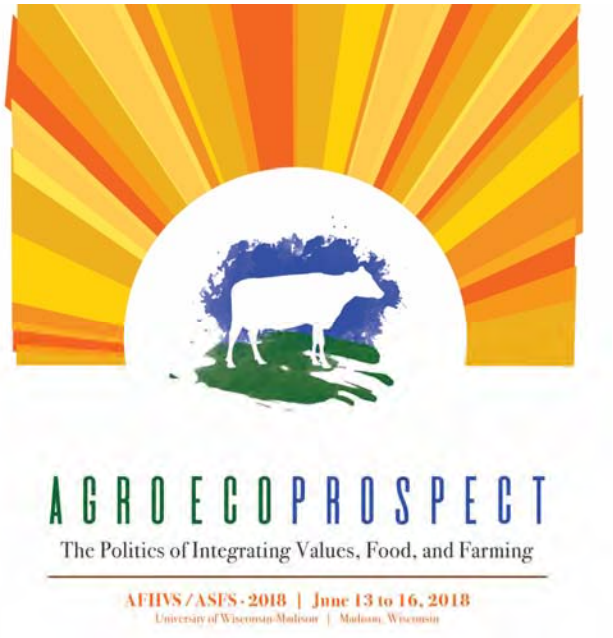
A Force of Nature: Native Peoples and the Making of the South Central Wisconsin Landscape

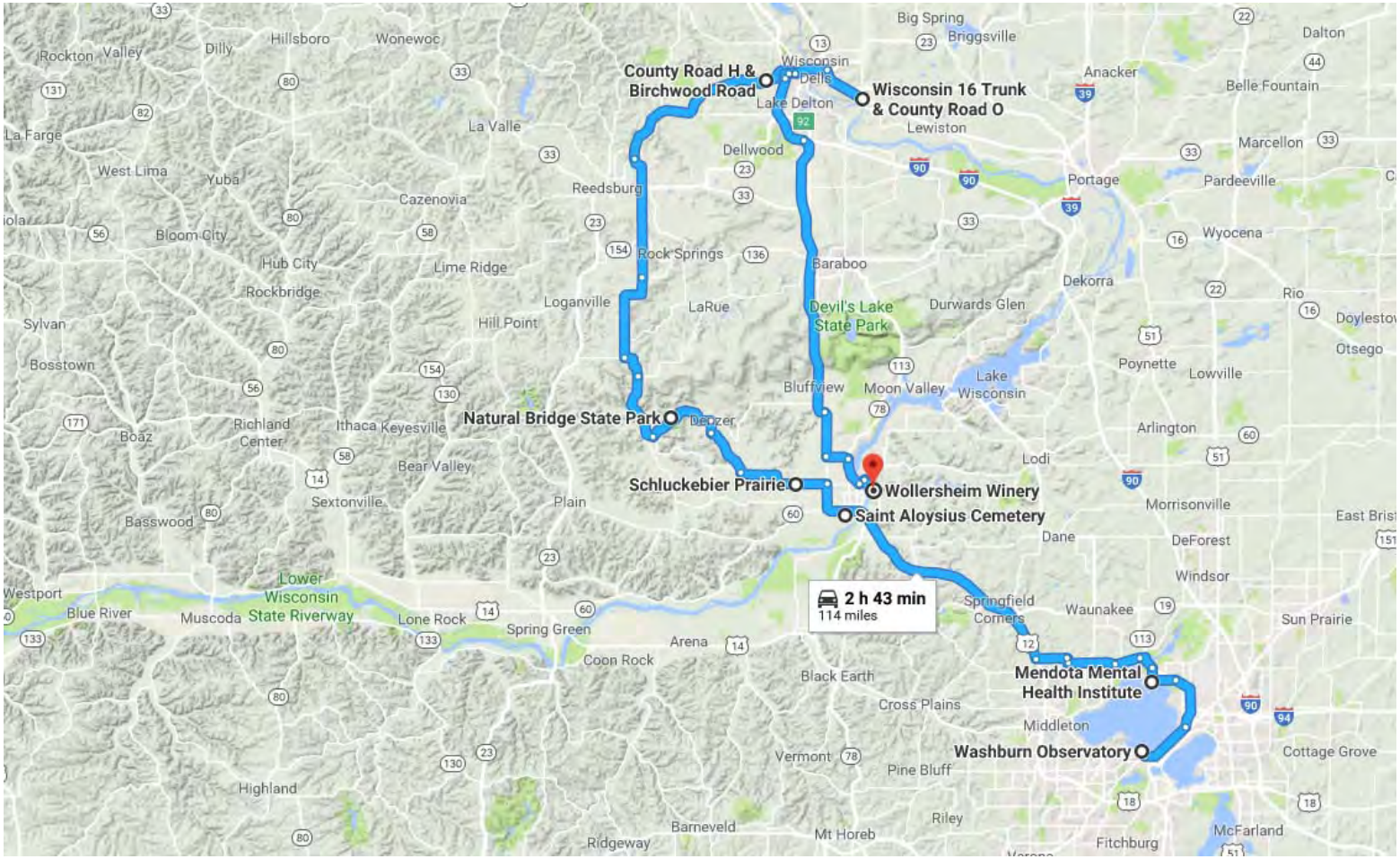


William Gustav Gartner
Department of Geography
Wednesday, 13 June 2018

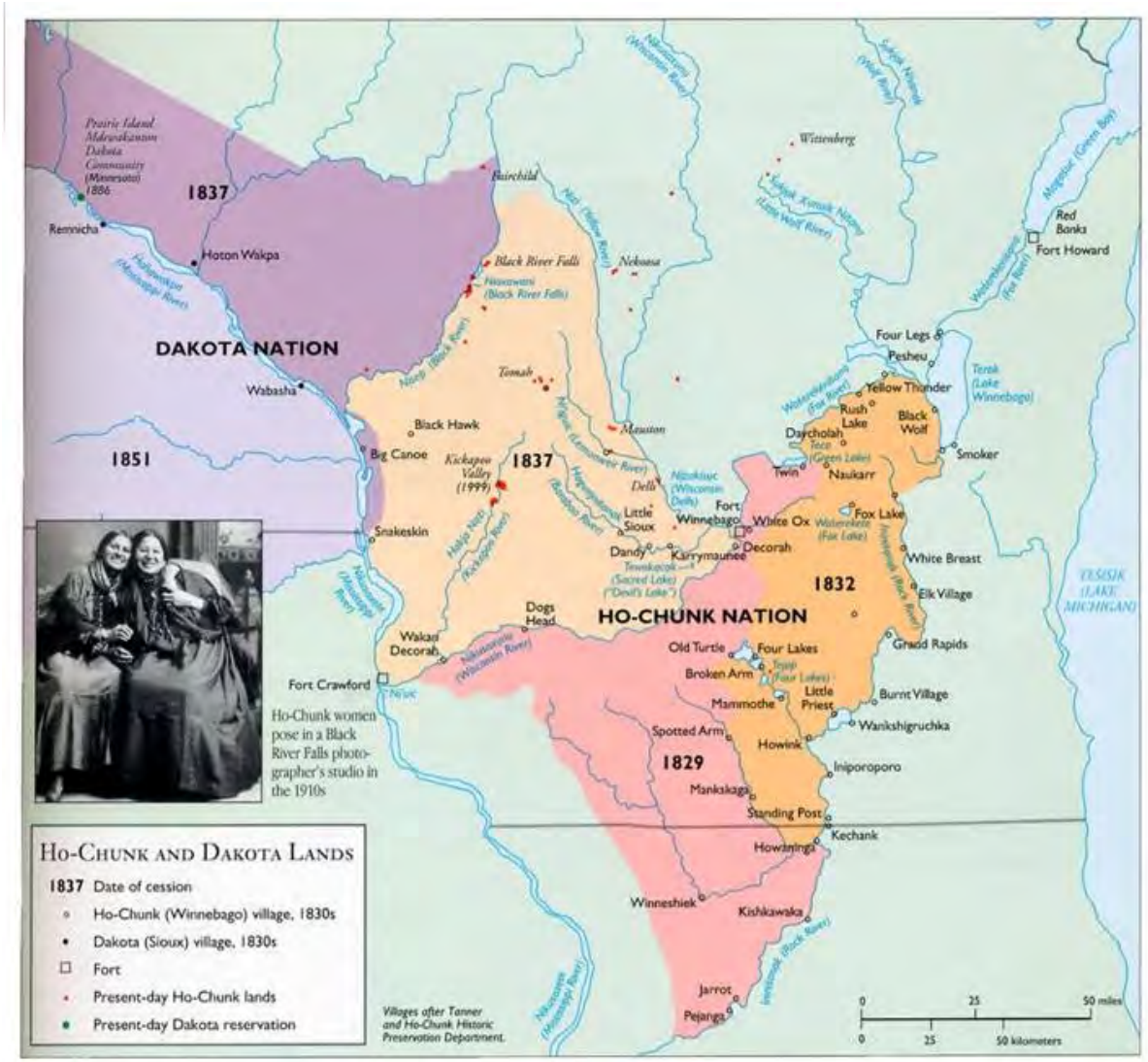
Field Trip Synopsis

Native peoples, such as the Ho Chunk Nation, have long called south central Wisconsin home. The ancestors of Ho Chunk, and other native peoples, also played an important role in in shaping land and life here, from the time of the receding Late Quaternary ice sheets to Euro-American settlement of the area in the mid-19th century. This tour will highlight the roles of nature and culture in shaping the surprisingly diverse ecosystems of south central Wisconsin, including prairies, oak openings, closed-canopy deciduous forests, mixed coniferous-deciduous forests, riparian forests, and wetlands. Native peoples used hundreds of plants from these communities for food, fiber, medicine, and myriad other uses. Archaeological and paleoecological evidence suggests that native peoples have actively managed their botanical resources since mid-Holocene times, primarily through planting, tending, selective tree felling, and burning. We will also see Pre-Columbian components of the built landscape in south central Wisconsin such as effigy mounds (ca 700-1050 AD) and relict agricultural fields. As we will see, native peoples were the original organic and sustainable agriculturalists in Wisconsin, practicing sophisticated raised field agriculture in marginal environments by 1000 AD. This session will make multiple stops from the bus including the scenic overview of Lake Mendota, effigy mounds, Natural Bridges State Park and a short forest hike, Hulburt Creek Raised Fields, and more

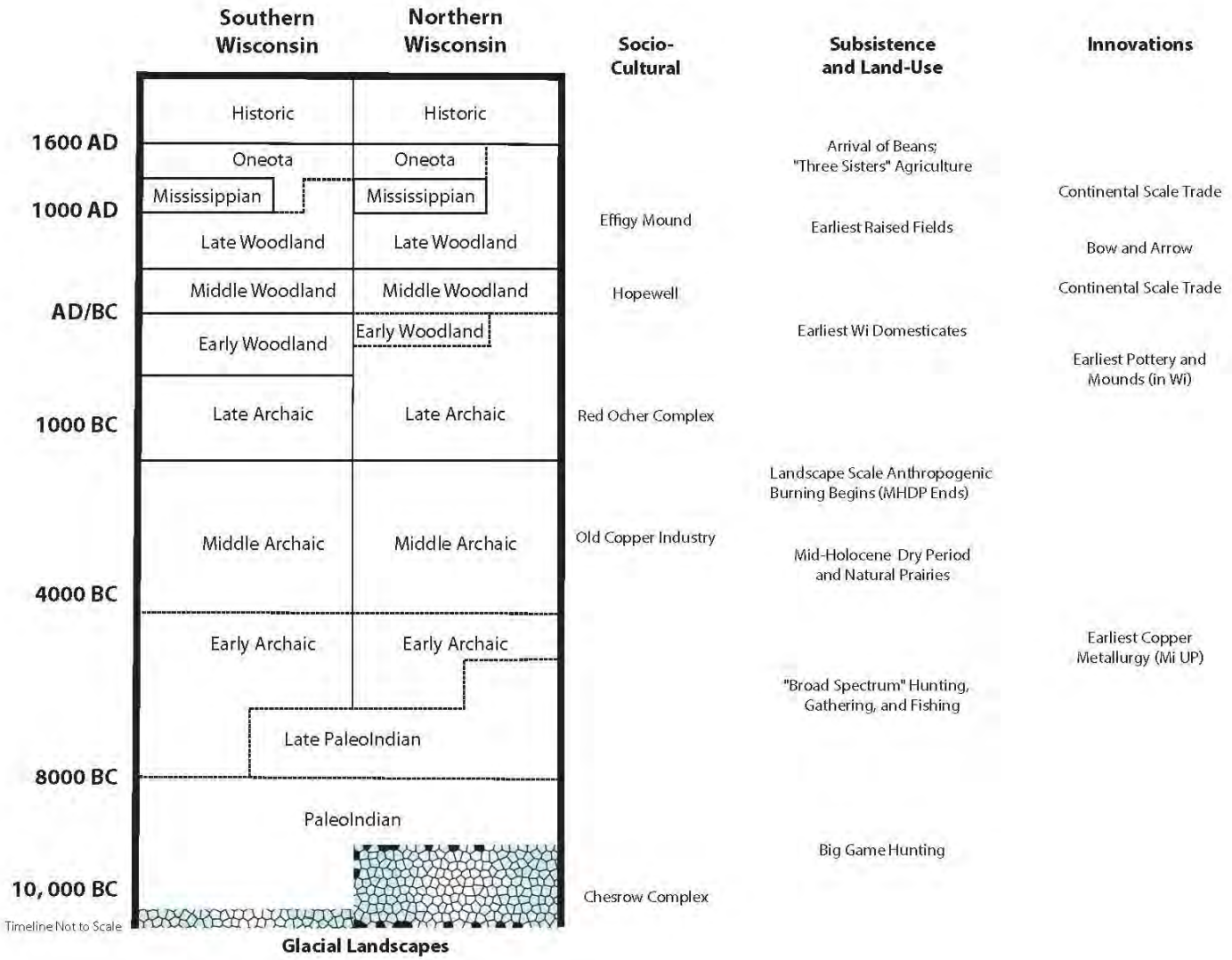
Field Trip Itinerary



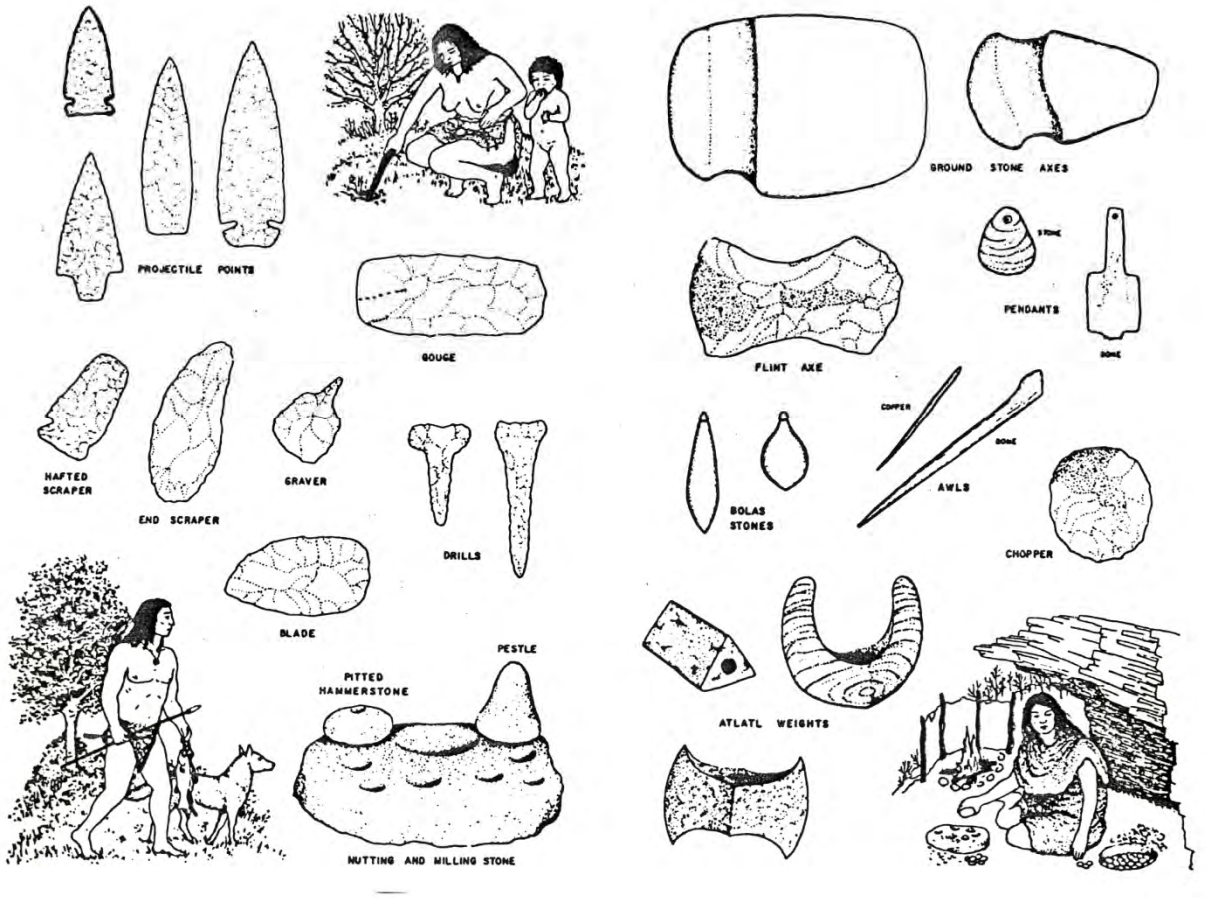
Ho Chunk Land Cessations



Wisconsin Archaeology

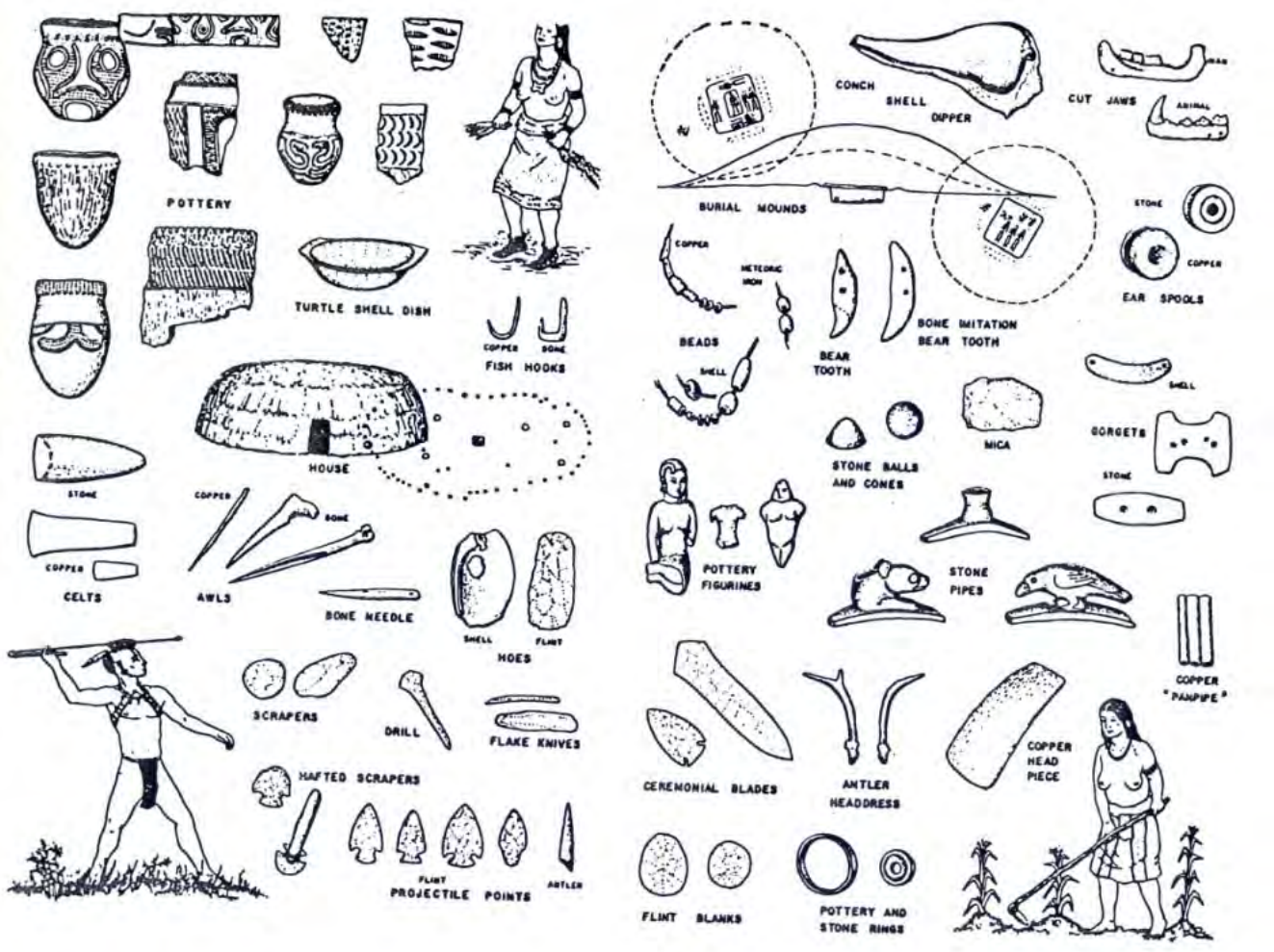


Archaic Stage Assemblage (ca 8000 BC – 600 BC)



