AIRPHOTO INTERPRETATION OF DRAINAGE FEATURES OF WABASH COUNTY, INDIANA

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Joint Highway Research Project

PURDUE UNIVERSITY
LAFAYETTE INDIANA

by

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Parvis

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

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FROM: Harold L. Michael, Assistant Director

Attached is a report entitled "Airphoto Interpretation of Drainage Features of Wabash 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 Parvis, Research Engineer, Joint Highway Research Project.

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

Respectfully submitted,

Harold L Michael

Harold L. Michael, Assistant Director
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AIRPHOTO INTERPRETATION OF DRAINAGE FEATURES OF WABASH COUNTY, INDIANA

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February 1, 1956

AERIAL PHOTO INTERPRETATION OF DRAINAGE FEATURES

OF

WABASH COUNTY, INDIANA

by

Merle Parvis

INTRODUCTION

The drainage map of Wabash 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 1941 in connection with the United States Department of Agriculture map program, and the prints were purchased from the Agricultural Adjustment Administration (now 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, Wabash 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. 772); these elevations are railroad elevations presumably at the

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

depots in the various towns and cities.

Geography

Wabash County is nearly rectangular in shape. There is a block of six land sections (2 wide and 3 long) missing from the rectangle in the north-east corner; these sections are a part of Whitley County. Wabash County is about 27 miles long (north-south) and about 16 miles wide (east-west). It has a total area of approximately 426 square miles (2, p. 5).

2. Wayne, W.J., and Thornbury, W.D., "Glacial Geology of Wabash County, Indiana," Ind. Dept. Conservation, Geol. Surv. Bull No. 5, Bloomington, Indiana, June, 1951

The regularity of the land section grid is broken by numerous land grants (Reserves) along the Wabash and Mississinewa rivers.

Climate

The climate of Wabash County is continental, marked by warm summers and moderately cold, moist winters with wide ranges of temperature. The average temperature of January is 27.7°F, and of July, 75.0°F. The lowest temperature on record was -18°F., at Wabash, and the highest, 109°F. The length of the growing season is about 163 days. The mean annual precipitation is 37.22 inches. The rainfall is fairly well distributed throughout the year; it is lowest in February and highest in June. About thirty inches of snow can be expected annually. (3).

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

Physiography

That part of Wabash County lying north of the Wabash River is in the Steuben Morainal Lake section of the Northern Moraine and Lake physiographic region of the state. The southern part of the county is in the Tipton Plain region (4, p.66).

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

Wayne and Thornbury believe that the area between the Wabash and Eel rivers is "typical" till plain and should be included in the Tipton Till Plain region (2, p.7).

In respect to its physiographic situation in the United States, the northern half of Wabash County is in the Eastern Lake section, and the southern half is in the Till Plains section of the Central Lowland province (4, p. 69).

Topography

McGrain writes, "In general, Wabash County is a broad, level till plain. Low moraines are present in the northwestern and eastern part of the county. The most conspicuous topographic feature are the valleys of Eel and Wabash rivers" (5, text).

5. McGrain, Preston, "Thickness of Glacial Drift in North Central Indiana", Circular No. 1, Indiana Flood Control and Water Resources Comm., Indianapolis, Indiana, January, 1950.

The county has an average elevation of 775 feet above sea level. Its highest point is about 930 feet, and its lowest point is about 685 feet. Maximum local relief is about 120 feet (4, p. 82).

A rather unique feature is the broad alluvial section of the Wabash Valley in the vicinity of Rich Valley; it is locally known as "The Prairie". It is believed that this widened portion of the Wabash Valley is the surface expression of the buried Teays Valley since the present Wabash River crosses the ancient drift filled valley here (5, text).

Wayne and Thornbury state, "Only along the Wabash sluiceway is the local relief in Wabash County greater than that in the Packerton Moraine" (2, p. 9).

Geology

The surface and near surface geologic ages represented in the county are the Silurian, Devonian, and Quaternary periods (1, p. 772). The Silurian rocks are limestones and shales. The Devonian rock is limestone. The Quaternary materials are clays, sands, and gravels (Pleistocene) and clays and sands (Recent) (1, p. 772).

Bedrock. Devonian limestone is mapped as existing directly below the glacial drift in the extreme northwestern part of the county (1, p. 772). Elsewhere the bedrock is composed of strata of Silurian age (1, p. 772). "Outcrops of the bedrock

occur along the courses of its principal tributaries. The bedrock surface was deeply trenched before the deposition of the glacial drift . . ." (1, p.772). McGrain writes, "Rock exposures are common along the valleys of Mississinewa, Salamonie, and Wabash rivers and Treaty Creek. No rock is exposed in the valley of Eel River" (5, text). Numerous klintar, composed of massive, coarsely crystalline dolomite, are to be found exposed in the valleys of the Wabash, Salamonie, and Mississinewa rivers and in the Treaty Creek valley (2, plate I). The bedrock in Wabash County dips in a westerly direction (2, p. 26).

