The Present and Future Status of Peatlands

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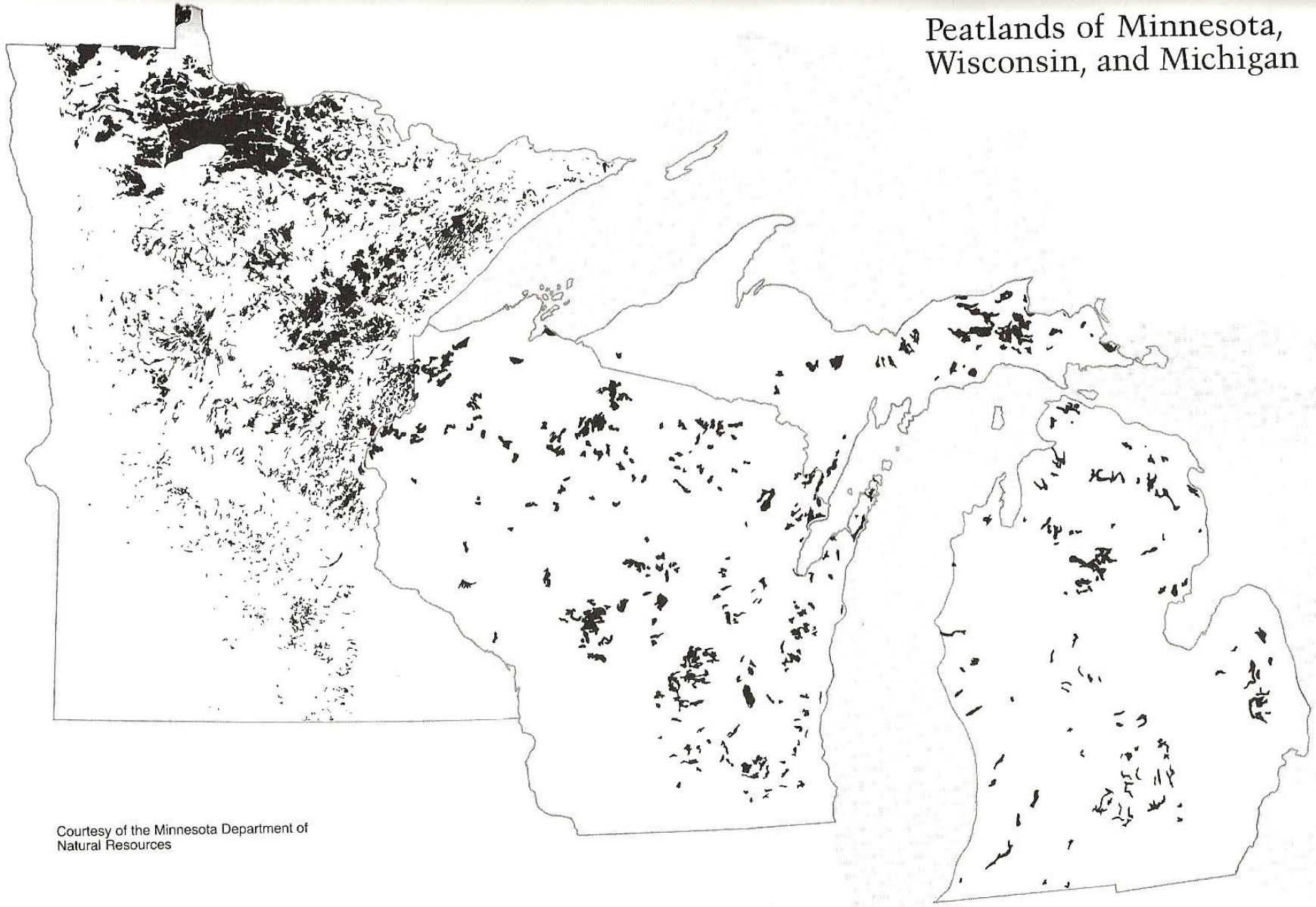
Peatlands

- Ecosystems with about 1m or more of partly decomposed peat
- Usually found where cold temperatures and high water table restrict decay
- Most are in northern regions where they grade into tundra, but some can be found in North Carolina, Borneo, Andes
- Significant sinks for atmospheric carbon dioxide since deglaciation 10,000 yr BP
- Unique plants adapted to cold, wet, and infertile conditions

