35 pounds of white-tailed deer per person on the summer hunt. Since high calorie wild plant foods (tubers and nuts) would have been mostly exhausted by this point and since greens and fruits do not provide many calories I will not assume that wild plants could have provided more than 4% of calories. With the customary 26% of calories provided by crops, this leaves 70% of calories to be provided by meat. Any meat left over from this would have been dried for later use. People would need to consume 1645 calories from meat then. If all of the animals killed in the summer hunt were 1000 calories per pound, people in the hunting group would need to be eating 1.645 pounds of meat per day. I assume that the white-tailed deer was eaten only late-June to September because after that there was access to venison from the fall hunt. This would mean that the hunting group was eating about 0.16 pounds of bison, 0.825 pounds of elk, and .66 pounds of white-tailed deer per day during the hunt. This translates to 4.8 pounds of bison, 24.6 pounds of elk, and 19.8 pounds of white-tail deer per month between late-June and September, leaving per person 10.8 pounds of bison ($16.6 - .6 * 9.6$), 130.5 pounds of elk ($160 - .6 * 49.2$), and 11.24 pounds of white tailed deer ($35 - .6 * 39.6$). I will assume people this dried meat at double the rate during the harvest as during the fall hunt, since in the late fall and winter they had access to lots of fresh venison. During the 1 and 2/3 month long harvest, people would have eaten 6.8 pounds of dried venison per month, 2.6 pounds of bison, and 32 pounds of

elk. Over the fall hunt, people ate on average 1.3 pounds of bison and 16 pounds of elk per month.

Seasonings were the same as in late spring (wild ginger, salt, pepper, wild garlic, wild leek, maple sugar, and wood sorrel) but with the addition of milkweeds. Some of the milkweeds harvested would be dried for winter consumption. Wild grains and legumes such as acorn meal, hackberry meal, groundnuts, and Kentucky coffee tree may have been eaten at this time along with the last of the previous year's crops. The leaves of New Jersey Tea would have been gathered at this time to be made into a beverage because they were in bloom and because people were on the prairies anyway. Gooseberries and currants were probably still being gathered and cooked with maple sugar as a desert. Also during this time people harvested may apples, Canada and wild plums, black raspberries, and elderberries which were eaten raw and possibly also cooked. Raspberries would have also been dried for winter storage.

As can be seen in Figure 6, my calculations show elk as a major component of the diet during the summer hunt. If this much elk had not been eaten, it seems that summer would have been a time of starvation for those on the summer hunt and people would not have done it and would have all fished instead. White-tailed deer meat dried from the fall hunt would probably be rotten by this point, meaning that a summer hunt of elk would have been imperative.

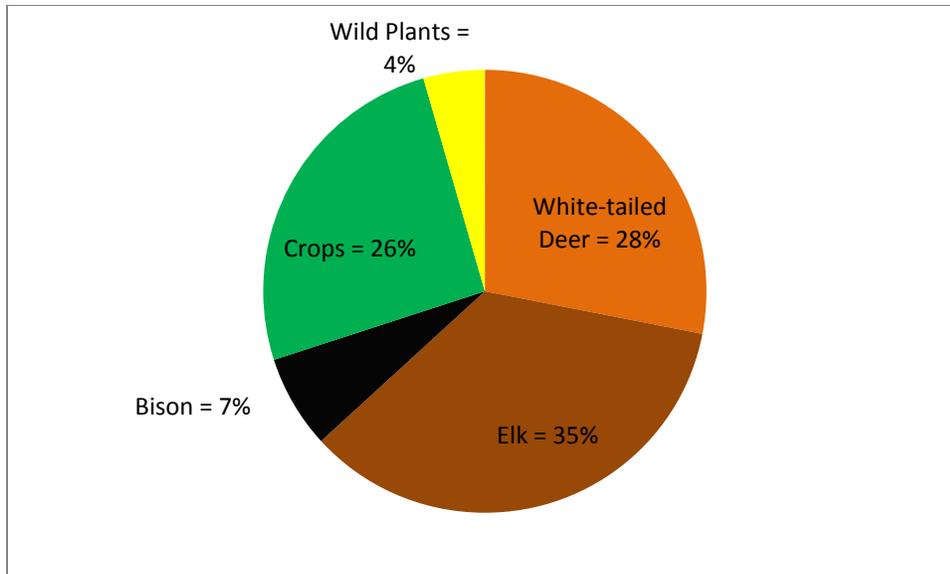


Figure 6: Percentage of calories contributed by various taxonomic groups in the summer hunt based on a 2,350 calorie diet.

