AIRPHOTO INTERPRETATION OF DRAINAGE FEATURES OF MARSHALL COUNTY, INDIANA

JULY, 1956

No. 27

Joint Highway Research Project

by

Merle Parvis

PURDUE UNIVERSITY
LAFAYETTE INDIANA

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TO: K.B. Woods, Director
Joint Highway Research Project

July 26, 1956
File: 17-5-1D-92
C-36-51A

FROM: Harold L. Michael, Assistant Director

Attached is a report entitled "Airphoto Interpretation of Drainage Features of Marshall County, Indiana." This compilation is in connection with an airphoto study of the application of the techniques in developing surface drainage maps of Indiana on a county basis. This report was prepared by Merle Purvis, Research Engineer, Joint Highway Research Project.

Included with the report is an ozalid print of a drainage map of Marshall County, Indiana. This map was prepared entirely from airphotos.

Respectfully submitted,

Harold L. Michael

Harold L. Michael, Assistant Director
Joint Highway Research Project

HLM:bad

Attachment

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Research Engineer

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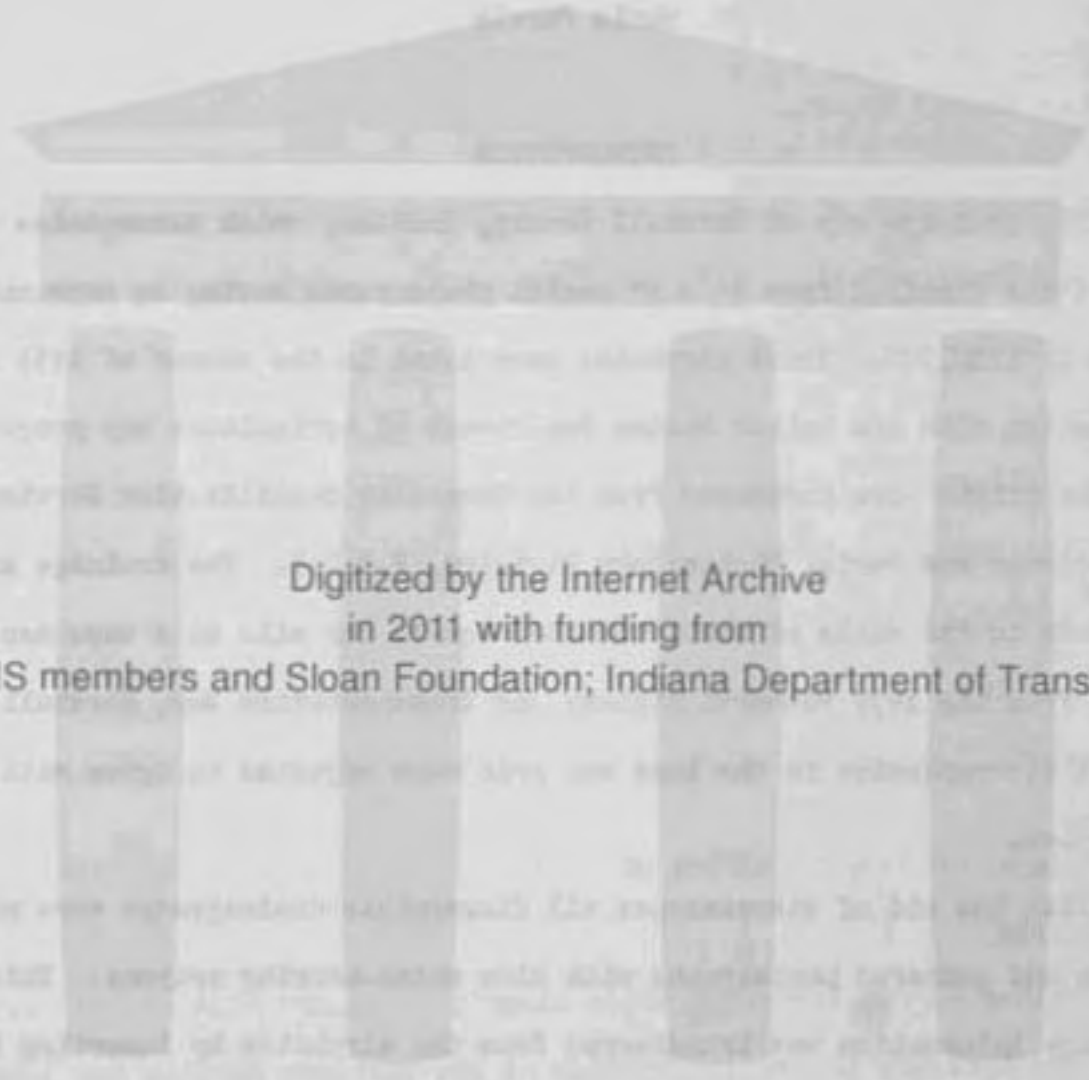
INTRODUCTION