Peatlands of Minnesota, Wisconsin, and Michigan



Courtesy of the Minnesota Department of Natural Resources

Bogs

Leatherleaf

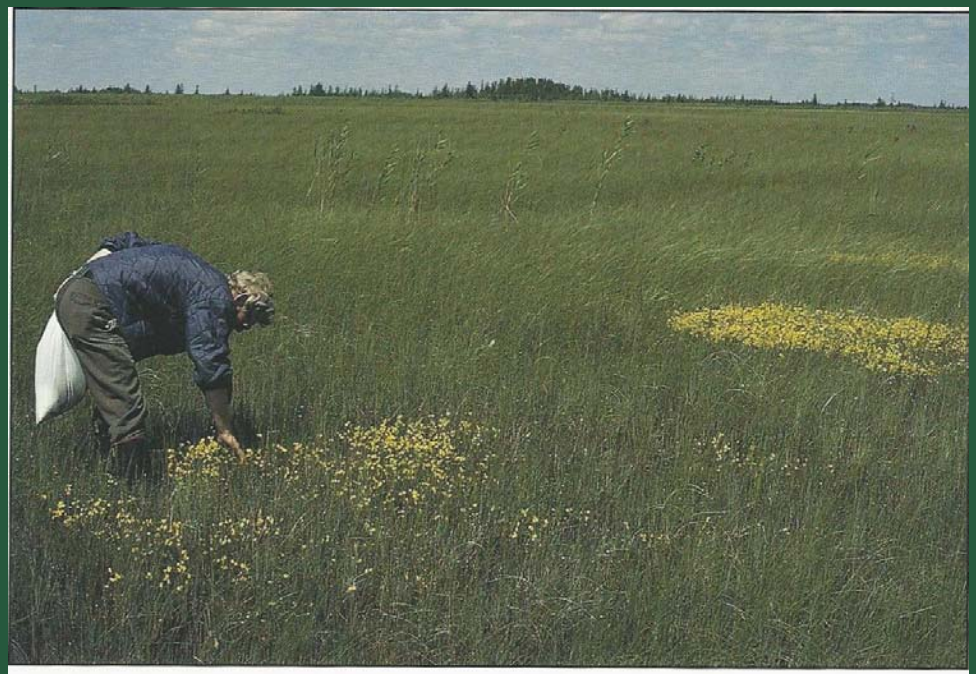
Labrador tea

Bog rosemary

Sphagnum mosses

Kalmia

Fens



