

GLACIAL LANDMARKS TRAIL

Iowa's Heritage of Ice

Some of the finest landforms of glacial origin to be seen in Iowa are found in the "lake district," here in the northwestern part of the state. The clues to these past origins are everywhere — in the clusters of natural lakes and wetlands, in the boggy swales scattered among irregularly shaped hills, and in the boulders and gravels perched on sideslopes and hilltops. Though attention here is focused on Dickinson and Osceola counties as a showcase of glacial history, distinct terrain features associated with the presence of a massive ice sheet extend throughout north-central Iowa. This region is called the "Des Moines Lobe," the area occupied by the last advance of glacial ice into the state (see Figure 1). Its name refers to the location of Iowa's capital city at the southernmost limit of this former ice mass.

During the Wisconsin glacial stage of the Pleistocene Epoch of geologic time, a surging lobe of glacial ice expanded briefly into Iowa from a much larger, continental ice sheet which lay to the north. This "brief" interval of time lasted approximately 1,500 years and occurred between 14,000 and 12,500 years ago, as

determined by radiocarbon dating of peat, logs, and stumps of trees within the deposits left behind. These deposits are younger by hundreds of thousands of years than the glacial deposits that mantle most other Iowa landscapes (see Figure 2). The geologically fresh deposits of the Des Moines Lobe still display the special landscape shapes that result from direct contact with melting and disintegrating glacial ice.

The places identified in Figure 3, and the terrain in their vicinities, clearly exhibit the topographic features that characterize a recently glaciated landscape. In particular, note the "knob-and-kettle" topography associated with the end moraines left by the stagnating Bemis and Altamont glacial advances, two major components of the Wisconsin-age glacial activity in Iowa, Minnesota, and the Dakotas. Enclosed depressions, marshes, lakes, knobs, ridges, glacial boulders ("erratics"), and the lack of an efficient drainage system all provide areas of unusual scenic beauty, valuable wildlife habitat, and outstanding examples of landscapes that reflect our state's glacial heritage.