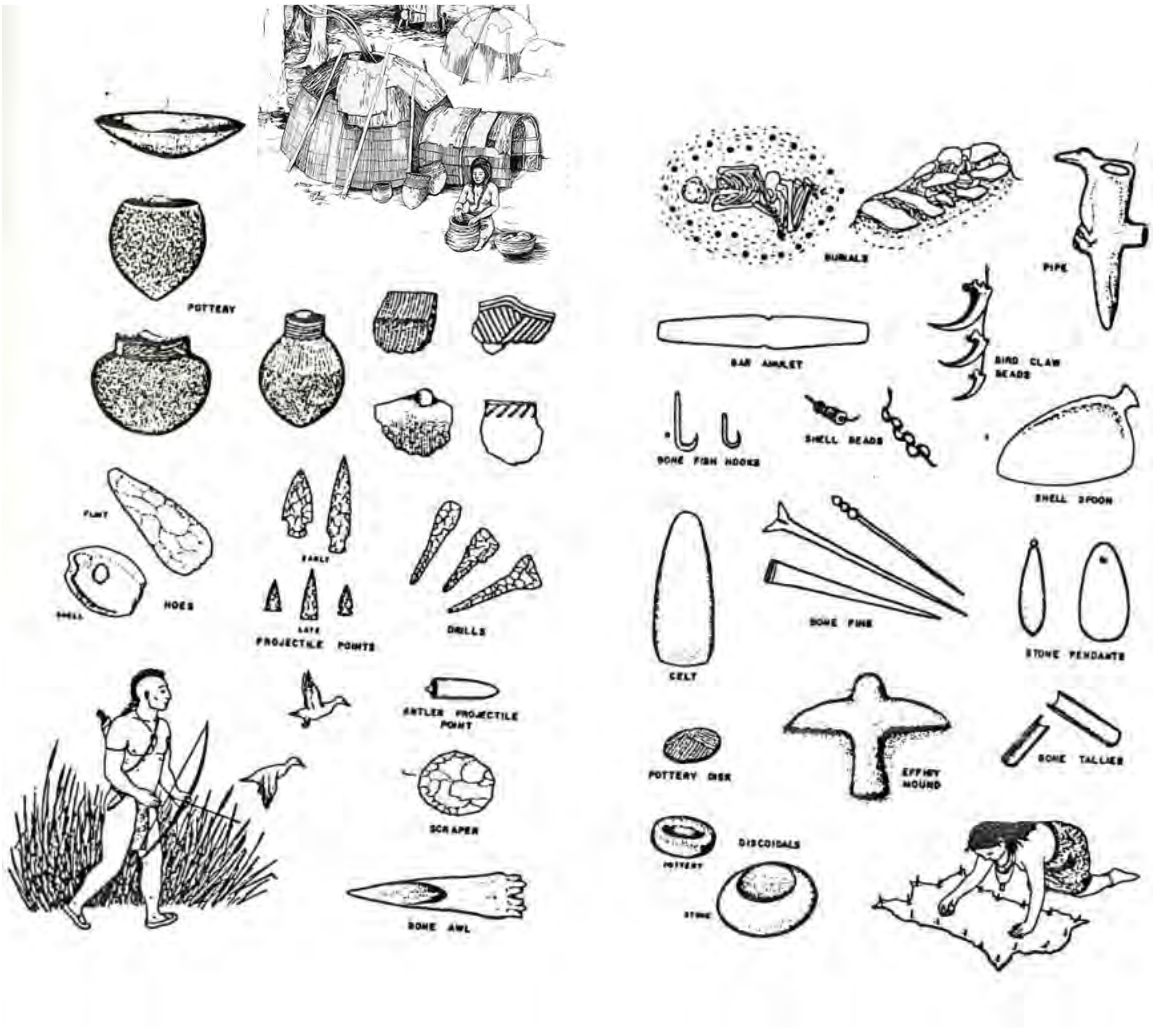
Sites: Raddatz Rockshelter
(Natural Bridges State Park)

Middle Woodland (ca 0 - 400 AD)



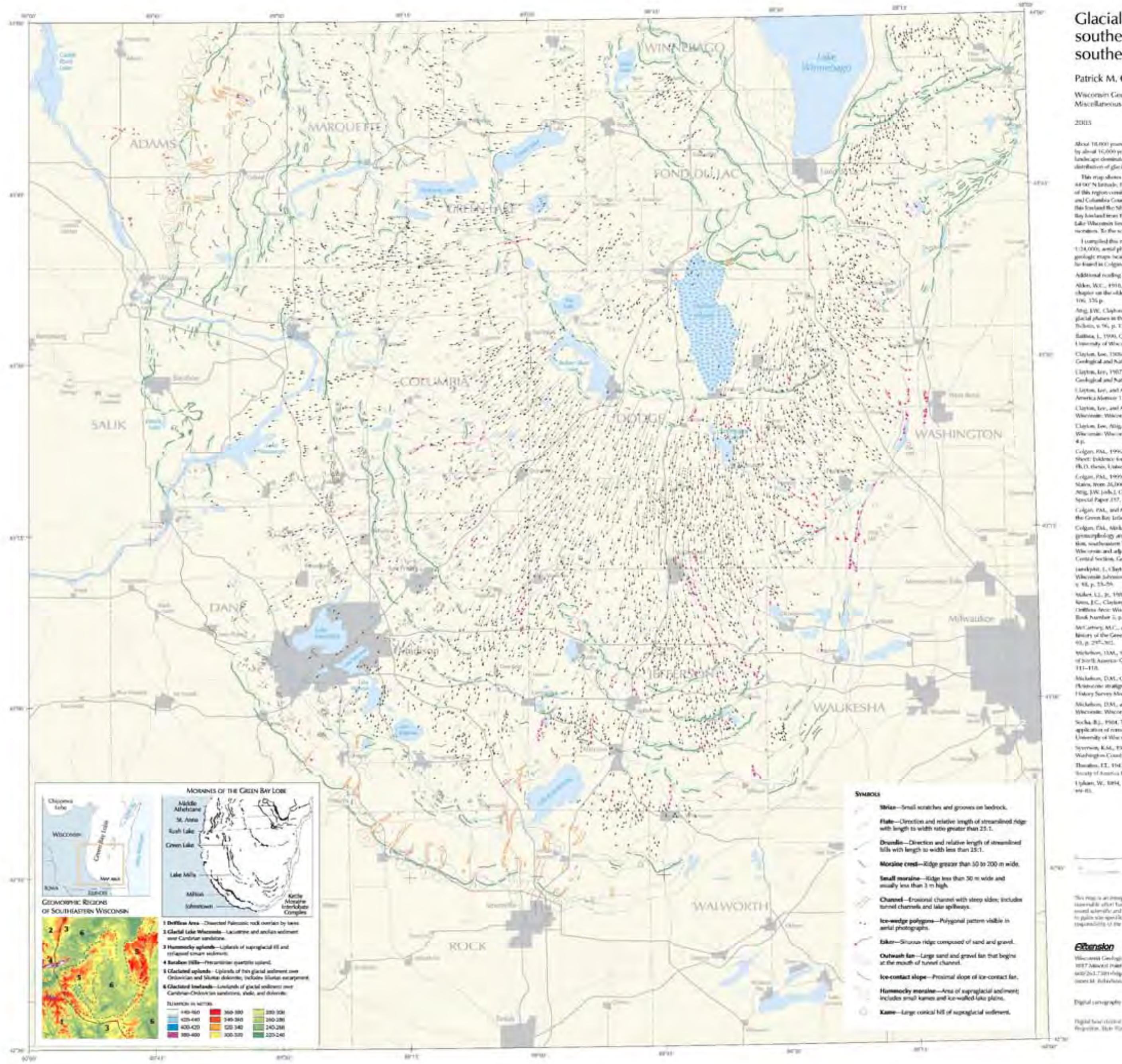
Sites: Kingsley Bend Mound Group

Wisconsin Late Woodland (600-1200 AD)



Sites: Mendota State Hospital Grounds, Hulburt Creek Raised Fields, Kingsley Bend Mound Group

Lake Mendota Scenic Overlook



Glacial landforms of the southern Green Bay Lobe, southeastern Wisconsin

Patrick M. Colgan

Wisconsin Geological and Natural History Survey
Miscellaneous Map 52

2003

About 18,000 years ago, the Green Bay Lobe reached its maximum position; by about 16,000 years ago, it began receding. The Green Bay Lobe created a landscape dominated by drumlins, moraines, and eskers. This map shows the distribution of glacial landforms created by the southern Green Bay Lobe.

This map shows an area of approximately 27,000 km², between 42°30′ and 44°00′ N latitude, 88°00′ and 90°00′ W longitude. The present-day topography of this region consists of a broad lowland divided by a bedrock upland in Dane and Columbia Counties (see geomorphic regions map, lower left). To the east of this lowland the Niagara escarpment and the Kettle Moraine separate the Green Bay lowland from the Lake Michigan lowland to the east. The sand plain of glacial Lake Wisconsin lies west of the Green Bay lowland beyond the hummocky outer moraines. To the southwest lie the Baraboo Hills and the Driftless Area.

I compiled this map from my interpretations of topographic maps (scale 1:24,000), aerial photographs (scale 1:20,000 and 1:40,000), and existing surficial geologic maps (scale 1:100,000 to 1:250,000). An earlier version of this map can be found in Colgan (1996).

Additional reading about the geology of the Green Bay lowland

Alden, W.C., 1918, The Quaternary geology of southeastern Wisconsin, with a chapter on the older rock formations: U.S. Geological Survey Professional Paper 106, 356 p.

Attig, J.W., Clayton, Lee, and Mickelson, D.M., 1985, Correlation of late Wisconsin glacial phases in the western Great Lakes area: Geological Society of America Bulletin, v. 96, p. 1585–1593.

Battista, J., 1990, Quaternary geology of the Horicon Marsh area: Master's thesis, University of Wisconsin, Madison, 132 p.

Clayton, Lee, 1986, Pleistocene geology of Portage County, Wisconsin: Wisconsin Geological and Natural History Survey Information Circular 56, 19 p.

Clayton, Lee, 1987, Pleistocene geology of Adams County, Wisconsin: Wisconsin Geological and Natural History Survey Information Circular 59, 14 p.

Clayton, Lee, and Attig, J.W., 1989, Glacial Lake Wisconsin: Geological Society of America Memoir 173, 80 p.

Clayton, Lee, and Attig, J.W., 1997, Pleistocene geology of Dane County, Wisconsin: Wisconsin Geological and Natural History Survey Bulletin 95, 64 p.

Clayton, Lee, Attig, J.W., Mickelson, D.M., and Johnson, M.D., 1992, Glaciation of Wisconsin: Wisconsin Geological and Natural History Survey Educational Series 36, 4 p.

Colgan, P.M., 1996, The Green Bay and Des Moines Lobes of the Laurentide Ice Sheet: Evidence for stable and unstable glacier dynamics 18,000 to 12,000 BP: Ph.D. thesis, University of Wisconsin, Madison, 255 p.

Colgan, P.M., 1999, A reconstruction of the Green Bay Lobe, Wisconsin, United States, from 26,000 to 13,000 radiocarbon years B.P., in Mickelson, D.M., and Attig, J.W. (eds.), Glacial processes past and present: Geological Society of America Special Paper 337, p. 137–150.

Colgan, P.M., and Mickelson, D.M., 1997, Genesis of streamlined landforms of the Green Bay Lobe, Wisconsin USA: Sedimentary Geology, v. 111, p. 14–25.

Colgan, P.M., Mickelson, D.M., Clayton, Lee, and Attig, J.W., 1997, Glacial geomorphology and glaciology of the Green Bay Lobe during the last deglaciation, southeastern Wisconsin, in Mudrey, M.G., Jr. (ed.), Guide to field trips in Wisconsin and adjacent areas of Minnesota: 31st Annual Meeting of the North-Central Section, Geological Society of America, Madison, Wisconsin, p. 71–83.

Lundqvist, J., Clayton, Lee, and Mickelson, D.M., 1993, Deposition of the late Wisconsin Johnstown Moraine, south-central Wisconsin: Quaternary International, v. 18, p. 53–59.

Maher, L.J., Jr., 1982, The palynology of Devils Lake, Sauk County, Wisconsin, in Knox, J.C., Clayton, Lee, and Mickelson, D.M. (eds.), Quaternary history of the Driftless Area: Wisconsin Geological and Natural History Survey Field Trip Guide Book Number 5, p. 119–135.

McCartney, M.C., and Mickelson, D.M., 1982, Late Woodfordian and Greatlakean history of the Green Bay Lobe, Wisconsin: Geological Society of America Bulletin, v. 93, p. 297–302.

Mickelson, D.M., 1987, Central Lowlands, in Graf, W.L. (ed.), Geomorphic systems of North America: Geological Society of America, Centennial Special Volume 2, p. 111–118.

Mickelson, D.M., Clayton, Lee, Baker, R.W., Mode, W.N., and Schneider, A.F., 1984, Pleistocene stratigraphic units of Wisconsin: Wisconsin Geological and Natural History Survey Miscellaneous Paper 84-1, 15 p.

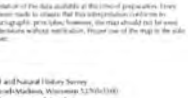
Mickelson, D.M., and McCartney, M.C., 1979, Glacial geology of Dane County, Wisconsin: Wisconsin Geological and Natural History Survey, 1:100,000.

Socha, B.J., 1984, The glacial geology of the Baraboo Area, Wisconsin, and application of remote sensing to mapping surficial geology: Master's thesis, University of Wisconsin, Madison.

Syverson, K.M., 1988, The glacial geology of the Kettle Interlobate Moraine Region, Washington County: Master's thesis, University of Wisconsin, Madison, 123 p.

Thwaites, F.T., 1943, Pleistocene of part of northeastern Wisconsin: Geological Society of America Bulletin, 54: 87–144.

Upham, W., 1894, The Madison type of drumlins: American Geologist, v. 14, p. 69–83.



This map is an interpretation of the data available at the time of preparation. Every reasonable effort has been made to ensure that this interpretation conforms to sound scientific and cartographic principles; however, the map should not be used to guide site-specific decisions without verification. Proper use of the map is the sole responsibility of the user.

Extension

Wisconsin Geological and Natural History Survey
3817 Mineral Point Road • Madison, Wisconsin 53705-5100
608/263.7389 • http://www.uwex.edu/wgnhs/
James M. Robertson, Director and State Geologist

Digital cartography by P.M. Colgan and D.L. Patterson.

Digital base [illegible] from U.S. Geological Survey 1:100,000 base maps, Lambert Projection, State Plane Coordinate System, 1927 North American Datum.

Four Lakes of Madison (*Dejope*)

Glacial History

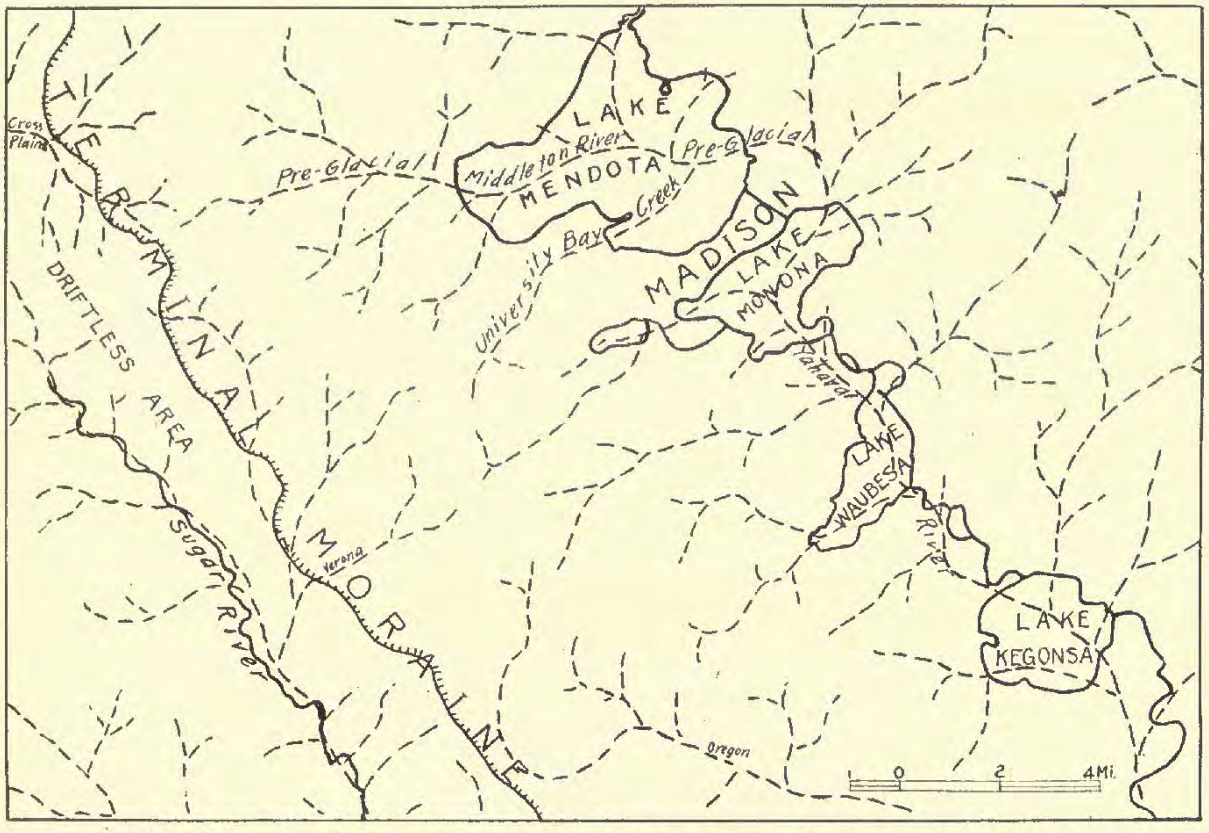


Fig. 103. Preglacial and present drainage near Madison. (Thwaites.)

