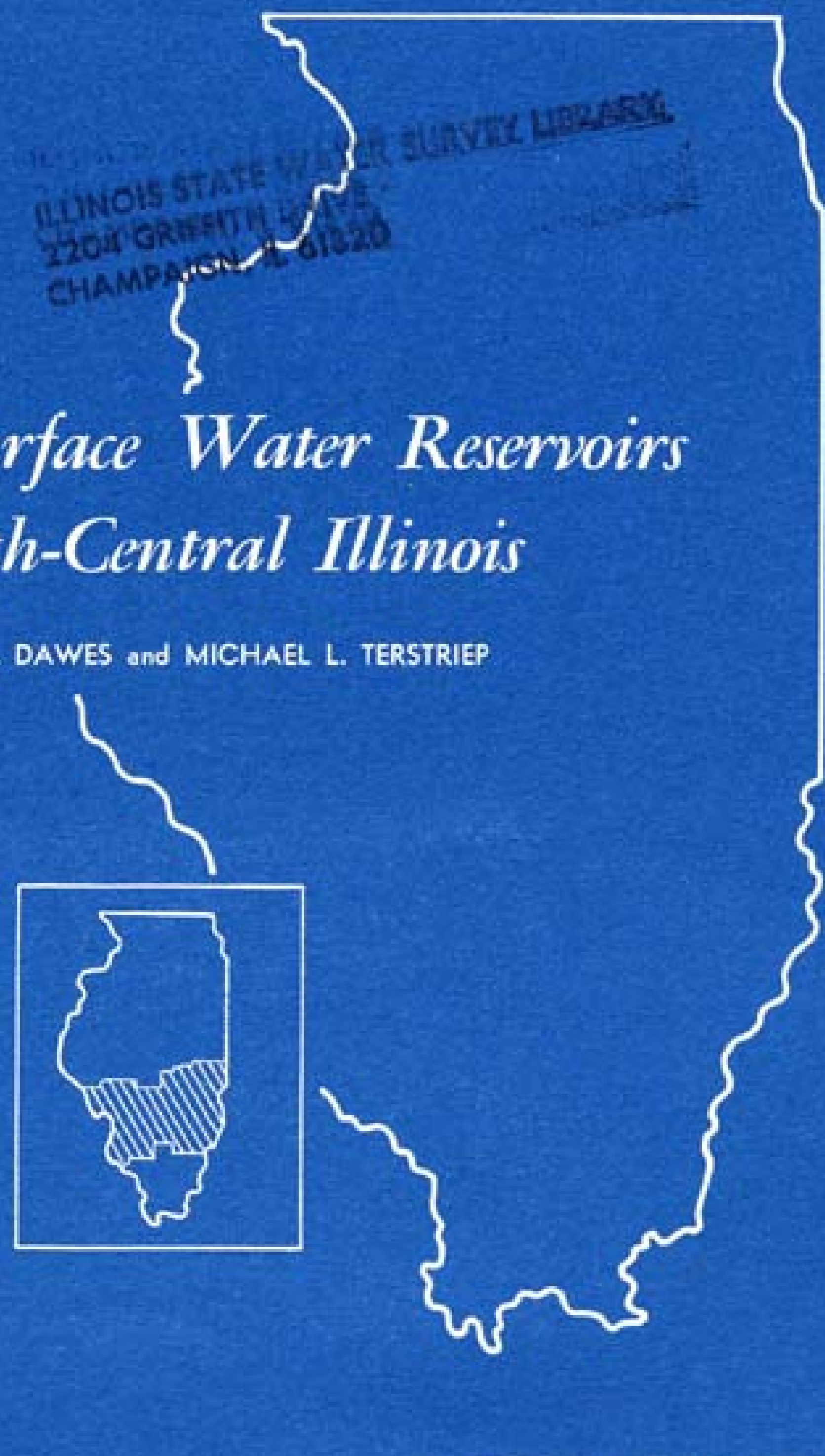
REPORT OF INVESTIGATION 54

STATE OF ILLINOIS

DEPARTMENT OF REGISTRATION AND EDUCATION



Potential Surface Water Reservoirs of South-Central Illinois

by JULIUS H. DAWES and MICHAEL L. TERSTRIEP

ILLINOIS STATE WATER SURVEY

URBANA

1966

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STATE OF ILLINOIS
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URBANA
1966

FOREWORD

In many parts of Illinois, reservoir storage of water is an important means of increasing usable water supplies to enable community growth and development. Because of this significance for water resources of the future, the Illinois State Water Survey initiated a reconnaissance investigation to identify potential sites within the state where surface storage of water is physically feasible.

This report provides information on potential and existing reservoirs in 29 counties of south-central Illinois. Results of an earlier study of possible sites in the 17 southern counties of Illinois were published in 1957 as Report of Investigation 31. Future reports will include similar information for 33 north-central counties and 23 northern counties. This division of the state was based primarily on drainage systems.

These publications are intended to bring about greater understanding of the surface water storage potential. It is hoped that the information will be of value in rural, urban, and regional planning for development of industry, agriculture, and recreation.

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Potential Surface Water Reservoirs of South-Central Illinois

by Julius H. Dawes and Michael L Terstriep

SUMMARY

The south-central portion of Illinois comprises 29 counties having a total area of 14,586 square miles. The physical potential for development of surface water reservoirs is favorable in much of this area because the rainfall and the resulting runoff is adequate and the topography is suitable for reservoir construction.

The counties included in the south-central section are Bond, Calhoun, Clark, Clay, Clinton, Coles, Crawford, Cumberland, Douglas, Edgar, Edwards, Effingham, Fayette, Greene, Jasper, Jersey, Lawrence, Macoupin, Madison, Marion, Monroe, Montgomery, Moultrie, Richland, Shelby, St. Clair, Wabash, Washington, and Wayne.

Within these counties 218 potential surface water reservoir sites have been identified. Potential sites are abundant in Clark, Coles, Cumberland, Greene, Jasper, Macoupin, Madison, Marion, and St. Clair Counties.

Sites suitable for reservoir development are scarce in Calhoun, Clinton, Douglas, Edgar, Edwards, Lawrence, Moultrie, Wabash, and Wayne Counties because of unfavorable topography or geology, or both. Calhoun County had a limited number of sites because of the high gradient streams with little or no watershed drainage area.

Rainfall in the area averages 39.4 inches per year. Thunderstorms account for 40 to 50 percent of the annual rainfall and 65 percent of the summer rainfall. This predominance of variable convective summer rainfall causes the streamflow to be highly variable. In the warmer half-year, rainfall of less than 13 inches may be experienced once in 5 years.

Ground-water contribution to streamflow causes continuous flow in many of the streams on which potential reservoir sites have been located. The normal runoff from an average rainfall of 27.4 billion gallons per day (bgd) is estimated at 7.15 bgd from 14,586 square miles of drainage area. An average 5.55 bgd flows from the 29 south-central counties via the Kaskaskia River, the Little Wabash River, the Embarras River, and tributaries to the Mississippi, Illinois, and Wabash Rivers.

INTRODUCTION

It is becoming increasingly apparent that water supply deficiencies can exist in the 29 counties described as south-central Illinois. This region is bordered on two sides by major rivers, the Mississippi on the west and the "Wabash on the east. Internally the area is drained by Macoupin Creek, the Kaskaskia River, the Little Wabash River, and the Embarras River. There are several developments of surface water impoundments, exemplified by the following lakes: Johnsonville, Lincoln Trail State Park, Mattoon, Charleston, Sara, Collinsville, Horseshoe, Silver, Raccoon, Omega, Moredock, Hillsboro, Washington County, and New Gillespie Reservoir.

Three large reservoirs are in progress by the U.S. Army Corps of Engineers for this area. Carlyle Reservoir on the Kaskaskia River near Carlyle in Clinton County is now under construction and almost completed. After completion of the dam in early 1966, filling is expected to take two years. The reservoir controls 2680 square miles of drainage area and has a total storage capacity of 983,000 acre-feet. Initial construction phases have begun for the Shelbyville Reservoir on the Kaskaskia River near Shelbyville in Shelby County. It will control 1030 square miles and have a total storage capacity of 684,000 acre-feet. Lincoln Reservoir, located on the Embarras River near the Coles-Cumberland County line, is in the planning stage and when completed will control 915 square miles and have a total storage of 538,300 acre-feet. All three reservoirs have three purposes, flood control, water supply, and recreation.

There are over 218 potential reservoir sites capable of development within the 29 counties. This section of the state supports a population of 1,026,000, or 21 percent of the total state population, and extends over 14,586 square miles which represents 26 percent of the area of Illinois.

Objectives and Scope

This report is primarily an inventory of potential reservoir sites, plus a partial list of presently developed sites, for the 29 south-central counties. The sites are potential reservoir areas insofar as they have 1) the physical characteristics necessary to impound water, 2) runoff from the watershed in sufficient quantities to provide storage for beneficial use plus anticipated losses, and 3) relative freedom from man-made or natural obstructions. Although a large potential for reservoir storage is present in the south-central counties, the distribution over the area is poor.

A complete evaluation of the potential reservoir sites for water resource development involves far more than physical availability of sites such as considered here. It is important to consider water developments in relation to other natural resources, social and political environment, and the economy of a region. Cost of development must be balanced by benefits. These are all critical factors that must be dealt with before a comprehensive report can be made. The surface water impoundment potential is dependent upon rainfall, topography, runoff, geology, and man's occupancy as determined from an analysis of physiographic and hydrographic data.

This inventory of potential reservoir sites was selected from a map study of U. S. Geological Survey quadrangles. Bach site was then visited by an engineer and a geologist for a feasibility study. These studies were reconnaissance in nature, and only surficial site examinations using manual equipment could be conducted. Thus, these studies do not take the place of the individual, and far more detailed, engineering survey in establishing the feasibility of any particular project. Detailed economic studies were not made, but studies of relative land cost, favorable topography, and runoff indicate the general feasibility of the selected sites. Cost considerations are described by the terms high, moderately high, normal, moderately low, or low.

From these studies it can be said with assurance that the physical potential exists for water resource development through the storage of surface water. An attempt has been made to indicate the maximum yield based on the largest reservoir available at each of these sites. Since the basic site data were obtained from topographic maps, they may require modification in light of additional field investigations.

This report has two principal parts. Part 1 discusses the pertinent hydrologic elements including geology and climate. Part 2 includes the data on potential and existing reservoirs for each of the 29 counties.

Acknowledgments

This study has been completed by the authors under the guidance of H. F. Smith, Head of the Hydrology Section, and William C. Ackermann, Chief, Illinois State Water Survey. A number of Water Survey personnel have aided in the preparation of this report. John B. Stall, Engineer, provided the streamflow analysis and furnished counsel during the development of a computer program used in watershed yield analysis. W. J. Roberts, Engineer, made available previous reservoir studies and evaporation data. Roger Corinth provided sedimentation data and assisted in the preparation of that section. The section on Climatological Elements was prepared by Stanley A. Changnon, Jr., Climatologist. William Motherway, Jr., prepared the illustrations under the direction of John W. Brother, Jr., Engineering Assistant.

The Embarras River Basin sites were investigated under the direction of George E. Ekblaw, Geologist and Head, Section of Engineering Geology and Topographic Mapping, Illinois State Geological Survey. All other geologic investigations were conducted by Louis H. Pierard, Geologist for the U. S. Soil Conservation Service, Department of Agriculture.

The University of Illinois Digital Computer Laboratory's computer facilities, principally the IBM 7094 system, were used extensively in carrying out data processing for this report.

Part 1. Hydrology

Study Criteria and Procedures

The greatest potential surface water resource in the 29 south-central counties lies in utilization of runoff of relatively small streams by creation of impoundments. Additional surface water resources are the large rivers that border the south-central section and the major tributaries such as the Kaskaskia River, the Little Wabash, and the Embarras River. Each of the 29 counties has been studied with respect to availability of potential reservoir sites as determined under the following criteria: 1) the surface area should be larger than 50 acres, 2) maximum depth at dam not less than 20 feet, 3) average mean depth not less than 7 feet, 4) time to fill not greater than or less than the lines depicted on the graph in figure 1 showing relationship of capacity to drainage area, 5) a maximum allowable storage loss of 2 percent per year by reason of sediment, 6) maximum dam length of 0.5 mile and, 7) a maximum dam height of 90 feet.

The procedure for conducting the inventory was as follows: 1) an initial inventory of potential reservoir sites was made from a topographic map study; 2) data obtained from the topographic maps were analyzed for conformance to the study criteria; 3) a field examination of each reservoir area was made by an engineer for determining its physical feasibility; and 4) a field examination of each dam site and reservoir area was made by a geologist for determining its geologic feasibility as to stability of dam construction, retention of water, and availability of construction material.

U. S. Geological Survey quadrangle sheets were used for the map study. A small percentage of the area is covered by 7.5 minute, 1:24,000 scale maps, and these were used where available; however, most of the work was done on the earlier 15 minute, 1:62,500 scale maps.

Personal judgment had to be relied upon throughout the map study. Required factors of consideration included length of dam, area of the lake, maximum depth, excessive shallow water, capacity of the lake and its relation to the watershed size, inundation of man-made obstructions, and possible future uses. Relative costs affecting feasibility were observed, although the economics involved in a complete evaluation was beyond the scope of this study. Whenever records were available, sites selected in previous studies and sites for which

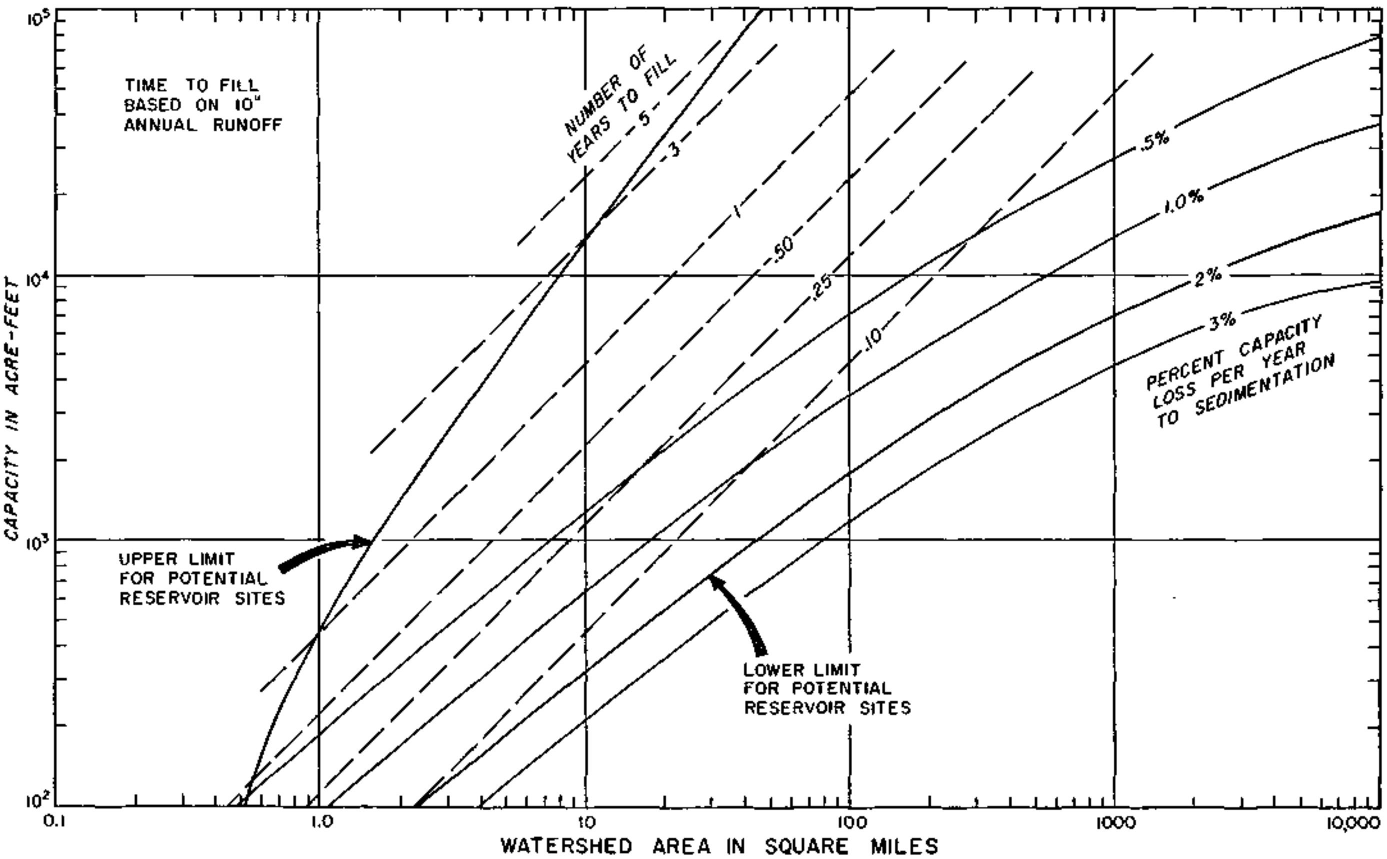

Figure 1. Capacity-watershed area criteria extracted from sedimentation curves

local interest had been shown were included in the inventory. In many cases literally hundreds of possible dam sites were available in a relatively small area; in such cases, and as a matter of general practice, an attempt was made to select the best development for each particular watershed without the use of an excessively long or high dam. The limits of dam size are arbitrary and were imposed as the study proceeded since they seemed to meet the requirements of the topography.

The quadrangle maps were studied one at a time and then combined by counties for an additional search, and for tabulating the inventory. In general the larger waterways were searched first and then the small tributaries. Smaller sites included in the inventory are generally located near centers of population as possible municipal water supply reservoirs. Since overlapping sites were not considered, one large site shown in the study might have been replaced by several smaller sites on tributaries. Obviously, because of the number of factors involved, no two individuals making a similar study would select identical reservoirs, but it is believed that the individual sites and the number of sites selected per county are representative of the area.

Data measured on the topographic maps were reservoir surface area, maximum depth, watershed area, length of shoreline, length of dam, and abutment slopes at the dam site. The contour interval of 10 or 20 feet used on the quadrangle maps was a severe limitation, especially on the selection of optimum spillway elevation. The capacity of a reservoir was computed as one-third times the maximum depth times the surface area. This formula gave results that were generally within 10 percent of the average-end-area method which involves planimetering the area inside each contour line below lake level.

The watershed-capacity relation is one of the more important factors used for the selection of potential sites. Figure 1 indicates the acceptable relations between watershed and reservoir capacity. The sedimentation curves were developed from actual sedimentation surveys on existing lakes in this area of the state. The upper limit is based on watershed/capacity ratios of existing sites that have demonstrated the proper balance between storage and runoff to insure satisfactory performance. The "years to fill" values were computed on the basis of 10 inches of runoff per year. There is a definite tendency for the potential sites to lie along the upper rather than the lower limit. In cases where one watershed is included within another, the sites were analyzed independently.

A program was prepared to compute net reservoir yield and volume of earthwork required. The method of determining reservoir yield is described elsewhere. Volume of earth was computed using a dam height of maximum depth plus 10 feet of freeboard; an upstream slope of 3 to 1; a downstream slope of 2.5 to 1; and a top width of 10 feet or twice the square root of dam height plus 3 feet, whichever is greater. The dam length was scaled at spillway elevation, and the abutment slopes were measured on the quadrangle sheets. In addition to the above computations, a 5-foot berm was added on both sides of the dam for each 30 feet of vertical height.

Field evaluation of each site by an engineer was primarily aimed at updating the maps for such features as homes, roads, or other man-made obstructions that might have been developed in the reservoir area. Since many of the existing maps are 30 to 40 years old, such a visit was imperative. The field evaluation also offered an opportunity to make a rough estimate of land use and project costs.

The field evaluations by a geologist, although surficial in nature, were extremely valuable in identifying those sites that have obvious geologic problems. These evaluations also made it possible to state with near certainty that a high percentage of the sites selected are geologically feasible. However, this evaluation in no way takes the place of a complete boring and testing program that should be undertaken early in the investigation stage of every reservoir development. The thorough program of borings and material testing may reveal unobserved problems and may be expected to provide information that can be used to resolve the geologic problems in some cases.

Climatological Elements

The climatic elements most closely related to water resources are precipitation, soil and air temperatures, and evapotranspiration. Precipitation, which is the major source of surface water, is the most important of these elements. For this reason, much of this discussion concerns precipitation conditions in south-central Illinois.

The continental type of climate present in south-eentral Illinois is characterized by warm to hot summers (June-August) and cool to cold winters (December-February). In general, more than 60 percent of the precipitation occurs in the warmer half-year (April-September), and the driest months occur during the winter. This area experiences greater precipitation deficiencies and more forms of severe weather than any other part of Illinois. On the average, 10 to 15 percent of the daylight hours during June, July, and August have wet-bulb temperatures above 76 F, which is usually considered a limit for effective use of cooling towers.

Precipitation

Annual and Seasonal. The distribution of the average annual precipitation in the south-central area is shown in figure 2. The average precipitation for the area is

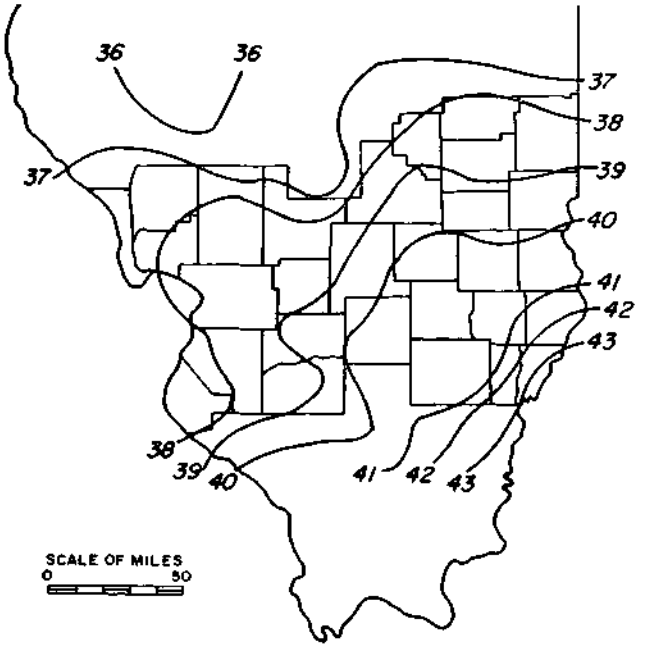

Figure 2. Average annual precipitation, in inches, 1900-1944 period

39.4 inches, and thunderstorms account for between 40 percent (eastern portion) and 50 percent (western portion) of the total precipitation.[1] The wettest years on record have produced as much as 58 inches of precipitation in the north and as much as 69 inches in the southeastern portions.[2] Dry calendar years have resulted in annual totals of less than 24 inches in the western portions of the area, and less than 28 inches in the eastern portions.

The distribution of precipitation in the colder half-year (October-March) largely accounts for the pattern of the annual precipitation (figure 3). The area average for this half-year is 17 inches, and normally from 8 to 12 percent of the cold season precipitation is derived from snowfall.

The average precipitation during the warmer half-year (April-September) is 22.4 inches, and the distribution in the area is quite uniform (figure 4) ranging from 22 to 23 inches. An east-west ridge of slightly higher precipitation extending across the area is the result of several meteorological factors. Primary among these, as shown by Huff,[3] is that this area of Illinois has the state's highest frequency of intense, short-duration, warm season rainstorms, storms that produce 24- to 48-hour totals exceeding 6 inches. The rainfall ridge shown in figure 4 has a position almost identical with a ridge in the area pattern of intense rainstorms.[3]

Monthly. Throughout the entire area, the month with the lowest average precipitation is February, and the second driest month normally is December. The month of maximum precipitation varies considerably. March has the highest average values in the extreme southeastern portion, but April amounts are highest in a small southern portion of the area (Washington County). May is the month of maximum average rainfall in much of the remaining portions of the south-central area, excluding a portion of Fayette, Bond, and Effingham Counties where the June averages are highest. The wettest three consecutive months in an average year are April, May, and June, and the driest three consecutive months are normally December, January, and February.

Daily Frequencies. Table 1 shows the average number of days per month with varying intensities of rainfall.

