

UNITED STATES DEPARTMENT OF THE INTERIOR  
FISH AND WILDLIFE SERVICE  
OFFICE OF RIVER BASIN STUDIES

WETLANDS INVENTORY OF  
INDIANA

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## INTRODUCTION

A survey to delineate, classify, and evaluate the wetlands in Indiana was initiated in September, 1953. This survey is part of a Nationwide inventory of wetlands subject to loss by drainage or other types of reclamation. A transect sampling method was employed and the data were expanded to provide an estimate of wetlands in the State. Included in the inventory were all natural marsh, swamp, and seasonally-flooded lands, as well as man-made areas that contain water, such as farm ponds, gravel pits, and strip mines.

Wetlands considered in this report include any lands having the minimum extreme of no surface water whatsoever but with waterlogged soils within a few inches of the surface to the maximum extreme where lands are covered with open water except during periods of prolonged drouth.

It should be noted that the inventory included all wetlands regardless of size, whether or not they were of value to waterfowl because many wetland areas are of vital significance in the perpetuation of other species of wildlife though they may have no present waterfowl value. Many wetlands which are presently of low or negligible value to waterfowl can be developed in the future to provide more good waterfowl habitat which will be needed to help satisfy the ever increasing hunter demand.

The letter-size waterfowl value map included as part of this report delineates some regions as containing wetlands of low or negligible waterfowl value. The reader is asked to recognize the fact

that there are wetlands of considerable value to waterfowl scattered throughout such delineated regions but not enough for a general moderate or high waterfowl value rating. In such regions, the need for additional good waterfowl habitat often is more acute than in regions of generally high waterfowl value wetlands and this need can be met only by development of suitable areas.

This inventory provides information useful for future waterfowl management in Indiana, and serves to point out areas where water development and waterfowl habitat improvement or preservation would be most valuable.

The present report was prepared with the cooperation of the Indiana Department of Conservation by the Fish and Wildlife Service, Office of River Basin Studies, Region III, Minneapolis, Minnesota. Other agencies providing valuable assistance and suggestions in securing data were the Indiana Coal Producers Association, Department of Forestry and Conservation of Purdue University, and the U. S. Army Corps of Engineers.

#### PROCEDURES

A sampling method based on physiographic regions was used to obtain most of the data for the inventory in Indiana.

Transects  $1/4$  mile wide and of varying lengths were laid out on county maps on which the physiographic region boundaries had been transcribed. Because the five northeastern counties contain the greatest concentration of natural water areas in Indiana, they were sampled more intensively than the remainder of the State.

The number and acreage of the different wetland types per square mile for each physiographic region were then computed. These tabulations were reduced to a county basis and recorded on appropriate forms.

Specific high waterfowl value areas over 640 acres in size were plotted on a 1:500,000 scale State base map. These specific areas were rated high on the basis of the intensity of waterfowl use during the migration, production, and wintering seasons.

The evaluation of wetlands by generalized regions (Figure 4, Appendix) is derived from similar Statewide waterfowl-use information and from data on the relative abundance of wetland types most important to waterfowl (Tables 4 and 5, Appendix).

#### COVERAGE

The entire State was surveyed with special emphasis on the northeastern counties where natural water areas are concentrated in abundance. Figure 1 discloses the approximate location of the transects.

#### DESCRIPTION OF WETLAND TYPES

The wetlands of Indiana were classified in accordance with standards developed by the Wetlands Classification Committee of the Fish and Wildlife Service (3). A description of these wetlands is given in the Appendix.

#### WETLAND ZONES

The State of Indiana was divided into five wetland zones for purposes of studying the waterfowl value of wetlands. The delination

of these zones is based on topography, vegetation, land use, number of wetland areas, and waterfowl utilization. Overall waterfowl use of some of these zones is low to negligible, even though wood ducks utilize suitable habitat for production throughout all zones of the State.

### Zone 1

An area of about 4,300 square miles in northwestern Indiana is designated as Zone 1. The topography is generally flat with most of the zone being heavily farmed. Woodlots, primarily oak, are scattered throughout the zone and osageorange hedgerows are common.

Zone 1 has value ratings of high, moderate, and low because of the dispersal of natural water areas and waterfowl usage of these areas during migration.

Drainage has taken a terrific toll of the wetland habitat once valuable to waterfowl and other wildlife in this zone. The Kankakee Marsh, once a "Sportsman's Paradise", is merely a remnant of its former self. Industrialization in the northern section is continuing to destroy marshes and lakes located behind the sand dunes bordering Lake Michigan.

### Zone 2

The northeastern corner of Indiana, known as "The Lake Region", has been delineated as Zone 2. This rugged morainic area with small local areas of flat till plains has diversified farming and an abundance of woodlots comprised of northern hardwoods.

The only waterfowl production area of any extent in Indiana is located in the lake and pothole area of this zone. As the birds

spread out across the country in their spring migration flights, Zone 2 gets a large amount of use. Fall migration, on the other hand, is of minor importance as this area is somewhat removed from the main southward migration routes. Zone 2 ranks high in value for waterfowl because of its use during the production and spring-migration seasons.

Drainage, both under construction and proposed, will likely have a devastating effect on the wetland habitat of this remnant waterfowl production area of Indiana.

### Zone 3

Zone 3 is a broad band of flat to gently rolling country in central Indiana. Farming is intensive in this 12,000 square mile area and hardwoods in the form of farm woodlots are well dispersed.

Most of this zone is rated negligible because, with the exception of the wooded river and creek bottoms, there are few wetland areas which provide waterfowl habitat.

Future drainage is not expected to be detrimental to waterfowl in Zone 3 because there are few areas left to be drained.

### Zone 4

Rugged and hilly to gently rolling describes the 10,000 square miles of Zone 4, where natural drainage has developed deep river valleys and short steep draws. Southern hardwoods can be found on most slopes and woodlots are numerous on the flatter terrain. Farms dot the countryside and cultivation is confined to the gentle hillsides and flat ridge tops.

Waterfowl habitat is mainly confined to the larger rivers and, for this reason, most of Zone 4 is rated negligible.

