

THE PHYSIOGRAPHY OF THE TIPPECANOE RIVER

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This paper is the partial result of four summers' work in the field. The primary purpose of this investigation was to determine migration routes of the snails into this area and their present distribution. To solve the problems of distribution a very detailed study of the physiography was made. These physiographic results are presented in this paper. The data and conclusions on the distribution of the gastropods are published elsewhere (Wright, 1932).

The Tippecanoe River, in northern Indiana, is one of the larger tributaries of the upper Wabash. It lies within latitude 41-42 degrees, longitude 85-87 degrees. The counties which are partly or entirely drained by it are Noble, Whitley, Kosciusko, Miami, Marshall, Fulton, Cass, Starke, Pulaski, White, Carroll and Tippecanoe. The entire area drained is 1,890 square miles (Scott, 1916). The total length of the river is about 166 miles.

The Tippecanoe River is a consequent stream. Its course is determined by a complicated system of moraines, most of which are assigned to the Saginaw lobe of the late Wisconsin substage of glaciation. The Saginaw-Erie interlobate morainal mass which forms the divide between the Tippecanoe and Eel rivers is termed the Packerton moraine by Malott (1922). The Maxinkuckee moraine extends "northward from the Wabash River some ten miles west of Logansport to the state line north of South Bend. . . . Several small moraines extend nearly at right angles" (Malott, 1922:117) between the Packerton and Maxinkuckee moraines. "These smaller moraines mark the stands of the Saginaw ice-lobes in its retreat northward." Using the names suggested by Leverett (1915:137-139) and Malott (1922:117), those which directly affect the course of the Tippecanoe River are the Rochester, Burket, Bremen, and New Paris moraines.

The great majority of the ninety-five or more lakes of the Tippecanoe River basin lie in depressions of the Packerton morainic system. The swampy and marshy regions of its middle and upper course are remnants of former lakes, many of which have become extinct through artificial drainage.

"The profile of the Tippecanoe River is peculiar in that the fall in the upper course is much less than in the lower course. The greatest fall occurs in the vicinity of Monticello. This is due to the fact that the stream flows over the Cincinnati anticline in northern White County and has been unable to cut through the hard rock at Norway. The Wabash River has been deepening its valley at the mouth of the Tippecanoe faster than the Tippecanoe could deepen its valley in the vicinity of Norway. The result of this condition is a gradually increasing fall in the lower course of the stream." (Tucker, 1922:381-382.) There is

evidence that the lower course of the Tippecanoe River has been developed later than in the middle course. "It seems probable . . . that from near Ora in Starke County there may have been a northwestward drainage to the Kankakee as well as a southwestward drainage to the Iroquois." (Leverett, 1915:130.)

Because of the marked difference in the upper, middle and lower courses of the Tippecanoe system, it seems best to describe them separately. For convenience in discussion, the upper course is arbitrarily defined as that part of the river basin between the headwaters in Crooked Lake and the point where the river crosses the Fulton-Marshall County line; the middle course, as the area between the Fulton-Marshall County line and the village of Norway in White County; and the lower course, as the region between Norway and the mouth, in northeastern Tippecanoe County.

Upper Course. The Tippecanoe River has its origin in Crooked Lake, near the crest of the Saginaw-Erie interlobate, or Packerton moraine (Malott, 1922:117). A narrow ridge is the "divide" between this and Cedar Lake of the Eel River drainage. The ridge is "a quarter of a mile across and twenty-five or thirty feet high" (Dryer, 1892:164). Scovell (1908:167) discusses the major drainage connections of this region: "Crane Lake and Crooked Lake, through short outlets, flow into Big or Tippecanoe Lake. Goose Lake, New Lake and Old Lake flow into Loon Lake. The outlet of Tippecanoe Lake flows westerly and northerly about two miles, where it joins the outlet of Loon Lake, forming Tippecanoe River. This stream flows northwesterly about five miles into Smalley Lake. . . ." For about two miles below Big Lake and the same distance above Smalley Lake, the stream is swampy. Near Ormas, in Section 24 (T33N, R8E) the river passes through a gap in a low moraine, the axis of which is northeast by southwest. This gap was the site of a former dam which impounded the waters of Big and Loon lakes in the intramorainic valley.

