

NATIONAL WETLAND INVENTORY USER REPORT 1:100,000 MAP AREA

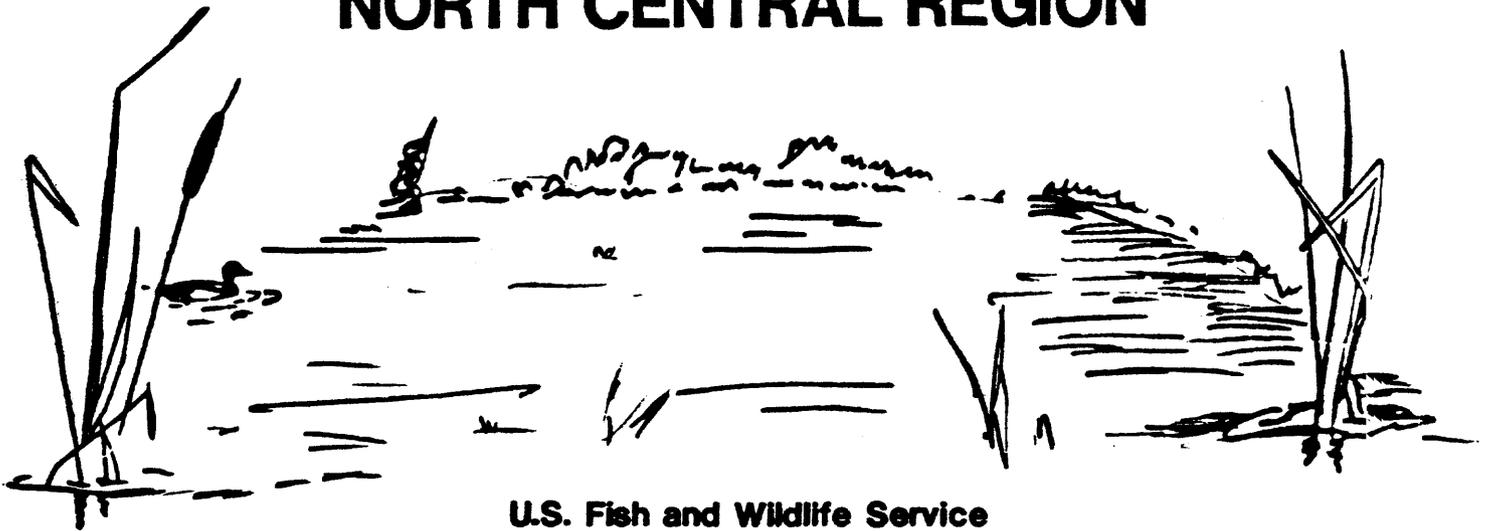
MAP AREA: TWO HARBORS NW

1:100,000 NAME: ELY

STATE: MINNESOTA



NORTH CENTRAL REGION



U.S. Fish and Wildlife Service

Federal Building, Fort Snelling Twin Cities, Minnesota 55111

USER CAUTION

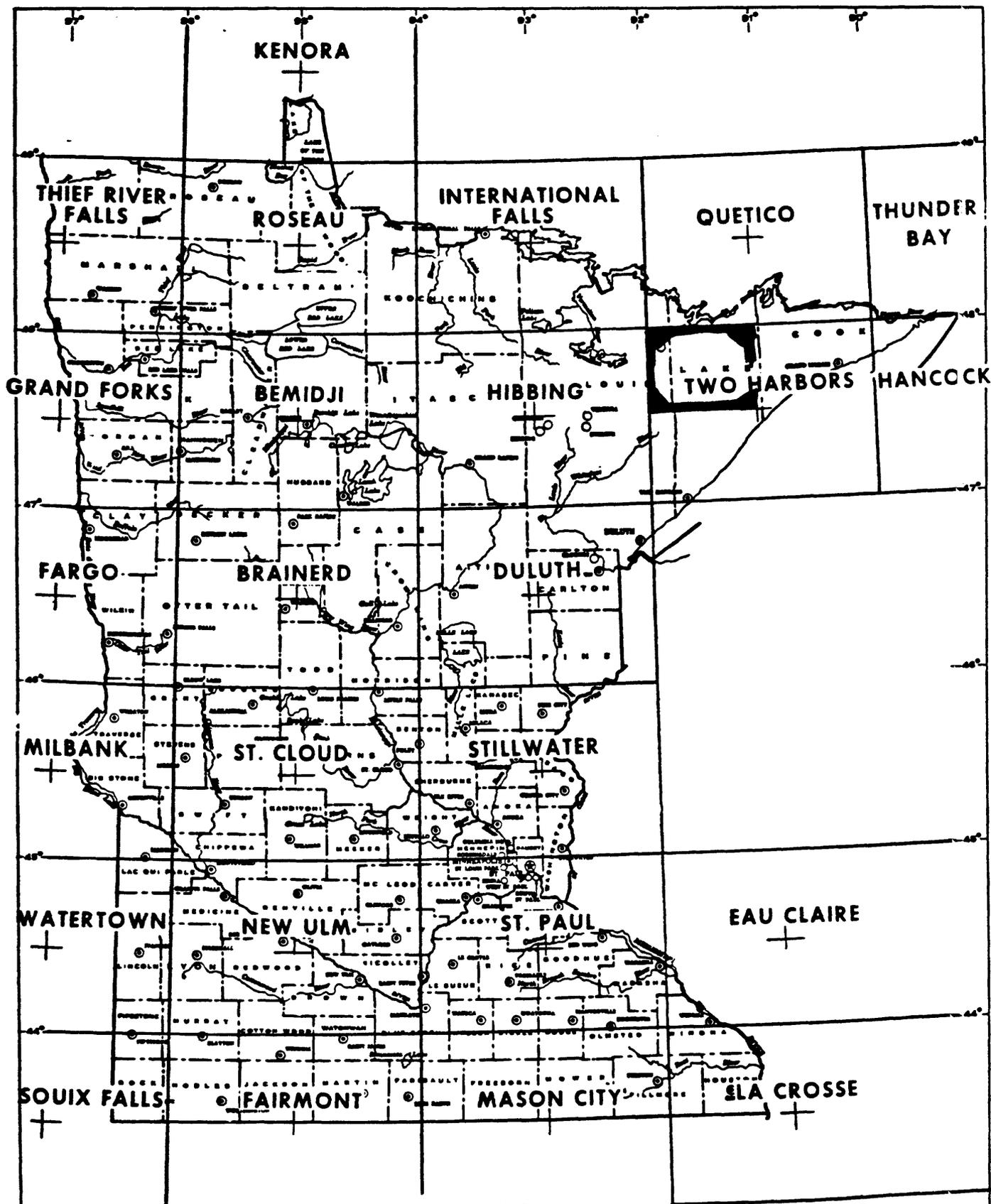
Maps for this 1:100,000 scale map were prepared primarily by stereoscopic analysis of high altitude aerial photographs. Wetlands were identified on the photographs based on vegetation, visible hydrology, and geography in accordance with Classification of Wetlands and Deepwater Habitats of the United States, Cowardin, et al., 1979. The aerial photographs reflect conditions during the specific year and season when they were taken. Some small wetlands and those obscured by dense forest cover may not be included on the map document. In addition, there is a margin of error inherent in the use and interpretation of aerial photographs. Thus a detailed on-the-ground and historical analysis of a single site may result in revision of the wetland boundaries established through photographic interpretation.

Federal, State, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either design or products of this inventory, to define limits of proprietary jurisdiction of any local, State, or Federal government or to establish the geographical scope of regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate Federal, State, or local agencies concerning specific agency regulatory programs and propriety jurisdictions that may affect such activities.