Glacial Deposits. All Wabash County was glaciated. Surface drift is of Wisconsin age. Its depth varies from nearly zero (because of outcropping bedrock) to at least 400 feet (in the buried Teays Valley) (5, Map) (2, p. 30). The intermorenic or till plain, areas cover from a half to two-thirds of the county. For the most part, these areas have gently rolling topography.

The Mississinewa moraine, crosses the county in a broad curving ridge. It extends from the southeast corner to Wabash then to the right hand point of the notch in the northeast corner. South of the Wabash River, the moraine is bounded on the west by Treaty Creek. North of the river it becomes the headwater area for such streams as Pawpaw Creek and Bear Grass Creek, and farther north it is crossed by Pony Creek. The Mississinewa moraine in Wabash County is gently rolling. It averages about 4 miles in width (2, p. 9).

The Packerton moraine crosses the northwest corner of Wabash County in a northeast-southwest direction. It roughly parallels Eel River although it is separated from that stream by "a belt of outwash plain and valley train 1 mile to 3 miles wide" (2, p. 9). "In the Packerton moraine, till is interbedded with outwash, and a complete picture of the lithology is difficult to obtain. In the several places where it has been examined, the till is medium brown, pebbly, clayey, and contains varying amounts of sand" (2, p. 14).

Wayne and Thornbury mention lacustine deposits in T30N R7E, T27N R8E, and T27N R5E (2, p. 16).

Soils

The soils of Wabash County have been developed mainly from glacial drift. Very little influence on the composition of the soil has been contributed by the underlying bedrock; this has occurred only in areas of thin drift. Wind has exerted its influence near Long Lake by sorting the sands from the outwash materials.

Most of the soils in the upland areas belong to the Miami-Brookston-Crosby catena. Clyde soils occur in many of the depressions, both in the till plain and morainic areas. The soils developed from coarse-textured outwash and terrace materials along Eel River belong to the Fox and Oshtemo catenas; and in the depressions there are Westland soils. The soils of the Wabash Valley have been mapped as belonging to the Genesse-Eel-Wayland catena; Fox soils have developed on the terraces. In the granular portions of the moraine in the northwest part of the county, soils belonging to the Coloma catena are found (6, map).

6. "General Soil Associations," Map, U.S.D.A. Purdue, May, 1940.

Engineering Materials

Engineering materials in Wabash County consist of limestone and shale, sand, gravel, clay, and marl. Deposits of deleterious materials, such as peat and muck, exist most frequently in the northwest corner of the county.

Sand. Many low sand dunes are to be found west of Long Lake (2, p. 20).

Gravel. Wayne and Thornbury state that there are about 80 gravel pits scattered over the county (2, p. 32). Several of these are in the granular hills and ridges of the Packerton moraine; the village of Disko is located among kames and eskerlike ridges.

Granular materials occur in the terraces along the Mississinewa, Salamonie, Wabash, and Eel rivers. Valley wall deposits along these rivers are sources

of gravel, also (2, p. 34).

Clay. Apparently little commercial use has been made of the glacial clays in Wabash County.

Peat and Muck. Taylor cites several deposits of peat in the county. The location of these are as follows: Sec. 32, T30N, R6E; Sec. 3, T30N, R6E; near Twin Lakes; near Flora and Luken Lakes; and along Silver Creek (7, p. 203-204).

7. Taylor, A.E., "On the Peat Deposits of Northern Indiana," 31st Annual Report, Department of Geology and Natural Resources, 1906, Indianapolis, 1907.

Muck is generally associated with the peat deposits and organic soils exist in many of the depressions.

Marl. Small deposits of marl occur bordering some of the lakes in the northwestern corner of the county. There is a workable deposit in the lakebed west of Long Lake (2, p. 23 and 35).

SURFACE DRAINAGE FEATURES

Drainage Basins

Wabash County lies wholly within the Wabash drainage basin of the state. The northern third of the county is in the Eel River subdivision. The southwestern sixth is in the Mississinewa subdivision. Perhaps a tenth of the county in the east-central part is in the Salamonie subdivision. Only the central part is drained by the Wabash River proper. (4, p. 271).