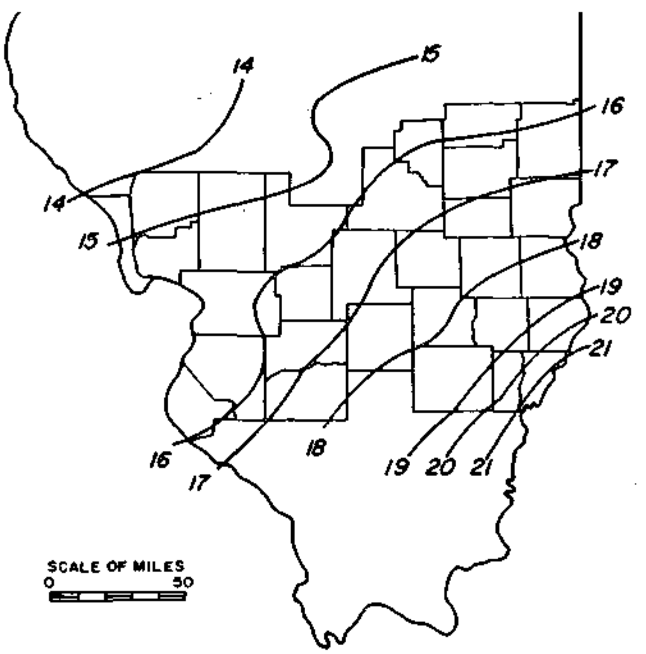

Figure 3. Average colder half-year precipitation, in inches, 1900-1944 period

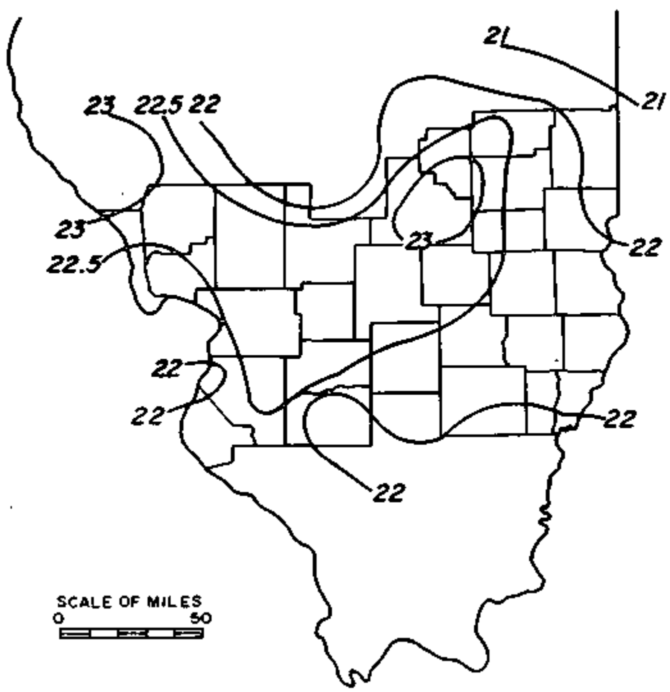

Figure 4. Average warmer half-year precipitation, in inches, 1900-1944 period

Table 1. Average Number of Days with Varying Weather Conditions per Month

Months	Precipitation ≧ given amounts, inches 0.1	0.5	1.0	Minimum air temperatures ≦ 32 F	4-inch soil temperatures ≦ 32 F North	Central	South
Jan	5	2–	*	25	31	31	22
Feb	5	1+	*	21	28	28	25
Mar	6+	2	1–	15	10	1	0
Apr	7	3	1	3	0	0	0
May	7	3	1	*	0	0	0
Jun	7	3–	1	0	0	0	0
Jul	5	2	1	0	0	0	0
Aug	6–	2+	1+	0	0	0	0
Sep	5+	2+	1	0	0	0	0
Oct	5	2	1–	2	0	0	0
Nov	5	2	*	11	0	0	0
Dec	5	2–	*	23	21	16	*
Annual	68	26	9+	100	90	76	47

* *Indicates an occasional occurrence in a month*

These averages are generally representative for any point in south-central Illinois, although slight regional variations do exist. Days with rain of 0.1 inch or more and days with 0.5 inch or more are most frequent in the spring and early summer and least frequent in the winter.

Short-Period Heavy Rainfall Frequencies. Figure 5 portrays the frequency of maximum precipitation amounts for varying durations at any point in the south-central area.[4,5] The curves on figure 6 describe the areal extent of maximum 24-hour rainfall amounts.[4]

Long-Term Dry Period Frequencies. One of the notable features of the precipitation climate of south-central Illinois is the fact that this area, and particularly its western half, has experienced the greatest precipitation deficiencies ever measured in Illinois; furthermore, serious rainfall deficiencies occur more frequently in this area than elsewhere in the state.[6] The greatest low rainfall departures for periods of 6- to 60-month duration for Illinois have occurred in Madison and Jersey Counties.[6]

Frequency maps of low precipitation expected during 6- to 60-month periods are presented in figures 7 and 8.

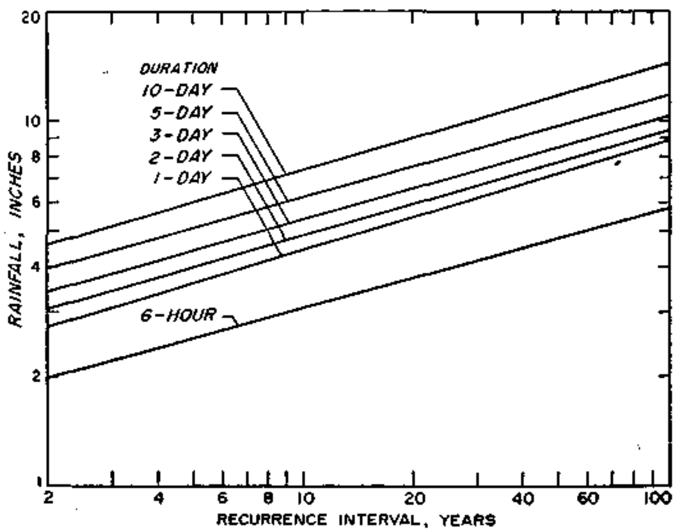

Figure 5. Maximum rainfall amounts equalled or exceeded for various recurrence intervals and durations at any point in south-central area

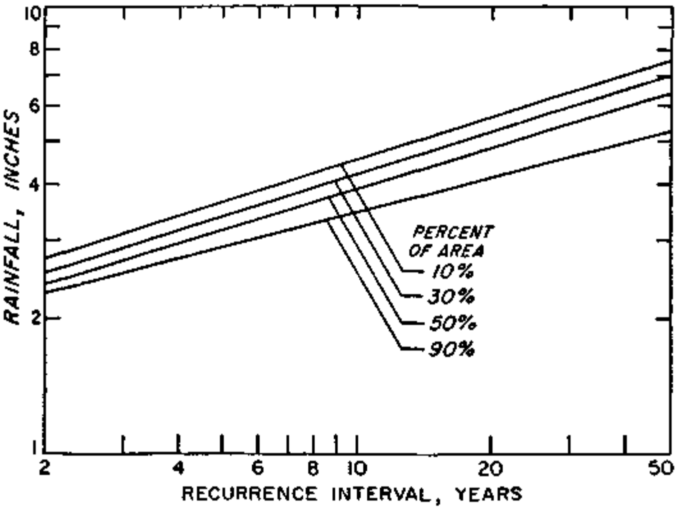

Figure 6. Areal frequency distribution of maximum 24-hour amounts equalled or exceeded at various recurrence intervals in the south-central area

Because of the great difference in average seasonal precipitation (figures 3 and 4), two sets of 6-month minimum rainfall maps are shown for the 5-year and 25-year frequencies. More than 75 percent of all 6-month dry periods in the south-central area occur during at least 4 of the 6 months of the colder half-year.[6] Figures 7 and 8 reveal that, in general, the lowest values in the area occur in the western parts and the highest values occur in the southeast or northeast.

Snowfall

The distribution of the average annual snowfall in the south-central area is shown on figure 9.[2] Snowfall is extremely variable from year to year, with observed annual values at points in the area ranging from 2 to 43 inches. More than 50 percent of the annual snowfall occurs in January and February, and December and March are normally the only other months when measurable snowfall occurs.

The south-central area has relatively high frequencies of days with freezing rain and sleet.[2] These forms of icing conditions occur on an average of 9 to 10 days in the western half and 7 to 8 days in the eastern half.

Cold Air and Soil Temperatures

Certain low air and soil temperatures affect water resources because the movement of water in lakes and ponds, across ground surfaces, and through the upper soil layers is affected by freezing conditions. Table 1 lists the average number of days per month with minimum temperatures of 32 F or lower.[7,8,9]

Air temperatures below 0 F are infrequent and normally occur on 7 days in the north and 3 days in the south. Many years have no days with 0 or lower temperatures. The first freezing temperature of the fall

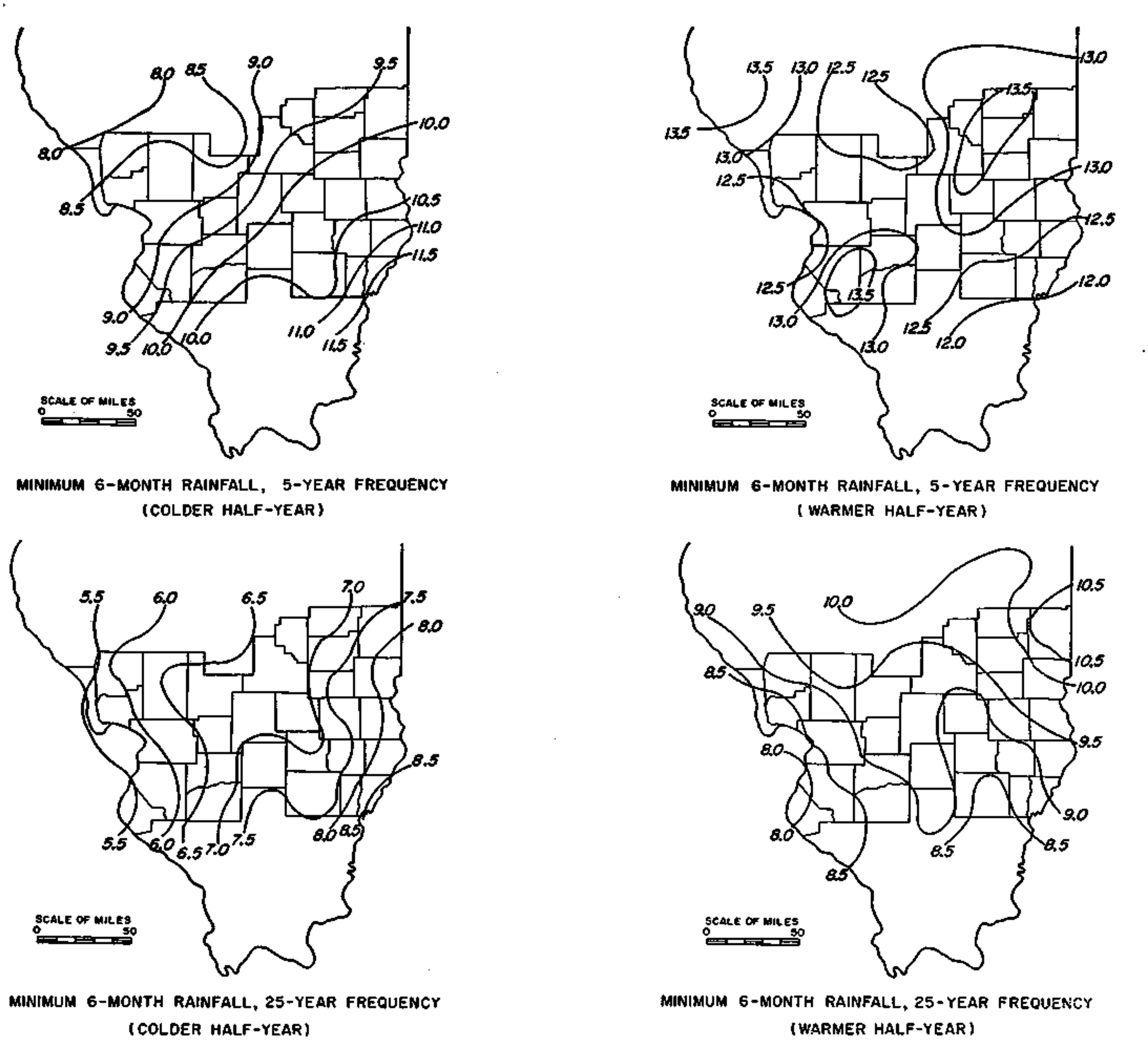

Figure 7. Minimum 6-month precipitation amounts, in inches, expected once every 5 and every 25 years, for colder and warmer half-years

normally occurs during the October 18-23 period, and the last freezing temperature in the spring normally occurs during the April 15-20 period.[2]

In the northern portions of the area the soil temperature at a depth of 4 inches normally goes below 32 P on about December 11 and rises above freezing on March 10, producing a 90-day period of frozen soil at this depth.[9]

At the 12-inch depth, soil temperatures normally remain below the freezing level in the northern portions of the area from early January until early March, producing 50- to 60-day periods of frozen soil at the 12-inch depth.[9] In the southern portions, the soil at the 12-inch depth normally does not freeze.

Geology

The many geologic considerations relative to the selection of feasible lake sites may be generalized into three categories: 1) composition of the bedrock; 2) composition of the unconsolidated material; and 3) thickness of unconsolidated material overlying the bedrock surface.

Of these three categories, bedrock composition is probably the most consistent in south-central Illinois.[13] Except for a narrow band along the Mississippi River, Pennsylvanian rocks underlie the unconsolidated material. The Pennsylvanian formation consists dominantly of weak shales which are easily eroded. Included in the formation are thin limestones, generally less than

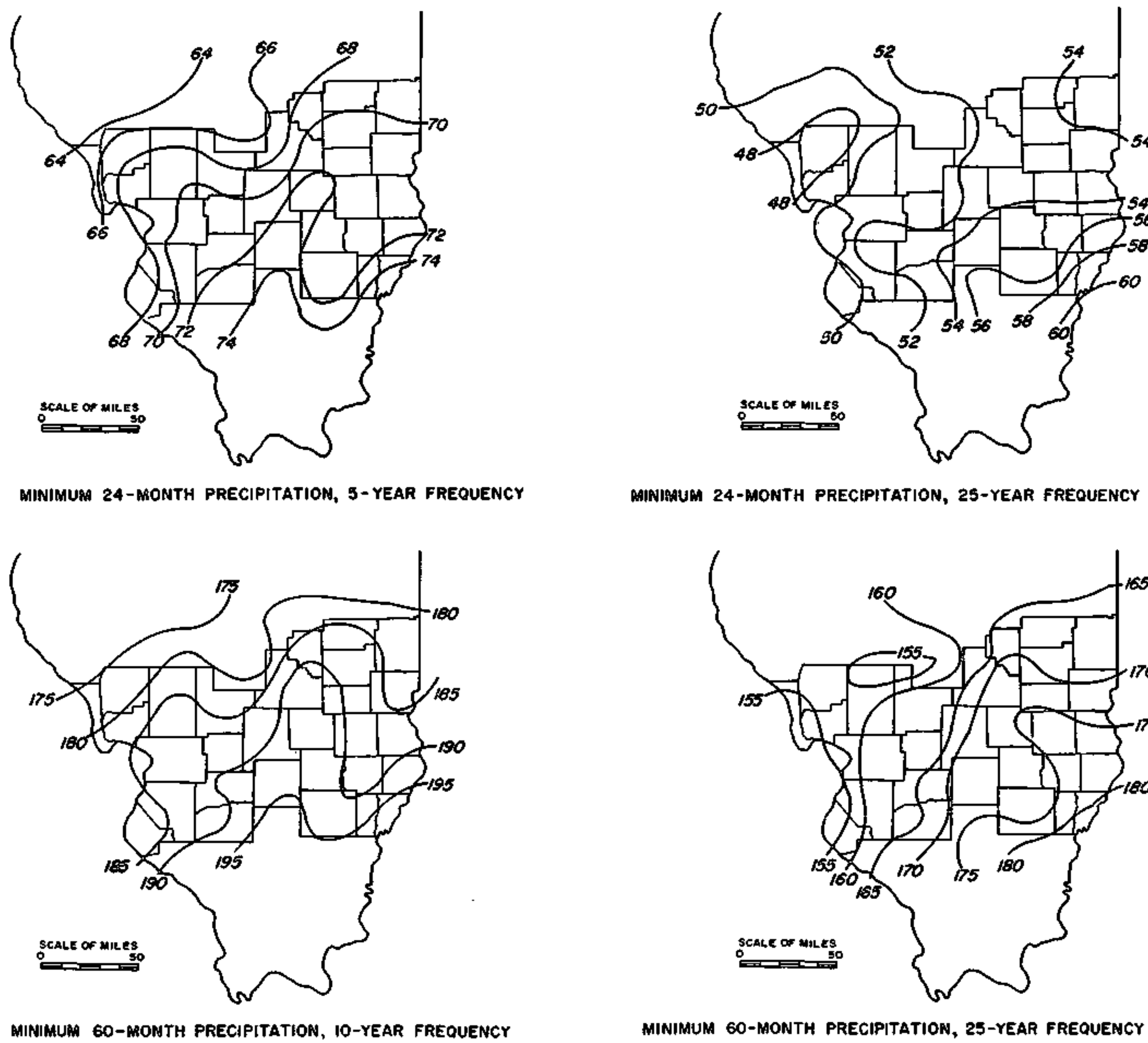

Figure 8. Minimum 24- and 60-month precipitation amounts, in inches, expected at varying recurrence intervals

25 feet thick, and locally developed sandstones which are more resistant to erosion. In those counties bordering the Mississippi River, older formations of limestone and shale from the Mississippian, Devonian, and Silurian ages would be encountered.

The unconsolidated material that rests on the bedrock surface was deposited by great ice sheets known as glaciers. These ice sheets modified the bedrock surface by cutting down the peaks and ridges and filling the valleys with the rock debris created in the process. Three distinct glaciations, all of which traveled in a southwesterly direction, were involved in the formation of the land surface in south-central Illinois. The Kansan and the Illinoian, in that order, covered all of the south-central area except for a band along the Mississippi River. The Wisconsinan was the most recent glacial period and reached only into the northeastern counties of south-central Illinois. Floodwaters from this ice mass were influential in forming the present watercourses throughout the area.

The composition of the debris left by the glaciers is highly variable, ranging in size from clay particles to boulders. The most common arrangement of the deposition consists of clean gravels and sands in the deep bedrock valleys and depressions, overlain by a mixture of clay to cobble size particles known as till. In many locations the surface material is a silt size, wind-blown deposit known as loess. This orderly arrangement of materials is often confused by local outwash conditions and various discontinuous deposits.

The thickness of glacial drift at a specific location is dependent not only upon the type and number of gla-

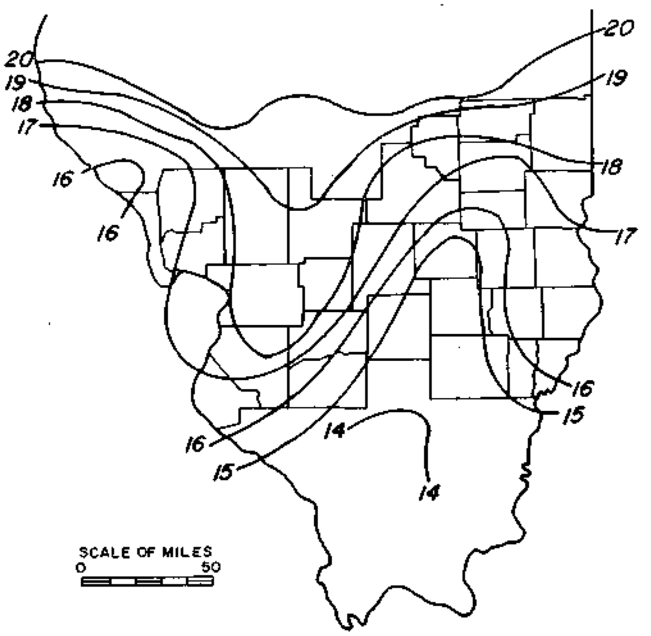

Figure 9. Average annual snowfall, in inches, 1920-1955 period

cial deposits at the location but upon the topography of the bedrock surface. In the southern and western portions of south-central Illinois the glacial drift is relatively thin, and the major features of the bedrock surface are discernable. The major bedrock valleys in the area are the Mississippi, the Illinois, the Kaskaskia, the Little Wabash, and the Embarras. In south-central Illinois these buried valleys lie along the same general course as the surface rivers with the same names, but this is not true in other parts of the state.

In general the geology of south-central Illinois is well suited to water storage structures. The glacial till, a relatively impervious material, is generally available throughout the area and provides an excellent material for earth dams. The availability of this material and the lack of continuous sand and gravel deposits or porous bedrock exposures which might cause leakage from the reservoir are two major geologic considerations in this area.

More detailed geology has been presented in each county section of this report, and the observations of a geologist at the dam site are presented in each site description. Pending verification by adequate borings and material testing, the sites are classified geologically as feasible, probably feasible, probably not feasible, and not feasible.

Streamflow and Water Yields

The major rivers in the south-central 29-county area are: the Mississippi River, which provides the western border; the Wabash River, which provides the southeastern boundary; the Illinois River crossing the western edge; and the internal rivers such as the Kaskaskia, Little Wabash, Embarras, and their tributaries.

The U. S. Geological Survey in its cooperative programs with the Illinois State Water Survey and other state, local, and federal agencies, collects long-term streamflow records to determine the performance of rivers and streams. The measurement of river discharge is usually expressed in cubic feet per second (cfs). It is sometimes converted to units of rate per unit of area, such as cubic feet per second per square mile of drainage area, or to inches of runoff per year. Inches of runoff is a term representing the depth to which a drainage area would be covered if all of the flow during a period of time (usually a year) were distributed uniformly on its surface. The term is convenient to use when comparing inches of rainfall with runoff. Figure 10 shows the location of the 25 stream gaging stations used in this report. Information on each station is presented in table 2. The detailed streamflow data were obtained from the Surface Water Records of Illinois, published by the U. S. Geological Survey. Data for the water years 1951 through 1959 were obtained from the U. S. Geological Survey Water Supply Papers.

The streamflow data have been used in two ways: first, for determining average streamflow conditions to estimate normal runoff at each of the potential sites; and second, for determining minimum yields for each site. Minimum yields were determined by a method developed during a study of low flows.[10]

In another study, the gross watershed yield was determined for 164 Illinois stream gaging records for selected recurrence intervals using a statistical analysis of monthly low flows for duration intervals by 1 month for the first 12 months and then by 2-month intervals for periods up to 60 months.[11] Mutually exclusive and independent low flow periods from these series were secured by avoiding overlapping of low flow periods and plotted on log-extreme value paper.

For each particular reservoir site, the analyzed stream gage having watershed runoff characteristics most similar to those of the site was employed to determine gross yield. Gross yield was determined as the percent of mean flow a given reservoir could sustain for droughts of various recurrence intervals. Adjusting gross yield to net yield involves two factors: 1) losses due to seepage, and 2) losses due to evaporation. In addition to these factors, loss of capacity to sedimentation will lower the yield.

Since reservoirs with severe seepage losses are generally discovered by geological investigations and eliminated or given special treatment, seepage losses were considered to be negligible and were not considered in this report.

