

Laurentide Ice Sheet: Ice-Margin Positions in Wisconsin

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Second Edition

This series of maps shows the chronology of the Laurentide Ice Sheet's many advances and retreats. The 44 maps cover Wisconsin and parts of surrounding states. They track the location of the glacier and the extent of ice-marginal lakes between 31,500 and 11,000 calendar years ago. We used mostly 500-year intervals between each map; we used different intervals when a significant event occurred that would otherwise be missed, or when we have good controls on the ice-margin position. Where helpful, we have referenced major regional events, especially if they are well-documented in the geologic literature. For more detailed studies on the subject, please see our list of references.

Nearly all of the maps are based on our long-distance and uncertain correlation of landscape features that mark former positions of the ice margin. Few of the ice-margin positions are closely constrained in time by radiocarbon or other types of age estimates, and positions of the ice margin during recession are particularly poorly constrained. Therefore, unless otherwise noted in the map description, there are no numeric age constraints on the ice margins.

Wisconsin ice-margin names are summarized in Attig and others (2011) and Syverson and others (2011); occasionally ice-margin names from Illinois and the Upper Peninsula of Michigan are used where the margins are continuous across the state borders. Note that the distance of ice-margin recession and re-advance was significantly greater in Illinois and Indiana than in Wisconsin, especially after 26,000 years ago, likely because the climate was warmer to the south.

Dating ice extents

Radiocarbon age estimates in Wisconsin and Illinois provide some constraints on the initial advance of the Lake Michigan Lobe. In Wisconsin there are very few radiocarbon age estimates between about 30,000 and 16,000 calendar years ago that control ice-margin positions, and none at all dating advances out of the Lake Superior basin. New age estimate techniques provide more accuracy on ice-margin fluctuations, but so far they are limited in both number and extent.

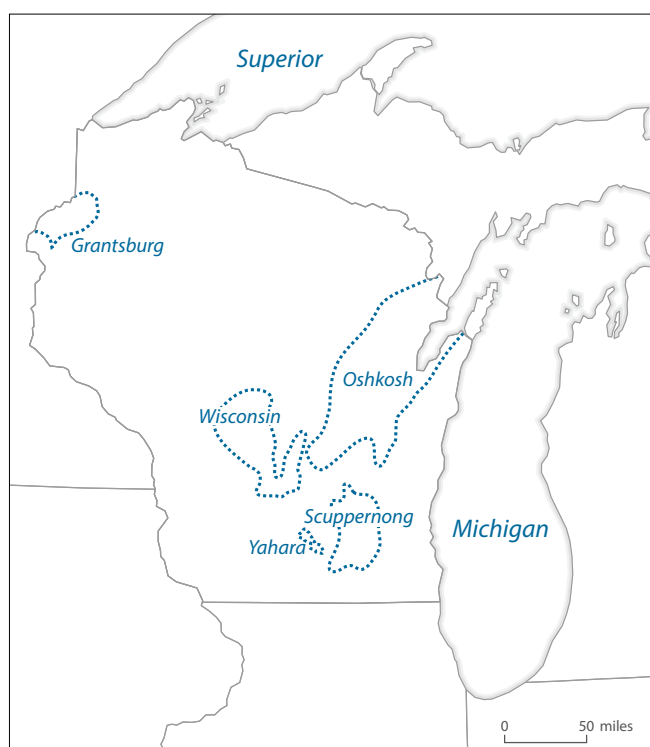
We have used crosscutting relationships of moraines, stratigraphic relationships, and available ages to assemble a series of maps that illustrate our best estimate as to where the ice margin was at various times. For many of the maps there is little or no precise age control, but we hope these maps highlight important areas for future research of ice-sheet chronology.



**Lobes of the
Laurentide Ice Sheet**

Determining lake positions

Large glacial lakes are shown in Wisconsin, but many smaller ones are not. (Glacial lakes are not shown outside of Wisconsin.) The geologic evidence for these former lakes is the distribution of lake sediment and, in a few places, beaches. The elevations of the lakes depicted on each map were calculated by incorporating an isostatic rebound model that calculates land surface elevations at various times in the past (Clark and others, 1994; James Clark, personal communication, 2010, 2011). For each map, we subtracted those elevations from the present-day digital elevation model (DEM). Those elevations were extrapolated onto the paleo-DEMs to depict a representative shoreline for illustrative purposes.



General location of major glacial lakes in Wisconsin.

Glacial lakes were formed and drained as the ice sheet advanced and retreated. These lakes were not all present at the same time.

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NOTE: The ice-margin maps are intended to be used at the 8 ½- x 11-inch page size and no larger; they are not intended to provide the level of details found on larger maps. The maps are best viewed as a continuous sequence.

Selected references

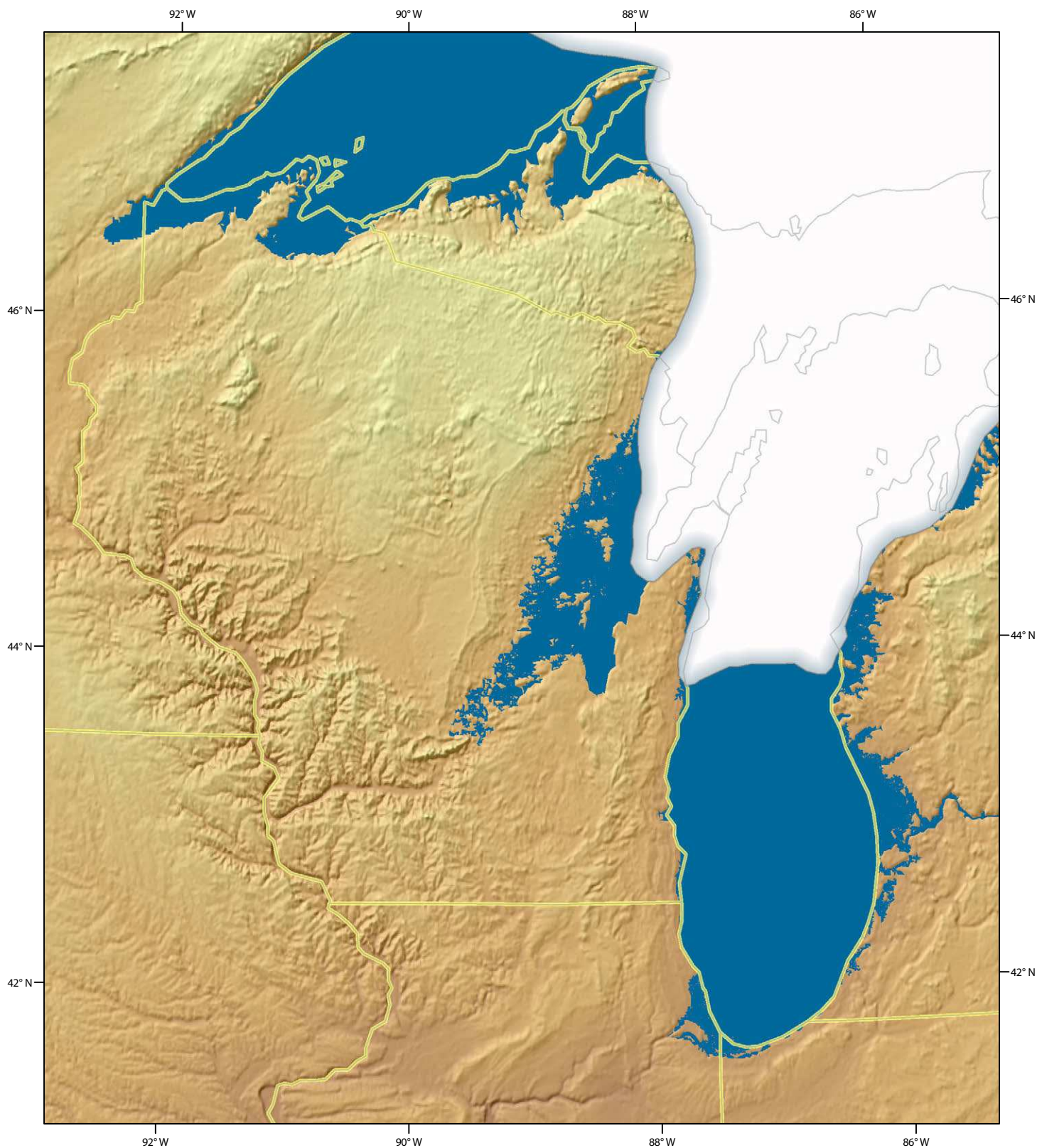
A sample of some of the references used in putting together this set of maps is listed below.

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31,500
YEARS AGO

LAURENTIDE ICE SHEET: ICE-MARGIN POSITIONS

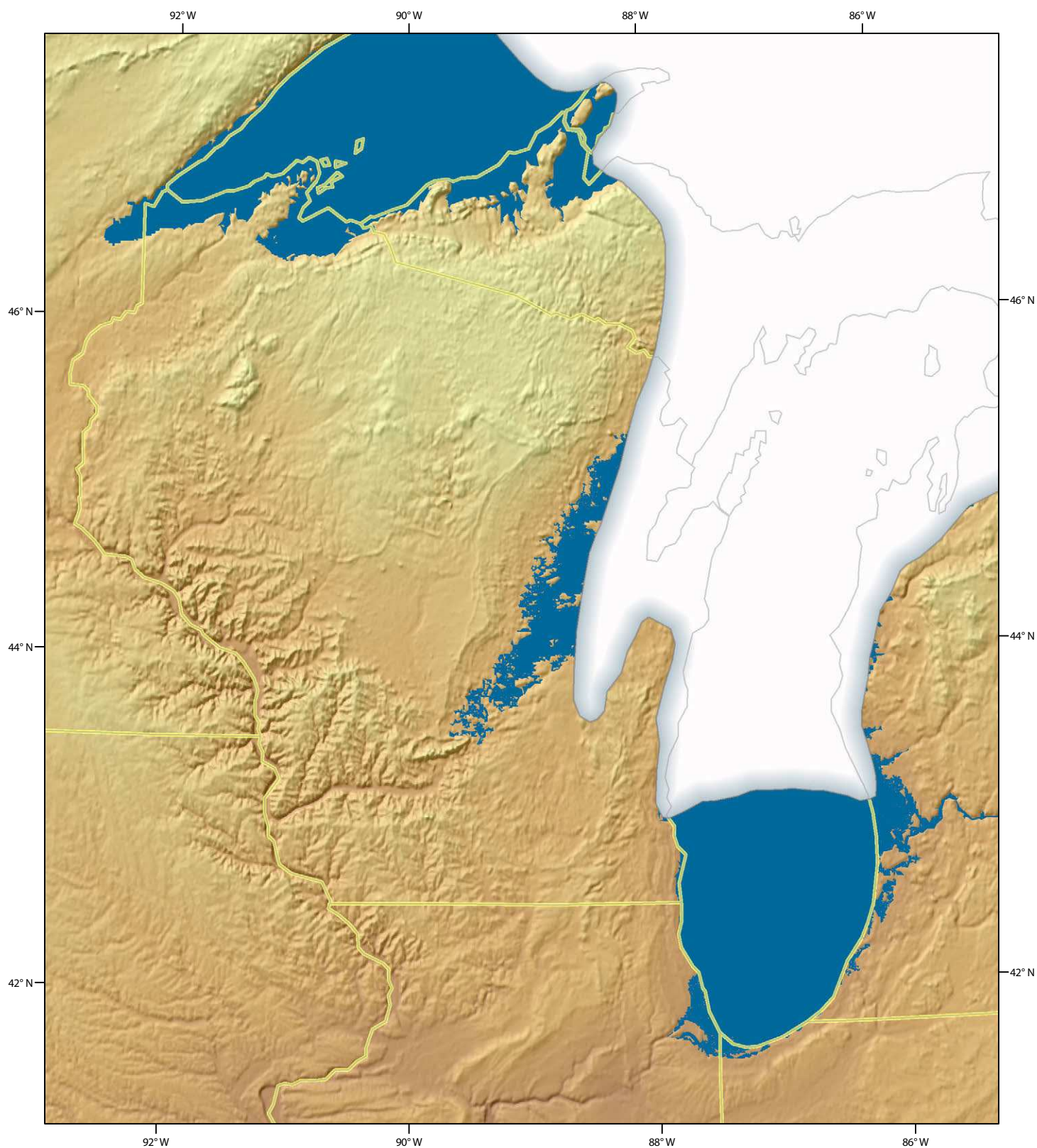
Ice advances into the eastern part of Lake Superior basin and the northern part of the Lake Michigan basin, Lakes Michigan and Superior at higher phases, glacial Lake Oshkosh forms—constraints are dates of 39,350 of hardwood in pink till and 31,640 in lake sediment between two tills in Sheboygan County.



31,000
YEARS AGO

LAURENTIDE ICE SHEET: ICE-MARGIN POSITIONS

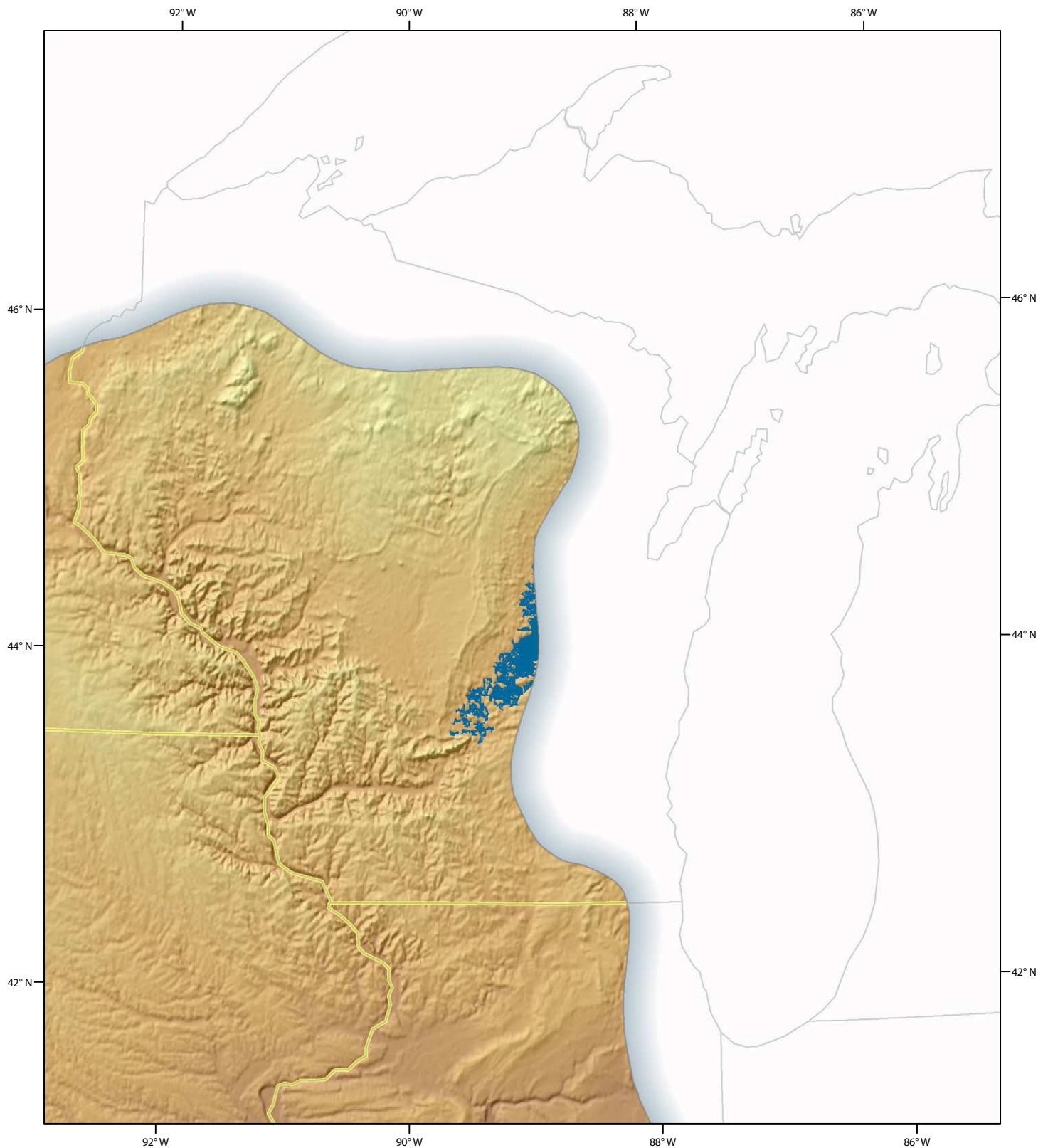
Continued advance.



30,000
YEARS AGO

LAURENTIDE ICE SHEET: ICE-MARGIN POSITIONS

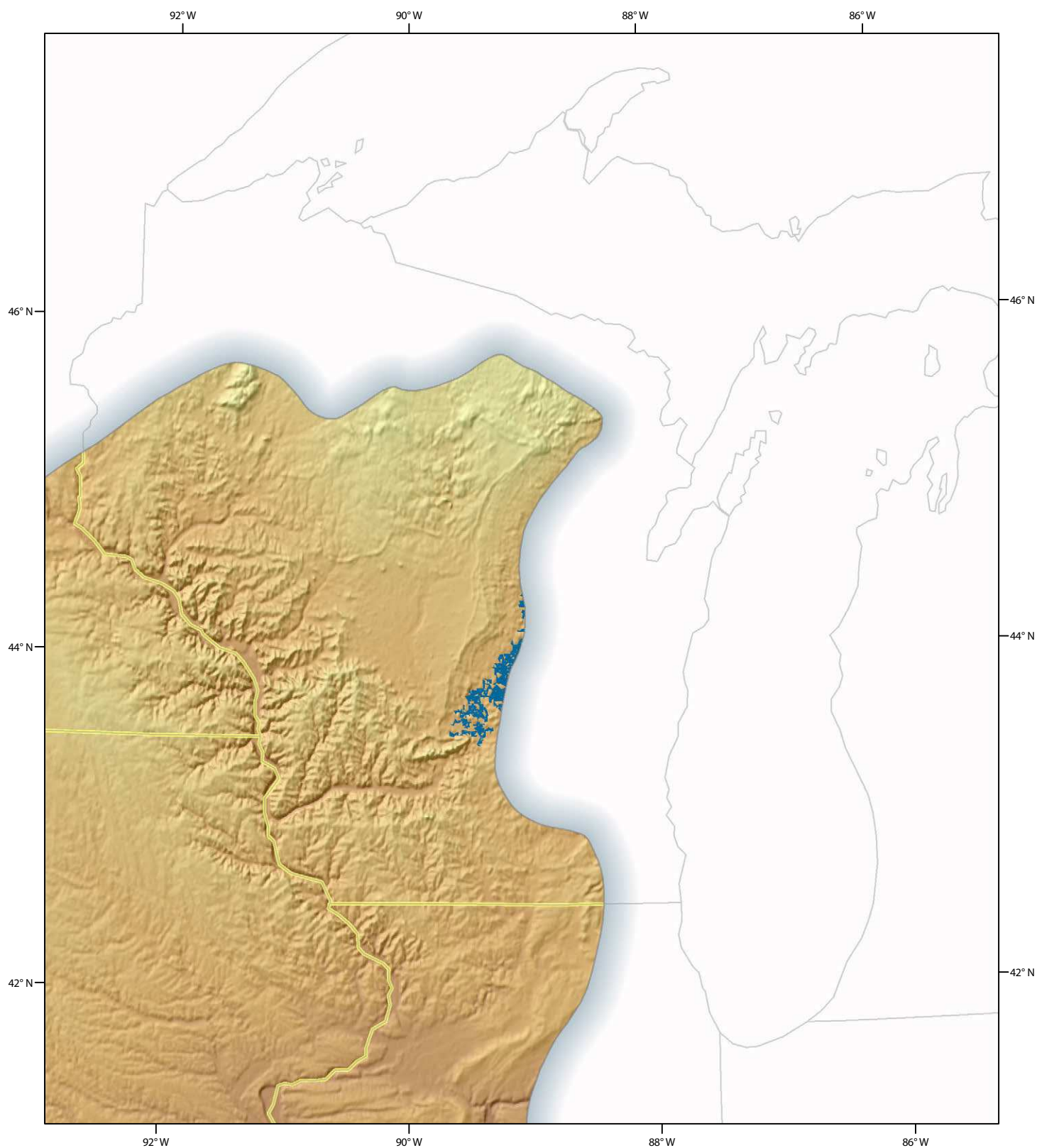
Ice advancing toward the Early St. Croix, Early Chippewa, Stanley, Arnott, and Brooklyn positions.