Heriff and Goose lakes (Noble County), tributary to Big Lake, are nearly extinct. Heriff is bordered by a tamarack swamp. The outlet of Goose (Whitley County) into Loon Lake is an intermittent, dredged ditch. The natural outlet of Old and New lakes into Loon is also dredged.

The Gilbert Lake chain, which drains into the north end of Smalley Lake, is composed of six small lakes: Little Metz, Buffalo, Metz, Buckle, Stump, and Gilbert lakes. The entire area of this lake basin is a little more than one square mile. The present open water area of these lakes occupies but a portion of their original basins. These lakes, together with those of the Indian Village chain to the north (Elkhart drainage), lie near the junction of the New Paris and Packerton moraines, which Dryer (1894:26) has distinguished as the Turkey Creek moraine. The gently sloping knolls of this region do not follow any definite course or direction. A low gravel ridge between Buckle and Metz lakes has at some time ponded the waters of Buckle, Stump, and Gilbert lakes into one lake. This low ridge (about four feet in height), through which the present dredged outlet of Buckle passes, now connects these lakes

with the Tippecanoe drainage basin. A shallow depression in the middle of Section 10 (T33N, R8E), between Buckle Lake and the swampy Bouse Lake (the upper lake of the Elkhart drainage) was the natural outlet of Gilbert, Stump, and Buckle lakes.

The lakes between Smalley and the swampy "Backwater" of Webster lie near the union of the New Paris and Packerton moraines. The region in western Noble County occupied by these lakes is a mass of ridges, knolls and swampy basins, "a topography which defies verbal description" (Dryer, 1892). Smalley, Johnson, and Baughner lakes, together with smaller lakes of the region, are bordered with swampy tracts. Mill Pond is formed by a dam across the western end of two gently sloping V-shaped ridges. Dryer (1892:101) describes this portion of the Tippecanoe River basin: "The surface resembles that of a sheet of paper which has been wet and dried, the depressions and elevations having very slight relief and no definite boundaries. . . . The marshes are like a platter having only an insignificant depth and no definite margins."

Webster, the "Backwater" with its several smaller lakes, Tippecanoe, Oswego, Stanton, and the Barbee lakes (Sawmill, Plew, Irish, Banning, Shoe, Little Barbee, Kuhn, and Heron) are probably located in outwash from the New Paris and Packerton moraines, according to the interpretation of Leverett. He says (1915:140): "Along the outer or southwest face of the moraine from the Barbee lakes and west end of Tippecanoe Lake to Milford is a gravel plain apparently formed as an outwash from the [New Paris] moraine. . . . A gravelly and sandy tract between the Barbee Lakes and Boydstown Lake [Webster] in eastern Kosciusko County has a northwestward slope that seems to indicate derivation from the moraine of the Huron-Erie lobe [Packerton] which lies southeast of this tract, rather than from the moraine of the Saginaw lobe [New Paris] north of it." A somewhat knolly tract divides the Tippecanoe Lake basin from the Dewart Lake basin of the Elkhart River drainage. The general bearing of this mass of gravelly knoll is to the east, being more prominent north of Webster Lake, and becoming gently undulating in the region of Gilbert Lake in southwestern Noble County. Interlocking drainage is the rule throughout this district.

The lakes tributary to the Barbee group lie on the Packerton moraine. They are Ridinger, Robinson, Rine, Tadpole, Big Cedar, Mud, and Little Mud Lakes. Grassy Creek (Elder Ditch) connects Ridinger Lake with Big Barbee Lake. Its course is roughly U-shaped; it leaves Ridinger Lake from the northwest end, flows north for a little more than a mile through a swampy channel, then swings to the west for about a half mile, then to the southwest for nearly a mile, where it flows through a narrow gap in the morainic mass before it turns to the northwest across a swampy flat to Big Barbee Lake.

After leaving Oswego Lake, below Tippecanoe Lake, the Tippecanoe River is deflected to the southwest by the Bremen moraine. For a discussion of this moraine, see Leverett (1915:137). At Warsaw a northern extension of the Packerton moraine turns the course of the Tippecanoe River again westward. The Chapman Lake basins, south of Tippecanoe

Lake, may be assigned to outwash from the Packerton moraine. Heter Creek is the outlet of the Chapman Lakes. It receives the outlet of Pike Lake before it flows into the Tippecanoe River.