Evaporative losses do not normally amount to a large percentage of the gross yield; however, for shallow reservoirs evaporation losses can be severe. A method pub-

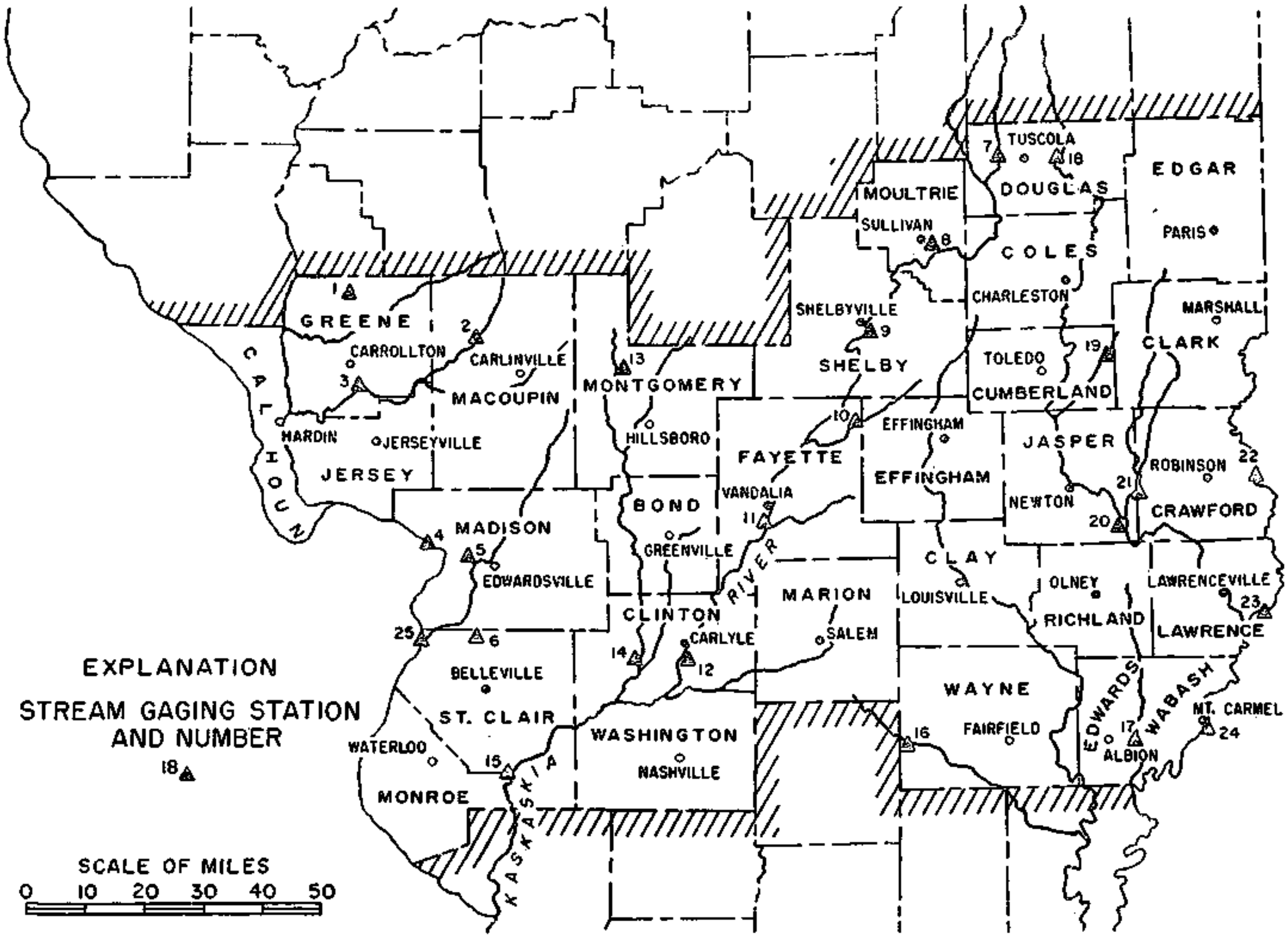

Figure 10. Stream gaging stations and numbers

lished by Stall[11] was used to evaluate evaporative losses. Evaporation and precipitation data were analyzed in the same manner as the low flow data. After developing a series of mutually exclusive and nonoverlapping maximum evaporation events and minimum precipitation events for periods of 1 to 60 months duration, net evaporation tables were developed by subtracting minimum precipitation from maximum evaporation for events of equal duration and recurrence interval. Tables for representative locations give net lake evaporation in inches for durations from 1 to 60 months and for recurrence intervals from 2 to 50 years. Springfield evaporation data were used in this report.[11]

Immediately upon closure of the dam, a surface water impoundment begins the process of trapping incoming water-borne sediments. The importance of sediment as a factor in determining the useful life of a water-supply reservoir has been recognized since the early 1930s. Prior to that time, selection of a reservoir site was based upon economic and engineering considerations such as distance between reservoir site and city, dam foundation conditions, watershed hydrology, evaporation losses, and predicted population and industrial growth trends. A prudent look to the future, with particular reference to water-supply reservoirs, should also include a provision for sediment storage volume.

The movement and deposition of sediment particles from watershed to reservoir requires the understanding of three different but related regimes of sediment movement. The first is the actual displacement of the soil particles by the bombing effect of individual raindrops striking the soil surface. The second step is the transportation of eroded material, and the third phenomenon is that of sediment deposition.

No attempt was made to relate sedimentation losses with reductions in water yield since expected sediment losses were usually less than 1 percent per year for all selected potential sites. Figure 1 shows the sedimentation curves developed from 82 sedimentation surveys by the Illinois State Water Survey.

Since the yield analysis assumes a full reservoir at the beginning of the critical period and an empty one at the end of it, an effective evaporative surface area of 65 percent of the normal lake area was used in the computations. Another phase of the yield analysis assumes that the reservoir is drawn down from full storage capacity

Table 2. Summary of Discharge Records at Stream Gaging Stations

Map no.	Station and number	Location	Location remarks	Drainage area (*sq mi*)	Records available	Discharge (*cfs*) Average	Maximum	Minimum
1	Hurricane Creek near Roodhouse (5-5865)	NE¼ sec 15, T12N, R12W	150 ft downstream from bridge on Ill. 106	2.33	Oct 1950 to Sep 1961	1.17	1,700	0
2	Otter Creek near Palmyra (5-5868)	SE¼ sec 23, T11N, R8W	Downstream of county highway bridge, 4 miles SE of Palmyra	61.6	Oct 1959 to Sep 1961		15,500	0
3	Macoupin Creek near Kane (5-5870)	SE¼ sec 11, T9N, R12W	Downstream side of bridge on U.S. 67 (Alt.)	875	Mar 1921 to Nov 1933 May 1940 to Aug 1940 Aug 1940 to Sep 1961	539	40,000	0
4	Mississippi River at Alton (5-5875)	Sec. 14, T5N, R10W	End of intermediate lock wall of lock and dam 26 at Alton	171,500	Oct 1927 to Sep 1960	93,130	437,000	7,960
5	Indian Creek at Wanda (5-5880)	SE¼ NW¼ sec 31, T5N, R8W	Upstream side of bridge on Ill. 159, 5 miles west of Edwardsville	37.0	Apr 1940 to Sep 1961	25.2	9,340	0
6	Canteen Creek at Caseyville (5-5895)	N½ NW¼ sec 8, T2N, R8W	Highway bridge at Caseyville, 400 ft upstream from bridge on Ill. 157	22.5	Oct 1939 to Sep 1961	18.1	10,200	0
7	Kaskaskia River at Ficklin (5-5905)	SW¼ NW¼ sec 36, T16N, R7E	¼ mile upstream from B.&O. RR bridge and ½ mile west of Ficklin	127	Feb 1954 to Sep 1961	79.7	4,400	0
8	Asa Creek at Sullivan (5-5915)	NW¼ NW¼ sec 26, T14N, R5E	Downstream side of highway bridge, 0.8 mile north of Sullivan	7.93	Jul 1950 to Sep 1961	4.55	1,100	0
9	Kaskaskia River at Shelbyville (5-5920)	SE¼ SW¼ sec 8, T11N, R4E	50 ft upstream from bridge on Ill. 16 in Shelbyville	1,030	Feb 1908 to Sep 1912 Nov 1912 to Dec 1912 Aug 1914 to Dec 1914 Oct 1940 to Sep 1961	822	25,900	0
10	Wolf Creek near Beecher City (5-5923)	NE¼ NE¼ sec 12, T8N, R3E	Left bank at downstream side of bridge on Ill. 128	48.0	Dec 1958 to Sep 1961		6,400	0
11	Kaskaskia River at Vandalia (5-5925)	SE¼ sec 16, T6N, R1E	Upstream side of Gallatin Street Bridge in Vandalia	1,980	Feb 1908 to Dec 1912 Aug 1914 to Sep 1961	1,430	62,700	3.5
12	Kaskaskia River at Carlyle (5-5930)	SE¼ sec 18, T2N, R2W	Downstream side of bridge on U.S. 50 at Carlyle	2,680	Mar 1908 to Sep 1912 Nov 1912 to Dec 1912 Aug 1914 to Sep 1915 May 1938 to Sep 1961	2,056	54,400	11.0
13	Blue Grass Creek near Raymond (5-5936)	SE¼ NE¼ sec 33, T10N, R4W	Downstream side of highway bridge, 0.8 mi east of Ill. 127, 4 mi SE of Raymond	17.2	May 1960 to Sep 1961		364	0
14	Shoal Creek near Breese (5-5940)	SW¼ SW¼ sec 13, T2N, R4W	Upstream side of bridge on U.S. 50	760	Nov 1909 to Dec 1912 Aug 1914 to Dec 1914 Oct 1945 to Sep 1961	511	52,000	0
15	Kaskaskia River at New Athens (5-5950)	SW¼ sec 28, T2S, R7W	0.5 mi downstream from bridge on Ill. 13 at New Athens	5220	Oct 1909 to Dec 1912 Jun 1914 to Sep 1921 Oct 1934 to Sep 1961	3818	83,000	13.0
16	Horse Creek near Keenes (3-3804.75)	NW¼ SW¼ sec 4, T2S, R5E	Downstream side of bridge on township road, 3 mi NW of Keenes	96.8	Jun 1959 to Sep 1961		17,100	0
17	Bonpas Creek at Browns (3-3780)	SW¼ SE¼ sec 33, T1S, R14W	Left bank 30 ft upstream from concrete dam of Albion Reservoir	235	Oct 1940 to Sep 1961	234	7,500	0
18	Embarras River near Camargo (3-3434)	NE¼ NW¼ sec 3, T15N, R9E	Left bank at downstream side of bridge on U.S. 36, 2 mi SW of Camargo	185	Oct 1960 to Sep 1961		5,200	0
19	Range Creek near Casey (3-3445)	NE¼ SE¼ sec 12, T10N, R10E	Right bank downstream of highway bridge 2½ mi W of Ill. 49, 3 mi NW of Casey	7.60	Oct 1950 to Sep 1961	5.23	3,500	0
20	Embarras River at St. Marie (3-3455)	NW¼ NW¼ sec 30, T6N, R14W	Left bank at downstream side of highway bridge at St. Marie	1,513	Oct 1909 to Dec 1912 Aug 1914 to Sep 1961	1,214	44,800	1.0
21	North Fork Embarras River near Oblong (3-3460)	sec 35, T7N, R14W	Downstream side of bridge on Ill. 33, 2 mi west of Oblong	319	Oct 1940 to Sep 1961	253	27,100	0
22	Wabash River at Riverton, Ind. (3-3420)	sec 30, T7N, R10W	Left bank downstream of Ill. Central RR bridge at Riverton	13,100	Oct 1938 to Sep 1960	11,393	201,000	858
23	Wabash River at Vincennes, Ind. (3-3430)		Downstream side of bridge on U.S. 50, at Vincennes	13,700	Oct 1929 to Sep 1960	11,511	189,000	770
24	Wabash River at Mount Carmel (3-3775)	NW¼ sec 28, T1S, R12W	Downstream side of Southern RR bridge at Mt. Carmel	28,600	Jan 1908 to Sep 1913 Oct 1927 to Sep 1960	26,890	428,000	1,620
25	Mississippi River at St. Louis, Mo. (7-100)	sec 11, T2N, R10W	Downstream side of center pier at Eads Bridge at St. Louis	701,000	Jan 1861 to Sep 1962	175,100	844,000	27,600

to one-half of its storage capacity. For this computation an effective evaporative surface of 80 percent of the normal lake area was used. Gross yields reduced by the evaporative losses, and computed for recurrence intervals of 5, 10, 25, and 40 years, are reported as net yields in million gallons per day (mgd). Yield data, presented in the tables of potential reservoir sites in each county, are given for both full reservoir capacity and one-half reservoir capacity.

A knowledge of stream discharge is important to the hydraulic engineer in solving problems of water supply. For this purpose he may use the flow-duration curve which illustrates graphically the percentage of total period of record when discharge falls within selected rates. Procedure for developing a curve for a particular river is described by Mitchell,[12] who demonstrates how to construct curves that will compare one basin having a long and representative period of record with an adjacent basin having only a short-term record. Mitchell has prepared duration curves for several streams in the south-central portion of Illinois including the Kaskaskia River at Shelbyville and Carlyle, the Little Wabash

River at "Wilcox, the Embarras River at St. Marie, and Macoupin Creek near Kane.

Water resource development requires both basic data and data analysis that permit an evaluation of the adequacy of the water supply. The techniques employed should allow the planner to select an acceptable risk governing the adequacy of the water supply. The impounding reservoir stores water when runoff is above normal making water available when runoff is below normal. In developing the inventory of potential reservoir sites, the amount of reservoir storage capacity was dictated by availability of runoff and the physical characteristics of the reservoir site.

Municipal Surface Water Supplies

In the south-central region 128 municipalities depend on wells, and 82 communities use surface water as a source of water supply. For these 82 surface water supplies, water is obtained from 7 channel dams, directly from 35 rivers or creeks, and from 43 impounding reservoirs which include multiple impoundments for two cities. Nine of the 82 supplies are privately owned, the others municipally owned. Surface water supplies are used by 43 percent of the region's population, which was 1,026,000 according to a 1964 tabulation for the 29 counties. The pumpage of surface water supplies amounts to 56.6 mgd or approximately 128 gpd per person.

Table 3 shows the distribution of surface water supplies. Available data indicated that no surface water supplies were being used in Calhoun, Clark, Crawford, Cumberland, Douglas, Jasper, Lawrence, Moultrie, and Shelby Counties.

Table 3. Data on Public Surface Water Supplies

Municipality * by county	Population 1960	Date installed	Source †	Pumpage (*1,000 gpd*)
Bond				
Sorento	681	1961	(I) Trib. Shoal Creek	9
Clay				
Clay City	1,144	1941	(C) Little Wabash	60
Flora	5,331	1911	Little Wabash River	450
Louisville	906	1899	Little Wabash River	90
Xenia	491	1955	From Flora	20
Clinton				
Breese	2,461	1902	Shoal Creek	225
Carlyle	2,903	1887	Kaskaskia River	225
Coles				
Charleston	10,505	1876	(C) Embarras River	1,200
Humboldt	342		(I) From Mattoon	
Mattoon	19,088	1885	(I) Little Wabash River	1,300
Oakland	939	1910	(I) Trib. Embarras River	55
		1938		
Edgar				
Paris	9,823	1892	(I) Sugar Creek	500
Edwards				
Albion	2,025	1926	(C) Bonpas Creek	170
Browns	251	1955	(C) From Albion	
West Salem	956	1951	(I) Crooked Creek	25
Effingham				
Altamont	1,656	1913	(I) Second Creek	100
Effingham	8,172	1895	(I) Little Wabash	900
		1957	(I) Blue Point Creek	
Fayette				
St. Elmo	1,503	1904	(I) Sugar Creek	100
		1935		
Vandalia	5,537	1898	Kaskaskia River	500
Greene				
Greenfield	1,064	1961	(I) Trib. Rubicon Creek	38
White Hall	3,012	1897	(I) Wolf Run Creek	160
Jersey				
Grafton	1,084	1936	Illinois River	42
Macoupin				
Benld	1,848	1935	(I) From Gillespie	78
Brighton	1,248	1952	From Alton (Mississippi River)	110
Carlinville	5,440	1939	(I) Honey Creek	345
East Gillespie	660		(I) From Gillespie	
Gillespie	3,569	1924	(I) Rocky Branch Creek	300
		1956	(I) Rocky Branch Creek	
Girard	1,734	1935	From Springfield	110
			(I) Sugar Creek	
Mount Clare	320	1949	(I) From Gillespie	20
Mount Olive	2,295	1905	(I) Branch Sugar Creek	200
		1936		
Sawyerville	362	1951	(I) From Gillespie	21
Staunton	4,228	1889	(I) Cahokia Creek	140
		1926		
Virden	3,309	1935	(I) From Springfield	115
Wilsonville	688	1952	(I) From Gillespie	5
Madison				
Granite City	40,073	1895	Mississippi River	5,000
Highland	4,943	1924	(I) Silver Creek	450
		1962	(I) Silver Creek	
Madison	6,861	1900	From E. St. Louis	500
Venice	5,380	1900	From. E. St. Louis	400
Williamson	324	1954	(I) From Staunton	4
Marion				
Alma	358	1960	From Kinmundy	
Central City	1,422	1894	(I) From Centralia	
Centralia	13,904	1894	(I) Morton's Branch	2,193
		1943	(I) Raccoon Creek	
Junction City	315	1963	(I) From Centralia	
Kinmundy	812	1953	(I) Railroad Reservoir	36
Odin	1,242	1941	(I) From Centralia	70
Patoka	601	1953	Kaskaskia River	25
Salem	6,165	1912	(I) Branch Crooked Creek	750
Sandoval	1,356	1936	(I) From Centralia	60
Vernon	235	1960	From Patoka	
Monroe				
Waterloo	3,739	1896	(I) Fountain Creek	200
Montgomery				
Coffeen **	502	1963	(I) McDavid Branch	
Hillsboro	4,232	1887	(I) Brush Creek	475
Litchfield	7,330	1873	(I) Shoal Creek	600
Schram City	698	1936	(I) From Hillsboro	
Taylor Springs	550	1950	(I) From Hillsboro	
Richland				
Olney	8,780	1892	(I) Fox River	600
St. Clair				
Alorton *	3,282	1944	From E. St. Louis	
Belleville *	37,264	1888	From E. St. Louis	2,100
Brooklyn *	1,922	1905	From E. St. Louis	25
Cahokia	15,829	1928	From E. St. Louis and Dupo	244
Caseyville	2,455	1937	From E. St. Louis	30
Centreville	12,769	1957	From E. St. Louis	
Dupo	2,937	1932	From E. St. Louis	340
East Carondelet	463	1951	From Prairie Dupont and E. St. Louis	
East St. Louis *	81,712	1885	Mississippi River	30,000
Fairmont City *	2,688	1921	From E. St. Louis	50
Freeburg	1,908	1898	Silver Creek	90
Lenzburg	420	1951	From New Athens	
Marissa	1,722	1938	(C) Mud Creek	75
Mascoutah	3,625	1905	Silver Creek	130
Monsanto *	324	1885	From E. St. Louis	10
National City *	117	1915	From E. St. Louis	2,000
New Athens	1,923	1899	Kaskaskia River	117
Old Marissa	217	1938	(C) From Marissa	
Shiloh	701	1950	From E. St. Louis	72
Swansea *	3,018	1928	From E. St. Louis	40
Washington Pk. *	6,601	1917	From E. St. Louis	200
Wabash				
Mount Carmel	8,594	1893	Wabash River	1,200
Washington				
Ashley	662	1914	(I) Trib. Muddy River	50
Nashville	2,606	1936	(I) Trib. Mill Creek	168
Wayne				
Fairfield	6,362	1913	Little Wabash River	700
Wayne City	903	1955	(C) Skillet Fork Creek	15

* *All supplies are municipally owned except those starred which are privately owned.*
** *CIPS private lake used for cooling steam-electric power plant.*
† *(I) impounding reservoir, (C) channel dam.*

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Part 2. Potential Reservoir Sites

There are numerous potential sites in the 29-eounty area of south-central Illinois that might be developed for water-supply reservoirs and/or other purposes. The hydrology of 218 potential sites has been studied, and data for each reservoir are presented in tabular form. Plate 1 *{in back-cover pocket)* shows the surface water resources of south-central Illinois.

In certain areas many similar potential sites exist; therefore, only data for typical examples have been included. The extent to which each would affect existing structures has been considered. The data presented are provisional and subject to revision when more detailed topographic, geologic, and engineering surveys are available.

On the following pages, the potential reservoir sites in the 29 south-central counties are discussed in detail, by counties. Site possibilities in each county were numbered during the map study, and since the nonfeasible sites were eliminated, the numbers of sites described in this report are not consecutive. A map for each county shows the locations of potential sites, identified by site number. Many of the existing reservoirs also are shown on the county maps, but it was not possible to show the small ones. Available hydrologic data for both potential and existing sites are given in tables that accompany the descriptions for each county. Where data are missing in the tables, it has not been possible to obtain accurate information.

BOND COUNTY

The general slope in Bond County is from north to south with drainage into the Kaskaskia River Basin. Shoal Creek and its tributaries drain about three-fourths of the county, and the remainder drains directly into the Kaskaskia. In the northern part of the county, large streams have cut valleys varying in depth from 25 to 125 feet, permitting considerable erosion by the smaller tributaries. The upland adjacent to the larger streams is therefore cut up into hills and valleys that are unsuited to ordinary agriculture and in most cases are covered with mixed timber.

The land surface of Bond County was shaped by glacial ice and running water, and modification of this surface is continuing as running water cuts into the land, carries away sand and rock particles, and deposits the debris in streambeds and on floodplains.

The glaciers of Kansan and Illinoian age covered Bond County and left a mantle of drift that varies in depth from a few feet to more than 200 feet. Finely ground rock (rock flour) from later ice sheets, in immense quantities, was carried south by melting waters and, when dried, was picked up by the wind and deposited on the surface burying the old Sangamon soils to a depth of 5 to 20 feet. This wind-blown material is known as loess, a mixture of all the materials over which the glacier traveled. The loess is a slightly yellow fine-grained material, naturally free from glacial pebbles but usually underlain by glacial drift.

If encountered, the bedrock surface would very likely consist of weak, easily eroded shales with a possibility of limestones up to 25 feet thick and locally developed, more resistant sandstones.

Bond County, particularly the northern half, is generally suited to water storage structures both topographically and geologically. Seven potential reservoir sites were analyzed in Bond County, and the resulting data are presented here.

Site 1. A long, narrow, and fairly deep lake could be developed on Dry Branch by construction of a dam about 2 miles east and 4 miles north of Greenville. The watershed is fast draining and has rolling uplands sloping into a well-developed system of steep-walled and rather narrow wooded valleys. Although there are numerous coves, there are only three very small fingers branching from the main body of the site. Three east-west township road crossings could be abandoned, and the roads would provide good access to several points on the lake. No residences would be inundated by the development. Land use in the lake area is mostly pasture in the floodplain and brush with mixed hardwoods on the valley walls. Costs should be moderate to low because of the minimal relocation problems and the low level of land use. From a preliminary examination, geologic conditions appear to be favorable. The abutments are sandy-textured glacial till. The lower half of each abutment is moderately stiff, calcareous, silty sand glacial till which is probably moderate to moderately slowly permeable. The upper half of the till is stiff sandy clay till which is very tough and noncalcareous. The till deposits are capped with about 5 feet of weathered loess. The alluvium consists of 3 feet of clayey silt and silty sand over 3 feet of silty clay over 1 foot of soft silty clay over 3 feet of silty sand over at least 1 foot of firm clayey sand. The upper half of the till should be used for fill; the lower half could be used on the flanks of the structure. Foundation and core-wall conditions would require a complete program of test borings.

Site 2. Construction of a dam across Owl Creek 0.5 mile northwest of Mulberry Grove would create a lake with good depth in all of its many fingers and coves. The gently rolling uplands of the watershed drop suddenly into the moderately steep-walled valleys. The water surface elevation of 550 feet above mean sea level (msl) shown in the table is an absolute maximum, and a 540 msl elevation probably would be a better choice. If one township road across the site were relocated slightly, the existing township roads would provide an excellent around-the-lake road system. An overhead telephone cable crossing the site might have to be relocated. A choice of the lower elevation would also eliminate any possibility of residence inundation, thus lowering costs and lessening possible local objection to the development. Land use in the lake area is at a low level, since there are idle marsh areas in the bottoms and brush with scattered hardwoods on the valley walls. The watershed is of minimal size so that the spillway structure should be relatively small and reservoir life should not be shortened by early siltation. Geologic conditions look quite good. Both abutments and the valley walls are stiff sandy clay glacial till. The floodplain shows 2 feet of sandy silt over 2 feet of clean sand over 1 foot of firm silty clay over 3 feet of soft silty clay over at least 1 foot of till-like stiff silty clay. This lower formation would form an excellent foundation material. Borrow material of very good quality is available on both upstream reservoir abutments. This site appears desirable from any viewpoint and should make a low cost development.