29,500
YEARS AGO

LAURENTIDE ICE SHEET: ICE-MARGIN POSITIONS

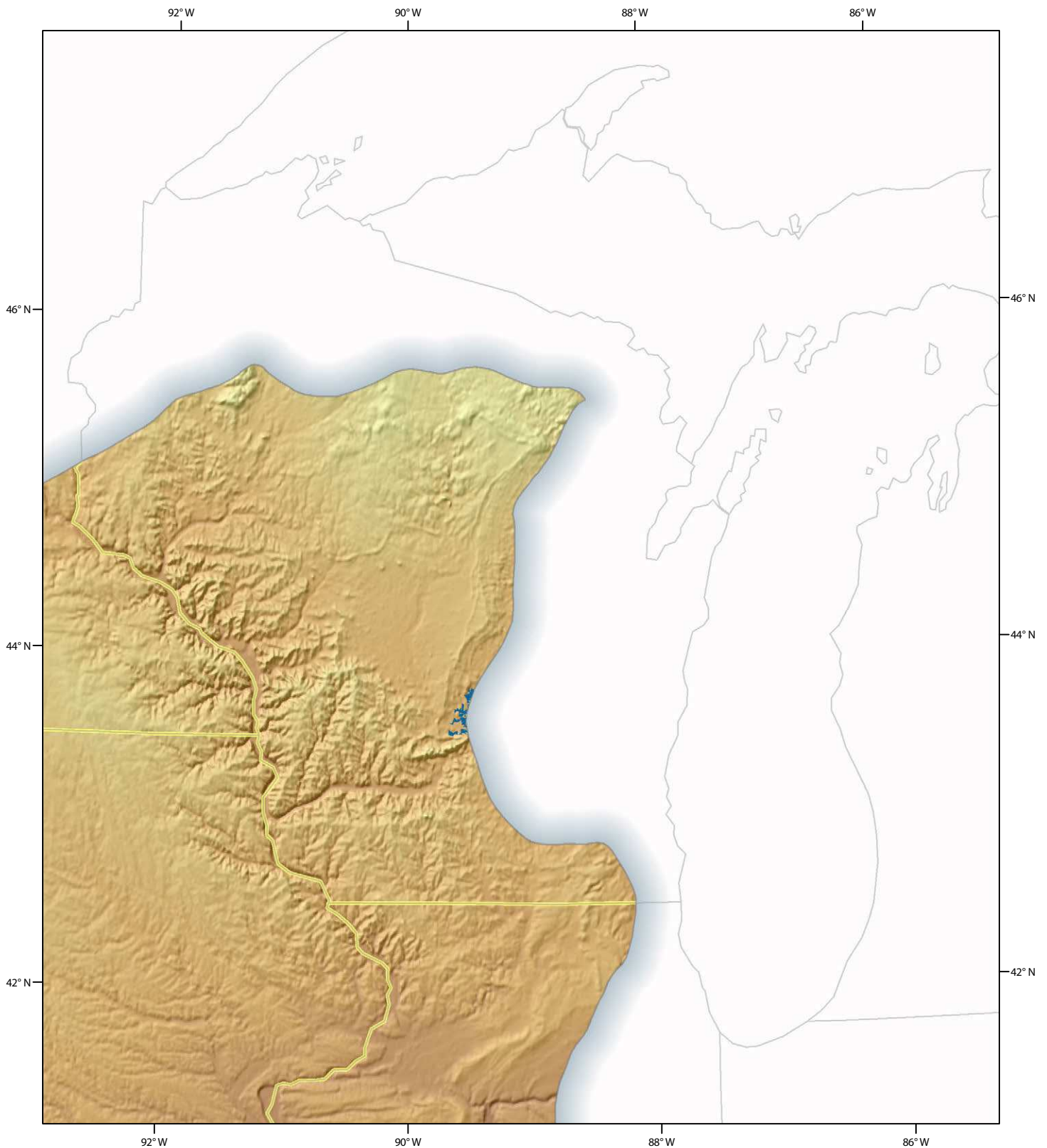
Slight advance.



29,000
YEARS AGO

LAURENTIDE ICE SHEET: ICE-MARGIN POSITIONS

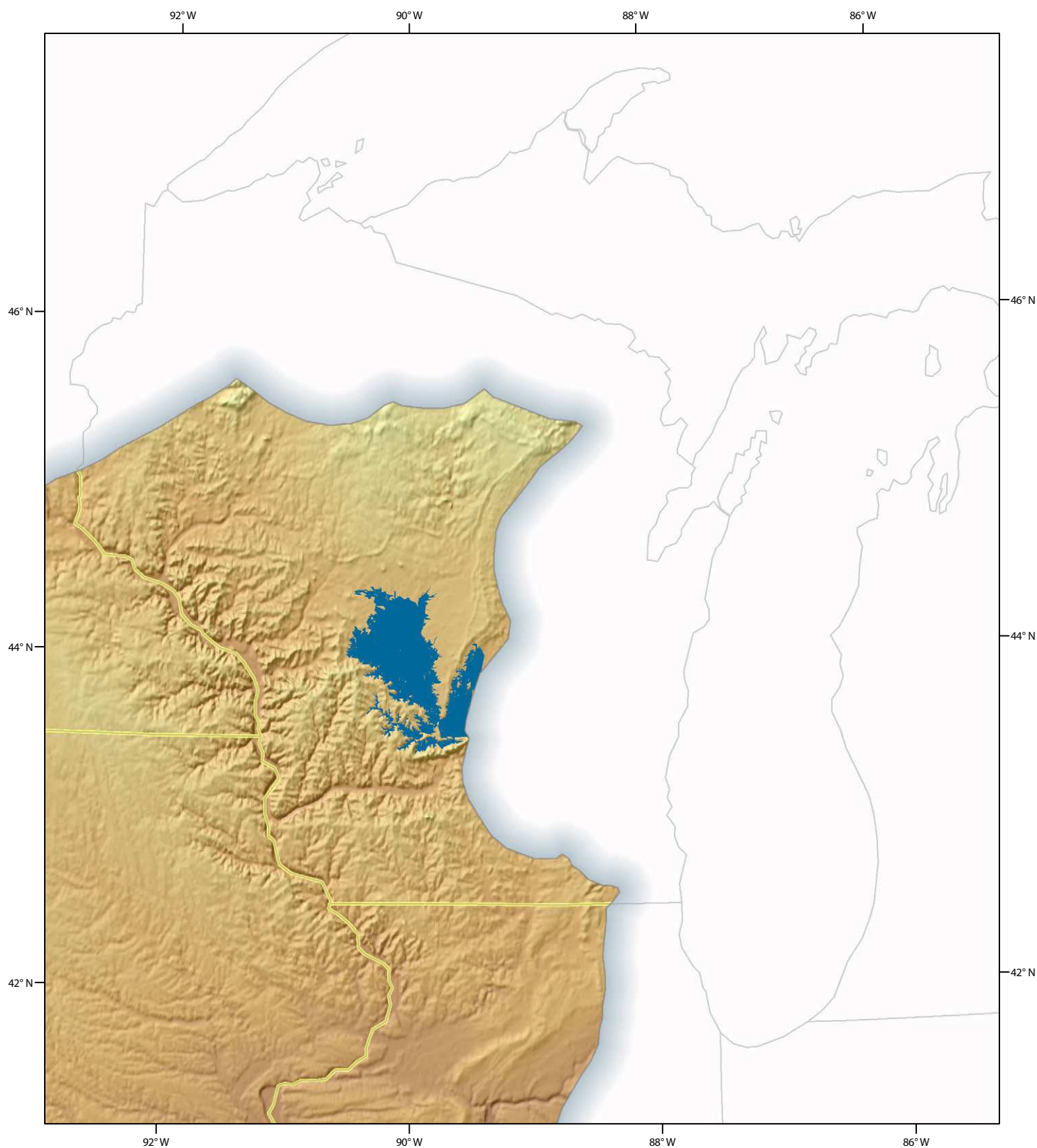
Slight advance—several 28,000 to 29,600 ages under Tiskilwa till in Illinois.



28,500
YEARS AGO

LAURENTIDE ICE SHEET: ICE-MARGIN POSITIONS

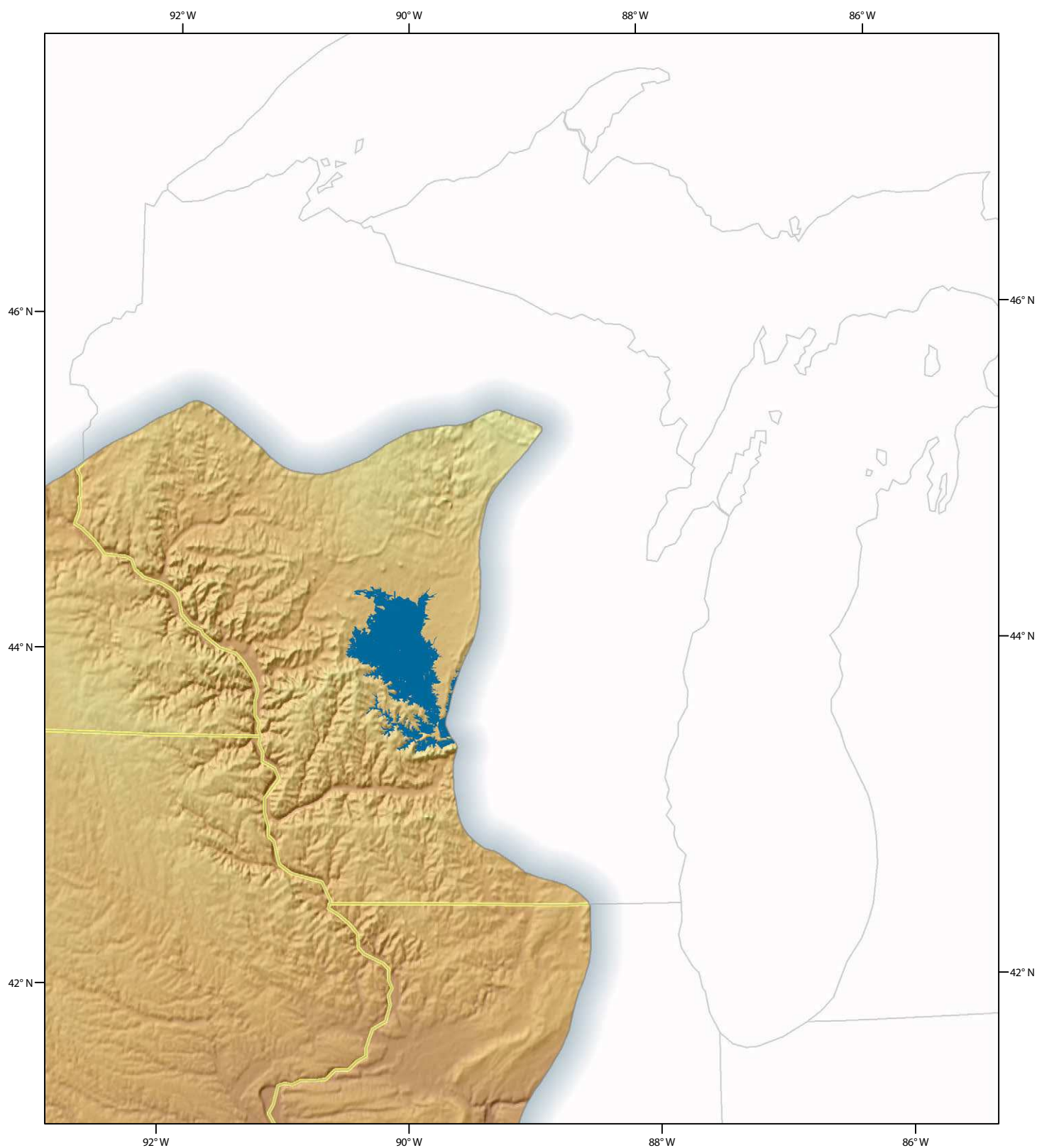
Slight advance, glacial Lake Wisconsin forms.



28,000
YEARS AGO

LAURENTIDE ICE SHEET: ICE-MARGIN POSITIONS

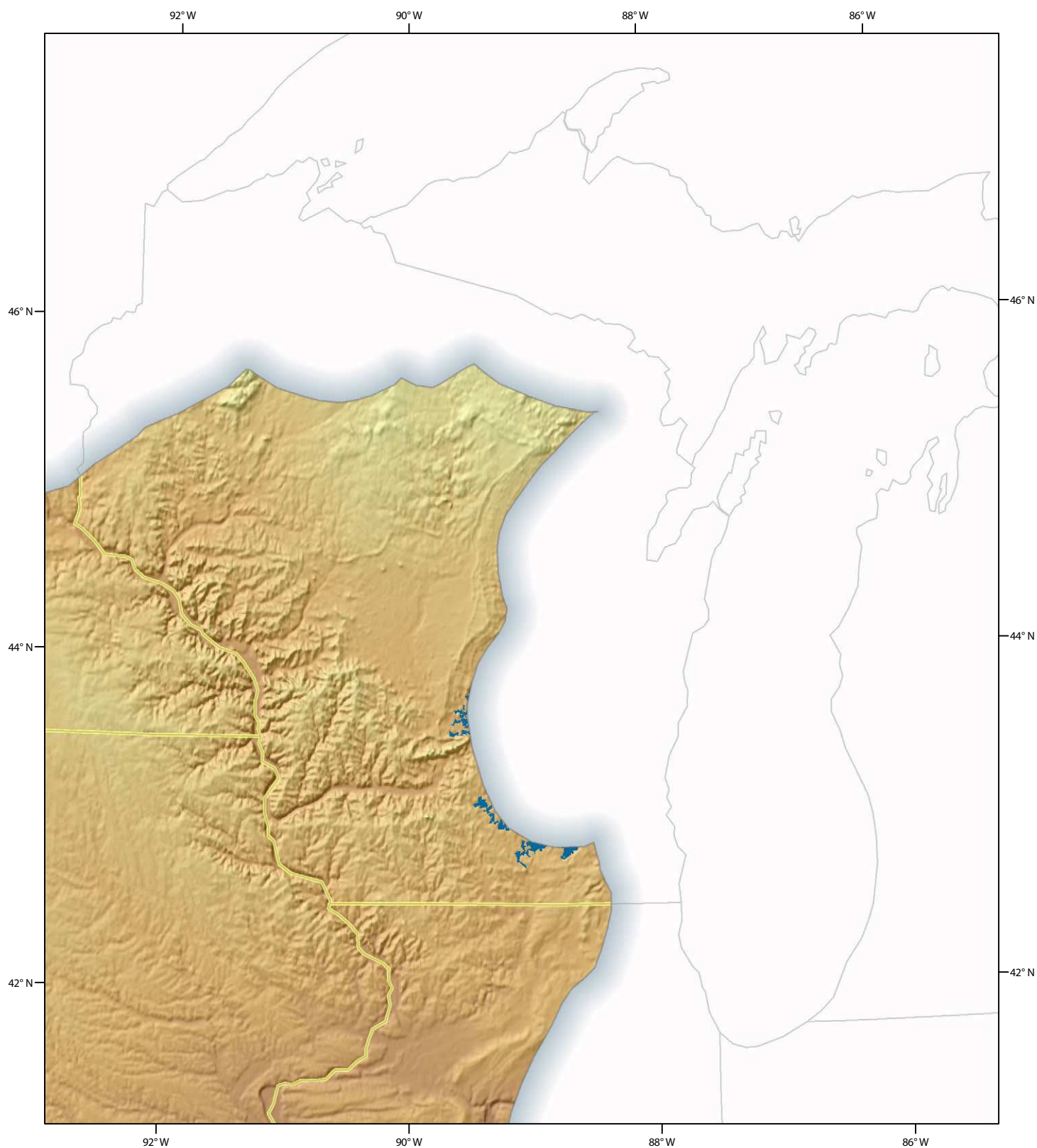
Continued minor advance.



27,500
YEARS AGO

LAURENTIDE ICE SHEET: ICE-MARGIN POSITIONS

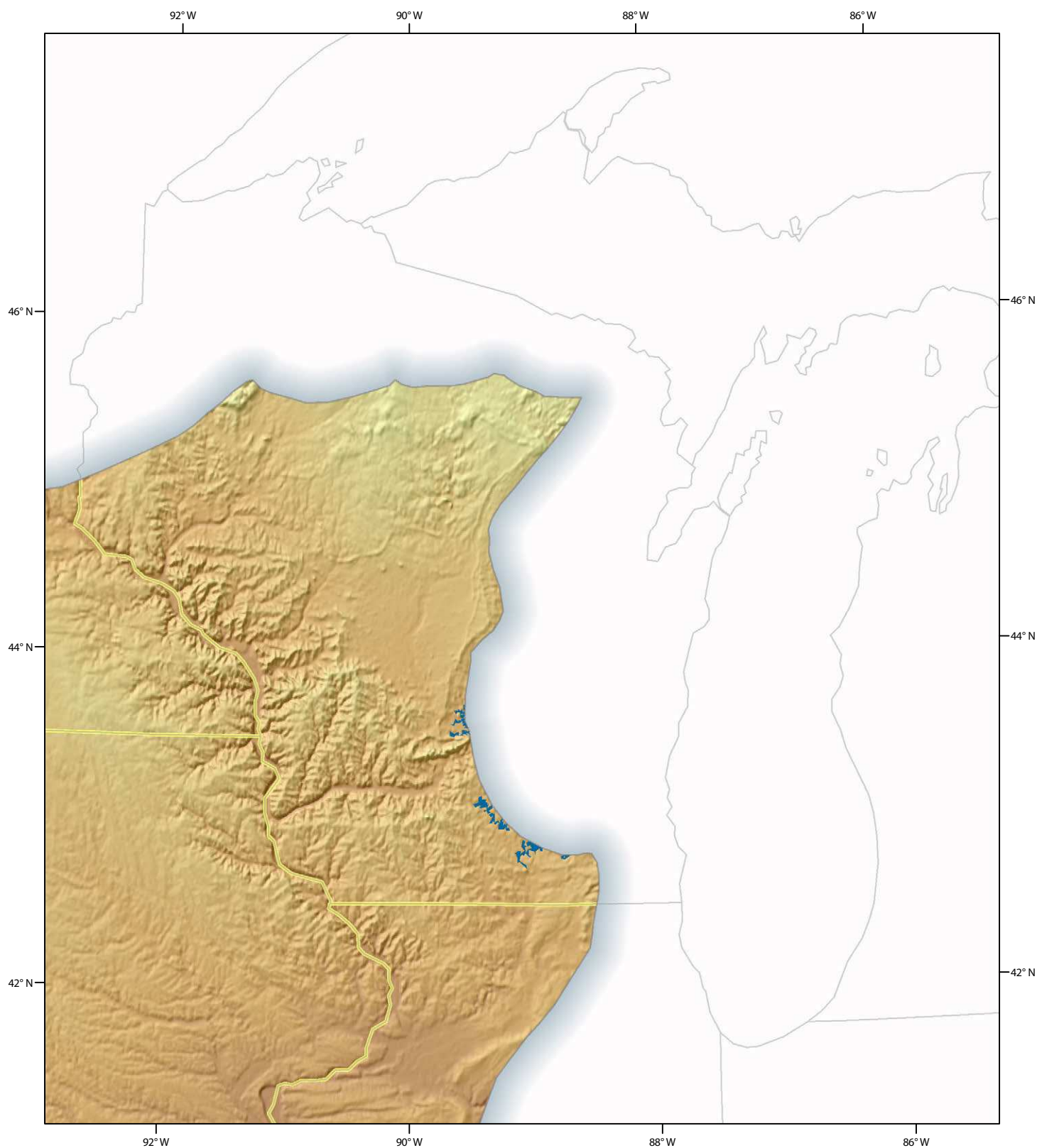
Minor recession, glacial Lake Wisconsin drains.



27,000
YEARS AGO

LAURENTIDE ICE SHEET: ICE-MARGIN POSITIONS

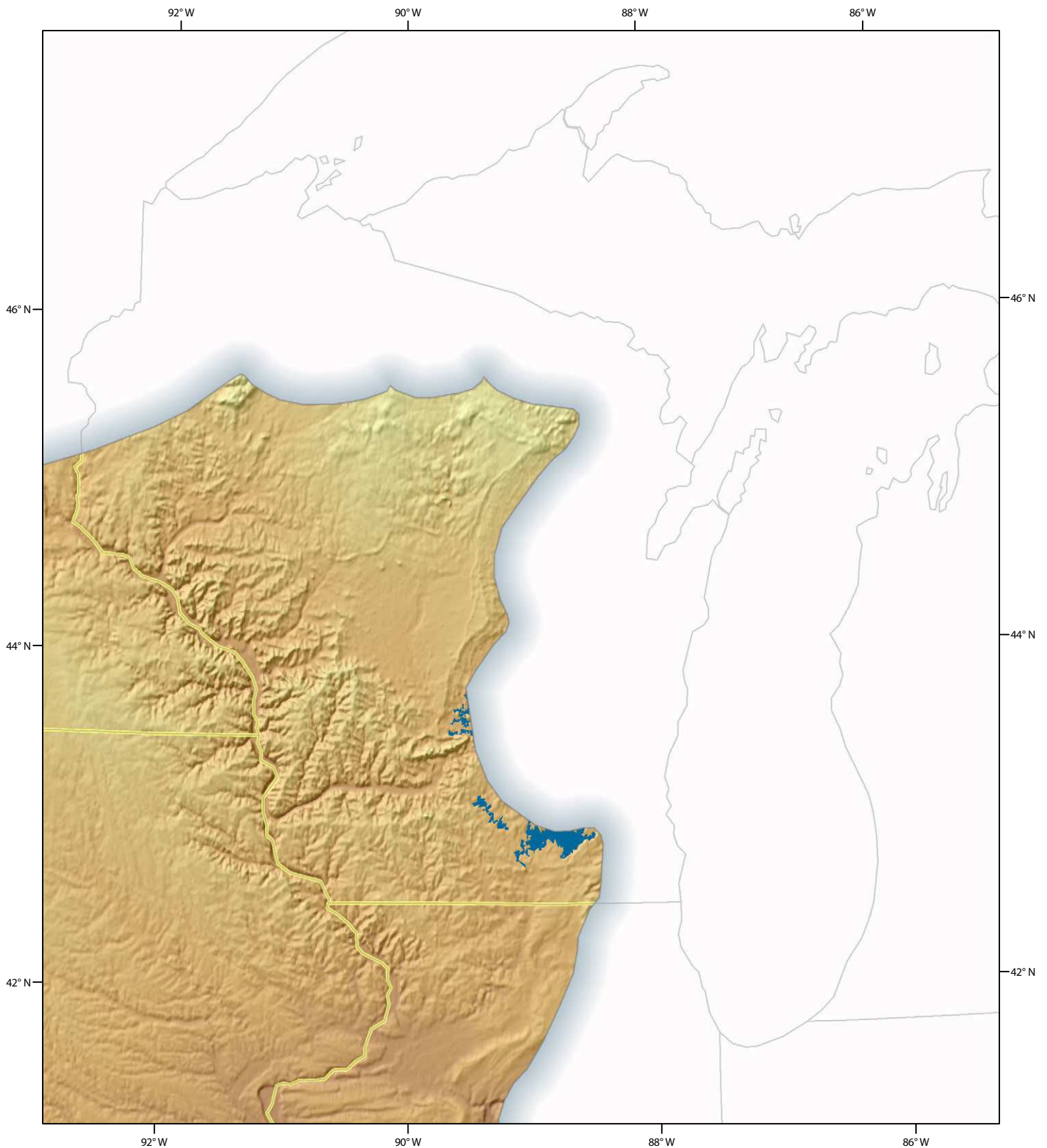
Minor advance and recession, glacial Lake Yahara forms.