Four Lakes of Madison (*Dejope*)

Glacial History

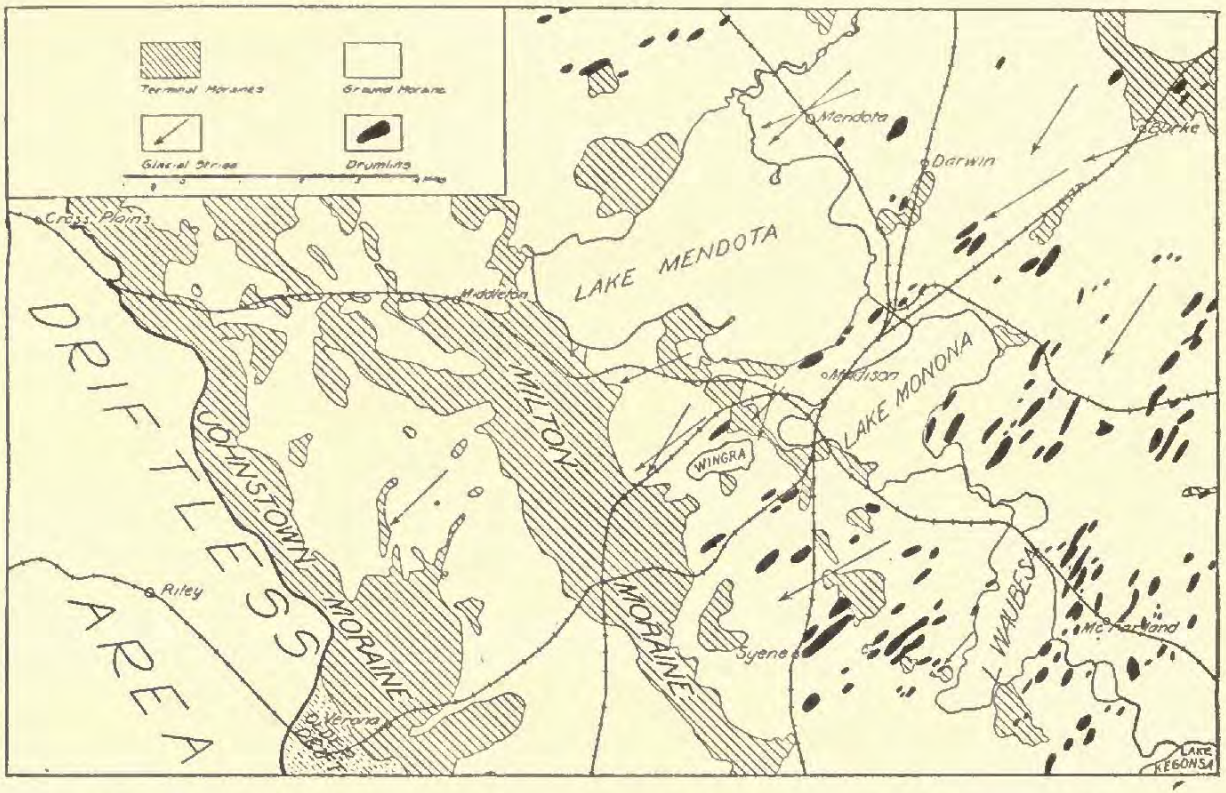


Fig. 95. Terminal and recessional moraines and drumlins near Madison. (Alden and Thwaites.)

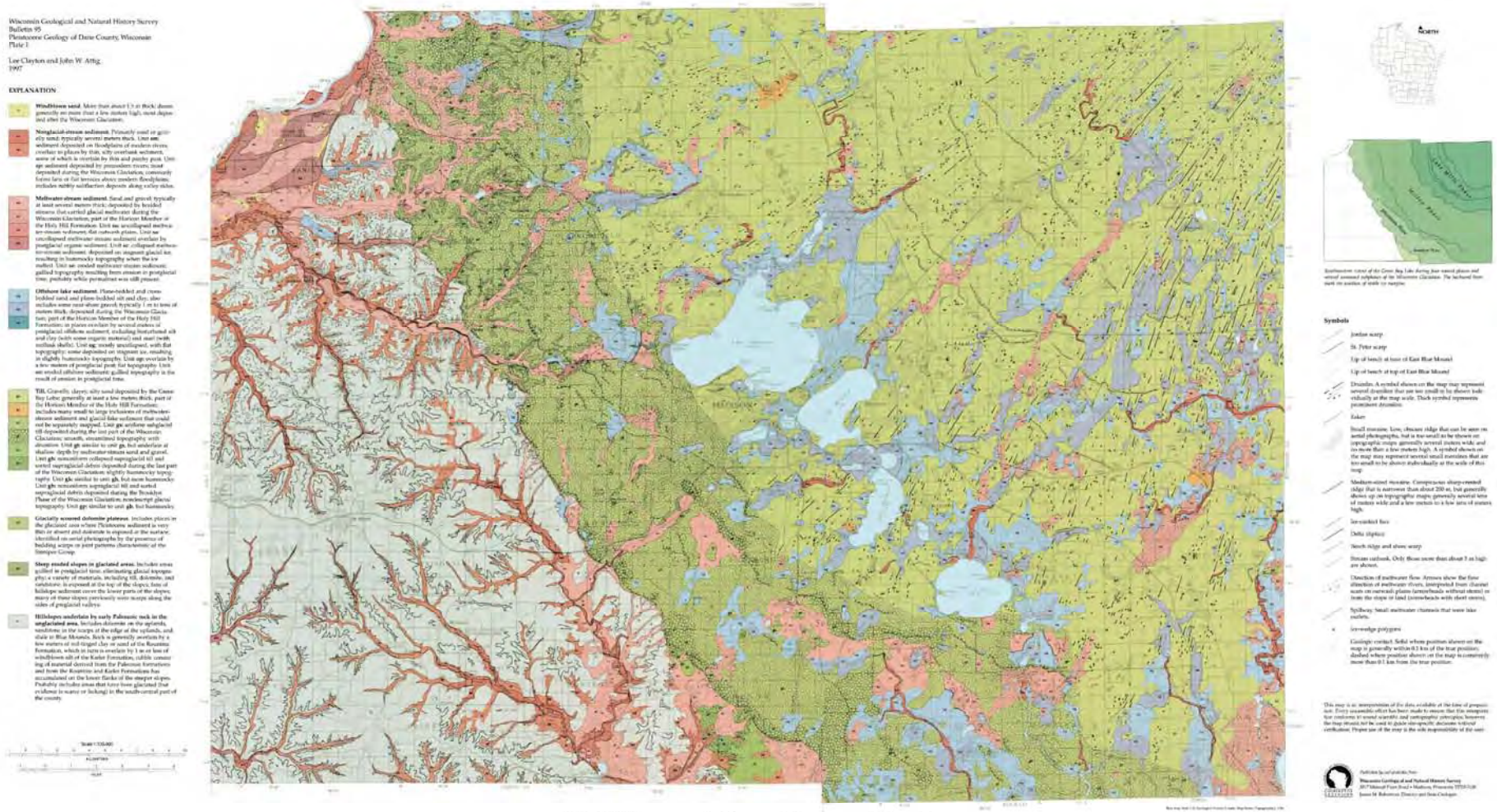
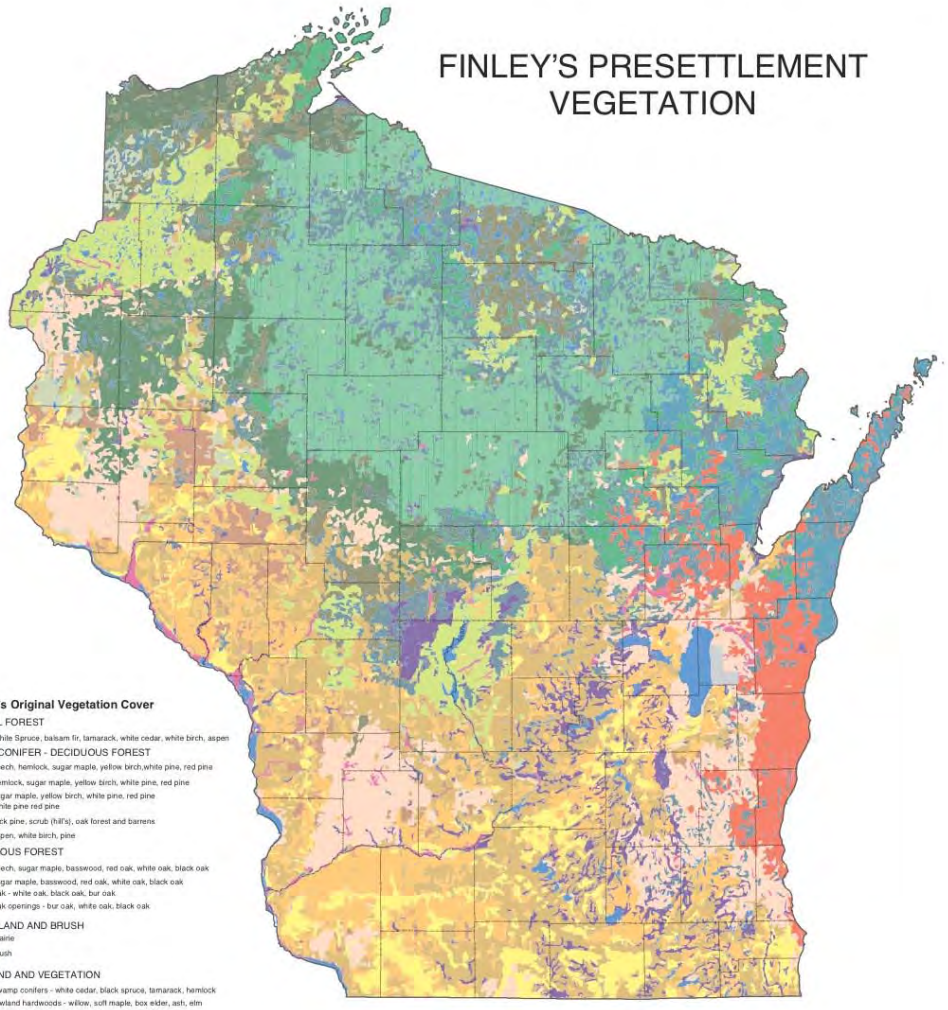


Plate 1. Pleistocene geologic map of Dane County, Wisconsin.

Dane County Glacial Chronology

- Ice Maximum: Between 26.4 ± 5.1 and 21.4 ± 3.3 kya (based on OSL ages)
- Initial Ice Retreat to Ice Free: Between 20.1 and 17.2 cal RCYBP (w/ Stratigraphic Correlation)

FINLEY'S PRESETTLEMENT VEGETATION



Finley's Original Vegetation Cover

BOREAL FOREST
- White Spruce, balsam fir, tamarack, white cedar, white birch, aspen

MIXED CONIFER - DECIDUOUS FOREST
- Beech, hemlock, sugar maple, yellow birch,white pine, red pine
- Hemlock, sugar maple, yellow birch, white pine, red pine
- Sugar maple, yellow birch, white pine, red pine
- White pine red pine
- Jack pine, scrub (hill's), oak forest and barrens
- Aspen, white birch, pine

DECIDUOUS FOREST
- Beech, sugar maple, basswood, red oak, white oak, black oak
- Sugar maple, basswood, red oak, white oak, black oak
- Oak - white oak, black oak, bur oak
- Oak openings - bur oak, white oak, black oak

GRASSLAND AND BRUSH
- Prairie
- Brush

WETLAND AND VEGETATION
- Swamp conifers - white cedar, black spruce, tamarack, hemlock
- Lowland hardwoods - willow, soft maple, box elder, ash, elm
- Marsh and sedge meadow, wet prairie, lowland shrubs

OTHER
- Area with vegetation cover type not interpreted on the source map
- Hydrographic area from 1:250000-scale land use and land cover layer

N
W E
S

0 12.5 25 50 75 100 Miles

Scale 1:2,750,000
Wisconsin Transverse Mercator NAD83(91)
Map Creator: Nina Janicki

Data created by Robert W. Finley - 1976
Professor of Geography Emeritus. University of Wisconsin Center System.
Digital Data prepared by Maribeth Milner, and Steve Ventura
University of Wisconsin - Madison.

This data layer is included in DVGISlib, a part of the DNRView extension to ArcView. DNRView makes it easier to use and share DNR geographic data. Trained ArcView users can obtain DNRView from the appropriate regional contact listed in the "GIS" Datasharing" section.

The data on this map are available on a cost of resources basis from WDNR, GIS Services Section. See the "GIS Datasharing" section.
Visit http://www.dnr.state.wi.us/org/at/et/geo.

Four Lakes of Madison (*Dejope*)

Vegetation History

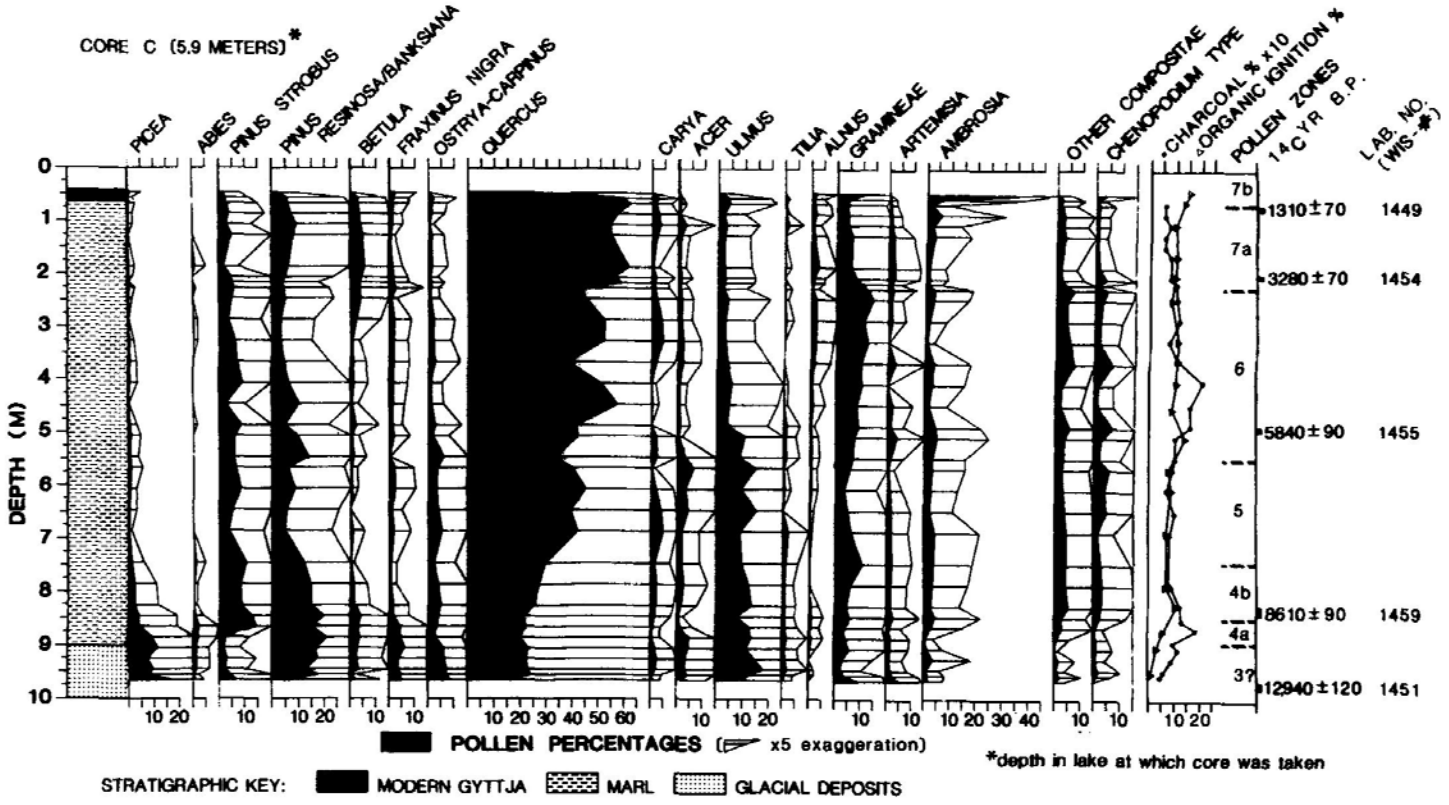
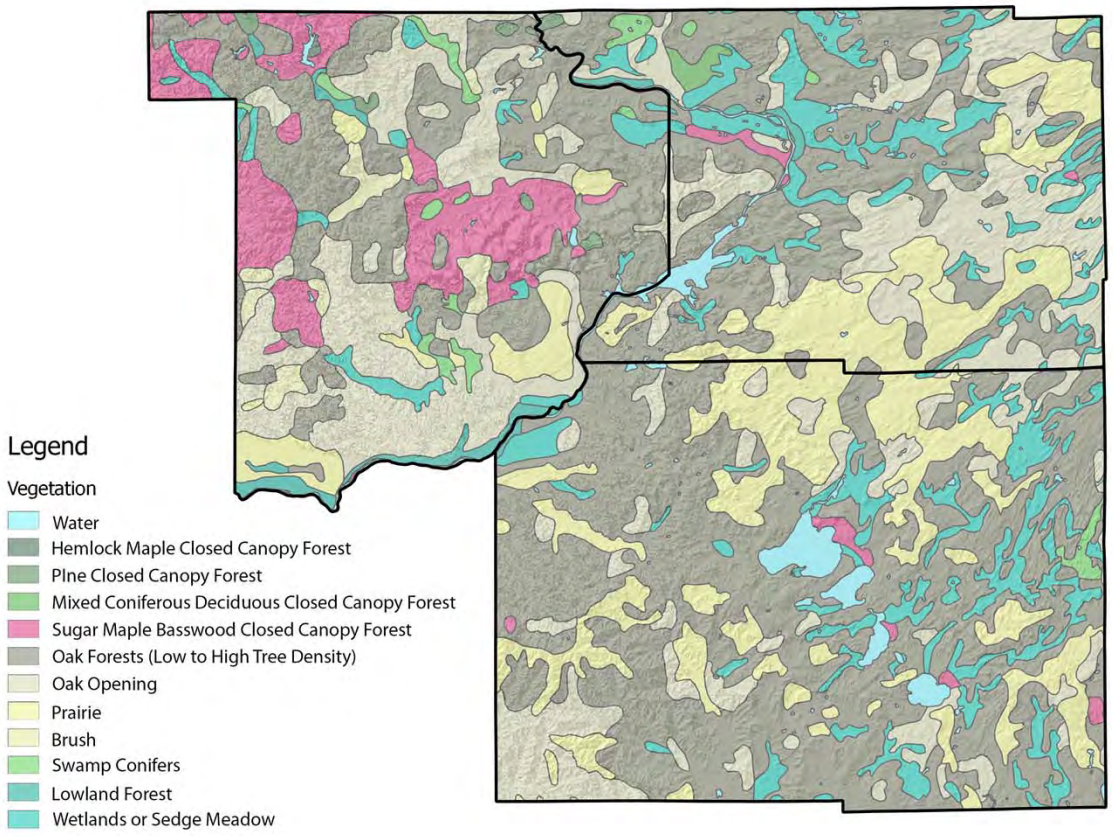