The divide between the Pike and Center Lake basins is a low gravel ridge bearing north-south, less than a mile in length, and a few hundred yards in width. Before the construction of the Moon Ditch "Cutoff" on the Tippecanoe River, which straightened its course, Center Lake discharged its waters directly into the Tippecanoe River. The outlet of Center Lake, since the alteration by artificial drainage, joins the dredged outlet of the Winona and Muskelonge Lake chains outside the city limits of Warsaw. The Bremen moraine abuts the Packerton moraine in the vicinity of Warsaw. The basins of Winona, Pike, and Center Lakes lie within this region. The Winona drainage, including Smith-Guy, Stoller, Stevens, Sherben, Sellers, Tennant, Stafford, and Shelley Lakes, lies on the inner border of the Packerton moraine. The Muskelonge Group (Muskelonge, Carr, Little Carr, Tibbits, and Schultz Lakes), the outlet of which joins the outlet of the Winona chain just west of the city limits of Warsaw, also lies in the northern margin of the Packerton moraine. The latter lake chain lies within that portion of the Packerton moraine which Leverett characterizes as "undulating gravelly, not definitely morainic."

Another small lake chain, consisting of three lakes, Sickle, Hibschan, and Goose, lies in a depression along the northeastern border of the Burket moraine. Goose Lake, the upper lake of this chain, is the only one of the series that has any gravelly shores exposed. The other two are nearing extinction, their shores are low and boggy; the open water area is reduced to small areas, circular in outline. The outlet of these lakes, below Sickle, flows with a scarcely perceptible current through a low flat in a northwesterly direction for nearly four miles before reaching the Tippecanoe River.

The outlet of the Palestine Lake chain joins the Tippecanoe River south of Atwood. This entire lake chain, which includes Palestine, Caldwell, and several smaller lakes, occupies intra-morainic valleys of the Burket moraine. The outlet of Palestine Lake passes through a narrow gap in a ridge of this moraine, about two miles from the Tippecanoe River. Crystal Lake is separated from the Tippecanoe River by a low gravel ridge, drains through an intermittent ditch into the outlet of the Palestine Lakes.

North from the outlet of this series of lakes is another intra-morainic valely about four miles in length. Its sluggish stream discharges into the Tippecanoe from a northeasterly direction. The basin of this tributary is scarcely more than one-half mile in width at any point along its course. This valley is bordered on the east by the inner borders of the Bremen moraine, northwest of Warsaw; and on the west by a prominent isolated morainic mass, bearing in a north and south direction. The village of Atwood marks the southern limit of this mass. Leverett (1915:132) does not attribute the Atwood mass to any morainic system. "The features are such as might result from a rapidly receding ice border. . . . It rises about 40 feet above surrounding country, is a mile in length, and nearly one-half mile in width."

The region between the southeastward extensions of the Maxinkuckee and Bremen moraines is very imperfectly drained. Many small, partially drained flats occur in this region. Leverett (1915:132) estimates that "probably one-fourth of the surface" is occupied by them. The largest includes Huffman Lake and the area northwest of it. West of Atwood, the Tippecanoe River meanders through a smaller flat, the greater area of which lies south of the present channel of the stream. It occupies the greater portions of Sections 1, 2, 3, 10, 11, and 12 (T 32N, R 5E). At Tippecanoe Town the river has entrenched a narrow valley in the outwash of the Maxinkuckee and Burket moraines. This narrow valley was the site of a former dam which furnished sufficient water power for a grist mill during the early settlement of this community.

The Yellow Creek group of lakes (Yellow Creek, Mud, Hill, Higgins, Loon, and Beaver Dam Lakes), with their associated swampy areas, is near the inner border of the Packerton moraine in southwestern Kosciusko County. The most eastern of these lakes, Mud and Hill, lie near the base of the Burket moraine. The outlet of this group of lakes, Meredith Ditch, flows northwest through gently undulating drift to the southeastern corner of Marshall County. Leverett (1915:163) considers this area an outwash plain. Here the course of Meredith Ditch is deflected to the southwest by the outer borders of the Burket and Maxinkuckee moraines. It joins the Tippecanoe River near the Fulton-Marshall County line.