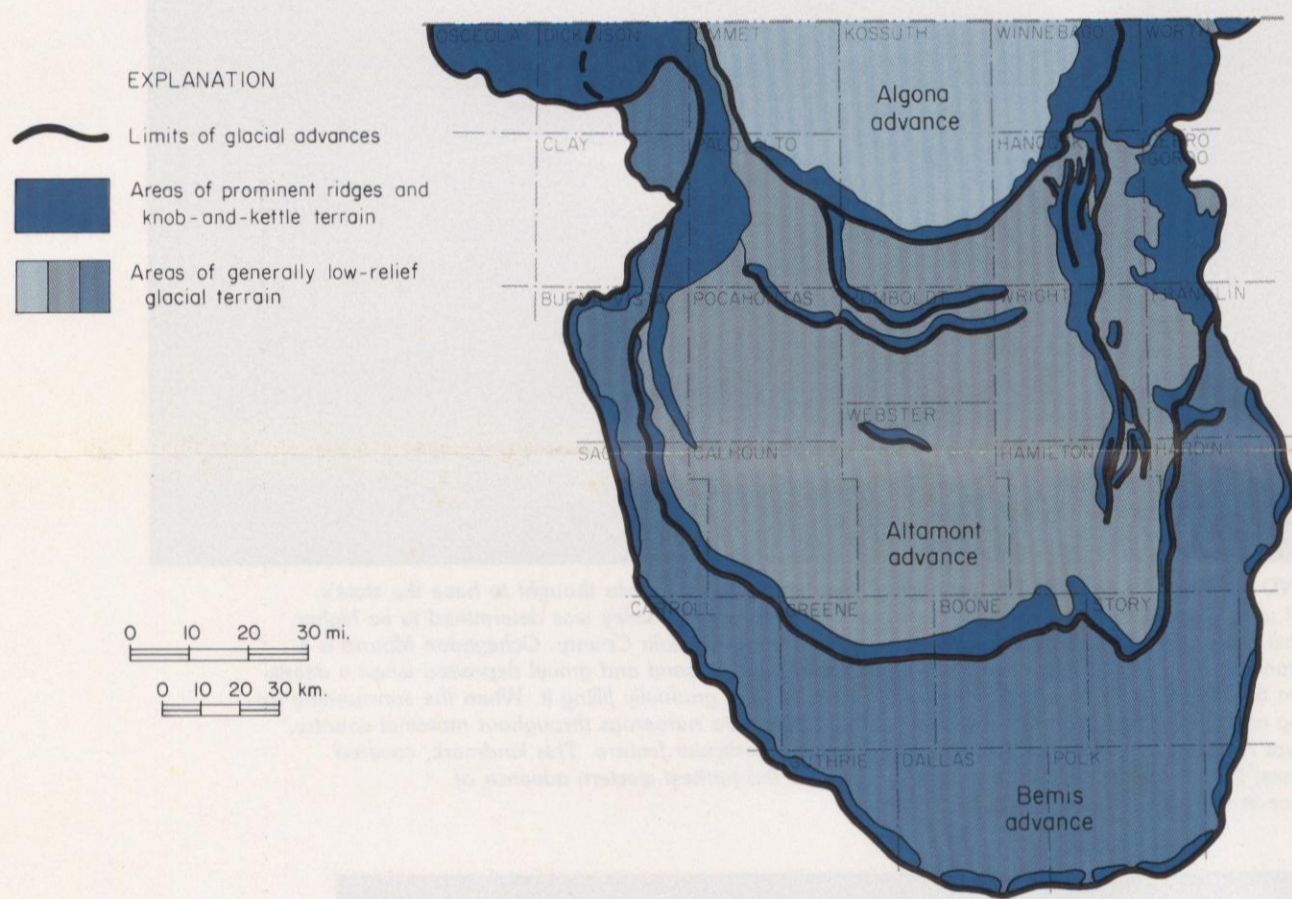


Figure 1. Glacial Map of the Des Moines Lobe.

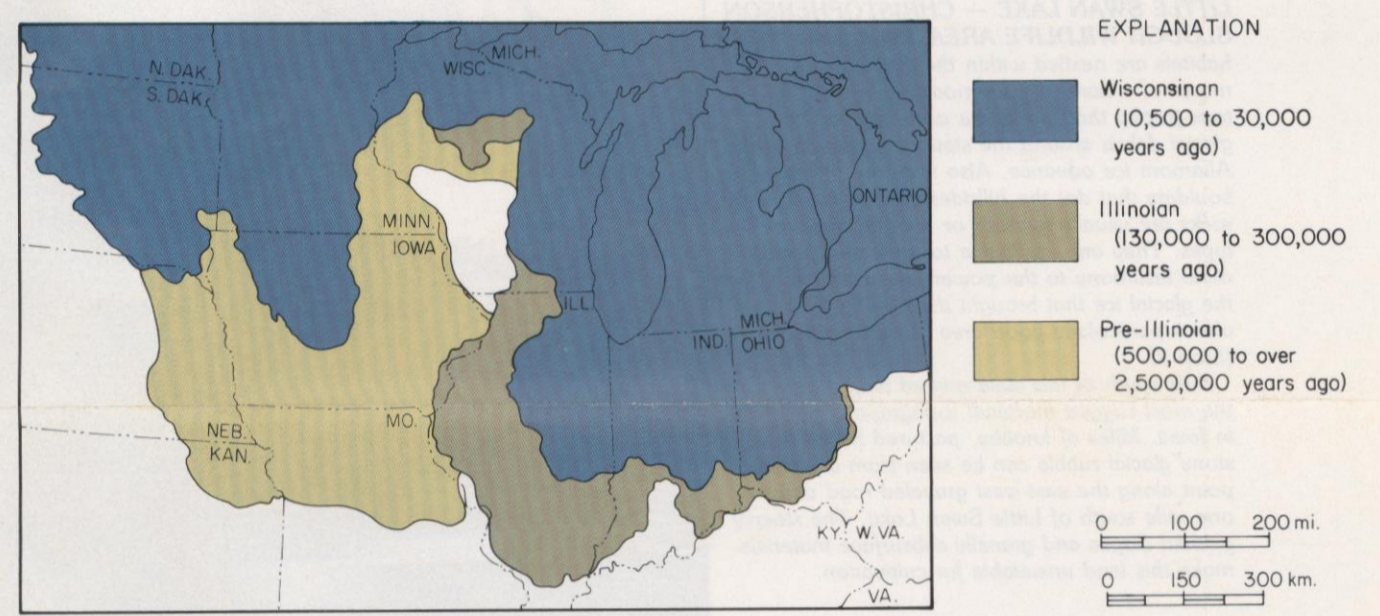


Figure 2. Limits of Major Pleistocene Glacial Advances into the Midwest.