The drainage map of Marshall County, Indiana, which accompanies this report was compiled from 9" x 9" aerial photographs having an approximate scale of 1:20,000. These airphotos were taken in the summer of 1951 in connection with the United States Department of Agriculture map program, and the prints were purchased from the Commodity Stabilization Service, Performance and Aerial Photography Division, U.S.D.A. The drainage map was made to the scale of about one inch equals one mile on a base map prepared from the 1937 "General Highway and Transportation Map, Marshall County". Slight discrepancies in the base map grid were adjusted to agree with the airphotos.

With the aid of stereoscopes all discernible drainageways were marked on the odd numbered photographs with blue china-marking crayons. This drainage information was transferred from the airphotos by inserting the prints into a reflectoscope and tracing their images onto the base map.

Map symbols are identified by a legend. The names of cities, towns, lakes, and streams are added to facilitate the use of the map. An appropriate title is given the map. When available, approximate elevations of the several towns are shown in small figures enclosed in parentheses (1, p. 430); these elevations are railroad elevations presumably at the depots in the various towns and cities.

1. Logan, W.N., "The Sub-Surface Strata of Indiana", Publication No. 108, The Department of Conservation, Indianapolis, Indiana, 1931.



GENERAL NATURE OF THE COUNTY

Geography

Marshall County is nearly square, being about 21 miles in both the east-west and north-south directions. It has a total area of approximately 440 square miles (2, p. 186).

2. Ward, L.C., "The Roads and Road Materials of the Northern Third of Indiana, 30th Annual Report, Department of Geology and Natural Resources, Indiana, 1905. Indianapolis, Indiana, 1906.

The regularity of the land section grid is broken by numerous "Michigan Road Land Sections" along U.S. 31. The county boundary on the west is the Second Principal Meridian.

Climate

The climate of Marshall County is continental, marked by warm summers and moderately cold, moist winters with wide ranges of temperature. The growing season is about 155 days. The mean annual precipitation is 35.20 inches at Plymouth. The rainfall is fairly well distributed throughout the year; it is lowest in February and highest in May (3).

3. "Climate and Man," Yearbook of Agriculture, U.S.D.A. Washington, D.C., 1941.

Physiography

A rather narrow irregular tract along the western side of the county lies within the Kankakee Lacustrine section of the Northern Moraine and Lake physiographic region of the state. The greater part of the county, however, is in the Steuben Morainal Lake section of the Northern Moraine and Lake region (4,p.66). In respect to its physiographic situation in the United States,

4. "Handbook of Indiana Geology," Department of Conservation, Indianapolis, Indiana, 1922.

Marshall County lies within the Eastern Lake section of the Central Lowland province (4, p. 69).

Topography

Marshall County has a average elevation of about 810 feet above sea level. Its highest point is aboub 895 feet, and its lowest point is about 775 feet. Maximum local relief is about 100 feet (4, p. 81). The topography is diversified. It varies from the undulating surface of the moraines to the nearly level sand plains and muck lands.

Geology

The surface and near surface geologic ages represented in the county are the Devonian and Quaternary periods (1,, p. 430).

Bedrock. The bedrock consists of shales and limestones of Devonian age (1, p. 430).

Glacial Deposits. All Marshall County was glaciated. The thickness of the drift is an much as 250 feet in places (1, p. 430).

The Maxinkuckee moraine, extending in a north-south direction, covers a large portion of the western half of the county. An arm of this moraine, called the Bremen moraine, crosses the northeast corner of the county in a northwest-southeast direction.

Soils

All Marshall County soils have been derived from materials deposited by glaciation or glacial materials reworked by wind or water.

Most of the soils in the northeastern corner of the county belong to the Miami catena.

Soils of the Fox-Westland, the Oshtemo, and the Genesee catenas extend from the central portion of the county to the southeast corner.

Coloma soils are present in the southwest corner of the county.

Extending in intermittent wide band from the northwestern corner to the southeastern corner are the soils of the Otis-Galena catena.

Soils bordering the Yellow River have been classed in the Tracy and Oshtemo catena.

A small area in the southwest part of the county has soils belonging to the Plainfield-Berrien catana.

The mucks have been mapped as Carlisle, Houghton, and Edwards soils. (5).