Site 3. A rather shallow reservoir could be developed on Beaver Creek with the dam about 2.5 miles south of Greenville. Except for two steep ridges along the extremities of the drainage area, the watershed is very gently rolling and slopes gradually into the valley. A north-south dirt road and 0.5 mile of old Illinois Route

127 could be abandoned. Two residences and a pond just north of the dam site would be inundated. Land acquisition should not be excessive since most of the lake area is idle or in pasture. The most desirable feature of this site is its proximity to Greenville. Shallow water in the upper reaches might have to be controlled by shoreline shaping. Geologic conditions at the site are good; both abutments consist of stiff sandy clay glacial till overlain by weathered loess from 5 to 7 feet thick on the upper gentler slopes. Till in the floodplain is probably overlain by 15 to 18 feet of permeable alluvium consisting of silty sand over coarse sand. An impervious core wall would be required through this material. Abundant borrow material of good quality is available from the left upstream abutment.

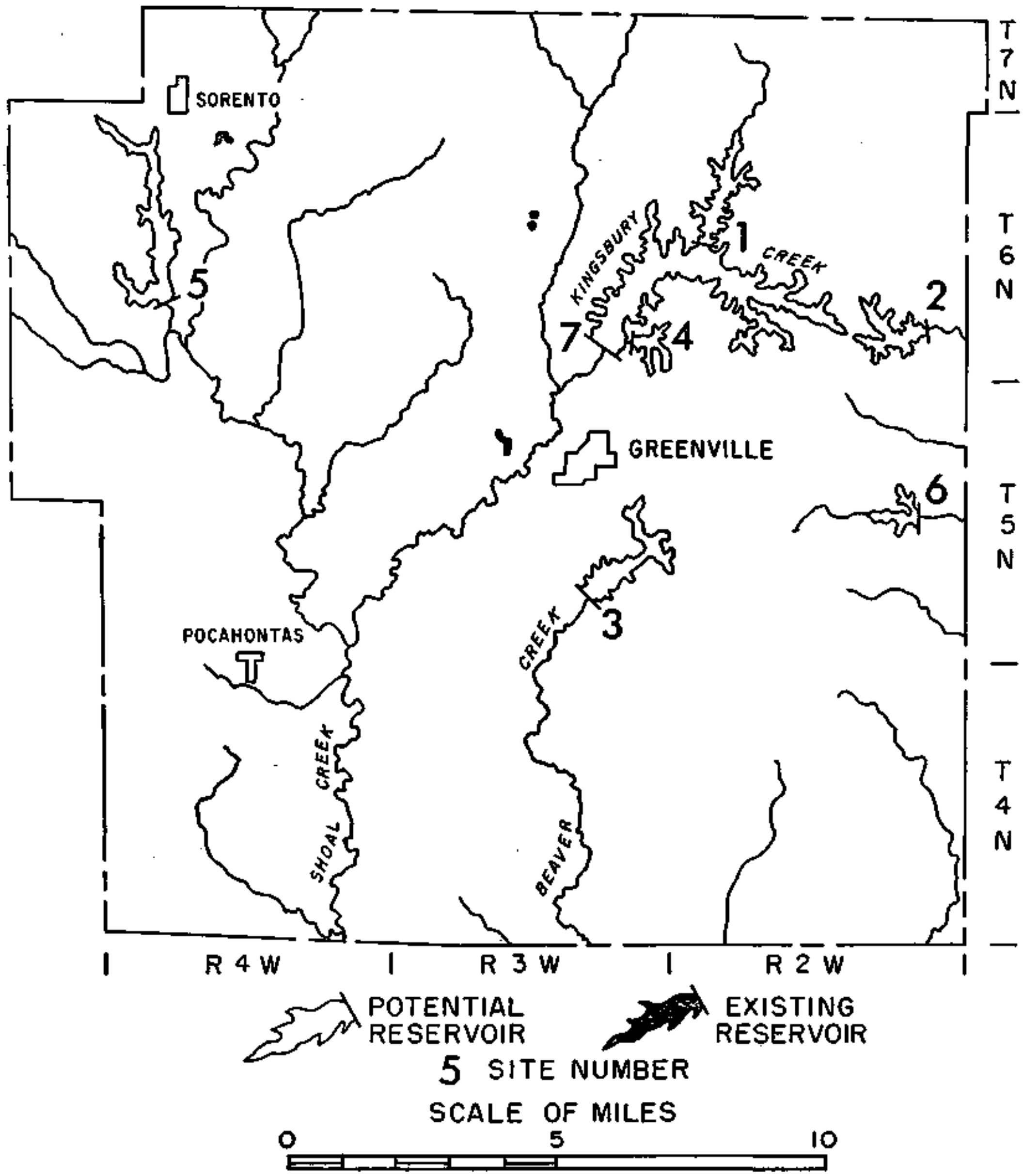
Site 4. A small deep three-fingered reservoir could be developed on a tributary of Kingsbury Creek about 2 miles north and 1 mile east of Greenville. The watershed has rolling uplands sloping into steep-walled wooded valleys that have narrow floodplains. One dirt road across a finger of the site could be abandoned, but no residences or other man-made obstructions would be involved. Land use within the reservoir area consists of pasturing on land in brush and scattered hardwoods. Low land values would be somewhat offset by clearing costs, but the lack of relocations, a short earth fill, and the small outlet structure due to the minimal watershed should make this a low cost development. Unfortunately geologic conditions do not appear too favorable for this site. Problems that would require further study are a 5-foot layer of sand in the abutments about 15 to 20 feet above the floodplain, and coarse sand in the floodplain to an undetermined depth. A program of test borings would be required to determine the seriousness of these problems. The abutment material above and below the sand layer is stiff silty clay glacial till. This is an excellent borrow material which is abundant on either abutment.

Site 5. A dam across Dry Fork of Shoal Creek about 4 miles south of Sorento would create a large deep reservoir with a sizeable finger on Flat Creek. The watershed has a highly developed dendritic drainage pattern with rolling uplands sloping into deep steep-walled valleys and very irregular floodplains. Of two roads crossing the site, a two-lane blacktop across the upper third of the site should be relocated or raised and a two-lane oil and chip road across the lower third could be abandoned. Most residences within the lake area seem to be deserted, but one or two occupied residences are close to lake level. The elevation used in the accompanying table is a maximum, and the lake could be developed 10 feet below this level. Cover consists of intensive row crops on a small percentage of the bottoms that are artificially drained, pasture and haylage on about half of the bottoms, and brush and timber on the remainder. Costs appear to be moderate for a site of this size. The abutments and probably the valley walls are shale from the floodplain to a height of 15 to 20 feet, overlain by 25 to 30 feet of very stiff silty clay glacial till which is covered by 10 to 15 feet of very gravelly till. The alluvium in the floodplain consists of 1 to 2 feet of clayey silt over 4 to 5 feet of silt and sand. At a depth of about 7 feet, gravelly sand becomes coarser for the next 5 feet at which depth it was impenetrable by manual equipment. An abundance of good quality till for borrow is available from both upstream abutments. Test borings

Potential Reservoirs in Bond County

Site number	Waterway location	Spillway elevation *(ft)*	Pool area *(acres)*	Storage *(ac-ft)*	Storage *(mg)*	Watershed *(sq mi)*	Times filled per year	Depth at dam *(ft)*	Length of dam *(ft)*	Earth fill *(cu yd)*	Shoreline *(mi)*	Mean annual runoff *(mgd)*	Net yield *(mgd)* for given recurrence intervals: Full capacity 5 Yr	Full capacity 10 Yr	Full capacity 25 Yr	Full capacity 40 Yr	Half capacity 5 Yr	Half capacity 10 Yr	Half capacity 25 Yr	Half capacity 40 Yr
1	Dry Branch SE ¼ NW ¼ 19-6N-2W (Greenville Quad)	550	450	4,950	1,610	11.7	1.1	33	1,000	203,300	16	4.88	4.4	3.5	2.4	2.0	2.9	2.1	1.0	1.0
2	Owl Creek NE ¼ NE ¼ 35-6N-2W (Greenville Quad)	540	170	2,040	665	2.9	3.0	35	700	128,200	16	1.36	.6	.4	.2	.1	.1	0	0	0
3	Beaver Creek NE ¼ SW ¼ 26-5N-3W (Greenville Quad)	520	500	4,170	1,360	15.5	1.7	25	1,000	128,400	13	6.47	5.2	3.5	2.1	2.0	2.3	2.2	.8	.7
4	Trib. Kingsbury Creek NW ¼ NW ¼ 36-6N-3W (Greenville Quad)	540	130	1,500	488	3.2	1.0	35	550	118,800	4	1.33	1.2	1.0	.7	.6	1.0	.6	.3	.3
5	Dry Fork SE ¼ SW ¼ 29-6N-4W (New Douglas Quad)	590	960	16,640	5,420	20.5	.6	52	1,050	407,100	26	8.55	7.5	7.5	6.3	5.0	7.3	5.5	3.7	3.1
6	Avery Branch SE ¼ SE ¼ 14-5N-2W (Greenville Quad)	500	110	840	274	4.8	3.0	23	600	76,200	3	2.25	1.2	1.0	.6	.4	.6	.4	.3	.2
7	Kingsbury Branch SE ¼ NW ¼ 6N-3W (Greenville Quad)	540	1,740	24,360	7,935	35.1	.6	42	1,350	381,280	43	14.70	13.5	14.29	10.7	8.2	13.2	8.8	5.9	4.9
Sites partially in Bond County (See Montgomery County for description)																				
10	Shoal Creek SW ¼ NW ¼ 21-7N-4W	560	20,000	367,000	119,500	34.0	.4	55	1,500	604,000	80	141.82	120.1	120.1	120.1	97.1	118.0	108.6	71.5	57.9

BOND COUNTY



Existing Reservoirs in Bond County

Reservoir name	Legal description	Owner	Watershed area (sq mi)	Watershed area (acres)	Height of dam (ft)	Depth of water at dam (ft)	Pool area (acres)	Storage capacity (ac-ft)	Storage capacity (mg)	Storage capacity (in)	Remarks and data source
Ayers Res.	15-16-21-6N-3W (Greenville Quad)	C.B.&Q. R.R.	2.87	1,836	18	12-15	26	150	48.9	0.98	Sed. survey 1958 (Leased to Greenville Rod & Gun Club)
City Lake	W ½ 9-5N-3W (Greenville Quad)	Greenville (C)	1.37	880	24	18	30	353	115.0	4.83	C. R. Coleman survey Oct. 1954
Sorento Res.	NW ¼ NW ¼ 9-6N-4W (New Douglas Quad)	Sorento (C)	0.57	355	29	23	11	81	26.4	2.67	Used as a water supply

would be required to determine the nature of foundation materials in the floodplain.

Site 6. A potential reservoir site exists on Avery Branch of Hurricane Creek 1 mile north of Pleasant Mound. The upper half of the watershed has some rolling cultivated uplands but the remainder shows a well-developed dendritic drainage pattern with steep-walled, wooded valleys. The floodplain in the vicinity of the lake is fairly level and under cultivation. No roads, residences, or local utilities are involved in the development at the suggested spillway elevation. An increase of 10 feet in lake level, which is quite feasible, would make only one road improvement necessary. The site appears to be feasible geologically. Both of the abutments are composed of stiff silty clay glacial till. The upper third of the left abutment does contain some clayey sand, probably not in any great extent, although this would have to be verified by borings. A similar deposit occurs on the high right abutment but has a much higher clay content and could, if carefully compacted, be used as borrow on the flanks of the structure. The alluvium consists of 6 feet of sandy and clayey silts over 1 foot of firm silty clay over stiff silty clay resembling the abutment material. The silty clay till is an excellent borrow material and occurs in abundance on both upstream abutments.

Site 7. A dam on Kingsbury Branch 2 miles north of Greenville would create a large deep reservoir. The watershed exhibits rolling uplands which slope into a fairly well developed dendritic drainage pattern. The tributary valleys are narrow and V-shaped, but the main valley shows steep wooded walls bordering a wide, flat floodplain. Cover on the floodplain is difficult to estimate, but agricultural development is moderate. Wooded uplands near the site are common and offer good potential for recreational development. Two county roads out of Greenville offer the best access to the site, and one of these would be relocated upstream. Several township roads would have to be raised or abandoned and a power transmission line just upstream from the structure would have to be relocated. By far the most important relocation and perhaps the greatest limitation of this site is the Chicago, Burlington, and Quincy Railroad crossing near the center of the lake. Cost of relocating this service could be prohibitive. Relocation and acquisition would in general make project cost moderately high for this development. Although geologic conditions are not ideal, a preliminary examination indicates that a dam at the proposed location is possible. The lower half of both abutments is clayey sand or silty sand glacial till which is moderately stiff, calcareous, and moderately slowly permeable. The upper half is mostly a sticky tough sandy clay with some clayey sand. Lenticular sand deposits were encountered throughout the abutments but are not believed to be continuous. Although they may not be indicative of the entire floodplain, a few hand auger borings show the alluvium to be composed of 3 feet of silty clay over 4 feet of fine sandy clay over 3 feet of 0.8 tons per square foot (tsf) silty sand over 2 feet of sand. Additional borings would be required to determine the full extent of the alluvium. Borrow of good quality is available from the upper half of both abutments. If lenses of sand are encountered at the ends of the dam, they should be cored, removed, or blanketed upstream.

CALHOUN COUNTY

Calhoun County lies almost entirely within one of the few unglaciated areas of the state. A maximum total relief of 525 feet is found between the upland and the rock floor of the Illinois valley at 275 feet above sea level. A long, rugged ridge between the Illinois and Mississippi Rivers divides the county approximately in equal parts, the drainage to the west going into the Mississippi and that to the east, into the Illinois River. The upland is very rough and broken. Runoff is excessive and rapid from a well-developed drainage pattern on steep slopes where erosion has been and still is active even though the soils have good absorptive capacity and are resistant to erosion.

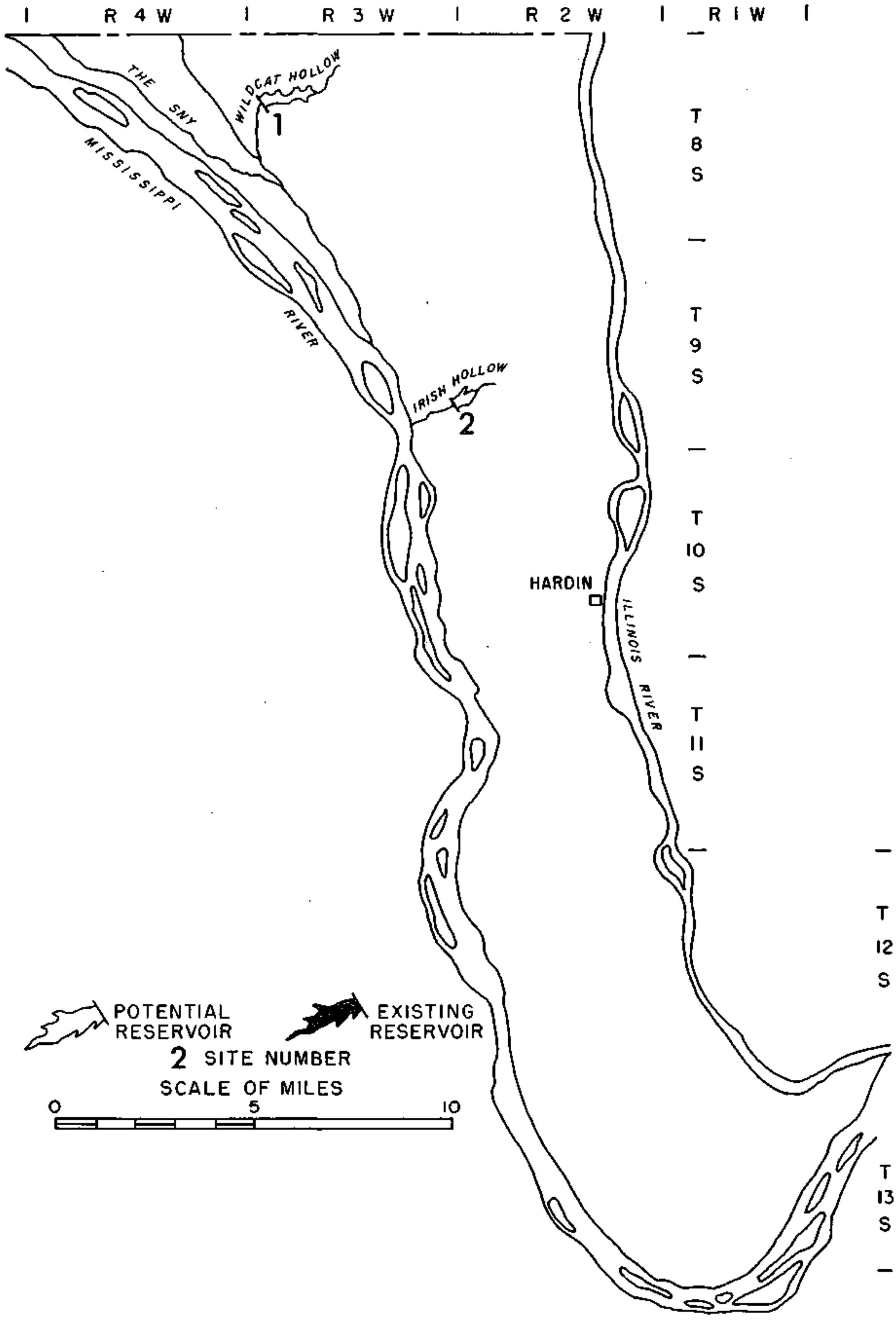
The bedrock surface is expressed everywhere in the county by the ground surface since only loess has been deposited over the rock. The bedrock is composed primarily of Mississippian rocks such as the Osage limestones and shales although older formations would be encountered in the deeper valleys.

The topography of Calhoun County is not well suited

Potential Reservoirs in Calhoun County

													Net yield *(mgd)* for given recurrence intervals: Full capacity				Half capacity			
Site number	Waterway location	Spillway elevation *(ft)*	Pool area *(acres)*	Storage *(ac-ft)*	Storage *(mg)*	Watershed *(sq mi)*	Times filled per year	Depth at dam *(ft)*	Length of dam *(ft)*	Earth fill *(cu yd)*	Shoreline *(mi)*	Mean annual runoff *(mgd)*	5 Yr	10 Yr	25 Yr	40 Yr	5 Yr	10 Yr	25 Yr	40 Yr
1	Wildcat Hollow SW ¼ SW ¼ 7-8S-3W (Nebo Quad)	560	190	4,120	1,340	3.3	.3	65	700	391,900	5	1.15	.9	.9	.9	.6	.8	.8	.8	.6
2	N. Prong Irish Hollow NE ¼ SW ¼ 25-9S-3W (Hardin Quad)	620	180	4,800	1,560	1.9	.2	80	1,200	943,800	3	.63	.4	.4	.4	.4	.4	.4	.4	.3

CALHOUN COUNTY



to the construction of reservoirs. The streams have steep slopes which tend to create deep high volume reservoirs that would have inadequate watersheds. Two reservoir sites were studied in the northern half of Calhoun County, and the data for these are presented here.

Site 1. Wildcat Hollow watershed is rectangular, about 3 miles by 1 mile, with drainage to the Sny River via Bay Creek. The dam site is located in a very steep Mississippi River bluff area. The watershed has ridged uplands, steep rocky valley walls, and only slightly developed floodplains. One gravel road traverses the reservoir area providing access to three residences, two of which would be inundated. Land use in the reservoir area is mostly timber with some low productivity cultivation. The abutments consist of limestone exposures and loess or cherty residuum over limestone. The alluvium consists of 10 to 15 feet of chert rubble. The lower 6 feet of both abutments is medium bluish gray, very fine grain, submassive limestone. The overlying 20 feet is light brown sublithographic limestone, regularly bedded to 3 to 6 inches and highly fractured perpendicular to the bedding plane. Cherty clay residuum, 0 to 10 feet in thickness, overlies the irregular upper surface of the limestone and is in turn overlain by loess which attains thickness in excess of 40 feet. Leakage through limestone crevices, probably through the loess and then into the limestone crevices, is the most serious problem at this dam site, and pressure testing is recommended. Scarcity of good quality fill material is a serious problem. These conditions could cause a moderately high cost project.

Site 2. The dam site on the north prong of Irish Hollow is located 1 mile northeast of Hamburg. The watershed is about 2 miles by 1 mile with very steep ridges and steep valley walls. The topography is bedrock-controlled, and the floodplain is rather wide and gently rolling. The reservoir is timbered and has some low productivity cultivation. Three old frame residences and a one-lane gravel road would be inundated. The bedrock formation is Keokuk-Burlington limestone which occurs in both dam site abutments and throughout the reservoir area. The unconsolidated material consists of about 30-foot thick deposits of Roxana and Peorian loess. The alluvium consists of 3 to 10 feet of silt and clayey silt over chert rubble with reddish clay sand in the interstices over limestone. Scarcity of good quality borrow material is the most serious problem of this site. Materials of satisfactory quality are probably obtainable from a small area of Mississippi bottomland south of Hamburg. Local alluvial materials are the next best source but should be thoroughly tested before construction so that compaction and permeability characteristics can be determined. Leakage through the basal cherty alluvium should be intercepted by an impervious core wall of compacted material. This will not only prevent undue leakage but will reduce the piping hazard. The utmost care should be exercised in planning and constructing this reservoir for failure of the fill would cause serious property damage to the village of Hamburg. The storage-inflow relationship indicates that it would require slightly more than 5 years of average runoff to fill the reservoir. For the above reasons this could be a moderately high cost project.

Existing Reservoirs in Calhoun County

Reservoir name*	Legal description	Owner	Watershed area (sq mi)	Watershed area (acres)	Height of dam (ft)	Depth of water at dam (ft)	Pool area (acres)	Storage capacity (ac-ft)	Storage capacity (mg)	Storage capacity (in)	Remarks and data source
Swan Lake		Public					2,345				
Pohlman Lake		Public					95				
Clear Lake		Public					70				
Fuller Lake		Public					150				
Chickahama Lake		Public					55				
Saw Mill Lake		Public					32				
Silver Lake		Public					40				
Beaver Pond		Public					80				
Long Lake		Public					31				
Prairie Pond		Public					411				
Heimbold Lake		Public					32				
Royal Lake		Public					68				
Mud Slough		Gilead Club					201				
Sand Slough		Gilead Club					178				
Sportsmen's Lakes		Alton-Wood River Sportsmen's Club					46				
Emeritt Lake		Private					39				
Merida Lake		Private					39				

**The lakes are in the Illinois or Mississippi River floodplain and are subject to possible overflow.*

Both the Kansan and Hlinoian glaciers deposited drift, primarily till, over all of Clark County. The glacial drift is thick enough to obscure all but major variations in the topography of the bedrock. Meltwaters from the Wiseonsinan glaciation which approached the northern border of Clark County were influential in forming the present north-south drainage. The eastern half of the county drains to the Wabash River by way of Hurricane, Mill, Big, Hawks, and Crooked Creeks. The western portion drains to the south through the North Fork of the Embarras River.

Exposures of bedrock in the area are typically Pennsylvanian consisting of easily eroded shales with more resistant sandstone layers and occasionally thin limestone and coal.

The topographic and geologic conditions throughout Clark County are favorable for construction of water storage structures. The results of analyses for 14 reservoir sites are presented here.

Site 1. The watershed of this site has gently rolling upland areas and deeply incised, steep-sided, V-shaped valleys covered with woods. A deep many-fingered lake about 4 miles east of Martinsville could be created on Hurricane Creek and a tributary, Johnson Branch. Existing township roads encircle the reservoir area, and the opportunity exists for locating a road on top of the dam. Land acquisition, relocations, and site conditions indicate a moderately low cost project. The dam would be founded on light bluish gray shale that is moderately hard and adequate in bearing strength. Sandy alluvium overlies the shale. The abutments, consisting of alternating layers of shale and sandstone, exhibit very little fracturing or jointing. Pressure-testing of the rock and subsurface investigation of the alluvium for thickness and permeability are recommended. Sandy clay glacial till is available for fill, but the alluvium appears too sandy to be usable. The site would support a dam, and leakage should not be serious.

Site 2. The Clear Creek watershed above this potential reservoir site is 9 by 2.5 miles, and has rolling uplands and deeply incised valleys. The valley has steep abutments and a broad, flat, alluvial floodplain of which over three-fourths is in cultivation. A gravel road along the eastern valley wall and two frame homes would be inundated. The Pennsylvania Railroad crosses the upper third of the reservoir, and its existing fill would require improvement. The broad, flat bottoms of the site rise slowly creating a shallow water problem in the upper reaches of the lake. Land acquisition, relocations, and site conditions indicate a high cost project. The dam would be founded on the shale at an undetermined depth. The basal alluvium is probably highly permeable and would have to be intercepted by an impervious core wall. Since this valley could have been deeply incised into glacial material or shale bedrock and subsequently filled with sand and gravel, it is recommended that more detailed subsurface investigations be made.

