4

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

MAP AREA: CLEVELAND SW

1:100,000 NAME: CLEVELAND SOUTH

STATE: OHIO

NORTH CENTRAL REGION

U.S. Fish and Wildlife Service

Federal Building, Fort Snelling Twin Cities, Minnesota 55111

USER REPORT
NATIONAL WETLAND INVENTORY
U.S. FISH AND WILDLIFE SERVICE
REGION 3

PREPARED BY

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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)
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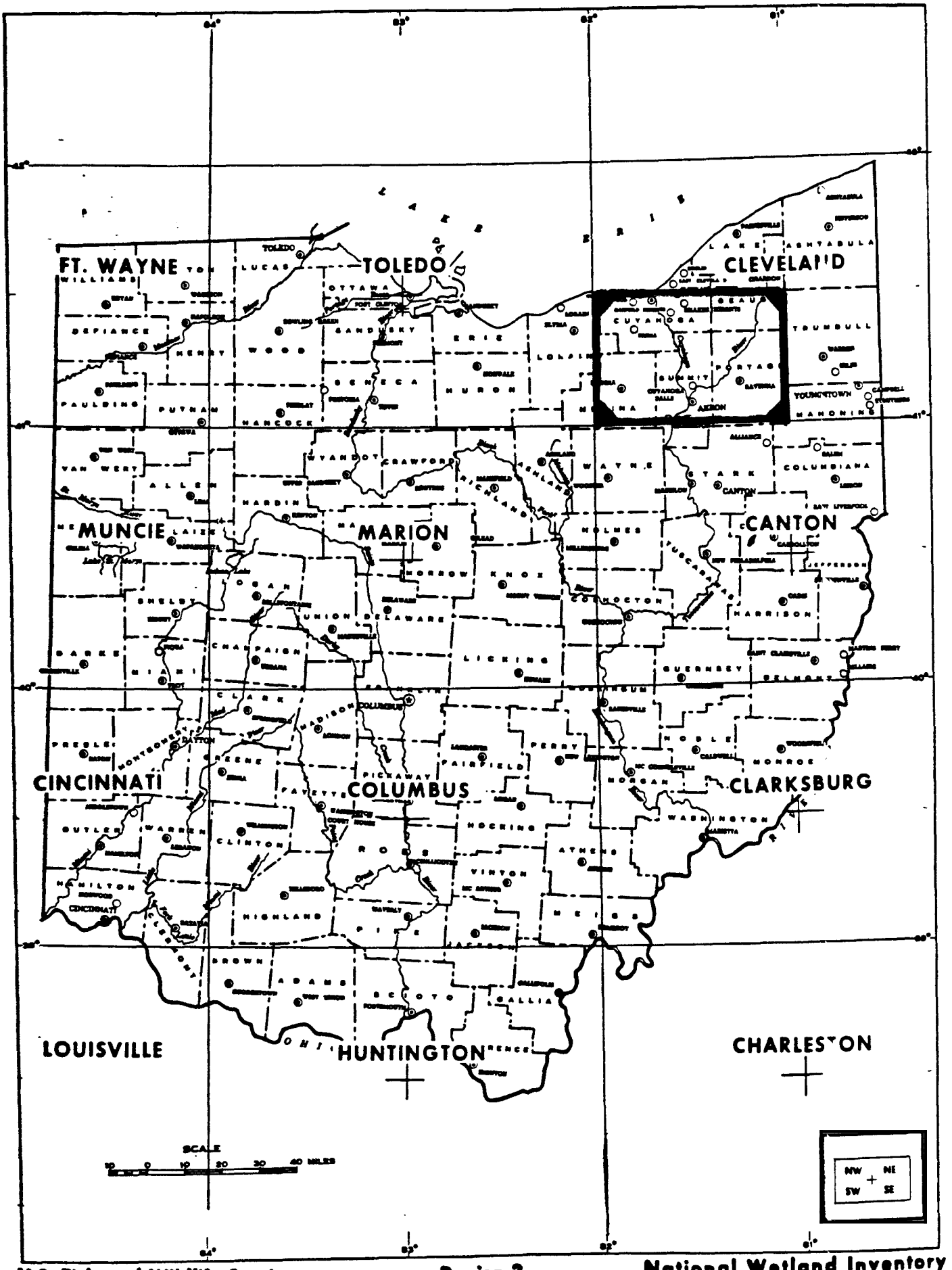
United States Fish and Wildlife Service
Federal Building, Fort Snelling
Twin Cities, Minnesota 55111

