C

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

MAP AREA: CANTON NE

1:100,000 NAME: EAST LIVERPOOL

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)
Attn: Regional Wetlands Coordinator
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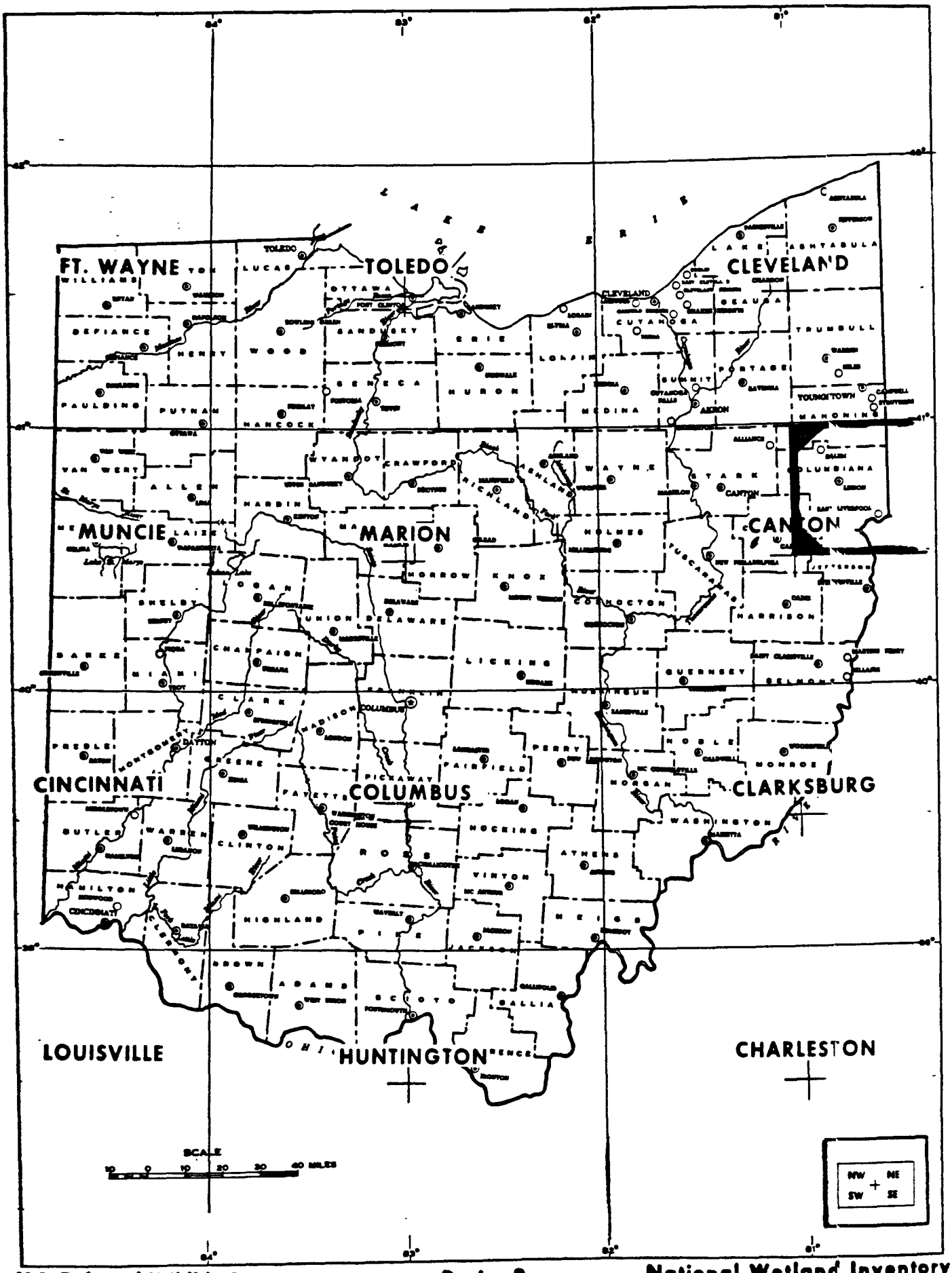
LOCATION OF REPORT
STATE OF OHIO



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	April 1976	16%
2. Black and white	1:80,000	May 1976	19%
3. Black and white	1:80,000	October 1976	3%

Field Check Dates:

1. April 30 - May 4, 1979
2. April 20 - May 2, 1980
3. January 26 - 30, 1981

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 Wetlands 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: 80° 0' to 81° 0' West

Degrees Latitude : 40° 30' to 40° 0' North

Largest City : East Liverpool, Ohio

The Ohio portion of Canton NE lies in the east-central part of the state and covers portions of Columbiana, Mahoning, Jefferson and Carroll Counties. This map is bordered on the east by the Pennsylvania and West Virginia state lines. The southeast border of this map is formed by the Ohio River; Canton NE is included in the Ohio River drainage basin.