26,500
YEARS AGO

LAURENTIDE ICE SHEET: ICE-MARGIN POSITIONS

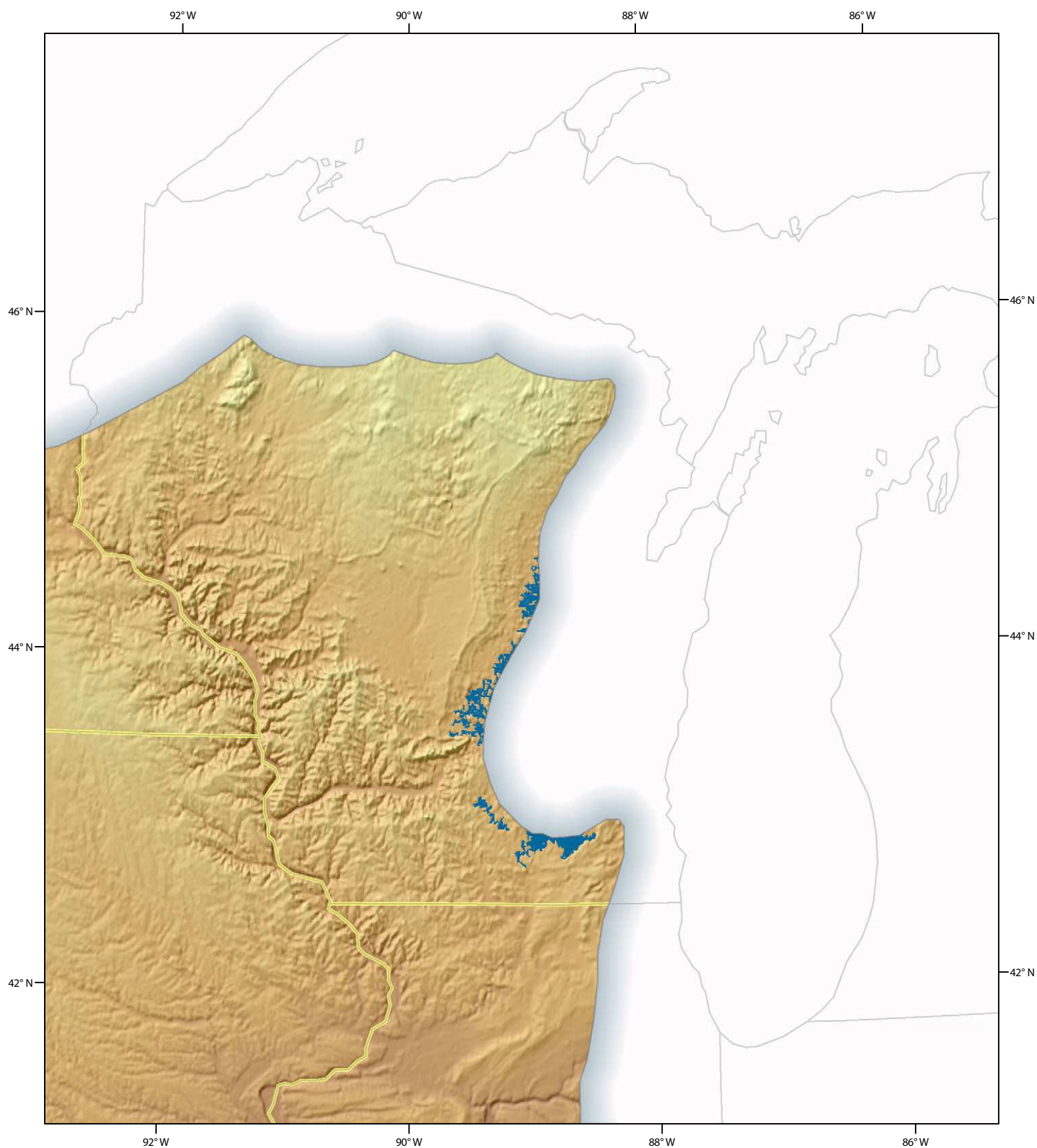
Ice-margin position nearly stable, glacial Lake Scuppernong forms.



26,000
YEARS AGO

LAURENTIDE ICE SHEET: ICE-MARGIN POSITIONS

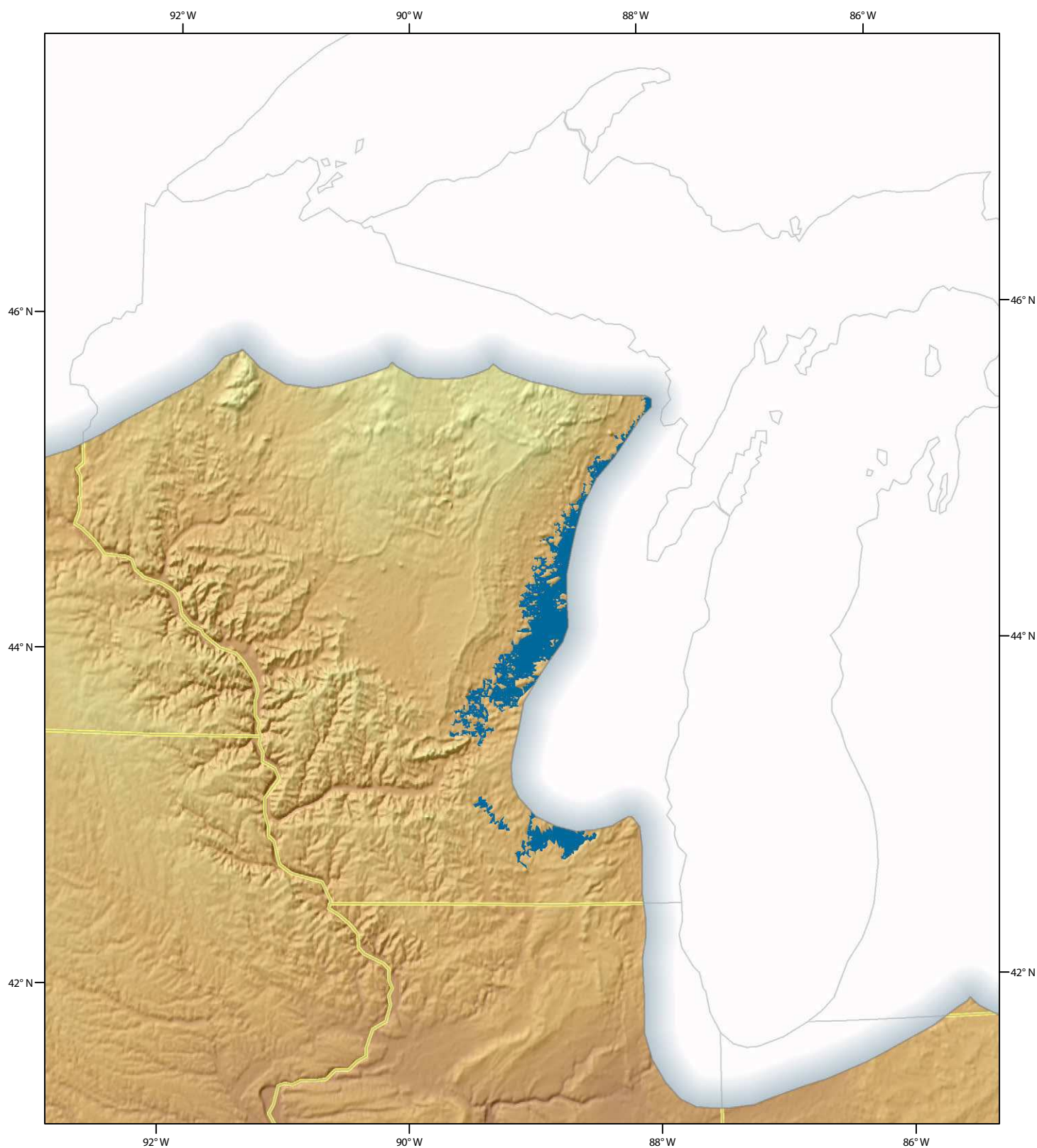
Minor recession, glacial Lake Oshkosh forms.



25,500
YEARS AGO

LAURENTIDE ICE SHEET: ICE-MARGIN POSITIONS

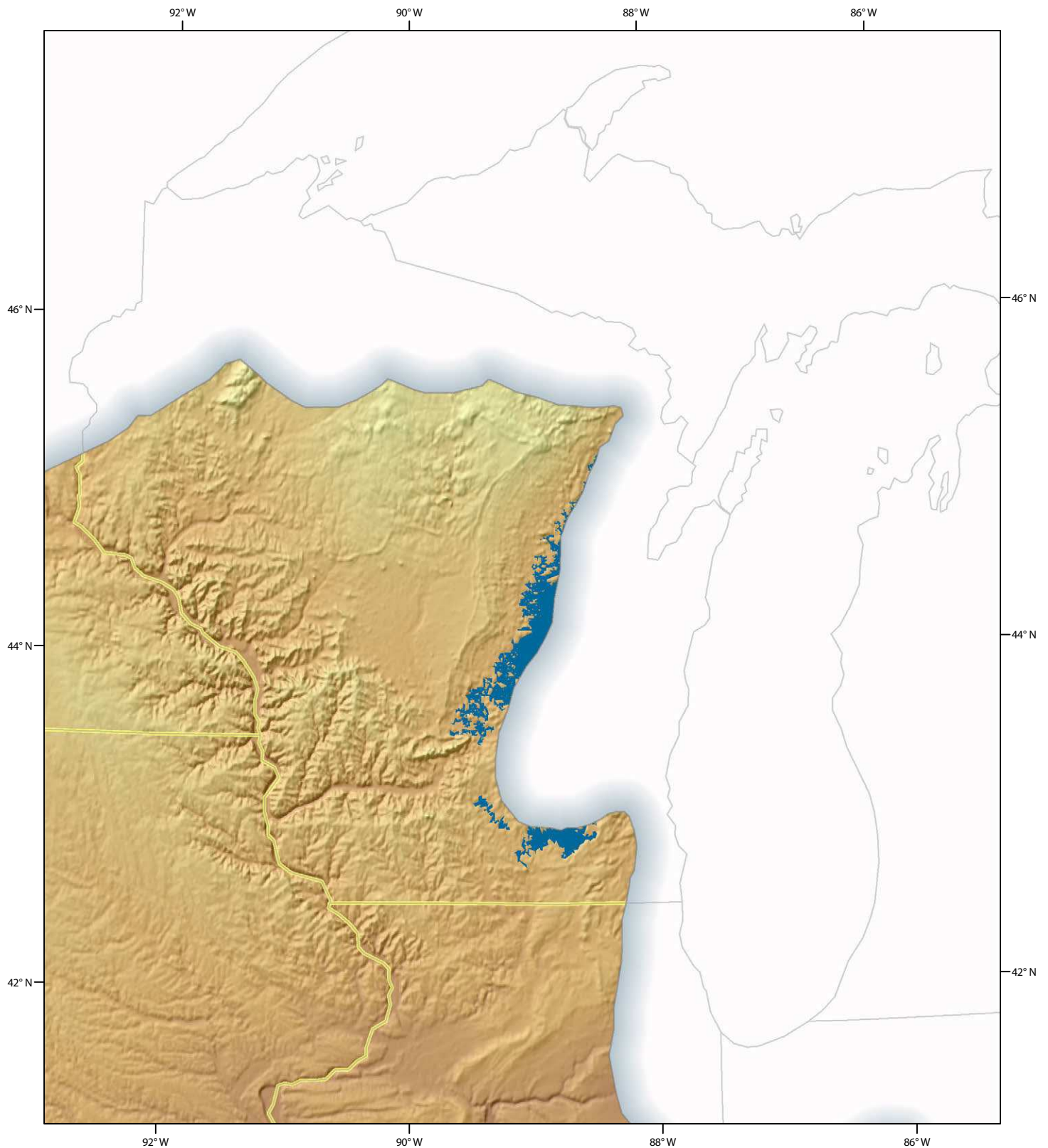
Minor advance or recession.



25,000
YEARS AGO

LAURENTIDE ICE SHEET: ICE-MARGIN POSITIONS

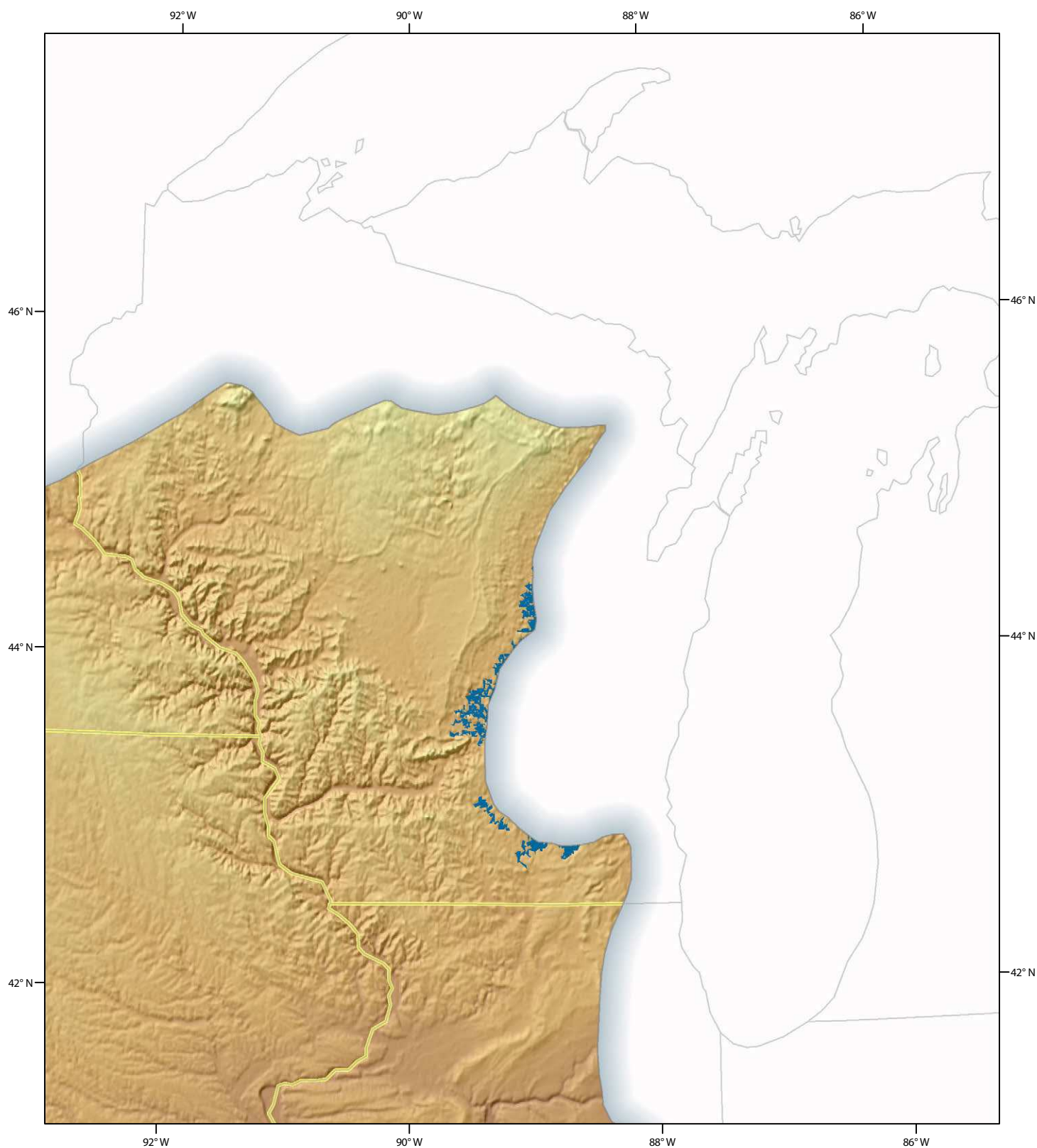
Minor advance.



24,500
YEARS AGO

LAURENTIDE ICE SHEET: ICE-MARGIN POSITIONS

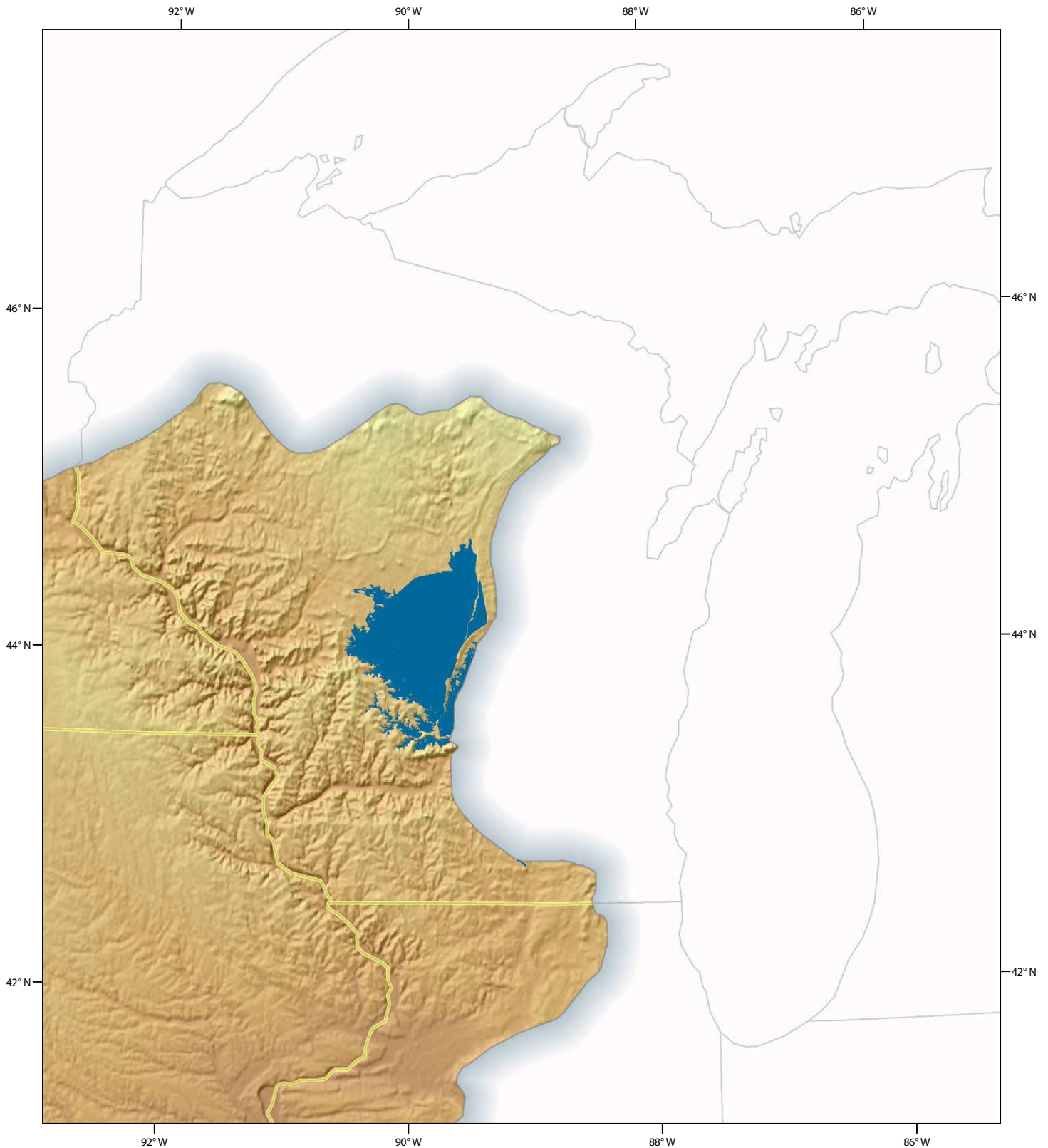
Continued minor advance.