Additional information regarding this map or other National Wetland Inventory activities may be obtained by contacting:

Regional Director, Region 3 (AH/TS)
Attn: Regional Wetlands Coordinator
United States Fish and Wildlife Service
Federal Building, Fort Snelling
Twin Cities, Minnesota 55111

LOCATION OF REPORT AREA
STATE OF MINNESOTA



DATE: December 1983

MAP PREPARATION

Basic Data

Photography Used:

<u>Emulsion</u>	<u>Scale</u>	<u>Date</u>	<u>Percent Coverage</u>
1. Black and white	1:80,000	May 1975	6%
2. Black and white	1:80,000	May 1976	57%
3. Black and white	1:80,000	October 1978	37%

Field Check Dates

1. June 24 - 25, 1980

Contractor(s) for Photo Interpretation

1. University of Massachusetts

Collateral Data Used

1. USGS topographic quad sheets
2. USDA soil surveys

Mapping Legend: (See Appendix D)

Farmed Wetlands

It is the policy of the Fish and Wildlife Service to not map farmed wetlands in the National Wetlands Inventory unless the wetland is a pothole-like depression, such as those found in the Prairie Pothole Region, intermittently flooded lake bottoms, cranberry bogs, or diked former tidelands in California. Therefore this map area may contain various amounts of non-depression type wetlands which were farmed on the date of the photography and intentionally not included in the inventory. Many of these omitted wetlands commonly occur in floodplains.