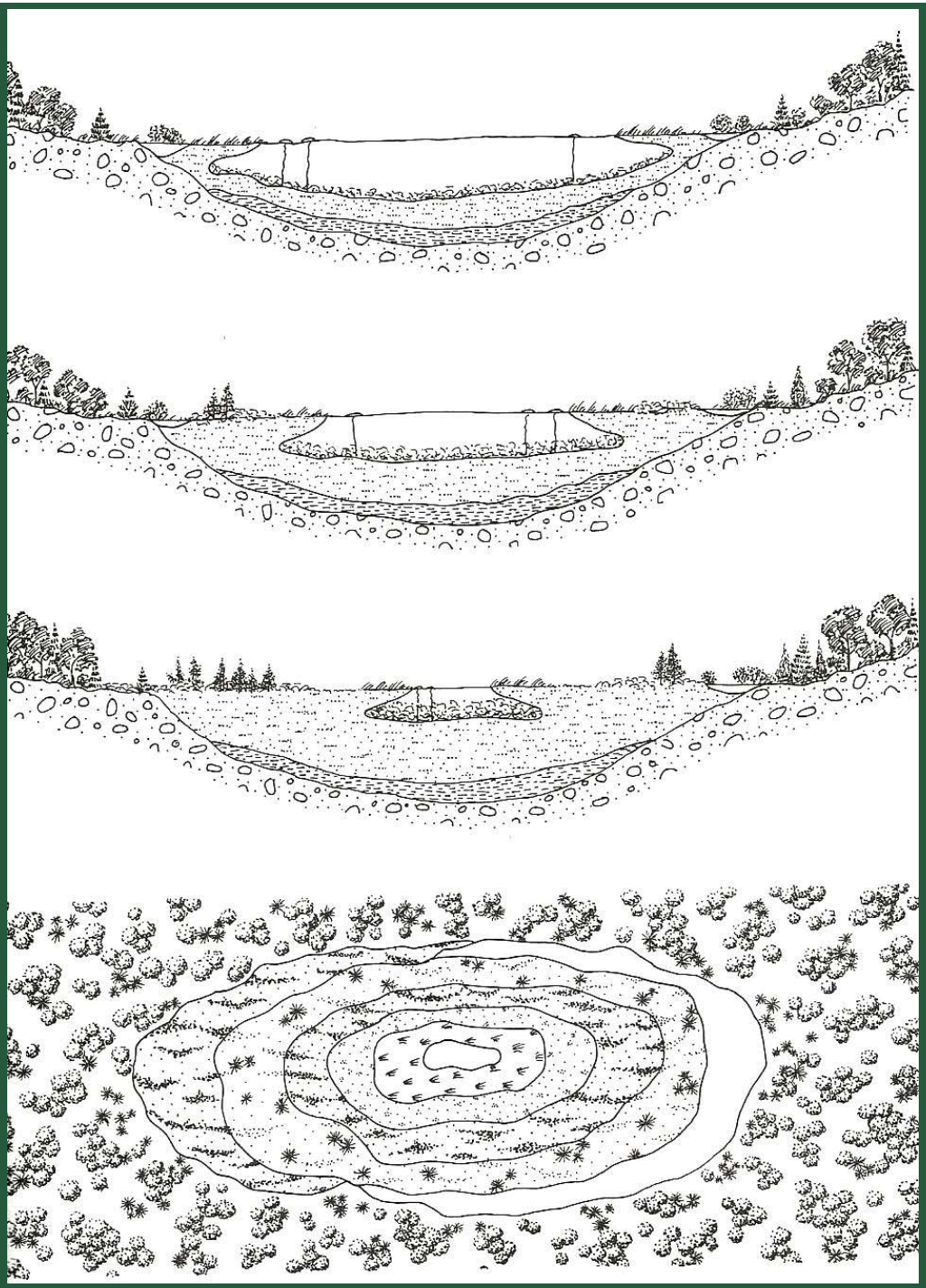
Carex lasiocarpa

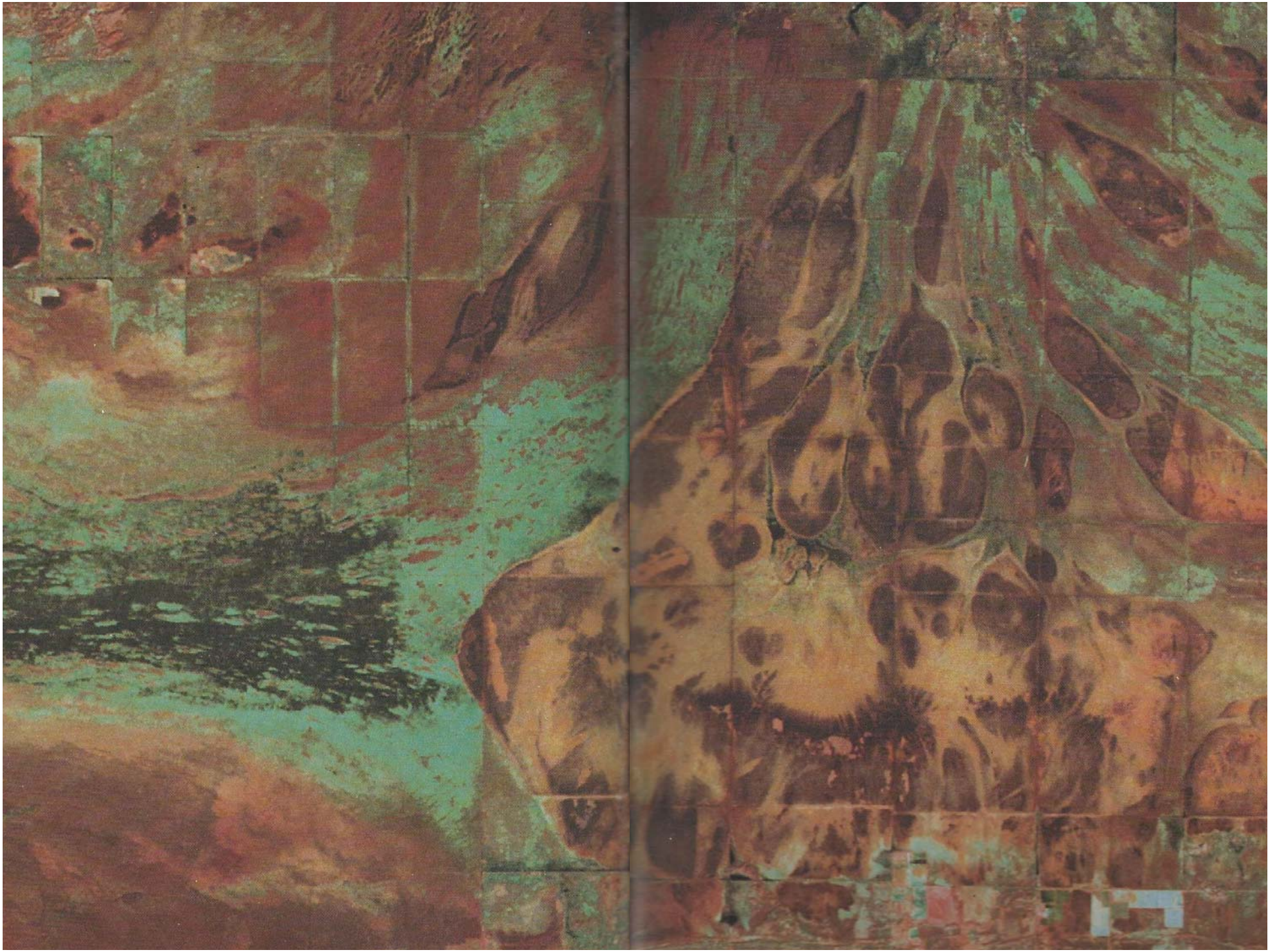
Cottongrass

Pitcher plants