Principal Streams

The principal stream in Wabash County is the Wabash River. It enters the county east of Lagro and flows west-southwest past Wabash and Rich Valley into Miami County. The Wabash River has a gradient of about 1.9 feet per mile across the county; it drops 35 feet in 18 3/4 miles (2, p. 7). The Wabash Valley is for most of its length from ½ to 1 mile wide, but in the vicinity of Rich Valley it widens to 2½ or 3 miles (2, p.22-23).

The main tributaries of the Wabash from the north (from east to west) are Lagro, Enyeart, Charley, Helm, Kentner, Brooks, and Englenaus creeks. These streams are relatively short; therefore, they have steep gradients except in the upland and where they cross the valley floor to the river.

Except for the Salamonie River, the largest tributary of the Wabash from the south is Treaty Creek. It heads east of Treaty and flows west to that town where it turns north; it joins the river at the city of Wabash. Ross Run and Burr Creek are named tributaries of the river between the Salamonie and Treaty Creek. Mill Creek and Asher Branch, as well as several small streams, drain the area west of Treaty in a northerly direction into the river.

The Salamonie River enters Wabash County east of Dora from Huntington County and flows in a northwesterly direction to its junction with the Wabash at Lagro. Rockaway Creek is tributary to the Salamonie, entering that river

from the west. Logan Creek joins the Salamonie less than a mile west of the Wabash-Huntington County line; the watershed of this stream lies mostly within Huntington County; its tributary in Wabash County is Black Creek. The average gradient of the Salamonie River is 5.9 feet per mile (2, p. 8). The entrenched Salamonie has valley walls of bedrock and glacial drift up to 75 feet in height (2, p. 8).

The Mississinewa River crosses the southwest corner of Wabash County. It enters the county from Grant County near LaFontaine and flows in a meandering northwesterly course past Somerset and Redbridge into Miami County where it enters the Wabash River east of Peru. Cart, Ten Mile, and Liston creeks are tributaries of the Mississinewa from the south. Grant Creek drains the area in the vicinity of LaFontaine in a westerly direction into the river. Goose Creek is a tributary of the river southeast of Redbridge. The average gradient of the Mississinewa River is 3.8 feet per mile (2, p.8).

The fourth stream of importance in the county is Eel River. It enters the county from Kosciusko County near Liberty Mills and flows in a southwesterly direction past North Manchester, Laketon, and Roann into Miami County. The average gradient of Eel River is 2.1 feet per mile (2, p. 8). Eel River has cut its channel through glacial drift; bedrock does not outcrop anywhere in the stream (2 , p. 8). Clear, Otter, Silver, and Squirrel creeks are its tributaries from the north. These streams drain the north western corner of the county. Wheeler, Pony, and Beargrass creeks are tributaries of the Eel from the southeast. In general, they are westernly flowing streams.

The area surrounding Urbana is drained in a westerly direction by Pawpaw Creek. This stream joins Eel River in Miami County. Bachelor Creek lies south and nearly parallel to Pawpaw Creek; it is tributary to the latter, joining that stream in Miami County.

Lakes and Ponds

There are several small lakes and ponds within the limits of the Packerton

moraine. They are called intramorainal lakes - Lukens Lake is the largest of this type. Other lakes in the area are Grass Lake, McColley Lake, Bull Lake, Bear Lake, Flat Lake, and Twin Lakes. Long Lake was formed apparently by a tributary stream being dammed by the Eel River valley train (2, p. 10). Round Lake is located near Long Lake. There are no lakes of any size in the Mississinewa moraine.

Swamps

Many basins in the morainic areas contain organic matter. The water table in these basins is generally high and swampy conditions prevail. The most extensive areas where these conditions exist lie northwest of Eel River.

Buried Valleys

The buried Teays (Kanawha) valley crosses the county from its south-east corner to the point where the Wabash River enters Miami County. Crossing the county from east to west on a line about 6 miles south of its northern boundary is the buried preglacial Eel River valley (5, text).

Glacial Sluiceways

The Wabash Valley is the former outlet of the old glacial Lake Maumee. Its width varies from ½ to 2½ miles (5, text). It is the major sluiceway of the county.

Extensive valley train deposits of granular materials along Eel River indicate that this stream must have carried melt waters from the glacier. Pony Creek, also, has the same indications of being a sluiceway, although a minor one.

The Mississinewa River has valley wall deposits of granular materials indicating that a large volume of debris-laden water must have flowed through its channel at one time.

Dams

Low dams exist in Eel River at Stockdale, Laketon, North Manchester, and

Liberty Mills. There is a low dam in Treaty Creek, also.

Dredged Ditches

Many of the sluggish streams in the till plain areas have been dredged to improve drainage conditions. Likewise, many basins in the morainic areas have been drained artificially.