GEOGRAPHY

A. General Location

Degrees Longitude: 91° 0' to 92° 0' West

Degrees Latitude : 47° 30' to 48° 0' North

Largest City : Ely, Minnesota

Two Harbors NW is located in the "arrowhead" region of Minnesota in the northeastern part of the state, and encompasses portions of St. Louis, Cook and Lake Counties. Portions of the Superior National Forest and the Boundary Waters Canoe Area are included in the map area. This map lies within the Kawishiwi River drainage basin.

B. Ecoregion

Bailey's Ecoregion Classification and Description (Bailey 1978):

Code: 2111 L

Humid Temperate Domain (2000)

The entire Two Harbors NW map is in this Domain.

The climate of this Domain has strong seasonal temperatures and precipitation cycles, and a distinctive winter season. The Humid Temperate Domain comprises the humid midlatitude forests of broadleaf deciduous and needleleaf evergreen trees.

Warm Continental Division (2100)

All of the Two Harbors NW map lies within this Division.

This Division characteristically has warm summers and cold, snowy winters. The natural vegetation is needleleaf and mixed needleleaf-deciduous forest. The soils of this Division are Spodosols, which are strongly leached but have a top layer of humus. Spodosols are usually acidic and lack calcium, potassium and magnesium. Despite these deficiencies, Spodosols are very suitable for growing the conifers found in this Division.

Laurentian Mixed Forest Province (2110)

The entire Two Harbors NW map area falls within this Province.

The vegetation of this Province is representative of the transitional zone in which it lies, between the boreal and deciduous forest zones. Forests consist either of mixed conifer-deciduous stands or mosaic-like arrangements with pure stands of deciduous forest growing on good soil sites and pure stands of conifers growing on poor soil sites.

Pines (Pinus spp.) are the most representative conifers of the mixed forest stands, with white pine (P. strobus) dominating in the Great

Lakes region. Pines are often a pioneer woody species following forest fires. Eastern hemlock (Tsuga canadensis) and eastern redcedar (Juniperus virginiana) also grow in this Province.

Spruce-Fir Forest Section (2111 L)

This section occurs in lowland areas and covers all of the Two Harbors NW map area.

Spruce (Picea spp.) and fir (Abies spp.) trees form the principal plant association of this section.

C. Topography and Land Forms

Hammond's Land Surface Form and Physical Subdivision (Hammond 1965, 1969):

Codes: (III-3) B2b, (III-3) B3b, (III-3) C5d

Interior Physical Division (III) - The entire Two Harbors NW map area lies within this Physical Division.

North Central Lake-Swamp-Moraine Plains Subdivision (3) - This Subdivision covers all of the Two Harbors NW map area.

Irregular Plains Class (B2b) - This Class covers 25% of the map area extending from the southwest portion to the south-central portion. Fifty to 80% of the area is in gentle slopes. Fifty to 75% of these slopes occur in lowlands. Local relief ranges from 100 to 300 feet.

Plains With Hills Class (B3b) - This Class covers 70% of the map area, including the northern half, and the central, extreme east central and extreme west central portions. Fifty to 80% of these slopes occur in lowlands. Local relief ranges from 300 to 500 feet.

Open Low Mountains Class (C5d) - This Class occurs in the extreme southeast corner of Two Harbors NW and comprises less than 5% of the map area. Twenty to 50% of the land is in gentle slopes. More than 75% of these slopes occur in upland areas. Local relief ranges from 1000 to 3000 feet.

RESOURCES

A. Wetlands*

No wetland acreage figure is available for the Two Harbors NW area at the present time.

Two Harbors NW has a very high density of wetlands; which are well distributed throughout the map area. An extremely high concentration of wetlands can be found in the southwestern part of the map, near the border between St. Louis and Lake Counties.

Some of the most common wetland types of Two Harbors NW include saturated forests and forest-shrub mixture. Black spruce (Picea mariana) is the predominant tree species of these wetlands, although northern white cedar (Thuja occidentalis), tamarack (Larix laricina) and speckled alder (Alnus rugosa) are common.

Bogs and saturated to seasonally flooded scrub-shrub wetlands are also common in the Two Harbors NW map area. Important bog species include tamarack, black spruce, leatherleaf (Chamaedaphne calyculata), sphagnum moss (Sphagnum spp.) and sweet gale (Myrica Gale). Predominant species of the scrub-shrub wetlands include speckled alder, willow (Salix spp.) and dogwood (Cornus spp.). A list of plant species for other wetland types can be found in Appendix C.