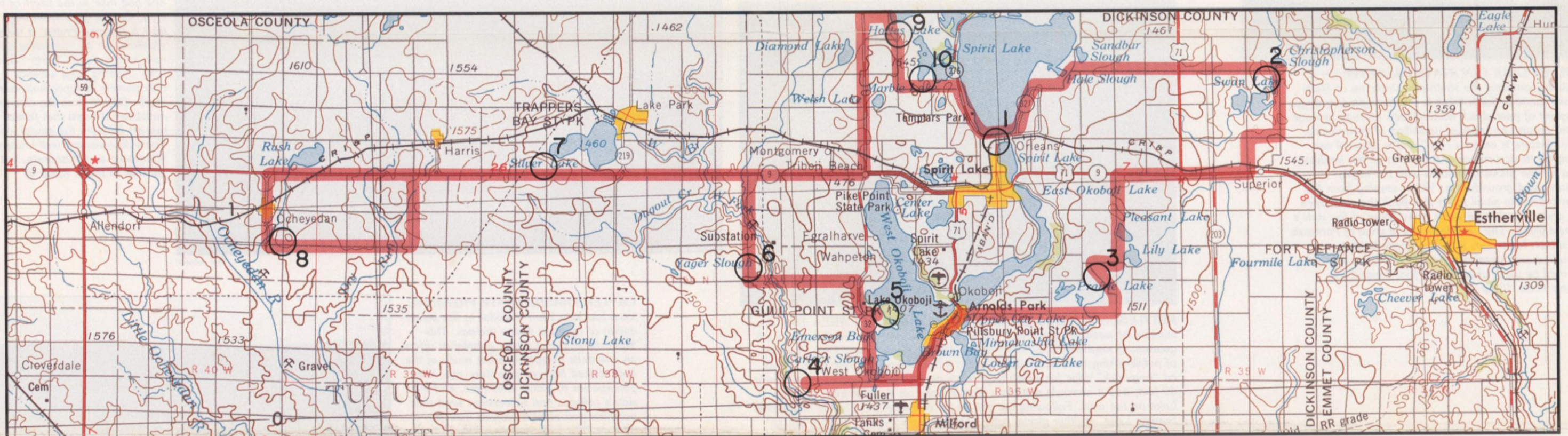
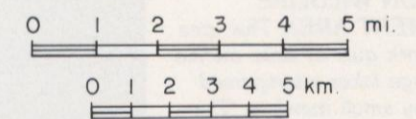


Figure 3. Points of Interest Along the Glacial Landmarks Trail in Northwest Iowa.

Source: U.S. Geological Survey, Fairmont, MN-IA: 1:250,000 topographic map

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| <p>Stop</p> <ol style="list-style-type: none"> 1. Spirit Lake (south shore) 2. Little Swan Lake — Christopherson Slough Wildlife Area 3. Spring Run Wildlife Management Area 4. Freda Haffner Kettlehole State Preserve 5. Gull Point State Park | <p>Stop</p> <ol style="list-style-type: none"> 6. Cayler Prairie State Preserve 7. Silver Lake Fen State Preserve 8. Ocheyedan Mound State Preserve 9. Grover's Lake Wildlife Area and Koppen Prairie 10. Kettleson Hogsback Wildlife Management Area |
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These 10 stops highlight the glacial landmarks in the "lake district" of Iowa (see photos on reverse side). Many people know the area for its water-based recreation; fewer realize the special geological origins of the wealth of wetlands and related natural resources. Thanks to the great thrust of a continental ice sheet into this area between 14,000 and 12,500 years ago, the land

was shaped to provide habitats for a rich bounty of plants and animals that live in these wetland-pocked prairies. More than just a good place for swimming, fishing, and boating, this region can be considered a living museum of the imprints of the last glacial advance to affect Iowa — one of nature's most remarkable phenomena.

prepared by:

Douglas C. Harr, Wildlife Bureau
Dean M. Roosa, Preserves and Ecological Services Bureau
Jean C. Prior, Geological Survey Bureau
Patricia J. Lohmann, Graphic Designer

Iowa Department of Natural Resources
Larry J. Wilson, Director

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SPIRIT LAKE This glacial lake is Iowa's largest natural body of water. The south shoreline (far horizon), known as "the Isthmus," is a low, narrow strip of sand, silt, and boulders which separates Spirit Lake from East Okoboji Lake. The cross-section profile of Spirit Lake reveals a nearly flat bottom, with shallow water and low shorelines. Like many of Iowa's larger glacial lakes, this may have been the site of prolonged melting of stagnant ice which left a broad basin behind. The boulders seen here originated hundreds of miles farther north before being deposited during glacial melting. While on the south shore, visitors can tour the Spirit Lake Fish Hatchery. This facility is open to the public during normal working hours; each April and May, during peak hatching activities, it is open seven days a week. (Stop 1)