LOCATION OF REPORT
STATE OF OHIO



U.S. Fish and Wildlife Service Region 3 National Wetland Inventory

DATE: December 1983

MAP PREPARATION

Basic Data

Photography Used:

Emulsion	Scale	Date	Percent Coverage
1. Black and white	1:80,000	March 1977	48%

Field Check Dates:

1. April 30 - May 4, 1979
2. April 20 - May 2, 1980

Contractor(s) for Photo Interpretation:

1. Earth Satellite Corporation
2. Revised in-house (FWS)

Collateral Data Used:

1. USGS topographic quad sheets
2. USDA Soil Surveys
3. Inland Wetland of the United States

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: 81° 0' to 82°' West

Degrees Latitude : 41° 0' to 41° 30' North

Largest City : Cleveland, Ohio

The Cleveland SW map area lies to the south and southeast of the City of Cleveland, Ohio and covers portions of Georgia, Cuyahoga, Medina, Portage, Summit and Jorain Counties. Lake Erie borders the extreme northwestern part of this map. This map is included within the Lake Erie watershed and Rocky, Cuyahoga and Grand River drainage basins.

B. Ecoregion

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

Code: 2212L, 2213L

Humid Temperate Domain (2000)
The entire Cleveland 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.

Hot Continental Division (2200)
All of the Cleveland SW map lies within this Division.

This Division characteristically has hot summer and cool winters. The natural vegetation is winter deciduous forest, where tall broadleaf trees dominate. These trees form a dense canopy in the summer, but lose their leaves in the winter. The schrub layer is weakly developed. A lush herbaceous layer develops in early spring, but diminishes as the dense tree canopy forms and shades the ground. Soils are primarily Alfisols, Inceptisols and Ultisols which are rich in humus and moderately leached.

Eastern Deciduous Forest Province (2210)
The entire Cleveland SW map area falls within this Province.

The vegetation of this Province represents a response to a climate that receives adequate precipitation all year long. Common tree species of the decisuous forests include beech (*Fagus grandifolia*), oak (*Quercus spp.*), birch (*Betula* spp.), basswood (*Tilia americana*), elm (*Ulmus* spp.), maple (*Acer* spp.), and ash (*Fraxinus* spp.). Pines develop quickly in forests cleared for logging.

Trees of poorly drained forests consist of alder (Alnus spp.), willow (Salix spp.), ash and elm.

Beech - Maple Forest Section (2212L)
This Section occurs in lowland areas and covers all but the northeast 1% of the map area.

Beech and maple trees form the principal plant association of this Section.

Maple - Basswood Forest/Oak Savanna Section (2213L)
This Section occurs in lowland areas and covers the northeast 1% of the map area.

Two important plant associations occur in this Section, one of maple and basswood trees and the other of oak trees and grasses.

C. Topography and Land Forms

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

Codes: (III-1) B2b, (III-1) B3c, (III-2) A2c

Interior Physical Division (III) - The entire Cleveland SW map area lies within this Physical Division.

Middle Western Upland Plain Subdivision (1) - This Subdivision cover all but the northwest 5% of the map area.

East Central Drift and Lake-bed Flats Subdivision (2) - This Subdivision covers the northwest 5% of the map area.

Smooth Plains Class (A2c) - This Class is found in the northwestern portion of Cleveland SW and comprises 5% of the map area. Greater that 80% of the land is in gentle slopes. Fifty to 75% of these slopes are in upland areas. Local relief ranges from 100 to 300 feet.

Irregular Plains Class (B2b) - This Class covers the eastern 25% and the western 40% of the map area. Fifty to 80% of the area is in gentle slopes. Fifty to 75% of these slopes are in lowland areas. Local relief ranges from 100 to 300 feet.

Tablelands, Moderate Relief Class (B3c) - The west-central third of Cleveland SW falls within this Class, where 50 to 80% of the area is in gentle slopes. Fifty to 75% of these slopes are in upland areas. Local relief ranges from 300 to 500 feet.

HYDROLOGY

Several river systems drain the Cleveland SW map area. The Cuyahoga system drains the west-central, south-central and east-central

portions of the map. The Rocky, Chagrin and Tuscarawas River systems drain the extreme western, north-central and southwestern parts of the map respectively. The southeastern portion of the map is drained by the Mahoning River system.

