Field Interpretive Techniques
BOG OVERVIEW

Bogs are unique ecosystems in the State of Minnesota. The MN DNR defines a bog as a Wetland Type 8: *Soil is usually waterlogged organic matter (peat). Vegetation is herbaceous or both, usually on a spongy covering of mosses. Typical plants are heath shrub, sphagnum moss and sedge. In the north, leatherleaf, Labrador tea, cranberry and cottongrass are often present. Scattered, often stunted black spruce and tamarack may occur. Occurring mostly in ancient lake basins, on flat uplands, and along sluggish streams.*

In Minnesota:

- 6,000,000 acres of bog
- Largest peat deposits outside of AK (in US)
- Red Lake Peatland has a stretch 50 miles x 9 miles, uninterrupted by streams or roads—most pristine ecosystem in Minnesota!

Why MN? Poor drainage on the level basin of glacial Lake Agassiz-and other regions of poor drainage-(waterlogged soils) and cool moist climate (slow decomposition) combine and result in the accumulation of peat.

PEAT: partly decomposed remains of plants—the decomposing action of bacteria and fungi is slowed by a lack of oxygen.

BOG EQUATIONS:
Cool wet climate + poor drainage (precipitation exceeding evaporation) = a condition favorable to the formation of peat.

Cold water + low oxygen + acidic = slow decomposition.

2 Main processes leading to the development of a bog:

- **Lake infilling** (Olson's Bog)—floating mats of sedges along the lake's edge develop and expand. A succession of plants, most notably sphagnum moss and leatherleaf, follow the sedges.
- **Swamping or paludification**—flat or gently sloping ground becomes swamped by mosses and sedges. Peat accumulates and the swamping continues on its slow uphill climb.

A TRUE BOG is a peat wetland where more than 50% of the nutrients come from precipitation (ombrotrophic bog). Bogs develop from the accumulation of peat in **fens**. We were seeing a fen-like situation at Olson's Bog along the lakeshore—the plants along the edge are probably receiving nutrients from the soil and other runoff into the lake; given the additional mineral soil sources of nutrients in fens, they are called minerotrophic. Less minerals in bogs means less buffering, thus we see high acidity readings in bogs; pH can range from 3.5 to 4.5. Further conditions limiting the variety of plant life found in bogs.

A number of key species to note relative to our visit to the bog:

- Various sedges, including **cottongrass** (Eriophorum vaginatum)—the pioneers of the bog. More info: www.rook.org/earl/bwca/nature/grass/eriophorumvag.html
- **Sphagnum moss**—the body of the bog. Both living and dead cells make up the sphagnum mat and often grow in a hummock pattern; capillary action allows water to be drawn upward as the plant grows. Dead cells can hold water, raising local water tables and retarding drainage.
- **Leatherleaf**—the first shrub of the bog. More info: www.rook.org/earl/bwca/nature/shrubs/chamaedaphne.html
- **Pitcher plant**—an amazing carnivorous plant (eats more than insects!) More info: www.rook.org/earl/bwca/nature/aquatics/sarracenia.html
- **See additional plant notes in reading handed out during last week's class**.

There are more **woody evergreen shrubs**, such as bog rosemary, Labrador tea, and bog laurel. The Evergreen nature of the shrubs helps the plants to survive in what is a nutrient poor and often drought-like environment (sphagnum moss can withhold water from other plants as it holds such an amazing amount; further, cold winters freeze the bog water preventing water absorption by the shrubs for much of the year. The nutrient poor soils (often rocky) of the Northern mixed forest and boreal forest are home to blueberry—an evergreen shrub relative to the bog shrubs listed; we see blueberry and bog shrubs growing where we do for many of the same reasons, including a tolerance for an acidic, nutrient poor soil.

Trees of the bog:
Most notably, **Black Spruce and Tamarack**. See field guide for ID. Other notes:

- Lower branches develop roots when in contact with wet moss, this is called "layering".
- New roots develop from the trunk as Sphagnum moss increases in depth. Deeper roots may be killed by a rising water table.
- Additional notes in reading supplied in class.

Animals
Many visitors, large mammals passing through—such as wolves or moose. Voles and bog lemmings make the bog home, thus owls (such as the Great Grey) and raptors, such as the Northern Harrier are often observed in bogs.

OTHER:

- Human history of fearing what we don't understand…fear of the bog—Bogeyman.

- Bog people—historic remains of ancient peoples (e.g. Lindow man of Britain, 2000 yrs old) found preserved in a bog. These human findings underscore the slow rates of decomposition in bogs…cold water, low levels of oxygen (slowing decomposing action of fungi and bacteria) and acidic. Remember Tim's pickle jar—bogs have served to "pickle" human remains—most findings in Britain and Scandinavia.

- **Muskeg**—term usually referring to the great expanse of bogs in Canada.