Site 3. The Hawks Creek site is located near the Indiana border about 8 miles east-northeast of Marshall. The watershed is about 8 by 1.5 miles, has nearly level uplands and deeply incised V-shaped valleys. The main valley has a wide floodplain which is under almost complete cultivation. Mixed hardwoods are growing on the gently sloping valley walls. Two frame houses and a gravel road would be inundated. U. S. Route 40 crosses the upper portion of the reservoir, and its earth fill would require protection. The bedrock at the dam site is probably shale overlain with an estimated 10 to 15 feet of alluvium. The stratified, sandy and clayey glacial outwash, which outcrops at the base of the right abutment and underlies the floodplain to an undetermined depth, is undoubtedly in contact with the coarse basal alluvium that underlies the reservoir floodplain. Since a problem of instability of foundation and piping might exist, it is suggested that the lateral extent, permeability, and stability of this material be explored. Land acquisition, relocations, investigations, and site conditions indicate a moderately high cost project.

Site 4. This site is about 8 miles east of Marshall in an area of gently rolling uplands that break sharply into V-shaped tributary valleys and moderately developed floodplains. TJ. S. Route 40 crosses the upper third of the reservoir and would require raising. A two-lane gravel road and four frame residences would be inundated. The narrow floodplain is under cultivation, and timber is restricted to the valley walls. The long, narrow watershed, 11 miles by 1.2 miles, has a road system that would parallel the shores of the impounded area. The dam would have its base in shale that is relatively impermeable and has adequate bearing strength. The overlying alluvium of clayey silt and silty sand is about 15 feet thick. The reservoir walls are mostly silty clay glacial till with a few sandstone bedrock exposures similar to the one in the right abutment of the dam. The shale extends about 25 feet up the right abutment and is overlain by about 3 feet of black fissile shale, then 5 feet of sandstone, more shale, and finally sandy clay glacial till. An impermeable core wall of compacted till bonded to the shale should effectively seal off leakage. The sandstone and shale in the right abutment appears water-tight but should be pressure-tested in future subsurface investigations. Land acquisition, relocations, and the raising of U. S. Route 40 would tend to make this a moderately high cost project.

Site 5. A small reservoir with a watershed some 5.5 miles long by 1.5 miles wide could be developed on

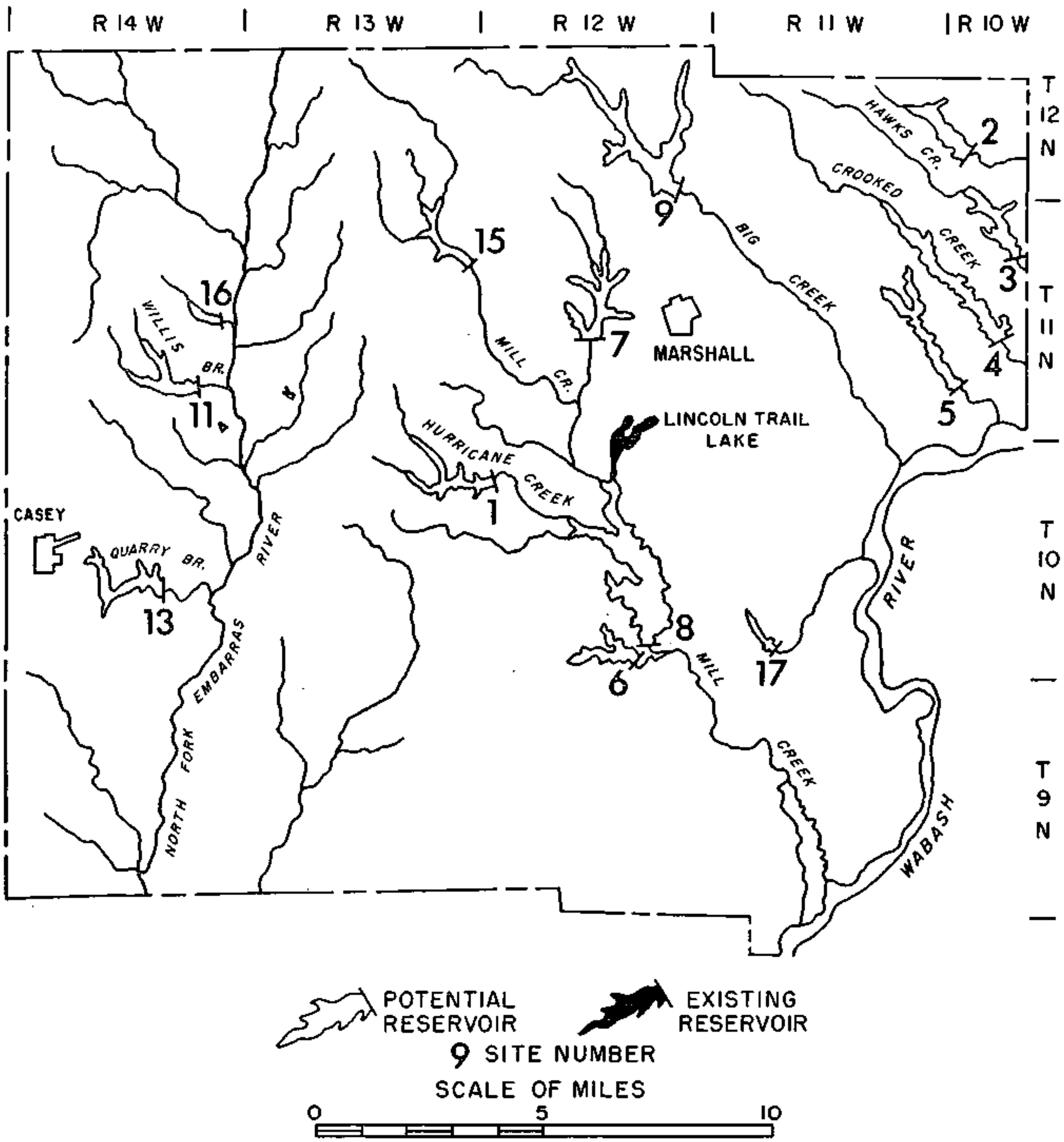
Potential Reservoirs in Clark County

Site number	Waterway location	Spillway elevation (*ft*)	Pool area (*acres*)	Storage (*ac-ft*)	Storage (*mg*)	Watershed (*sq mi*)	Times filled per year	Depth at dam (*ft*)	Length of dam (*ft*)	Earth fill (*cu yd*)	Shoreline (*mi*)	Mean annual runoff (*mgd*)	Net yield (*mgd*) for given recurrence intervals: Full capacity 5 Yr	Full capacity 10 Yr	Full capacity 25 Yr	Full capacity 40 Yr	Half capacity 5 Yr	Half capacity 10 Yr	Half capacity 25 Yr	Half capacity 40 Yr
1	Hurricane Creek NE ¼ SW ¼ 7-10N-12W (Casey Quad)	580	355	6,130	1,995	8.4	.7	52	1,000	405,600	18	3.98	3.6	3.6	2.7	2.4	3.4	2.4	1.5	1.2
2	Clear Creek SW ¼ SE ¼ 30-12N-10W (Marshall Quad)	560	1,410	28,200	9,185	48.0	.9	60	2,100	1,054,700	5	22.76	21.7	21.4	13.7	12.7	17.0	12.1	7.2	6.3
3	Hawks Creek SE ¼ NE ¼ 8-11N-10W (Marshall Quad)	510	255	3,070	1,000	7.3	1.3	36	900	199,500	7	3.96	3.2	2.4	1.6	1.3	1.8	1.3	.7	.6
4	Crooked Creek SW ¼ NE ¼ 20-11N-10W (Marshall Quad)	500	415	6,900	2,248	12.3	1.0	47	650	199,500	21	5.83	5.4	5.2	3.3	2.8	4.2	2.9	1.6	1.5
5	Ashmore Creek NW ¼ SE ¼ 30-11N-10W (Marshall Quad)	500	255	3,750	1,220	5.8	.8	44	700	203,600	6	2.75	2.5	2.5	1.7	1.5	2.2	1.4	.9	.7
6	Joes Fork NE ¼ SW ¼ 35-10N-12W (Marshall Quad)	530	550	11,000	3,584	14.0	.7	60	1,000	481,500	4	6.64	6.1	6.1	4.7	4.1	5.9	4.3	2.7	2.2
7	East Mill Creek NE ¼ NE ¼ 28-11N-12W (Marshall Quad)	550	450	4,540	1,480	14.7	1.7	30	1,250	227,600	12	6.97	5.6	3.8	2.6	2.0	2.6	2.0	.8	.6
8	Mill Creek NE ¼ NE ¼ 35-10N-12W (Marshall Quad)	500	2,050	24,030	7,829	94.0	2.1	35	1,400	294,100	20	44.58	30.3	21.8	13.8	11.9	15.0	11.8	5.5	4.2
9	W. Fork Big Creek SW ¼ SE ¼ 36-12N-12W (Marshall Quad)	570	1,690	30,980	10,090	80.0	1.4	55	1,700	718,800	24	37.94	35.2	25.9	17.3	14.1	19.4	14.3	8.2	7.2
11	Willis Branch E ½ NE ¼ 35-11N-14W (Casey Quad)	630	375	6,050	1,970	5.7	.5	48	900	299,300	12	2.70	2.3	2.3	2.2	1.9	2.2	2.0	1.2	.9
13	Quarry Branch SE ¼ NE ¼ 27-10N-14W (Casey Quad)	600	490	7,060	2,300	12.5	.9	43	500	149,400	14	5.93	5.4	5.4	3.3	2.8	4.1	2.8	1.6	1.4
15	Mill Creek SE ¼ NE ¼ 13-11N-13W (Casey Quad)	600	650	10,800	3,518	21.6	1.1	50	500	179,000	5	10.24	4.4	3.2	1.7	1.4	1.8	1.6	.3	.2
16	Lindsay Branch NW ¼ SE ¼ 24-11N-14W (Casey Quad)	620	115	1,340	437	2.8	1.1	35	450	94,900	2	1.33	1.2	1.0	.6	.5	.8	.5	.3	.3
17	Neely Creek NE ¼ NE ¼ 32-10N-11W (Marshall Quad)	490	57	510	166	1.7	1.8	27	500	75,100	2	.81	.6	.4	.3	.2	.3	.2	.1	.1
	Sites partially in Clark County (See Crawford County for description)																			
3	Willow Creek Ctr N ½ 7-8N-13W	550	1,600	22,400	7,298	36.1	1.0	42	1,575	436,200	32	19.18	17.5	17.0	11.0	9.6	13.4	9.9	5.4	4.1
5	Raccoon Creek NE ¼ SE ¼ 1-8N-12W	480	900	9,600	3,128	34.0	2.1	32	950	187,400	17	18.07	12.7	9.9	6.1	5.0	6.5	4.8	2.6	1.8

Existing Reservoirs in Clark County

Reservoir name	Legal description	Owner	Watershed area (*sq mi*)	Watershed area (*acres*)	Height of dam (*ft*)	Depth of water at dam (*ft*)	Pool area (*acres*)	Storage capacity (*ac-ft*)	Storage capacity (*mg*)	Storage capacity (*in*)	Remarks and data source
Lincoln Trail State Park	NE ¼ 10-10N-12W (Marshall Quad)	State of Ill.	3.28	2,100		33	158	2,500	814.5	14.29	Built in 1956, 7 mi shoreline
Stevenson's Lake	SW ¼ 32-11N-13W (Casey Quad)		0.37	234			9	46	15.0	2.36	Sed. survey 1959
Mill Pond	SW ¼ 20-10N-14W (Casey Quad)	Casey (C)	0.02	15			5				City park Casey
Craig & Davidson Lakes	SE ¼ 8-9N-12W (Annapolis Quad)		0.54	343			25	175	57.0	6.12	Sed. survey 1959
Marathon Pipe Co.	SE ¼ 12-10N-14W (Casey Quad)	Ohio Oil Co.	0.08	51			5				Near Martinsville
Round Grove Sportsman's Club	SW ¼ 1-10N-14W (Casey Quad)	Round Grove Sportsman's Club	0.1	60			8				Near Casey
Witmer's Lake	NW ¼ 1-10N-14W (Casey Quad)	Bill Witmer	0.60	385			15				3 mi NW of Martinsville
Newman's Lake	NW ¼ 33-11N-13W (Casey Quad)	Roy Newman	0.27	173	22	18	8	28	8.9	1.91	3 mi NE of Martinsville, built in 1953
McNavy's Lake	SE ¼ 27-11N-14W (Casey Quad)	Everett McNavy	1.52	970			16				
Stoelting's Lake	NE ¼ 14-11N-11W (Marshall Quad)	Dr. Stoelting	.08	48			5				6 mi E of Marshall

CLARK COUNTY



Ashmore Creek about 6 miles east of Marshall. The dam site is in a deep steep-walled valley. The reservoir area is confined to a narrow floodplain which is not occupied and would require only minor road relocations. There are several producing oil wells in the vicinity of this site, but none were visible or known to exist in the reservoir area. At the dam site the bedrock is probably shale overlain by alluvium consisting of 3 to 5 feet of silty and sandy clay over 7 to 10 feet of sand and gravel. The shale would provide adequate bearing strength. The massive sandstone present in the valley walls is fairly well covered with residual soil consisting of sandy clay and clayey sand. There is a possibility of open joints existing in the sandstone which could be troublesome especially in the left abutment where leakage could find an outlet in a nearby parallel valley. There is plenty of glacial till for fill material and impervious material for a core wall through the alluvium. This site should produce a low cost project at elevation 500 feet msl, and the topography would permit raising the reservoir as much as 40 feet.

Site 6. A potential reservoir site is located at Joes Fork, a tributary of Mill Creek, about 8 miles south of Marshall in a valley which has been eroded into bedrock and later covered with glacial deposits. The watershed has rolling uplands, steep V-shaped minor streams, and broad alluviated floodplains in the major valleys. The floodplain is under cultivation, and the valley walls are timbered. Acquisition and relocations should be minor, and one north-south road would be required across the reservoir. The dam would be founded on shale overlain by about 10 inches of blocky coal; 6 feet of dark gray shale; 6 feet of coarsely crystalline, dark buff limestone; loosely cemented, fragmented sandstone; and above this, glacial till. The possibility of leakage through the sandstone in the valley walls indicates the need for pressure-testing the formation. This site should develop into an average or normal cost project.

Site 7. A reservoir 2 miles west of Marshall would occupy the alluviated floodplain of a deep valley. The watershed, 4.5 by 3.5 miles, has rolling uplands and rounded hills on valley slopes. The Pennsylvania Bailroad crosses the reservoir in two places creating problems in elevation limitation and stabilization of fills. Acquisition of land and relocations of utilities and highways should not be difficult nor expensive, except for the railroad and a two-lane concrete highway at the upper end of the reservoir. If the reservoir elevation is raised 10 feet, the railroad and two-lane concrete highway must be raised. Downstream from the dam site U. S. Eoute 40 crosses Bast Mill Creek creating a greater than normal hazard. Waste products from a chemical plant are being dumped into the stream above the reservoir. The underlying material at the dam site could be either till or shale bedrock. It is overlain with an alluvium of unknown depth composed of coarse sand and gravel covered with about 5 feet of silty, clayey material. A complete subsurface investigation should be performed before seriously considering this site. This project would have a high cost because of railroad crossings and site conditions.

Site 8. A dam across Mill Creek about 7 miles south of Marshall would create a large reservoir having a watershed some 18 miles long by 6 miles wide. The broad floodplain is highly developed and under extensive cultivation. Land acquisition costs would be high but road, utilities, and residence relocations should be normal for a reservoir of this size. The valley in which the dam site is located has been deeply entrenched into bedrock and then partially filled with glacial outwash. The bedrock is probably shale, estimated to be at a depth of 20 feet and overlain by stratified silts and sands which in turn are covered by clays and silts. The inner cores of the abutments consist of bedrock that had a very rough and irregular surface before being covered with glacial materials. It is therefore possible that the relatively permeable sandstone and limestone exposures are isolated remnants and not in contact with other permeable exposures. An impermeable core wall should be constructed through the basal alluvium and bonded to the bedrock. The ridge forming the left abutment is naturally blanketed with glacial till which should not be removed. This site should produce a large reservoir at a moderately high cost.

Site 9. A large reservoir having steep valley walls and a broad, nearly level floor could be created by damming Big Creek, 3 miles north of Marshall. The lake would have main branches on the West Fork and East Fork of Big Creek. The entire lake bed is under cultivation, and contains several residences and a network of dirt and gravel roads. Because of the developments, land costs, relocations, and impact to the tax base, this project would have a moderately high cost. The dam would be founded on limestone bedrock approximately 15 feet below the floodplain. The alluvium consists of silty sand and gravel overlain with silty clay. The abutments are mostly glacial till although Livingston limestone outcrops in the channel about 400 feet upstream from the center line of the dam. Shale overlying the limestone outcrops 0.4 mile farther upstream. The limestone has tight joints and bedding planes with no apparent indication of solution action. An impermeable core wall of compacted till bonded to the underlying bedrock should be constructed through the alluvium.

Site 11. A good reservoir and dam site exists on Willis Branch about 2 miles northwest of Martinsville. The watershed is some 3 miles long by 2.5 miles wide and has three distinct tributaries making possible a multiple-fingered lake. Approximately three-fourths of the reservoir area is cleared. Land acquisition should not present a major problem as there are no residence relocations. Road and utilities relocations would be minor, and there exists the opportunity to place a north-south highway over the top of the dam. The reservoir would then be completely surrounded by a highway. The dam site and reservoir area are considered probably feasible from a geologic standpoint. The dam would be founded on bedrock of Pennsylvanian age overlain with glacial till of Illinoian age which in turn has been covered with silts of Wisconsinan age. All of these materials are generally satisfactory with regard to foundation stability, relative impermeability, and source of material for the construction of an earth dam. This site should make a good low cost project.

Site 13. A good reservoir and dam site is available on Quarry Branch about 2 miles east of Casey. With a watershed some 4 miles long by 4 miles wide this site development could result in a deep lake with an extensive shoreline. Approximately three-fourths of the reservoir area is cleared land, and the valley walls and coves are covered with mixed hardwoods. There are currently three residences in the lake area. Telephone cables above and below ground cross the lake about 0.25 mile upstream from the dam site. Four township roads cross the lake bed; two of these roads could be abandoned and the rest raised. The dam site and reservoir area are considered probably feasible from a geologic standpoint by the same reasoning cited for *site 11.* This is a good site and should produce a moderately low cost project.

Site 15. The watershed for Mill Creek is about 8 miles long and 3 miles wide and has very level interfluvial uplands, steep V-shaped valleys on tributary streams, and a rather narrow floodplain on the main stream. The floodplain is partially under cultivation with the remainder in brush and woods. Valley walls are steep and wooded. There are no known utilities, residences, or buildings in the reservoir area. One dirt road crossing the middle of the reservoir could be abandoned. Sedimentation, streambank cutting, erosion, and shallow water in upper reaches of the reservoir will adversely affect this project. The dam would be founded on shale bedrock overlain with an estimated 20 feet of alluvium composed of gravel, sand, and sandy clay. The probability of leakage can be effectively controlled by constructing a core wall through the alluvium at the dam site. The abutments and valley walls are covered with glacial till of sandy or silty clay. From all indications this site is suited for water retention and should be a moderately low cost project.

Site 16. The watershed on Lindsay Branch, a tributary of the North Fork of the Embarras River, is about 3 miles long and 1.5 miles wide. The site is covered with brush and woods, and the valley walls are covered with mixed hardwoods. There are no known residences, buildings, highways, or utilities in the area. There is evidence of severe gullying in tributary drainage and infertile overwash of sands and gravels on the floodplain. The geologic conditions of the reservoir and dam site are questionable. The alluvium in the valley bottom may largely consist of, or may be underlain by, sand and gravel sufficiently permeable that the site should be abandoned unless future investigations indicate that a practical cut-off can be accomplished. If future geologic investigations indicate a practical solution, this should make an excellent moderately low cost project.

Site 17. The watershed of this site is about 2.5 miles long, 0.75 miles wide, and has a relatively flat upland under intensive clean-tilled cultivation. The reservoir area is in light woods and meadow, and the valley walls are in woods. There are no known residences, utilities, or highways, so that land acquisition should be at a minimum cost. The dam would be founded on bedrock of shale and would require an impermeable core wall constructed through the shallow, permeable alluvium. Compacted silty clay glacial till covers most of the abutments which are of siltstone interbedded with thin layers of sandstone and shale. Although the siltstone with sandstone layers is moderately or slowly permeable, the natural blanket of silty clay will seal most of it. This site should make a good, small reservoir at low cost.

CLAY COUNTY

All runoff from Clay County finds its way to the Little "Wabash River which crosses the county diagonally from northwest to southeast. Drainage from the southwestern portion of the county is somewhat indirect passing first through Skillet Fork or Elm Creek.

The Kansan and Illinoian ice sheets both covered Clay County depositing moderate amounts of glacial drift. The drift, primarily till, is somewhat deeper in the northern regions of the county and thins to the south.

Exposures of bedrock occur in many valleys throughout the county and are typically Pennsylvanian consisting of weak shales with fractured limestone layers and locally developed sandstones and possibly coal seams.

Most of Clay County, particularly the northern half, is well suited to the development of surface water storage structures. The results of feasibility studies on nine sites in the county are presented here.

Site 1. A large potential reservoir site exists on the Little "Wabash River approximately 3 miles west and 7 miles north of Louisville. Edgewood and Mason are respectively 5 and 4 miles west of the center of the reservoir. The watershed has gently rolling uplands and steep slopes into broad alluviated valleys. Most of the bottomlands have been developed for agricultural purposes, but there are large areas of marsh. Timber is generally restricted to the creek banks and floodplain extremities. Development of this reservoir would inundate the following: seven average frame residences, one new power transformer installation, a cemetery, numerous oil wells, at least one high pressure oil line, and about 4 miles of U. S. Route 45. Protection would be required for Illinois Route 37 at the intersection of Interstate Route 57. In addition to these highways township roads would be inundated in about nine locations. The Illinois Central Railroad crosses the Limestone Creek finger of the reservoir on a high fill, and possibly would need additional protection. The depth to bedrock, probably shale, is estimated at between 15 and 18 feet. The shale is medium bluish gray and moderately hard, has bedding planes of 0.25 inch to 0.5 inch apart, with numerous flat limonitic nodules along bedding planes. The unconsolidated material is Illinoian glacial till, mostly sandy clay, or some clayey sand, highly variegated yellowish brown and gray. The upper 12 feet of the alluvium is mixed dark brownish gray clayey silt and light silty clay over stiffer brown silty clay. The small percentage of reservoir area sampled indicates predominantly clayey silt in the upper 3 to 5 feet, more clay in the next 2 to 3 feet, and sand or gravel or both below 5 to 8 feet. The abutments have a high percentage of stiff sandy clay and glacial till; however, there are occasional exposures of gray shale. The stiff brown clay encountered at a 12-foot depth in several mid-valley borings appears to be adequate for a foundation, although it is not certain that this layer is continuous across the valley. It is also quite possible that there are deposits of sand or gravel beneath the clay. These permeable strata may be in contact with the channel in the reservoir area. Although there are no obvious hazards to construction of an earth dam at this site, it is recommended that a more detailed investigation be carried out prior to design. This reservoir will provide a large water storage area but the cost will be high.

Site 2. A many fingered potential reservoir site is located on Lucas Creek, a tributary of the Little Wabash River about 1.5 miles west of Hord. The watershed is approximately 11 miles long and 2 miles wide. An old frame residence and three east-west gravel roads would have to be abandoned. One road could be relocated over the structure, and U. S. Route 45 might have to be raised in two places. The reservoir area is about half cleared and in pasture. Cost of land acquisition and relocations of highways and utilities should be low. Indications are that the alluvium may be 20 feet deep and have basal sands and gravel. The upper alluvium of silty clay forms a natural blanket and should not be removed. Some of the coarse sand lenses that were observed in the reservoir abutments are seepy. These wet-weather seeps may reverse under water pressure, and therefore should be blanketed with relatively impermeable material. This appears to be a very good dam site for water storage purposes and should result in a moderately low cost project.