Numerous lakes and reservoirs occur in the map area. Wetland density ranges from sparse in the northwest portion, which contains the city of Cleveland, to moderate in the east portion.

GEOLOGY

During the Precambrian age, foldbelts were created in the Cleveland SW area by several disturbances within the earth's crust. These disturbances caused the flowage, recrystallization and metamorphism of rock layers far below the surface of the earth, with granite and other plutonic rocks forced into the deepest layers. Much folding and faulting occurred in the subsurface strata, resulting in mountainous terrain.

Foldbelts were eventually eroded to lowlands and were subsequently buried during the Upper and Middle Paleozoic ages by several strata of sedimentary rocks; these rocks were referred to as platform areas (Gerlach 1970).

Platform areas were then covered by glacial deposits during a more recent age. Several terminal moraines formed near the southern edge of Cleveland SW, where a once-stagnant glacier deposited a mixture of sand, clay, rubble and boulders. During glacial recession, clay-rich till was deposited by ice sheets and gravelly outwash was left behind by meltwater streams. In the northern-most and east-central portions of Cleveland SW, glacial lakes melted to form flat lake plains. These former lake bottoms are commonly lined with heavy clay and have sandy edges (Borchert and Gustafson 1980, Collins 1975).

CLIMATE

The climate of Cleveland SW is rather mild, with average temperatures ranging from 21°F to 37°F in January and from 60°F to 84°F in July. The average annual precipitation ranges from 32 - 42 inches, of which 16 - 20 inches falls during the growing season. Snowfall averages 35 - 55 inches per year, and the ground is usually frost-free from May 5 - October 15 (Collins 1975). Intense rainstorms can occur during the spring and summer months, sometimes causing damage (Great Lakes Basin Commission 1975c).

LAND USE

The presettlement vegetation of the Cleveland SW map area consisted largely of beech forests in the northwest, southwest and east with mixed mesophytic and bottomland hardwoods in the east central,

southeast and northwestern portions of the map. Mixed oak and oak-savanna existed in the southcentral portion of the map. Marshes and bogs were scattered throughout the map area (Collins 1975).

Presently, the cities of Cleveland and Akron cover a sizable portion of the Cleveland SW map area. Much of the remaining land is used for agricutural purposes. Many beech forests and isolated woodlots, as well as some scattered marshes, still remain.

RESOURCES

A. Wetlands*

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

Most of the wetlands of Cleveland SW are concentrated in the eastern portion of the map, away from the cities of Cleveland and Akron. The map area has a high diversity of wetland types including many of which are found in river flood plains. These flood plain wetlands are primarily temporary to semi-permanently flooded woodlands and shrub-emergent mixtures. Non-floodplain wetlands are scattered throughout the map area, and include several saturated to semi-permanently flooded woodlands and emergent marshes. Several intermittently exposed/permanent open water ponds are also found in the map area.

Predominant trees and shrubs of the forested wetlands include red maple (*Acer rubrum*), oak (*Quercus* spp.), ash (*Fraxinus* spp.), willow (*Salix* spp.) and dogwood (*Cornus* spp.). Species commonly found in the shrub-emergent wetlands include willow, young red maple, dogwood, rush (*Juncus* spp.) and sedge (*Carex* spp.). A list of plant species for other wetland types can be found in Appendix C.

Three wetland areas of Cleveland SW are on the list of potential Registered Natural Landmarks. Frame Glacial Bog is an area of 80 acres in Portage County, 2 miles southwest of Strutsboro. The bog lake contains tamarack, sphagnum, cranberry, cinquefoil and other characteristic bog flora. Lake Abrams is a glacial lake swamp-forest and marsh of several hundred acres in Cuyahoga County, between Berea and Middleburg Heights. This area is surrounded by industrial and housing developments. Mantua Swamp is a natural area of about 800 acres near Mantua in Portage County. The area contains marsh, bog and swamp forest. Flora includes Philadelphia lilies, Indian paintbrush, azaleas, shrubby cinquefoil and rare orchids (Goodwin and Niering 1975).

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

B. Wildlife and Fish

Urbanization has led to a direct loss of habitat and degradation of water quality in the Cleveland SW map area (Great Lakes Basin Commission 1975d). Despite this problem, a diversity of wildlife species can still be found in the region.