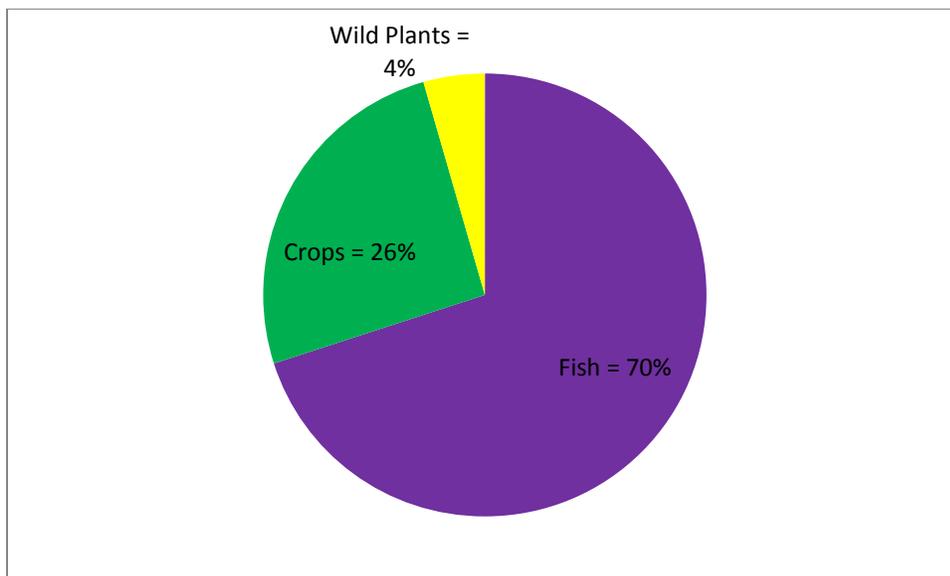


Figure 7: Percentage of calories contributed by various taxonomic groups in the fishing expeditions based on a 2,350 calorie diet.

The Harvest (Early-August – September)

In August, people would return to their villages in river valleys and harvest the green corn, green beans, and summer squashes (Kurtz 109). Some of the squashes and green corn were

dried and stored for later use (Kurtz 109). Around a third of the corn may have been harvested at this time (Kurtz 109). Nonetheless, most of the crops harvested during this early period would have been consumed at the time. The rest of the corn and beans were harvested around mid September along with pumpkins and watermelons (Kurtz 82; Jauron & Nelson). Musk melons were probably harvested in both August and September (Jauron & Nelson). Melons could not be preserved so they would have also been eaten during harvest time.

During this time the same seasonings would be used as during the summer hunt (wild ginger, salt, pepper, wild garlic, wild leek, maple sugar, wood sorrel, and milkweed). Some of the milkweeds harvested would be dried for winter consumption. Wild grains and legumes such as acorn meal, hackberry meal, groundnuts, and Kentucky coffee tree were able to be gathered fresh for consumption over the following year. The leaves of New Jersey Tea could have been gathered at this time to be made into a beverage or could have been used dry from being gathered during the summer hunt. Many wild fruits were harvested during this time, including carrion flower, pear thorn, Canada and wild plum, chokecherry, blackberry, smooth sumac, ground cherries, and elderberry. These were eaten fresh but some were also cooked. The sumac was used to make a lemonade-like drink. Some sumac and blackberries were dried for winter use. Nuts were also gathered during this time for fresh and winter consumption, including hazelnuts, hickory, walnuts, and hog peanuts. The roots of wild plants were also gathered during this time, including wild garlic, wild leek, and some of the wild potatoes (arrowheads, wood lilies, yellow lotus, groundnuts, Jerusalem artichokes, and cow parsnips).

