

Field Report for Hibbing NW, Bemidji NE, Bemidji SE

Dates of Field Trip: October 17-28, 1983

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I N T R O D U C T I O N

The Hibbing NW, Bemidji NE and Bemidji SE 1:100,000 work areas are located in north central Minnesota. The approximate boundaries extend from the eastern half of Lower Red Lake in the northeast, southward to the southern edge of Leech Lake Indian Reservation, and eastward to the western edge of Superior National Forest. Included is most of the Chippewa National Forest and the Leech Lake Indian Reservation.

The work areas are in the Spruce-Fir Forest Section of the Laurentian Mixed Forest Province (2111), according to Bailey's ecoregion classification (1978)*.

The Mississippi River runs west to east through Bemidji SE providing a major drainage route. However, in general these work areas represent a region of relatively low relief characterized by numerous lakes and potholes. Drainage is localized. Lakes tend to drain into other lakes according to micro-relief.

The aerial photographs are 1:58,000 scale, color infra-red transparencies. The date of all photography is May 5, 1981. Rolls 19 and 21, covering Hibbing NW, have exceptional contrast and resolution. The colors are sharp and clear, and all features are easily distinguishable. Rolls 15 and 17, covering Bemidji NE and SE, have excellent resolution, but the colors are slightly washed out, reducing contrast. Overall quality is very good.

The December 1981 mapping conventions will be used. In order to conserve space during delineation, the persistent emergent subclass (symbol "1") will not be used. Any emergent wetland not containing a subclass symbol is assumed to be persistent (ie. PEMC=PEM1C).

*Bailey, R. G. 1978. Descriptions of the Ecoregions of the United States. USDA Forest Service. Ogden, Utah. 77pp.

The objective of the trip was to correlate photographic characteristics with field observations of plant communities and water regimes in new work areas. Specific objectives were:

1. to determine the water regime of the large emergent marshes associated with river floodplains and lake margins. They appear as solid bright white signatures, commonly interspersed with patches of shrubs.
2. to determine if lacustrine and riverine areas of wild rice (Zizania aquatica) are at all visible on this photography, or whether vegetated areas visible on the photos are some other emergent or aquatic bed.
3. to visit areas of cultivated wild rice to determine an appropriate wetland classification, or whether these should be considered upland agricultural fields.
4. to determine if the signature of larch (Larix laricina), known to be an important component of forested bogs, can be identified consistently, and distinguished from needle-leaved evergreen species such as black spruce (Picea mariana) in determining dominance or codominance. Also, to determine if larch can be distinguished from broad-leaved deciduous species in forested wetlands.
5. to determine appropriate use of the organic "g" modifier in bogs as an indicator of possible peat accumulation.
6. to determine appropriateness of mixing types in order to improve legibility when labelling large wetland complexes.
7. to determine degree of flooding and vegetation changes caused by beaver impoundments.
8. to verify if the orange shrub signature is caused solely by leatherleaf (Chamaedaphne calyculata) as suspected.
9. to determine the wetland classification of small (<1 acre) isolated wetlands that often occur in clusters within upland forests and agricultural fields.

WETLAND COMMUNITIES

Many of the wetlands in these work areas are scrub-shrub and forested bogs with saturated water regimes, most commonly dominated by one or several of the following species: Picea mariana, Larix laricina, Abies balsamiae, Chamaedaphne calyculata and Salix sp. There is often a floating mat of sphagnum supporting this vegetation, and a narrow "moat" of standing water at the upland/wetland border encircling the bog. These wetlands are mostly in well-defined depressions, easily distinguishable on the aerial photography. In well-developed forested bogs (PF04Bg) mound and pool development is usually pronounced, with sphagnum growing well up the tree bases, and shallow pools of standing water in the depressions. Bog size appears to be limited only by the size of the depression containing it, ranging from less than one acre to several square miles in extent. Bogs are slightly more common in Hibbing NW than on the Bemidji work areas where the lakes are larger, and drainage systems are more developed.