This zone is naturally well drained and wetland habitat is almost non-existent. Little artificial drainage of such habitat is expected.

#### Zone 5

Zone 5, which contains about 4,500 square miles, is located in the extreme southwest corner of Indiana. Ribbons of timber and woodlots of the southern hardwood species are scattered throughout this intensively farmed zone.

Zone 5 is an important waterfowl wintering area especially for mallards and black ducks. The Ohio, Wabash, White, and Patoka Rivers hold high concentrations of ducks during the wintering period. The early winter flooding of adjacent agricultural and wild lands provides waterfowl with the necessary food supply. Migration use is also high in this zone. The value of wetlands in Zone 5 to waterfowl is, no doubt, the highest in Indiana.

Drainage of wetlands could destroy important waterfowl habitat in Zone 5. Although waterfowl habitat is well dispersed on the upland, the important habitat is in the river valley, overflow lands, and permanent lakes, such as Hovey Lake in the extreme southwest corner of the State.

#### CONTRIBUTION OF WETLAND TYPES TO OTHER WILDLIFE

Wetland areas in Indiana provide habitat for many species of wildlife. The furbearing animals in particular benefit from the aquatic

habitat. Also, both the edge and interior vegetation of wetlands are beneficial to many upland game species. Table 1 lists the game and fur species using Indiana wetlands and indicates by species and wetland type the relative value, kind of use, and season of use.

#### FACTORS AFFECTING THE STATUS OF WETLANDS

Waterfowl habitat in Indiana has suffered greatly from the drainage ditch. The Kankakee Marsh, once world-renowned as a hunting area, is almost non-existent today.

The "Grand Marsh of the Kankakee" contained about 400,000 acres of marsh, timbered swamps, open water areas, and sand-formed islands (1). The first visitors to the area were hunters and trappers. Closely on their heels followed the pioneers who settled on the higher ground of the basin and began to farm.

The agricultural drainage of the marsh began in 1896 and was accentuated by the food crisis in World War I (1). By 1950, drainage had reduced the marsh to small remnants of isolated swales, oxbows, and restored areas such as the Kankakee Game Preserve, the Cameron Marsh, and the Christensen Marsh.

The northeastern counties of Indiana (Zone 2) have also been exposed to drainage which affects waterfowl. During the field survey conducted in this zone, a large amount of ditching was noted and more stacks of tile than wetland areas were seen.

The use of tile to drain agricultural lands has also been practiced in Zones 3, 4, and 5, but the effect on waterfowl has been

INDIANA

Table 1. Importance of Wetlands to Wildlife Other Than Waterfowl

	Wetland Types						
	I	II	III	IV	V	VI	VII
Muskrat	N-2b	N-1a	M-1a	H-1a	M-1a	L-1a	L-1a
Mink	N-3a	N-1a	L-1a	L-1a	M-1a	L-1a	L-1a
Beaver	N-2a	N-2a	N-1a	N-1a	N-1a	L-2a	H-3a
Squirrels	H-1a	-	-	-	-	N-3a	M-1a
Opossum	M-1a	N-3a	-	-	-	L-1a	L-1a
Raccoon	H-1a	M-1a	H-1a	M-1a	M-1a	H-1a	H-1a
Fox (es)	H-1a	H-1a	L-1a	-	-	L-1a	L-1a
Pheasant	H-2a	H-1a	H-1a	M-3a	L-3a	N-3a	N-3a
Quail	N-1de	N-1a	N-3a	L-3a	-	N-3a	-
Cottontail Rabbit	H-1a	H-1a	L-1cde	-	-	L-1de	L-1de
Deer	H-1a	M-1a	N-3a	-	-	M-1a	H-1cde
Mourning Dove	H-1bcde	-	-	-	-	L-1bcde	L-1bcde
Woodcock	H-1bd	H-1bd	-	-	-	M-1bd	N-3d
Snipes	H-1bd	H-1bd	M-1bd	N-1bcd	N-1bcd	L-1bd	N-1bcd
Rails	N-1b	L-1b	M-1bcd	M-1bcd	N-1bcd	-	-

Value Categories

H - High  
M - Moderate  
L - Low  
N - Negligible

Use Categories

1. Food and Cover  
2. Food  
3. Cover  
(Available water assumed used by all species in varying degrees)

Time Categories

a - Year-round  
b - Spring  
c - Summer  
d - Fall  
e - Winter

negligible. For the most part, tiling in these zones has been on agricultural lands not classified as natural wetlands (3) in this survey.

The amount of contemplated future drainage in Indiana is unknown; however, Figure 5 delineates the area of the State where future drainage would have a devastating effect on waterfowl habitat.

Industrialization has also had an adverse effect on wetlands in Indiana. The sand dune region of Zone 1 that borders Lake Michigan has valuable marshes nestled in behind the dunes. These wetlands lie in the highly commercialized section of the State and are being destroyed by the construction of industrial plants and facilities.

Leveeing is another factor which has a detrimental effect upon the wetlands of Indiana. The Wabash Lowland, Zone 5, is the area in which the bulk of the leveeing has been and is being done. The elimination of flood waters from the natural flood plains of the major rivers in this zone and the drainage or drying up, after leveeing, of the more permanent wetlands on these flood plains result in the destruction of important waterfowl habitat.

#### IMPROVEMENT OF WETLANDS FOR WILDLIFE

Wetlands provide facilities for the use of increased leisure time. Improvement of wetlands, designed to be beneficial to wildlife, is of major importance to the people of Indiana. The Nation is also interested in the improvement of Indiana wetlands because of the number of wintering waterfowl harbored in the State.

Improvement of wetlands in Indiana would yield the greatest dividends in Zones 1, 2, and 5. Wetlands in Zones 1 and 2 may be preserved, in part, by means of outright acquisition and an educational program emphasizing the importance of wetlands and how agriculture and wildlife can be twin crops.

Major wetlands preservation, restoration, and improvement projects in Indiana include the Kankakee Game Preserve, Willow Slough, Christensen Marsh, and Cameron Marsh. Drained marshes have been reflooded and optimum water levels maintained through the use of dikes, water level control structures, and pumps. Share cropping on State agricultural lands included in the projects provides food for waterfowl and other wildlife because the State's share is left in the field. Cover management practices such as fencing and controlled grazing have improved nesting sites.