I will assume that the typical 600 calories of crops were eaten in this period. As calculated above, 2.6 pounds of bison, 32 pounds of elk, and 6.8 pounds of white-tail deer were

being eaten per month during this period. This comes out to 1.38 pounds or 1,380 calories. The rest of the calories would have been dried fish and wild plants.

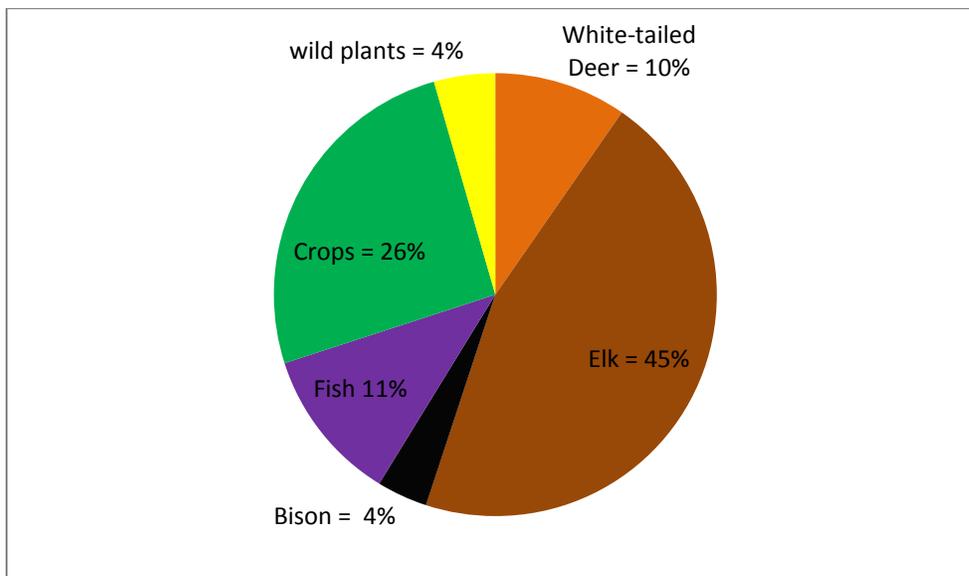


Figure 8: Percentage of calories contributed by various taxonomic groups during the harvest based on a 2,350 calorie diet. Crops could be a higher percentage and Fish and Wild Plants could be lower but I have no data for either of them.