Site 3. The watershed for the Dismal Creek reservoir site is about 13 miles long and 3 miles wide, and has very gently rolling uplands which break abruptly into the valleys, and wide flat alluviated floodplains. Timber in the lake bed is restricted to the floodplain extremities and creek banks. Use of the cleared land is divided between pasture and row crops. Acquisition costs would be high as there are at least six frame residences, three north-south township roads, two east-west township roads, numerous oil wells, and underground telephone cables. The Baltimore and Ohio Railroad, crossing the upper third of the reservoir, is above elevation of high water, but the existing fill would need improvements. The dam site is founded on limestone bedrock that is fractured and tilted. The formation is not expected to be leaky since the joints appear to be well filled with residual clays or till. An impermeable core wall of compacted glacial till should be installed through the alluvium and bonded to the limestone bedrock. Since abundant glacial till is available for fill, the alluvium should not be used. This site should make a good reservoir but would be a high cost project.

Site 4. A potential reservoir site exists on Crooked

Creek, a tributary of the Little Wabash River, 5 miles northwest of Louisville. The watershed has gently rolling uplands, moderate slopes, and broad flat valleys. The floodplains are level and have deep alluvium. Half of the lake area is idle but free from timber and the remainder is under cultivation. One frame house would be inundated. The extent of encroachment on a limestone quarry and coal mine is unknown. Several oil wells are operating below the proposed lake level. A two-lane oil road would have to be relocated; a gravel road and a dirt road could be abandoned. The unconsolidated upper half of the reservoir abutments at the dam site is sandy clay glacial till of Illinoian age. The lower half consists of outcrops of shale, limestone, and siltstone strata. The mantle of soil material prohibits an accurate description of the strata. The limestone appears to be broken by slumping of the underlying shale but does not show any evidence of solution channels. The upper 8 feet of the alluvium is silty clay over clayey silt and may be as much as 15 or 20 feet deep. Quite possibly sands or gravels exist near the bedrock contact. An impervious core wall should be placed deep enough to bond to the silty clay material. There exists an active limestone quarry about 0.5 mile upstream from the dam site. This site should make a good reservoir but would have a moderately high cost.

Site 5. A good small site exists on a tributary of Crooked Creek 1 mile west of Louisville. The watershed has rolling uplands, moderate slopes, and rather shallow V-shaped valleys. A gravel road crosses the site but could be abandoned. About half of the lake bed is free from timber. Bedrock was not encountered in the site and the depth to bedrock was not determined but is believed to be not more than 12 feet. The unconsolidated material is Illinoian glacial till which consists of stiff sandy clay containing numerous pebbles. The alluvium diminishes in thickness and width a short distance upstream from the dam site. Till forms most of the floor in the upper reservoir. The alluvium should be intercepted at the dam site by an impermeable core wall of compacted till material. The exact depth of the alluvium could not be determined by manual equipment. No unusual problems should be expected at this dam site. The dam site should result in a normal cost project.

Site 6. A potential reservoir site exists on Raccoon Creek 4.5 miles northeast of Xenia. The watershed has moderately hilly uplands, gradual but steep slopes into valleys, and rather narrow floodplains. One frame residence would be inundated by the reservoir along with one gravel road which could be abandoned. Land acquisition cost should be low since the area is in scattered timber, about half cleared for pasture. There is the possibility that oil wells exist in the reservoir area. There are heavy oil developments east, west, and south of the reservoir site. Depth to bedrock was not determined and type of bedrock is not known. The unconsolidated material is Illinoian glacial till consisting of stiff silty and sandy clay in highly variegated shades of green and brown, with iron stains and numerous pebbles. The alluvium consists of several feet of fine sand and silty mixtures over predominantly sandy basal material. The total thickness varies between 6 and 18 feet. The reservoir abutments are sandy clay glacial till, highly variegated and stiff, with some sand and gravelly lenses. The core wall may have to be extended through the entire alluvial deposit. This should make an excellent water storage dam site and a many-fingered reservoir at moderately low costs.

Site 7. A dam site exists on a tributary of Brush Creek 2.5 miles southeast of Xenia. The watershed has rolling or moderately hilly uplands and moderate slopes into broad alluviated floodplains. There are no residences, roads, utilities, or other known obstructions in the reservoir area. Nearly all of the reservoir area is covered with light timber. No bedrock was encountered in the reservoir area nor at the dam site. All known abutments are somewhat variegated sandy clay glacial till which is stiff and slowly permeable. The upper 3 feet of alluvium is mostly clayey silt and silty sand over an undetermined depth of stratified sand and gravel mixtures. There is little doubt that these permeable strata are in contact with the channel and that impounded water could escape through the alluvium under the dam. Installation of an impermeable core of compacted material through the alluvium and bonded to the underlying till (or bedrock if such is the case) should effectively stop leakage. The total depth of alluvium could not be determined by manual augers, but is estimated to be about 15 feet deep in mid-valley. This should make a small reservoir at a normal project cost.

Site 9. An excellent water storage site exists on Hurricane Creek 6 miles east of Bible Grove. The watershed has gently rolling uplands that break abruptly into broad flat valleys. The floodplains are nearly level. Relocations would include two north-south gravel roads, and one east-west gravel road. Land cost should be fairly low since most of the bottoms are pasture or scattered timber. Only small patches of ground are under cultivation. There are several active oil wells in this area. The unconsolidated material is Illinoian glacial till which consists of sandy clay, and some silty clay that is predominantly medium yellowish brown, moderately stiff, and contains numerous pebbles and some cobbles. The general characteristics of the alluvium indicate that a deep intercepting core wall would not be necessary but that a core wall should cut through the upper siltier material. The use of the alluvium for fill would depend upon moisture conditions at the time of construction and the necessity of its being left in place to blanket the more permeable basal material. Till in the upstream abutments would be an excellent fill material. This should be an excellent, moderate cost, water storage site.

Site 10. A potential reservoir site exists on Panther Creek 2 miles northeast of Louisville. The watershed has gently rolling uplands which become hilly as streams are approached. The valley walls are steep, and the wide floodplains have been developed for agriculture. There are three east-west highways crossing the reservoir in four locations; one could be raised, but two would have to be abandoned or relocated. At least four residences and associated outbuildings would be inundated. The depth to bedrock is unknown and bedrock was not encountered in either the dam site or the reservoir area. The unconsolidated material consists of stiff yellowish

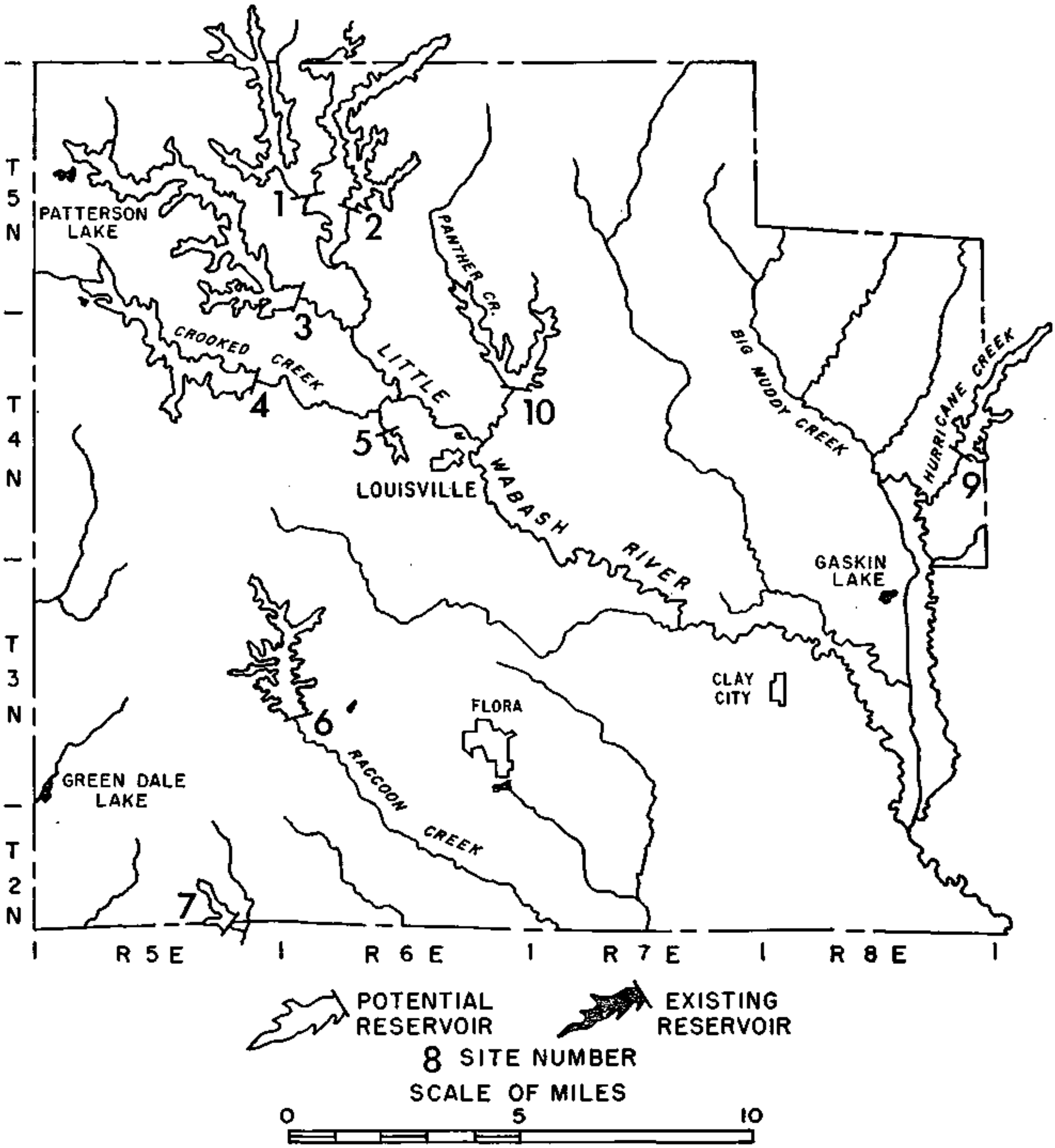
Potential Reservoirs in Clay County

Site number	Waterway location	Spillway elevation (ft)	Pool area (acres)	Storage (ac-ft)	Storage (mg)	Watershed (sq mi)	Times filled per year	Depth at dam (ft)	Length of dam (ft)	Earth fill (cu yd)	Shoreline (mi)	Mean annual runoff (mgd)	Net yield (mgd) for given recurrence intervals: Full capacity 5 Yr	Full capacity 10 Yr	Full capacity 25 Yr	Full capacity 40 Yr	Half capacity 5 Yr	Half capacity 10 Yr	Half capacity 25 Yr	Half capacity 40 Yr
1	Little Wabash River NE ¼ 19-5N-6E (Edgewood Quad)	500	12,000	160,000	52,130	572.0	2.1	40	1,900	534,200	150	294.15	213.3	166.9	123.2	94.4	116.8	95.4	68.7	46.2
2	Lucas Creek SE ¼ NE ¼ 20-5N-6E (Edgewood Quad)	500	900	12,000	3,910	17.2	.8	40	1,200	310,600	35	8.85	8.2	8.2	5.6	4.7	7.3	5.0	3.4	2.6
3	Dismal Creek SE ¼ SW ¼ 31-5N-6E (Edgewood Quad)	500	2,100	28,700	9,350	50.0	1.0	50	1,300	422,600	58	25.71	24.2	21.6	15.0	12.8	16.8	13.3	9.6	6.8
4	Crooked Creek W ½ SW ¼ 12-4N-5E (Edgewood Quad)	500	900	10,800	3,520	37.5	2.0	38	950	232,500	33	19.28	14.0	11.0	8.2	6.3	7.7	6.0	4.5	2.8
5	Trib. Crooked Creek NE ¼ NE ¼ 21-4N-6E (Edgewood Quad)	480	60	500	163	1.0	1.2	25	400	53,900	3	.51	.5	.4	.3	.2	.3	.2	.2	.1
6	Raccoon Creek S ½ SW ¼ 19-3N-6E (Xenia Quad)	500	1,000	11,700	3,812	15.0	.8	35	1,250	250,600	33	7.89	7.1	7.1	4.8	4.3	5.1	3.5	3.0	2.6
7	Brush Creek NE ¼ SE ¼ 14-2N-5E (Xenia Quad)	500	125	1,040	389	2.4	1.4	25	600	81,600	6	1.26	.9	.7	.6	.5	.6	.3	.2	.1
9	Hurricane Creek NE ¼ NE ¼ 24-4N-8E (Sailor Springs Quad)	450	540	4,140	1,349	23.0	3.2	23	850	103,400	14	11.83	5.8	4.6	3.4	2.4	2.8	2.5	1.5	.9
10	Panther Creek SE ¼ SE ¼ 12-4N-6E (Sailor Springs Quad)	460	420	2,100	684	28.0	7.7	15	800	61,500	9	14.4	9.7	7.6	5.6	4.3	4.9	3.8	2.5	1.3
Sites partially in Clay County (See Marion County for description)																				
6	Skillet Fork NE ¼ NE ¼ 23-3N-4E	500	1,300	13,000	4,235	40.0	1.8	30	1,100	200,200	21	21.03	13.9	9.5	7.5	7.0	7.4	5.1	3.3	2.9
(See Wayne County for description)																				
1	Nickolson Creek NW ¼ NW ¼ 31-2N-4E	500	820	12,000	3,910	13.6	.7	44	900	258,200	18	7.15	6.5	6.5	4.8	4.2	5.1	3.7	3.0	2.7

Existing Reservoirs in Clay County

Reservoir name	Legal description	Owner	Watershed area (sq mi)	Watershed area (acres)	Height of dam (ft)	Depth of water at dam (ft)	Pool area (acres)	Storage capacity (ac-ft)	Storage capacity (mg)	Storage capacity (in)	Remarks and data source
Greendale Lake	SW ¼ 31-3N-5E (Xenia Quad)	C & E I	7.50	4,800		18	34	230	75.0	0.58	
Brown Park Lake	28-33-3N-6E (Xenia Quad)	Flora (C)	1.47	940	20.0	18	9	37	12.3	0.48	Sed. survey 1959
Trago Lake	SW ¼ 20-3N-6E (Xenia Quad)	Clarence Trago Flora, Ill.	.50	320	12.5	10	14	45	14.6	1.69	Tributary of Raccoon Lake
East	36-3N-6E (Flora Quad)	B & O Res.	1.0	640	15.0	12	14	111	36.1	2.08	Pumpage from 6 nearby wells keeps reservoir full
West	36-3N-6E (Flora Quad)	B & O Res.				6	11				
Paterson Lake	17-18-5N-5E (Edgewood Quad)	I & C R.R.	1.27	812.8	30.0	22	30	281	91.6	4.15	Data from sed. survey 1959
McArthur Lake	SW ¼ SE ¼ 9-5N-5E (Edgewood Quad)	Harry Milbarger	.40	256	20.0	12	5	32	10.4	1.50	Observation and estimate from owner
Ging Lake	SW ¼ SW ¼ 32-5N-5E (Edgewood Quad)	Ging Seed Co. Farina, Ill.	.05	32		22	5	38	12.4	14.24	SCS Constr. records
Gaskin Lake	S ½ 3-3N-8E (Flora Quad)	Carrell Gaskin	1.5	960		15	68	310	100.9	3.75	Owner estimate, nearest town Clay City
Clay County Sportsmen's Club	14-5N-8E (Sailor Springs Quad)	Clay County Sportsmen's Club	0.08	50	22.0	18	5	35	11.4	0.84	From club president, A. C. Rudolph
Freeman Lake	SE ¼ SE ¼ 2-4N-6E (Sailor Springs Quad)	John Freeman Louisville, Ill.	.05	32		25	5	40	13.0	15.00	Originally constr. by SCS, later enlarged

CLAY COUNTY



brown to reddish brown sandy or silty clay glacial till, with many pebbles and some cobbles. The alluvium is a heterogeneous cut-and-fill deposit which is fine textured in the upper 10 feet and coarse in the lower portions. The depth of the alluvial material could not be determined with manual equipment but is estimated to be as much as 25 feet in mid-valley. The alluvium should be tested to determine whether the material is impermeable enough to act as a blanket for the underlying sandy material, and to determine the total consolidation that will occur from the weight of the fill. An alternate solution may be to blanket the channel from the dam upstream for about 500 feet. This site should make a many-fingered reservoir at a moderately high project cost.

CLINTON COUNTY

Clinton County lies wholly within the Kaskaskia River basin. The Kaskaskia River and its numerous tributaries (Sugar, Lake, Shoal, Flat, Coles, Lost, and Crooked Creeks) are well distributed over the area and capable of removing excess surface runoff. However, because of the nearly level topography, most of the uplands drain slowly.

Most of Clinton County is underlain by a wide bedrock lowland that was formed at the confluence of the Kaskaskia bedrock valley and several of its tributaries. This lowland was filled by drift from Illinoian and earlier glaciations, but the present surface materials are post-Illinoian, fluvial and lacustrine deposits that are much more youthful than the surrounding Illinoian drift.

The level topography and wide shallow stream beds do not lend themselves to reservoir sites within the scope of this study. The possibility of a very large development is, however, well demonstrated by the Carlyle Reservoir project that is under construction on the Kaskaskia River.

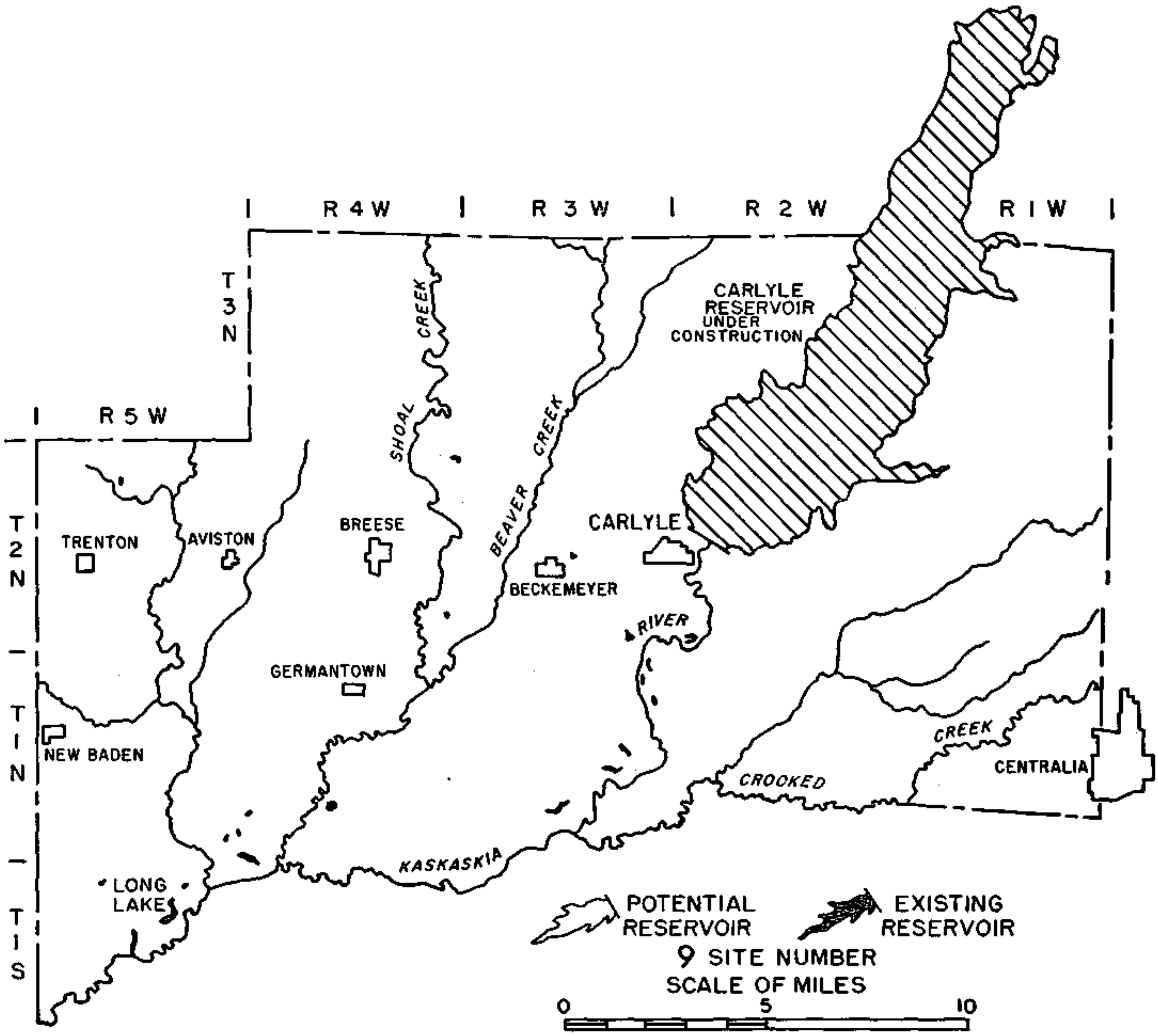
Potential Reservoirs in Clinton County

Site number	Waterway location	Spillway elevation *(ft)*	Pool area *(acres)*	Storage *(ac-ft)*	Storage *(mg)*	Watershed *(sq mi)*	Times filled per year	Depth at dam *(ft)*	Length of dam *(ft)*	Earth fill *(cu yd)*	Shoreline *(mi)*	Mean annual runoff *(mgd)*	Net yield *(mgd)* for given recurrence intervals: Full capacity 5 Yr	Full capacity 10 Yr	Full capacity 25 Yr	Full capacity 40 Yr	Half capacity 5 Yr	Half capacity 10 Yr	Half capacity 25 Yr	Half capacity 40 Yr
Sites partially in Clinton County (See Madison County for description)																				
9	Spanker Branch SW ¼ SW ¼ 25-3N-5W	480	800	8,000	2,606	14.5	.8	30	1,000	172,500	15	6.05	5.5	5.0	3.3	2.7	4.5	2.8	1.2	1.3

Existing Reservoirs in Clinton County

Reservoir name	Legal description	Owner	Watershed area *(sq mi)*	Watershed area *(acres)*	Height of dam *(ft)*	Depth of water at dam *(ft)*	Pool area *(acres)*	Storage capacity *(ac-ft)*	Storage capacity *(mg)*	Storage capacity *(in)*	Remarks and data source
Carlyle Reservoir	17-18-2N-2W (Carlyle Quad)	Federal Gov't	2,680		70		12,500	100,000			Conservation pool
C B & Q R.R.	NE ¼ SE ¼ 36-2N-1W (Centralia Quad)	C B & Q R. R		400	30	20	20	100	33		Marion County line
Lake Joy	SE ¼ NE ¼ 35-2N-3W (Carlyle Quad)	Boy Scouts of America		290	13	10	10	40	13		
Blanke Lake	NW ¼ NE ¼ 1-1N-3W (Carlyle Quad)	A. O. Hickcox					15	45	15		Oxbow
Frogtown Lake	36-3N-4W (Carlyle Quad)	Lloyd Smith F. Trautman					40	40	13		Slough
Bluff Lake	18-2N-3W (Carlyle Quad)	Geo. Hustedde					5	10	3		Slough
Horseshoe Lake	SE ¼ 36-1N-5W (Okawville Quad)	Several small tracts			3		14	42	14		Oxbow
Long Lake	10-1S-5W (Okawville Quad)	C. H. Bopp Eugene Iberg					17	68	22		Oxbow
Queen's Lake	9-16-1S-5W (Okawville Quad)	W. H. Lutz Chas J. Glass					20	100	33		Oxbow
Big Fork Lake	31-1N-4W (Nashville Quad)	Several small tracts					20	100	33		Oxbow
Cooper Lake	25-1N-5W (Okawville Quad)	Henry Fuehne					10	20	7		Oxbow
Grass Lake	35-1N-4W (Okawville Quad)	Ben Henker					8	40	13		Oxbow
Clear Lake	34-1N-4W (Okawville Quad)	Ben Henker Geo. Hermeling					10	40	13		Oxbow
McMillan Lake							12				
Coles Lake							19				
Bear Lake							10				
Mossy Lake							8				
Walcott Lake							14				

CLINTON COUNTY



COLES COUNTY

Coles County was covered not only by the Illinoian glacial advance but also by the more recent Wisconsinan. The effect of the Wisconsinan and the amount of material it deposited are clearly visible at the southern edge of the county where the end of a terminal moraine about 5 to 9 miles wide is marked by an abrupt drop onto an outwash plain. Various advances and retreats of the Wisconsinan poured huge quantities of water over Coles County resulting in deposits of permeable outwash material in most of the valleys. These deposits constitute a hazard to every dam site in the county and must be thoroughly investigated whenever they are encountered.