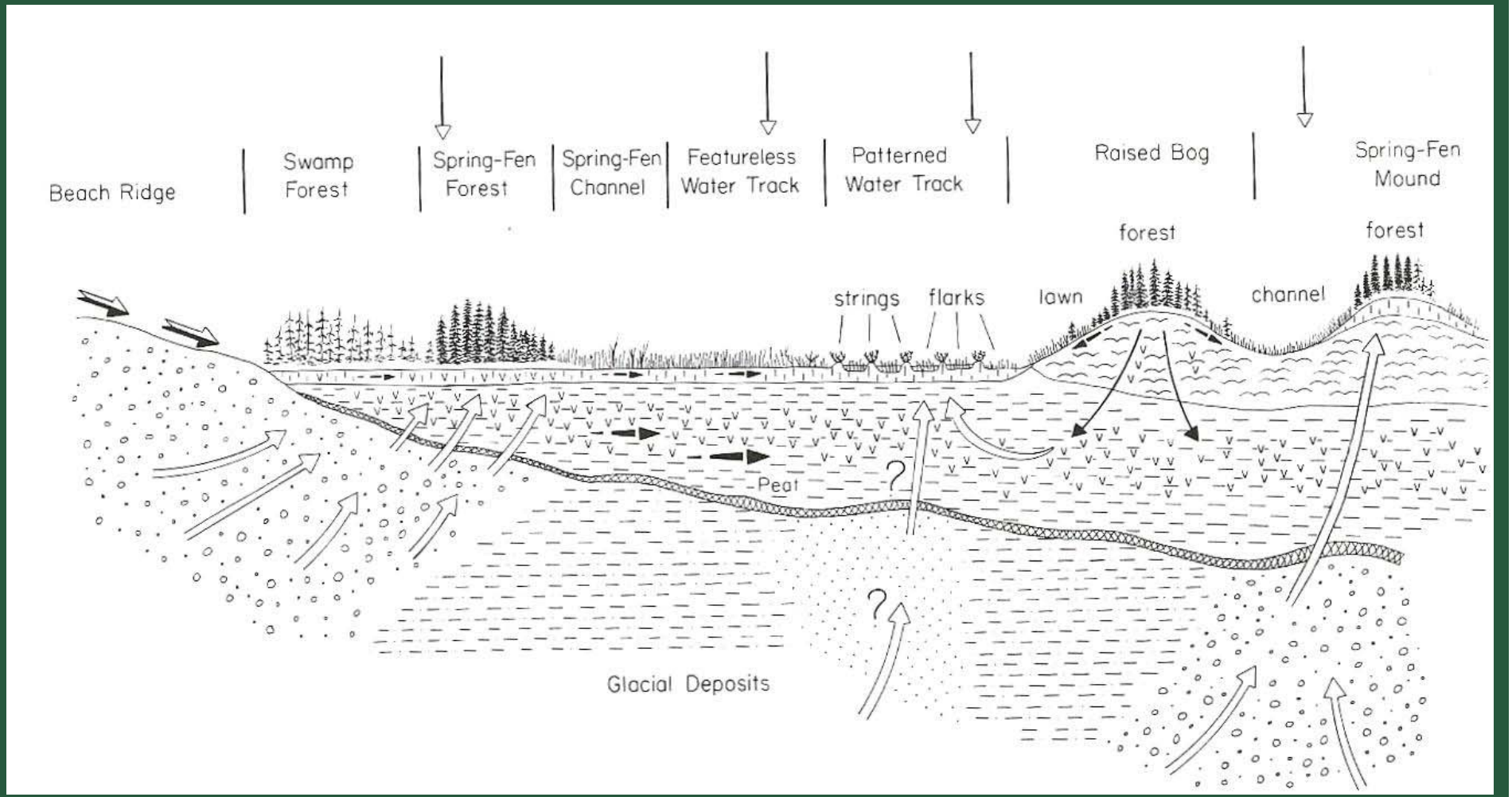
Rhyncospora

Rose pogonia orchid

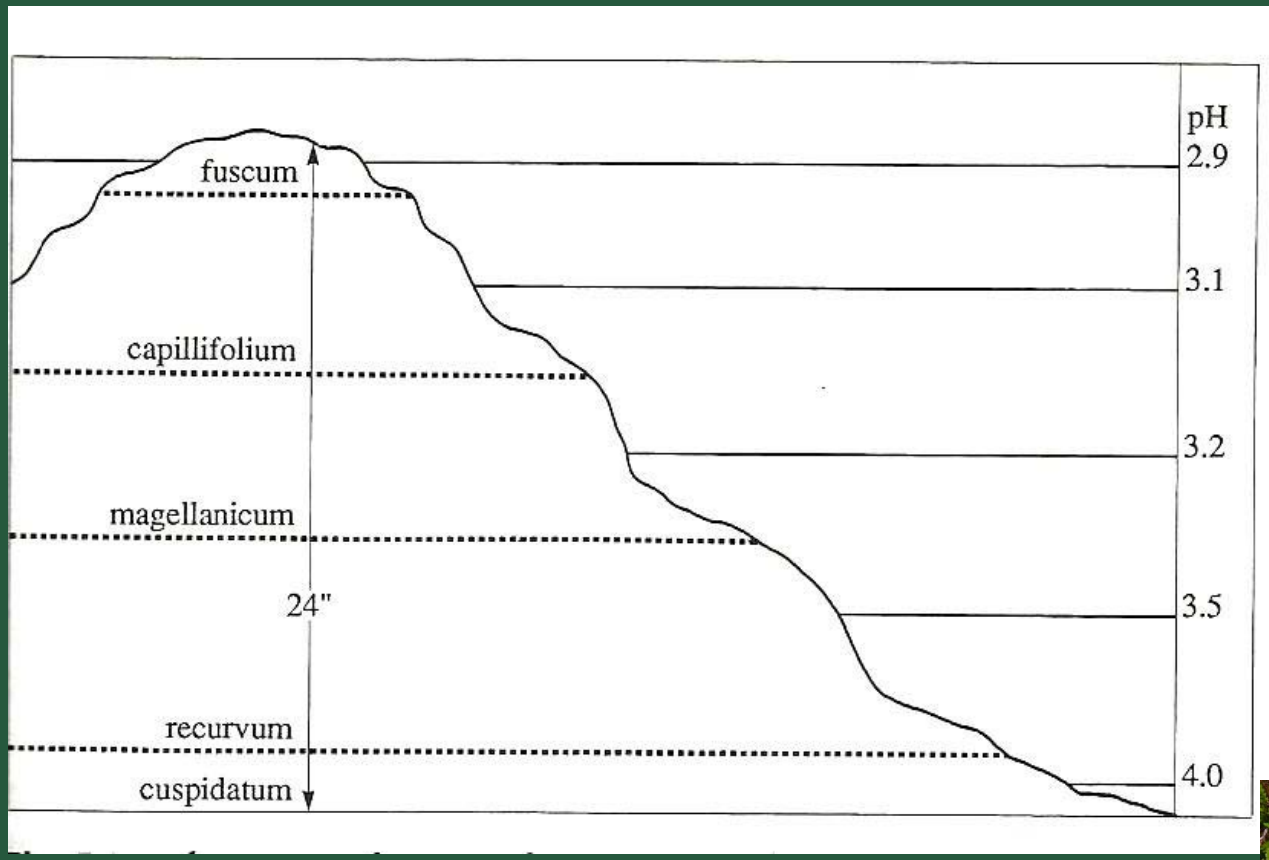