*Some plant species named here were found in adjacent 1:100,000 map areas and are believed to be representative of those species also present in the Two Harbors NW map area.

B. Wildlife and Fish

Extensive forests cover much of the Two Harbors NW map area. Through natural selection, these forests are changing from young, uneven-aged, mixed hardwood-conifer stands to even-aged, homogeneous spruce-fir forests. This change is causing a downward population trend for game species which prefer the diversity of habitat types afforded by the younger forests, such as the white-tailed deer (Odocoileus virginianus), black bear (Ursus americanus), moose (Alces alces), snowshoe hare (Lepus americanus), ruffed grouse (Bonasa umbellus) and American woodcock (Philohela minor). The spruce grouse (Canachites canadensis), however, prefers the spruce-fir forests and is therefore increasing in numbers. Aquatic furbearers in the area include beavers (Castor canadensis) and muskrats (Ondatra zibethica).

Some production of black ducks (Anas rubripes), mallards (Anas platyrhynchos), mergansers (Mergus spp.) and common goldeneyes (Bucephala clangula) occurs in the area. The best waterfowl habitat in the area consists of beaver ponds, small flows, and lake bays.

Other wildlife species that inhabit the map area include the woodchuck (Marmota monax), porcupine (Erethozon dorsatum), red squirrel (Tamiasciurus hudsonicus), eastern gray squirrel (Sciurus carolinensis), eastern fox squirrel (S. niger), red fox (Vulpes vulpes) and bobcat (Lynx rufus), most of which have maintained relatively stable populations.

Timber wolves (Canis lupus) and bald eagles (Haliaeetus leucocephalus), on the Endangered and Threatened list, also reside in the area. Northeastern Minnesota, including Two Harbors NW, has the largest timber wolf population in the United States (Great Lakes Basin Commission 1975b, Mann 1955).

Sport fishing occurs in many lakes and inland streams, and in Lake Superior. Fish species commonly found in the lakes include walleyes

(Stizostedion vitreum vitreum), northern pike (Esox lucius) and smallmouth bass (Micropterus dolomieu). Lake trout (Salvelinus namaycush) are found in some rock-bound lakes. Stream species include brook trout (Salvelinus fontinalis), brown trout (Salmo trutta) and rainbow trout (Salmo gairdneri). Factors limiting stream fish populations include stream shallowness, lack of pools, heavy ice cover and low water fertility.

Common fish of Lake Superior tributaries include rainbow smelt (Osmerus mordax), perch (Perca sp.), suckers (Catostomus), panfish (Lepomis spp., Promoxis spp.), northern pike, walleyes, bass (Micropterus sp.), coho salmon (Onchorhynchus kisutch) and rainbow, brook and brown trout (Great Lakes Basin Commission 1975a).

Appendix A

REFERENCES

- Bailey, R. G. 1978. Descriptions of the Ecoregions of the United States. USDA For. Serv. Intermtn. Reg. Ogden, Utah. 77 p.
- Cowardin, L. M., V. Carter, F. C. Golet, and E. T. LaRoe. 1979. Classification of Wetlands and Deepwater Habitats of the United States. U. S. Fish and Wildlife Service, Washington, D. C. FWS/OBS-79/31. 103 p.
- Great Lakes Basin Commission. 1975a. Fish: Great Lakes Basin Comm. Great Lakes Basin Framework Study, App. 8. Ann Arbor, Mich. 290 p.
- 1975b. Wildlife: Great Lakes Basin Comm. Great Lakes Basin Framework Study, App. 17. Ann Arbor, Mich. 140.
- Hammond, E. H. 1965. 1:17,000,000 scale Physical Subdivisions. 1 map. p. 61. In Gerlach, A. C., ed. 1970. National Atlas of the United States of America. USDI Geol. Surv. Washington, D. C. 417 p.
- 1969. 1:7,500,000 scale Classes of Land Surface Form. USDI Geol. Surv. 1 map. p. 62-63. In Gerlach, A. C., ed. 1970. National Atlas of the United States of America. USDI Geol. Surv. Washington, D. C. 417 p.
- Mann, G. E. 1955. Wetlands Inventory of Minnesota. U. S. Fish and Wildlife Service, Office of River Basin Studies. Minneapolis, Minn. 42 p.

ADDITIONAL INFORMATION

The purpose of this report is to provide general information regarding the production of the map and wetlands found within the area of this map. It does not include descriptions of all wetlands found in the area nor complete species information. For additional information, the following references are recommended:

- Hammond, E. H. 1964. Analysis of Properties in Land Form Geography: An Application to Broad-Scale Land Form Mapping. Annals, Assoc. Amer. Geog. v. 54. p. 11-23.