Persistent emergents and deciduous scrub-shrubs constitute a second group of wetlands found alone or intermixed. They are commonly associated with river floodplains and lake margins. The emergents appear as a white signature, dominated by Carex spp. or a combination of Carex spp. and Phalaris arundinacea. Several inches of standing water were usually present, thus, a "C" water regime was applied. Carex meadows with a "B" water regime appear as a much duller white signature and usually contain a large amount of sphagnum around the base of the emergents. Flooded emergents with a bluish cast, common near the water's edge and in beaver impoundments, often contained Typha latifolia and were assigned an "F" water regime.

Deciduous scrub-shrubs appear brown or smokey grey, dominated by Alnus rugosa and Salix spp. They are very common in beaver and road impoundments, and in association with Carex meadows. A "C" water regime is typical. A slight orange hue indicates a mixture with leatherleaf, and usually requires "B" water regime. Scrub shrub wetlands surrounded by, or associated with, saturated emergent wetlands will often be saturated also.

Broad-leaved deciduous forests (PF01) were not common. They were usually seasonally (C) or temporarily flooded (A) and dominated by Fraxinus nigra mixed with species such as Illia americana, Populus tremuloides, and Betula papyrifera. The signature is difficult to distinguish from upland, but expect a slightly darker grey as an indication. Topographic contour is important in determining the extent of these wetlands.

Wild rice, when visible on the photos, will appear as a very faint purplish hue along river and lake margins. However, due to the nonpersistent life form of this species, it is expected that most areas will not be visible at the date of photography and will be mapped as open water.

Scirpus validus, also found on lake margins, appears as a very dark hue or as a strip of light blue. This is the only species that may be confused with wild rice and will be mapped PEMF. Identification of aquatic bed is not reliable without field verification, though several small stands of Nymphaea odorata were observed. Cultivated wild rice will be classified as P (or L2) EM2Kff. Though water levels are artificially manipulated, these areas have well developed hydric soils, and are used exclusively to produce a native obligate wetland species.

Larix laricina appears easily separable from other needle leaved species. In pure stands its signature is pale purple, in contrast to the deep red and oranges of the latter. More commonly, forested types are a uniform mixture of these two life forms, and spatial dominance will be determined by the relative degree of purple in the signature. Larch may be more difficult to distinguish from broad-leaved deciduous species, as both have a purple to greyish tone. Location and crown shape should help in these situations.

Chamaedaphne calyculata and, less commonly, Ledum groenlandicum were the species responsible for orange or orange/gold shrub signatures. The presence of these species in combination with any others will be assigned a saturated water regime, unless recent impounding is evident. A brownish hue indicates mixing with deciduous shrubs, common near bog borders.

SPECIAL MAPPING CONSIDERATIONS

Though we did not sample for peat deposits, the organic "g" modifier will be applied to well developed shrub and forested bogs greater than 20 acres in size, to indicate possible peat accumulation.

Evidence of beaver activity was profuse throughout the work areas, responsible for most of the seasonally and semipermanently flooded areas near streams and roadside culverts. Dams and lodges are usually visible on the photography. Areas immediately influenced will be assigned a "b" modifier. In cases where beavers have altered wetlands since the time of photography, classification will be delineated according to photo signature. Mostly these impoundments will not be classified any wetter than "F", except in larger open water areas.

Evidence of human alteration of wetlands was common. Many wetland areas have been ditched and at least partially drained. These will be identified with the "ditched partially drained" (d) modifier. Timber harvesting also appears to be significant. Logging roads were seen up to the water's edge and stumps left standing just above water (ice) level. Cultivated wild rice was another wetland use, but was relatively limited.

In several areas large emergent marshes had a black/brown signature, but were indistinguishable in the field from areas with a white PEMC signature. We assumed these were burned near the time of photography though we did not find evidence or cause. Care must be taken to not classify these areas as scrub-shrub, though these burns seem to have a much smoother texture.

The abundance and complexity of wetlands in these work areas creates special mapping problems not specifically related to the actual classification of signatures. In order to minimize photo interpretation time per photo and create a legible product, it is both necessary and feasible to combine some adjacent types into single units, and assign a mixed classification. This is in addition to types that are naturally uniformly mixed. This "lumping" will only be done at the class and subclass level in exceptionally intricate areas.