Middle Course. The middle course of the Tippecanoe drainage basin extends from the northeastern corner of Fulton County to the village of Norway in central White County. This portion of the river's course is bordered on the south by the Packerton moraine, on the west by the "Kankakee flat," on the north by the Maxinkuckee moraine, and on the east by the outer border of the Burket and an eastern extension of the Maxinkuckee moraine.

The Maxinkuckee moraine, in northern Fulton and southern Marshall Counties, forms a conspicuously knolled topography. The Tippecanoe River flows along the southern border of these knolls through Fulton County. "North of the Tippecanoe River to the vicinity of South Bend occurs a belt of uneven-surfaced drift 5 to 15 miles wide, and attaining in its highest knolls an altitude of nearly 900 feet. . . . The moraine at its outer margin adjacent to the Kankakee plain is prominent, but its inner border is rather indistinguishable from the gentle undulating drift that stands nearly as high as the moraine itself. For some distance south of South Bend the knolls are prominent, rising abruptly 50 or 60 feet above their bases. Sloughs and enclosed basins are numerous, and lakes are plentiful." (Malott, 1922:118.) The basin of Lake Maxinkuckee, in southwestern Marshall County, is at the southwestern border of this moraine. Its inlets from the north and east drain smaller "enclosed basins." One of these basins, about one and one-half miles north of Lake Maxinkuckee, is nearly one square mile in area, occupying the greater part of section 3 (T 32N, R 1E). It is imperfectly drained by tributaries of both Lake Maxinkuckee and the Yellow River. East of this basin are several smaller ones. The Maxinkuckee Lake and Yellow River drainages interlock at several places in this area.

South of the Tippecanoe River, throughout the greater part of its course in Fulton County, is a sand plain. This plain begins southwest of the village of Talma, and extends as a triangular spur southward to near the northern city limits of Rochester. Mill Creek, the outlet of Manitau Lake, flows near the western border of this part of the plain. The northern extension of the Rochester moraine separates the Mill Creek plain from the Mud Creek plain west of Rochester. The sand plain becomes narrow in the vicinity of the junction of Mill Creek with the Tippecanoe River. West of this area the plain extends southward again into the Mud Creek flat. The plain narrows again at Leiters Ford, due to the encroachment of the north and south limbs of the Maxinkuckee moraine. From the village of Leiters Ford westward to the village of Monterey "the plain is on the north side of the river." (Leverett, 1915:137.)

Chippawanuck Creek drains the greater portion of the area lying between the Rochester and Burket moraines. The headwaters of the stream are near the crest of the Packerton moraine in eastern Fulton and southwestern Kosciusko Counties, east of the village of Akron. The stream flows in a northwesterly direction, joining the Tippecanoe River about one mile downstream from the village of Sturgeon.

Mill Creek, the inlet of Manitau Lake, follows the eastern border of the Rochester moraine. This moraine is most pronounced near its northern termination in the vicinity of Rochester, the county seat of Fulton County. A "sharp ridge" bordering Manitau Lake on the west rises to "about 40 feet." The trend of this moraine is to the southeast, until it reaches the village of Macy in northwestern Miami County where it joins the Packerton moraine.

On the west, near the angle formed by the junction of the Packerton and Rochester moraines in southeastern Fulton County, is the Mud Lake basin containing Nyona and South Mud Lakes. These two lakes empty their waters through the swampy Mud Creek into the Tippecanoe River about three miles east of Leiters Ford. The imperfectly drained valley of Mud Creek is nearly four miles wide; it is bordered on the west by the weak southern extension of the Maxinkuckee moraine, and on the east by the outlying sand plains of the Rochester moraine. "On Mud Creek an extensive swamp, standing about 750 feet above sea level, is separated from the Tippecanoe by the sand plain, which seems to form a dam across the lower end of Mud Creek valley. Probably for a considerable period the swamp was occupied by a lake, but the creek had cut its outlet sufficiently deep partly to drain it before the country was settled, and a system of ditches has since much reduced the swamp. The sand of the plains is rather light and drifts in places into dunes, of which the sand ridge along the south border is a conspicuous example." (Leverett, 1915:137.)