Jean C. Prior



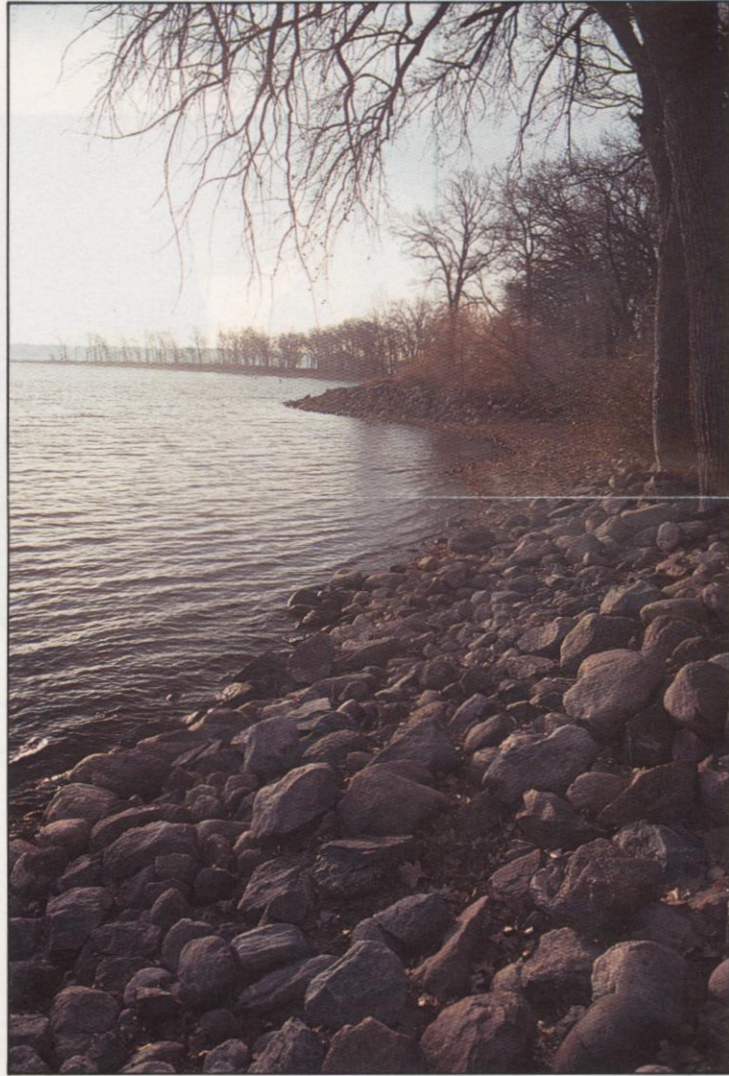
Richard G. Baker, Univ. of Iowa

FREDA HAFNER KETTLEHOLE STATE PRESERVE This feature was created when an isolated, perhaps partially buried, pocket of clean ice melted slowly in place after the main ice sheet was gone. The steep-sided, bowl-shaped depression has no surface drainage outlet, so the water level fluctuates in response to precipitation. Native vegetation within the kettle occurs in distinct zones as it reflects changes in moisture conditions from wet at the bottom to dry at the top. The Little Sioux River valley, seen to the west, actually flowed beneath the stagnant glacial ice along this segment of its course. This preserve is owned and managed by The Nature Conservancy. (Stop 4)

Douglas C. Harr

LITTLE SWAN LAKE — CHRISTOPHERSON SLOUGH WILDLIFE AREA These wetland habitats are nestled within the Altamont moraine, a band of hummocky, rumpled topography that marks the accumulation of glacial debris around the stationary margin of the Altamont ice advance. Also note the glacial boulders that dot the hillsides. These travel-worn rocks are usually igneous or metamorphic rock types. They are not native to Iowa and provide mute testimony to the power and direction of the glacial ice that brought them here. This is also a particularly good area for bird-watching. (Stop 2)

Just south of this state-owned land is some of the most rugged morainal topography that exists in Iowa. Miles of knobby, pastured heaps of stony glacial rubble can be seen from a vantage point along the east-west graveled road about one mile south of Little Swan Lake. The steeply pitched slopes and gravelly subsurface materials make this land unsuitable for cultivation.