The high diversity of wetland types in the area attracts both nesting and migrating waterfowl. Of particular importance to the waterfowl of Cleveland SW are North and Mogadore Resevoirs, Aurora Pond and Geauga, Punderson, Rockwell, Wingboat, Nesmith, Springfield, Long, Summit and Chippewa Lakes. Species which commonly nest in the area include mallards (Anas platyrynchos), black ducks (A. rubripes), blue-winged teal (A. discors) and wood ducks (Aix sponsa). Common migrants include scaup (Aythua sp.), American wigeon (Anas americana), common goldeneyes (Bucephala clangula), bufflehead (B. albeola), mergansers (Mergus sp.) and Canada geese (Branta canadensis) (Rounds 1955, U.S. Fish and Wildlife Service 1957).

Other important wildlife species of Cleveland SW include the bald eagle (Haliaeetus leucocephalus) and peregrine falcon (Falco peregrinus), both of which are on the Threatened and Endangered list. Habitat for some species has improved in recent years, due to a general decrease in the age of forest stands and farms reverting to early successional stages (Great Lakes Basin Commission 1975d).

Sport fishing is common in the area, particularly in reservoirs and in the Grand, Cuyahoga and Rocky Rivers. Common fish species of the reservoirs include largemouth bass (Micropterus salmoides), white bass (Morone chrysops), chain pickerel (Esox niger), northern pike (E. lucius), crappies (Pomoxis spp.), sunfish (Lepomis spp.) and channel catfish (Ictalurus punctatus). Important river species include smallmouth bass (Micropterus dolomieui), walleye (Stizostedion vitreum vitreum), muskellunge (Esox masquinongy), and suckers (Catostomus). Commercial fishing is limited, primarily because the available species are not in high demand (Great Lakes Basin Commission 1975b).

C. Soils

Soils which occur in the Cleveland SW map area are classified under the soil order Alfisol. Alfisols are soils with medium to high bases, a gray to brown surface horizon and subsurface horizons which have accumulated clay. The Alfisols of Cleveland SW belong to the suborder Udalf, and more specifically to the great groups Fragiudalf and Hapudalf.

Soils of the suborder Udaf are usually moist, but may become dry during the warm part of the year. The average annual temperature of Udalfs often exceeds 47°F.

Fragiudalfs, by definition, have a dense brittle horizon that is usually below a horizon in which clay has accumulated. These soils cover the northwestern 40% and southeastern 10% of the map area.

Hapludalfs which cover the rest of the map area, extending from the northeast corner to the south-central and southwestern portions. Soild of the great group characteristically have a clayey subsurface horizon that is either thin or brownish (U. S. Conservation Service 1967, Gerlach 1970).

D. Agriculture

Agriculture in the Cleveland SW area is of moderate importance. The most important agricultural commodities are dairy and beef cattle. Other important commodites include vegetables, greenhouses and nurseries, poultry, corn and soybeans (Collins 1975).

E. Minerals

Active mining operations take place in several locations throughout the Cleveland SW region. Sand and gravel are the most commonly mined resources. Shale, clay, stone, salt, peat and natural gas are also extracted. Coal, which was once mined in the area, is still available in small amounts. An untested petroleum potential exists in the southern part of the map area (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.

Borchert, J.R. and N.C. Gustafson. 1980. Atlas of Minnesota Resources and Settlement. Center for Urban and Regional Affairs. Minneapolis, Minn. pp. 4-6.

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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 pp.

Gerlach, A.C., ed. 1970. National Atlas of the United States of America. USDI Geol. Surv. Washington, D.C. 417 pp.

Goodwin, R.H. and W.A. Niering. 1975. Inland Wetlands of the United States. USDI National Park Service. Natural History Theme Studies No. 2. Connecticut College, New London. pp. 370-372.

Great Lakes Basin Commission. 1975a. Mineral Resources: Great Lakes Basin Comm. Great Lakes Basin Framework Study, App. 5. Ann Arbor, Mich. 136 pp.

----- 1975b. Fish: Great Lakes Basin Comm. Great Lakes Basin Framework Study, App. 8. Ann Arbor, Mich. 290 p.

_____ 1975c. Floodplains: Great Lakes Basin Commission Great Lakes Basin Framework Study, App. 14. Ann Arbor, Mich. 327 p.