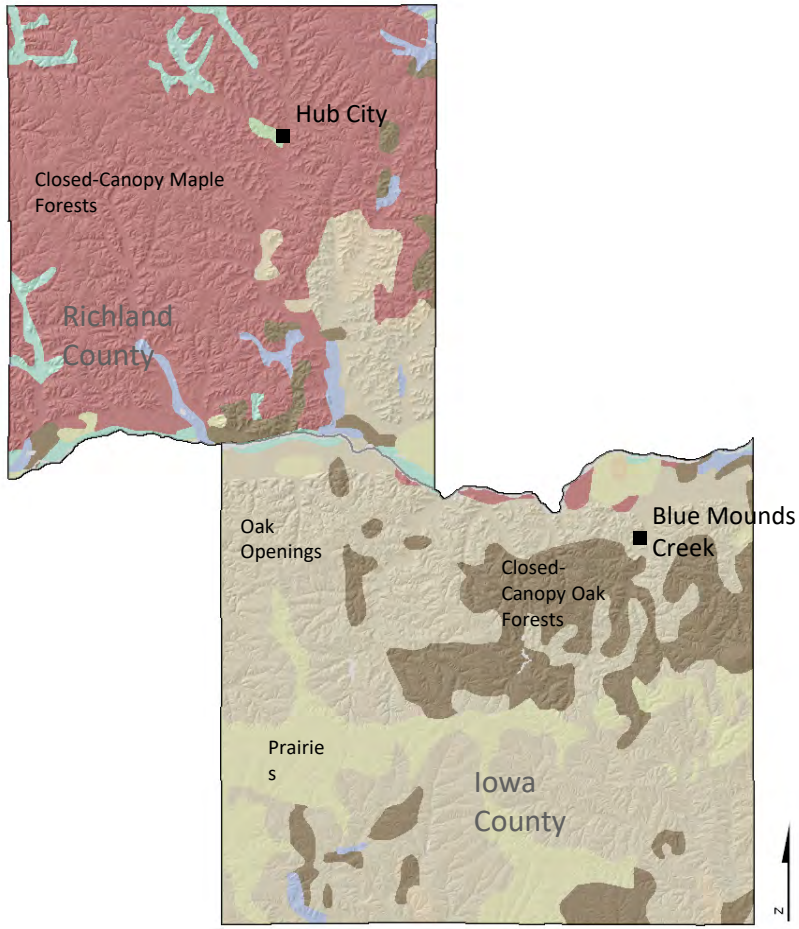
FIG. 5. Percentage pollen and charcoal diagram: Lake Mendota University Bay core C. (Depth in lake at which core was taken: 5.9 m.)

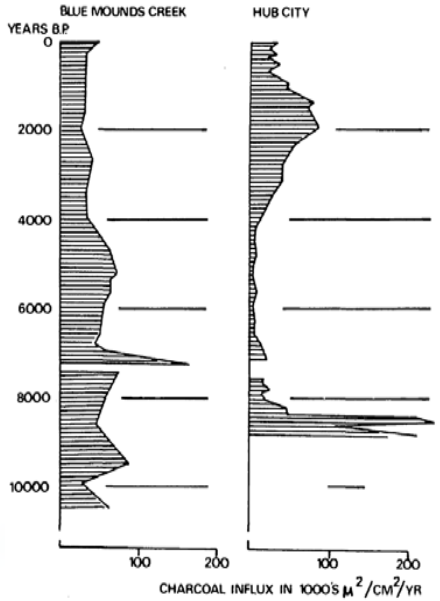
Mid 19th Century Vegetation in South Central Wi



1:500,000

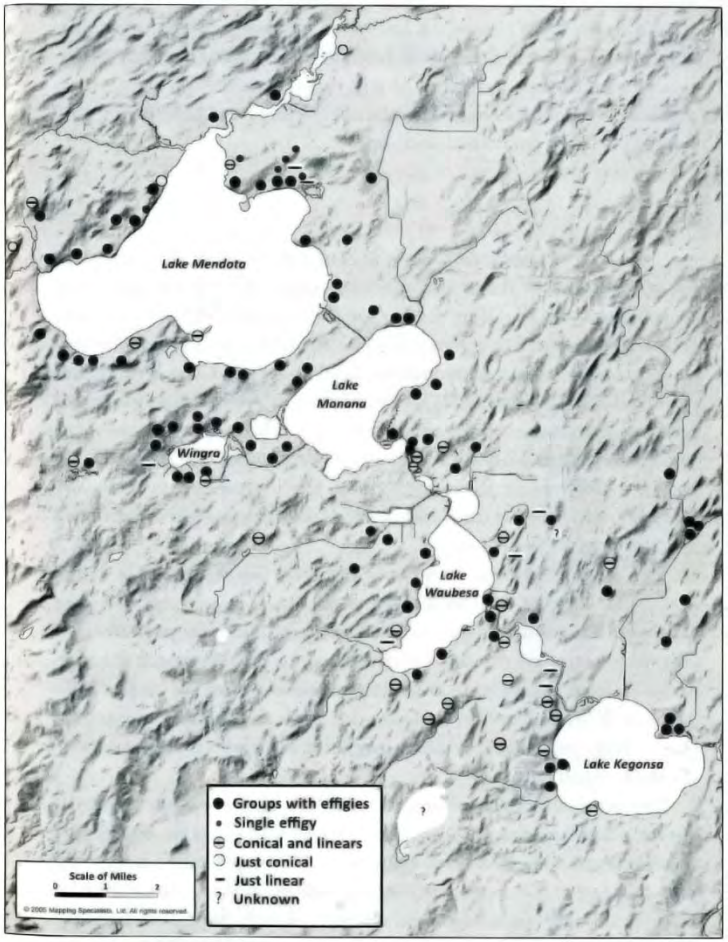
Paleoecological Evidence for Natural and Anthropogenic Fire

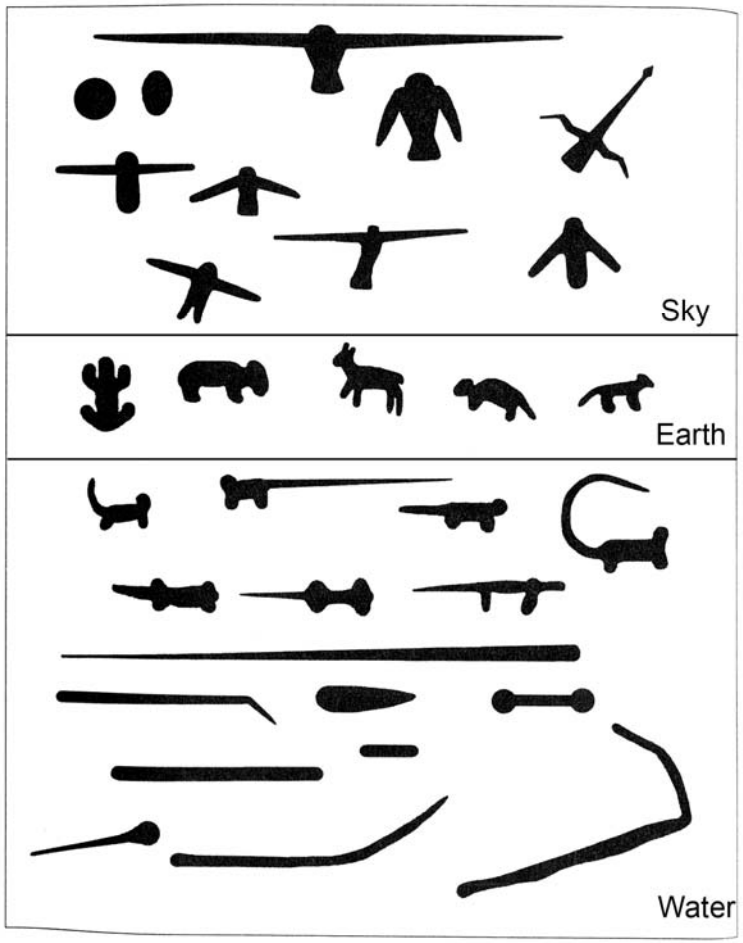




Sources: Davis 1977; Dorney 1981; Dorney and Dorney 1989; Loope and Anderton 1998; Anderton 1999; Toretti 2003; Wolf 2004; Arahms et al 2014, …

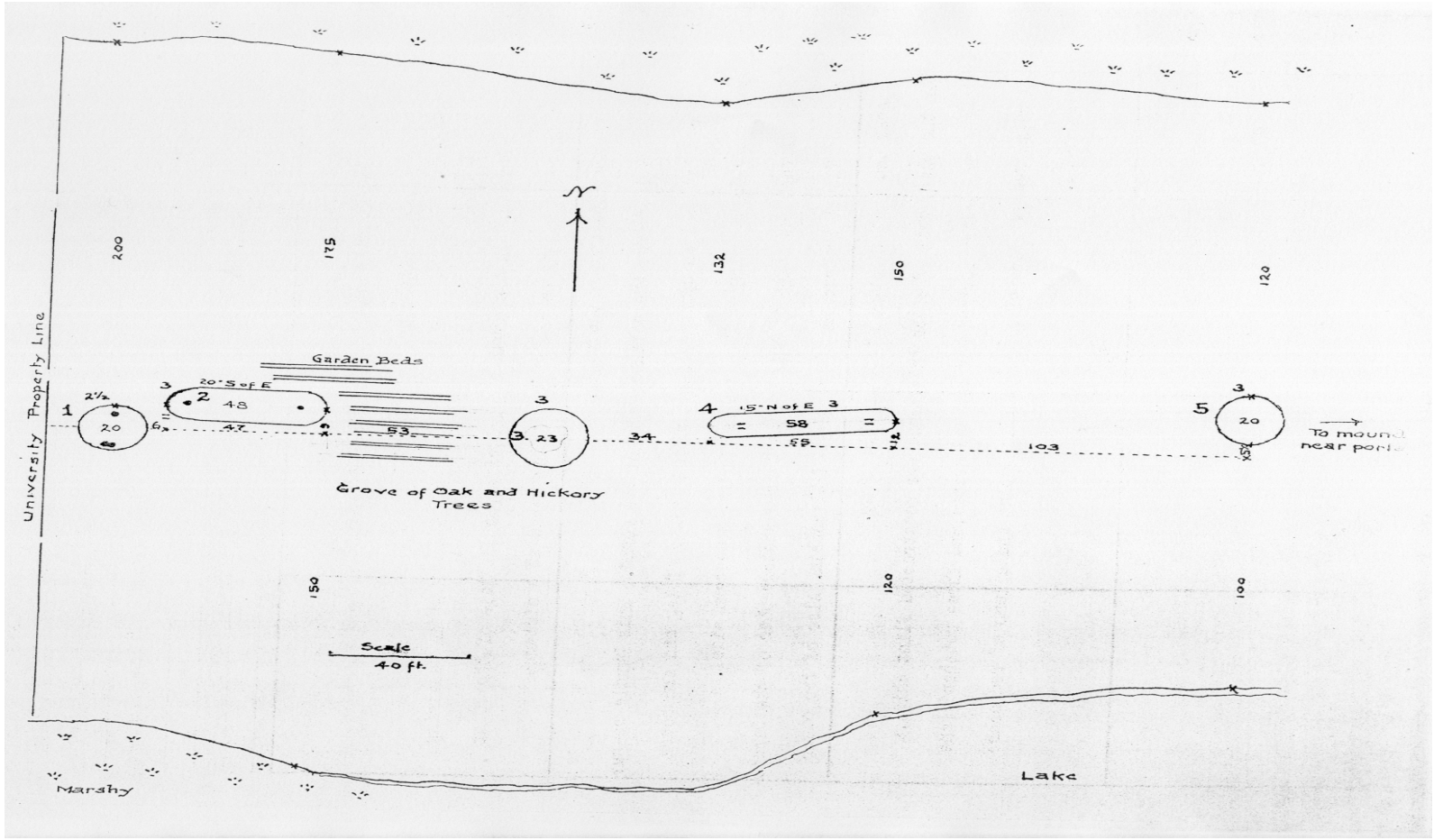
Dejope Mounds





Source: Birmingham, Robert. 2010. *Spirits of the Earth: The Effigy Mound Landscapes of Madison and the Four Lakes.* Madison: University of Wisconsin Press.

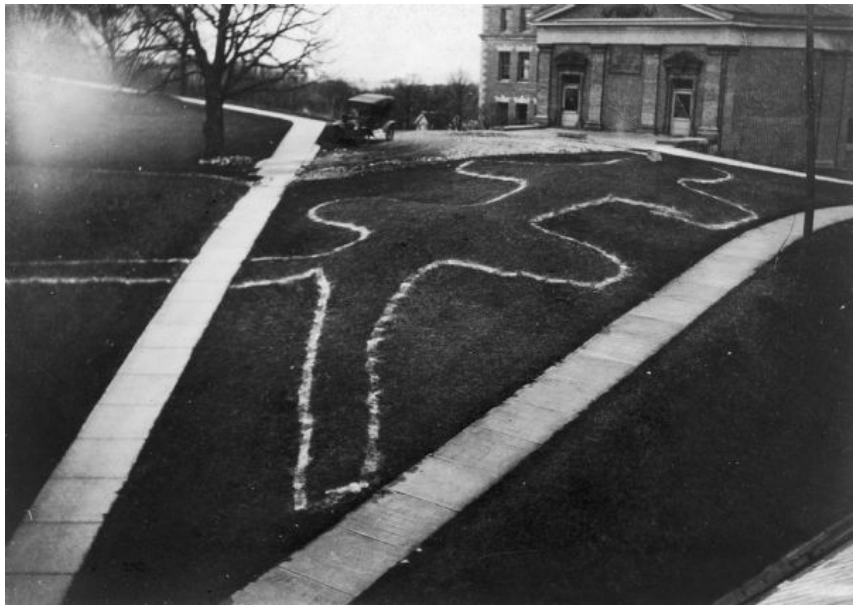
Picnic Point Mound Group (47-Da-121)



"Near the mounds are faint vestiges of the garden beds in which the villagers grew their corn, melons, beans, and squash, Brown said. Each bed is about 30 feet long and four feet wide, and separated by a narrow pathway." - Charles E Brown, *The Wisconsin State Journal*, 25 August 1939.

Map Source: Charles E Brown 1939, *Field Notes from the Excavation of Mounds in the Picnic Point Mound Group,* Document on file in the Archives Division of the Wisconsin Historical Society.

Observatory Hill



Lake Mendota

"Wunk-sheek-ho-mikla"

(Where the Ho Chunk Man Lies with the (Cat-) Fish)

Lost Lake

White Eagle Village

Pheasant Branch
Peenah Village

Den of Water Spirits

Cheenuck Village

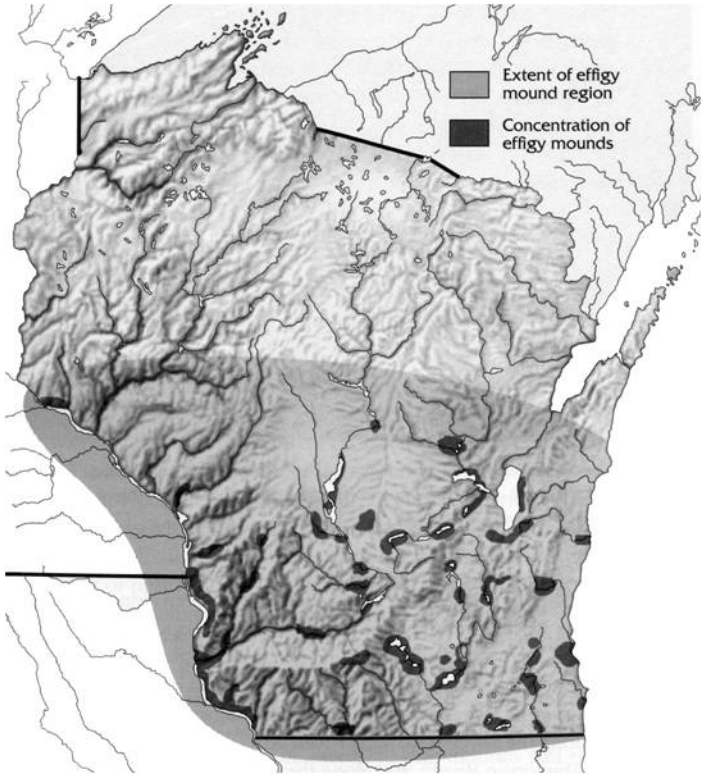
Merrill Wishing Spring

University Village

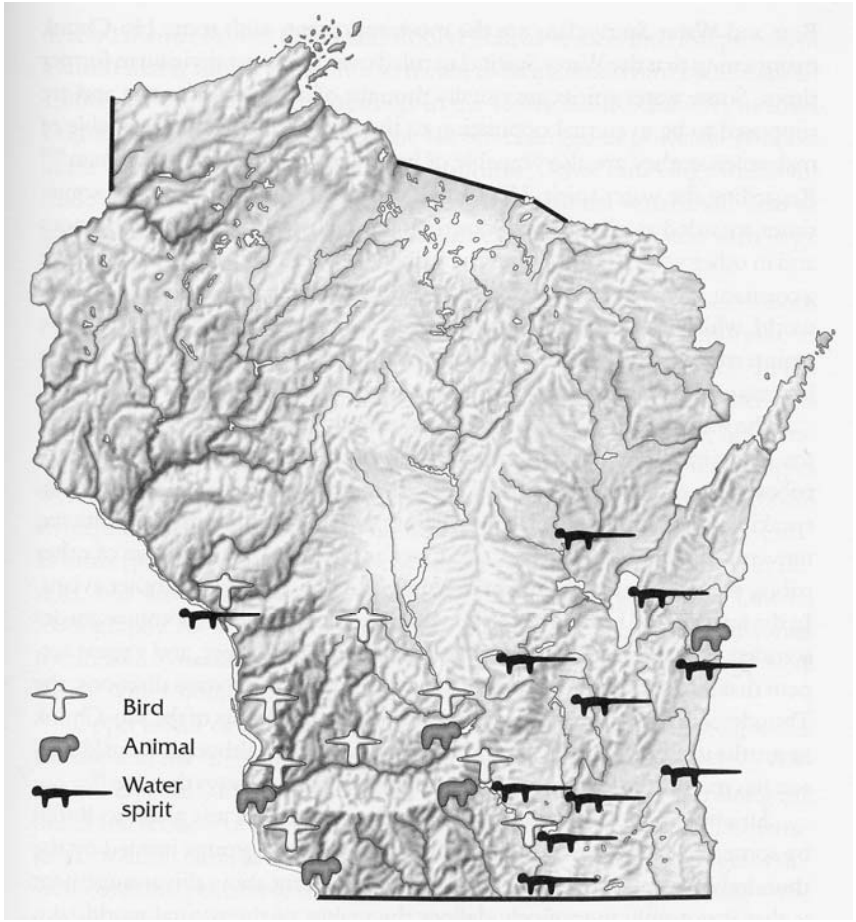
Oral Traditions: "Man Who Killed and Ate the Spirit Raccoon", "Spirit Horses on Horse Hill", "Flying Skull", "Big Beaver", Girl Whose Lover Went to War", Rattlesnake Myth", Wakanda Loses Lake", Wakanda Annoyed by Rabbit", "Thunderbird Roost" and Girl Who Married a Sky Man". WSHS: Image ID: 85412, Brown 1927.