"Below Leiters Ford the north side of the Tippecanoe Valley is occupied by a plain three or four miles in extent, which carries fine gravel at its surface. This plain seems to grade into the Maxinkuckee moraine at the north and east borders and was probably formed by direct outwash from that part of the ice border. It remains gravelly only to the outlet of Lake Maxinkuckee. West of that outlet for two or three

miles, fine sand lies along the north side of the river. Near Monterey the pitted gravel plain outside the small moraine leading past Bass Lake sets in." (Leverett, 1915:136.)

Near the village of Ora, the Tippecanoe River turns abruptly from a northwesterly to a southwesterly direction. The northwesterly course of the river was maintained to this point by northern and southern portions of the Maxinkuckee moraine and its smaller outlying ridges to the west. The direction of these morainic ridges is northwesterly north of the Tippecanoe River in the vicinity of Ora, and southwesterly south of the river between Ora and Monterey. Between the morainic masses north of the river and the western border of the Maxinkuckee, near Culver, is another sand plain. Leverett (1915:136) considers the eastern portion of this area an outwash plain. "A line of glacial drainage descends westward from the Maxinkuckee moraine just south of Culver station near the west shore of Lake Maxinkuckee to a tamarack swamp around Manitou Lake.¹ Its surface is strewn with cobblestones and small boulders and is indented by shallow basins. South of it a spur of the main moraine extends west nearly to the Starke County line in secs. 29, 30, 31, and 32, T32N, R1E. From Manitou Lake the water may have discharged either southward along the west edge of the morainic spur to the Tippecanoe Valley or may have continued westward through a gap in the outlying moraine in secs. 23, 26, and 27, T32N, R1W, to strike the Tippecanoe near Ora."

"A ridge connects at the southeast with the Maxinkuckee moraine west of Lake Maxinkuckee, but leads away from it northwestward to Bass Lake in Starke County. It is 1 to 1½ miles wide and seems to mark a position held by the ice before the reentrant between the Saginaw and Michigan lobes had receded to the head of the Kankakee River." (Leverett, 1915:131.) This ill-defined ridge marks the divide between the Tippecanoe and Yellow River drainages. In Section 6 (T 32N, R1 E) are several shallow, broadly U-shaped depressions bearing in a general north and south direction which have the appearance of "sluiceways" between the Tippecanoe and Yellow River drainages.

West of the village of Ora, in southeastern Starke County, the Tippecanoe enters the "Kankakee Marsh" area. "At its point of entry near Ora it is closest to the Kankakee River. From this point the sandy plain slopes northwestward toward the Kankakee as well as southwestward into the territory traversed by the Tippecanoe, forming a very flat alluvial cone. This suggests a spreading of drainage from this part of the Tippecanoe during the height of glacial floods. The present stream for some 25 miles below Ora takes a zigzag course through a series of boulder-strewn depressions which the sand did not fill and which, as already suggested, may have been occupied by remnants of the ice sheet during the deposition of the sand. The sand on the western side slopes away from the river toward Monon Creek, continuing the southwestward slope it had on the eastern side. Thus Monon Creek, although a tributary of the Tippecanoe, flows through a district lower than that of the main stream. The divide between Monon Creek and the headwaters of

¹ Old Manitou Lake. This is not to be confused with the Manitou Lake near Rochester, in Fulton County.

the Iroquois is very low and flat, especially south of the Marseilles morainic system, and the general southwestward slope is continued into the Iroquois basin. The valley of the creek, however, is a broad slough which, like the depressions along the Tippecanoe River below Ora, has diverted the drainage to a course out of harmony with the general slope. It seems probable, therefore, that from much of Pulaski County now drained southward, there was a southwestward glacial drainage to the Iroquois and that from near Ora in Starke County there may have been a northwestward drainage to the Kankakee as well as a southwestward drainage to the Iroquois. Below the junction of Monon Creek and the Tippecanoe River there may have been a southward drainage to the Wabash, but if so it seems not to have distributed the sand far in that direction, unless along the immediate valley of the Tippecanoe River." (Leverett, 1915:129-30.)