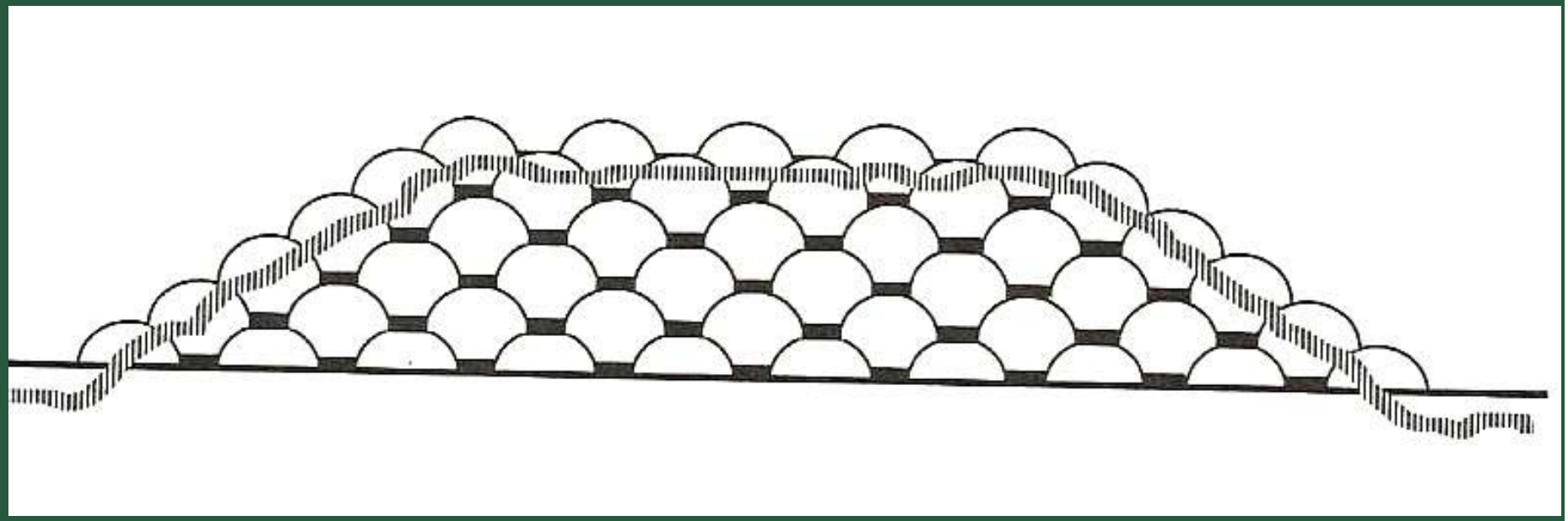


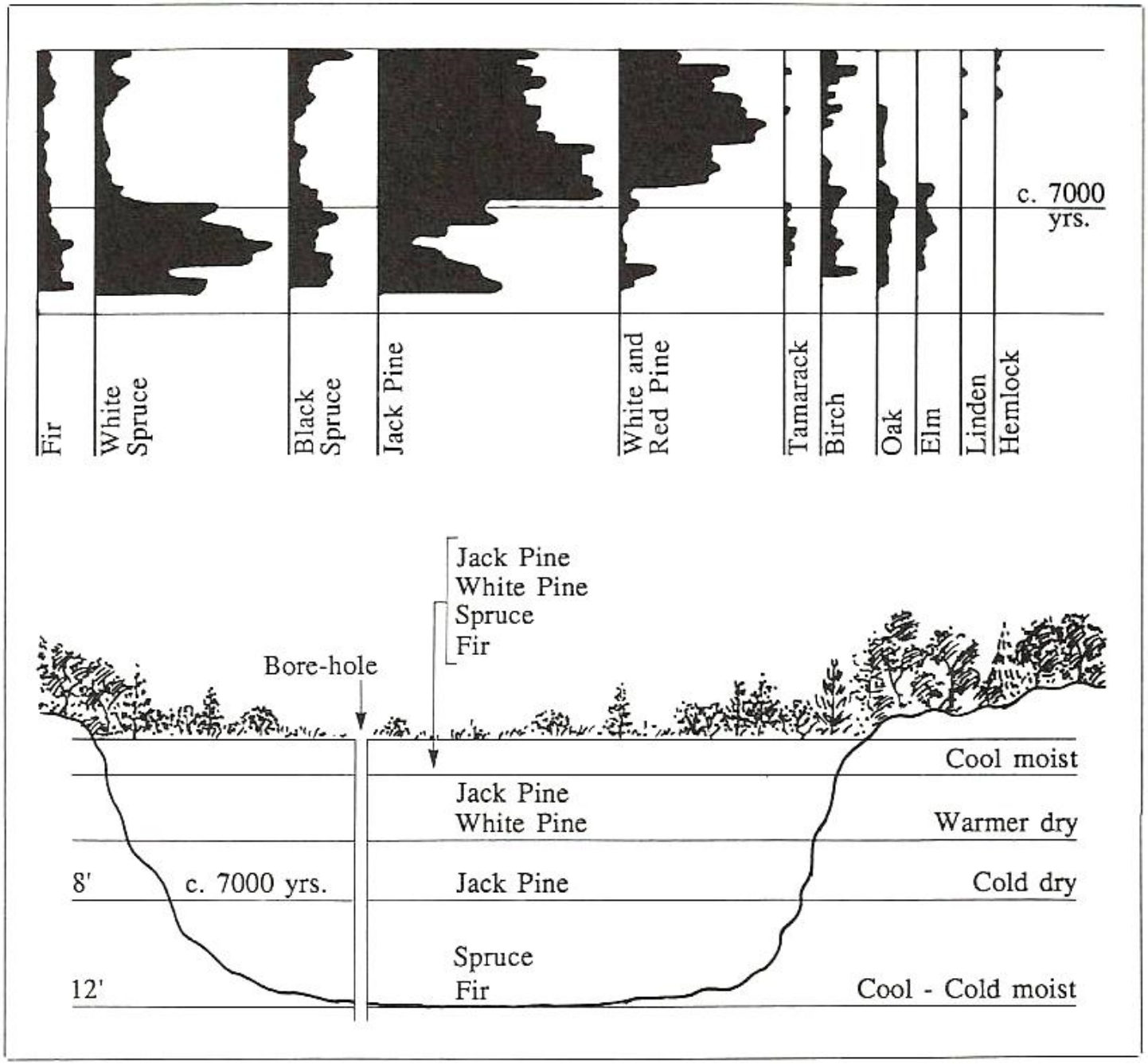
Large scale peatland topography and hydrology