24,000
YEARS AGO

LAURENTIDE ICE SHEET: ICE-MARGIN POSITIONS

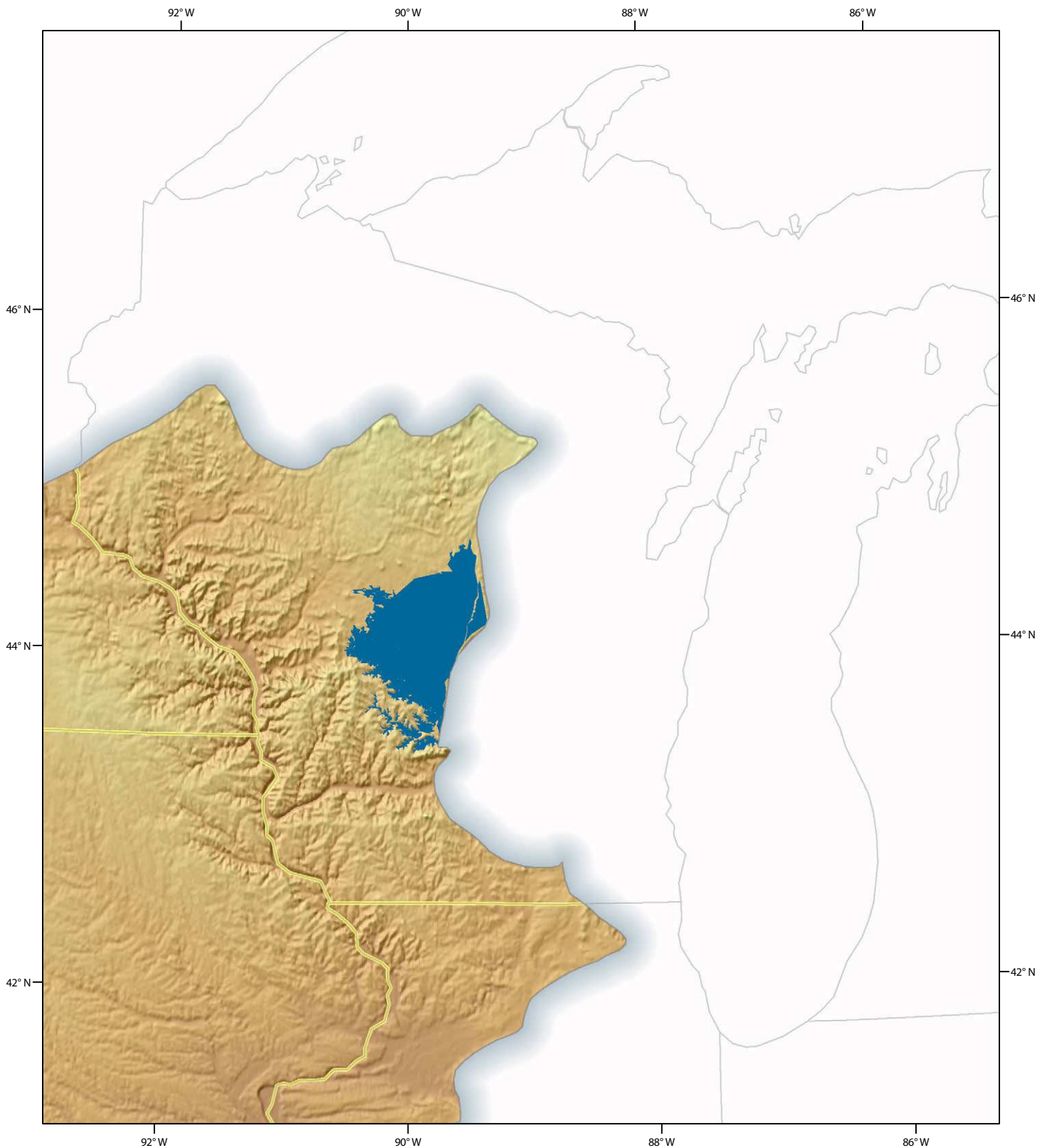
Advance to near the Johnstown position, glacial Lake Wisconsin forms as ice margin reaches the eastern Baraboo Hills.



23,500
YEARS AGO

LAURENTIDE ICE SHEET: ICE-MARGIN POSITIONS

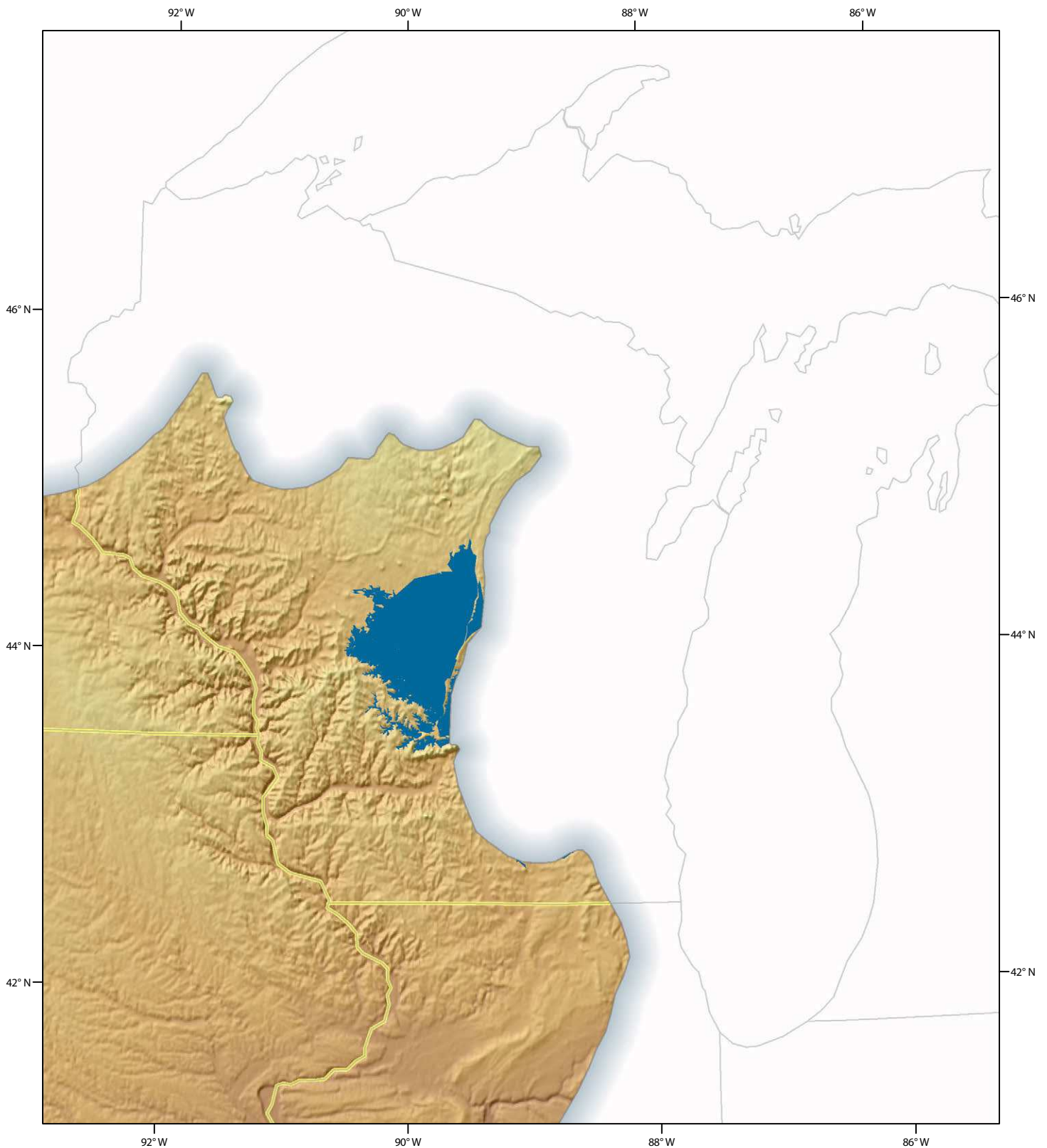
Ice margin at the Hancock, Johnstown, Bloomington positions
—several 23,000 dates in Illinois.



23,000
YEARS AGO

LAURENTIDE ICE SHEET: ICE-MARGIN POSITIONS

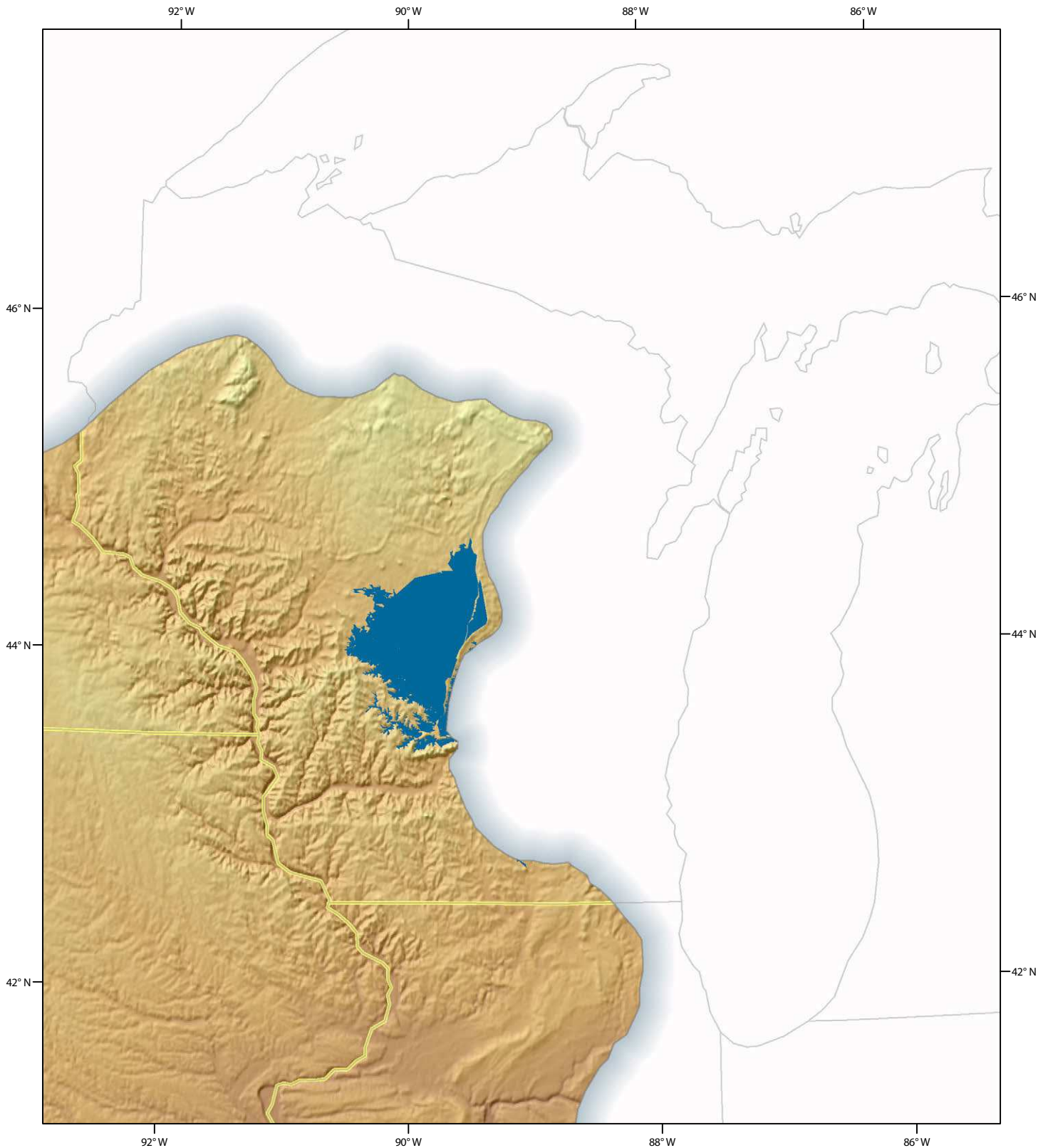
Minor recession and advance to the Parrish, Harrison, Chippewa positions.



22,500
YEARS AGO

LAURENTIDE ICE SHEET: ICE-MARGIN POSITIONS

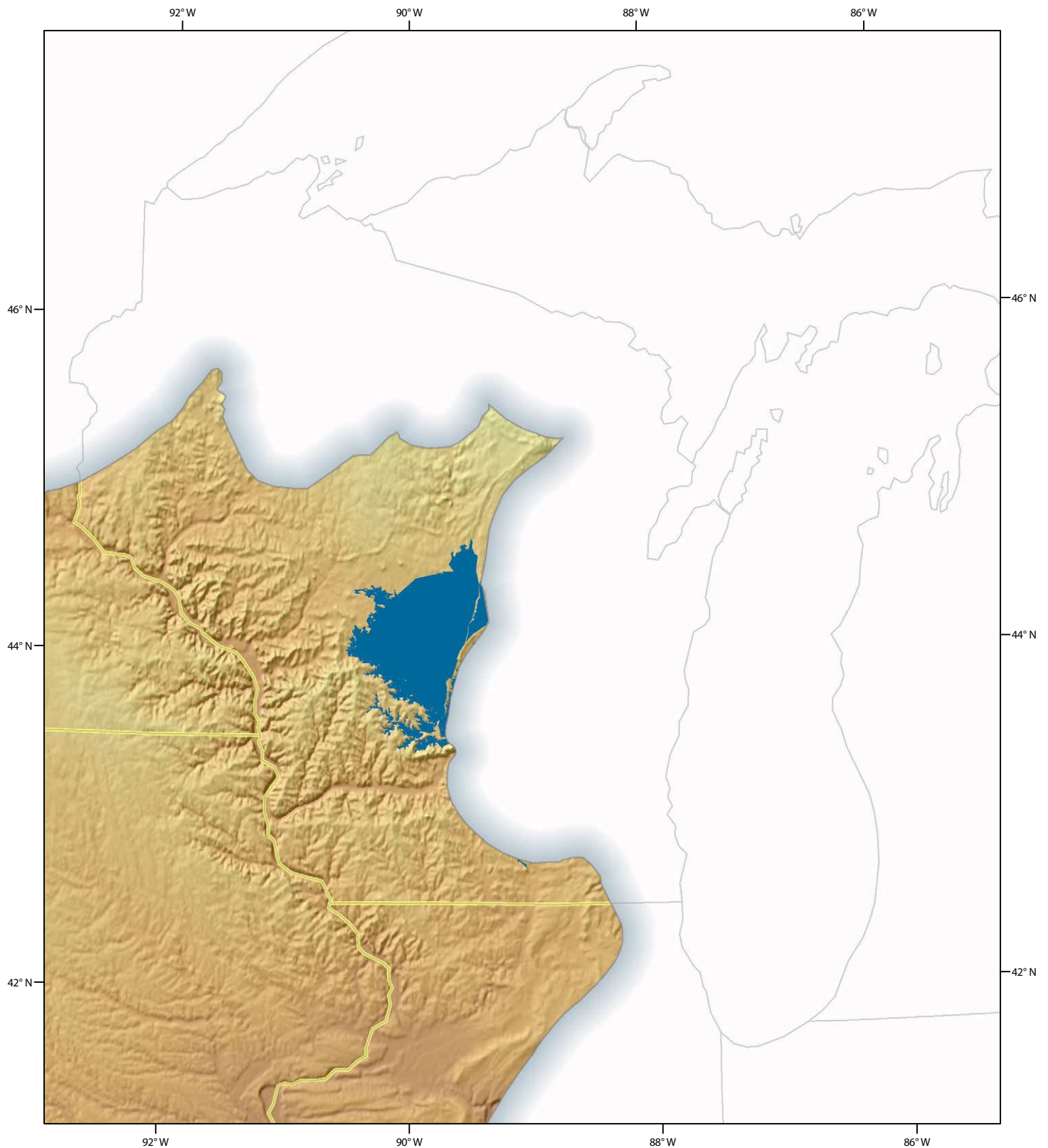
Minor recession.



22,000
YEARS AGO

LAURENTIDE ICE SHEET: ICE-MARGIN POSITIONS

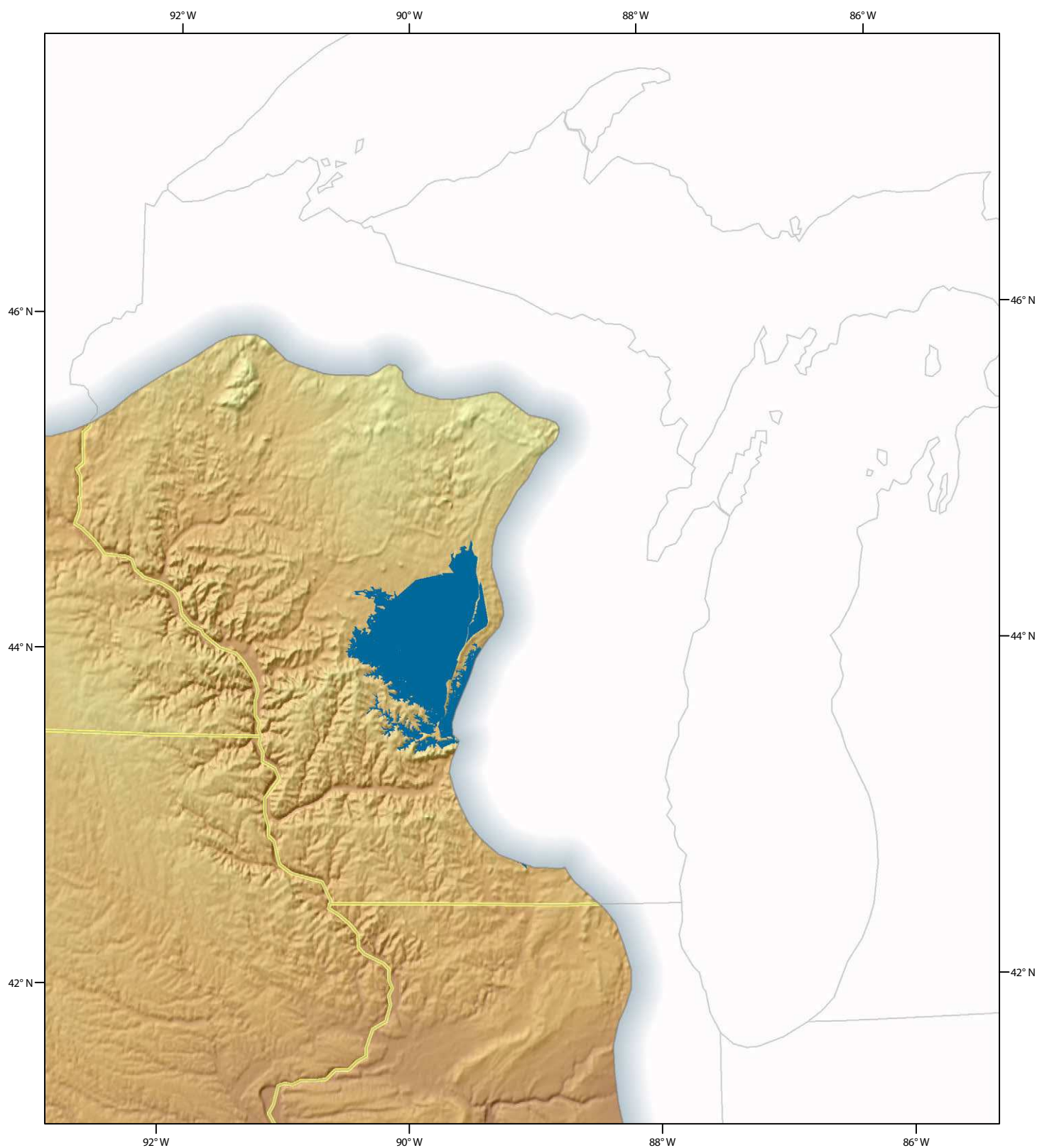
Chippewa and Wisconsin Valley Lobes advance, Green Bay Lobe behind
Almond position.



21,500
YEARS AGO

LAURENTIDE ICE SHEET: ICE-MARGIN POSITIONS

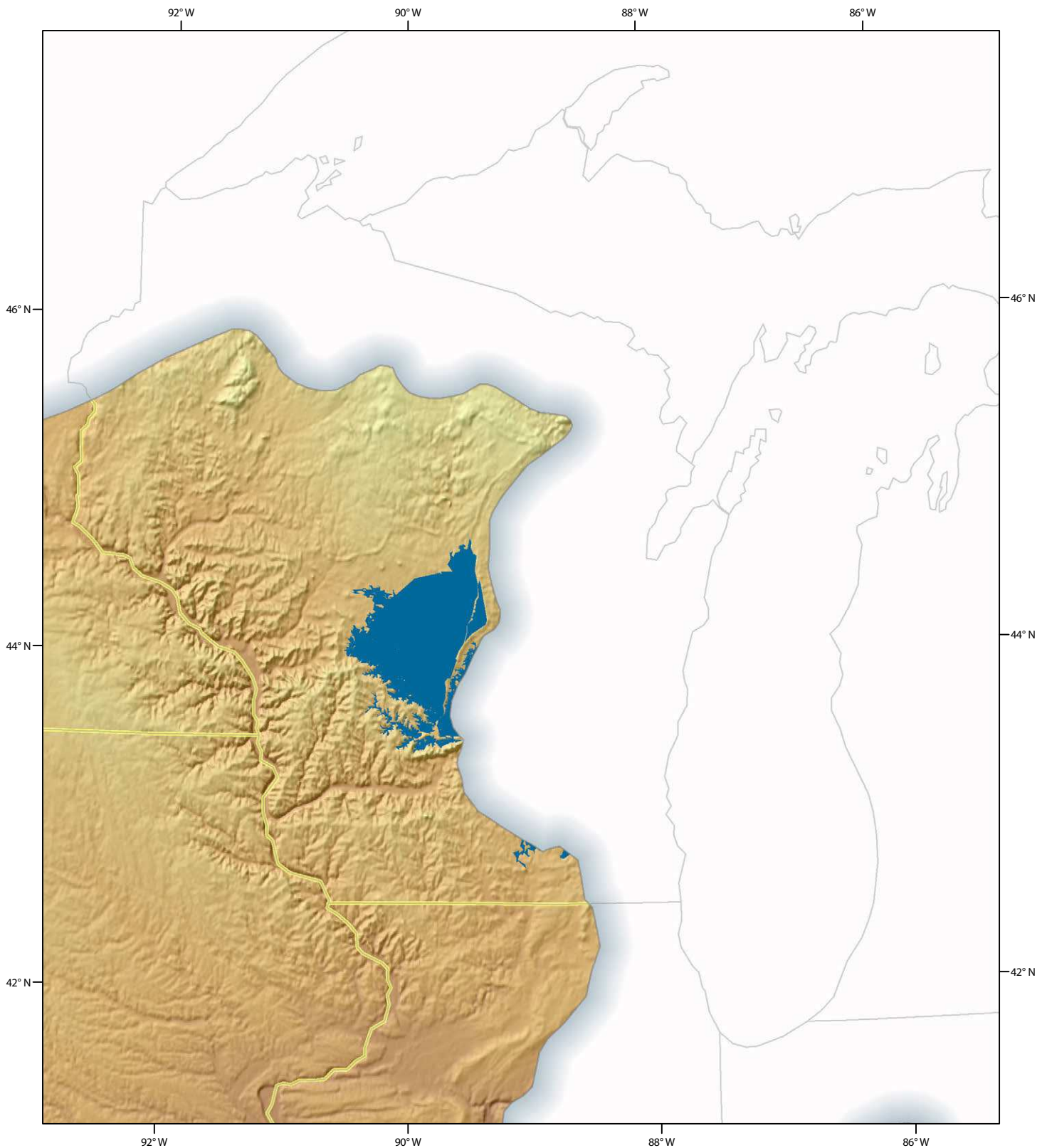
Recession.