The northern termination of the southern limb of the Maxinkuckee moraine is south of the Tippecanoe River, in the region between the village of Leiters Ford and Monterey. It forms a broad crescent, open to the west, through the western portion of Fulton and northeastern Cass Counties. Leverett (1915:131) describes its course as "southward from the Tippecanoe Valley passing east of south along the east side of Bruce Lake to Kewanna, where it swings around toward Royal Center and runs west of south to the Wabash Valley at Lake Cicott, about 10 miles west of Logansport. From Lake Cicott it is probably continued westward by a line of bowldery ridges past Idaville and dying out east of Monticello. Kawanna stands in a reentrant that apparently marks an incipient separation between the Saginaw and the Erie lobes, for the portion of the moraine to the south conforms more nearly with the trend of a moraine of the Erie lobe lying north of the Wabash than with the moraine of the Saginaw lobe under discussion."

The region bordering the Tippecanoe River through Pulaski and northern White counties is nearly all covered with sand, and has "a nearly plane surface." In many places the sand presents a dune-like topography. In the region east of the Tippecanoe River in Pulaski County sand ridges occur. "There is a somewhat broken east-to-west sand ridge north of Indian Creek in southeastern Pulaski County, which passes through the village of Rosedale (Oak post-office) [Thornhope], where it presents large dunes, and thence turning northeastward, terminates at a gravelly knoll in the northeast corner of T29, R1W. The area from this ridge north to and beyond the middle of Tippecanoe Township [T31N, R1W] is an extensive sandy plain, with the exception of short ridges of sand. There are also the following areas within this plain where sand is not present: (1) a small area in eastern Pulaski County, 1½ miles north of Bruce's Lake; (2) an area south of Bruce's Lake extending south to Little Mill Creek and west about 3 miles from the county line; (3) between Mill Creek and Little Mill Creek; (4) a small area about Star City [T29N, R1W]." (Leverett, 1899:329-330.)

Much of the stream bed of the Tippecanoe between Winamac and Monticello is strewn with bowlders. "The river has a steep slope through this part of its course, the fall from Winamac to Monticello being not less than 100 feet in thirty miles." (McBeth, 1909:341.)

Lower Course. The lower course of the Tippecanoe River extends from Norway in central White County to its junction with the Wabash in northeastern Tippecanoe County. The part of this area north of Tippecanoe County is the margin of the late Wisconsin drift border. The moraines, though not definitely terminal, are probably a detached westward extension of the Packerton terminal moraine of the Saginaw Lobe. About 9 miles north of Lake Cicott¹ a well defined ridge forms the east border of the till plain that descends westward to the Tippecanoe River. This ridge turns abruptly westward near Lake Cicott and is nearly continuous with the Tippecanoe valley at Monticello. For a part of this course the ridge lies along the north slope of a moraine of the Erie Lobe (Packerton of Malott). After crossing the Tippecanoe River at Monticello the moraine turns south, while the ridge continues in a course slightly south of west about to the line of White and Benton counties (Leverett, 1899:329).

The greater part of the area in the vicinity of the Tippecanoe River in southeastern White and western Carroll counties is a ground moraine interspersed with a network of boulder belts and sandy knolls. This section of the river's course is the only place within the system that the channel reaches bed rock. "It first touches bed rock at Norway, three miles above Monticello. In this part of its course the stream crosses the Cincinnati anticline, whose surface formation in this locality is the hard Niagara limestone. After touching bed rock at Norway, it is near the rock throughout the rest of its course and rock exposures are frequent. The banks below Norway are usually high and there is little overflow. . . . At Monticello the bluffs are 67 feet high and at Oakdale 100 feet. This is approximately the maximum depth of the valley" (Tucker, 1922:373).

South of the village of Springboro, about five miles west of Delphi (T25N, R3W) to the junction with the Wabash River in northeastern Tippecanoe County (T24N, R3W), the Tippecanoe River has eroded a shallow meandering channel in a sand plain.

In the lower course of the Tippecanoe two dams have recently been constructed. The first one at Norway, with a water-head of 30 feet, impounds the waters upstream to the village of Buffalo (T28N, R3W); the other at Oakdale, with a water-head of 40 feet, impounds the waters in the narrow valley to Monticello.

