

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

**MAP AREA:** THUNDER BAY SW

**1:100,000 NAME:** N/A

**STATE:** MINNESOTA



## NORTH CENTRAL REGION



**U.S. Fish and Wildlife Service**

**Federal Building, Fort Snelling Twin Cities, Minnesota 55111**



### USER CAUTION

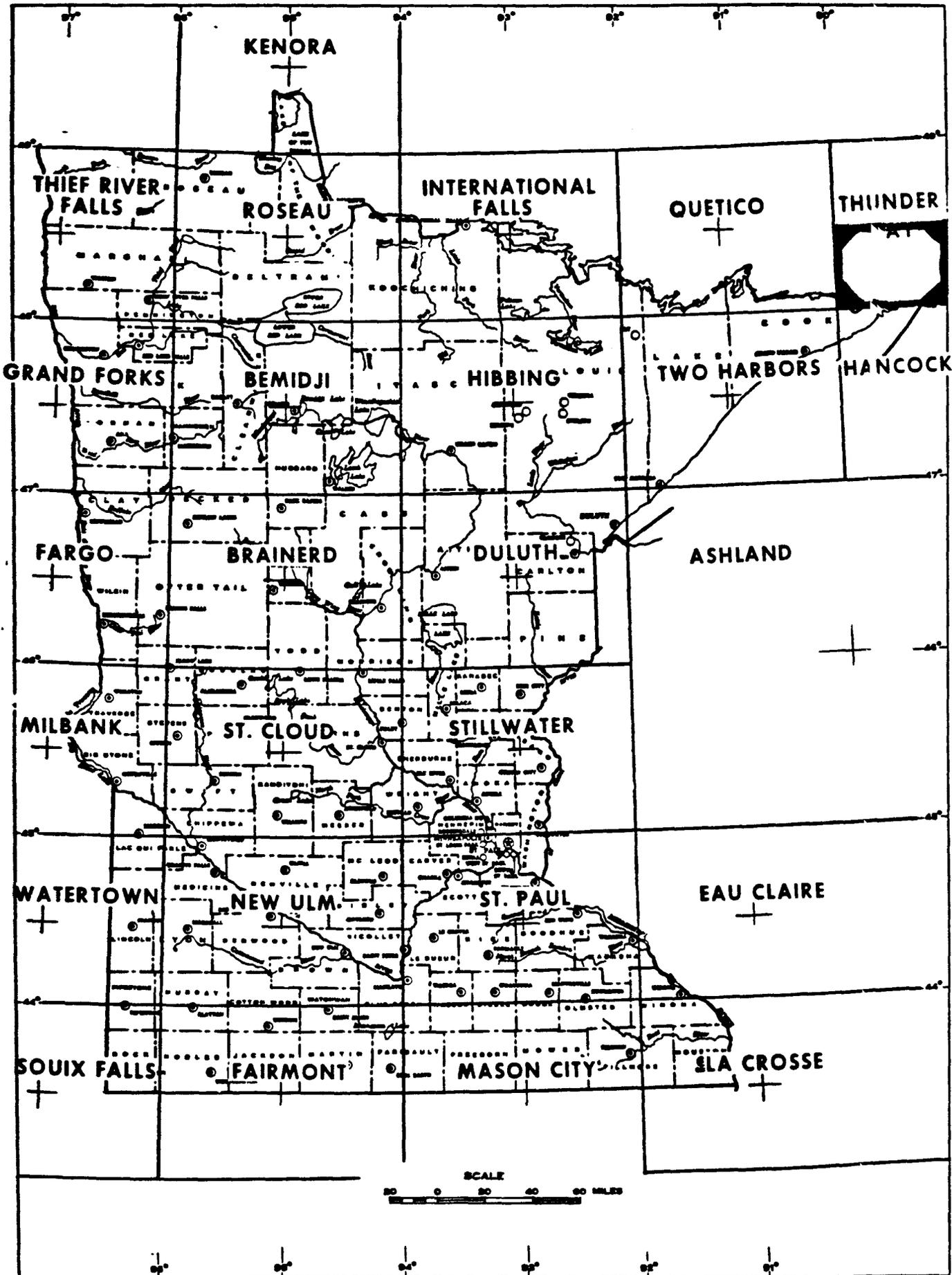
Maps for this 1:100,000 scale map were prepared primarily by stereoscopic analysis of high altitude aerial photographs. Wetlands were identified on the photographs based on vegetation, visible hydrology, and geography in accordance with Classification of Wetlands and Deepwater Habitats of the United 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 1979	100%

Field Check Dates:

1. None

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: 89° 0' to 90° 0' West

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

Largest City : Grand Portage, Minnesota

Thunder Bay SW is located in the "arrowhead" region of Minnesota in the northeastern part of the state, and includes the "tip of the arrow". Only a small portion of the Thunder Bay SW lies in the United States. This map includes a portion of Cook County, and lies within the Pigeon River drainage basin. The map is bordered on the southeast by Lake Superior, and includes a part of the Grand Portage Indian Reservation.

