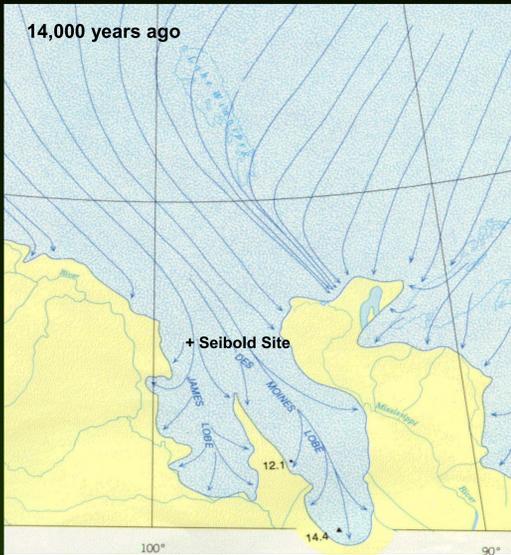


# THE MISSOURI COTEAU AND THE SEIBOLD SITE

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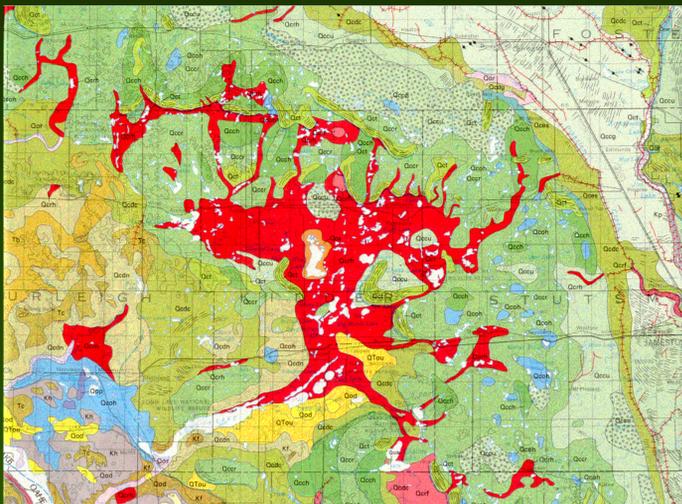
The deposits of the Missouri Coteau were deposited on the western margin of the James River Lobe



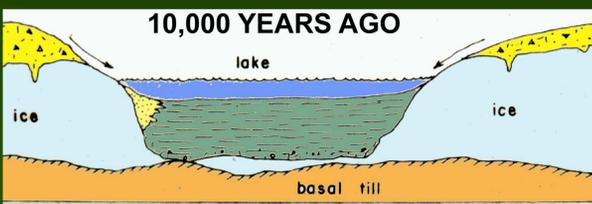
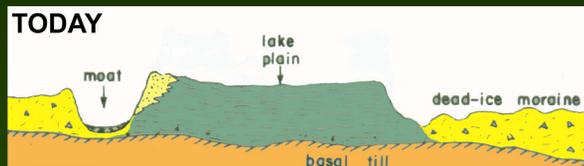
The Missouri Coteau is a band of moraine that stretches NW to SE from Saskatchewan to South Dakota. The moraine was deposited between 11,000 to 9,000 years ago.



The position of the Laurentide Ice Sheet at 10,000 years ago. In eastern North Dakota, Lake Agassiz extends along the North Dakota-Minnesota border. Glacial ice still remains buried in the till in the Missouri Coteau region (Bajc et al., 2000).



NDGS/USGS Geologic Map of North Dakota (Clayton and others). The Missouri Coteau is represented by green (till) and red (river channel sand and gravel) colors. About 300 feet of till, sand and gravel were deposited as the ice margin advanced and then stagnated on numerous occasions. Thick supraglacial deposits resulted from internal thrusting of the ice as it rode over the edge of a preglacial bedrock plateau. Blocks of ice remained buried and were insulated by the till for up to three thousand years. Eventually they melted out and formed the moraine we see today. Linear sand and gravel deposits (red) appear to be those of rivers that were once tributaries of the Missouri River.



Clayton's (1967) interpretation of one of the common landforms in the Missouri Coteau. The topography was inverted on numerous occasions as buried ice blocks melted out. What were once lakes are now high places. Glacial, lake and river deposits are interbedded in a complex stratigraphy resulting in a complex hydrology today.



The Seibold Slough in 1969



The Seibold Slough in 2002

At the end of the ice age the vegetation surrounding the slough was an aspen-spruce woodland not prairie. The climate was slightly cooler and wetter than today.

## FOSSIL INVERTEBRATES

Fossils of many types of aquatic and terrestrial invertebrates have been found. They include sponges, bryozoans, cladocerans, molluscs, amphipods, and insects, including 70 species of beetles.



Many thanks to Vernon and Carol Seibold who brought the attention of the fossils to geologists at UND and NDSU, and who gave their permission to excavate the site



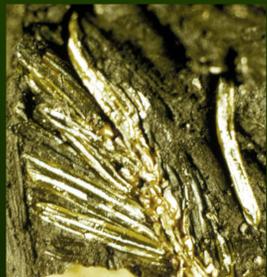
The laminated sediments of the 'fish bed' are about 10 feet below the surface. The deposits can be split into sheets which are like tar paper. The flexibility is probably caused by abundant algal strands.

## PLANT FOSSILS

The vegetation in the lake consisted of algae and pond weeds. Sedges and other types of marsh vegetation grew around the margins of the lake. The morainic hills had a vegetation cover of spruce (*Picea*) and aspen (*Populus*). A piece of beaver-gnawed wood from the top of the fish bed has a <sup>14</sup>C age of 9,750±140 yr B.P.



Spruce (*Picea*) cones



Tip of a branch of spruce (*Picea*). The leaves were still attached and green colored.



Leaf of Aspen (*Populus tremuloides*)



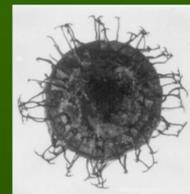
Leaf of cottonwood (*Populus*).



Gastropods (snails)



Amphipod (*Gammarus*)



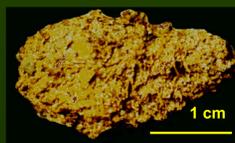
Statoblast of the bryozoan *Cristatella mucedo*



A backswimmer (Hemiptera: *Notanecta*)



Stonefly (Plecoptera) larva



A fecal pellet of beaver (*Castor canadensis*). The pellet appears to be made of wood chips of *Populus*.



Abdomen of a whirligig beetle (Gyrinidae) with parts of the digestive tract preserved

## VERTEBRATE FOSSILS

The most notable of the vertebrate fossils are those of five species of fish. The largest fish found was a perch that measured about 30 cm (~10 inches). Many of the fishes are complete with every scale intact and some show evidence of being parasitized. Other vertebrates include, frogs, musk rat (*Ondatra zibethicus*) and beaver.



Perch scales



Leopard frog (*Rana pipiens*)



Yellow Perch (*Perca flavescens*)



Musk Rat skull (*Ondatra zibethicus*)