_____ 1975d. Wildlife: Great Lakes Basin Comm. Great Lakes Basin Framework Study, App. 17. Ann Arbor, Mich. 140 p.

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U.S. Fish and Wildlife Service. 1957. Inventory of Permanent Water Habitat Significant to Waterfowl in Ohio. U.S. Fish and Wildlife Service, Office of River Basin Studies. Minneapolis, Minn. 10 p.

U. S. Soil Conservation Service. 1967. 1:7,500,000 scale. Distribution of Principal Kinds of Soils: Orders, Suborders and Great Groups. Nat. Coop. Soil Surv. Classif. of 1967. 1 map. p. 86-87. In Gerlach, A. C., ed. 1970. National Atlas of the United States of America. USDI Geol. Surv., Washington, D. C. 417 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:

Snell Environmental Group. 1977. Critical Wetland Areas. Ohio Department of Natural Resources. Columbus. 83 p.

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 three: Lake Erie. U. S. Fish and Wildlife Service, Washington, D. C. FWS/OBS-81/02-v3. 505 p.

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: Black and white emulsion and generally poor imagery made water regime determination and species identification difficult, thus causing inconsistencies in photo interpretation.

Resolution: Awareness of signature variations from photo to photo and use of combined (Z, W, Y) water regimes. Density and texture of emergent cover in these wetlands was the basis for separating PEMY from PEMW. Differentiation was not always possible due to limits of photography. Also, some misclassification may have occurred at the subclass level. For example, some bogs (PSS3) may have been classified as PSS1.

Problem 2: Recognition of drained or ditched wetlands, and excavated ponds on the photography.

Resolution: The "d" modifier applies to partially drained wetland areas in which ditching is evident on the photography. Use of this modifier is not inclusive, however, as some draining is not detectable. In addition, many small ponds are actually excavations, but could not be determined as such due to small scale imagery and topography of the area.

Problem 3: The high sediment load of excavated mining ponds yields a very light signature which is difficult to distinguish from surrounding upland signatures or recently dumped spoil.

Resolution: Use of USGS topographic quad sheets as collateral data. It may be more correct to classify some of these ponds as Unconsolidated Bottom. This is best done on a site specific basis while in the field.

Problem 4: The whitish photo signature of linear emergent wetlands dominated by cattails (*Typha latifolia*) was confused with the whitish signature of linear snowbanks.

Resolution: Use of USGS topographic quad sheets combined with the awareness of snow cover on early spring (March 1977) photos.

Problem 5: Some frozen lakes and ponds did not exhibit a typical signature and consequently some were omitted from initial delineations.

Resolution: Care taken in recognition of the signature for these frozen smaller ponds on the early spring (March 1977) photos.

Problem 6: Some mixed hardwood forested wetlands were found to contain many small upland hummocks.

Resolution: The scale of photography and the small size of some areas (often less than 5 acres) made the identification of these hummocks difficult. Careful interpretation allowed many of the larger upland patches to be excluded from wetland delineations. These forested wetlands have a mottled dark gray/light gray signature on the black and white imagery and often have erratic linear shrub wetlands entwined within.

*Some of the problems and resolutions listed here were for photography in northeastern Ohio and are believed to also represent problems which occurred in the Cleveland SW map area.

Appendix C

WETLAND COMMUNITIES*

MAP SYMBOLS	LOCAL NAME	DOMINANT VEGETATION	WATER REGIME
PFO1A PFO1W PFO1/SS1A PFO1/SS1W	Woodlot Streambank Bottomlands	*Acer rubrum* *Quercus* spp. *Salix* spp. *Fraxinus* spp. *Cornus* spp.	Temporary Intermittently flooded
PFO1B PFO1C PFO1E PFO1Y PFO1F PFO1/SS1C PFO1/SS1Y	Swamp	*Acer rubrum* *Ulmus* spp. *Fraxinus* spp. *Fagus grandifolia* *Acer saccharinum* *Quercus bicolor* *Quercus palustris* *Alnus* spp. *Cornus* spp. *Salix* spp.	Saturated Seasonal Semi-permanent
PFO5Z	Swamp	Dead trees	Intermittently exposed Permanent
PFO1/EMW	Swamp Streambank	*Acer rubrum* *Quercus* spp. *Salix* spp. *Fraxinus* spp. *Carex* spp. Misc. grasses	Temporary Intermittently flooded
PSS1C PSS1Y PSSY PSS1F	Swamp	*Alnus* spp. *Salix* spp. *Cornus* spp. *Spiraea* spp. *Cephalanthus occidentalis* *Rhododendron viscosum*	Saturated Seasonal Semi-permanent
PSS4Y	Swamp	*Tsuga canadensis*	Saturated Seasonal Semi-permanent
PSS1/EMCd	Partially drained marsh	*Alnus* spp. *Cornus* spp. *Salix* spp. Misc. grasses & sedges	Seasonal Partially ditched/drained