5. "General Soil Association Map," U.S.D.A., Purdue, May, 1940.

Sand

Ward stated that Marshall County is "Pre-eminently a sand country" (2,p.186).

"Sand ridges on the outer slope of the Maxinkuckee moraine at many points from Lake Maxinkuckee northward to Pine Creek Valley in the northwest township of Marshall County seem to have been heaped up by the wind." (6.p,136).

6. Leverett, F., and Taylor, F.B., "The Pleistocene of Indiana and Michigan and the History of the Great Lakes," U.S.G.S. Monograph LIII, Washington, D.C., 1915.

Gravel

Granular outwash plains exist in the vicinity of Argos and east of Plymouth. Hills of granular material occurr in the moraines.

STREAM SYSTEMS

Drainage Basins

Marshall County lies within two drainage basins of the state. The southeastern corner (about a quarter of the county) is in the Tippecanoe subdivision of the Wabash drainage basin. The remainder of the county is in the Kankakee drainage basin (4, p. 271).

Principal Streams.

The principal stream system in Marshall County is Yellow River and its many tributaries. Yellow River enters Marshall County at a point near the northwest corner of Kosciusko County. It flows in a northwesterly direction past Bremen. About a mile and a half west of that town the river turns south. It then zigzags south, then west to Plymouth, then south for about 4 miles, then west past Burr Oak to the Starke County line. In Starke County, Yellow

River joins the Kankakee River. Dausman Ditch, Packard Ditch, Wolf Creek, and numerous smaller streams are tributaries of Yellow River on the south.

Yellow Bank Creek and Pine Creek drain the northwest corner of the county in a northwesterly direction into St. Joseph County to the Kankakee River.

The west-central part of the county is drained by Storm, Crooked, and Eagle creeks in a westerly direction into Starke County.

The Tippecanoe River meanders in a southwesterly direction across the southeast corner of the county, passing on the northwest side of the town of Tippecanoe. Outlet Creek is its main tributary from the northwest. The south-central part of the county is drained southward into Fulton County by Eddy Creek. The southwest corner of the county drains through Lake Maxinkuckee into Fulton County.

Lakes

There are several lakes in Marshall County. Some of the named ones are as follows:

Eddy	Houghton
Mud	Moore
Maxinkuckee	Flat
Little	Galbreth
Lost	Pretty
Thomas	Lake of the Woods
Nichols	
Myers	
Cook	
Lawrence	
Dixon	
Krechbaum	

Dredged Ditches

Nearly all streams have been dredged. Only the small tributaries and very large streams flow in their natural channels, and even the channels of those have been improved in some of their reaches.