B. Ecoregion

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

Code: 2111L

Humid Temperate Domain (2000)

The entire Thunder Bay SW 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 Thunder Bay SW map area 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 Thunder Bay SW map 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 (2111L)

This Section occurs in lowland areas and covers all of the Thunder Bay SW 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) C5d

Interior Physical Division (III) - The entire Thunder Bay SW map lies within this Physical Division.

North-Central Lake-Swamp-Moraine Plains (3) - This Subdivision covers all of the Thunder Bay SW map area.

Open Low Mountains Class (C5d) - All of the Thunder Bay SW map area lies within this Class, where 20% to 50% of the land is in gentle slopes. More than 75% of these slopes are in uplands. Local relief ranges from 1000 to 3000 feet.

RESOURCES

A. Wetlands\*

No wetland acreage figure is available for the Thunder Bay SW area at the present time.

Steep topography has precluded extensive wetland formation in the Thunder Bay SW map. Most wetlands which occur in the map area are located in river floodplains.

Saturated forests and forest/shrub mixtures are the most common wetland types in the western part of the map area. Beaver floodings are abundant in the eastern portion of Thunder Bay SW. Predominant trees and shrubs of the saturated forests and forest/shrub wetlands include black spruce (Picea mariana), northern white cedar (Thuja occidentalis), tamarack (Larix laricina), speckled alder (Alnus rugosa), and willows (Salix spp.). A list of plant species for wetland types can be found in Appendix C.

\*Plant species named here were found in adjacent 1:100,000 map areas and are believed to be representative of those species also found in the Thunder Bay SW map area.

B. Wildlife and Fish\*

Expansive forests cover much of the Thunder Bay SW 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.

Populations of aquatic furbearers, including beavers (Castor canadensis) and muskrats (Ondatra zibethica), are limited because of low water fertility and a lack of food plants and organisms. These factors also limit waterfowl populations; however, some production of black ducks (Anas rubripes), mallards (A. 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 (Erethigon dorsatum), red squirrel (Tamiasciurus hudsonicus), eastern gray squirrel (Sciurus carolinensis), eastern fox squirrel (S. niger), red fox (Vulpes vulpes), and bobcat (Lynx rufu), 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 Thunder Bay SW, has the largest timber wolf population in the United States (Great Lakes Basin Commission 1975b, Mann 1955).

The most notable fish species of Thunder Bay SW are those species which are harvestable. Sport fishing occurs in many inland lakes and streams, and in Lake Superior and its immediate tributaries. Commercial fishing is limited to Lake Superior.

Fish species commonly found in the inland lakes include walleyes (Stizostedion vitreum vitreum), northern pike (Esox lucius) and smallmouth bass (Micropterus dolomieu), lake trout (Salvelinus fontinalis), brown trout (Salmo trutta) and rainbow trout (Salmo gairdneri). Factors limiting stream fish populations include stream shallowness, lack of pools and heavy ice cover where groundwater is lacking.

Common sport fish of Lake Superior and its tributaries include rainbow smelt (Osmerus mordax), perch (Perca sp.), suckers (Catostomus),

panfish (Lepomis spp., Pomoxis spp.), northern pike, walleyes, bass (Micropterus sp.), coho salmon (Oncorhynchus kitsutch), and rainbow, brook, and brown trout. Lake herring (Coregonus artedii), account for a large share of the commercial catch out of Lake Superior, as do chubs (Semotilus), lake whitefish (C. clupeaformis), and smelt. Lake trout are of minor importance commercially; sea lampreys (Petromyzon marinus) have prevented this species from establishing a self-reproducing population in recent years (Great Lakes Basin Commission 1975a).

\*Fish and wildlife species named here occur over a large portion of northeastern Minnesota and are believed to be representative of species also present in the small area occupied by this map.

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 p.
- 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 the 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. pp. 11-23.
- Herdendorf, C.E., S.M. Hartley, and M.D. Barnes, eds. 1981. Fish and Wildlife Resources of the Great Lakes Coastal Wetlands Within the United States. Volume six: Lake Superior. U.S. Fish and Wildlife Service, Washington, D.C. FWS/OBS-81/02-v6. 846 p.

Appendix B

SPECIAL MAPPING PROBLEMS

No Special Mapping Problems occurred for the Thunder Bay SW map area.