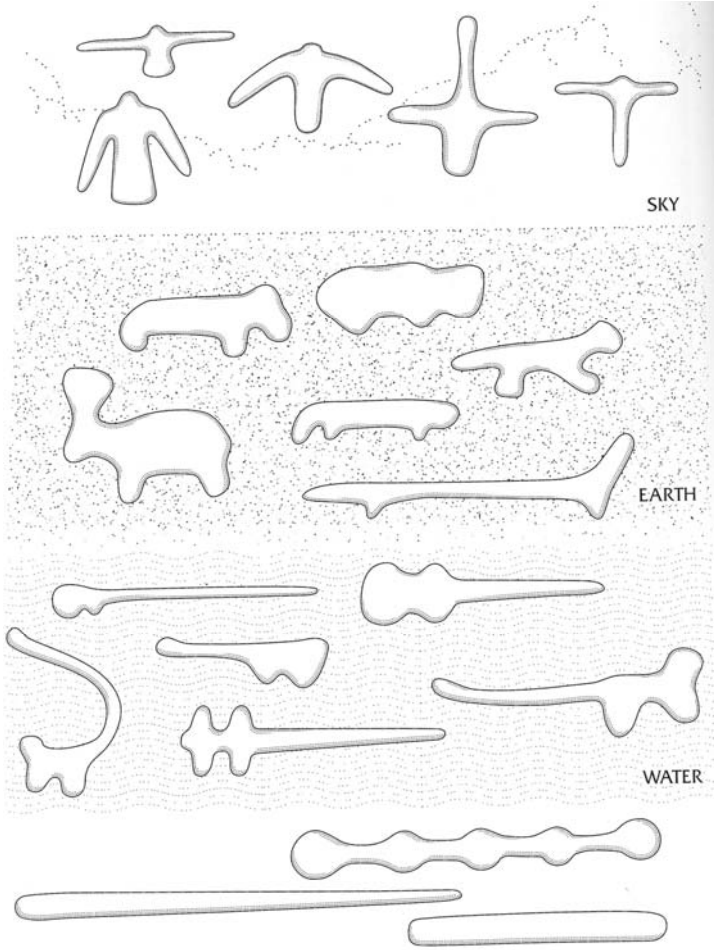
Mendota State Hospital Grounds

Effigy Mounds



Effigy Mounds





Source: Birmingham and Eisenberg 2000

Ho Chunk Clans

Name	**Translation**
Wakąja	Thunderbird
Wonąğire	Wąąkšik People of War
Caxšep	Eagle
Rucge	Pigeon
Hųc	Bear
Šųkjąk	Wolf
Ca	Deer
Hųwą	Elk
Cexjį	Buffalo
Wakjexi	Water-spirit
Ho	Fish
Waką	Snake

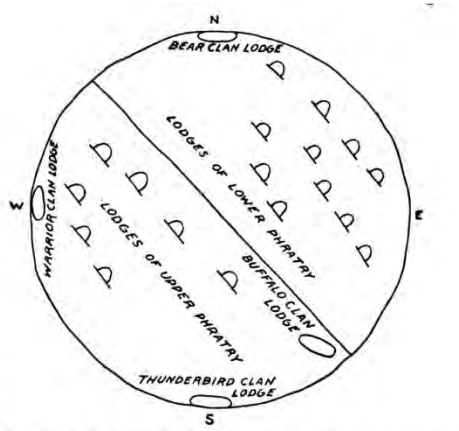


FIG. 33.—Plan of village according to Thundercloud, of the Thunderbird clan.

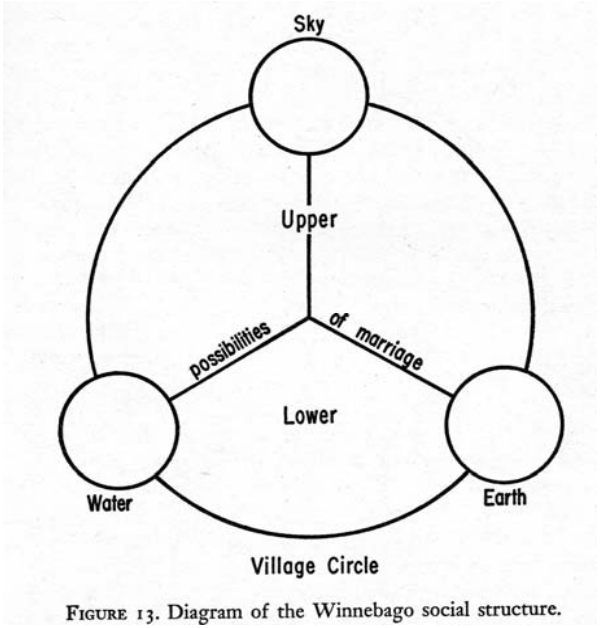
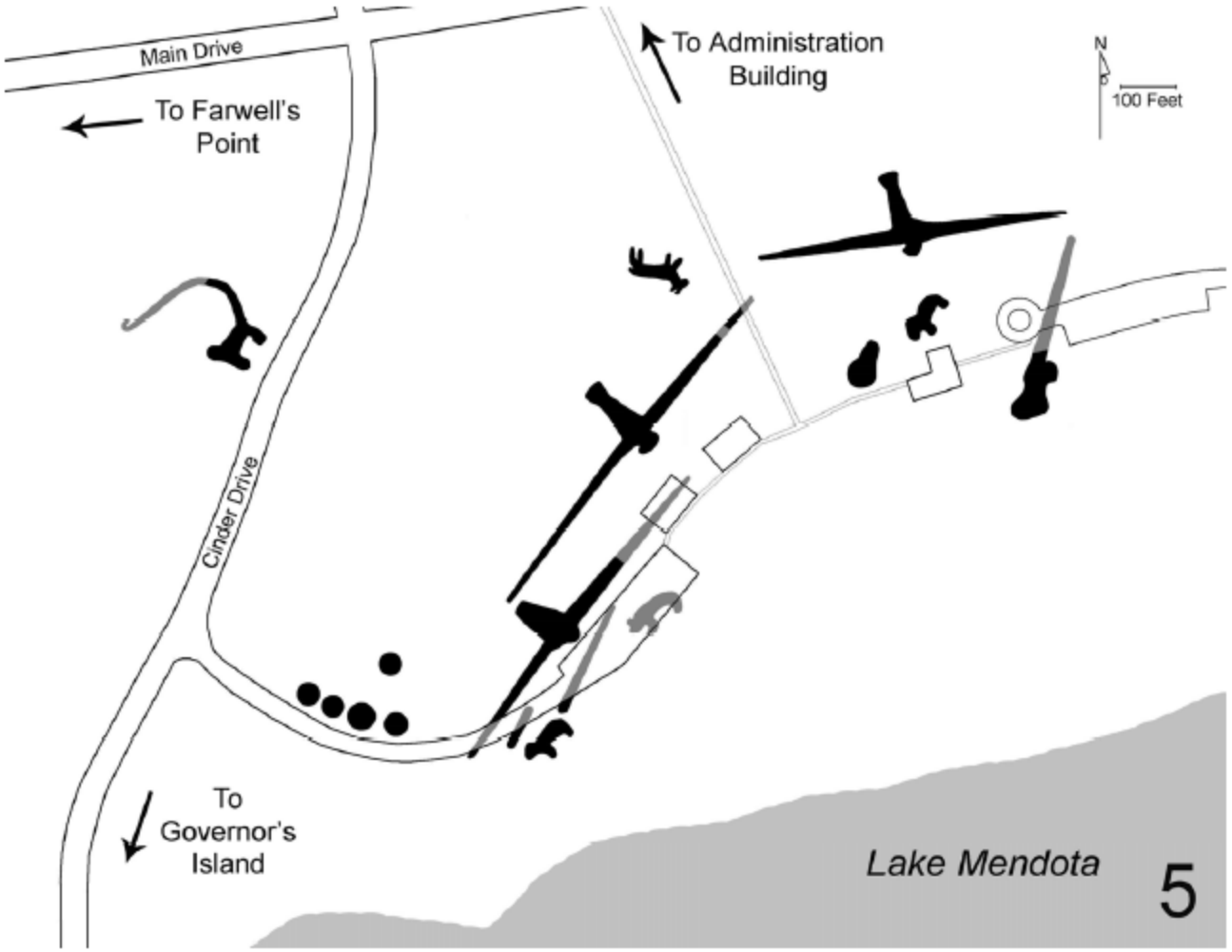


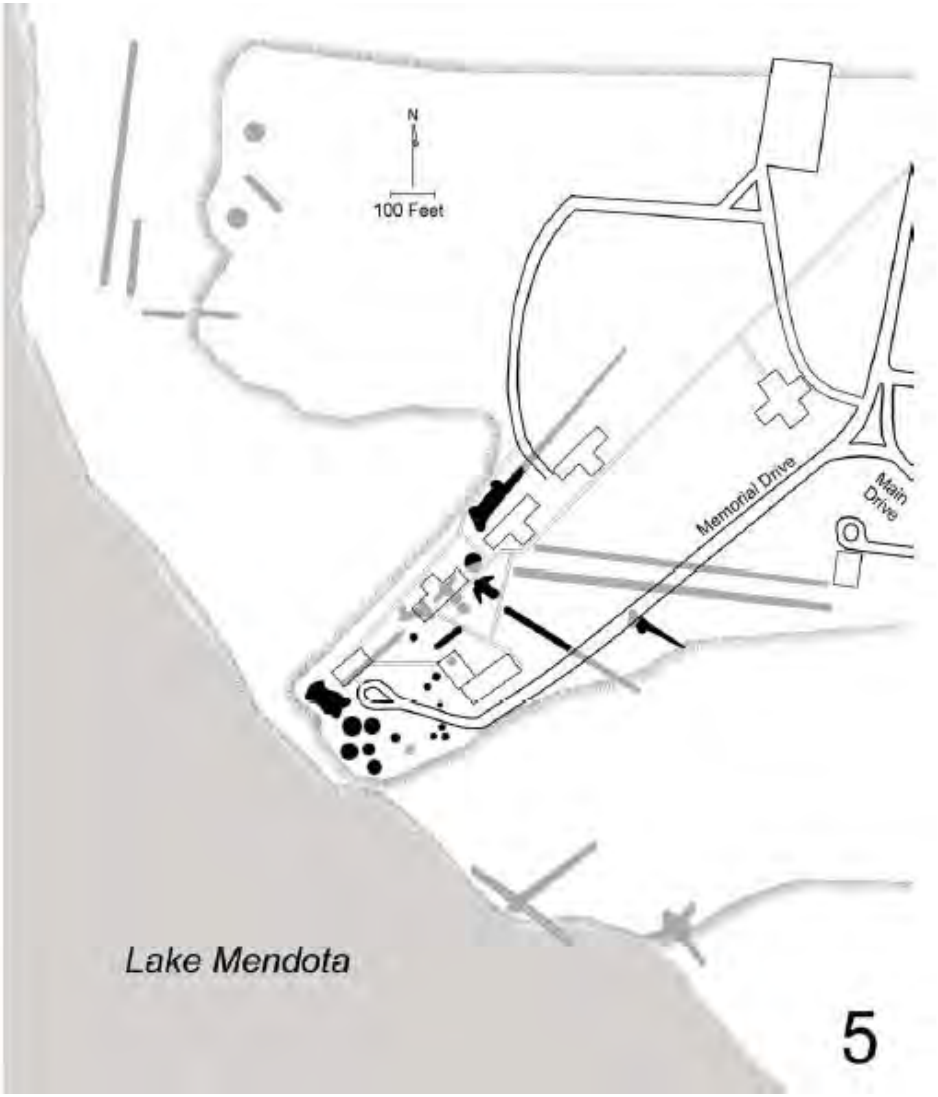
FIGURE 13. Diagram of the Winnebago social structure.

Source: Radin 1990 [1915]

Mendota State Hospital Grounds

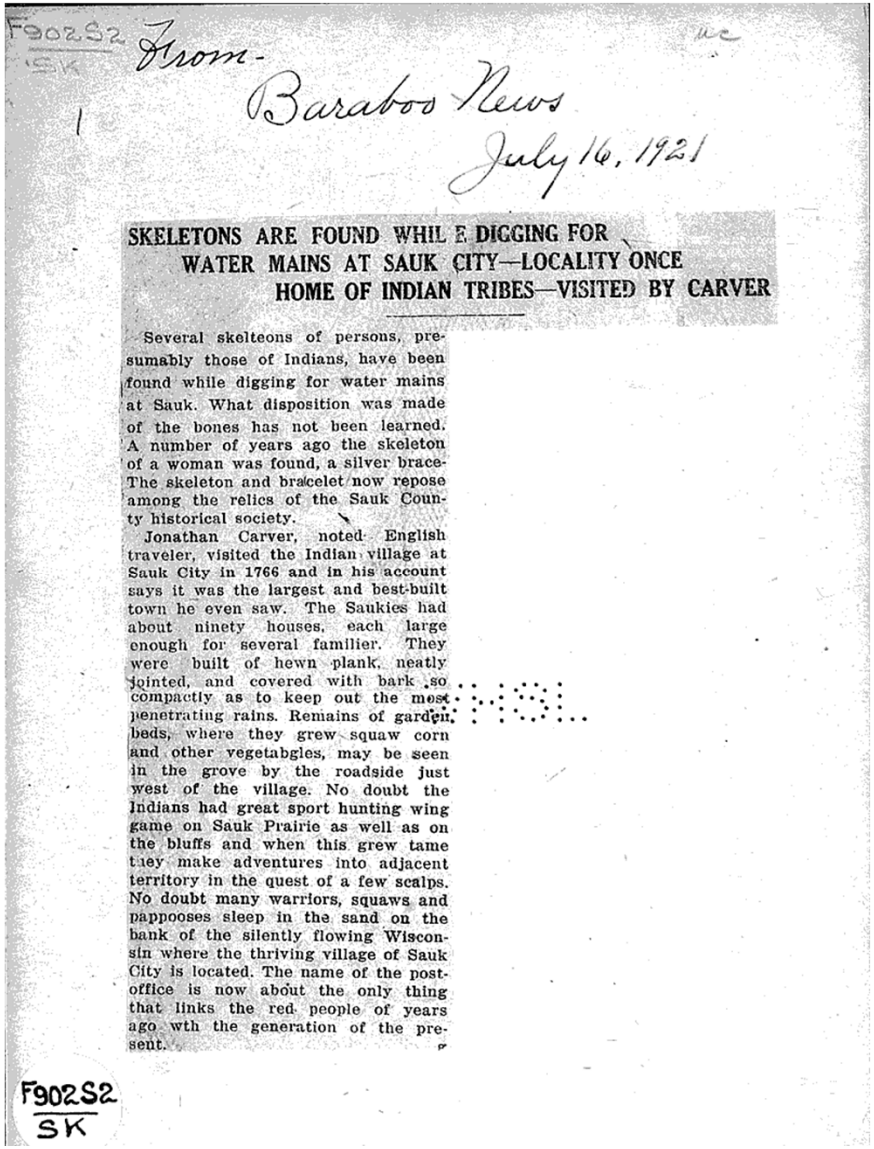


Mendota State Hospital Grounds
(Farwell's Point)



Prairie du Sac: The Great Village of the Saukies

The Great Village of the Sauk Indians at Prairie du Sac



F902.S2
SK

From-
Baraboo News
July 16, 1921

SKELETONS ARE FOUND WHIL E DIGGING FOR WATER MAINS AT SAUK CITY—LOCALITY ONCE HOME OF INDIAN TRIBES—VISITED BY CARVER

Several skelteons of persons, presumably those of Indians, have been found while digging for water mains at Sauk. What disposition was made of the bones has not been learned. A number of years ago the skeleton of a woman was found, a silver brace-The skeleton and bracelet now repose among the relics of the Sauk County historical society.

Jonathan Carver, noted English traveler, visited the Indian village at Sauk City in 1766 and in his account says it was the largest and best-built town he even saw. The Saukies had about ninety houses, each large enough for several familier. They were built of hewn plank, neatly jointed, and covered with bark so compactly as to keep out the most penetrating rains. Remains of garden beds, where they grew squaw corn and other vegetabgles, may be seen in the grove by the roadside just west of the village. No doubt the Indians had great sport hunting wing game on Sauk Prairie as well as on the bluffs and when this grew tame they make adventures into adjacent territory in the quest of a few scalps. No doubt many warriors, squaws and pappooses sleep in the sand on the bank of the silently flowing Wisconsin where the thriving village of Sauk City is located. The name of the post-office is now about the only thing that links the red people of years ago wth the generation of the present.

F902S2
SK

18th Century Descriptions of the Great Village of the Sauk Indians at Prairie du Sac

... and the next day [we] arrived at the Great Town of the Saukies. This is the best built Town I ever saw. It contains about ninety houses, each large enough for several families. ... The land near the town is very good. In their plantations, which lie adjacent to their houses, and which are neatly laid out, they raise great quantities of Indian com, beans, melons, &c. So that this place is esteemed to be the best market for traders to furnish themselves with provisions of any within 800 miles of it.... a few groves of hickory and stunted oaks covered some of the vallies" (Carver 1781 (1766): 47-48).

"Twelve Leagues down the Ouisconsang, on the west shore is a large town of Sackin, in which there are three hundred warriors. ... Behind the Town is a very extensive Plain, on which the Indians raise large quantities of Indian Com, squashes, mellons &c., tobacco: they raise sufficient to supply themselves and sell vast quantities to traders" (Goddard 1766: 5).