TABLE I
LAKES OF THE TIPPECANOE RIVER SYSTEM

*Artificial Lakes. †Extinct or nearly so.

Lakes	Counties	Township	Range	Section
Oakdale*	Carroll	25N	3W	parts of 3, 4, 33, 34
Shafer*	White	28N	3W	parts of 21, 16, 17 8, 5, 32, etc.

¹This lake is west of Logansport in the Wabash drainage basin.

TABLE I—Continued

Lakes	Counties	Town- ship	Range	Section
O'Brien.....	Fulton.....	29N	1E	21
Fletcher.....	Fulton.....	29N	2E	parts of 31, 32
Bruce.....	Fulton-Pulaski.....	30N	1E	parts of 1, 6
Langhabaugh.....	Starke.....	32N	1W	36 S. W.
Hart.....	Starke.....	32N	1W	35 S. C.
Leopold.....	Starke.....	32N	1W	25 C.
Old Manitauſ.....	Starke-Marshall.....	32N	1W, 1E	parts of 24, 13, 18
Houghton.....	Marshall.....	32N	1E	7 S. W.
Mooreſ.....	Marshall.....	32N	1E	7 C.
Lost.....	Marshall.....	32N	1E	28, 29
Maxinkuckee.....	Marshall.....	32N	1E	parts of 16, 15, 21, 22, 28, 27, 34
Eddy.....	Marshall.....	32N	2E	32 N. E.
South Mud.....	Fulton.....	29N	3E	parts of 21, 22, 16, 15
Nyona (North Mud).....	Fulton.....	29N	3E	parts of 16, 15, 10
Manitau.....	Fulton.....	30N	3E	parts of 9, 10, 16, 15, 22
Millark.....	Fulton.....	30N	4E	31 S.
Rock.....	Kosciusko-Fulton.....	30N	5E	parts of 21, 16
Yellow Creek.....	Kosciusko.....	31N	5E	27 S.
Higgins (McClure)	Kosciusko.....	30N	5E	3 N. C.
Loon.....	Kosciusko.....	30N	5E	4 N. E.
Beaver Dam.....	Kosciusko.....	31N	5E	33 C.
Mud.....	Kosciusko.....	31N	5E	26 S. E.
Hill.....	Kosciusko.....	31N	5E	25, 30
Huffman.....	Kosciusko.....	33N	5E	parts of 31, 30
Crystal (Wooden).	Kosciusko.....	32N	5E	7 S. C.
Palestine.....	Kosciusko.....	31N-32N	5E	parts of 33, 34, 2, 1
Caldwell.....	Kosciusko.....	31N	5E	19 N. E.
Sickle.....	Kosciusko.....	32N	5E	26 E. C.
Hibschman (Mud)	Kosciusko.....	32N	5E	25 S. W.
Goose.....	Kosciusko.....	32N	5E	25 S. E.
Center.....	Kosciusko.....	32N	6E	parts of 5, 8
Muskelonge.....	Kosciusko.....	31N	6E	3 N. W.
Fish.....	Kosciusko.....	31N	6E	2 W. C.
Tibbits (Downing)	Kosciusko.....	31N	6E	12 S. W.
Schultz.....	Kosciusko.....	31N	6E	22 N. E.
Carr.....	Kosciusko.....	31N	6E	parts of 4, 9
Little Carr.....	Kosciusko.....	31N	6E	4 S. W.
Winona (Eagle)...	Kosciusko.....	32N	6E	parts of 17, 16, 15, 21, 22
Smith-Guy.....	Kosciusko.....	32N	6E	36 N. E.
Stoller.....	Kosciusko.....	32N	7E	31 S. W.
Stevens.....	Kosciusko.....	31N	7E	4 N. E.
Sherben.....	Kosciusko.....	31N	7E	9 N. E.
Sellers.....	Kosciusko.....	31N	7E	9 E. C.
Tennant.....	Kosciusko.....	31N	7E	10-15
Stafford.....	Kosciusko.....	31N	6E-7E	5 W. C.
Shelley.....	Kosciusko.....	31N	6E-7E	5 C.
Little Pike.....	Kosciusko.....	32N	6E	5 N. E.
Pike.....	Kosciusko.....	32N	6E	parts of 5, 4, 8, 9
Little Chapman...	Kosciusko.....	33N	6E	35 C.
Big Chapman (Little Eagle)...	Kosciusko.....	32N	6E	parts of 27, 26, 25, 24