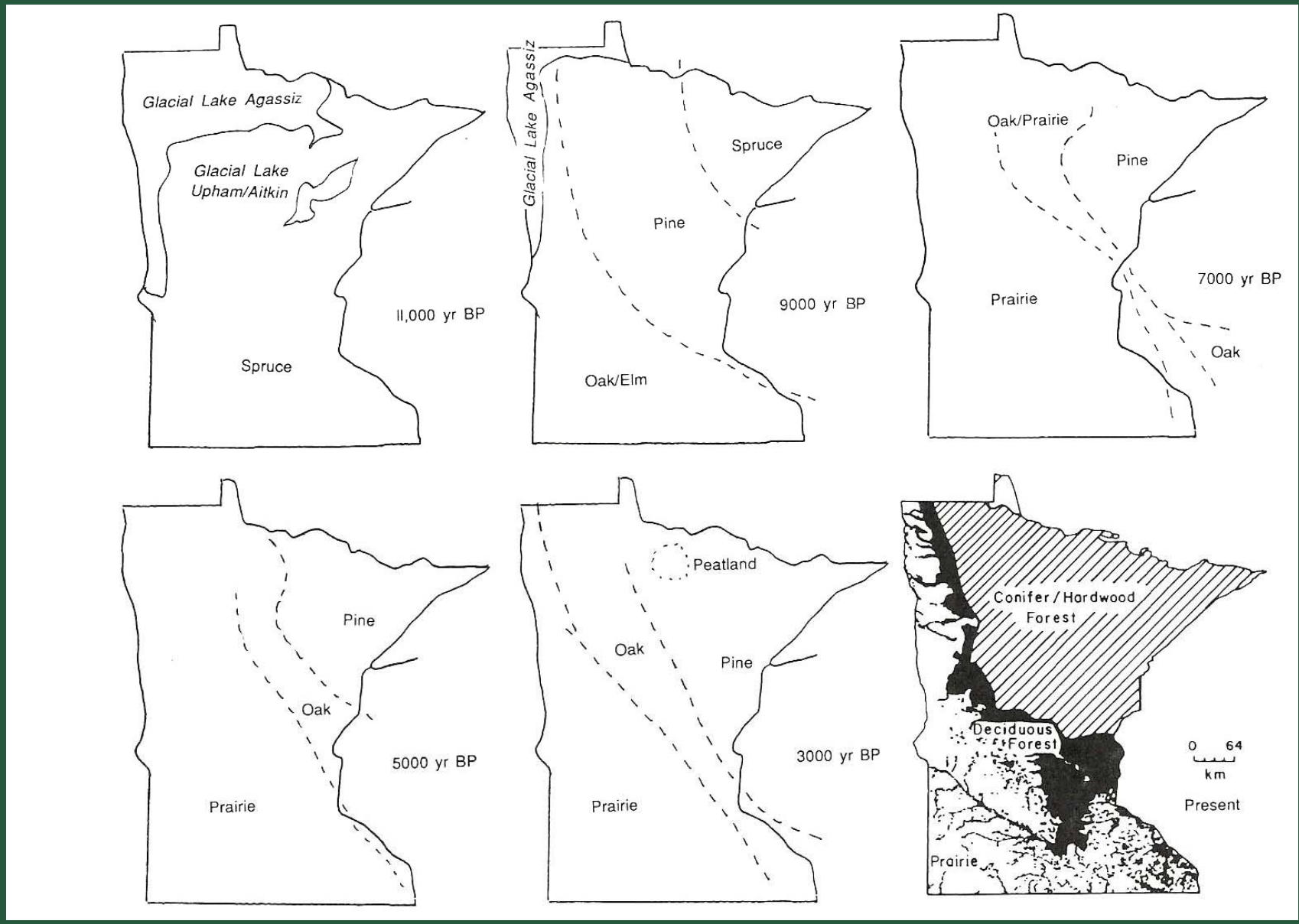


Moss hummock microtopography


pH
2.9
3.1
3.2
3.5
4.0
fuscum
capillifolium
magellanicum
24"
recurvum
cuspidatum




c. 7000 yrs.
Fir
White Spruce
Black Spruce
Jack Pine
White and Red Pine
Tamarack
Birch
Oak
Elm
Linden
Hemlock
Jack Pine
White Pine
Spruce
Fir
Bore-hole
Cool moist
Jack Pine
White Pine
Warmer dry
8'
c. 7000 yrs.
Jack Pine
Cold dry
Spruce
Fir
12'
Cool - Cold moist