" [The houses are} Sixtey feet [18.3 m] Long and Contanes several fammalayes". … "This being the last Part of September, these people had every artikle of Eating in thare way in Abunans. ... The women rase Grat Crops of Com, Been, Punkens, Potatoes, Millans and artikels - the Land is Exalent - and clear of Wood Sum Distans from the Villeag" (Pond 1908 (1773): 335).

[The Sauk village] appears to have been several years deserted when I first saw the place in 1795, as there were then only a few remains of places and posts to be seen." (August Grignon, Recollections, in Wis. Hist. Colls. (3) 206.

19th and 20th Century Descriptions of the Great Village of the Sauk Indians

"… there was a large settlement of the Sacs on the lower end of Sauk Prairie. I have often examined the remains of their tillage there, and should suppose they raised corn in one lot of at least 400 acres; the town of Westfield [Sauk City] is laid out on part of this ground, and the whole quantity of land, the 400 acres, is covered with well formed, regular, corn hills. In the vicinity are a number of irregular Indian mounds. "

JAMES M. BURGESS 1851 (In *Transactions of the Wisconsin Agricultural Society* 1852 (1): 215).

"Of these extensive fields only about an acre remain undisturbed. This small area is on the NW ¼ of the SW ¼ of Section 12, on land belonging to Mr. John Riche. Stout 1906: 278.

"The children of these pioneers grew up in the Sauk Prairie country, playing among the Indian mounds, among the com hills that were left to mark the village Carver had visited in 1766. ('When we were little girls', remembered my grandmother Derleth, 'we went out in the evenings ... and we played a little game there among the com hills - that's what they were, those mounds - and we played we were Indians, and jumped from one to the other of them, daring each other, boys and girls together, like children will. Oh those days!')" - August Derleth 1942: 342.

Schluckebier Prairie

Schluckebier Prairie

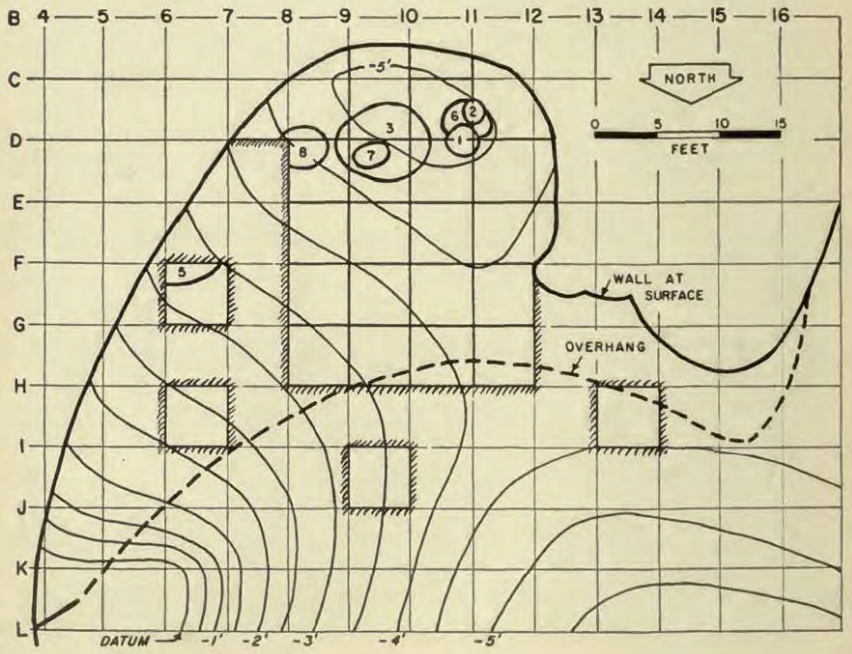
Endangered/Threatened Species

Prairie Bush Clover
(*Lespedeza leptostachya*)

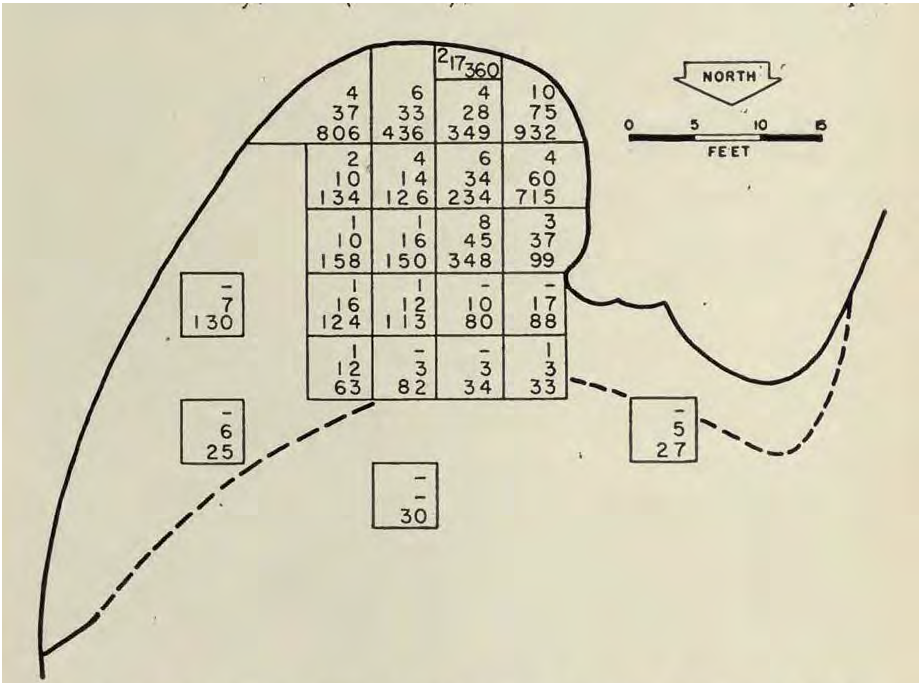
Red-Tailed Leafhopper
(*Aflexia rubranura*)
Host plant is prairie dropseed (*Sporobolus heterolepis*).

Natural Bridges State Park (Raddatz Rockshelter)

Raddatz Rockshelter



Map 1. The Raddatz Rockshelter, Sk5. Contour interval is 0.5 foot, figures indicating depth below datum in feet.



Map. 2. Distribution of projectile points (upper figure), total artifacts (middle figure), and faunal remains in ounces (lower figure).

Raddatz Rockshelter

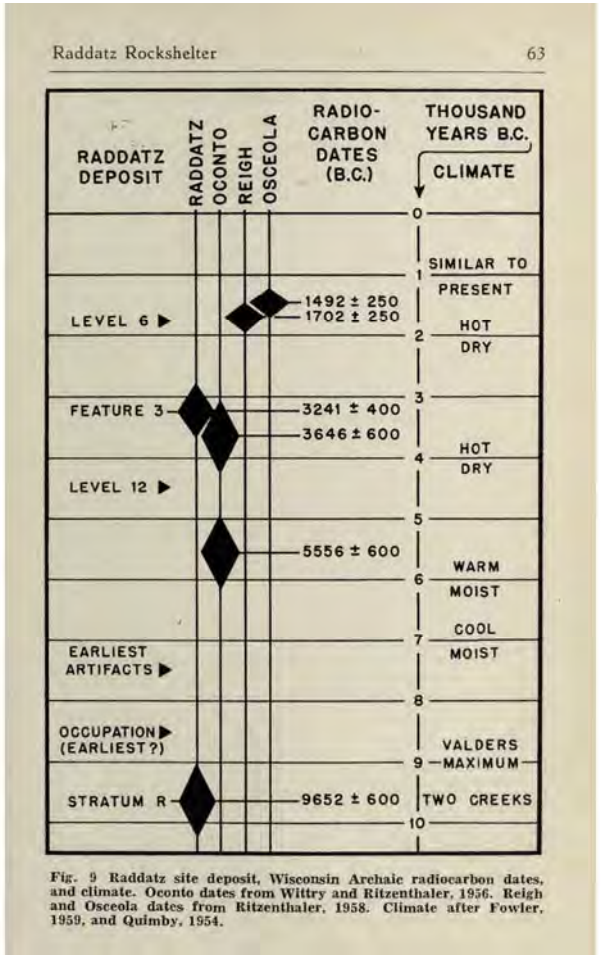


Fig. 9 Raddatz site deposit, Wisconsin Archaic radiocarbon dates, and climate. Oconto dates from Wittry and Ritzenthaler, 1956. Reigh and Osceola dates from Ritzenthaler, 1958. Climate after Fowler, 1959, and Quimby, 1954.

Fig. 1. Stratigraphic section (F12-G12) of Raddatz Rockshelter, Sk5, looking west at the northwest edge of the shelter. Five-foot scale. Photo by Warren L. Wittry.

Raddatz Rockshelter

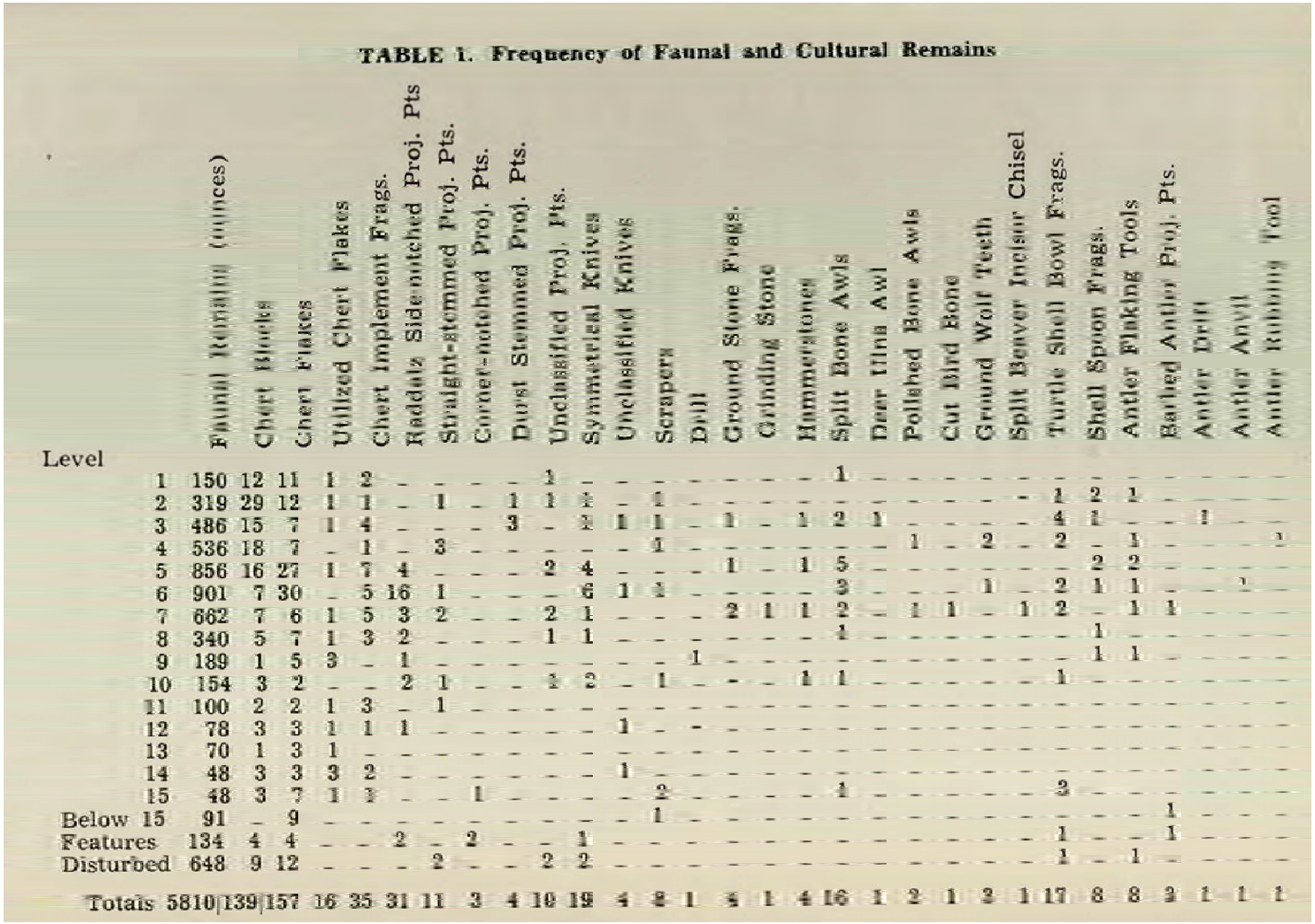


TABLE 1. Frequency of Faunal and Cultural Remains

Level	Faunal Remains (ounces)	Chert Blocks	Chert Flakes	Utilized Chert Flakes	Chert Implement Frags.	Raddatz Side-notched Proj. Pts	Straight-stemmed Proj. Pts.	Corner-notched Proj. Pts.	Dust Stemmed Proj. Pts.	Unclassified Proj. Pts.	Symmetrical Knives	Unclassified Knives	Scrapers	Drill	Ground Stone Frags.	Grinding Stone	Hammerstones	Split Bone Awls	Deer Ulna Awl	Polished Bone Awls	Cut Bird Bone	Ground Wolf Teeth	Split Beaver Incisor Chisel	Turtle Shell Bowl Frags.	Shell Spoon Frags.	Antler Flaking Tools	Barbed Antler Proj. Pts.	Antler Drill	Antler Anvil	Antler Rubbing Tool
1	150	12	11	1	2	–	–	–	–	1	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–
2	319	29	12	1	1	–	1	–	1	1	–	–	1	–	–	–	–	–	–	–	–	–	–	1	2	1	–	–	–	–	–
3	486	15	7	1	4	–	–	–	3	–	–	1	1	–	1	–	1	2	1	–	–	–	–	4	1	–	–	1	–	–	–
4	536	18	7	–	1	–	3	–	–	–	–	–	1	–	–	–	–	–	–	1	–	2	–	2	–	1	–	–	–	–	1
5	856	16	27	1	1	4	–	–	–	2	4	–	–	–	1	–	1	5	–	–	–	–	–	2	2	2	–	–	–	–	–
6	901	7	30	–	5	16	1	–	–	–	6	1	1	–	–	–	–	3	–	–	–	1	–	2	1	1	–	–	1	–	–
7	662	7	6	1	5	3	2	–	–	2	1	–	–	–	2	1	1	2	–	1	1	–	1	2	–	1	1	–	–	–	–
8	340	5	7	1	3	2	–	–	–	1	1	–	–	–	–	–	–	1	–	–	–	–	–	–	1	–	–	–	–	–	–
9	189	1	5	3	–	1	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	1	1	–	–	–	–	–
10	154	3	2	–	–	2	1	–	–	1	2	–	1	–	–	–	1	1	–	–	–	–	–	1	–	–	–	–	–	–	–
11	100	2	2	1	3	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
12	78	3	3	1	1	1	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
13	70	1	3	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
14	48	3	3	3	2	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
15	48	3	7	1	2	–	–	1	–	–	–	–	2	–	–	–	–	1	–	–	–	–	–	3	–	–	–	–	–	–	–
Below 15	91	–	9	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–
Features	134	4	4	–	–	2	–	2	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	1	–	–	–	–
Disturbed	648	9	12	–	–	–	2	–	–	2	2	–	–	–	–	–	–	–	–	–	–	–	–	1	–	1	–	–	–	–	–
Totals	5810	139	157	16	35	31	11	3	4	10	19	4	8	1	5	1	4	16	1	2	1	2	1	17	8	8	3	1	1	1	

Raddatz Rockshelter

TABLE I

The Species and Number of Identified Remains of Mollusks Re- covered at the Raddatz Rockshelter (Sk5), Sauk County, \Visconsin. 1957.

Species	Total Number of Identified Remains
FRESH-WATER MUSSELS:	
L:1m11silis ventricosa (Pocketbook)	22
Actinonaias carinata (Mucket)	8
Elliptio dilatatus (Spike)	7
Lampsilis siliquoid ea (Fat Mucket)	2
Qua dr .ula metanevra (Monkey-face)	2
Lampsilis sp.	2
Anodonta sp. (Floater)	2
Ligumia recta (Black Sandshell)	1
Pleth obas us cyphyus (Sheepsnose)	1
Amblema sp. (Three.ridge)	1
SNAILS:	
Anguispira alternata	154
Triodopsis and/or Me odon spp.	18
Mesodon thyroidus	9
Stenotrema fraternum	5
Triodopsis multilineata	3
Helicina orbiculata	2

TABLE II

The Species and Number of Identified Remains of Vertebrates Re - covered at the Raddatz Rockshelter (S k5) , Sauk Cou n t y, Wiscons in. 1957.

Species	Total Number of Identified Remains
AMPHIBIANS:	
Small Frogs and/or Toads	16
TURTLES:	
Snapping Turtle (Ch elyd ra serpentina)	30
Box Turtle (Terra pene carolina)	28
Turtle spp.	18
Painted Turtle (Ch r ys em ys pic ta), Blanding's Turtle (Emys bla nd in gii) and/or Map Turtle (Graptem ys sp.)	17
Painted Turtle (Ch ryscm ys picta)	10
Blar..ding's Turtle (Emys bla nd ingii)	2
SNAKES:	
Snake sp.	