In Zone 5, where overflow lands along large rivers provide waterfowl habitat particularly during the wintering period, the primary problem is to keep leveeing at a minimum. Close cooperation between Federal, State, and private organizations will be required if the valuable wetlands of this area are to be perpetuated.

#### SUMMARY

The State of Indiana contains approximately 46,000 natural wetland areas which total some 283,000 acres. The high-value portions of Wetland Types 1, 3, 4, and 5, have a combined total area exceeding 150,000 acres.

Information from the survey includes for each county: (1) total numbers of wetlands by types, (2) types commonly associated with each other, (3) acreages by waterfowl value, (4) types of use by waterfowl, (5) land capability classes, and (6) natural vegetation. These are recorded on county summary forms. Total acreages by wetland type and waterfowl value are tabulated on a state summary form (Page 12). A base map delineating the general areas of high, moderate, and low waterfowl value, and showing high-value specific areas of 640 acres or over is on file with the Indiana Conservation Department, Indianapolis, Indiana, and the U. S. Fish and Wildlife Service, Office of River Basin Studies in Minneapolis, Minnesota, and Washington, D. C. A page-size replica of this map is included in the Appendix (Figure 4).

Both the over-all waterfowl value and use of the five wetland zones are discussed. Zones 1, 2, and 5 are the most important in the State waterfowl picture. Zones 3 and 4 are, by comparison, of low and negligible value respectively.

Three factors - drainage, industrialization, and leveeing - have had and will likely continue to have a detrimental effect on waterfowl wetlands in Indiana. Drainage and industrialization have been most detrimental to wetlands in Zone 1 and are a continuing threat to waterfowl habitat in that zone. Leveeing is mainly confined to Zone 5.

Indiana's wetlands can be preserved or improved through the reduction of drainage, restoration of marshland by land acquisition and management, and minimizing leveeing.

STATE SUMMARY  
WETLAND CLASSIFICATION AND EVALUATION

Wetland Category	Wetland Type*	Wetland Acreage by Waterfowl Value				State	INDIANA
		High	Moderate	Low	Negligible	Total Acreage by Types	
<b>INLAND FRESH AREAS</b>							
Flooded Agr. Land	1A	106,809	72,397	45,726	17,515	242,447	
Permanent Open Water	5P	43,657	5,595	7,541	49	56,842	
	Farm Pond	35	2,036	6,459	176	8,706	
	Gravel Pit	21	222	989	936	2,168	
	Quarry				260	260	
	Sand Pit				23	23	
	Strip Mine		2,078	700	330	3,108	
<b>Totals</b>		<b>150,522</b>	<b>82,328</b>	<b>61,415</b>	<b>19,289</b>	<b>313,554</b>	
Seasonally flooded	1	130,462	60,745	19,450	505	211,162	
Fresh Meadows	2		4,278	5,050	23,763	33,091	
Marshes (Shallow)	3	6,711	1,299	4,219	281	12,510	
Marshes (Deep)	4	2,177	160	667	24	3,028	
Open Water	5	12,267	204	3,742	80	16,293	
Shrub Swamps	6	30	751	56	3,815	4,652	
Wooded Swamps	7		1,437	366	878	2,681	
<b>Totals</b>		<b>151,647</b>	<b>68,874</b>	<b>33,550</b>	<b>29,346</b>	<b>283,417</b>	

\*List non-add items separately

Checked by B. W. Rounds

Approved by J. W. Kimball

Fish and Wildlife Service, Region III

Date: Revised Sept. 1954

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1. Indiana Department of Conservation, undated. The Old Kankakee, Izaak Walton League of America, Indiana Division.
2. Logan, W. N., et al, 1922. Handbook of Indiana Geology, Department of Conservation, Division of Geology, Indianapolis, Indiana.
3. Martin, Alexander C., et al, 1953. Classification of Wetlands of the United States, Special Scientific Report No. 20, U. S. Department of Interior, Fish and Wildlife Service, Washington, D. C.

## APPENDIX

### Description of Wetland Types in Indiana

The wetlands of Indiana fall into the inland fresh types (3) and are listed below:

Type I - Seasonally flooded depressions or flats, usually without vegetation, that contain water for only a few days in the spring or after heavy rains.

Type II - Shallow depressions without standing water but waterlogged within at least a few inches of the surface during the growing season.

Type III - Marshy depressions containing up to 6 inches of water until approximately mid-summer, at which time they may dry up completely or remain waterlogged for the remainder of the season.

Type IV - Marshy depressions covered with 1 to 3 feet of water during the growing season. Cattails and bulrush are common.

Type V - Open water areas of 6 feet in depth that have emergent vegetation restricted to a narrow border.

Type VI - Shrub swamps in which the soil is normally waterlogged during the growing season or covered with as much as 6 inches of water.

Type VII - Wooded swamps in which the soil is waterlogged at least to within a few inches of its surface during the growing season. In river bottoms often covered with as much as one foot of water.

SOIL CONSERVATION SERVICE LAND CAPABILITY\*  
OF WETLAND TYPES

1. Seasonally Flooded Basins or Flats

a. Drainable

Land capabilities I, II or III, depending on the inherent properties of the soils and the soil drainage classes as defined in the Soil Survey Manual, pages 169-170, U.S.D.A. Handbook No. 18.

b. Not drainable or very frequently flooded

Land capability class V.

2. Fresh Meadows

b. Not drainable

Land capability classes V and VIII.

3. Shallow Fresh Marshes

a. Drainable

Land capability classes II and III.

b. Not drainable

Land capability classes V and VIII.

4. Deep Fresh Marshes

b. Not drainable

Land capability class VIII if the water is normally not more than one foot deep. Marshes or shallow lakes with two feet or more of water, would ordinarily be mapped as water.

5. Open Fresh Water

b. Not drainable

Classified as water in Indiana.

\*Extracted from a letter from Mr. T. C. Bass, State Soil Scientist, Soil Conservation Service, Plant and Soils Laboratory, Purdue University, Lafayette, Indiana, May 12, 1954.