B. Ecoregion

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

Code: 2212L, 2214L

Humid Temperate Domain (2000)
The entire Canton NE map lies within 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 Canton NE map area lies within this Division.

This Division characteristically has hot summers 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 shrub 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 Canton NE 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 deciduous 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 the northern 40% of the map area, excluding the extreme northeast corner and extreme east-central portion.

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

Appalachian Oak Forest Section (2214L)
This Section occurs in lowland areas and includes all of the Canton NE map area.

Oaks are the dominant tree species of this Section.

C. Topography and Land Forms

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

Codes: (II-2) D3, (II-2) D4, (III-1) B2b, (III-1) B3c

Eastern Highland Physical Division (II) - The southern 60% of the Canton NE map area is in this Physical Division.

Appalachian Highland Subdivision (2) - This Subdivision covers the southern 60% of the Canton NE map area.

Interior Physical Division (III) - The northern 40% of the map area lies within this Physical Division.

Middle Western Upland Plain Subdivision (1) - This Subdivision includes the northern 40% of the map area.

Irregular Plains Class (B2b) - This Class comprises nearly 40% of Canton NE in the northern part of the map, excluding the extreme northeast corner and the extreme east-central portion. Fify to 80% of the land is in gentle slopes. Fifty to 75% of these slopes occur in lowland areas. Local relief varies from 100 to 300 feet.

Tablelands, Moderate Relief Class (B3c) - This Class covers less than 5% of the map area, including the extreme northeast corner and the extreme east-central portion. Fifty to 80% of the area is in gentle slopes. Fifty to 75% of these slopes are found in upland areas. Local relief ranges from 300 to 500 feet.

Hills Class (D3) - This Class includes 40% of the Canton NE map area, extending from the southwest portion to the southeast and east-central portions. Less than 20% of the land is in gentle slopes. Local relief varies from 300 to 500 feet.

High Hills Class (D4) - Fifteen percent of the Canton NE map area is covered by this Class, extending from the east-central portion to the southeast corner. Less that 20% of the area is in gentle slopes. Local relief ranges from 500 to 1000 feet.

HYDROLOGY

Several river systems drain the Canton NE map area. The Little Beaver Creek system drains the largest area, all but the western and southern portions of the map. The northwest portion is drained by the Mahoning River system, while the southwest is drained by the Sandy Creek system. The Yellow Creek system drains the south-central portion of the map.

A few lakes and reserviors occur in the Canton NE map, including Guilford and Pine Lakes. Wetland density ranges from sparce in the south to moderate in the central and northern portions of the map.

GEOLOGY

During the Precambrian age, foldbelts were created in the Canton NE 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 Paleozoic ages by several strata of sedimentary rocks; these rocks were referred to as platform areas. The surface of these platform areas accounts for the present day land forms in the southern half of the Canton NE map area (Gerlach 1970).

Platform areas in the northern half of Canton NE were covered by glacial deposits during a more recent age. Several terminal moraines formed in this portion of the map, 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, kames and eskers were left behind by meltwater streams (Borchert and Gustafson 1980, Collins 1975).

CLIMATE

The climate of Canton NE is rather mild, with average temperatures ranging from 21°F to 39°F in January and from 60°F to 85°F in July. The average annual precipitation ranges from 34 - 42 inches, of which 16 - 19 inches falls during the growing season. Snowfall averages 35 - 40 inches per year, and the ground is usually frost-free from May 15 - September 30 (Collins 1975).

LAND USE

The presettlement vegetation of Canton NE consisted largely of oak, sugar maple and elm-ash swampland in the north, and mixed oak forests

and oak savannas in the south. A small area of mixed oak forests and oak savannas also existed in the extreme north, as did some beech forests in the extreme northwest (Collins 1975).