A P P E N D I X

W E T L A N D C O M M U N I T I E S

The following list gives the general descriptions of the wetland plant communities found in Brainerd NE and SE, Bemidji NE and SE, and Hibbing NW. The community types are listed by subclass and water regime. For instance, there are four distinct community types which would be classified PEM1B.

R2DWH

The majority of riverine situations observed will be classified lower perennial (R2) unless rapids are shown on the topo.

R2AB3/OWH

At the time of field checking Nuphar variegatum dominates this wetland type which has a narrow channel of open water. Vegetation is usually not detectable on the photo (Bemidji NE #21). Other species may be present, but not noted due to the late dates of field work.

L1DWH

Open water areas greater than 20 acres. If entire area is less than 6' deep on the topo it is classified L2DWH.

L2UB3F

An extensive mud flat with areas of unidentified green vegetation (moss, algae, or grass). Area appears flooded on photo (Bemidji NE #22). Only one site was noted and this was a fish hatchery.

L2EM2F

Zizania aquatica dominates these stands which thinly populate open water areas along lake shores. Other species include Scirpus validus and Iypha latifolia (Brainerd NE #22).

L2EM2Kff

Zizania aquatica stands which are farmed and artificially flooded. Iypha latifolia may also be present (Bemidji NE #24).

PAB3/DWGb

Nymphaea odorata dominates this area which is not visible on the photo. Carex sp., Iypha latifolia, and Salix sp. are subdominants (Bemidji NE #44).

DWF or G

Open water areas less than 20 acres. "F" water regime used for small open water ponds. These are commonly excavated or impounded.

PEM1A

Calamagrostis canadensis or Phalaris arundinacea dominated areas associated with Cornus stolonifera, Rubus sp., Larix laricina saplings. Some signs of past farming (Hibbing NW #47; Bemidji SE #38).

Aster sp. dominated drainage area through an agricultural field. Associated with unidentified grass, Ribes americanum, and Rosa sp. (Bemidji SE #34).

FEM1B

Carex sp. or Phalaris dominated, occasionally grazed or mowed areas mixed with Aster sp., Scirpus cyperinus, Calamagrostis canadensis, Sphagnum spp., or Salix sp. Areas may or may not be ditched (Brainerd NE #16, #25; Brainerd SE #9; Bemidji NE #43; Bemidji SE #28).

Typha and Carex spp. dominated wet floating mats associated with Sphagnum spp., Salix sp., or Rumex sp. (Brainerd NE #20).

Carex spp. dominated areas associated with true bog species such as Sphagnum spp., Chamaedaphne calyculata, Eriophorum spp., Picea mariana, Larix laricina, etc. Areas are often bordered by a wetter area with or without emergents such as Typha spp. (Hibbing NW #9; Brainerd SE #1, #7).

Other wetlands dominated by species such as Scirpus cyperinus associated with Salix sp., Chamaedaphne calyculata, Sphagnum spp. (Hibbing NW #8) or Eleocharis sp. associated with Alisma sp. (Brainerd SE #4).

PEM1C

Carex spp. or Phalaris arundinacea dominated areas associated with species such as Salix sp., Alnus rugosa, Aster sp., Typha latifolia, Sphagnum sp., or Scirpus cyperinus. These areas may be mowed or burned, and may be associated with ditching (Brainerd NE #15, 26; Brainerd SE #14; Bemidji SE #27; Bemidji NE #40; Hibbing NW #6).

Phragmites australis dominated wetland with Carex spp. and Sphagnum spp. This wetland may be an "F" (Brainerd NE #39).

Scirpus atrovirens wetland co-dominant with Salix sp. and Juncus sp., Phalaris arundinacea, Carex spp., and Alnus rugosa also present (Hibbing NW #14).

PEM1F

Typha latifolia or T. angustifolia dominated with Carex spp. and Phragmites australis present (Brainerd SE #3).

Scirpus validus and open water dominated areas along lake shores. Typha spp. may also be present (Brainerd NE #18, 22).