6. Shrub Swamps

a. Drainable

Land capability classes II and III.

b. Not drainable

Land capability classes V and VIII.

7. Wooded Swamps

a. Drainable

Land capability classes II and III.

b. Not drainable

Land capability classes V and VIII.

Note: The Fish and Wildlife Service has found that the foregoing term "not drainable" is subject to many varied interpretations. Drainability usually is dependent on economic factors. Many of Indiana's former wetlands which could have been classed as "not drainable" under the foregoing system have already been drained and there is no reason to believe that such drainage of valuable wildlife habitat will not continue unless prohibited by economic conditions or reduced through positive intervention by wildlife conservation and recreation interests.

The Land Capability Classification  
of the Soil Conservation Service

Land suited for cultivation

CLASS I. Land subject to no or very slight permanent limitations in use or risks of damage because of permanent land characteristics; very good land that can be cultivated safely with ordinary good farming methods. It is nearly level land with deep, productive, easily worked soils, and is not subject to more than slight water or wind erosion. It is well drained and is not subject to damaging overflows.

CLASS II. Land subject to moderate limitations in use, or moderate risks of damage, because of permanent land characteristics; good land that can be cultivated with easily applied special practices.

The limitations of different kinds of Class II land include: (1) gentle slopes; (2) moderate susceptibility to erosion; (3) soils of only moderate depth; (4) somewhat unfavorable texture and workability; (5) moderate alkalinity or salinity, easily correctible but likely to recur; (6) occasional moderate overflows; or (7) moderate wetness correctible by drainage but existing permanently as a land limitation.

CLASS III. Land subject to severe limitations in use for cropland, or severe risks of damage, because of permanent land characteristics; moderately good land that can be used regularly for crops in a good rotation but needs intensive treatment. Limitations of different kinds of Class III land include the following; the list probably is not complete: (1) moderately steep slope; (2) high susceptibility to erosion; (3) moderate overflow hazard; (4) slow or very slow subsoil permeability; (5) excessive wetness and a continuing hazard of waterlogging; (6) shallow depth to bedrock, hardpan, or claypan; (7) sandy, very sandy, or gravelly soil with low moisture capacity; or (8) low inherent fertility.

CLASS IV. Land subject to very severe permanent limitations or hazards in use for cropland; fairly good land that is best maintained in perennial vegetation but can be cultivated occasionally or in a limited way if handled with great care. Its cropping use is limited by natural permanent features such as slope, erosion, unfavorable soil characteristics, or adverse climate. Much Class IV land in the humid regions is suited for occasional cultivation.

Land not suited for cultivation

CLASS V. Land not suited for cultivation but suited for permanent vegetation, grazing or forestry, with few or no permanent limitations and not more than slight hazards. Cultivation is not feasible because of one or more factors such as permanent wetness, stones, or some other limitation. The land is nearly level and not subject to wind or water erosion. Grazing use or forestry use is governed by the requirements for maintaining good vegetation.

CLASS VI. Land subject to moderate permanent limitations or moderate hazards under grazing or forestry use; not suited for cultivation. It is too steep, subject to erosion, shallow, wet, dry, or otherwise not suited for cultivation, but with careful management is suited for grazing or forestry. Some Class VI land can be tilled just enough to establish pastures; some can be used safely for tree crops if permanent cover is maintained.

CLASS VII. Land subject to severe permanent limitations or severe hazards under grazing or forestry use; not suited for cultivation. It is very steep, eroded, rough, shallow, dry, swampy, or otherwise limited, but can be used for grazing or forestry if handled with great care. Owing to these adverse land characteristics that severely limit the growth or utilization of vegetation, the land is generally fair or poor for grazing or forestry.

CLASS VIII. Land that has some limitation that makes it unfit for cultivation, grazing, or forestry. It is suited for wildlife, recreation, or watershed uses. It includes such areas as marshes, deserts, badlands, deep gullies of the caving type, high mountain land, and very steep, rough stony, or barren land. Class VIII land often occurs in small areas, such as roadsides or ditch banks, that cannot be shown on the maps made for farm planning.

It is obvious from the foregoing description of land capability classes and from Table 3 that any class of land can be used safely for wildlife production if the owner desires to use it that way.

Reproduced from Biology Handbook, Third Edition (Revised), U. S. Department of Agriculture, Soil Conservation Service, Upper Mississippi Region, July, 1950.