As the area was settled during the late 1700's to the early 1800's, forests were cleared on a large-scale basis to make room for agricultural crops. The cut trees were used to fuel the furnaces of industry. Deforestation continued until much of the remaining timber was concentrated on small scattered tracts of land. This practice left bare slopes which were subjected to severe water erosion, and much of the topsoil was washed away. Many farms were eventually abandoned; permanent pastures and second-growth forests gradually recovered the denuded slopes (Cochran 1960).

Present day land use in the Canton NE map area consists mainly of cropland and pastures interspersed with oak-hickory forests and woodlots. Coal strip-mining occurs in several locations throughout the Canton NE map. Many small urban areas also exist.

RESOURCES

A. Wetlands

No wetland acreage figure is availale for the Canton NE area at the present time.

The most common wetlands in the Canton NE map area are excavated open water ponds, many of which are located in strip-mined areas. These ponds are most numerous in the central and east-central portions of the map. Highest concentrations of other wetlands are found mainly in the northern two-thirds of the map area, particularly the northwest portion. Steep topography has precluded most natural wetland development in the southern third of Canton NE.

Natural wetlands which occur in the map area are primarily saturated/seasonal/semi-permenant flooded woodlands, shrub-emergent mixtures and emergents. These wetlands are found in uplands and in river flood plains; however, shrub-emergent wetlands are the most abundant flood plain wetlands. Predominant trees and shrubs of the wet woodlands include red maple (*Acer rubrum*), elm (*Ulmus* sp.), willow (*Salix* spp.), swamp-white oak (*Quercus bicolor*) and alder (*Alnus* sp.). Species commonly found in the shrub-emergent wetlands include red maple, alder, elm, willow, common buttonbush (*Cephalanthus occidentalis*), sedge (*Carex* spp.) and rush (*Juncus* sp.). Common plant species of the emergent wetlands include soft rush (*J. effusus*), reed canarygrass (*Phalaris arundinacea*), sensitive fern (*Onoclea sensibilis*), royal fern (*Osmunda regalis*), cattail (*Typha* sp.), sedge, and bulrush (*Scirpus* sp.). A list of plant species for wetland types can be found in Appendix C.

A wetland area in the Canton NE is listed as a potential Registered Natural Landmark (Goodwin and Niering 1975). Watercress Marsh, a

wetland of an estimated 100 acres, is in Columbiana County just north of New Gardeu. The area contains a bog meadow, alder swamp, beech-maple woods and glacial pond. Over 200 species of vascular plants have been collected here for the state herbarium.

B. Wildlife and Fish

Although northeastern Ohio lies to the east of the major migration routes, the high diversity of wetland types in this area attracts both nesting and migrating waterfowl. Of particular importance to the waterfowl of Canton NE are Berlin Reservoir, and Pine and Guilford Lakes. Species which commonly nest in the area include mallards (Anas platyrynchos), black ducks (A. rubripes), wood ducks (Aix sponsa) and blue-winged teal (Anas discors). Common migrants include scaup (Aythya spp.), American wigeons (Anas americana), common goldeneyes (Bucephala clangula), buffleheads (B. albeola), mergansers (Mergus spp.) and Canada geese (Branta canadensis) (Rounds 1955, U.S. Fish and Wildlife Service 1957, Weeks 1978).

Other important wildlife species of Canton NE include the eastern cottontail (Sylvilagus floridanus), white-tailed deer (Odocoileus virginianus), red fox (Vulpes vulpes), gray fox (Urocyon cinereoargenteus), squirrel (Sciurus sp.), woodchuck (Marmota monax), ruffed grouse (Bonasa umbellus) and bobwhite quail (Colinus virginianus). Habitat for these species consists primarily of an interspersion of second-growth hardwood forests, permanent pastures, cropland and brushland (Cochran 1960).

Farm ponds provide many fishing opportunities and are generally stocked with various combinations of largemouth bass (Micropterus salmoides), sunfish (Lepomis spp.), crappies (Pomoxis spp.), white bass (Morone chrysops), catfish and bullheads (Ictalurus spp.), walleye (Stizostedion vitreum vitreum), and perch (Perca sp.) (U.S. Fish and Wildlife Service 1969). Little Beaver Creek also provides fishing opportunities, particularly for smallmouth bass (Micropterus dolomieui) and the other species which spawn in the creek (Langlois).