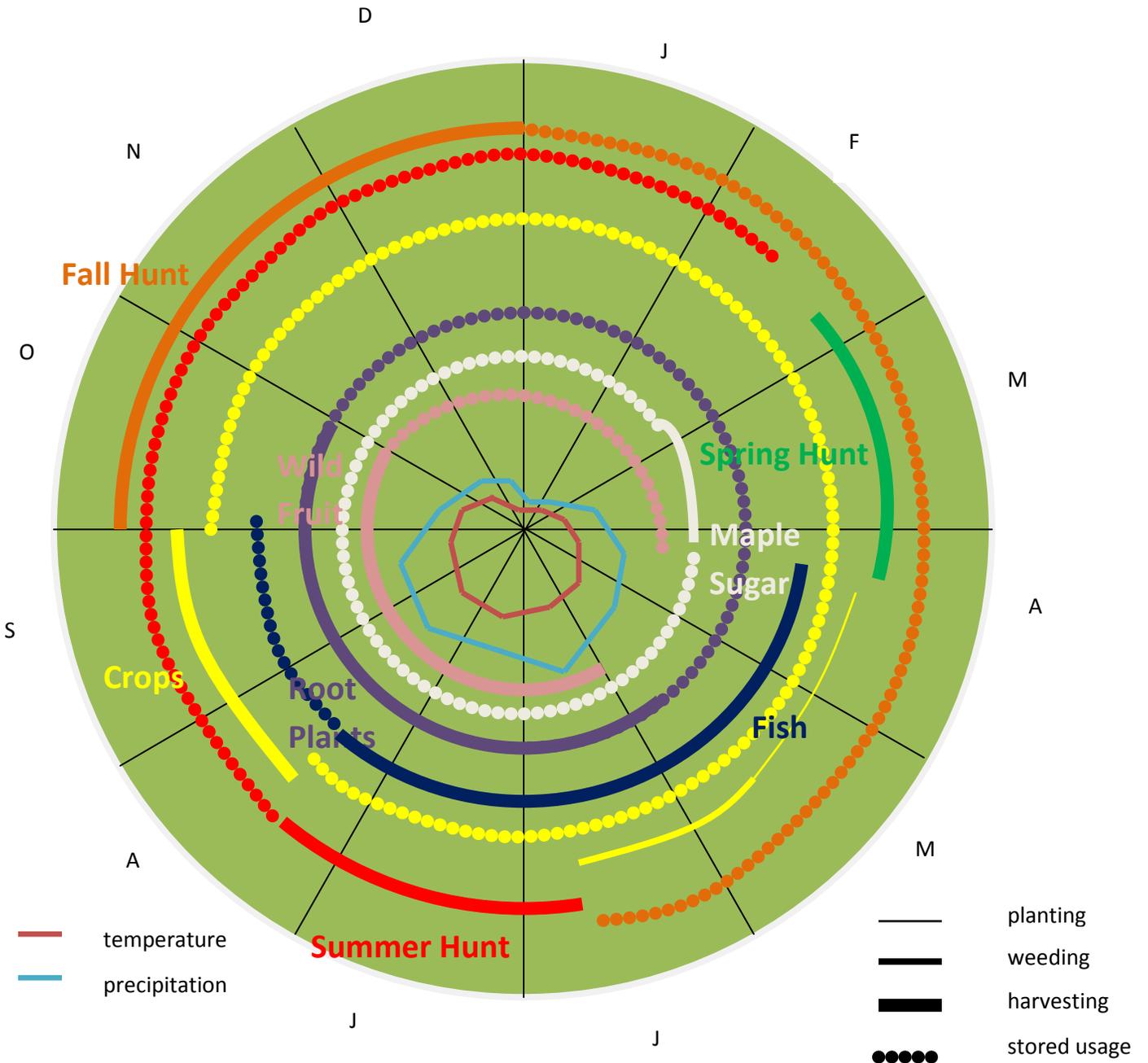


Figure 9: Annual subsistence round of the Sauk and Mesquakie (Weather Averages for Grinnell, IA)

Conclusion

This study has shown that meat (particularly white-tailed deer) was a very important component of the Sauk and Mesquakie diet 200 years ago. In fact, the only season when venison could have comprised less than half of total calories consumed was during the harvest. A fair amount of crops were eaten, usually representing around a quarter of calories. Wild plants were a relatively minor contribution to the diet, usually being about 4% of calories.

This diet was almost certainly quite different from that of the Baxoje 300 years ago. The fur and skin trade introduced both a strong incentive to kill more furbearers and big game (trade goods) as well as the means to enable it (beaver traps and most importantly guns). 300 years ago wild plants, small game, fish, and possibly crops would have played a greater role in the diet. There probably was not as much long term storage of meat, since most of what was killed had to be eaten at the time. This probably would have meant hunger in late spring and early summer as well as lots more fishing and hunting of turkey and rabbits. Horses also enabled a more effective summer hunt, since they provided both the transportation to the interior, an improved way to hunt bison, and a way to haul the meat back to the villages along the Mississippi. Canoes could have provided transportation to the interior and a means to haul the meat back to the villages.

Another reason to believe that there was a summer hunt into prehistory in addition to that there would have been starvation without is the very existence of the tallgrass prairie. Had the prairies not been of utmost importance for breaking the hungry time before the harvest, I doubt that the Baxoje would have burned to the extent they did to maintain them. Tallgrass prairie encompassed about 80% of the state 200 years ago, almost entirely due to anthropogenic fires. This would have probably been significantly lower had there not been a summer hunt and Iowa would have substantially less of the thick black soils which make it so attractive to agriculture today.