Appendix B

SPECIAL MAPPING PROBLEMS

Problem 1: Presense of snow on some of the spring photography.

Resolution: Use of USGS topographic quad sheets as collateral data. Snow cover made determination of specific water regimes impossible. The combined water regime "Y" had to be used in some places.

Problem 2: Swamp symbols inaccurately placed on 15 minute USGS topographic maps (e.g. Greenwood Lake quad). USGS symbology was misaligned with the contours.

Resolution: No solution. Special attention was given to the contour lines, but often the swamp symbols had to be ignored. USGS symbology was misaligned with the contours.

Problem 3: Delineation of littoral zones based on depth contours is often an approximation.

Resolution: Note given to zoom transfer technicians to follow 6 foot depth contour when photo information was transferred to the maps.

Problem 4: Lack of clarity and poor resolution of photography made determination of species in broad-leaved deciduous (PSS1 - alder, willow, bog birch, etc.) vs. needle-leaved evergreen (PSS3 - leatherleaf, laborador tea, etc.) scrub-shrub wetlands difficult.

Resolution: Special attention was given to USGS topographic quad sheets and other sources of collateral data. Subclasses were used only when signature was clearly identifiable. Hydrologic system (e.g. PSS1 along streams, PSS3 in bog mats) used to help identify subclasses when possible.

Problem 5: Discrepancy when tying photos taken during different seasons of the year. Example: A wetland that is a POW on one photo may be a PEM on the adjacent photo which was taken during a different season.

Resolution: Wetlands were classified according to highest vegetation type when photos overlap. Thus, some POW's were classified as PEM's.

Problem 6: Some forest clearcut areas difficult to distinguish as wetland or upland. Height factor used to distinguish upland vegetation from wetland vegetation was eliminated by the clear-cutting.

Resolution: Wetland symbols and contours on USGS topographic maps were used as an aid to help determine the presence and extent of a wetland.

Problem 7: Question of applying "C" water regime to PF04's - several instances of PF04's along flood plains adjacent to PSSC's, etc.

Resolution: Generally seasonal "C" water regimes were applied to these situations when a visible source of seasonally fluctuating water (stream, lake or pond) was present, allowing adjacent vegetation to flood on a seasonal basis. Other vegetation further removed from these water bodies would more appropriately be called saturated "B".

Appendix C

WETLAND COMMUNITIES

<u>MAP SYMBOLS</u>	<u>LOCAL NAME</u>	<u>DOMINANT VEGETATION</u>	<u>WATER REGIME</u>
PF01/4B	Swamp	<u>Butula papyrifera</u> <u>Thuja occidentalis</u>	Saturated
PF02B	Swamp Bog	<u>Larix laricina</u>	Saturated
PF04B	Swamp Bog	<u>Picea mariana</u> <u>Thuja occidentalis</u> <u>Larix laricina</u> <u>Alnus pugosa</u> <u>Sphagnum sp.</u>	Saturated
PF04/2B	Swamp Bog	<u>Picea mariana</u> <u>Larix laricina</u>	Saturated
PF04/SS1B	Swamp	<u>Picea mariana</u> <u>Alnus rugosa</u>	Saturated
PF01/SS1C	Swamp	<u>Fraxinus nigra</u> <u>Alnus rugosa</u> <u>Betula papyrifera</u> <u>Prunus sp.</u>	Seasonal
PSS1Bg	Bog?	<u>Myrica Gale</u>	Saturated
PSS4Bg	Bog	<u>Picea mariana</u> <u>Larix laricina</u>	Saturated
PSS1C	Swamp	<u>Alnus rugosa</u> <u>Salix sp.</u>	Seasonal
PSS3/EM5Bg	Bog	<u>Chamaedaphne calyculata</u> <u>Carex sp.</u> <u>Sphagnum sp.</u> <u>Andromeda glaucophylla</u> <u>Potentilla palustris</u> <u>Myrica Gale</u>	Saturated
PSS4/EM5Bg	Swamp	<u>Picea mariana</u> <u>Carex sp.</u>	Saturated
PEM5B	Marsh	<u>Carex sp.</u>	Saturated
PEM5Bg	Marsh	<u>Carex sp.</u> <u>Eleocharis sp.</u>	Saturated