BIRDS:

Passenger Pigeon **(Ectopistes migratorius)**	149
Ruffed Grouse **(Bonasa umbellus)**	84
Turkey **(Meleagris gallopavo)**	14
Sharp-tailed Grouse **(Pedioecetes phasianellus)**	10
Small Passerines	9
Flicker (probably Yellow-shafted Flicker, **Colaptes auratus)**	7
Screech Owl **(Otus asio)-**	6
Woodpecker spp.	5
Cardinal **(Richmondena cardinalis)**	4
Common Crow **(Corvus brachyrhynchos)**	4
Blue Jay **(Cyanocitta cristata)**	4
Turkey Vulture **(Cathartes aura)**	3
Red-tailed Hawk **(Buteo jamaicensis)**	2
Barred Owl **(Strix varia)**	2
Sora **(Porzana carolina)**	2
Ca t bi r d . **(Dumetella** carolinensis)-probably	2
American Coot **(Fulica americana)**	1
Mallard **(Anas platyrhynchos)**	1
Canada Goose **(Branta canadensis)**	1
Wood Duck **(Aix sponsa)**	1
Red-headed Woodpecker **(Melanerpes erythrocephalus)**	1
Redwinged ·Blac k b ir d **(Agelaius phoeniceus)**	1
Owl **(Asio** sp.; probably Short-eared Owl, **A. .flammeus)**	1

MAMMALS:

Whitetail Deer **(Odocoileus virginianus)**	4,409
Eastern Chipmunk **(Tamias striatus)**	55
Elk (Cervus canadensis)	34
Raccoon **(Pro<:yon lotor)**	33
Gray Wolf **(Canis lupus)**	33
Woodchuck **(Marmota monax)**	33
Red Squirrel **(Tamisciurus hudsonicus)**	27
Southern Flying Squirrel **(Glaucomys volans)**	26
Gray Squirrel **(Sciurus caroli nensis)'**	25
Eastern Cottontail **(Sylvilagus floridanus)**	24
Beaver **(Castor canadensis)**	20
Canis sp. (Probably Domestic Dog, **C. familiaris)**	20
Common Mole **(Scalopus aquaticus)**	15
Big Brown Bat **(Eptesicus fuscus)**	7
Brown Bat **(Myotis** sp.)	6
Vole **(Microtus** sp.)	5
Deer Mouse **(Peromyscus** sp.)	4
Muskrat **(Ondatra zibethica)**	3
Bog Lemming **(Synaptomys cooperi)**	2
Bobcat **(Lynx rufus)**	2
Red Fox **(Vulpes** fulva)- probably	2
Martin **(Martes americana)**	2
Fisher **(Martes pennanti)**	1
Short-tailed Shrew **(Blarina brevicauda)**	1
Northern Flying Squirrel . **(Glaucom ys sabrinus)**	1
Weasel **(Mustela frena.ta)**	1
Mountain Lion **(Felis concolor)**	1

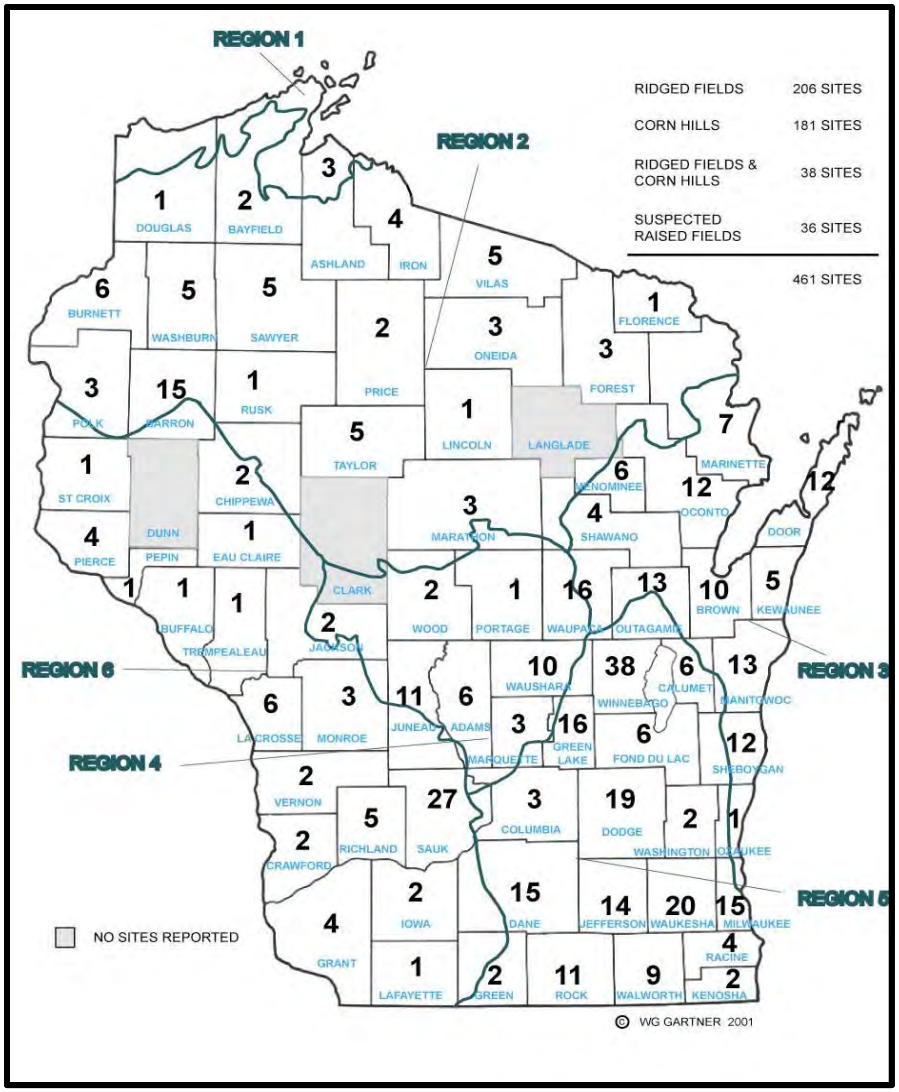
Raddatz Rockshelter

Fig. 7. A-1, split bone awls; J, deer ulna awl; K-L, polished bone awls; M, cut bird bone; N-P, ground wolf teeth; Q, split beaver incisor chisel; R-S, shell spoons.

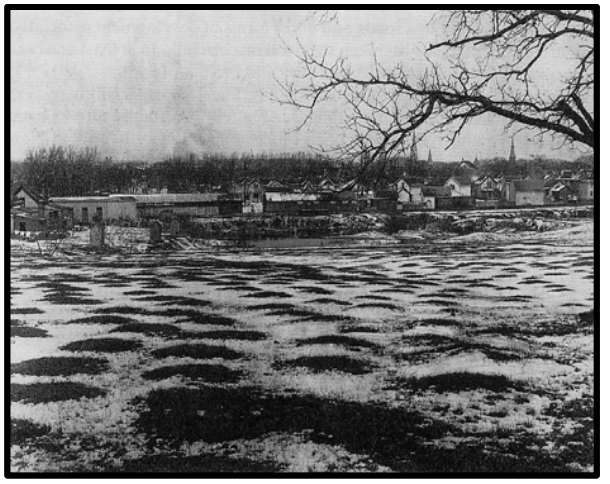
Fig. 8. Antler artifacts: A, flaking tool; B-C, barbed projectile points (D is a waste section); E, cut section; F, drift; G, anvil; H, rubbing tool.

Hulburt Creek Raised Fields

Raised Fields



Source: Gartner 2003b



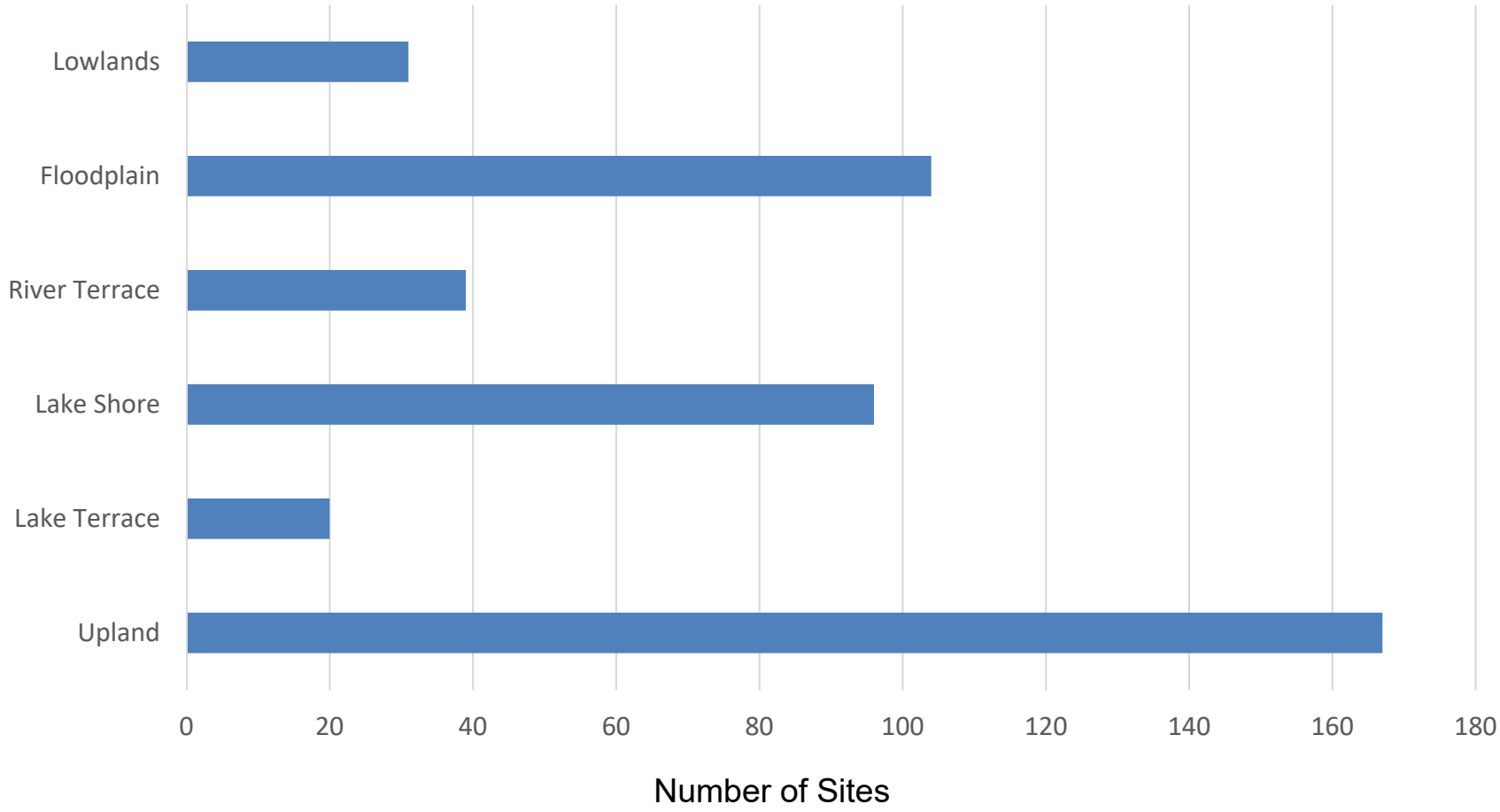
Corn Hills

Carroll College, WI: Photo by George Fox 1902. Wisconsin State Historical Society WHi (x3) 44498, Lot 3700.

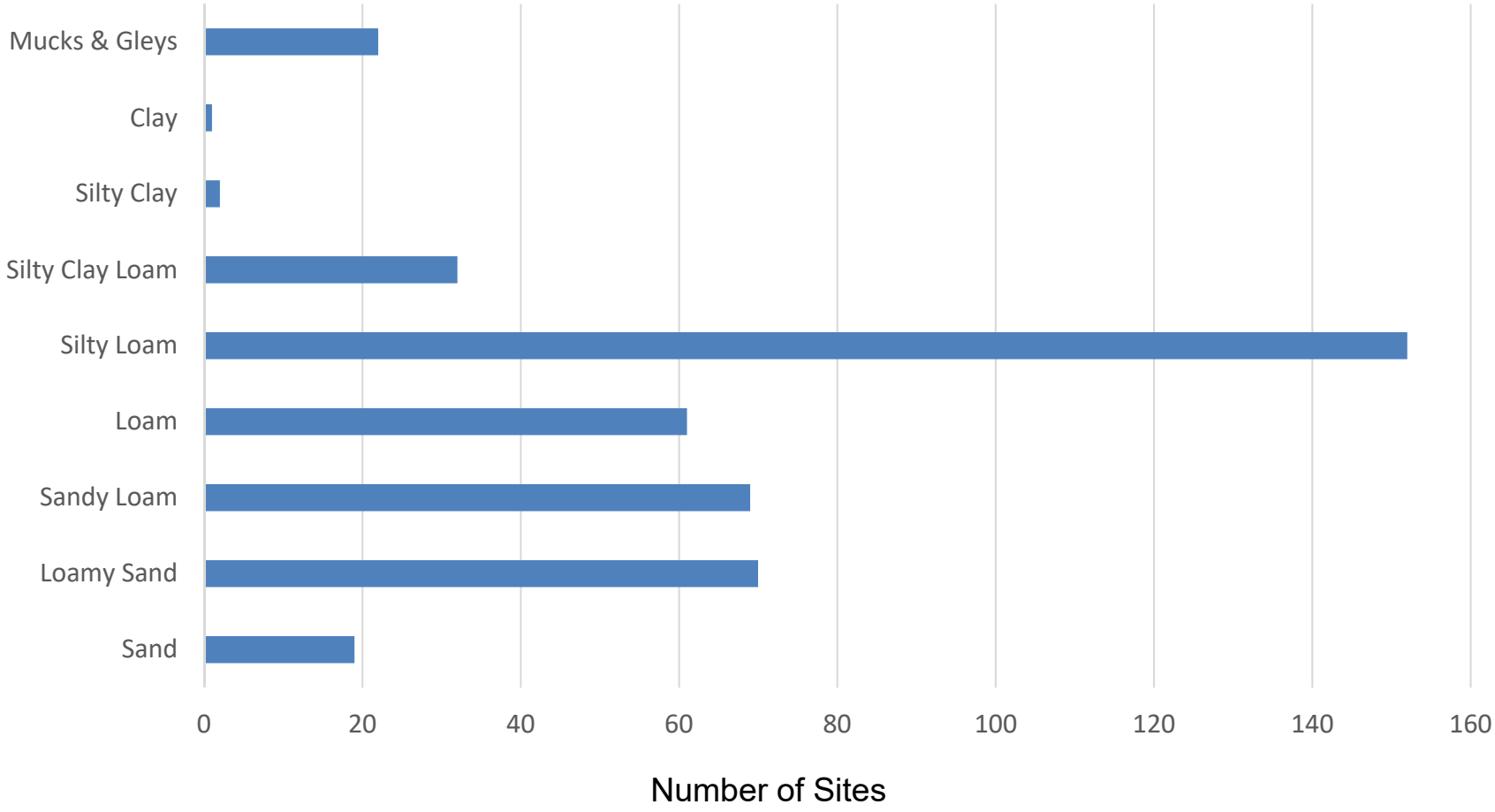
Ridged Fields

Eulrich Farm, WI: Photo by George Fox 1913. Wisconsin State Historical Society WHi (x3) 44500, Lot 3700

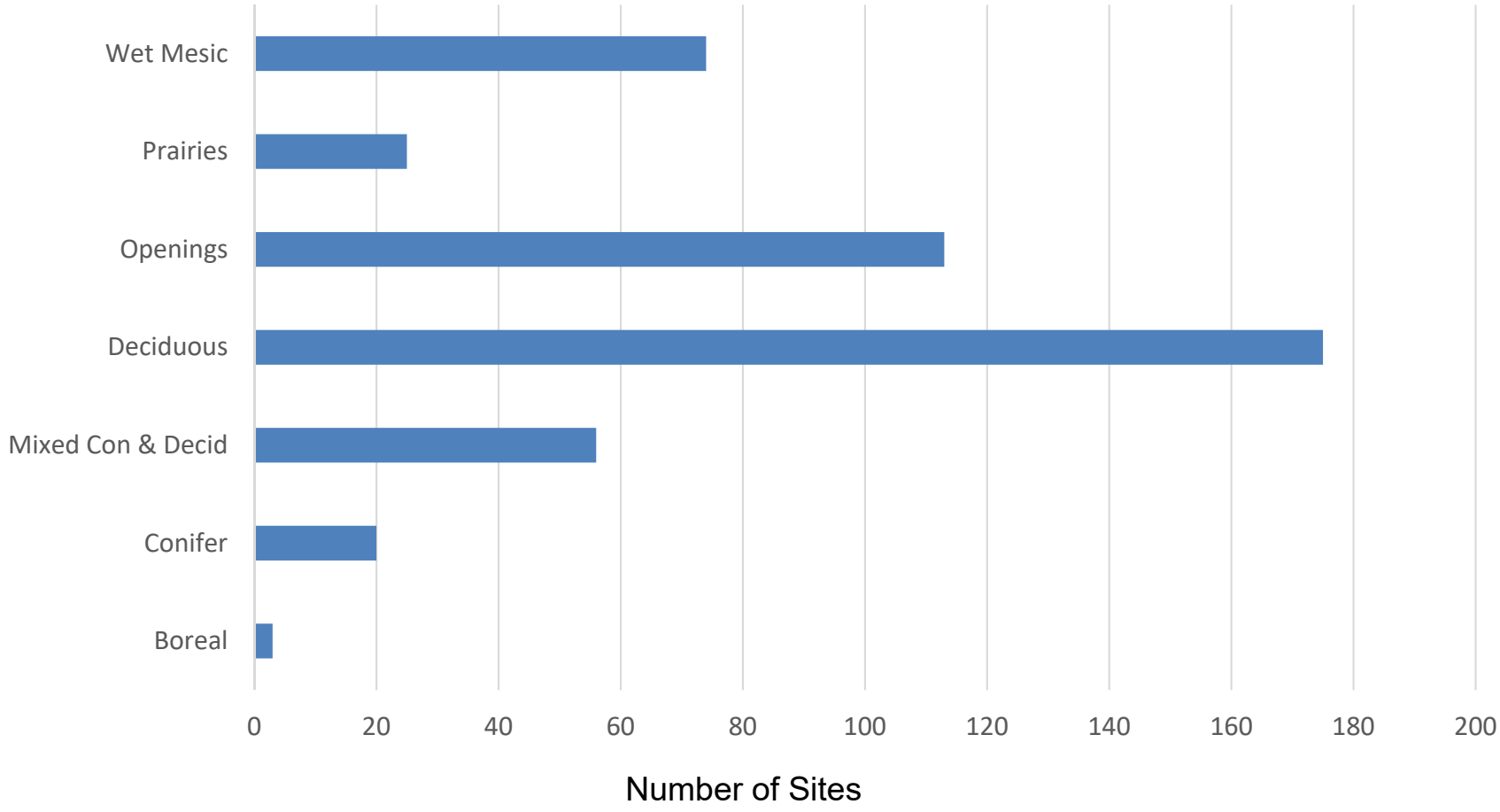
Landforms and Wisconsin Indian Agriculture



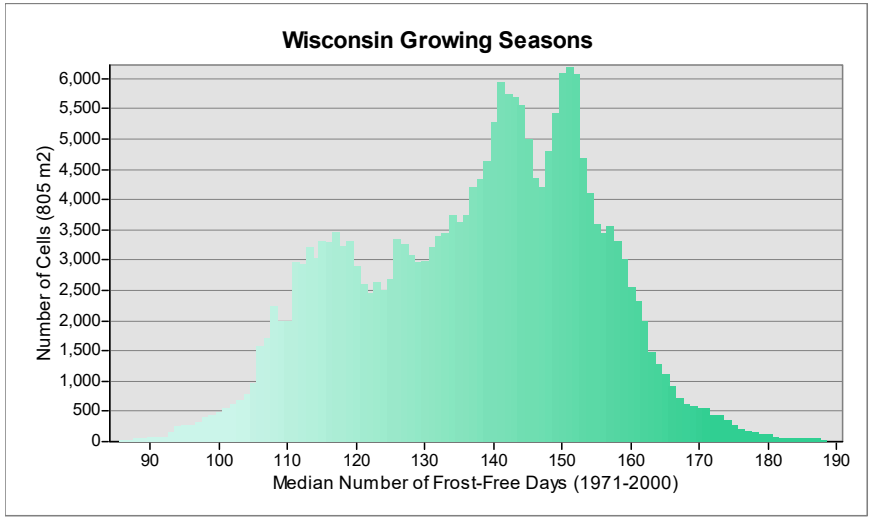
Soil Texture and Wisconsin Indian Agriculture