TRANSECT ROUTES

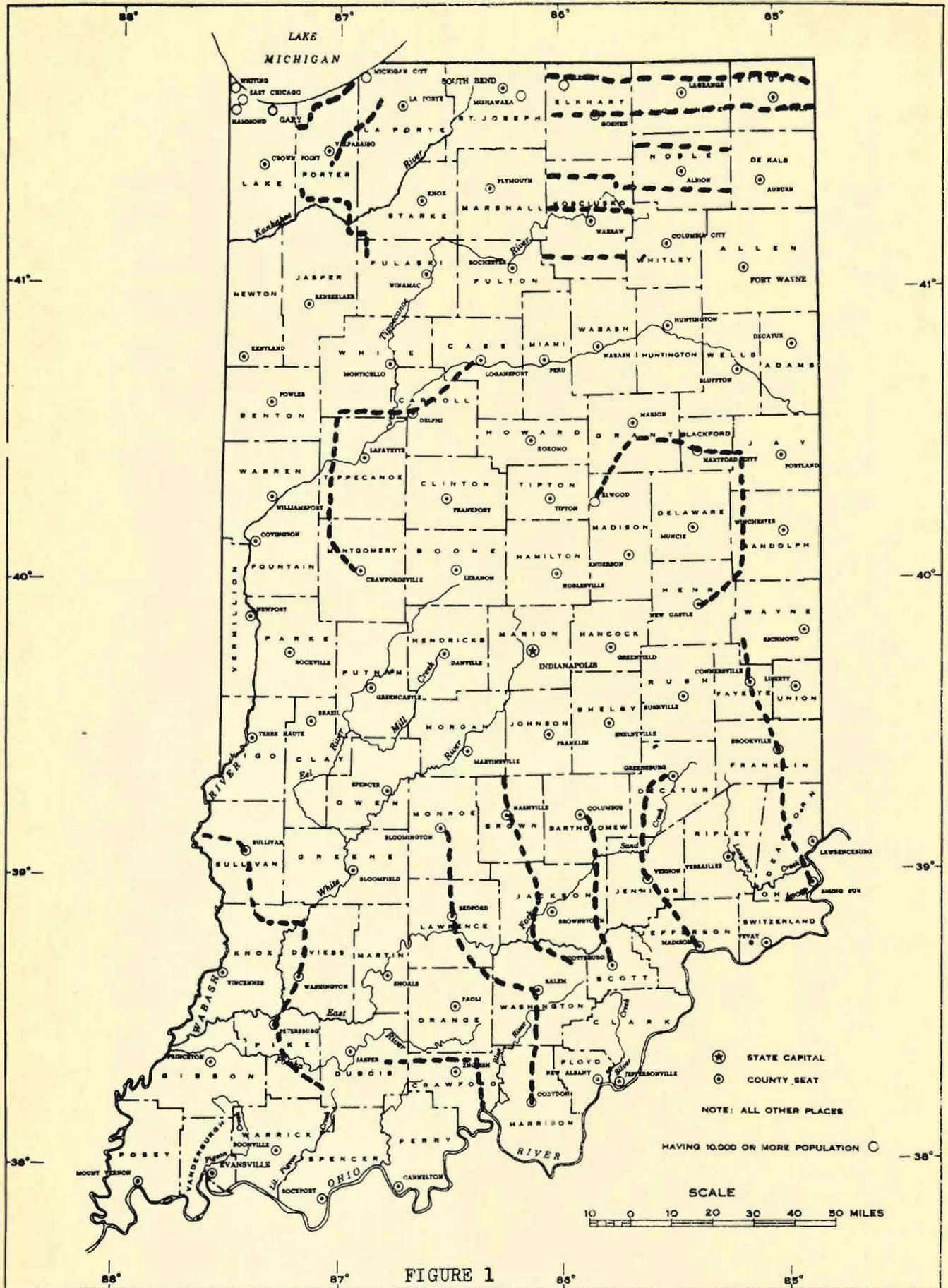


FIGURE 1

INDIANA

PHYSIOGRAPHIC REGIONS

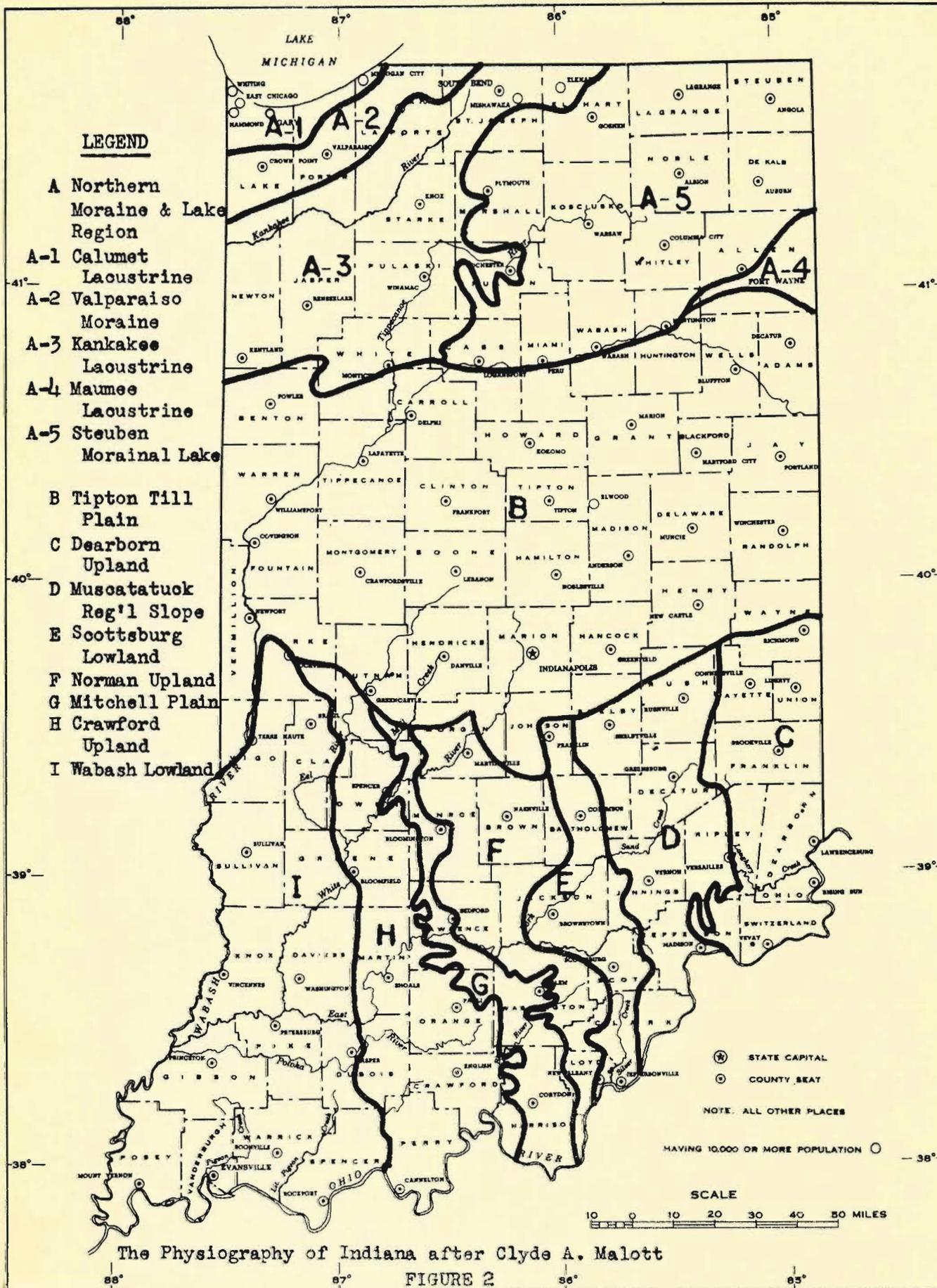