21,000
YEARS AGO

LAURENTIDE ICE SHEET: ICE-MARGIN POSITIONS

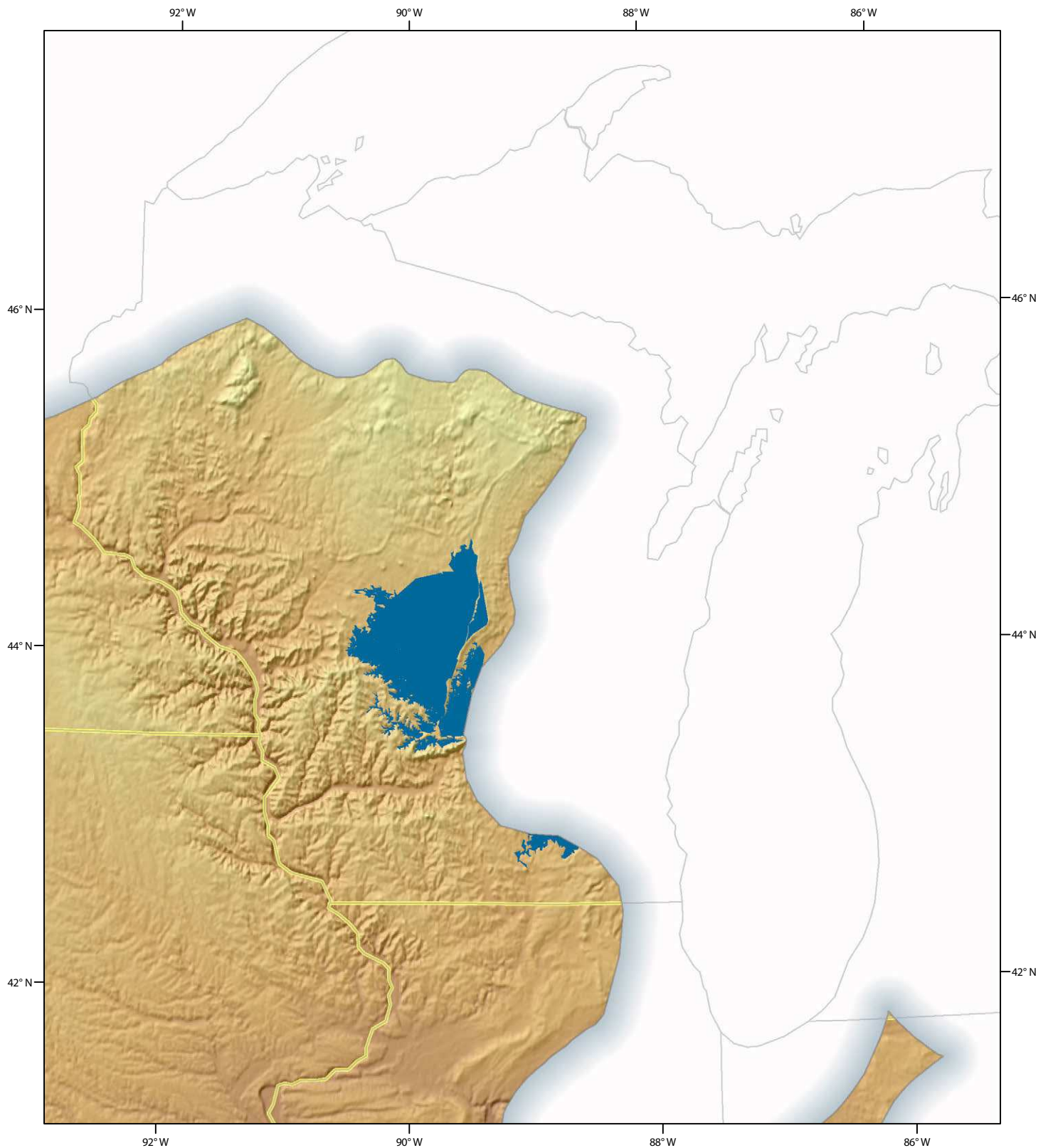
Little change in Wisconsin; recession to the Paxton, Farm Ridge, Chatsworth, and St. Charles positions in Illinois.



20,500
YEARS AGO

LAURENTIDE ICE SHEET: ICE-MARGIN POSITIONS

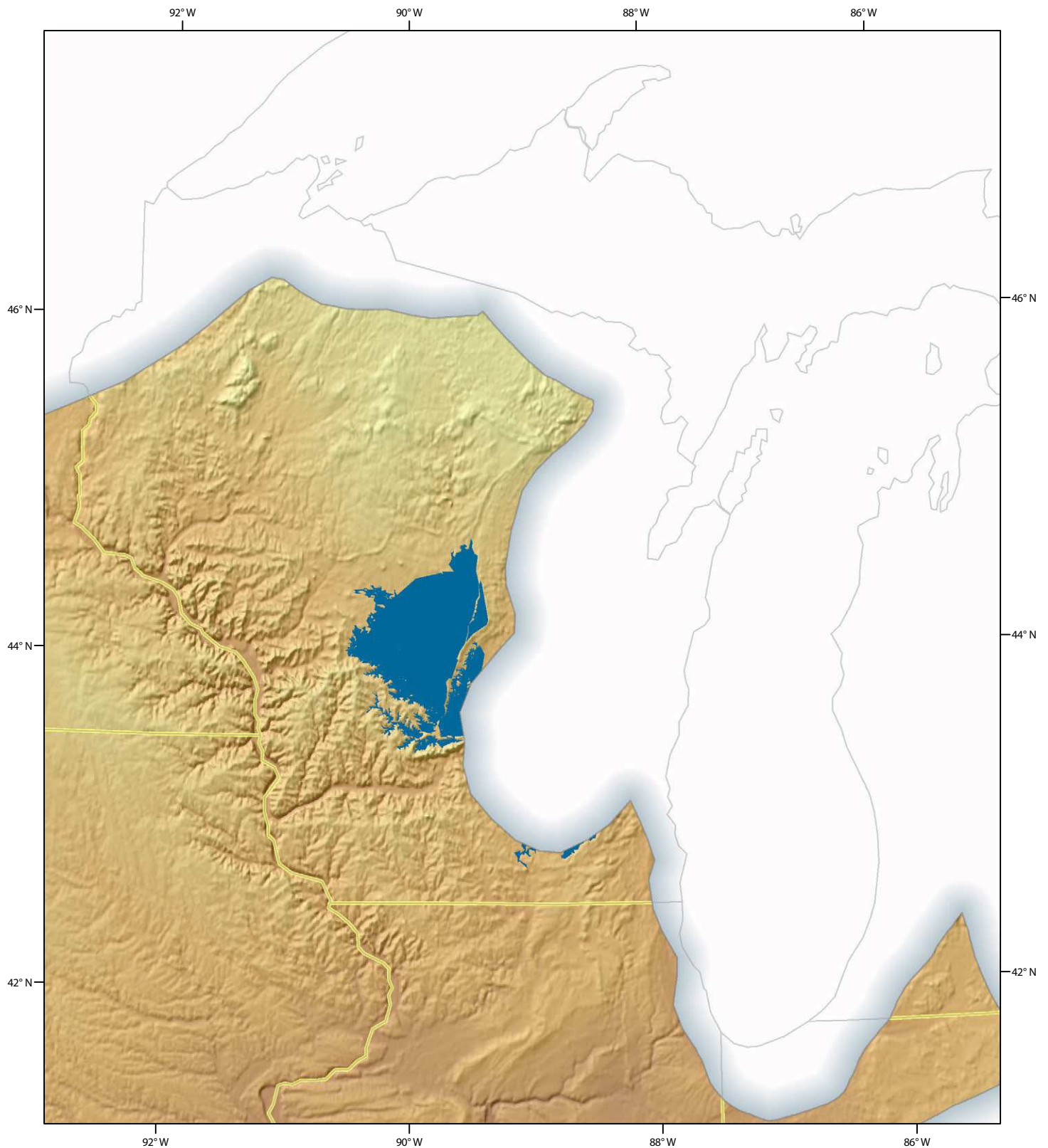
Ice still on eastern Baraboo Hills, ice at Marseilles position in Illinois.



20,000
YEARS AGO

LAURENTIDE ICE SHEET: ICE-MARGIN POSITIONS

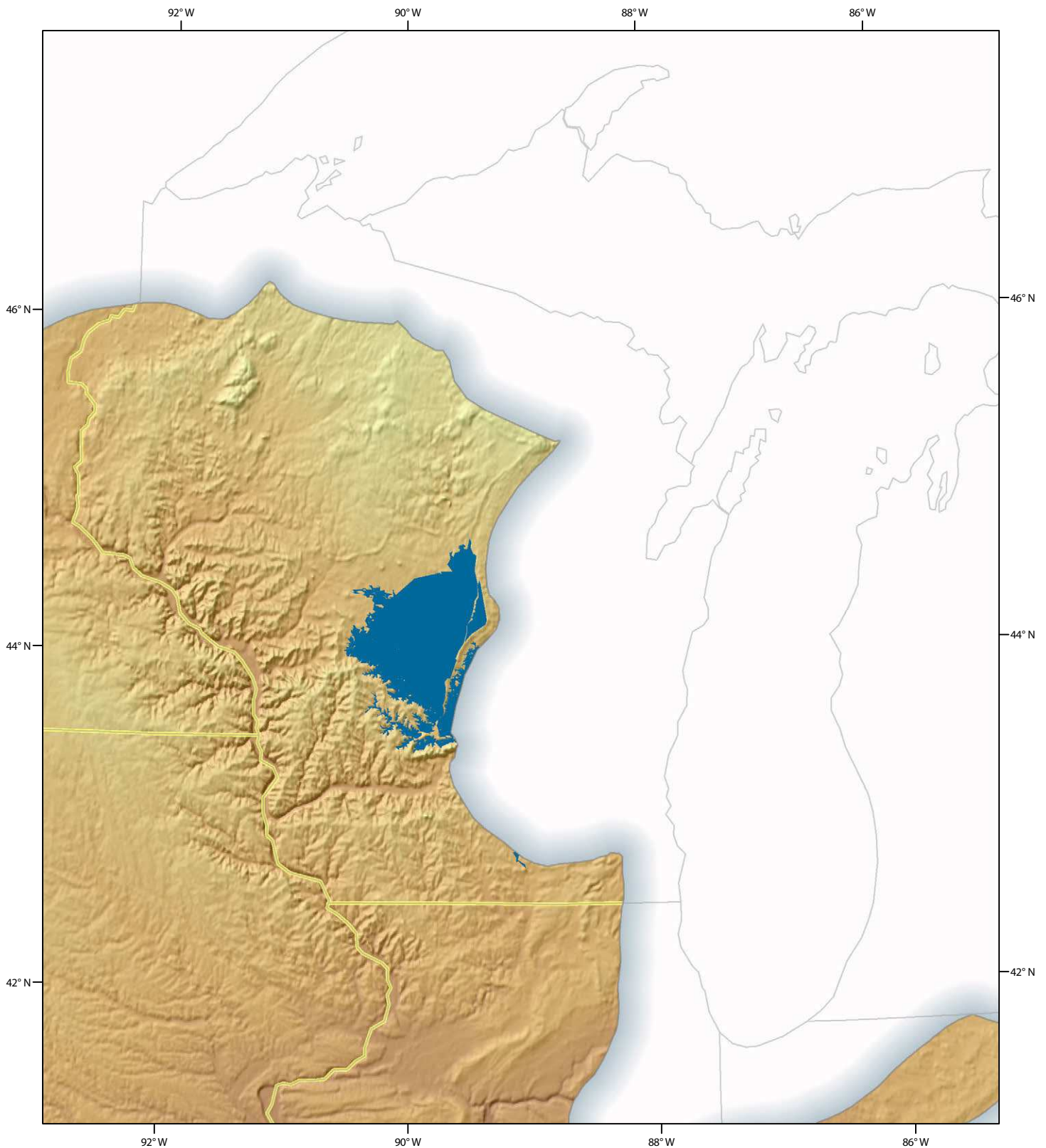
Ice still on eastern Baraboo Hills, recession from Marseilles position.



19,500
YEARS AGO

LAURENTIDE ICE SHEET: ICE-MARGIN POSITIONS

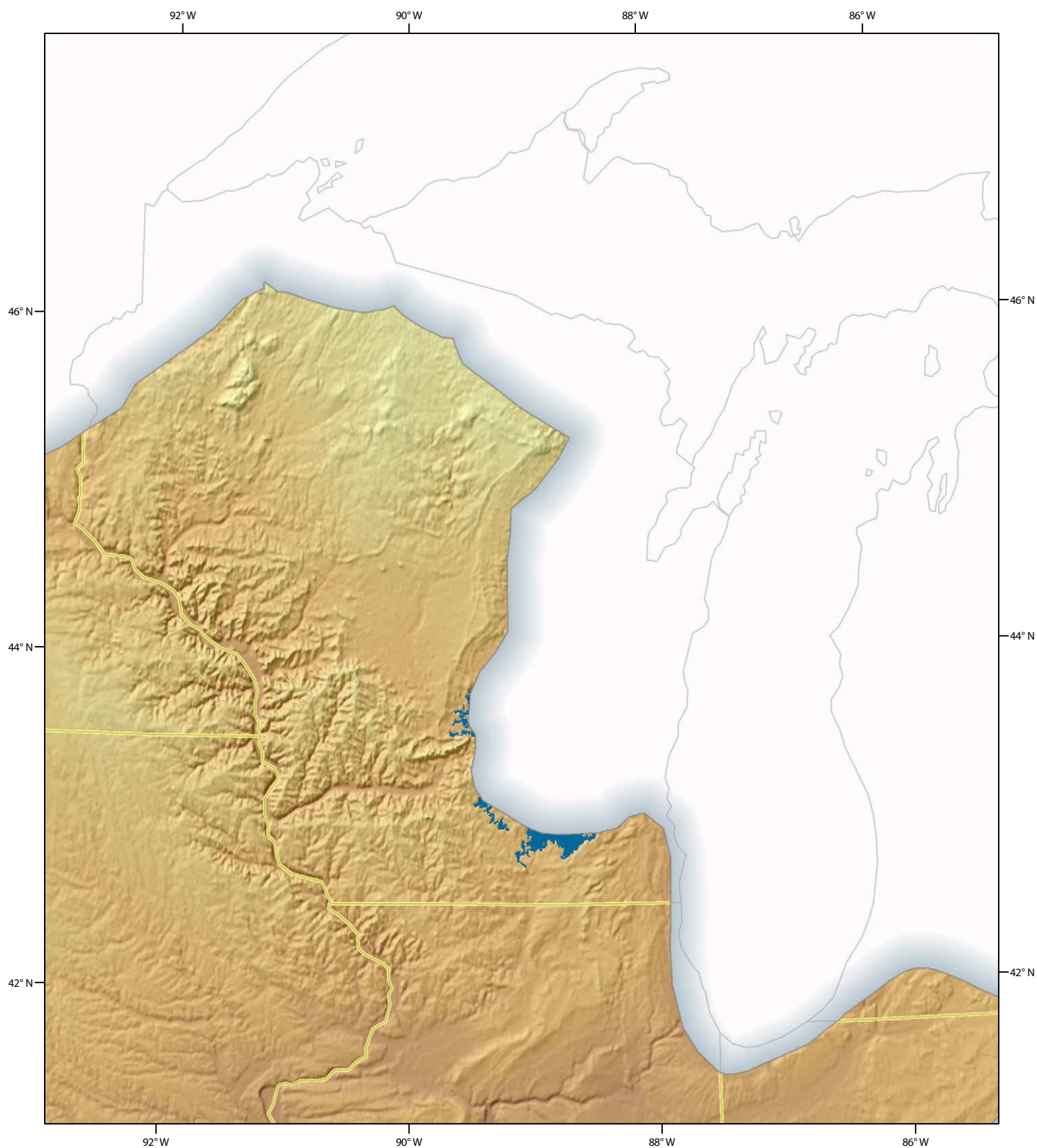
Little change in Wisconsin, Chippewa Lobe at Tiger Cat position, Wisconsin Valley Lobe at Willow position, and Langlade Lobe at Summit Lake position; advance to Minooka position in Illinois.



19,000
YEARS AGO

LAURENTIDE ICE SHEET: ICE-MARGIN POSITIONS

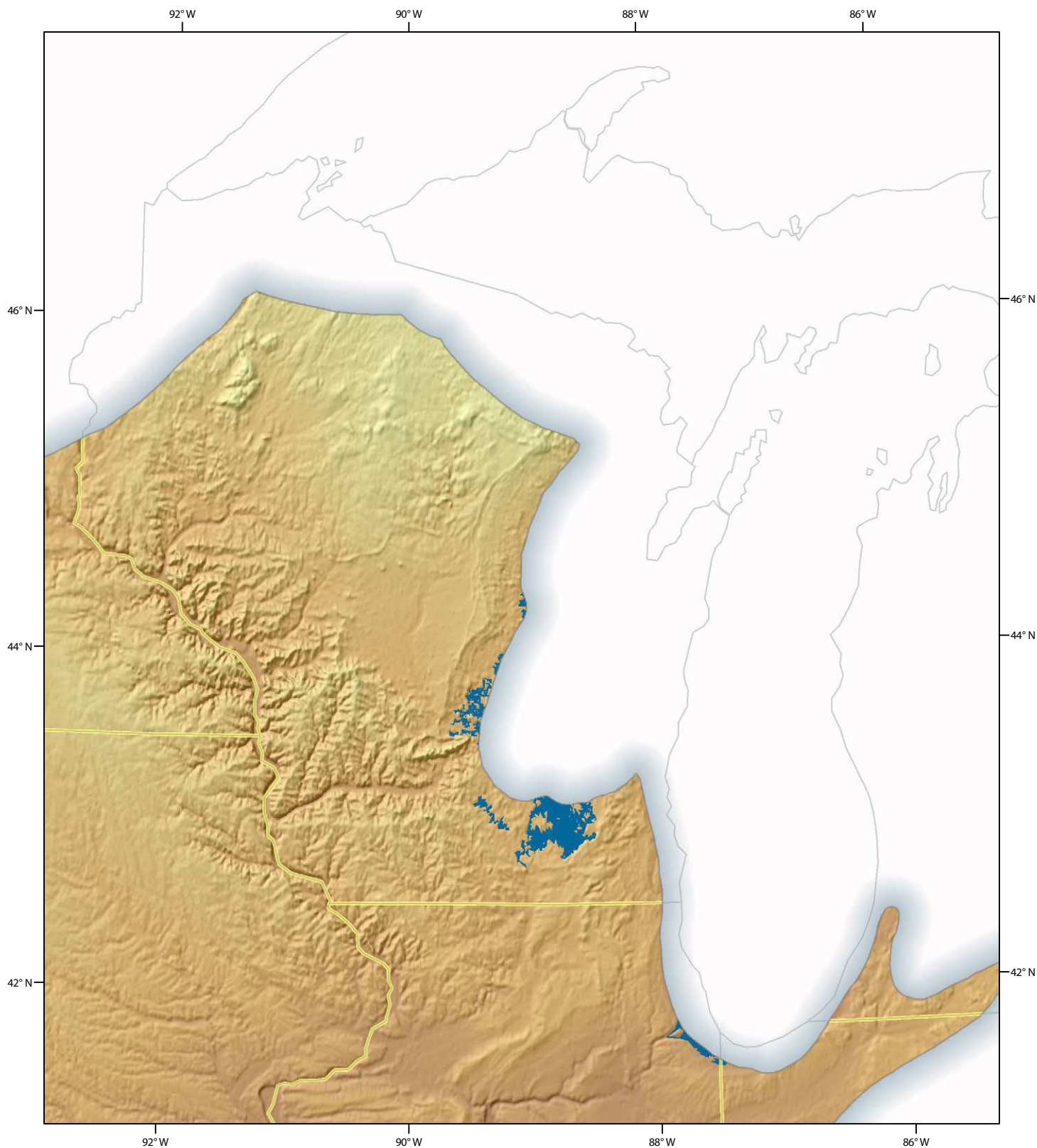
Slight recession, glacial Lake Wisconsin drains.