## Appendix C

## WETLAND COMMUNITIES\*

<u>MAP SYMBOLS</u>	<u>LOCAL NAME</u>	<u>DOMINANT VEGETATION</u>	<u>WATER REGIME</u>
PFOB	Swamp	<u>Thuja occidentalis</u>	Saturated
PFO4B	Bog	<u>Picea mariana</u>	
PFO/SSB		<u>Larix laricina</u>	
PFO4/SSB		<u>Betula papyrifera</u>	
		<u>Alnus rugosa</u>	
		<u>Salix sp.</u>	
		<u>Chamaedaphne calyculata</u>	
		<u>Ledum groenlandicum</u>	
PFOC	Swamp	<u>Fraxinus nigra</u>	Seasonal
PFO/SSC		<u>Betula papyrifera</u>	
		<u>Alnus rugosa</u>	
		<u>Cornus stolonifera</u>	
		<u>Picea glauca</u>	
PFO5/EME	Swamp	Dead trees	Saturated/ Seasonal
		<u>Carex sp.</u>	
		<u>Salix sp.</u>	
		<u>Alnus rugosa</u>	
PFO5Fb	Swamp/Beaver	Dead trees	Semi-permanent
PFO5/OWFb	flooding	Open water	
PSSB	Bog	<u>Myrica Gale</u>	Saturated
		<u>Chamaedaphne calyculata</u>	
		<u>Ledum groenlandicum</u>	
PSSB	Swamp	<u>Alnus sp.</u>	Saturated
PSSC		<u>Salix sp.</u>	Seasonal
PSSE		<u>Fraxinus nigra</u>	Saturated/ Seasonal
		<u>Cornus sp.</u>	
PSS/EMB	Swamp	<u>Alnus rugosa</u>	Saturated
PSS/EMC		<u>Salix sp.</u>	Seasonal
PSS/EMY		<u>Carex sp.</u>	Semi-permanent
		Misc. grasses	
PSS/EMEb	Swamp/Beaver	<u>Alnus rugosa</u>	Saturated/ Seasonal
	flooding	<u>Carex sp.</u>	
PSS/OWFb	Swamp/Beaver	Unknown shrubs	Semi-permanent
	flooding	Open water	
POWF	Pond	Open water	Semi-permanent

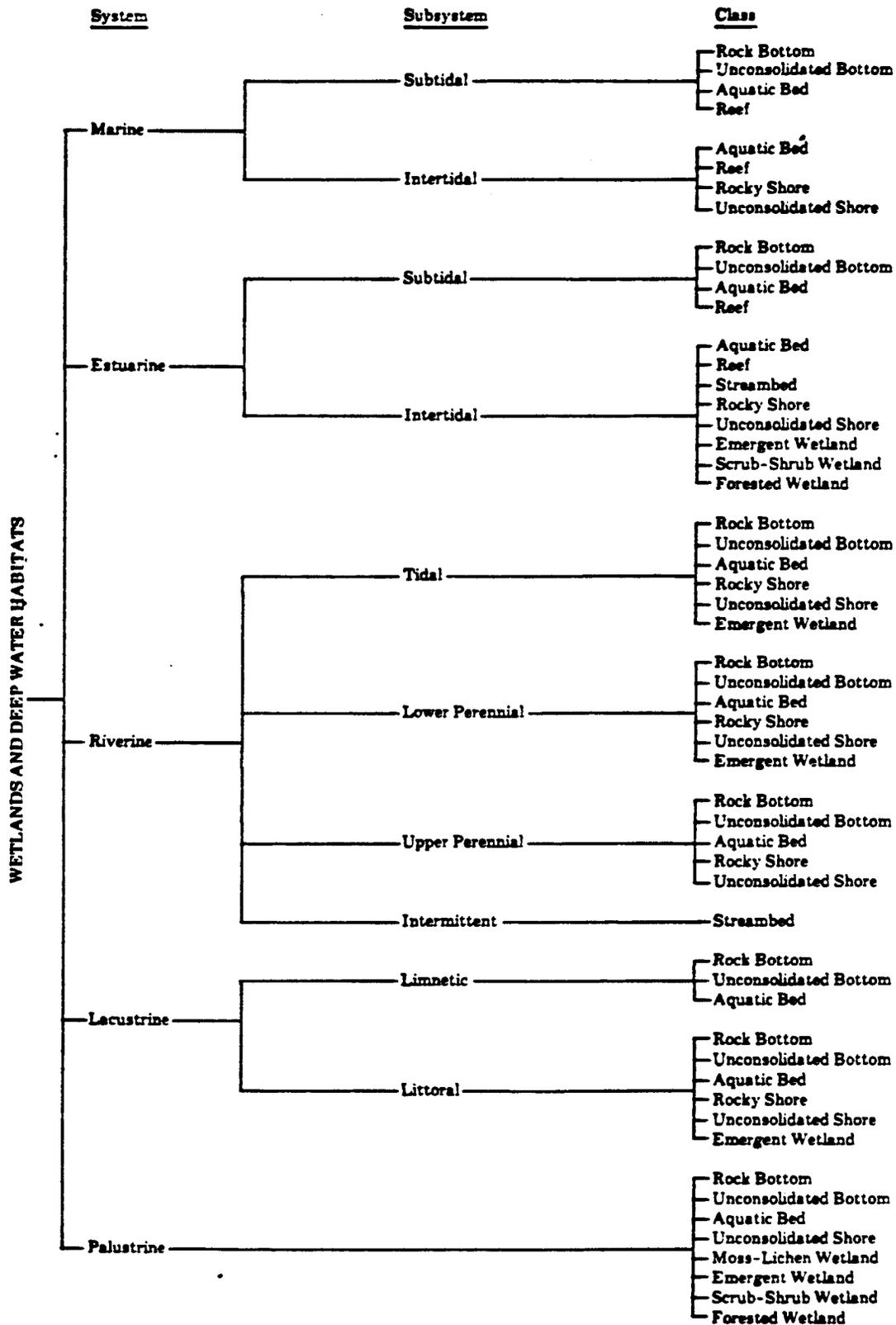
\*Plant species listed here were found in adjacent 1:100,000 map areas and are believed to be representative of species present in the Thunder Bay SW map area.