FIGURE 2

INDIANA

WETLAND ZONES

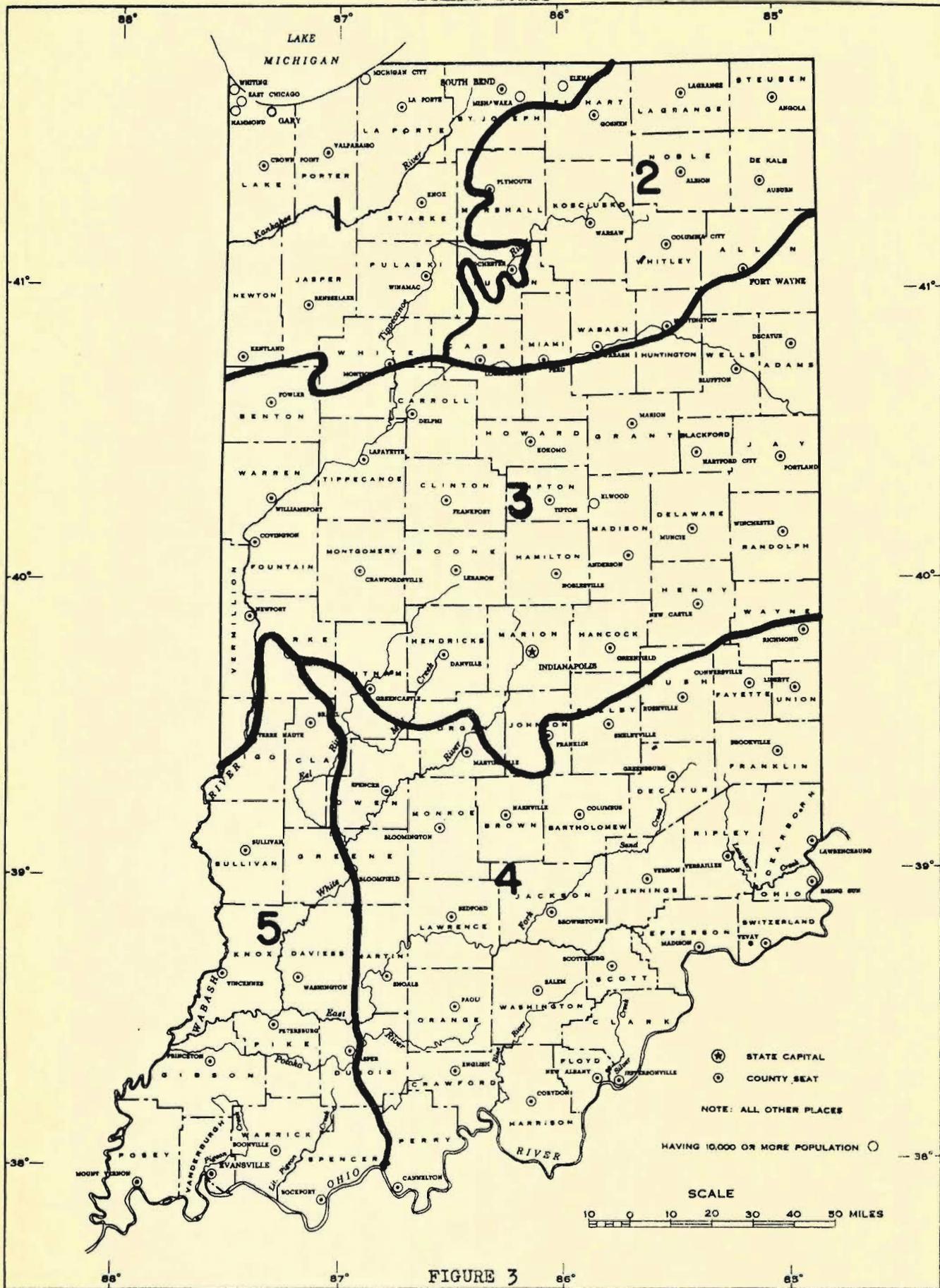
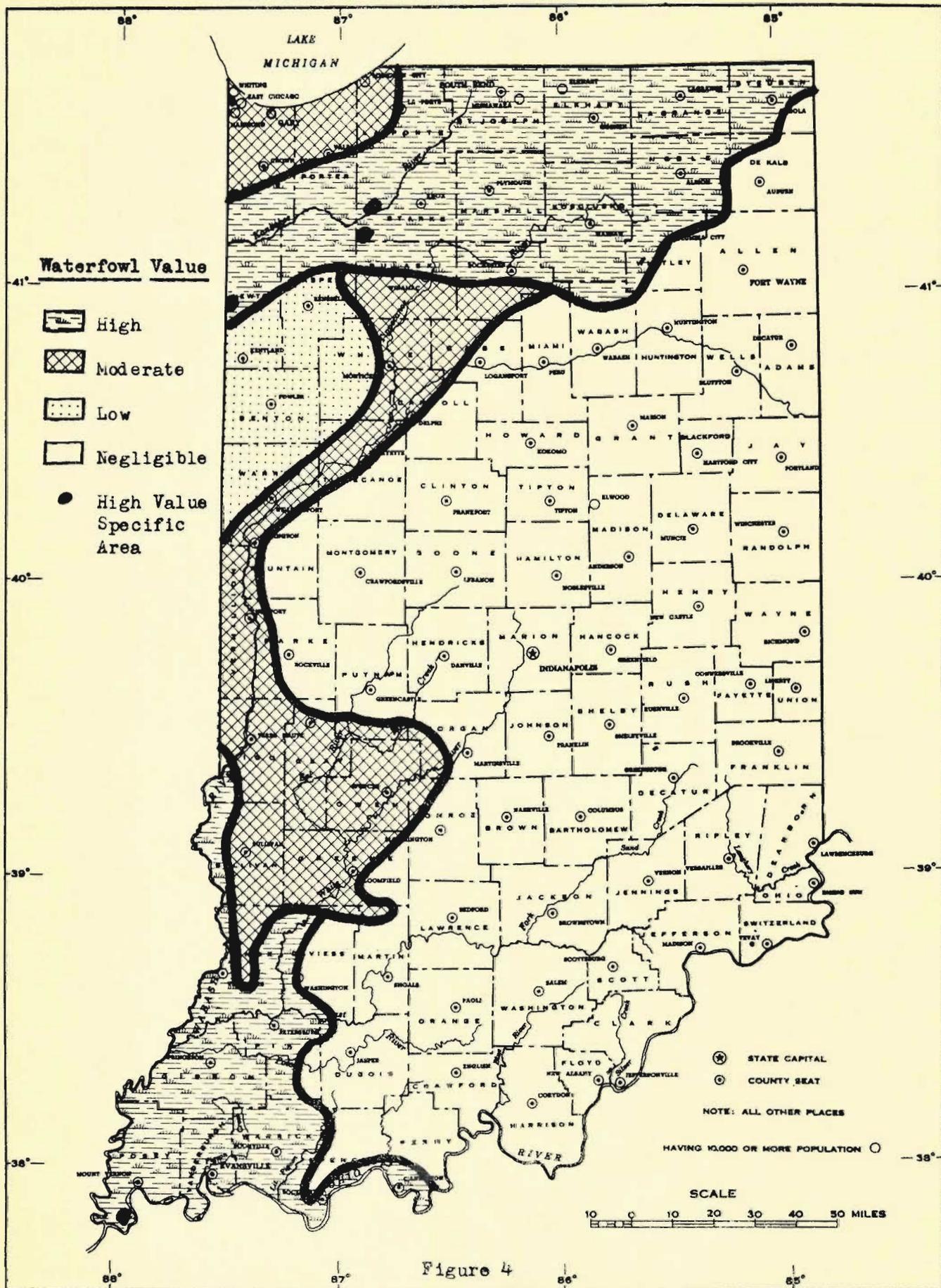