18,500
YEARS AGO

LAURENTIDE ICE SHEET: ICE-MARGIN POSITIONS

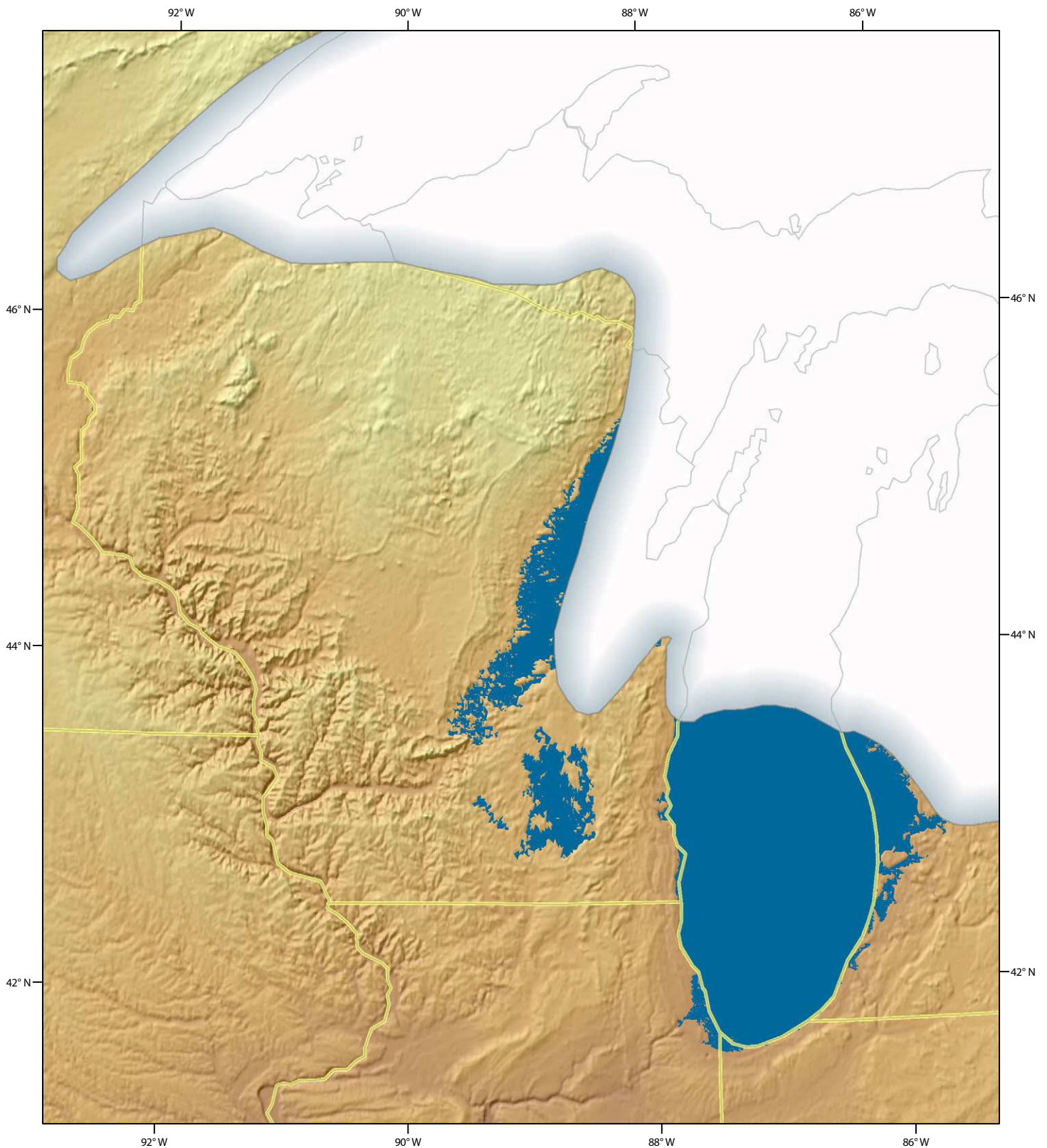
Recession from east end of Baraboo Hills, ice margin at Lake Mills, West Chicago, Iroquois, Champaign positions; glacial Lake Scuppernong forms—several optical ages for Green Bay Lobe from Devils Lake area.



18,000
YEARS AGO

LAURENTIDE ICE SHEET: ICE-MARGIN POSITIONS

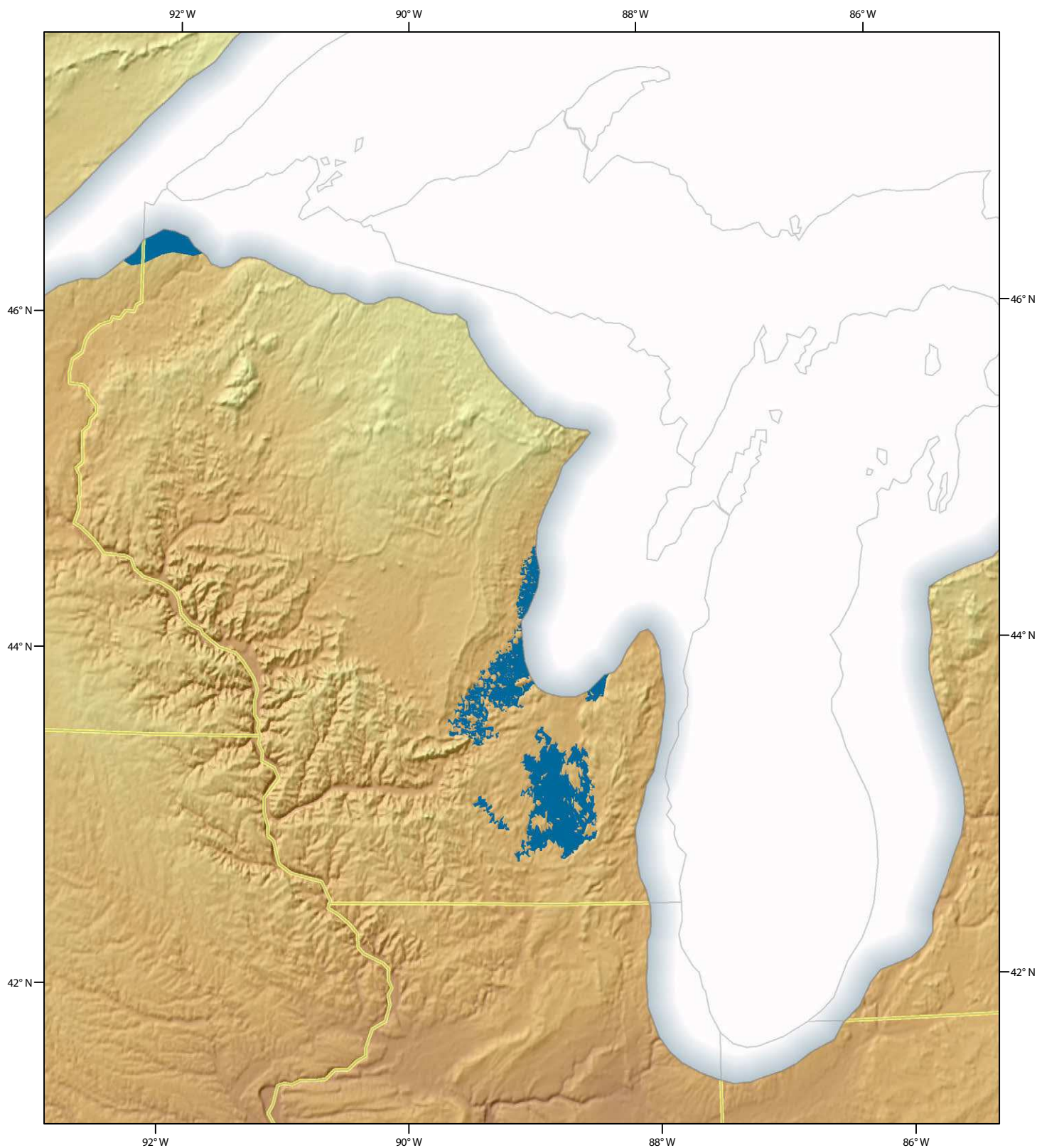
Recession to near the Bowler and Green Lake positions of the Green Bay Lobe, glacial Lake Milwaukee forms in the Lake Michigan basin; glacial Lake Oshkosh forms.



17,500
YEARS AGO

LAURENTIDE ICE SHEET: ICE-MARGIN POSITIONS

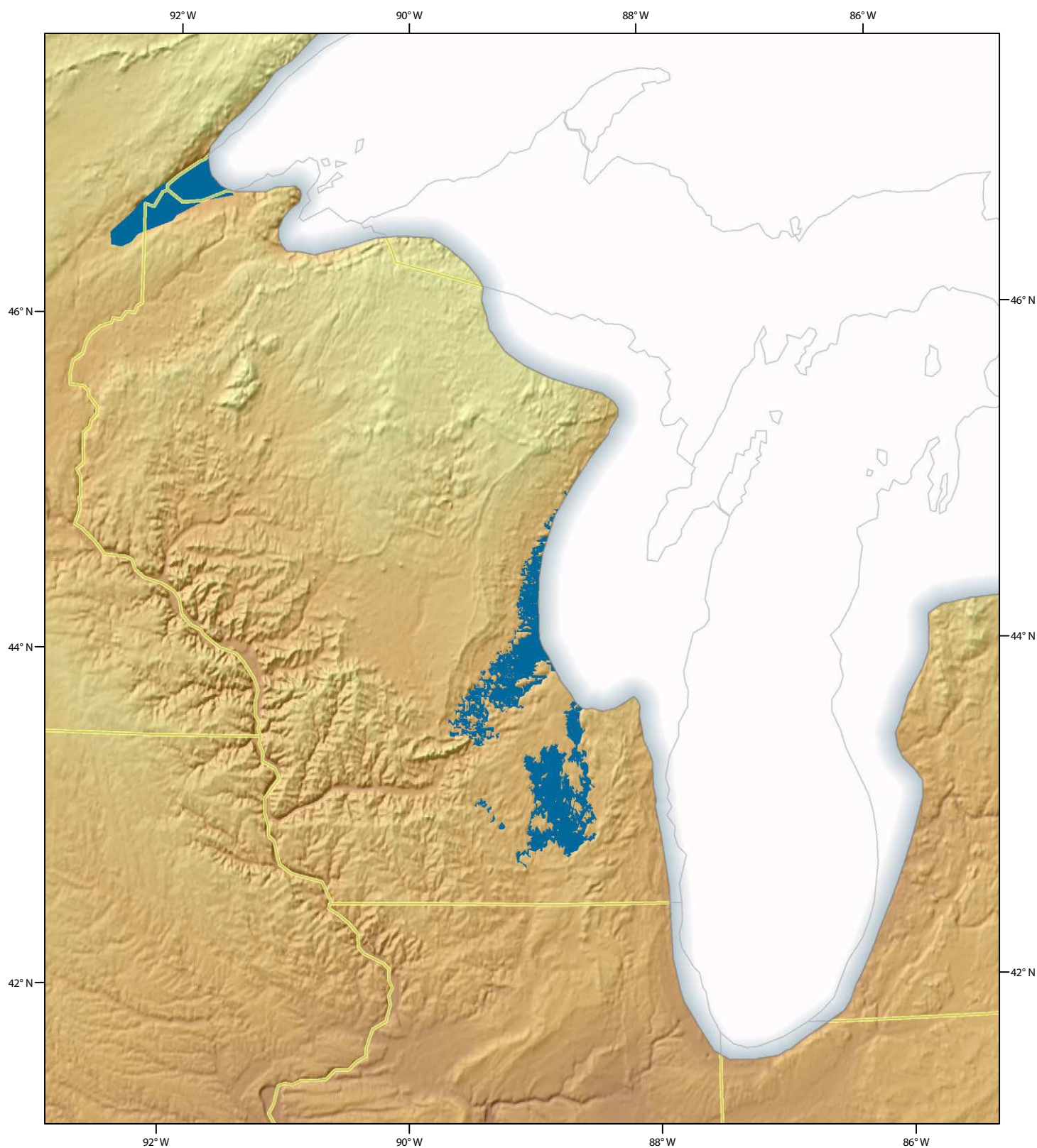
Advance to Swiss, Glidden, Muskellunge, Bittersweet, and Elcho positions in northern Wisconsin, Green Bay Lobe at Green Lake position, and Lake Michigan Lobe at Valparaiso position.



17,000
YEARS AGO

LAURENTIDE ICE SHEET: ICE-MARGIN POSITIONS

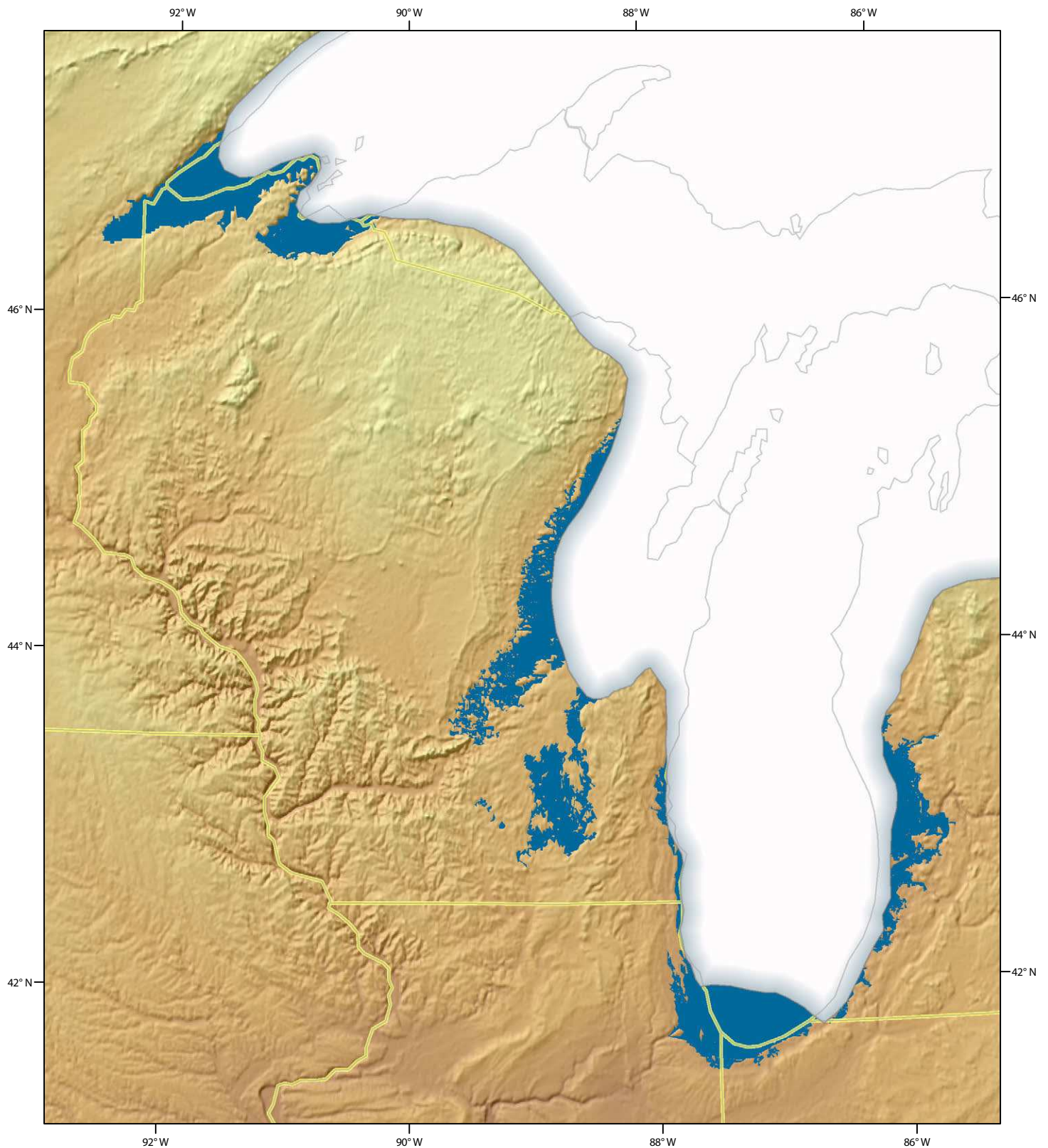
Recession to Stormy Lake and Laona positions in northern Wisconsin,
Lake Michigan Lobe at Lake Border position, high phase of Lake Superior.



16,600
YEARS AGO

LAURENTIDE ICE SHEET: ICE-MARGIN POSITIONS

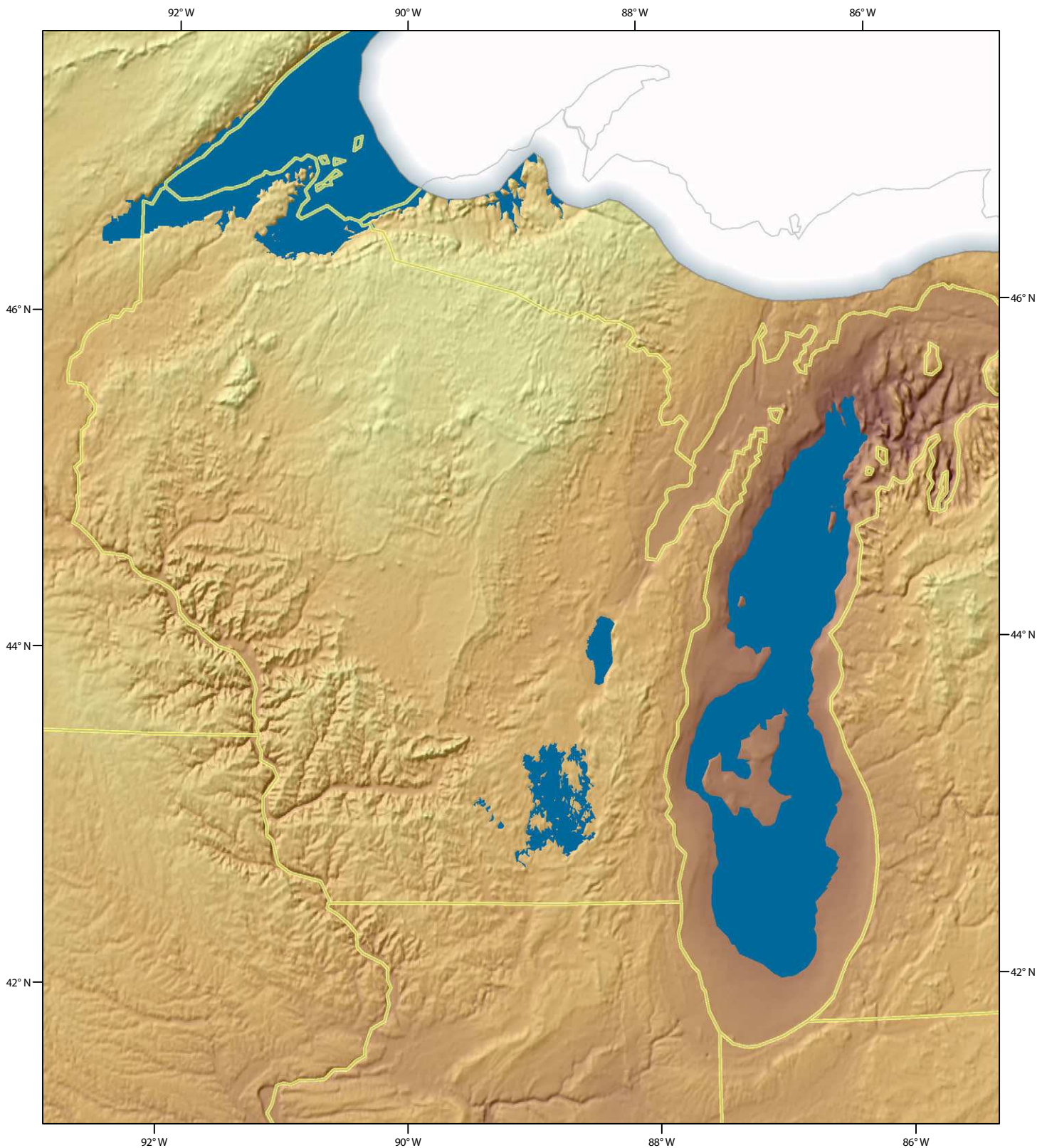
Recession in northern Wisconsin, last of Lake Border moraines deposited,
Lake Michigan at Glenwood level.