DRAINAGE PATTERNS

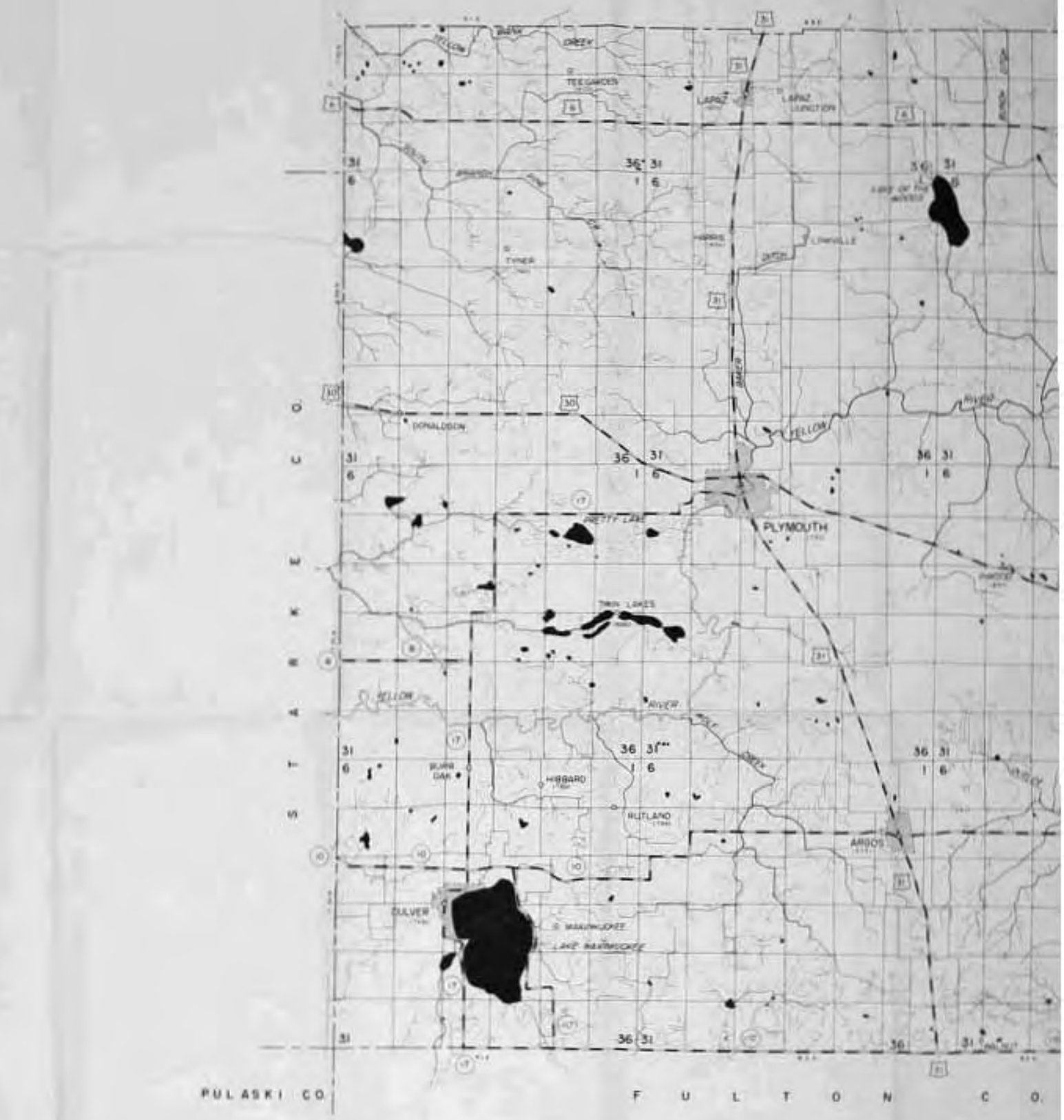
Drainage patterns of Marshall County are mostly rectilinear in character because of the many dredged ditches. Before drainage was "improved" the patterns were either broadly dendritic or the haphazard ones of young drift deposits (7).

7. Purvis, H. "Regional Drainage Patterns of Indiana," A Thesis, Purdue University, Lafayette, Indiana, 1947.

ACKNOWLEDGMENTS

The author wishes to acknowledge the assistance given by all those persons who have helped in the preparation of this report. Special acknowledgments are due members of the Joint Highway Research Project Advisory Board for their active interest in furthering this study; Professor H.L. Michael, Assistant Director of the Joint Highway Research Project, for his valuable suggestions and review of the report; and to the several individuals in the Airphoto Laboratory who have aided in the compilation of the map, especially to W.O. Reed and B.H. Moore for marking, checking, and transferring of the drainage data on and from the airphotos.

All airphotos used in connection with the making of the map automatically carry the following credit lines: "Photographed for Commodity Stabilization Service, Performance and Aerial Photography, U.S.D.A."



DRAINAGE MAP
MARSHALL COUNTY
INDIANA

PREPARED FROM
1951 AAA AERIAL PHOTOGRAPHS
BY
JOINT HIGHWAY RESEARCH PROJECT
OF
PURDUE UNIVERSITY
1956

SCALE OF MILES
0 1 2 3 4

PREPARED UNDER THE SUPERVISION OF W. H. MAYO

O S E P H C O

ELKHART CO

LAPAZ JUNCTION

BURNHAM DITCH

BREMEN

LAKE OF THE WOODS

LINVILLE DITCH

YELLOW RIVER

PLYMOUTH

ARGOS

OLD TIP TOWN

TIPPECANOE

BOURBON

36 31 1 6

LEGEND

- CITIES AND INCORPORATED TOWNS
- UNINCORPORATED CITY ADDITIONS
- STATE CAPITAL
- COUNTY SEATS
- OTHER TOWNS AND VILLAGES
- U.S. AND STATE HIGHWAYS
- STATE LINE
- COUNTY LINE
- CONGRESSIONAL TOWNSHIP CORNERS
- SECTION LINES
- APPROXIMATE ELEVATIONS
- MAJOR STREAMS
- PERENNIAL STREAMS
- INTERMITTENT DRAINAGE WAYS
- CANALS
- BRIDGES
- LAKES AND PONDS
- INFILTRATION BASINS
- SINK HOLES
- ELEVATED AREAS
- DAMS
- HEADWALLS

L T O N C O.

DRAINAGE MAP
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AT
PURDUE UNIVERSITY
1956

SCALE IN MILES

POLYCONIC PROJECTION

DRAWN BY H. F. EVANS