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 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

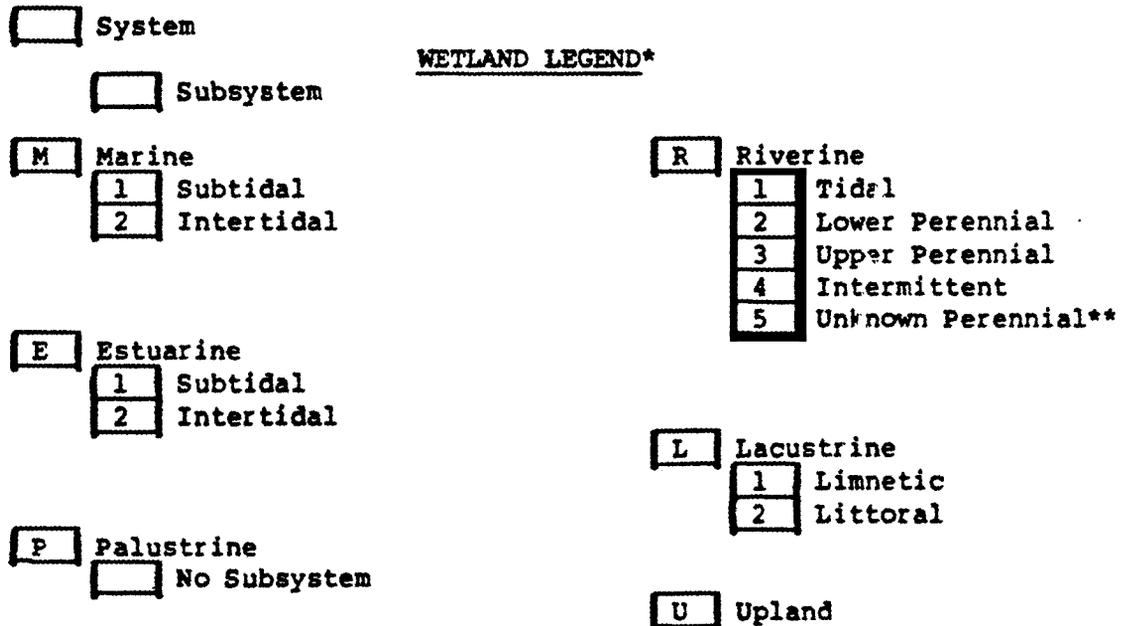
a. Classification of wetlands to water regime and special modifier:

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

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

#### Nontidal Combined

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

#### Nontidal and Tidal

<b>U</b>	Unknown**
<b>K</b>	Artificial

#### Tidal

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

### WATER CHEMISTRY MODIFIERS

#### Coastal Halinity

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

#### Inland Salinity

<b>7</b>	Hypersaline
<b>8</b>	Eusaline
<b>9</b>	Mixosaline
<b>0</b>	Fresh

#### pH Freshwater

<b>a</b>	Acid
<b>t</b>	Circumneutral
<b>l</b>	Alkaline

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