MAP SYMBOLS	LOCAL NAME	DOMINANT VEGETATION	WATER REGIME
PSS1/EMY	Swamp	Salix nigra Juncus effusus	Saturated Seasonal Semi-permanent
PSS1/OWF PSS/OWZ PSS1/OWZ	Swamp	Alnus spp. Cornus spp. Salix spp. Cephalanthus occidentalis Open water	Semi-permanent Permanent Intermittently flooded
PEMA PEMW	Meadow Bottomlands	Juncus spp. Carex spp. Solidago spp. Aster spp. Misc. grasses	Intermittently flooded Temporary
PEMC PEMY	Wet meadows	Carex spp. Juncus spp. Solidago spp. Juncus effusus Scirpus spp.	Saturated Seasonal
PEMY	Seasonal basin	Carex spp. Polygonum spp. Misc. grasses	Seasonal
PEMY	Shallow marsh	Juncus spp. Carex spp. Typha spp. Sagittaria spp. Sparganium sp.	Saturated Seaonal
PEMY PEMF PEM/OWY PEM/OWF	Deep marsh	Typha latifolia Typha angustifolia Juncus militaris Sagittaria spp. Open water	Semi-permanent
PEM/ABY PEM/ABF	Marsh	Typha spp. Juncus spp. Sagittaria spp. Carex spp. Nymphaea sp. Lemna sp.	Semi-permanent
PEMZ PEM/OWZ PEM1/OWZ PEM/OWH	Marsh	Typha spp. Sagittaria spp. Juncus spp. Sarganium sp. Open water	Intermittently exposed Permanent

MAP SYMBOLS	LOCAL NAME	DOMINANT VEGETATION	WATER REGIME
PABF PABZ PAB/OWZ PAB/OWH	Marsh	*Nymphaea* sp. *Nuphar* sp. *Lemna* sp. Open water	Semi-permanent Intermittently exposed Permanent
PFLY	Flat	Lacking vegetation	Seasonal Semi-permanent
PFLK	Flat	Lacking vegetation	Controlled water regime Seaonal Semi-permanent
Pf	Swale	Tilled wetland	Variable
POWJ	Intermittent pond	Open water	Intermittently flooded
POWFx POWZx	Excavated pond	Open water	Semi-permanent Intermittently exposed
POWZ POWH	Pond	Open water	Intermittently exposed Permanent
R2OWZ	River	Lower perennial open water	Intermittently exposed Permanent
R2OWZx	Drainage ditch	Lower perennial open water	Intermittently exposed Permanent
R3OWZ	River	Upper perennial open water	Intermittently exposed Permanent
R4SBY	River	Intermittent stream bed	Seasonal Semi-permanent
R5OWZ	River	Unknown perennial open water	Intermittently exposed Permanent
L1OWKZ	Controlled lagoon	Limnetic open water	Controlled water regime

MAP SYMBOLS	LOCAL NAME	DOMINANT VEGETATION	WATER REGIME
L1OWZ	Lake	Limnetic open water	Intermittently exposed Permanent
L1OWHh	Impoundment	Limnetic open water	Artificial control-impound
L2FLY	Lake flat	Lacking vegetation	Seasonal Semi-permanent
L2OWZ	Lake	Littoral open	Intermittently exposed Permanent

*Plant species listed here were found in this portion of Ohio and therefore are believed to be representative of species also present in the Cleveland 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 "Classisfication 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.