TABLE I—Continued

Lakes	Counties	Town- ship	Range	Section
Oswego.....	Kosciusko.....	33N	6E	parts of 11, 12
Stanton.....	Kosciusko.....	33N	6E	12 S. E.
Tippecanoe.....	Kosciusko.....	33N	6E-7E	Parts of 1, 6, 12, 7, 8, 18, 17
Sawmill.....	Kosciusko.....	33N	7E	20-21
Plew (Seehrist)...	Kosciusko.....	33N	7E	parts of 21, 28
Irish.....	Kosciusko.....	33N	7E	parts of 20, 29
Banning.....	Kosciusko.....	33N	7E	20 C.
Shoe.....	Kosciusko.....	33N	7E	intersection of 18, 17, 19, 20
Little Barbee (Kuhn).....	Kosciusko.....	33N	7E	28 N.
Big Barbee (Ham- mon).....	Kosciusko.....	33N	7E	parts of 28, 27, 34
Dan Kuhn.....	Kosciusko.....	33N	7E	27 E.
Heron.....	Kosciusko.....	33N	7E	22 S. C.
Ridinger.....	Kosciusko.....	32N-33N	7E	parts of 36, 1
Little Robinson...	Kosciusko-Whitley.	32N	7E-8E	parts of 13, 18, 19
Unnamed.....	Kosciusko.....	32N	7E	15 S. E.
Rine.....	Whitley.....	32N	8E	19 N. C.
Tadpole.....	Whitley.....	32N	8E	19 N. E.
Cedar.....	Whitley.....	32N	8E	10-11
Small unnamed Lakes.....	Whitley.....	32N	8E	14 S.
	Whitley.....	32N	8E	10 N. E.
	Whitley.....	32N	8E	3 W. C.
	Whitley.....	32N	8E	3 N. W.
	Whitley.....	32N	8E	2-11
James.....	Kosciusko.....	33N	7E	11 N. C.
Webster.....	Kosciusko.....	33N	7E	parts of 8, 9, 17, 16
Kaiser.....	Kosciusko.....	33N	7E	parts of 11, 12, 14, 13
Unnamed.....	Kosciusko.....	33N	7E	13 S. E.
Black.....	Kosciusko.....	33N	7E	25 N. E.
Unnamed.....	Kosciusko.....	33N	7E	12 C.
Mill Pond*.....	Kosciusko.....	33N	7E	13 N. E.
Baugher.....	Noble.....	33N	8E	18-19, 17
Johnson.....	Noble.....	33N	8E	16 C. E.
Horseshoe.....	Noble.....	33N	8E	16-21
Beer's.....	Noble-Whitley.....	33N	8E	22-27
Brown.....	Whitley.....	33N	8E	27 E. C.
Smalley.....	Whitley.....	33N	8E	26 W. C.
Little Metz.....	Noble.....	33N	8E	parts of 15, 22
Metz.....	Noble.....	33N	8E	15 C.
Buckle.....	Noble.....	33N	8E	15 N. C.
Stump.....	Noble.....	33N	8E	10 S. C.
Gilbert.....	Noble.....	33N	8E	10 S. W.
Dollar.....	Noble.....	33N	8E	9-10
Loon.....	Noble.....	33N	8E	25 S. W.
Old.....	Noble-Whitley.....	33N	8E-9E	parts of 36, 31, 1
New.....	Whitley.....	33N	8E	35-36
Goose.....	Whitley.....	32N	8E	parts of 2, 1
Big.....	Whitley.....	32N	8E	12 S.
Goose.....	Noble.....	33N	9E	parts of 32, 33
Herriff.....	Noble.....	33N	9E	29 S. W.
Crane.....	Noble.....	33N	9E	20 C.
Crooked.....	Noble.....	33N	9E	33 N. E.
	Noble-Whitley.....	32N-33N	9E	parts of 33, 34, 4, 3

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