<u>MAP SYMBOLS</u>	<u>LOCAL NAME</u>	<u>DOMINANT VEGETATION</u>	<u>WATER REGIME</u>
PEM5E	Marsh	<u>Equisetum fluviatile</u>	Saturated/ Seasonal
PEM5Eg	Marsh	<u>Typha latifolia</u> <u>Carex</u> sp.	Saturated/ Seasonal
PEM5F	Marsh	<u>Typha latifolia</u> <u>Sparganium</u> sp.	Semi-permanent
PAB4/RB1F	Aquatic bed	<u>Nuphar</u> sp. Bed rock	Semi-permanent
R2AB4F R2AB4H	Aquatic bed	<u>Nuphar</u> sp.	Semi-permanent Permanent

Appendix D

NATIONAL WETLAND INVENTORY
Information and Legend
For Map Products

Classification System: The U.S. Fish and Wildlife Service uses the "Classification of Wetlands and Deepwater Habitats of the United States", December, 1979, by L. M. Cowardin, et al., to delineate and identify wetlands. This system is hierarchical and structured around a combination of ecological, biological, hydrological and substrate characteristics which permits universal use across the United States, its territories and possessions. It consists of five systems: Marine, Estuarine, Riverine, Lacustrine (lake) and Palustrine (swamps, bogs, marshes) and proceeds in a hierarchical manner through subsystem, class, and subclass. It also contains provisions to use water regime, water chemistry, soil, and special modifiers to provide additional levels of detail.

Figure 1 is an illustration of the classification system to the class level.