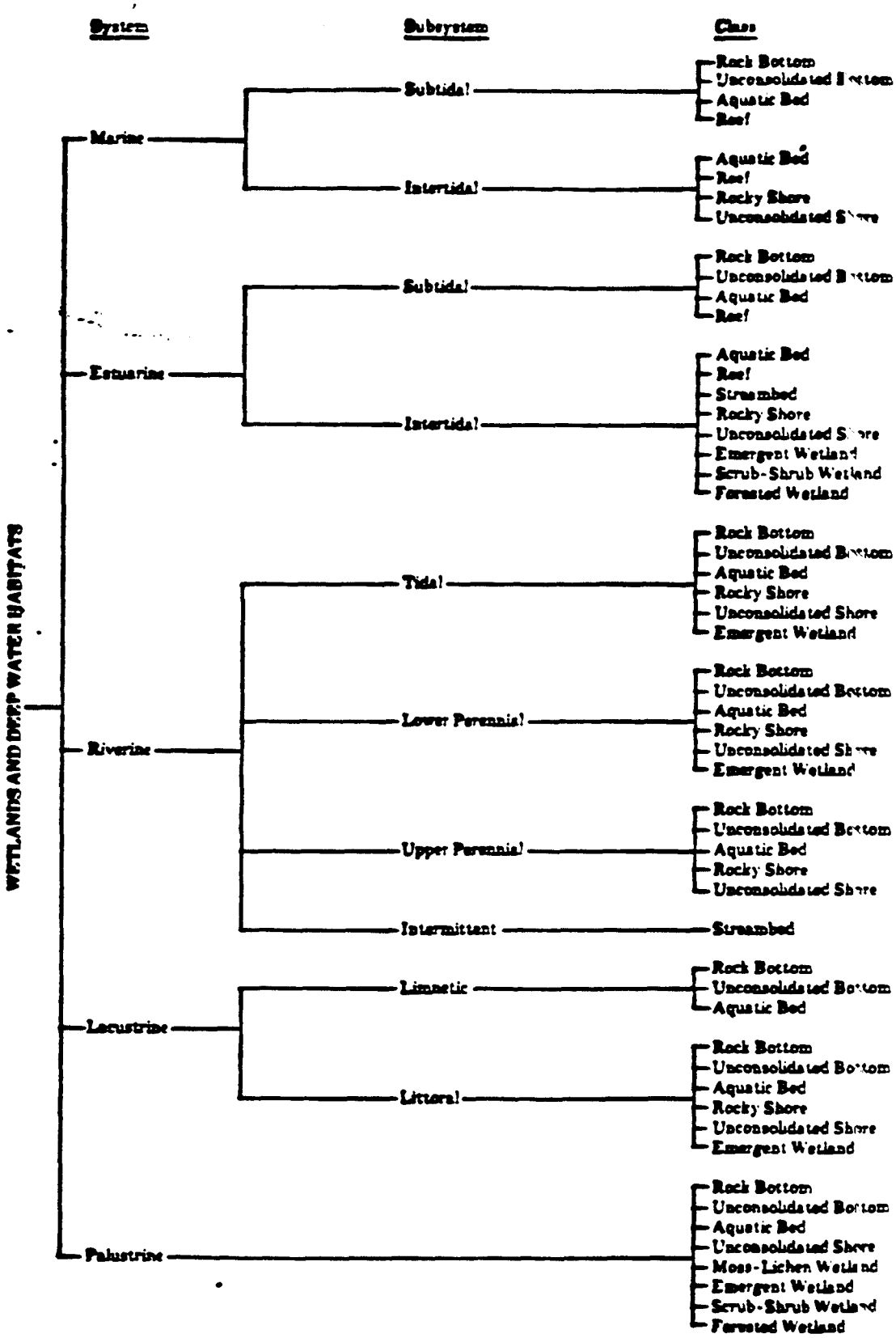

Fig 1. Classification hierarchy of wetlands and deepwater habitats, showing systems, subsystems, and classes The Palustrine System does not include deepwater habitats

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).

WETLAND LEGEND*

- [ ] System
  - [ ] Subsystem
- [M] Marine
  - [1] Subtidal
  - [2] Intertidal
- [E] Estuarine
  - [1] Subtidal
  - [2] Intertidal
- [P] Palustrine
  - [ ] No Subsystem
- [R] Riverine
  - [1] Tidal
  - [2] Lower Perennial
  - [3] Upper Perennial
  - [4] Intermittent
  - [5] Unknown Perennial**
- [L] Lacustrine
  - [1] Limnetic
  - [2] Littoral
- [U] Upland

*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 Decidous
- [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/Gr
- [2] Sand
- [3] Mud
- [4] Organic
- [5] Vegetated

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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 Salinity

- 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

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OTHER MODIFIERS

Special

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

Soils

- q 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 additon, 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 additon, 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 descirbe 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.