Pennsylvanian bedrock underlies the area and is exposed as shale and sandstone in the valleys of the central and northeastern portions of the county. The Pennsylvanian formation should be expected to contain weak, easily eroded shales, thin limestones up to 25 feet thick, coal seams, and locally developed more resistant sandstones.

Although the topography of Coles County is well suited to reservoir development, the geology as described above is questionable. Fourteen sites were investigated in the county and the results are presented here.

Site 1. A potential reservoir site exists on the Kaskaskia River about 2 miles east of the Moultrie-Coles County line. The watershed consists of gently rolling uplands that break sharply into valleys with wide, slightly rolling floodplains. The floodplain, where drainage is adequate, is in cultivation. Valley walls and noncultivated areas are covered with brush and mixed hardwoods. Extensive land clearing and numerous relocations or improvements of railroads and highways would be required in the reservoir area. Land easements and rights of way would be expensive. There also are a few residences, active oil wells, oil and gas lines, and power lines in the reservoir area. The upper third of the reservoir would have a mean depth of less than 7 feet. This is a very good dam site for water storage and has no unusual problems of design or construction. Depth to bedrock was not determined, but the unconsolidated material is Wisconsinan glacial till, consisting of sandy clay or silty clay that is firm in the upper abutments and stiff in the lower abutments. Some sandy inclusions may exist in the glacial till, but leakage is not expected to be a problem. This would be a very high cost project.

Site 2. This dam site on Kickapoo Creek is located 2 miles south and 3 miles west of Charleston, about 1 mile above the confluence with Riley Creek. Four frame residences and their outbuildings would be inundated, along with one county highway and several township roads. The reservoir area is under cultivation, and timber is restricted to the banks of the creek. The dam site is considered questionable from a geologic standpoint since the valley bottoms may largely consist of, or be underlain by, sand and gravel. These sands and gravels may be sufficiently permeable that the reservoir water might escape through it, unless practicable means to prevent leakage are installed. A saddle dam would be required on the right abutment, and there exists the possibility of leakage through this abutment into an adjacent tributary. This site would make only a fair reservoir at a moderately high to high cost.

Site 3. A small reservoir could be developed by construction of a dam on the West Branch of Hurricane Creek about 1 mile south of Hutton and 8.5 miles southeast of Charleston. The watershed has rolling uplands, steep valley walls, and a moderately wide alluviated floodplain. The reservoir area is open land under some cultivation; timber is confined to the stream banks. One single story frame house and a two-lane concrete highway known as Hutton Road would be inundated. This site should make a good reservoir at a moderately high cost. Based on a preliminary investigation this reservoir is classed as probably not feasible geologically because it is highly probable that the site is underlain by sand or gravel through which reservoir water could escape. A program of boring would be required to determine the extent and seriousness of the permeable materials.

Site 4. The lower dam site on Riley Creek is located 3 miles west of Charleston. The reservoir area is about 80 percent open land, and timber is confined to the stream banks. Illinois Route 316 makes three crossings of Riley Creek within the reservoir area. There are six township roads in the inundated area. The seriousness of the loss of roads is offset by a four-lane highway from Mattoon to Charleston just south of the reservoir area. The embankment of the New York Central Railroad might need protection, and there are several residences that would be close to the reservoir area. Access to the area is good. The dam site is considered questionable geologically because of underlying sands and gravels. Proper construction techniques might overcome the geologic conditions, but this site would probably be a moderately high cost project.

Site 5. The Whetstone Creek tributary of the Embarras River has a dam site on a 5.75 by 2.5 mile watershed having rolling uplands, steep-walled tributary valleys, and a broad alluviated floodplain. The entire reservoir area consists of willow swamps and mixed timber. The dam site is swamped by the backwater from Lake Charleston creating some construction difficulties. Land acquisition and relocation costs should be at a minimum, but construction costs would be above normal. Like Kickapoo Creek sites, the Whetstone Creek site is considered questionable from a geologic standpoint since the valley floor may be underlain by sands and gravels sufficiently permeable that the reservoir water might escape.

If construction techniques can eliminate the leakage problem this site should make a good reservoir at a moderately low cost. There are possibilities of developing a site farther upstream, but this would require a high fill and would have a smaller drainage area.

Site 6. The watershed of this site on Indian Creek, a tributary of the Embarras River, has rolling uplands, steep-sided tributary valleys, and a broad alluviated floodplain. The reservoir area consists of open crop land and heavy timber along the stream banks. A north-south section of the Lincoln Memorial Highway crosses the upper third of the reservoir area and would require raising. There are two single story frame residences with barns that would be inundated. Sandstone bedrock was observed in the south abutment, but sand and gravel alluvium would cause reservoir leakage unless properly cut off. Land acquisition, relocations, and construction conditions would make this a moderately high cost project.

Site 7. This Kickapoo Creek site is located about 3 miles south of Charleston. The reservoir area is under extensive cultivation, and contains three new residences and four frame residences that are very close to the lake shore. Timber is confined to the stream banks and valley walls. Like the other two Kickapoo Creek sites the dam site is considered questionable from a geologic standpoint since the valley bottom may be underlain by sand and gravel sufficiently permeable that the reservoir water might escape. A section of the Lincoln Memorial Highway, as well as several township roads, would be inundated. Land acquisition, relocations, and construction costs would be high making this a high cost project.

Site 8. A good dam site for a very large reservoir exists on the Little Embarras River about 2 miles above its confluence with the Embarras River. The resulting lake would extend upstream some 10 miles to a point about 2 miles south of Brocton and a mile northwest of Redmon. This long deep lake would have branches about 3 miles in length on Catfish and Donica Creeks. The reservoir area is about 85 percent open land; the wide bottomlands are cultivated and timber is restricted to the stream banks. There are several residences in the reservoir area, and several others in the vicinity which would require access roads. There are a number of power transmission lines as well as local utility services across the lake bed. At least nine township roads, three county roads, and Illinois Routes 133 and 49 would be inundated. This dam site is classed as probably not feasible because its valley was known to have carried outwash from melting Wisconsinan glaciers. It is highly probable that the dam site is underlain by deposits of sand or gravel, through which reservoir water could escape. Pending subsurface investigation, it may be assumed that proper construction techniques could control leakage. This site should produce a good large reservoir at a moderately high project cost.

Site 9. The upper reservoir on Riley Creek is located about 5 miles west of Charleston. The reservoir area is primarily agricultural, with medium timber along the stream banks. There are no known residences in the reservoir area, but Illinois Route 316 and several township roads would be inundated. Like the Kickapoo Creek sites, the dam site is questionable because of underlying sands and gravels that may provide an escape for reservoir water. Land acquisition and relocation costs would be high, resulting in a moderately high cost project.

Site 10. A small reservoir could be developed from a dam site on Greasy Creek located about 4 miles west of Oakland. The watershed is 8 by 3 miles and has gently rolling uplands, gradual valley slopes, and a narrow alluviated floodplain. The reservoir area is about 80 percent heavy timber, but has some cultivation on open land near the dam site. At least two and possibly three residences would be inundated. Two gravel roads and one blacktop road cross the lake bed. It would be possible to relocate the blacktop road over the structure. The geologic conditions at the dam site are considered questionable because the valley bottom may largely consist of, or may be underlain by, sand and gravel which may be sufficiently permeable to allow reservoir water to escape unless practicable means to prevent leakage can be installed. Relocations, clearing, and construction problems would make this a moderately high cost project.

Site 11. A deep V-shaped reservoir could be developed from a dam site on Jakes Branch, a tributary of the Little Embarras River. The watershed has gently rolling uplands, steep deep tributary valleys, and a rather long narrow floodplain. The reservoir area is nearly 70 percent timbered; the open land is confined to the lower bottom near the dam site. There are no known residences or utilities in the reservoir area, but two township roads would have to be raised or abandoned. The abutments are steep and the stream bed rocky. Bedrock constitutes the bottom, or may be a little below the bottom, of the valley. The valley walls are believed to be till with some alluvium of silt, and some clay and sand near the bottom. The geologic situation appears favorable although there may be some permeable material in the till, or between the till and the bedrock, which might prove unsatisfactory. This is a good site and would result in a normal cost project.

Site 12. A dam site exists on Kickapoo Creek about 6 miles east and 1 mile south of the city of Mattoon. The watershed is rectangular, about 6 by 3 miles, and has gently rolling uplands, steep sloped tributary valleys, and a rather narrow alluviated floodplain. About half of the lake bed is open land capable of cultivation. The stream banks and valley walls are lightly timbered. A cemetery and parts of the Mattoon Country Club would be inundated or very close to inundation. Illinois Route 16 crosses the upper third of the reservoir area and would require raising; two gravel township roads could be abandoned or relocated. The reservoir area is situated over a preglacial valley in which the surficial material is glacial drift of Wisconsinan age. The bedrock is of Pennsylvanian age and occurs at shallow depths. The alluvium may be sufficiently permeable that the site cannot be used unless practical means to prevent leakage can be installed. This would be a good reservoir at a moderately high cost.

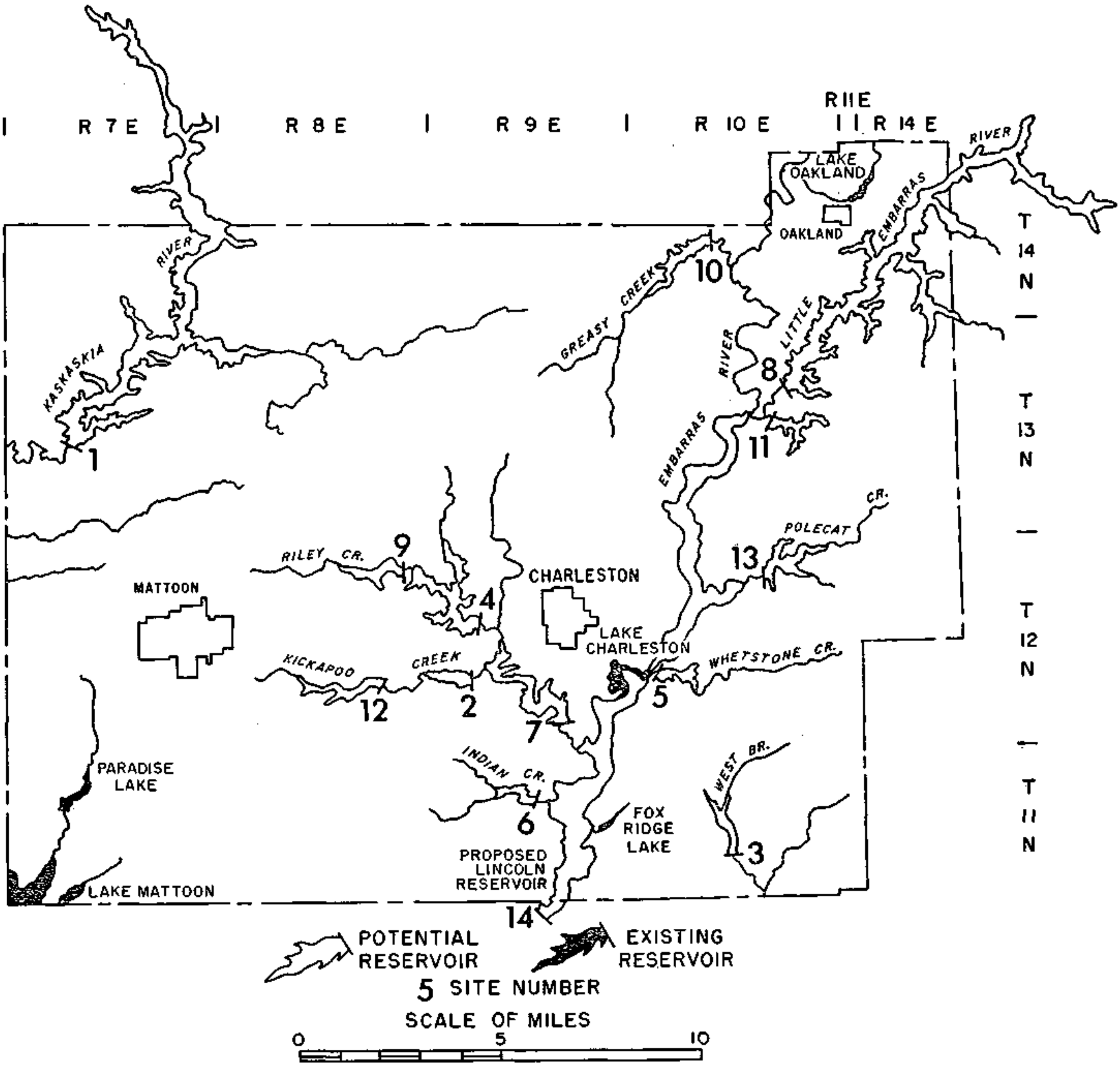
Site 13. Polecat Creek, a tributary of the Embarras River, has a potential reservoir site on a 10 by 4 mile cone-shaped watershed about 6 miles east of Charleston. The reservoir area is open land except for a fringe of timber along the stream banks. The four-fingered lake would inundate four frame residences and probably affect three others. At least three township roads would have to be abandoned and several others relocated to provide access to the village of Ashmore. Shale was observed in the creek bed and some sandstone in the abutments, but the possibility of sands and gravels underlying the dam site and reservoir area make it questionable geologically until further geologic investigations are made. This is a good reservoir site having high storage capacity, high yield, low rate of storage loss, low land acquisition cost, and high potential recreational features. It should make a moderately low cost project.

Site 14. A good dam site exists on the main stem of the Bmbarras River about 8 miles south of Charleston. This is approximately the site location for the U. S. Corps of Engineers Lincoln Reservoir. Depending on the size of lake desired, a dam in this location could have a spillway elevation of from 570 to 630 feet. At the lower elevation only one township road and one isolated residence would be inundated. At the higher elevation water would be backed up to 1 mile north of Camargo or about 30 straight-line miles north of the dam site. Timber is generally restricted to the river banks and steeper valley walls. The dam site and reservoir area are considered probably not feasible geologically until further investigation proves that leakage can be controlled. The project cost will vary with the elevation chosen. The lower elevation would result in a moderately low cost project, but the higher elevation would result in a high cost project.

Potential Reservoirs in Coles County

Site number	Waterway location	Spillway elevation (*ft*)	Pool area (*acres*)	Storage (*ac-ft*)	Storage (*mg*)	Watershed (*sq mi*)	Times filled per year	Depth at dam (*ft*)	Length of dam (*ft*)	Earth fill (*cu yd*)	Shoreline (*mi*)	Mean annual runoff (*mgd*)	Net yield (*mgd*) for given recurrence intervals: Full capacity 5 Yr	10 Yr	25 Yr	40 Yr	Half capacity 5 Yr	10 Yr	25 Yr	40 Yr
1	Kaskaskia River NE ¼ NE ¼ 20-13N-7E (Arcola Quad)	640	3,100	24,800	8,080	303.0	7.6	24	1,100	142,700	70	167.94	48.5	36.4	32.5	31.6	23.8	16.5	15.6	15.5
2	Kickapoo Creek SE ¼ SW ¼ 20-12N-9E (Toledo Quad)	640	423	5,600	1,824	30.0	3.3	40	650	111,700	7	16.63	9.5	7.1	5.8	5.4	4.7	3.5	2.9	2.8
3	W. Branch Hurricane Creek NE ¼ SE ¼ 16-11N-10E (Toledo Quad)	660	250	3,750	1,221	9.0	1.5	45	1,200	332,400	6	4.99	4.8	3.4	2.5	2.4	2.7	1.9	1.5	1.4
4	Riley Creek NW ¼ NE ¼ 17-12N-9E (Toledo Quad)	640	230	2,760	899	41.0	9.2	36	900	207,900	11	22.72	5.7	4.4	3.9	3.6	3.0	2.3	2.1	1.9
5	Whetstone Creek SW ¼ SE ¼ 19-12N-10E (Toledo Quad)	610	211	2,530	824	13.0	3.2	36	500	70,500	3	7.21	4.2	3.1	2.6	2.4	2.1	1.5	1.3	1.2
6	Indian Creek NE ¼ NW ¼ 10-11N-9E (Toledo Quad)	610	200	2,440	794	10.0	2.5	34	700	123,500	3	5.54	3.6	2.7	2.1	2.0	1.9	1.4	1.3	1.2
7	Kickapoo Creek NE ¼ NE ¼ 34-12N-9E (Toledo Quad)	600	851	9,360	3,050	87.0	5.8	33	750	147,600	10	48.2	17.4	13.5	11.4	11.1	9.4	6.7	6.1	5.9
8	Little Embarras River NE ¼ SW ¼ 11-13N-10E (Toledo Quad)	650	3,700	71,500	23,290	112.7	.9	58	800	351,100	60	59.50	56.0	55.9	40.0	35.3	45.9	31.3	24.7	18.4
9	Riley Creek SE ¼ SW ¼ 1-12N-8E (Arcola Quad)	660	274	2,280	743	21.2	5.8	25	750	103,500	7	11.75	4.1	3.2	2.6	2.6	2.1	1.5	1.3	1.3
10	Greasy Creek SE ¼ NW ¼ 21-14N-10E (Oakland Quad)	640	240	2,558	833	20.0	4.4	32	800	143,800	5	9.94	3.9	3.0	2.6	2.4	2.2	1.3	.9	.7
11	Jakes Branch NW ¼ SW ¼ 14-13N-10E (Oakland Quad)	650	255	4,250	1,385	7.5	1.0	54	850	342,200	8	3.73	3.5	3.4	2.4	2.1	2.7	1.9	1.3	1.1
12	Kickapoo Creek E ½ SE ¼ (23-26) 12N-8E (Mattoon Quad)	680	592	8,900	2,900	18.2	1.3	45	900	277,400	15	10.09	9.8	8.0	5.7	7.7	6.0	4.2	3.3	3.1
13	Polecat Creek SE ¼ SE ¼ 3-12N-10E (Oakland Quad)	665	570	8,550	2,786	28.7	1.9	45	1,000	286,100	19	14.17	11.3	8.0	6.4	5.2	6.1	4.7	3.0	2.2
14	Embarras River Ctr 27-11N-9E	596	6,760	65,450	21,324	915.0	8.7	55	2,400	669,540	56	507.13	139.5	108.9	98.1	90.9	70.2	57.9	54.5	47.5
Sites partially in Coles County (See Cumberland County for description)																				
7	Dicks Creek NE ¼ SW ¼ 26-11N-8E	650	112	1,640	534	3.6	1.4	44	800	248,600	3	2.00	1.9	1.4	1.0	1.0	1.2	.8	.6	.6

COLES COUNTY



Existing Reservoirs in Coles County

Reservoir name	Legal description	Owner	Watershed area (sq mi)	Watershed area (acres)	Height of dam (ft)	Depth of water at dam (ft)	Pool area (acres)	Storage capacity (ac-ft)	Storage capacity (mg)	Storage capacity (in)	Remarks and data source
Paradise Lake	33-12N-7E, 4-5-8-11N-7E (Mattoon Quad)	Mattoon (C)	18.1	11,580		20	220	2,302	750.0	2.39	
Lake Mattoon	19-20-29-30-31-32-11N-7E, 36-11N-6E, 1-10N-6E (Mattoon Quad)	Mattoon (C)	55.6	35,200		30	1,210	10,435	3,400.0	3.56	
Lake Oakland	7-18-14N-14W (Oakland Quad)	Oakland (C)	14.3	9,158		18	33	92	30.0	0.12	Data from 1954 sed. survey
Lake Charleston	18-19-30-12N-10E, 24-25-12N-9E (Toledo Quad)	Charleston (C)	811.0	519,040		10	404	1,291	420.6	0.03	Built 1947, data est. 1959
Fox Ridge State Park	13-11N-9E (Toledo Quad)	State of Ill.	1.4	902		22	18	172	56.0	2.29	Sed. survey 1947

CRAWFORD COUNTY

Crawford County was covered by the Illinoian glaciation, but the drift is quite thin over the southeast quarter of the county. The drift is primarily glacial till, and Wisconsinan outwash deposits may very likely be encountered. The northeastern and southwestern corners of the county are bedrock lows, and contain sand and gravel outwash deposits.

Pennsylvanian bedrock which consists of weak shales, thin limestones, coal seams, and sandstones occurring in various combinations underlie the drift in Crawford County. Exposures of bedrock are very common in the southeastern quarter of the county.

The topography of Crawford County is only moderately well suited to reservoir development. The major streams flow in very wide valleys that are too shallow for good developments and many of the tributary valleys have small drainage areas. The results of studies on eight sites in the county follow.

Site 1. Grassy Creek, a tributary of Big Creek, has a dam site 4 miles northwest of Robinson and 4.5 miles northeast of Oblong. The diamond-shaped watershed, 3.5 by 1.5 miles, has gently sloping uplands, gradually sloping tributary valleys, and a rather long and narrow floodplain. The reservoir area has 50 percent mixed timber and most of the open land is idle. Development of this site would inundate one section of township road, one frame residence, at least one active oil well, and several oil pipe lines. This is a poor site in comparison with the northern sites in this county and would result in a moderately high cost project. The reservoir area and dam site are considered probably feasible geologically, indicating the materials are generally satisfactory for dam construction with regard to foundation stability, relative impermeability, and source of material for an earth dam.

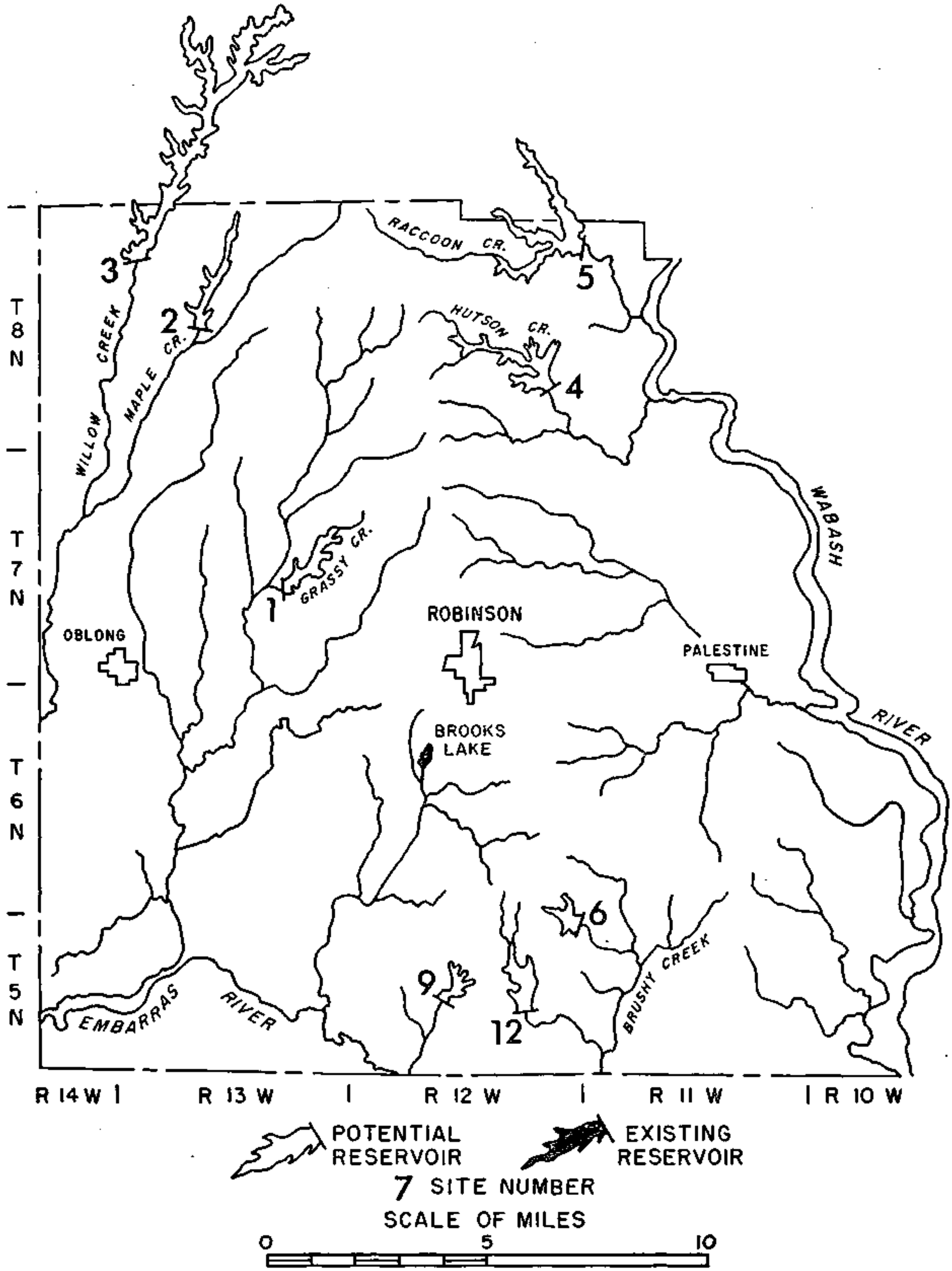
Site 2. Maple Creek, a tributary of Muddy Creek, has a long, narrow club-shaped watershed 9 by 1.75 miles. A dam could be located 3 miles west and 1 mile south of Annapolis to create a narrow lake about 3 miles long. The reservoir area has about 70 to 80 percent mixed timber cover, and the remainder is in pasture. There is a possibility that some active oil wells may exist in the lake bed. Construction of this lake would necessitate relocating or raising four township roads, one of which could be placed over the structure. The reservoir area and dam site are considered to be probably feasible from a geologic standpoint, indicating satisfactory conditions of foundation stability, relative impermeability, and source of material for an earth dam.