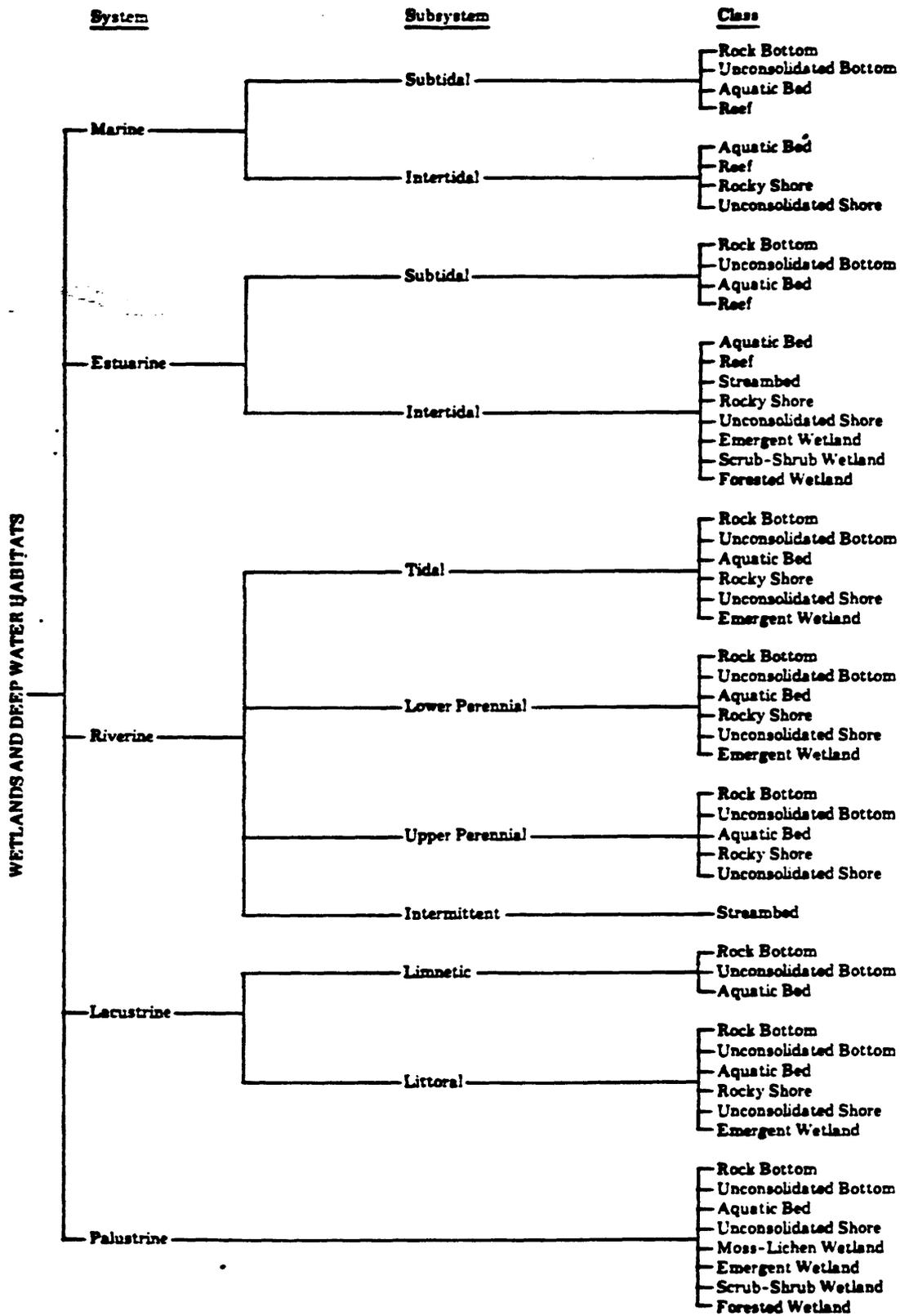


Fig. 1. Classification hierarchy of wetlands and deepwater habitats, showing systems, subsystems, and classes. The Palustrine System does not include deepwater habitats.

Use of Wetland Legend: Wetland data are displayed on overlays or maps by a series of letters and numbers (alpha numerics) with the first letter representing the system and subsequent alpha numerics representing, in a sequential manner, the subordinate levels of detail down to the modifiers. Where classes and subclasses have been mixed, they are separated by a diagonal line.

Examples

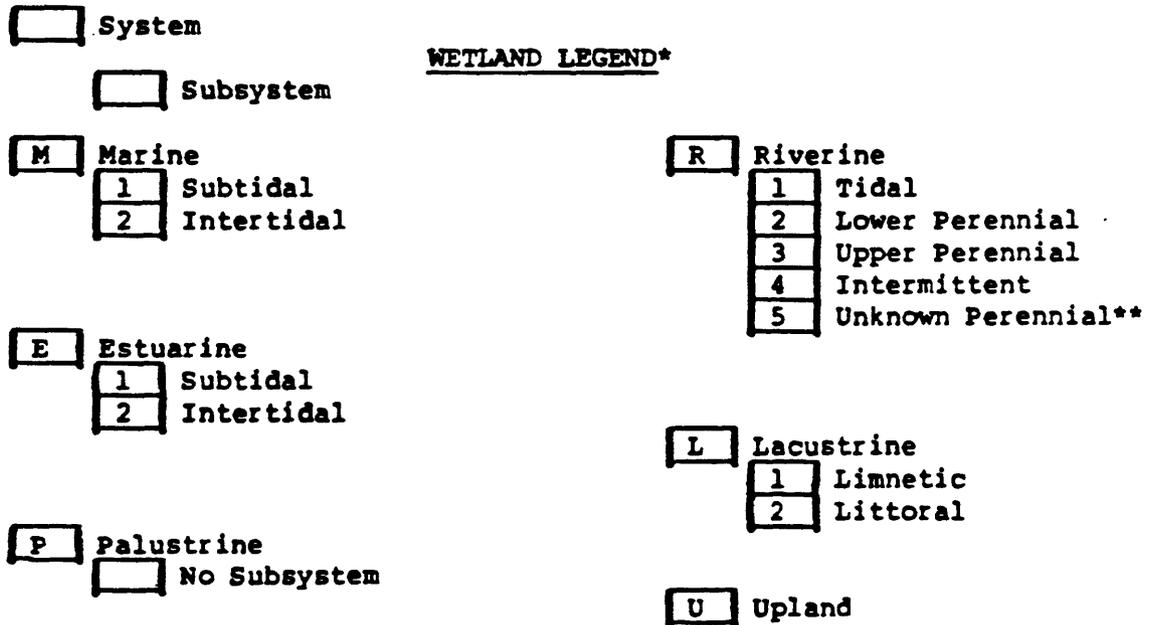
a. Classification of wetlands to water regime and special modifier:

System:	Lacustrine
Subsystem:	Limnetic
Class:	Unconsolidated Bottom
Subclass:	Mud
Water Regime:	Intermittently Exposed
Special Modifier:	Diked/Impounded

L 1 UB 3 G h

b. Mixing of wetland classes and subclasses:

PFO2/EM1F = Palustrine, Forested, Needle-leaved deciduous (PFO2) mixed with Palustrine, Emergent, Persistent (PEM1) with semipermanent water regime (F).



*Should be used in conjunction with "Classification of Wetlands and Deepwater Habitats of the United States," by L. M. Cowardin et al.

**Not included in "Classification of Wetlands and Deepwater Habitats of the United States." Created specifically for National Wetland Inventory mapping effort.