C. Soils

Soils which occur in the northern third of Canton NE are classified under the soil order Alfisol, while those in the southern two-thirds of the map belong to the order Inceptisol. Soils throughout the map area are usually moist, but may become dry during the warm season of the year. The average annual temperature of these soils often exceeds 47°F.

Alfisols are soils with medium to high bases, a gray to brown surface horizon, and subsurface horizons which have acumulated clay. The Alfisols of Canton NE belong to the suborder Udalf, and more specifically to the great group Fraguidalf. Fraguidalfs, by definition, have a dense brittle horizon that is usually below a horizon in which clay has accumulated.

Inceptisols have weakly differentiated horizons showing an alternation of parent materials. Unlike Alfisols, clay and other materials have not accumulated in the subsurface horizons of Inceptisols. Inceptisols occurring in the Canton NE map area are of the suborder Ochrept, and more specifically of the group Dystochrept. Ochrepts are soils which formed in materials containing crystalline clay minerals. The surface horizon of Ochrepts is low in organic matter and exhibits a pale color; subsurface horizons are altered and have lost mineral materials. Dystochrepts have subsurface horizons which are low in bases and contain no free carbonates (Gerlach 1970, U.S. Soil Conservation Service 1967).

D. Agriculture

The most important agricultural commodities of Canton NE are beef and dairy cattle. Other important commodities include greenhouses and nurseries, poultry and hogs (Collins 1975).

E. Minerals

Active mining operations take place in several locations throughout the Canton NE map area. Coal is perhaps the most extensively mined resource, although clay and carbonate rocks, such as limestone and dolomite are also extracted. Other mineral resources which occur in the map area include oil and gas pools, oil shale, salt and gypsum (Collins 1975, Gerlach 1970).

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. Mpls., Minn. p. 4-6.

Cochran, R. 1960. Ohio's Wildlife Resourses. Ohio Dept. of Nat. Res., Columbus. 210 p.

Collins, C.W. 1975. Atlas of Ohio. Amer. Printing and Publishing, Inc., Madison, Wisc. 310 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.

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Langlois, T.H. n d. Ohio's Fish Program. Ohio Div. of Cons. and Nat. Res. 40 p.

Rounds, B.W. 1955. Wetlands Inventory of Ohio. U.S. Fish and Wildlife Service, Office of River Basin Studies, Minneapolis, Minn. 23 p.

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.

----- 1969. Fish and Wildlife Resources: Ohio River Basin Survey Coordinating Committee. Ohio River Basin Survey Comprehensive Study, App. G. Cinncinnati. 74 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., Wash., D.C. 417 p.

Weeks, J.L. 1978. Ohio Wetlands Inventory, 1972-1974. P-R Proj. W-104-R, Ohio Dept. of Nat. Res., Div of Wildlife, Columbus. 24 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 pp.

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.

Appendix B

SPECIAL MAPPING PROBLEMS*

Problem 1: Black and white emulsion, poor imagery, and poor resolution 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.

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 from the photography. 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: Some small emergent wetlands occurred on substantial slopes, and could not be consistently identified. These areas were used for grazing livestock, which further compounded the problem.

Resolution: Species such as soft rush (*Juncus effusus*) often dominate these areas as they are not selected for food by grazing animals. Larger areas where soft rush is dense and saturated conditions are present can be identified from the photos. These wet terraces are fairly common on sloping lands.

Problem 4: Forested areas which were upstream from reservoirs and therefore subject to controlled inundation may have been omitted or delineated conservatively.

Resolution: Use of USGS topographic quad sheets as collateral data. Some of these areas are subject to intermittent flooding as reservoir levels are raised. Users should be aware that wetland maps reflect conditions which occurred at the time of photography.

Problem 5: The high sediment load of excavated mining ponds yielded a very light signature which was 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 6: Difficult to distinguish between linear POW's in strip-mined areas and shadows created by steep slopes.

Resolution: Use of USGS topographic quad sheets as collateral data.

Problem 7: Due to the dynamic nature of strip-mined area, many associated POW's were missed.

Resolution: Use of USGS topographic quad sheets as collateral data. In these dynamic areas, new ponds may be created and others filled as mining progresses. The date of the photography provides the primary source of information.

Problem 8: Some mixed hardwood forested areas 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 signiture on the black and white imagery and often have erratic linear shrub wetlands entwined within.