16,000
YEARS AGO

LAURENTIDE ICE SHEET: ICE-MARGIN POSITIONS

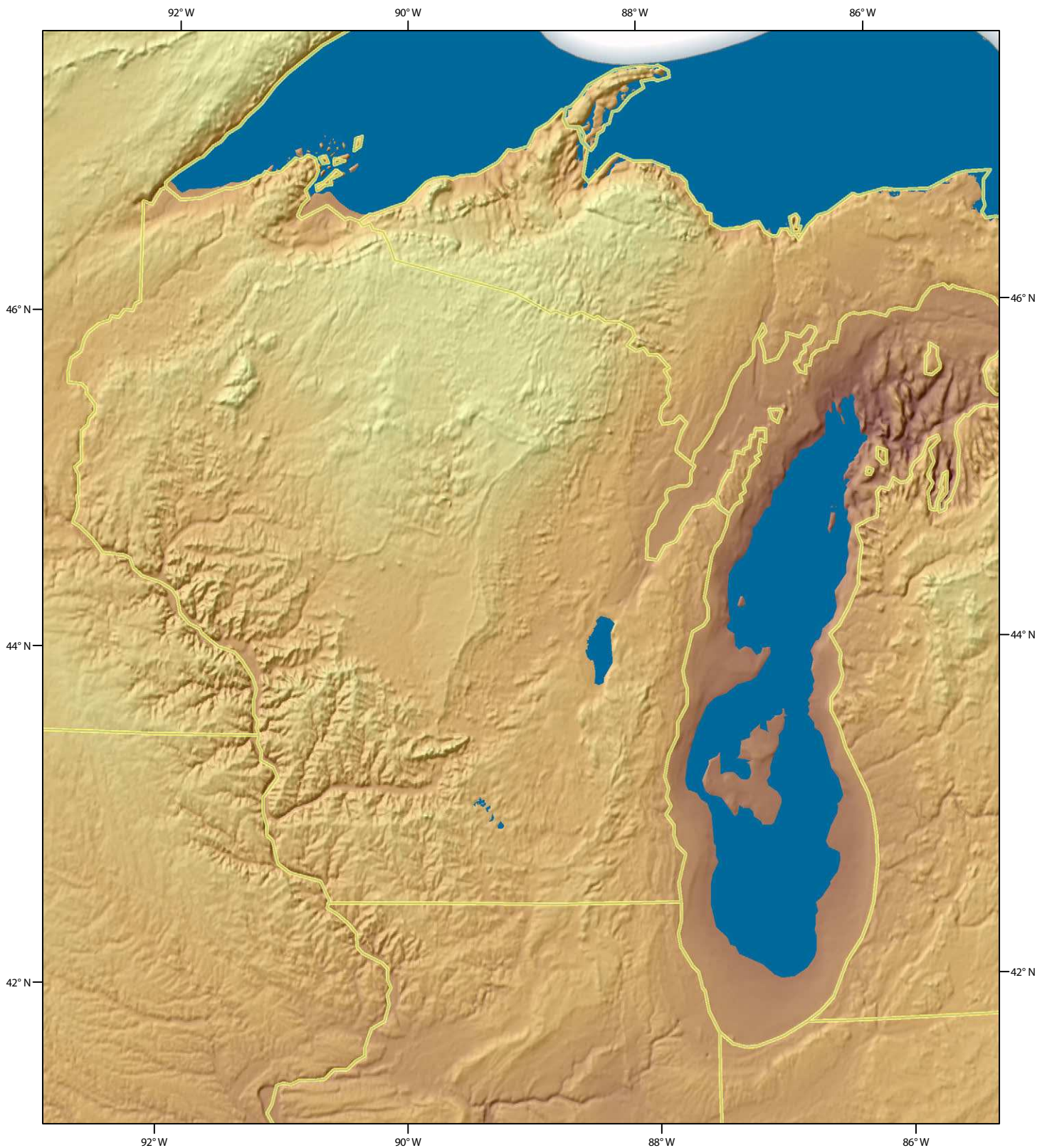
Major recession of ice margin into the Upper Peninsula of Michigan,
Lake Michigan below modern level.



15,750
YEARS AGO

LAURENTIDE ICE SHEET: ICE-MARGIN POSITIONS

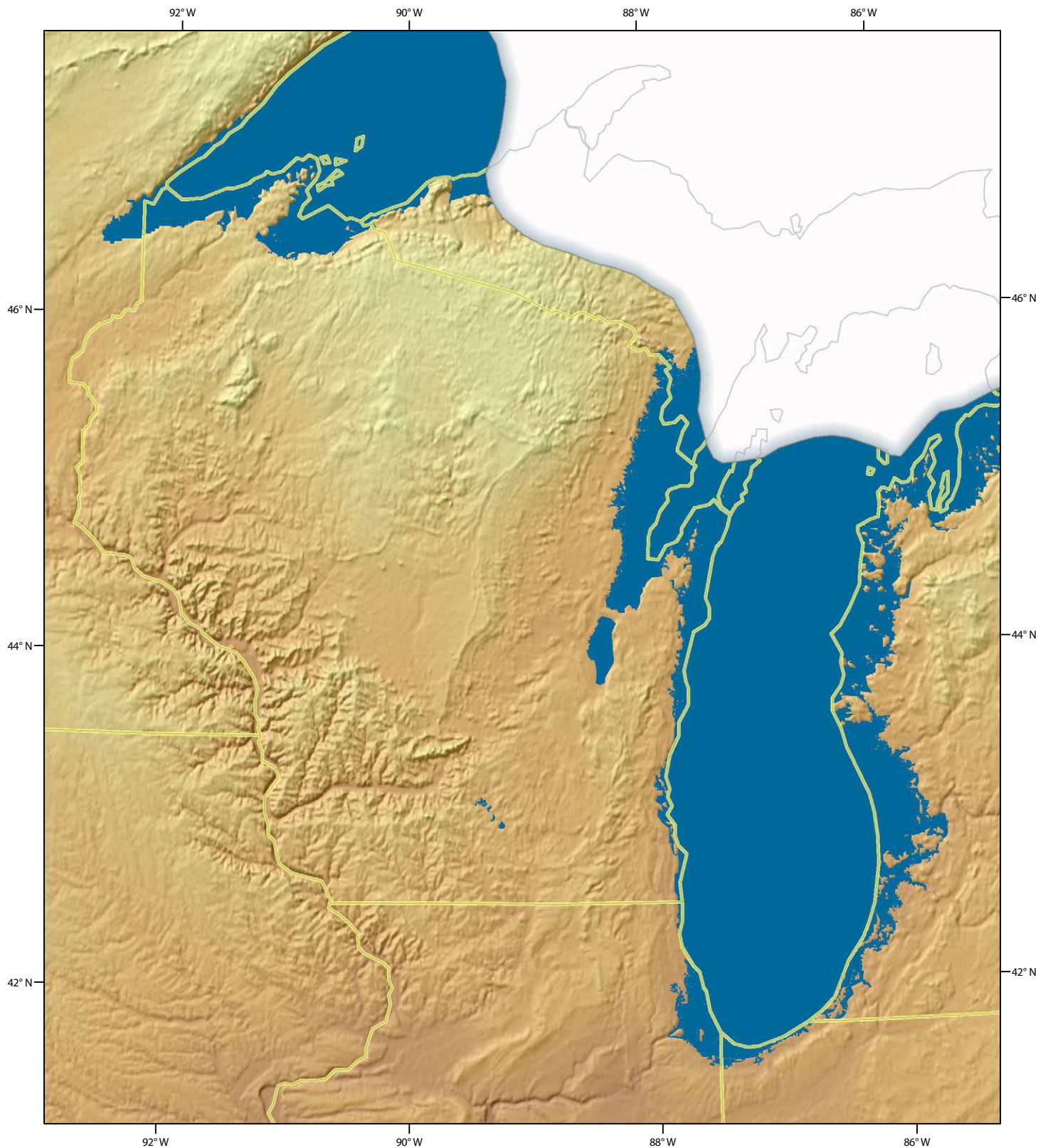
Continued major recession, Mackinaw interstade—several radiocarbon dates in eastern Wisconsin.



15,500
YEARS AGO

LAURENTIDE ICE SHEET: ICE-MARGIN POSITIONS

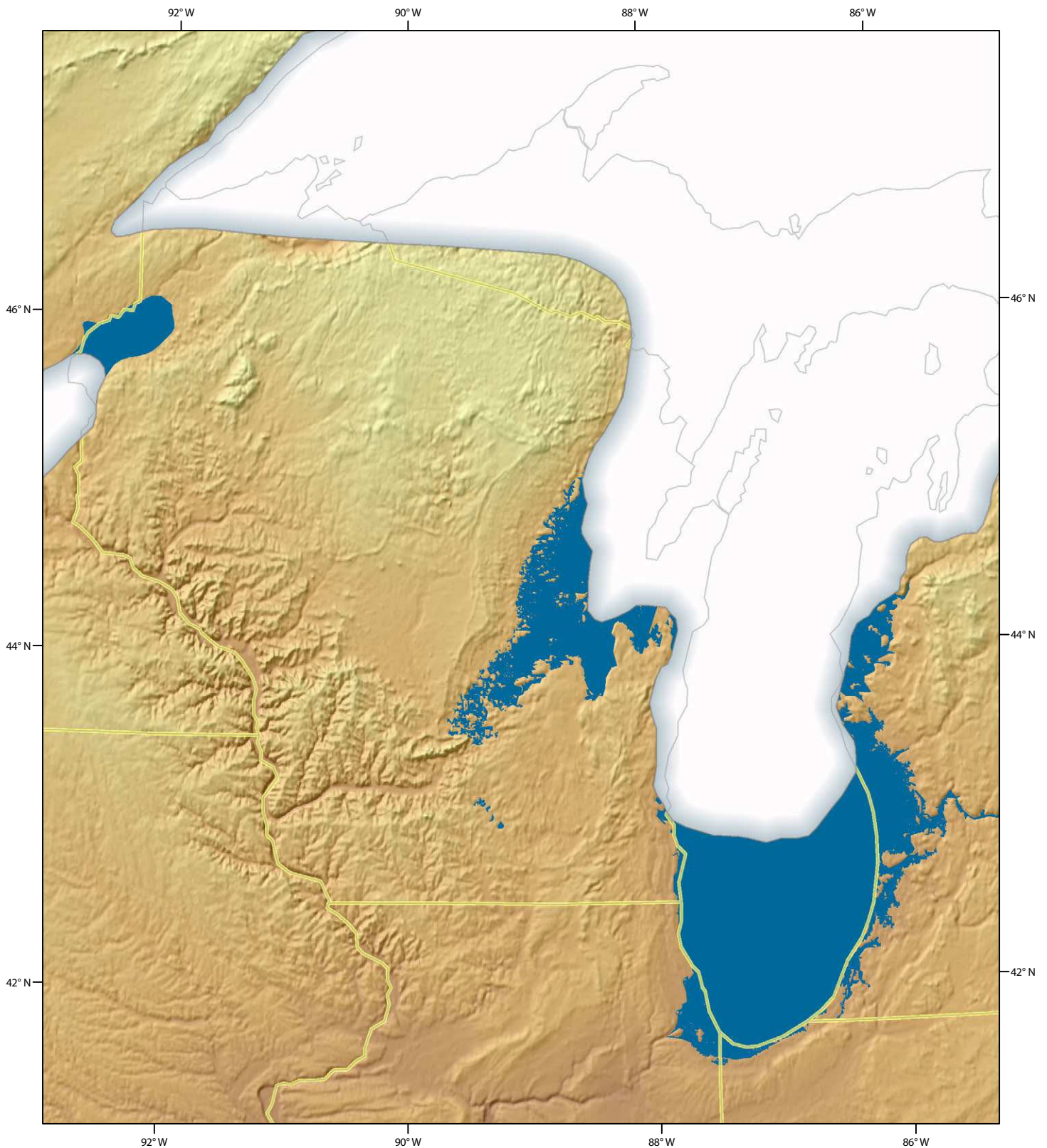
Ice margin advancing toward Winegar and Early Port Huron positions,
Lake Michigan rises to Glenwood level.



15,250
YEARS AGO

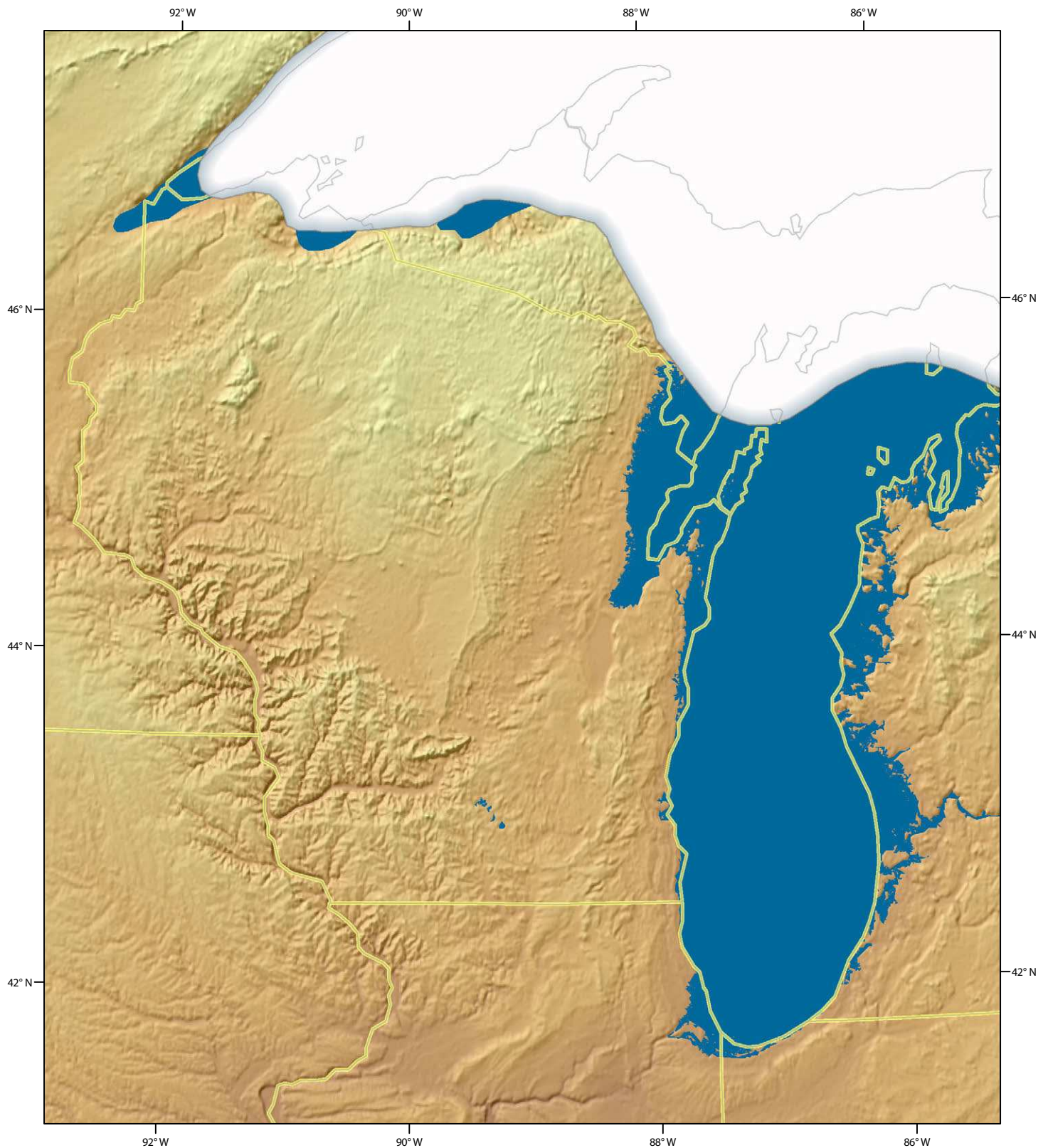
LAURENTIDE ICE SHEET: ICE-MARGIN POSITIONS

Ice margin advances to Late Mountain and Early Port Huron positions, Grantsburg Sublobe advances in western Wisconsin, glacial Lakes Grantsburg and Oshkosh form.



15,000
YEARS AGO

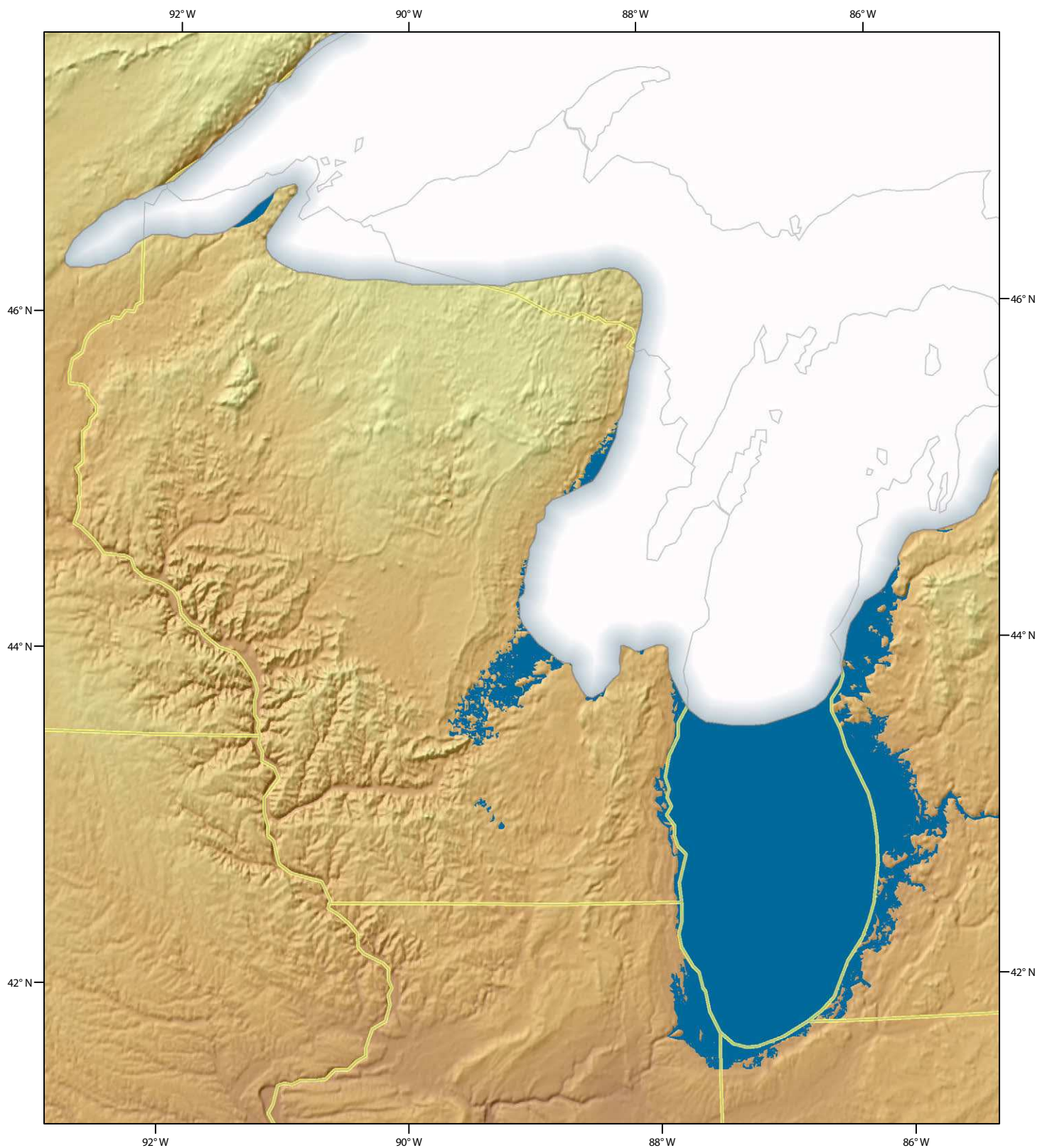
LAURENTIDE ICE SHEET: ICE-MARGIN POSITIONS
Recession.



14,600
YEARS AGO

LAURENTIDE ICE SHEET: ICE-MARGIN POSITIONS

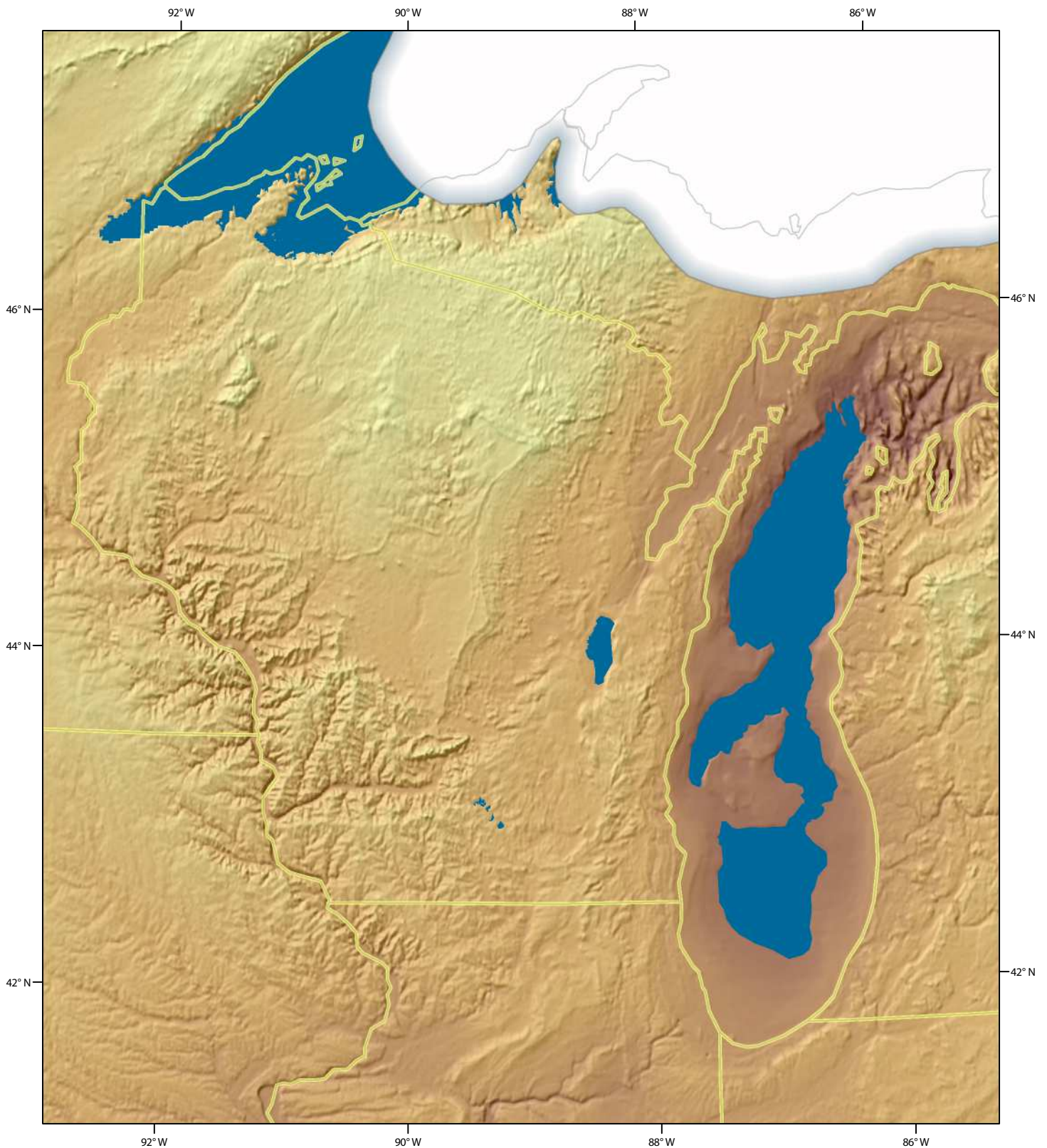
Ice advances to Winegar and Valders positions.