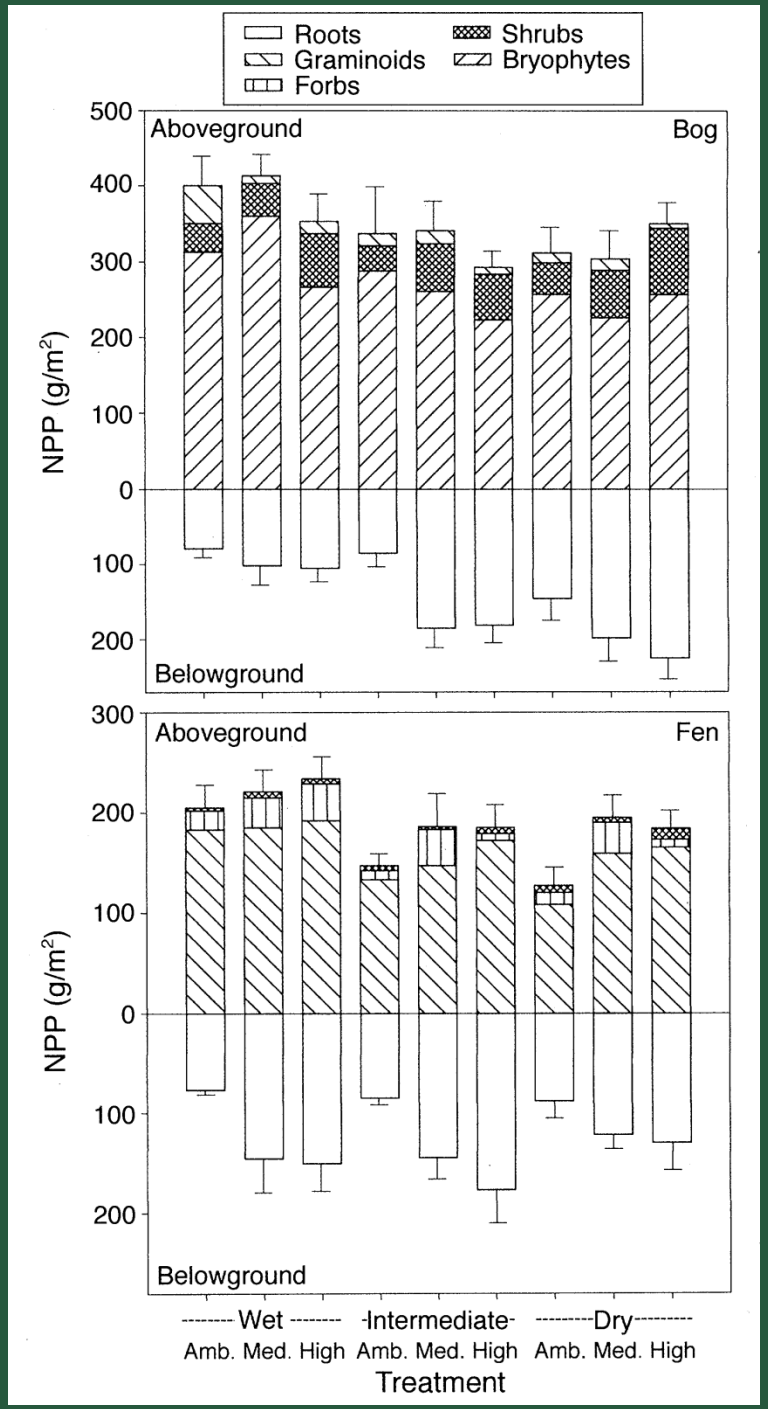

Glacial Lake Agassiz
Glacial Lake Upham/Aitkin
Spruce
11,000 yr BP
Glacial Lake Agassiz
Spruce
Pine
Oak/Elm
9000 yr BP
Oak/Prairie
Pine
Prairie
Oak
7000 yr BP
Pine
Oak
Prairie
5000 yr BP
Peatland
Oak
Pine
Prairie
3000 yr BP
Conifer / Hardwood Forest
Deciduous Forest
Prairie
0 64
km
Present

Climate Change and the Future of Peatlands

What will happen to peatlands in a warmer and possibly drier climate?

- Warmer climate increases decay rate – soil carbon stores decrease as peat carbon -> CO_2 and CH_4
- Increased decay increases nutrient availability -> increased productivity and CO_2 uptake by photosynthesis
- What is the balance?

Changes in Plant Species



Changes in Carbon Storage