Carex spp. dominated area with Chamaedaphne calyculata associated and Typha latifolia, Nuphar variegatum and Feltandra virginica less common (Hibbing NW #10).

Other areas dominated either by Dulichium arundinaceum or by Juncus sp. (Hibbing NW #5).

PSS1B

Betula pumilla areas co-dominant with either Carex spp. or Chamaedaphne calyculata and associated with other bog species such as Larix laricina, Eriophorum spp., and Sphagnum spp. (Brainerd SE #10).

Alnus rugosa dominated areas associated with species such as Cornus stolonifera, Salix sp., Larix laricina, Carex spp., Aster sp., and Sphagnum spp. (Brainerd NE #23; Bemidji NE #42).

PSS1C

Alnus rugosa or Salix sp. dominated areas. No pure PSS1C wetlands were field checked, although they were often mixed with Carex sp. or Phalaris arundinacea dominated PEM1Cs.

PSS1F

Salix sp. dominated area with patches of open water visible on photo (Brainerd SE #6).

PSS3B

These were true bogs dominated by Chamaedaphne calyculata well mixed with Sphagnum spp., Andromeda glaucophylla, Kalmia polifolia, and Ledum groenlandicum. Other plants often associated were Picea mariana, Larix laricina, Pinus banksiana, Betula pumilla, Eriophorum sp., Vaccinium macrocarpon, and Carex spp. (Brainerd SE #2; Brainerd NE #19; Bemidji NE #29; Hibbing NW #4).

PSS2B and PSS4B

Same description as PSS3B only with Larix laricina or Picea mariana, respectively, being dominant (Bemidji NE #30; Hibbing NW #15).

PFO1A

Fraxinus nigra or Populus tremuloides dominated wetlands with possible associations of Quercus macrocarpa, Betula papyrifera, Acer rubrum, Ulmus americana, Alnus rugosa, Corylus cornuta, Vaccinium cassinoides, Ribes americanum and Sphagnum spp. (Bemidji SE #26; Bemidji NE #31; Hibbing NW #13).

Tilia americana dominated wetland associated with Fraxinus nigra, Equisetum sp., Sambucus sp., Sphagnum sp. (Bemidji NE #41).

PFO1B

Fraxinus nigra or Populus tremuloides dominate these wetlands with commonly associated plants such as Abies balsamea, Alnus rugosa, Phalaris arundinacea, and Sphagnum spp. (Bemidji NE #32; Hibbing NW #11, 16).

Fraxinus nigra dominated area with Poa sp., Typha latifolia, and Onoclea sensibilis (Hibbing NW #3).

PFO1C

Fraxinus nigra or, less commonly, Ulmus americana dominated wetlands, usually with well developed mounds and pools. Common associates are Tilia americana, Alnus rugosa, Cornus stolonifera, Ribes americanum, Carex spp. and Sphagnum spp. (Brainerd SE #11; Brainerd NE #17, 21; Bemidji SE #36).

Betula papyrifera or Populus tremuloides dominated wetlands well mixed with Larix laricina. Associates are Populus balsamea, Phalaris arundinacea, and Carex spp. (Brainerd SE #12).

PFO2B

Larix laricina dominates these wetlands. They may be mixed with any of the species listed for PSS3B, as well as Abies balsamea (Brainerd SE #2; Bemidji NE #20; Hibbing NW #7).

PFO4A

Dominated by Pinus banksiana with Picea mariana, Abies balsamea, Rosa sp., Rubus sp., and Sphagnum sp. in association. This area fades to a classic PFO4B dominated by Picea (Bemidji SE #35).

PFO4B

These wetlands may be dominated either by Picea mariana, Abies balsamea, Pinus banksiana, or Thuja occidentalis. Associated species are same as listed for PSS3B (Brainerd SE #2, 35; Bemidji SE #37; Bemidji NE #33; Hibbing NW #2).

PF05F

Dead trees of undetermined species dominated these wetlands, most of which had been affected by beaver activity. Associated plants include Sparganium sp., Carex spp., Typha latifolia, Scirpus cyperinus, Sphagnum spp., and Lemna minor (Brainerd SE #8; Bemidji SE #37; Hibbing NW #12).