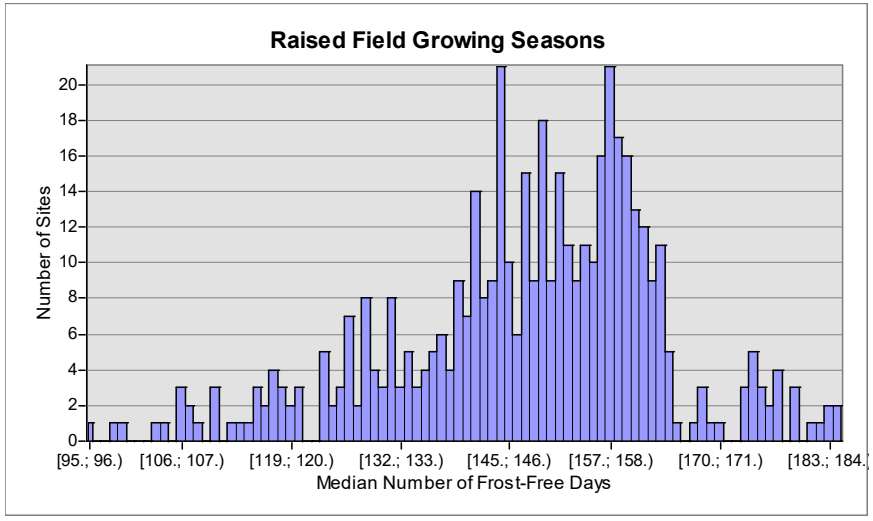


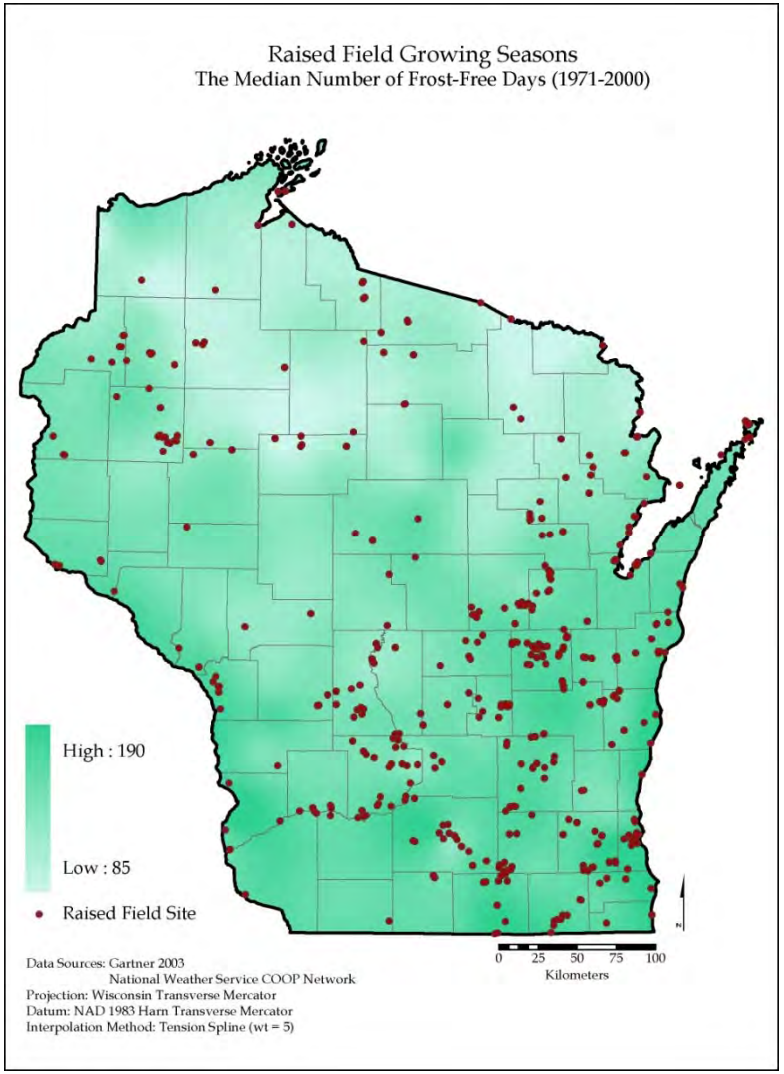
Vegetation and Wisconsin Indian Agriculture



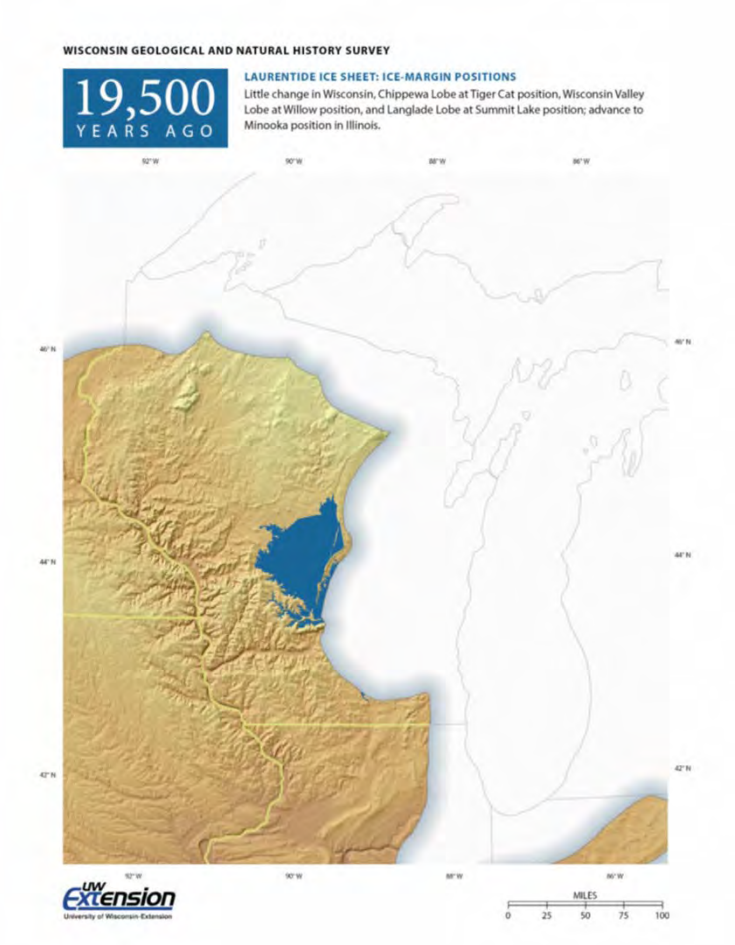
Climate and Wisconsin Indian Agriculture



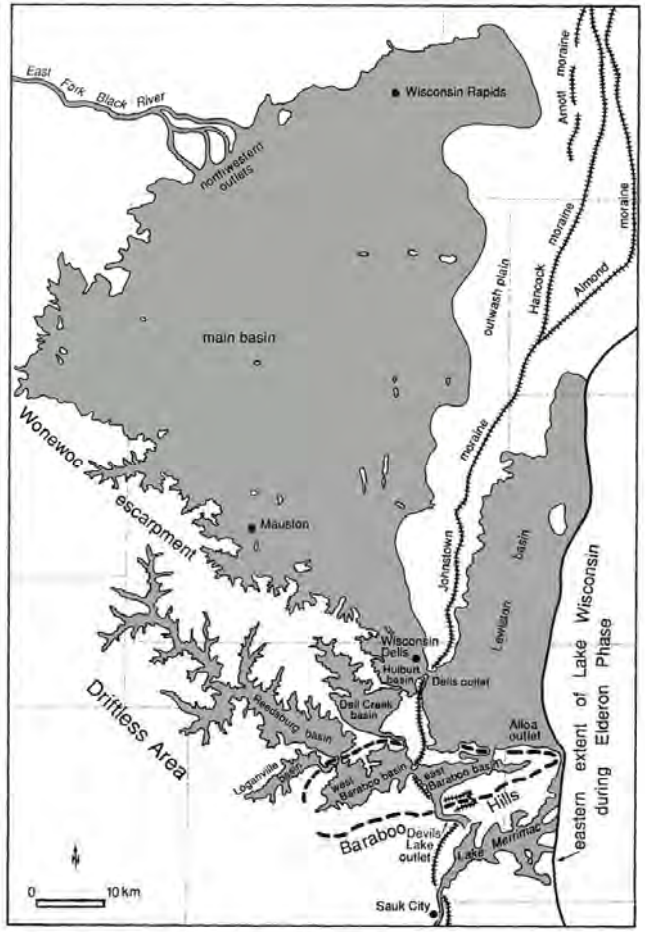


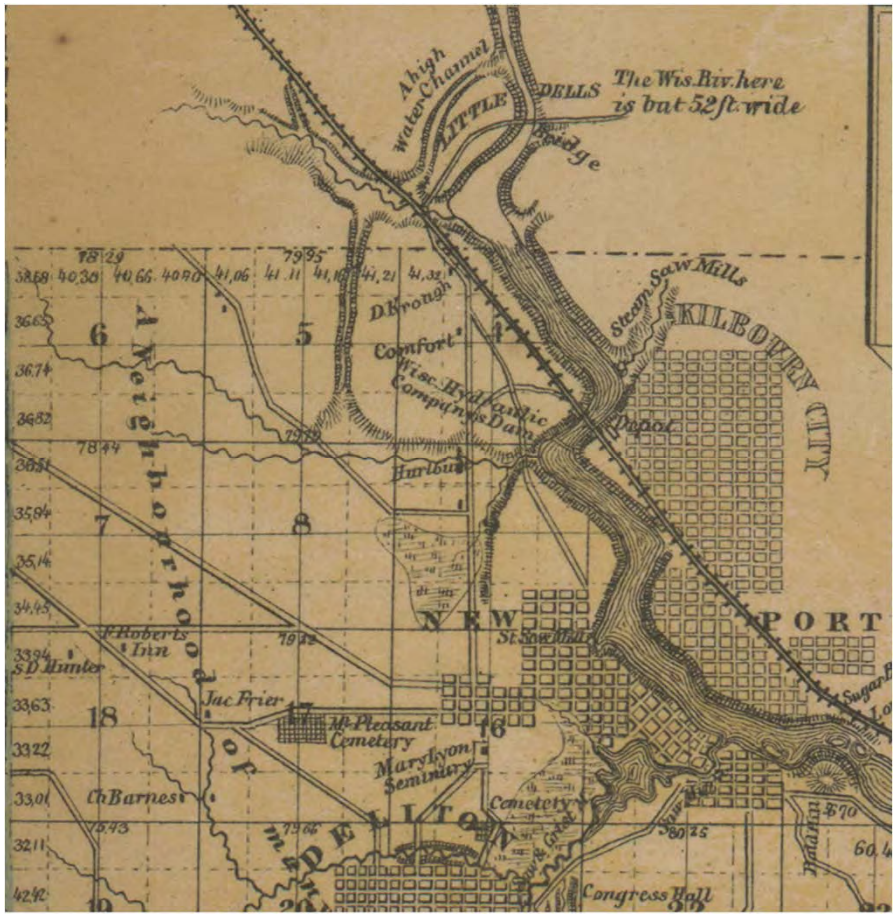


Glacial Lake Wisconsin

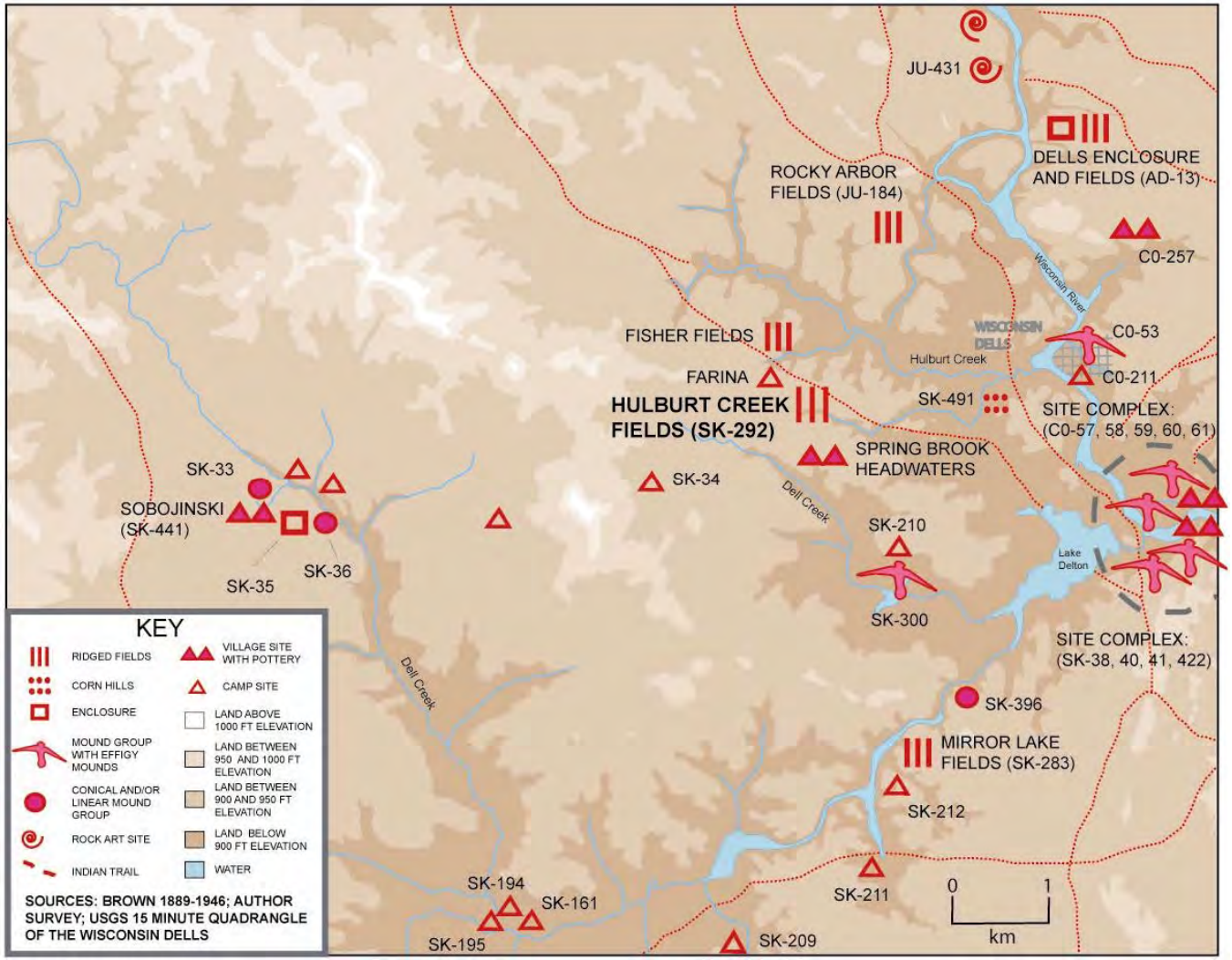


Glacial Lake Wisconsin





The Hulburt Creek Raised Fields



Source: WG Gartner 2003

The Hulburt Creek Raised Fields

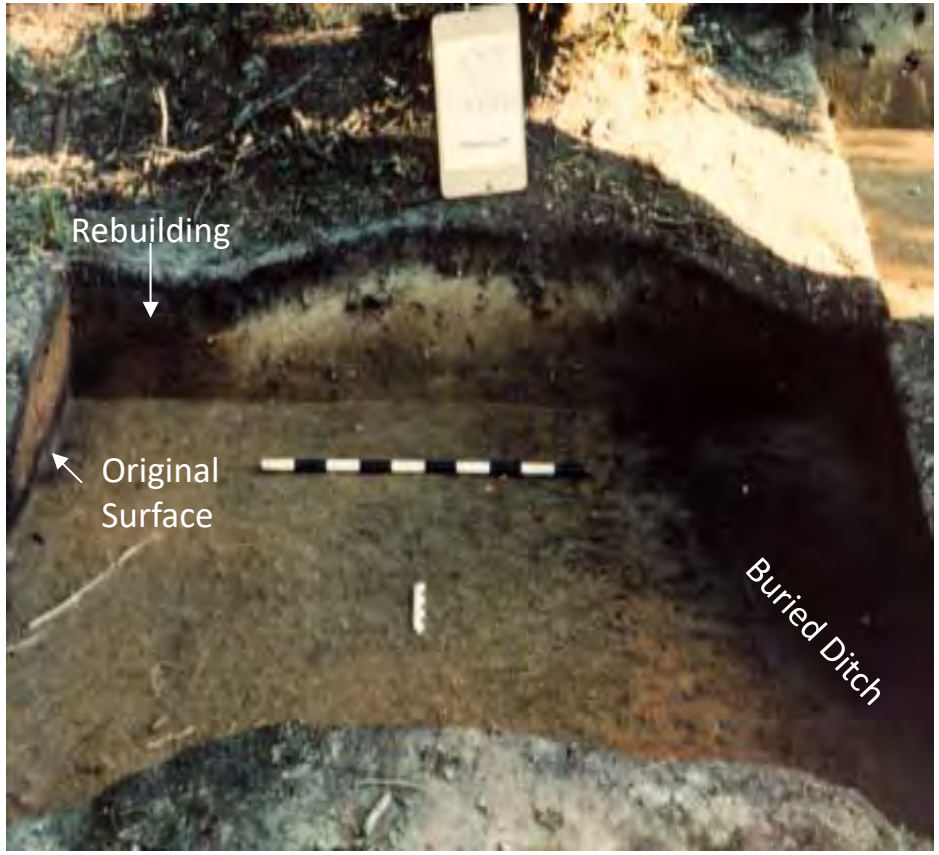
Raised Field

Original Surface

980 ± 50 RCYBP

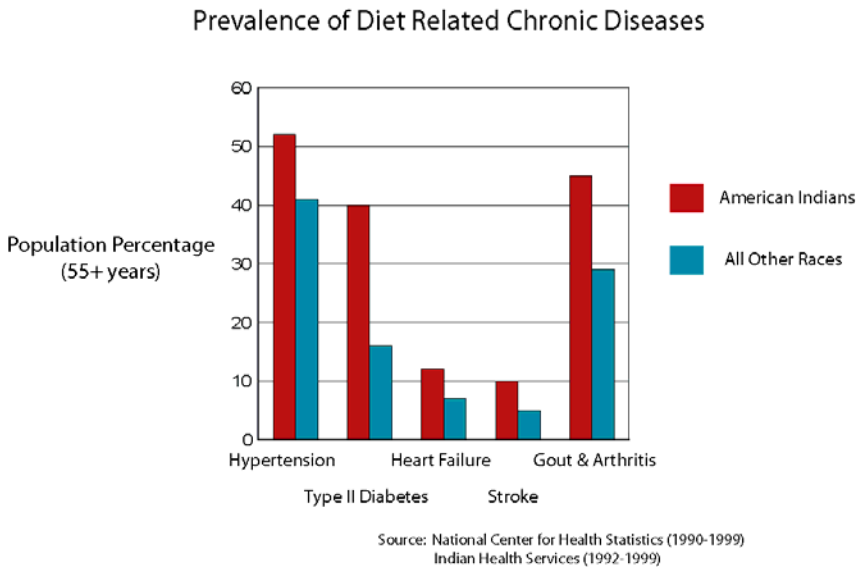
Mottles

Bedrock



Source: WG Gartner 2003

Food Sovereignty and Restoration Subsistence Ecology



Kingsley Bend Mound Group

Kingsley Bend Mound Group