14,300
YEARS AGO

LAURENTIDE ICE SHEET: ICE-MARGIN POSITIONS

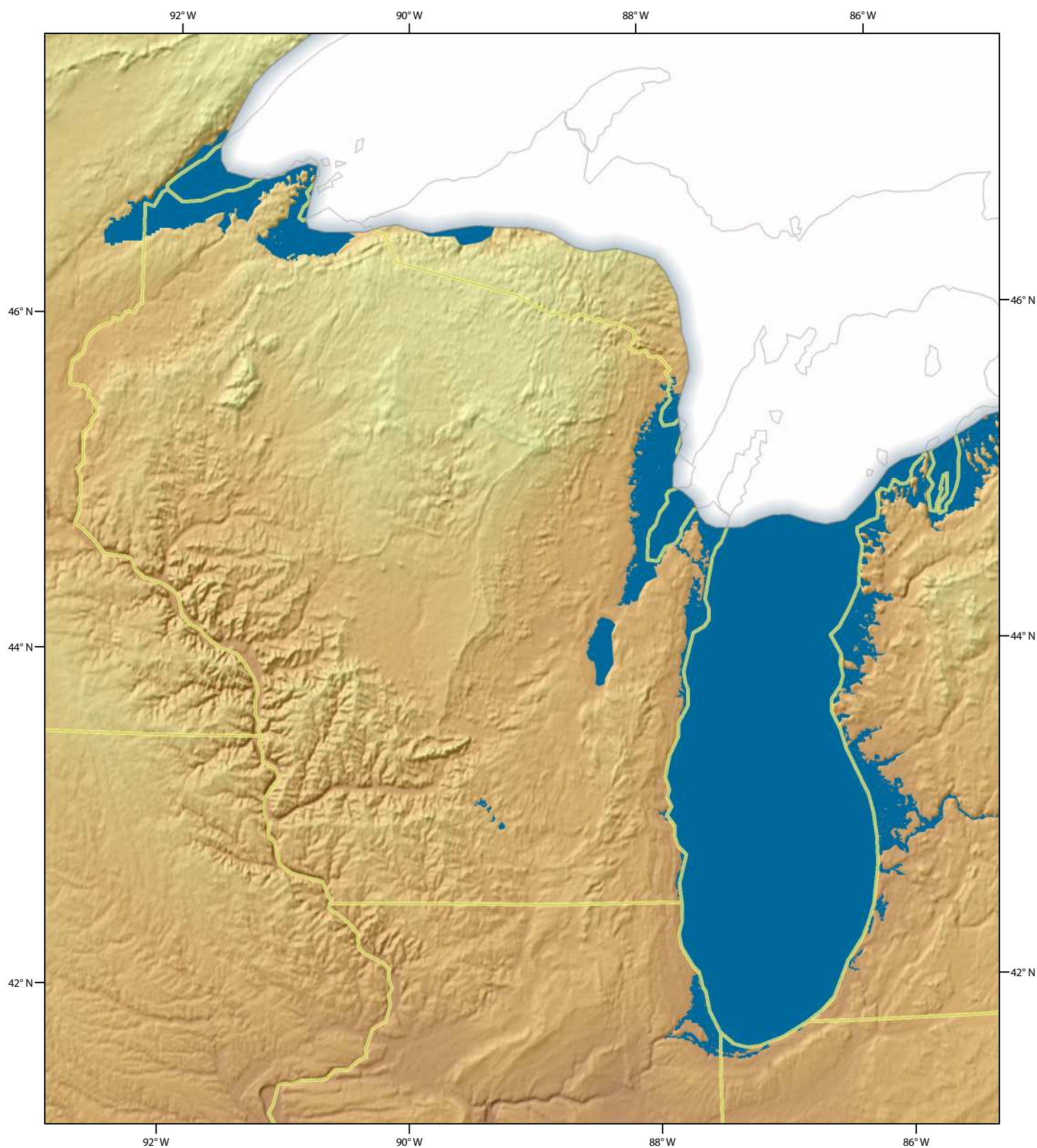
Major recession, spruce forest grows in Wisconsin, Lake Michigan drops below present level—many radiocarbon dates.



14,100
YEARS AGO

LAURENTIDE ICE SHEET: ICE-MARGIN POSITIONS

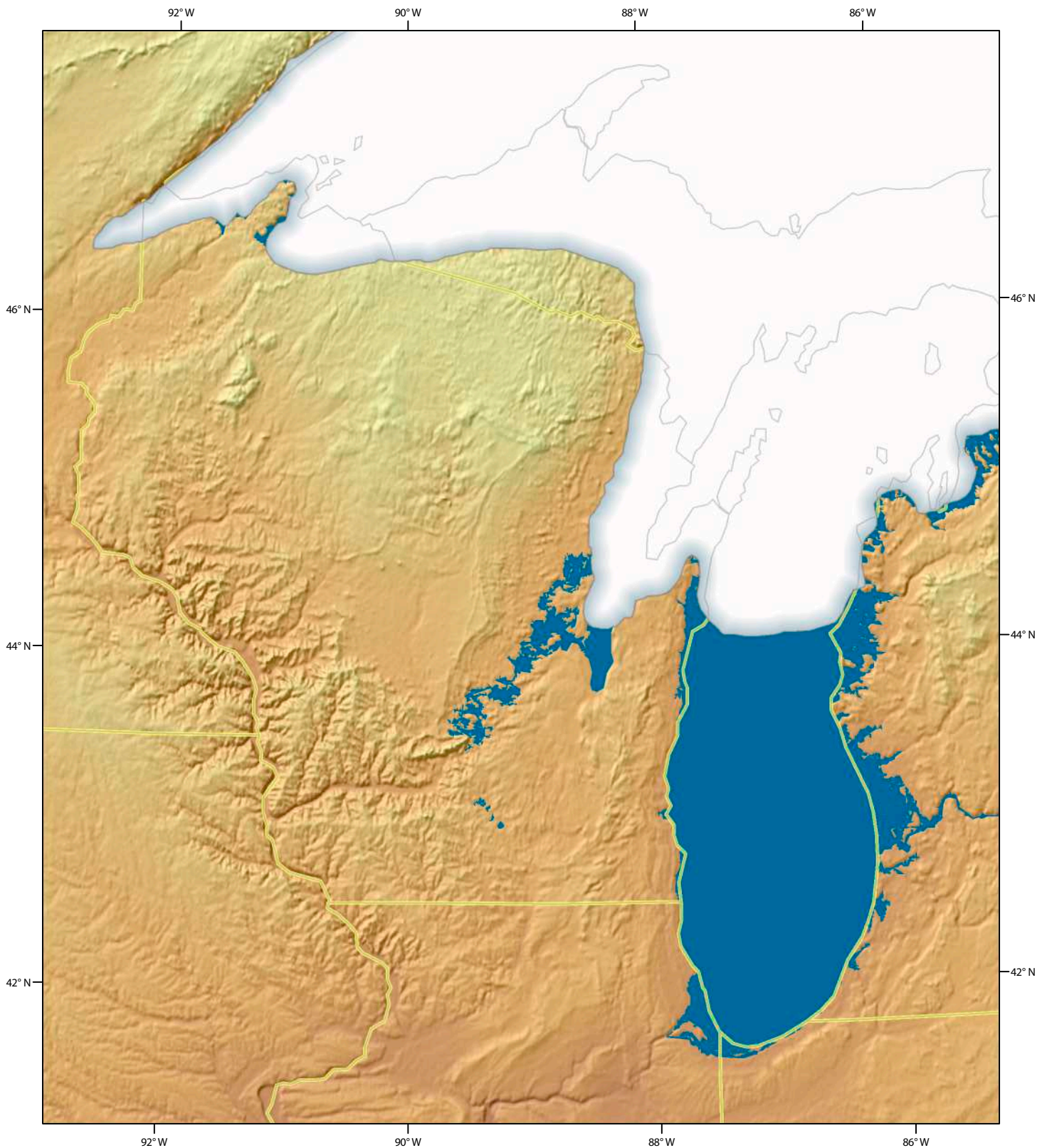
Ice margin advancing toward Marenisco and Two Rivers positions
—many radiocarbon dates on wood of the Two Creeks Forest buried
by the glacier or rising lake level.



13,000
YEARS AGO

LAURENTIDE ICE SHEET: ICE-MARGIN POSITIONS

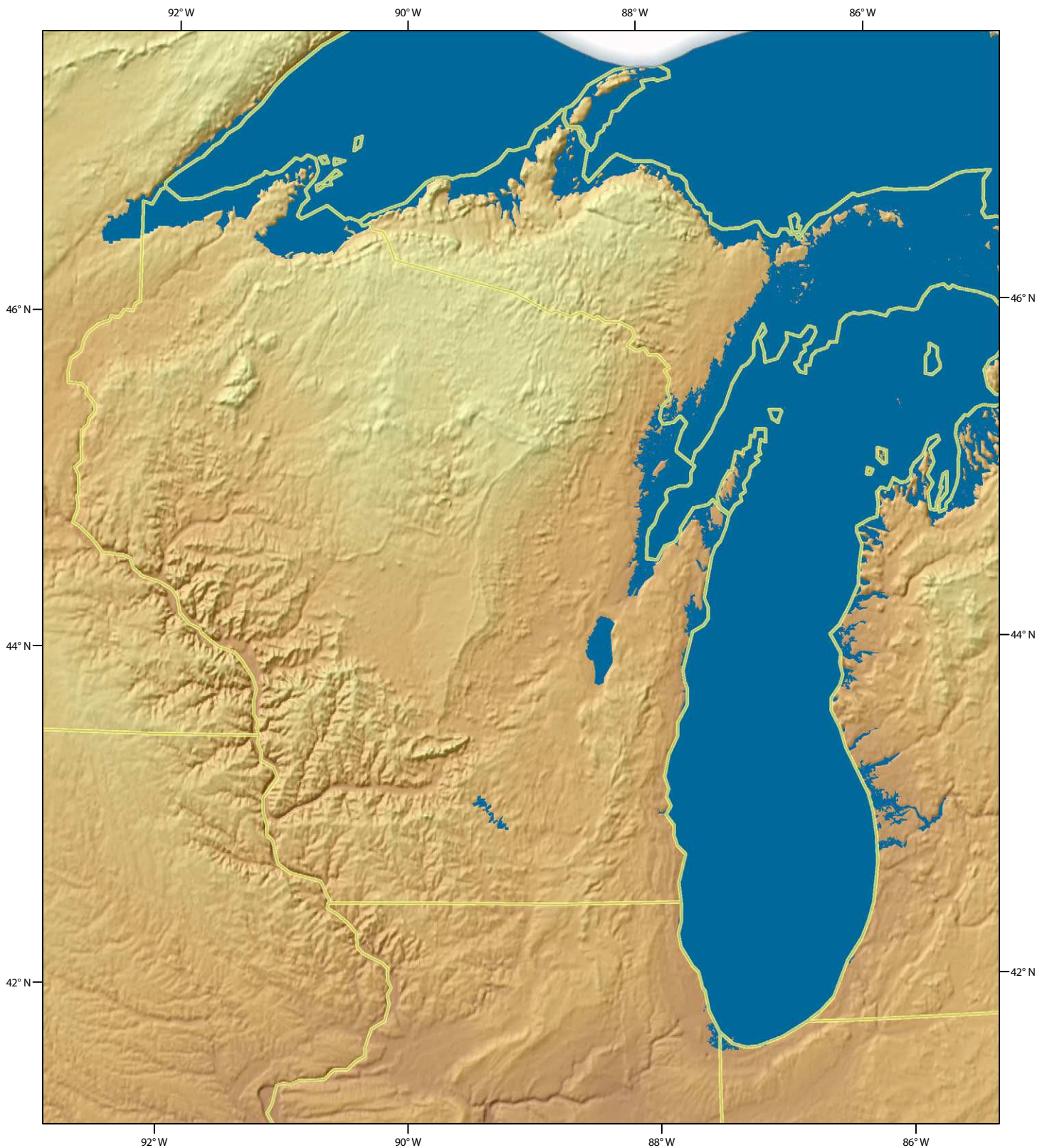
Ice reaches Two Rivers and Marenisco positions, glacial Lake Oshkosh forms.



12,500
YEARS AGO

LAURENTIDE ICE SHEET: ICE-MARGIN POSITIONS

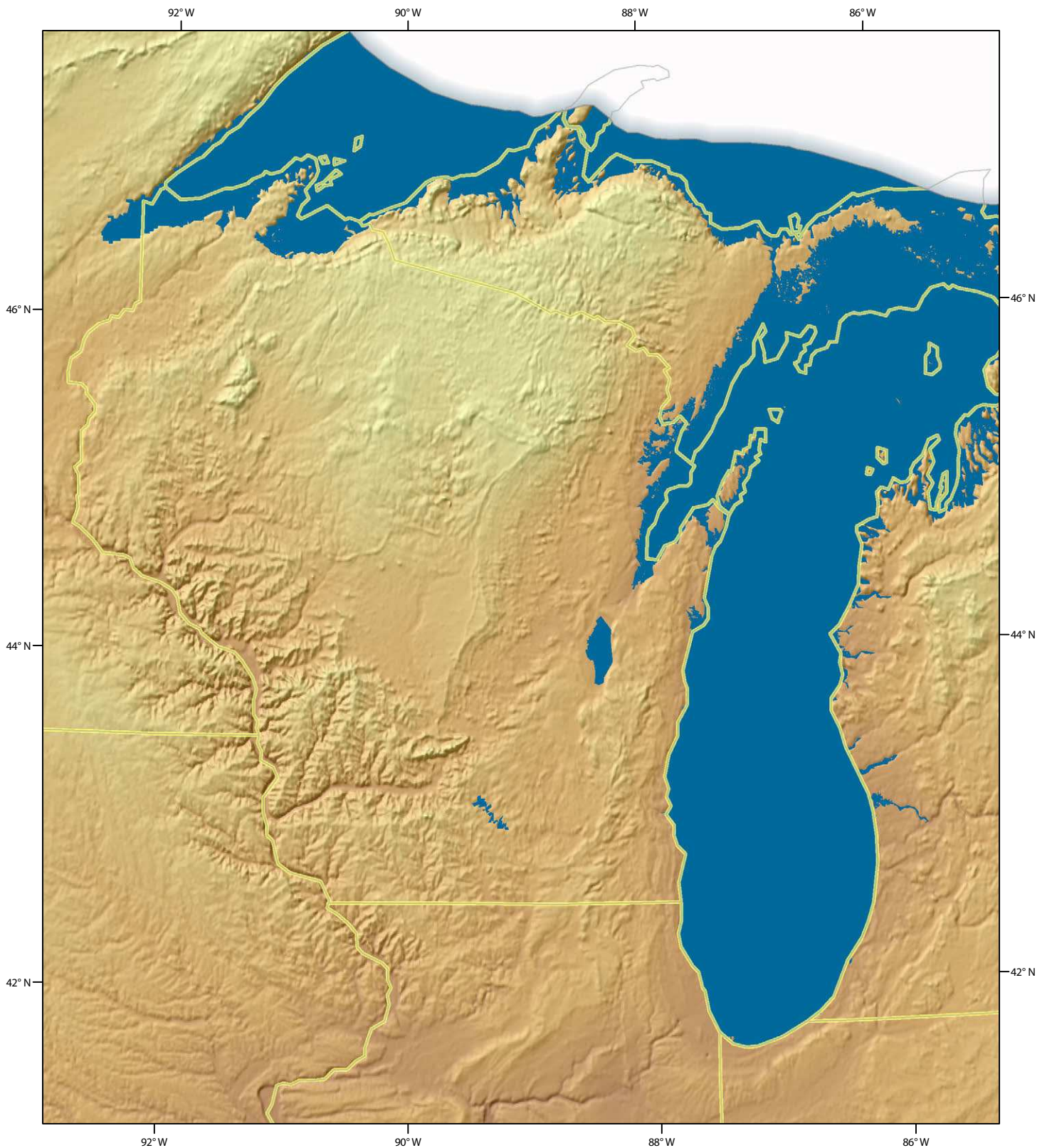
Major recession into Lake Superior basin, present-day Lakes Michigan, Huron, and Superior are one lake at Algonquin level.



12,000
YEARS AGO

LAURENTIDE ICE SHEET: ICE-MARGIN POSITIONS

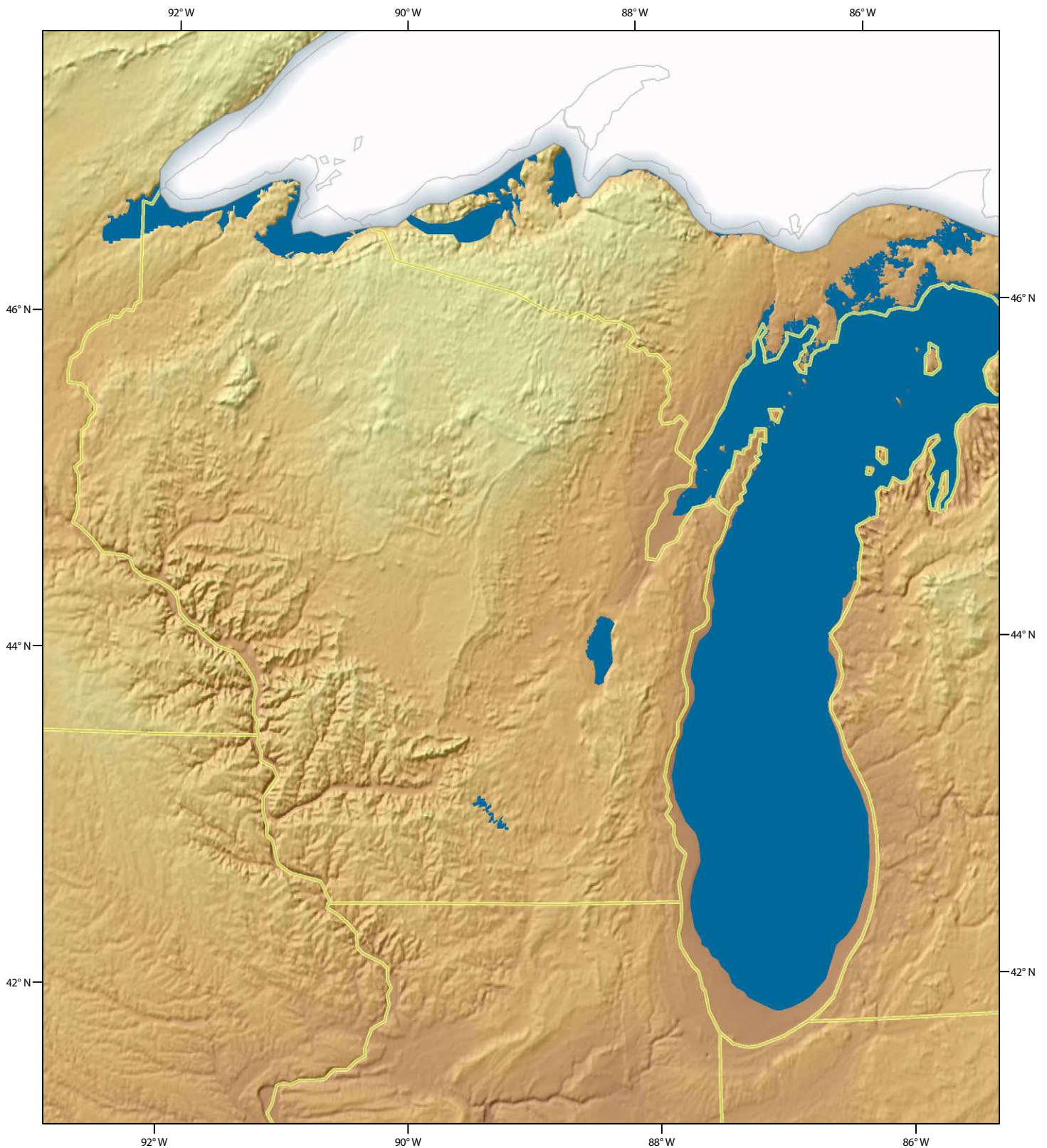
Ice margin advances in the Lake Superior basin, Lake Michigan at Algonquin level.



11,500
YEARS AGO

LAURENTIDE ICE SHEET: ICE-MARGIN POSITIONS

Ice margin advances to Marquette position in the Lake Superior basin,
St. Croix outlet opens, southern basin of Lake Michigan below modern level
—many radiocarbon dates.



11,000
YEARS AGO

LAURENTIDE ICE SHEET: ICE-MARGIN POSITIONS

Recession from the Marquette position, Lake Michigan drops below present level. The ice sheet does not reach Wisconsin again, but survives in Canada for several thousand years.