Problem 9: Some shrub-emergent flood plain wetlands may have been missed due to poor quality of photos.

Resolution: Low lying scrub-emergent wetland areas along streams or river flood plains may continue on higher contour levels which may not be wetland. Delineations are generally conservative in these areas.

*Problems and resolutions listed here were for mapping in the vicinity and therefore may not represent the actual problems which occurred for the Canton NE map.

Appendix C

WETLAND COMMUNITIES

MAP SYMBOLS	LOCAL NAME	DOMINANT VEGETATION	WATER REGIME
PFOW PFO1W	Streambank Woodlot Bottomlands	Ulnus spp. Acer rubrum Quercus spp. Salix spp.	Temporary Intermittently flooded
PFO1Y PFO/SSY PFO1/SS1Y	Swamp Streambank	Acer rubrum Ulmus spp. Salix spp. Quercus bicolor Alnus spp.	Saturated Seasonal Semi-permanent
PFO1Y PFO/SSY PFO1/SS1Y	Swamp Streambank	Acer rubrum Salix spp. Ulmus spp. Quercus bicolor Alnus spp.	Saturated Seasonal Semi-permanent
PFO5Z PFO5/OWZ	Swamp	Dead trees Open water	Permanent Intermittently exposed
PFO1/EMY	Swamp Streambank	Acer rubrum Salix spp. Ulmus spp. Quercus bicolor Carex spp. Sagittaria sp. Ranunculus sp. Ludwigia sp.	Saturated Seasonal Semi-permanent
PSSW PSS1W PSS/EMW	Streambank Bottonlands	Cornus stolonifera Spiraea latifolia Juncus spp. Carex spp. Misc. grasses	Temporary Intermittently flooded
PSS1Y PSS1/EMC PSS/EMY PSS1/EMY PSS1/EMF	Swamp Streambank	Alnus spp. Acer rubrum Ulmus spp. Salix spp. Cephalanthus occidentalis Carex spp. Juncus spp. Misc. grasses	Saturated Seasonal Semi-permanent

MAP SYMBOLS	LOCAL NAME	DOMINANT VEGETATION	WATER REGIME
PEMW	Swale	Juncus effusus Misc. grasses and sedges	Temporary Intermittently flooded
PEMB PEMC PEMY	Marsh Meadow	Phalaris arundinacea Juncus effusus Onoclea sensibilis Osmunda regalis Carex spp.	Saturated Seasonal
PEMYx	Strip-mine excavation	Misc. grasses and sedges	Saturated Seasonal Semi-permanent
PEMF PEMY PEMZ PEM/OWF PEM/OWZ	Deep marsh	Typha latifolia Scirpus spp. Sparganium sp. Open water	Semi-permanent Intermittently exposed Permanent
PEM/ABY PEM/ABZ PABZ	Marsh	Typha latifolia Scirpus spp. Lemna sp. Nymphaea sp. Carex spp.	Semi-permanent Intermittently exposed Permanent
PEM/OWZh	Impoundment	Typha latifolia Misc. grasses and sedges Open water	Artificial control
PFLY	Flat	Lacking vegetation	Seasonal Semi-permanent
PFLYx	Excavated flat	Lacking vegetation	Seasonal Semi-permanent
Pf	Swale	Tilled wetland	Variable
POWZx POWHx	Strip-mine excavation Stock pond	Open water	Permanent Intermittently exposed
POWZh POWHh	Impoundment	Open water	Artificial control
POWZ POWH	Pond	Open water	Permanent Intermittently exposed

MAP SYMBOLS	LOCAL NAME	DOMINANT VEGETATION	WATER REGIME
R2OWZ R2OWH	River	Lower perennial Open water	Permanent Intermittently exposed
R3OWZ R3OWH	River	Upper perennial Open water	Permanent Intermittently exposed
R4SBY	River	Intermittent stream bed	Seasonal Semi-permament
R5OWZ R5OWH	River	Unknown perennial Open water	Permanent Intermittently exposed
L1OWZx	Excavated lake	Limnetic open water	Permanent Intermittently exposed
L1OWKZ	Controlled lagoon	Limnetic open water	Controlled water regime Permanent Intermittently exposed
L1OWZ Z1OWH	Lake	Limnetic open water	Permanent Intermittently exposed
L1OWHh	Impoundment	Limnetic open water	Artificial control

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.