FIGURE 3  
INDIANA

# EVALUATION OF WETLANDS BY GENERALIZED REGIONS



INDIANA



Table 2. NUMBER OF WETLAND AREAS IN INDIANA BY ZONES  
DETERMINED BY TRANSECT\*

Wet- land Zone	1A	1	2	3	4	5	6	7	Total	Farm Pond	Borrow Gravel	Pit Pit	Strip Mines
1	11826	1187	1039	482	130	333	444	-	3,615	167	333	-	-
2	499	3634	2725	5451	908	908	136	454	14,216	-	-	-	-
3	44388	3599	5998	2399	239	479	3599	-	16,313	1199	-	-	-
4	5602	308	3859	592	-	457	2933	-	8,149	20762	663	-	-
5	5148	468	1872	1123	-	936	187	187	4,773	6084	936	2340	-

Table 3. ACREAGE OF WETLANDS IN INDIANA BY ZONES DETERMINED BY TRANSECT\*

Wet- land Zone	1A	1	2	3	4	5	6	7	Total	Farm Pond	Borrow Gravel	Pit Pit	Strip Mines
1	16722	427	812	3450	261	1332	355	-	6,637	217	333	-	-
2	908	454	4088	4997	2271	6814	272	908	19,804	-	-	-	-
3	10197	2399	22794	1679	359	1199	239	-	28,669	959	-	-	-
4	890	47	1947	238	-	174	1604	-	5,010	6562	1177	-	-
5	936	3276	1404	1123	-	1404	93	374	7,674	1404	936	3276	-

\*State Wetland Summary includes, in addition, river-bottom wetlands and lakes not included in the transect coverage. This is not duplication as river-bottom areas were not surveyed by transects and permanent lakes or large Type 5 open water areas were not included in transect records.

Table 4. WATERFOWL USE OF WETLANDS IN INDIANA BY ZONES

Type	Kind of Use														
	Zone 1			Zone 2			Zone 3			Zone 4			Zone 5		
	D	G	C	D	G	C	D	G	C	D	G	C	D	G	C
1	3,2,1	3,2	3	3,1,2	3,2	3,2	3,2	3	-	3,2,1*	-	-	4,3,2	4,3,2	3,2
2	3,2	-	-	3,2	-	3,2	3,2	-	-	3,2	-	-	4,3,2	-	-
3	3,2,1	-	3,1,2	3,1,2	-	3,1,2	3,2,1	-	3,2	3,2	-	-	4,3,2	4,3	3,2
4	3,2,1	-	3,1,2	3,1,2	-	3,1,2	3,2,1	-	3,2	3,2	-	-	4,3,2	4,3	3,2
5	3,2,1	3	3,2,1	3,2	3	3,2	3,2,1	3	3,2	3,2	-	3,2	4,3,2	4,3	3,2
6	3,2	-	3	3,2	-	3	3,2	-	-	3,1	-	-	4,3,1	-	-
7	3,2,1*	-	3	3,2,1*	-	3,2	3,2,1*	-	-	4,3,2,1*	-	-	4,3,2,1*	4	-

LEGEND

- 1 - Nesting
- 2 - Feeding
- 3 - Migration
- 4 - Wintering

- D - Ducks
- G - Geese
- C - Coots
- \* - River Bottoms

Table 5. IMPORTANCE OF INDIANA WETLAND TYPES TO WATERFOWL BY ZONES

Wet-land Zone	Wetland Types							Non-Add Items					
	1	2	3	4	5	6	7	1A	5P	Farm Pond	Gravel Pit	Quarry	Strip Mines
1	M	L	H	H	H	M	N	L	H	M	M	N	N
2	H	M	H	H	H	M	N	M	H	H	H	N	N
3	L	N	N	L	L	L	N	N	L	L	N	L	L
4	L	N	N	N	N	N	N	N	L	L	N	N	N
5	H	L	H	H	H	H	M	M	H	M	L	N	M