The Sauk and Mesquakie food system could have probably supported a higher population had there been a greater emphasis on crops. A relatively small percentage of floodplain land was cleared for agriculture (floodplains were the only places where swidden agriculture could be practiced). However, farming represents much more labor per calorie gained than hunting, meaning there was little incentive to expand agriculture. However, people in the Oneota phase did farm the smaller river valleys in central Iowa in the late prehistoric phase, before warfare and epidemics decimated populations (Alex 187). Therefore, the relative lack of intensity of land use in the historic period is probably an artifact of continued population loss from warfare and disease which prevented a recovery of populations.

Regardless of the reasons why the food system was the way it was, it did preserve most of the biodiversity of the area and created relatively little erosion, as opposed to modern Iowa agriculture which supports far fewer species of plants and insects. Also, several species of large mammals have been extirpated from the state (originally through overhunting, but the reintroduction of bison and elk is now prevented by habitat fragmentation). However, although the Sauk and Mesquakie food system was overall better environmentally than our modern food system, overhunting was a major issue for furbearers and deer in Eastern Iowa – they started becoming rare in eastern Iowa as early as 1810 due to the influence of the fur trade (Gussow 101). In fact, this overexploitation is what pushed the Sauk and Mesquakie to hunt as far west as the Grinnell area in the first place. Therefore, the amount of meat being eaten by the Sauk and Mesquakie in 1808 was unsustainable, in spite of low population densities.

Nonetheless, the Sauk and Mesquakie diet of 1808 was quite healthy. It was comprised of large amounts of moderately lean meat, a fair amount of starches, and some fruits and vegetables, particularly in season. Sugars and salt were a relatively minor part of the diet. This

is contrasted with the modern American diet in which the average person eats the equivalent of 20 teaspoons of sugar a day (8 is the recommended maximum – equal to about 12 ounces of pop) (Brody). I have no way of knowing how many teaspoons of sugar equivalents Sauk and Mesquakie ate per day, but I would imagine that it was lower. Americans ate on average 300 pounds of meat in 1999, less than half of what Sauk and Mesquakie ate 200 years ago (about 650 pounds) (Amrock 6). Even though the red meat the Sauk and Mesquakie ate was leaner than the pork and beef modern Americans eat (1000 calories per pound versus 1200 calories per pound), they ate much more of it: about 575 pounds or 86% of meat eaten compared to 134 pounds or 45% of meat eaten (Calories in Pork). Americans also consumed the equivalent of 500 pounds of milk in 1999, a food product with no equivalent in the Sauk and Mesquakie diet, which takes the place of some of Sauk and Mesquakie meat consumption. Milk is about a quarter of the calories of meat pound for pound, making it the equivalent of about 125 pounds of meat in the modern American diet (Calories in Milk). The average American ate about 300 pounds of fruits and 220 pounds of vegetables per year in 1999 (Amrock 6). I have no way of comparing this to Sauk and Mesquakie fruit and vegetable consumption since there are no records of this. I can, however, compare grain consumption. Americans ate on average 200 pounds of grain in 1999, while the Sauk and Mesquakie corn consumption was about 150 pounds, a considerable difference.

Therefore, the main differences between the Sauk/Mesquakie and modern American diets are that the Sauk and Mesquakie ate more meat, somewhat less grain and much less sugar. Another major difference was that Sauk and Mesquakie were far more physically active than modern Americans. From this study we can see that eating large amounts of meat is not necessarily unhealthy. I would not recommend that Americans eat more meat because of the

unsustainability of eating large amounts of meat in a high population density society but would definitely recommend less sugar and more exercise. It particularly seems that pop is a problem because the body does not register its calories as food and because it contains huge amounts of sugar. Another problem is that modern Americans eat a lot of processed foods, which contain lots of fat, sugar, and salt. Processed foods are softer and therefore easier to digest than whole foods, meaning that fewer calories are burned getting at the calories contained in them (“What’s Cooking?”). Although the Sauk and Mesquakie diet was not perfect (primarily because its emphasis on meat led to unsustainable harvest of many wild animal species), it was better than the modern American diet for the same reason that most traditional diets are better than the modern American diet: less sugar and less processed foods.