Ron Johnson



OCHEYEDAN MOUND STATE PRESERVE This prominent Iowa landmark was once thought to have the state's highest elevation, but it was surpassed several years ago when a farm feedlot near Sibley was determined to be higher. Even so, this isolated hill is an imposing feature standing above the plains of Osceola County. Ocheyedon Mound is a classic example of a "kame," a roughly cone-shaped knob composed mostly of sand and gravel deposited when a debris-laden stream flowing on the glacier's surface dropped into a cavity in the ice, gradually filling it. When the surrounding ice melted, the gravel filling remained as a hill on the landscape. Small kames are numerous throughout morainal country, but none in Iowa (except Pilot Knob in Hancock County) can equal this particular feature. This landmark, covered with native prairie grasses, lies on the Bemis end moraine which marks the farthest western advance of the Des Moines Lobe ice in this part of Iowa. (Stop 8)

Jean C. Prior



SILVER LAKE FEN STATE PRESERVE On a hillside bordering the southwest shoreline of Silver Lake (another kettle lake) is a waterlogged, spongy deposit of peat which accumulated through geologic time around an unusual upwelling of groundwater. This feature is called a "fen" and is unusual not only for its occurrence and position on the landscape but for the plants associated with the highly mineralized groundwater. Water seeping from the fen collects in small pools that flank the sideslopes. In and around these pools grow some of the state's rarest plants. The delicate bloom of grass of Parnassia is shown here. This is a very fragile habitat, coupled with uncertain footing; extreme caution should be used when setting foot beyond the entry posts. (Stop 7)



Ron Johnson



Ron Johnson

GROVER'S LAKE WILDLIFE AREA AND KOPPEN PRAIRIE This special tract, very near the Minnesota border, contains a rich and diverse prairie flora, abundant wildlife, and valuable wetland habitats. Visitors must hike about one-half mile to the heart of the area. On the far eastern edge of this tract is Koppen Prairie, a ridge-top grassland on an interesting glacial relic known as an "esker." The long, winding ridge extends a considerable distance both north and south. Eskers mark the channels of meltwater streams that flowed in tunnels beneath the glacial ice. These features are well known in Minnesota and Wisconsin, but they are rare in Iowa. (Stop 9)

KETTLESON HOGSBACK WILDLIFE MANAGEMENT AREA This combination of wetlands, open-field uplands, woods, and lakes is also the headquarters of northwest Iowa's Big Sioux Wildlife Management Unit. A system of public hiking trails for viewing wildlife includes walks up the high, wooded "hogsback" ridge for which the area is named. The hogsback rises nearly 40 feet, and it narrowly separates Marble Lake on the east from Hottes Lake on the west. Following the trail as far east as possible takes hikers past Sunken Lake, another glacial kettle. The lakes and wetlands are a refuge for Giant Canada geese, reintroduced to Iowa in 1964, and now the most commonly seen waterfowl on the area. (Stop 10)

Douglas C. Harr



SPRING RUN WILDLIFE MANAGEMENT AREA This area is a patchwork quilt of state-owned land and large lakes interspersed among many small marshes. The area displays an excellent example of "prairie potholes," those poorly drained hollows that dimple glacial moraines, especially in the prairies of the Dakotas and Canada. These landscapes are very attractive to migrating and nesting waterfowl and to other aquatic bird life. Remnants of native prairie vegetation are common on the knobby hills throughout the area. (Stop 3)

CAYLER PRAIRIE STATE PRESERVE Iowa has long been a leader in the preservation of remnant native prairies. This 160-acre parcel of native grasslands offers an authentic glimpse of what much of the state looked like just a century ago. Over 265 species of plants exist here, and the state's colleges and universities send their botanists and plant ecologists here for training. The wide variations in topography, materials, and moisture conditions contribute to a rich and diverse native prairie flora, including gay feather, a summer-blooming species seen in this view. The jumbled hills, ridges, and swales of this preserve and the surrounding landscape are excellent examples of features that formed under lingering glacial ice. (Stop 6)




Douglas C. Harr


GULL POINT STATE PARK This beautiful peninsula juts out into the waters of West Okoboji Lake, the deepest of Iowa's "Great Lakes." Numerous embayments, forested edges, scenic vistas, glacial boulders that rim the high-walled shoreline, and good fishing make this park particularly attractive. Located near-by on Miller's Bay is Lakeside Laboratory, an historic field-biology station operated by Iowa's state universities. (Stop 5)

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