Wetland Types

H - High over-all value

M - Moderate over-all value

L - Low over-all value

1. Seasonally Flooded Basins or Flats

2. Fresh Meadows

3. Shallow Fresh Marshes

4. Deep Fresh Marshes

5. Open Fresh Water

6. Shrub Swamps

7. Wooded Swamps

1A Cultivated Type 1

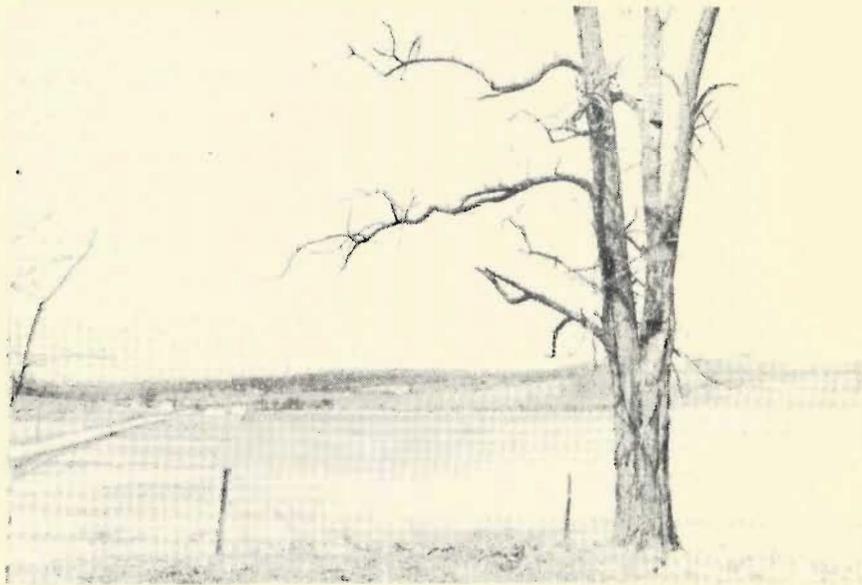
5P Permanent Type 5



Photo #1

General view in Wetland Zone 1 showing the flat terrain, bordering the moraines (background), which is generally tilled for corn production.

H. G. Anderson U.S. Fish and Wildlife Service April, 1954



Photoe #2

Hilly terrain of Zone 2 showing the wooded ridges and shallow valleys. These valleys are well drained and intensively cultivated.

H. G. Anderson U.S. Fish and Wildlife Service April, 1954



Photo #3

Rugged and wooded landscape, characteristic of Zone 4.

H. G. Anderson U.S. Fish and Wildlife Service April, 1954



Photo #4

Flat, intensively cultivated Zone 5.

H. G. Anderson U.S. Fish and Wildlife Service April, 1954



Photo #5

Type 1, seasonally flooded basin, commonly found during the spring in Zone 1.

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Photo #6

Combination Type 2 (fresh meadow) and Type 3 (shallow fresh marsh), located on the rather flat lake plain lying between Lake Michigan sand dunes and morainic hills of Zone 1.

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Photo #7

Type 4, deep fresh marsh, typical in the area adjacent to the Lake Michigan sand dunes (background) in Zone 1.

H. G. Anderson U.S. Fish and Wildlife Service April, 1954



Photo #8

Type 5, open fresh water, characteristic of the small natural lakes in Zone 5.

H. G. Anderson U.S. Fish and Wildlife Service April, 1954



Photo #9

Type 6, shrub swamp, found in the west portion of Zone 3. These remain waterlogged for long periods.

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Photo #10

A rather large artificial farm pond in Zone 4 adjacent to farm buildings. This pond is much larger and closer to the farmstead than most ponds noted in Zone 4.

H. G. Anderson U.S. Fish and Wildlife Service April, 1954

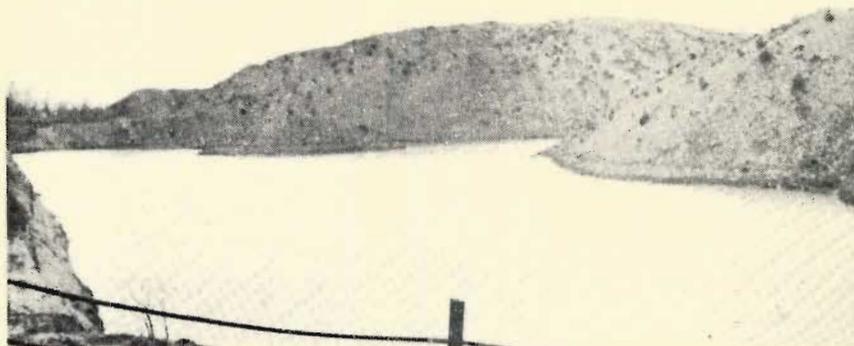


Photo #11

Strip mine located in the north portion of Warwick County,  
Zone 5. Note the cover plantings on the spoilbanks.

H. G. Anderson U.S. Fish and Wildlife Service April, 1954

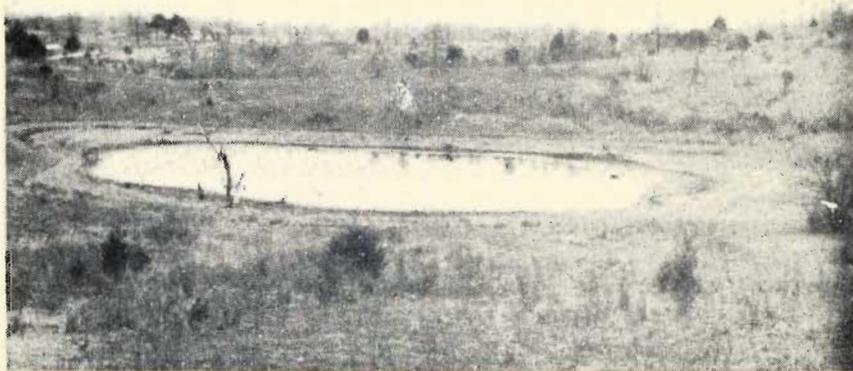


Photo #12

Typical large sink hole found in Zone 4.

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Photo #13

Type 5 oxbow of the Kankakee River (Zone 1) which later in the year will support a border of emergent and submerged vegetation.

H. G. Anderson U.S. Fish and Wildlife Service April, 1954



Photo #14

Drainage ditch in Zone 1. These ditches are common in the morainic region which ties into the headwaters of all tributaries entering the Kankakee River.

H. G. Anderson U.S. Fish and Wildlife Service April, 1954