Works Cited

- 2008-09 Iowa Hunting Seasons and Bag Limits. <http://www.iowadnr.gov/law/files/08season_baglimits.pdf>
- Alex, Lynn. *Iowa’s Archaeological Past*. Iowa City: University of Iowa Press, 2000.
- Amrock, Julia. “Causes and Effects of the Changing American Diet, 1900 to the Present” <<http://www.as.ua.edu/ant/bindon/ant475/Papers/Amrock.pdf>>
- Black Hawk. *Life of Black Hawk*. Iowa City: State Historical Society of Iowa, 1932.
- Blaine, Martha. *The Ioway Indians*. Norman: University of Oklahoma Press, 1979.
- Bonvillain, Nancy. *The Sac and Fox*. New York: Chelsea House Publishers, 1995.
- Brodie, Jedediah. “A Review of American Bison (*Bos bison*) Demography and Population Dynamics.” *Wildlife Conservation Society*. Working Paper No. 35, July 2008 <http://www.wcs.org/media/file/WCSwp35_jbrodie_review_of_bison_demography.pdf>

Brody, Jane. "America's Diet: Too Sweet by the Spoonful," *The New York Times*, February 10, 2009.

"Calories in Bear Meat" <<http://www.calorie-counter.net/meat-calories/bear.htm>>

"Calories in Beaver Meat" <<http://www.calorie-counter.net/meat-calories/beaver.htm>>

"Calories in Milk, Reduced Fat, Fluid, 2% Milkfat" <<http://caloriecount.about.com/calories-milk-reduced-fat-fluid-2-i1079>>

"Calories in Muskrat" <<http://caloriecount.about.com/calories-muskrat-i17175>>

"Calories in Pork, Ground, Fine/coarse" <<http://caloriecount.about.com/calories-pork-ground-fine-coarse-i10803>>

"Calories in Raccoon Meat" <<http://www.calorie-counter.net/meat-calories/raccoon-meat.htm>>

"Calories in Roast Duck" <<http://www.calorie-counter.net/calories-chicken/roast-duck.htm>>

Christiansen, Paul and Mark Müller. *An Illustrated Guide to Iowa Prairie Plants*. Iowa City: University of Iowa Press, 1999.

Dary, David. *The Buffalo Book: The Full Saga of the American Animal*. Athens, Ohio: Swallow Press, 1989.

Dinsmore, James. *A Country So Full of Game: The Story of Wildlife in Iowa*. Iowa City: University of Iowa Press, 1994.

"Edible Wild Plants of the Meskwaki Nation" <http://www.ivrcd.org/Back_of_poster.pdf>

Elias, Thomas and Peter Dykeman. *Edible Wild Plants: A North American Field Guide*. New York: Sterling Publishing, 1990.

Elliott, Douglas. *Roots: An Underground Botany and Forager's Guide*. Old Greenwich: Chatham Press, 1976.

Field, Ray. "Mechanically Deboned Red Meat." *Advances in Food Research*. Vol 27 (1981). 23-100.

Forsyth, Thomas. "An Account of the Manners and Customs of the Sauk Nation of Indians." *Sac, Fox, and Iowa Indians I*. Ed. David Horr. New York: Garland Publishing, 1974. 185-236.

Forsyth, Thomas. "Memoirs Relating to the Sauk and Foxes." *The Indian Tribes of the Upper Mississippi Valley and the Region of the Great Lakes*. Kraus Reprint, 1969. 137-245.

Freitus, Joe and Salli Haberman. *Wild Jams and Jellies: Delicious Recipes Using 75 Wild Edibles*. Stackpole Books, 2005

Green, Bill. Personal communication. February 16, 2009.

Gussow, Zachary. "An Anthropological Report on Indian Use and Occupancy of Royce Areas 69 and 120." *Sac, Fox, and Iowa Indians I*. Ed. David Horr. New York: Garland Publishing Inc, 1974. 29-120.