Wetland Legend (continued)

Class

Subclass

CLASSES AND SUBCLASSES

- AB** Aquatic Bed
- 1 Algal
 - 2 Aquatic Moss
 - 3 Rooted Vascular
 - 4 Floating Vascular
 - 5 Unknown Submergent**
 - 6 Unknown Surface**

- EM** Emergent
- 1 Persistent
 - 2 Nonpersistent

- FO** Forested
- 1 Broad-Leaved Deciduous
 - 2 Needle-Leaved Deciduous
 - 3 Broad-Leaved Evergreen
 - 4 Needle-Leaved Evergreen
 - 5 Dead
 - 6 Deciduous**
 - 7 Evergreen**

- ML** Moss/Lichen
- 1 Moss
 - 2 Lichen

- OW** Open Water/
Unknown Bottom**

- RB** Rock Bottom
- 1 Bedrock
 - 2 Rubble

- RF** Reef
- 1 Coral
 - 2 Mollusk
 - 3 Worm

- RS** Rocky Shore
- 1 Bedrock
 - 2 Rubble

- SB** Streambed
- 1 Bedrock
 - 2 Rubble
 - 3 Cobble/Gravel
 - 4 Sand
 - 5 Mud
 - 6 Organic
 - 7 Vegetated

- SS** Scrub/Shrub
- 1 Broad-Leaved Deciduous
 - 2 Needle-Leaved Deciduous
 - 3 Broad-Leaved Evergreen
 - 4 Needle-Leaved Evergreen
 - 5 Dead
 - 6 Deciduous**
 - 7 Evergreen**

- UB** Unconsolidated Bottom
- 1 Cobble/Gravel
 - 2 Sand
 - 3 Mud
 - 4 Organic

- US** Unconsolidated Shore
- 1 Cobble/Gravel
 - 2 Sand
 - 3 Mud
 - 4 Organic
 - 5 Vegetated

**Not included in "Classification of Wetlands and Deepwater Habitats of the United States." Created specifically for National Wetland Inventory mapping efforts.

MODIFIERS TO WETLAND CLASSIFICATION

WATER REGIME MODIFIERS

Nontidal

A	Temporary
B	Saturated
C	Seasonal
D	Seasonally Flooded-Well Drained
E	Seasonally Flooded-Saturated
F	Semipermanent
G	Intermittently Exposed
H	Permanent
J	Intermittently Flooded

Nontidal Combined

Z	Intermittently Exposed/ Permanent (G,H above)**
W	Intermittently Flooded/ Temporary (A,J above)**
Y	Saturated Semipermanent/ All Seasonals (B,C,D,E F above)**

Nontidal and Tidal

U	Unknown**
K	Artificial

Tidal

L	Subtidal
M	Irregularly Exposed
N	Regularly Flooded
P	Irregularly Flooded
R	Seasonal - Tidal
S	Temporary - Tidal
T	Semipermanent - Tidal
V	Permanent - Tidal

WATER CHEMISTRY MODIFIERS

Coastal Halinity

1	Hyperhaline
2	Euhaline
3	Mixohaline (Brackish)
4	Polyhaline
5	Mesohaline
6	Oligohaline
0	Fresh

Inland Salinity

7	Hypersaline
8	Eusaline
9	Mixosaline
0	Fresh

pH Freshwater

a	Acid
t	Circumneutral
l	Alkaline

**Not included in "Classification of Wetlands and Deepwater Habitats of the United States." Created specifically for National Wetland Inventory mapping Effort.

OTHER MODIFIERS

Special

b	Beaver
d	Partially Drained/ Ditched
f	Farmed
h	Diked/Impounded
r	Artificial
s	Spoil
x	Excavated

Soils

g	Organic
n	Mineral

Statement to Users: The overlays/maps were prepared primarily by stereoscopic analysis of high altitude aerial photographs. Wetlands were identified on the photographs based on vegetation, visible hydrology, and geography in accordance with "Classification of Wetlands and Deepwater Habitats of the United States." The aerial photographs typically reflect conditions during the specific year and season when they were taken. In addition, there is a margin of error inherent in the use of aerial photographs. Thus, a detailed on-the-ground and historical analysis of a single site may result in a revision of the wetland boundaries established through photographic interpretation. In addition, some small wetlands and those obscured by dense forest cover may not be included on this map. Federal, State, and local regulatory agencies with jurisdictions over wetlands may define and describe wetlands in a different manner than that used in this Inventory. There is no attempt, in either the design or products of this Inventory, to define the limits of proprietary jurisdiction of any Federal, State, or local government or to establish the geographical scope of the regulatory programs and proprietary jurisdictions that may affect such activities.

To Order NWI Topical Wetland Overlays/Maps: A National Wetland Inventory Order Form is required and can be obtained by writing to the address on the letterhead.