DRAINAGE PATTERNS

The Wabash River is the artery of drainage in Wabash County and all streams eventually empty their waters into it. On the south side of the Wabash the streams trend to the northwest, and on the north side of the river the streams flow toward and into Eel River which is a southwesterly flowing stream.

In the till plain areas the drainage patterns are broadly dendritic. The density of the patterns increases in the morainic areas and they are more haphazard in character. This is especially true in the Packerton moraine where lakes and kettles contribute much to the irregularity of the patterns. Rock control is exhibited in the sharp bends of the Salamonie River, Mississinewa River, and Treaty Creek while Eel River more or less meanders freely in an alluviated valley. Dredging of the streams and ditches have added a rectilinear effect locally to the drainage patterns in the till plain and morainic areas (8).

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8. Parvis, M., "Regional Drainage Patterns of Indiana", A Thesis, Purdue University, Lafayette, Indiana, 1947.

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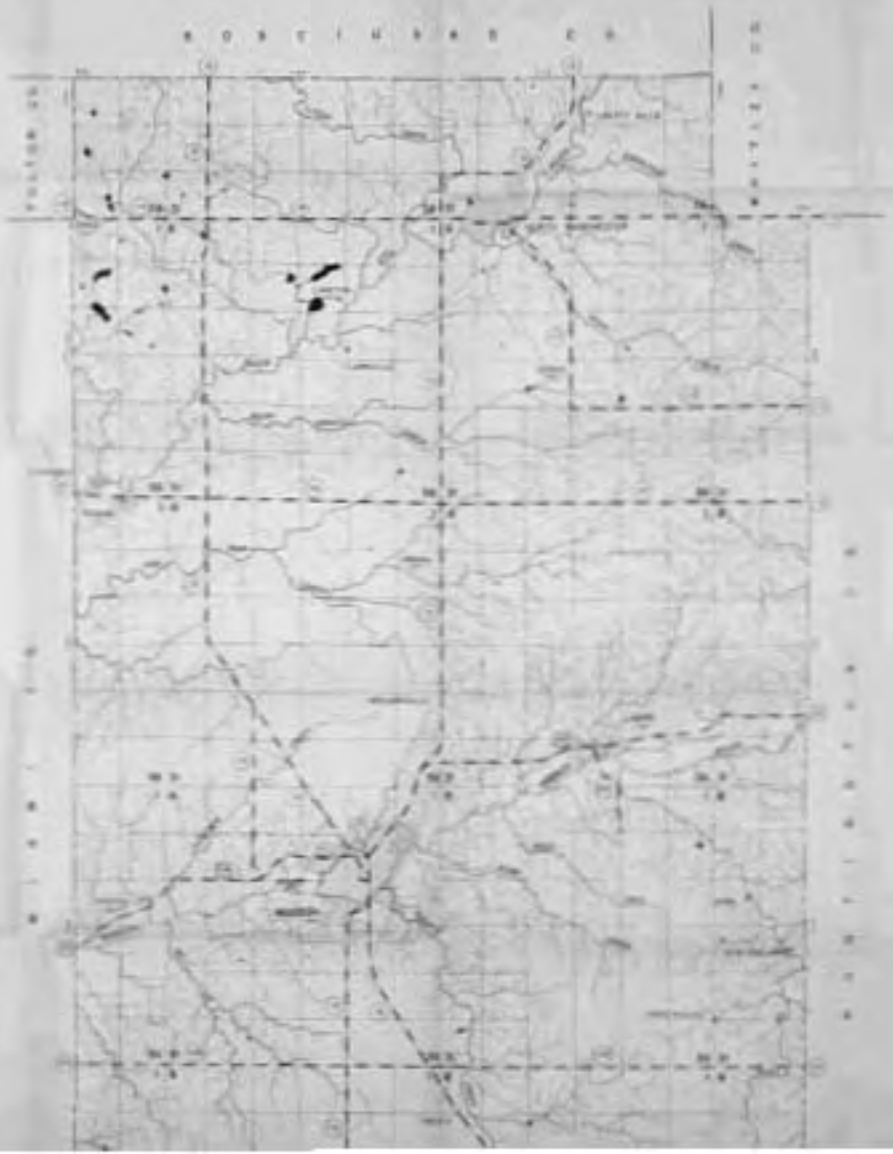
All airphotos used in connection with the making of the map automatically carry the following credit lines: "Photographed for Commodity Stabilization Service, Performance and Aerial Photography, U.S.D.A."



DRAINAGE MAP

WABASH COUNTY

INDIANA

JOINT HIGHWAY RESEARCH PROJECT

PURDUE UNIVERSITY

1958