"Gymnocladus dioica" <http://www.ibiblio.org/pfaf/cgi-bin/arr_html?Gymnocladus+dioica>

Halloran, Arthur. "American Bison Weights and Measurements from the Wichita Mountains Wildlife Refuge." *Proceedings of the Oklahoma Academy of Science for 1960*: 212-218.

- Henry, Jimmy and Jerry Kaiser. "Planting Guide: American Hazelnut" <<http://plant-materials.nrcs.usda.gov/pubs/mopmcp3gcoam3.pdf>>
- Hodge, Frederick. "Fox Indian Tribal History," *Handbook of American Indians, 1906*.
<http://www.accessgenealogy.com/native/tribes/fox/foxehist.htm>
- Hodge, Frederick. "Sauk Indian Tribe History," *Handbook of American Indians, 1906*.
<http://www.accessgenealogy.com/native/tribes/sauk/saukhist.htm>
- Hurteau, Matthew. *Asarum canadense* L. <https://eol.org/pages/596511?category_id=218>
- Jauron, Richard and Diane Nelson. *Planting and harvesting times for garden vegetables*. Iowa State University, University Extension: May 2007. <<http://www.extension.iastate.edu/Publications/PM534.pdf>>
- Jung, Patrick. *The Black Hawk War of 1832*. Norman: University of Oklahoma Press, 2007.
- Kindscher, Kelly. *Edible Wild Plants of the Prairie*. Lawrence: University Press of Kansas, 1987.
- Krajicek, John and Robert Williams. "Hackberry" <http://www.na.fs.fed.us/spfo/pubs/silvics_manual/volume_2/celtis/occidentalis.htm>
- Kurtz, Royce. *Economic and Political History of the Sauk and Mesquakie: 1780s-1845*. Ann Arbor: University Microfilms International, 1986.
- "Leather Elk." *Centralia Fur and Hide*. <<http://www.furandhide.com/showcat.asp?id=9>>
- Marrone, Teresa. *Abundantly Wild*. Cambridge, MN: Adventure Publications, 2004.
- Paterek, Josephine. *Encyclopedia of American Indian Costume*. Denver: ABC-CLIO, 1994.
- Petersen, William. "Buffalo Hunting with Keokuk," *The Palimpsest*. 16 (1935): 33-49.
- "Sac & Fox Moons," Mascoutah, IL: Nipundikan, 2002.

Smith, Huron. *Ethnobotany of the Menominee Indians; Ethnobotany of the Meskwaki Indians*.

New York: Ams Press, 1978.

Spencer, John. "Reminiscences of Pioneer Life in the Mississippi Valley." *The Early Days of*

Rock Island and Davenport. Ed. Milo Quaife. Chicago: Lakeside Press, 1942. 3-85.

Swanton, James. "Iowa Indian Tribes," <http://www.accessgenealogy.com>

[/native/iowa/index.htm#Iowa](http://www.accessgenealogy.com/native/iowa/index.htm#Iowa)

Tanner, Helen, ed. *Atlas of Great Lakes Indian History*. Norman: University of Oklahoma Press,

1987.

The Tree of Life. <tolweb.org>

U.S. Indian Claims Commission. "Commission Findings on the Sac, Fox, and Iowa Indians."

Sac, Fox, and Iowa Indians III. Ed. David Horr. New York: Garland Publishing Inc,

1974.

"Viburnum Prunifolium," <http://en.wikipedia.org/wiki/Viburnum_prunifolium>

"Weather Averages for Grinnell, IA," <http://weatherreports.com/United_States/IA/Grinnell/

[averages.html](http://weatherreports.com/United_States/IA/Grinnell/averages.html)>

Wegner, Robert. *Deer and Deer Hunting*. Stackpole Books, 1992.

"What's Cooking?" *The Economist*. February 19, 2009. <[http://www.economist.com/](http://www.economist.com/science/displaystory.cfm?story_id=13139619)

[science/displaystory.cfm?story_id=13139619](http://www.economist.com/science/displaystory.cfm?story_id=13139619)>

Whitaker, Arthur. *The Mississippi Question 1795-1803*. New York: D. Appleton-Century

Company, 1934.