Site 3. "Willow Creek, a tributary of the North Fork of the Embarras River, has a long cone-shaped watershed 9 by 1.75 miles. A dam site on "Willow Creek about 10 miles north of Oblong would create a lake 7 miles long. The reservoir area is extensively farmed, and less than 25 percent of the bottomlands are covered with brush and mixed timber. The development would inundate one single story frame house, seven township roads, one power transmission line, and would come very close to several other residences. One township road could be relocated over the structure, several others raised and the rest abandoned, for a parallel-to-lake system of existing township roads. The reservoir would be filled on the average once per year. The reservoir area and dam site

Potential Reservoirs in Crawford County

Site number	Waterway location	Spillway elevation (*ft*)	Pool area (*acres*)	Storage (*ac-ft*)	Storage (*mg*)	Watershed (*sq mi*)	Times filled per year	Depth at dam (*ft*)	Length of dam (*ft*)	Earth fill (*cu yd*)	Shoreline (*mi*)	Mean annual runoff (*mgd*)	Net yield (*mgd*) for given recurrence intervals: Full capacity 5 Yr	Full capacity 10 Yr	Full capacity 25 Yr	Full capacity 40 Yr	Half capacity 5 Yr	Half capacity 10 Yr	Half capacity 25 Yr	Half capacity 40 Yr
1	Grassy Creek NW ¼ SW ¼ 23-7N-13W (Annapolis Quad)	500	125	960	313	4.0	2.5	23	800	96,300	4	2.13	1.3	1.0	.6	.5	.6	.5	.2	.1
2	Maple Creek NW ¼ NW ¼ 21-8N-13W (Annapolis Quad)	530	330	3,000	977	14.9	3.0	27	700	102,700	9	7.92	4.3	3.2	2.0	1.7	2.0	1.7	.9	.5
3	Willow Creek Ctr N ½ 7-8N-13W (Annapolis Quad)	550	1,600	22,400	7,298	36.1	1.0	42	1,575	436,200	32	19.18	17.5	17.0	11.0	9.6	13.4	9.9	5.4	4.1
4	Hutson Creek SW ¼ NW ¼ 25-8N-12W (Hutsonville Quad)	500	720	8,200	2,672	9.0	.7	34	1,100	236,300	14	4.78	4.0	4.0	3.4	2.9	3.8	3.2	1.8	1.6
5	Raccoon Creek NE ¼ SE ¼ 1-8N-12W (Hutsonville Quad)	480	900	9,600	3,128	34.0	2.1	32	950	187,400	17	18.07	12.7	9.9	6.1	5.0	6.5	4.8	2.6	1.8
6	Trib. Brushy Creek SE ¼ NE ¼ 1-5N-12W (Birds Quad)	520	125	1,200	391	2.0	1.0	28	1,000	155,200	5	1.06	.9	.9	.6	.5	.7	.5	.2	.1
9	Trib. Embarras River NE ¼ NW ¼ 16-5N-12W (Hardinville Quad)	490	147	1,470	479	1.81	.6	30	900	127,900	5	.96	.8	.8	.8	.6	.7	.6	.4	.3
12	Sugar Creek SE ¼ NW ¼ 14-5N-12W (Birds Quad)	520	230	2,800	912	4.0	.8	36	800	172,400	6	2.13	1.9	1.9	1.3	1.1	1.7	1.1	.6	.5

CRAWFORD COUNTY



Existing Reservoirs in Crawford County

Reservoir name	Legal description	Owner	Watershed area (sq mi)	Watershed area (acres)	Height of dam (ft)	Depth of water at dam (ft)	Pool area (acres)	Storage capacity (ac-ft)	Storage capacity (mg)	Storage capacity (in)	Remarks and data source
Brooks Lake	8-17-6N-12W (Hardinville Quad)	Dr. Brooks	0.5	320	24	20	55	275	17.9	10.3	
Horseshoe Pond	NE ¼ 14-5N-14W (Hardinville Quad)	O. Arnold	0.1	60		5	5	12	3.9	2.4	Slough—cutoff
Circle Pond	NW ¼ 18-5N-13W (Hardinville Quad)	E. Townsend	0.2	120		5	5	10	3.3	1.0	Slough—cutoff
West Lake Corp.	SE ¼ 36-7N-13W (Annapolis Quad)	Corporation	0.47	300	14	12	16	70	22.8	2.8	Nearest town Robinson
Dr. Allen Lake	NW ¼ 27-7N-12W (Hutsonville Quad)	Dr. Sam Allen	0.28	180	18	16	20	80	26.1	5.3	
Bureham Lake	SE ¼ 12-7N-13W (Annapolis Quad)	Don Bureham	0.28	180	18	13	10	45	14.7	3.0	
Athey Lake	NW ¼ 6-7N-12W (Annapolis Quad)	Charles Bowen	1.88	1,200	16	12	10	50	16.3	0.5	
K. Lewis Pond	NE ¼ 31-8N-12W (Annapolis Quad)	Kent Lewis	0.19	120	15	12	8	40	13.0	4.0	
Schmidt Lake	NE ¼ 34-7N-13W (Annapolis Quad)	Dr. Gus Schmidt	0.50	320	13	12	10	40	13.0	1.5	
Shaw Lake	SW ¼ 25-8N-13W (Annapolis Quad)	Shaw & Shonk	0.1	60	15	13	8	35	11.4	7.0	
Oblong Park Lake	NW ¼ 31-7N-13W (Annapolis Quad)	Oblong (V)	0.28	180	10	8	5	15	4.9	1.0	
Hensley Lake	SE ¼ 9-6N-13W (Hardinville Quad)	Oscar Hensley	0.05	30	15	12	5	25	8.1	10.0	
Ohio Oil Lake	SE ¼ 35-7N-12W (Hutsonville Quad)	Ohio Oil Co.	0.25	160	15	11	8	36	11.7	2.7	
Palestine Gravel Pits	SW ¼ 27-7N-11W (Hutsonville Quad)	Mr. Wyke	0.05	30		20	30	240	78.0	96.0	Gravel pit
Lake Walton	NE ¼ 7-8N-11W (Hutsonville Quad)	Corporation	0.1	60		14	20	100	32.6	20.0	Borrow pit
Newlin Lake	NE ¼ 10-7N-12W (Hutsonville Quad)	Charles Newlin	0.28	180		12	9	45	14.7	3.0	
Long Pond	SW ¼ 16-6N-10W (Birds Quad)	Clarence Artman	0.19	120		5	7	28	9.1	2.8	Slough—cutoff
Chittick's Cutoff	E ½ 8-5N-10W (Birds Quad)	Eva Goodwin	0.38	240		6	24	72	23.5	3.6	Slough—cutoff

are considered possibly feasible geologically. Future geologic exploration might find that the alluvium is too deep for economical cut-off techniques. This should make a good large reservoir, but the project cost would be moderately high because of high land acquisition and relocation.

Site 4, The Hutson Creek site is located 2 miles west of Hutsonville on a rectangular watershed 4 miles long and 2 miles wide which has gently rolling uplands and valleys that slope gradually into broad alluviated floodplains. Approximately half of the relatively flat and level bottomland is developed for agricultural use. Valley walls and undeveloped bottomlands are covered with brush and mixed hardwoods. Six frame residences would be inundated by the development. The relocations and raising or abandonment of two-lane gravel roads should not be difficult. A dark gray shale outcrop in the channel floor and 3 feet up the right channel bank on the center line of the dam is the only outcrop observed in the dam site or reservoir area. Shale apparently underlies the entire dam site at an estimated depth of 20 feet below the floodplain floor. A seepy zone at the contact of the shale and till would be entirely covered by the fill and should present no problem. The depth of alluvium could not be determined but is estimated to be over 20 feet. An impermeable core of compacted till should extend through the alluvium to prevent leakage. This site would make a good reservoir and should result in a moderately low cost project.

Site 5. The dam site for this reservoir is located below the confluence of Raccoon Creek and its North and South Fork tributaries, 1 mile west of West York. The watershed, 8 miles long and 6 miles wide, has gently rolling uplands, moderately steep valley walls, and broad level floodplains. The level bottom is used primarily for clean tilled crops, and the valley walls are covered with mixed hardwoods. There are several frame residences in the reservoir area. Three north-south and two east-west two-lane gravel roads would have to be relocated, abandoned, or raised. A power line that crosses the South Fork and Eaccoon Creek would require raising. The presence of sandy and gravelly glacial outwash at the dam site and several locations in the reservoir area creates some doubt concerning the water-holding ability of this site. The actual water loss will depend upon the continuity of the permeable strata. Even though leakage may occur through the abutments at the dam site, the seepage can be taken care of with toe drains or relief wells or both. The major concern is whether or not the lower alluvial materials can be intercepted by an impermeable core wall. Suitable soil material for construction of an impermeable core wall and fill would be difficult to find in the vicinity of the dam site. Eelocations and construction difficulties would make this a moderately high cost project.

Site 6. A long shallow forked reservoir could be created by a dam on a tributary of Brushy Creek about 1 mile west of Flat Rock. The reservoir area is 40 to 50 percent covered with mixed timber. Development would inundate at least one active oil well, one township road, and a section of power transmission lines. Geologically the reservoir area and dam site are considered probably feasible. This is not a good site and the project cost would be moderately high.

Site 9. A reservoir could be created by construction of a dam across a tributary of the Eembarras River about 4 miles west and 1.5 miles south of Flat Rock. The watershed of about 2 miles by 1 mile has rolling slopes and dendritic drainage. The reservoir area has over 75 percent mixed timber. Development of this lake would inundate one residence and probably several oil pipe lines since there are several oil wells in the vicinity of the lake. The reservoir area and dam site are considered probably feasible geologically indicating generally satisfactory conditions with regard to foundation stability, relative impermeability, and source of material for an earth dam. This site should make a fair reservoir at a normal cost.

Site 12. Sugar Creek, a tributary of Brushy Creek, has a rectangular watershed, 3.25 by 1.25 miles, above a dam site that is 2.25 miles west and 1.75 miles south of Flat Rock. Over half of the reservoir area is clear of timber and in cultivation. The development of this site would inundate two township roads and one county road which could be raised. There are several oil wells and small ponds in the vicinity. At the dam site the stream bed and left abutment have clay shale which has some sandstone inclusions. The reservoir area and dam site are considered probably feasible from the standpoints of foundation stability, relative impermeability, and source of material for an earth dam. This should make a good reservoir at a normal project cost.

CUMBERLAND COUNTY

The Illinoian glaciation covered all of Cumberland County leaving a deep gently rolling layer of glacial drift, primarily till. The Wiseonsinan glaciation advanced to the northern edge of the county and poured out great quantities of water and outwash materials. These outwash deposits are permeable and create a leakage hazard to any reservoir constructed over them.

Except in a few isolated locations the Pennsylvanian bedrock which underlies the area is not exposed. Elevation of the bedrock surface ranges from 650 feet mean sea level (msl) on the western side of the county to 350 feet msl on the east. If encountered these rocks would probably consist of various combinations of weak, easily eroded shales, limestone layers up to 25 feet thick, coal seams, and locally developed sandstones.

The topography of Cumberland County offers many opportunities for reservoir sites, but the existence of permeable sand and gravel deposits complicate many of these developments. The results of feasibility studies on 16 sites in Cumberland County are reported here.

Site 1. Point Creek, a tributary of Muddy Creek, has a dam site located about 4 miles west of Jewett and 10 miles northeast of Teutopolis. A long shallow lake can be developed from this L-shaped watershed which has gently rolling uplands, gently sloping valleys, and a wide level floodplain. Most of the reservoir area is in open land that is under cultivation, but brush and timber exist along the stream banks and valley walls. Two township roads would be inundated and a county road would require raising. Land acquisition, relocations, and construction costs would be normal. The geologic conditions at this site are generally satisfactory for dam construction from the standpoints of foundation stability, relative impermeability, and source of earth dam construction material. This is a fair site and could be developed at near normal costs.

Site 2. Two miles northwest of Jewett a good dam site is located on Crooked Creek, a tributary of Muddy Creek. The L-shaped watershed is 4.5 by 1.25 miles and has gently rolling uplands, sloping tributary valleys, and a narrow floodplain. Only about one-fourth of the reservoir area is open land, and the remainder is in mixed timber. Three township highways could be abandoned in favor of a parallel road system on other existing town roads. One frame residence exists in the lake bed. The site is geologically classed as probably feasible from the standpoints of foundation stability, relative impermeability, and source of material for earth dams. Costs for land acquisition, relocations, and construction should be moderately low.

Site 3. Island Creek, a tributary of Muddy Creek, has a rectangular watershed, 8 by 3 miles, which has gently rolling uplands, fairly steep tributary valleys, and a long narrow floodplain. A dam located about 3 miles southwest of Jewett would create a long deep lake that would require about two years to fill. The reservoir area is about 60 to 70 percent covered with mixed timber. Two residences and their outbuildings would be inundated. Township roads in five places including one three-way intersection and a cemetery access road would require relocation or abandonment. In addition to these, overhead and underground telephone cables cross the

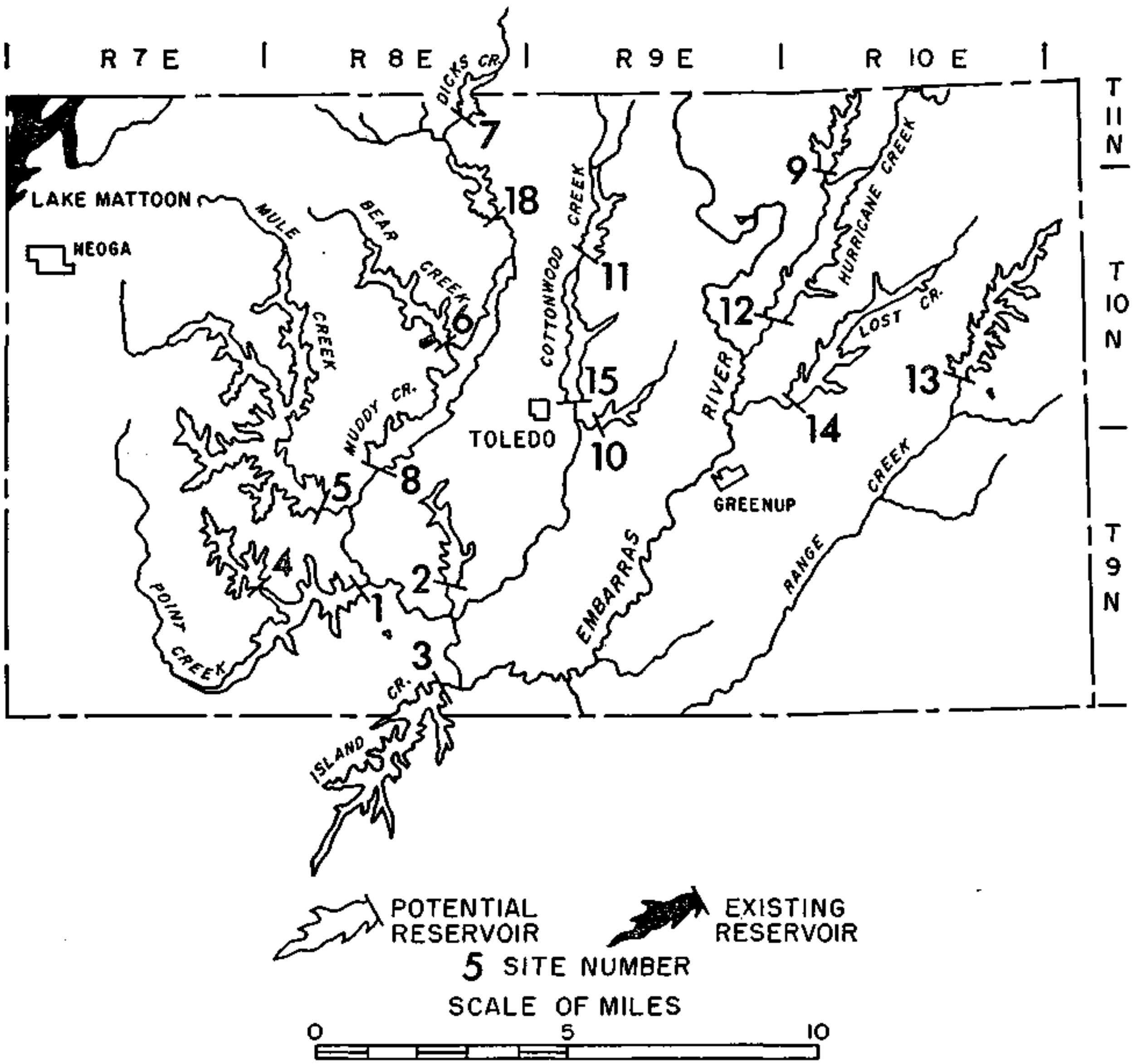
Potential Reservoirs in Cumberland County

Site number	Waterway location	Spillway elevation (ft)	Pool area (acres)	Storage (ac-ft)	Storage (mg)	Watershed (sq mi)	Times filled per year	Depth at dam (ft)	Length of dam (ft)	Earth fill (cu yd)	Shoreline (mi)	Mean annual runoff (mgd)	Net yield (mgd) for given recurrence intervals: Full capacity 5 Yr	Full capacity 10 Yr	Full capacity 25 Yr	Full capacity 40 Yr	Half capacity 5 Yr	Half capacity 10 Yr	Half capacity 25 Yr	Half capacity 40 Yr
1	Point Creek NW ¼ NW ¼ 21-9N-8E (Teutopolis Quad)	560	850	10,200	3,323	32.0	1.8	36	900	202,300	8	16.46	14.4	11.0	7.0	5.5	7.6	6.4	3.4	2.4
2	Crooked Creek NW ¼ NW ¼ 23-9N-8E (Teutopolis Quad)	570	224	3,508	1,143	3.8	.6	47	700	182,200	3	1.95	1.7	1.7	1.6	1.3	1.8	1.5	1.0	.8
3	Island Creek SE ¼ NE ¼ 34-9N-8E (Greenup Quad)	570	1,200	22,800	7,428	18.8	.5	57	1,150	503,200	8	9.67	8.4	8.4	8.4	7.4	8.1	8.1	5.6	4.8
4	Turkey Creek SE ¼ NE ¼ 24-9N-7E (Teutopolis Quad)	590	301	3,109	1,039	3.6	.7	31	700	89,800	3	1.85	1.5	1.5	1.4	1.1	1.4	1.3	.8	.6
5	Mule Creek SW ¼ NW ¼ 8-9N-8E (Teutopolis Quad)	600	2,470	54,340	17,700	32.0	.3	66	1,500	839,300	8	16.46	13.8	13.8	13.8	13.8	13.1	13.1	11.5	9.5
6	Bear Creek SW ¼ NW ¼ 23-10N-8E (Mattoon Quad)	600	448	5,670	1,847	15.0	1.5	38	700	159,600	6	7.71	7.2	5.9	3.7	3.1	4.0	3.3	1.7	1.3
7	Dicks Creek NE ¼ SW ¼ 26-11N-8E (Mattoon Quad)	650	112	1,640	534	3.6	1.4	44	800	248,600	3	2.00	1.9	1.4	1.0	1.0	1.2	.8	.6	.6
8	Muddy Creek SW ¼ NE ¼ 4-9N-8E (Mattoon Quad)	570	850	11,330	3,691	62.0	3.2	40	850	225,800	12	31.88	18.6	15.0	9.2	6.9	9.9	7.9	5.0	3.3
9	Opossum Creek SE ¼ SE ¼ 31-11N-10E (Toledo Quad)	600	311	3,940	1,284	5.1	.8	38	1,100	278,200	5	2.83	2.5	2.5	1.9	1.8	2.1	1.6	1.1	1.1
10	Trib. Cottonwood Creek SW ¼ NE ¼ 32-10N-9E (Toledo Quad)	570	106	700	228	3.9	3.1	20	500	52,400	3	1.95	1.0	.8	.5	.4	.5	.3	.2	.1
11	Cottonwood Creek NE ¼ SW ¼ 8-10N-9E (Toledo Quad)	600	280	1,660	541	11.5	4.3	24	1,100	137,100	6	6.37	2.6	2.0	1.7	1.5	1.2	.8	.6	.6
12	Hurricane Creek NW ¼ NE ¼ 24-10N-9E (Toledo Quad)	570	1,240	16,500	5,376	55.0	1.9	40	1,700	479,500	12	28.28	23.3	18.3	11.2	9.2	12.9	10.7	5.6	4.2
13	Range Creek NE ¼ SE ¼ 27-10N-10E (Toledo Quad)	600	506	5,394	1,757	18.0	1.8	32	900	174,200	8	8.54	6.6	4.7	2.8	2.1	3.1	2.2	.9	.8
14	Lost Creek NW ¼ NW ¼ 31-10N-10E (Toledo Quad)	580	742	11,130	3,626	13.8	.7	45	800	247,900	10	7.10	6.3	6.3	5.4	4.4	6.3	5.2	3.3	2.5
15	Cottonwood Creek SW ¼ NW ¼ 29-10N-9E (Toledo Quad)	580	700	8,860	2,886	20.0	1.3	38	1,300	209,900	9	10.28	9.6	8.5	5.7	4.6	6.4	4.6	2.5	1.9
18	Muddy Creek SW ¼ 1-10N-8E (Mattoon Quad)	600	275	2,100	684	34.0	10.0	23	800	94,800	5	18.84	4.4	3.3	2.8	2.7	1.8	1.5	1.1	1.1
Sites partially in Cumberland County																				
(See Jasper County for description)																				
6	Panther Creek NW ¼ NW ¼ 17-8N-14W	550	500	5,350	1,743	13.0	1.4	32	700	139,600	12	6.91	6.3	5.0	3.2	2.6	3.4	2.4	1.4	1.0
(See Coles County for description)																				
14	Embarras River Ctr 27-11N-9E (Toledo Quad)	596	6,760	65,450	21,329	915.0	8.7	55	2,400	669,540	56	507.13	139.5	108.9	98.1	60.9	70.2	57.9	54.5	47.5

Existing Reservoirs in Cumberland County

Reservoir name	Legal description	Owner	Watershed area (sq mi)	Watershed area (acres)	Height of dam (ft)	Depth of water at dam (ft)	Pool area (acres)	Storage capacity (ac-ft)	Storage capacity (mg)	Storage capacity (in)	Remarks and data source
Woodbury Lake	NE ¼ 28-9N-8E (Teutopolis Quad)	Jerry Sheehan	1.88	1,200	17	12	8	77	25.1	0.77	
Vevay Park Lake	S ½ 26-10N-10E (Toledo Quad)	Ehlebrick Shoe Co.	0.12	74	21	15	11	54	17.6	8.44	
Montrose City Lake	SW ¼ SW ¼ 36-9N-7E (Teutopolis Quad)	Montrose	0.25	160	26	20	8				
Cumberland County Sportsmen's Club	SE ¼ 19-10N-10E (Toledo Quad)	Cumberland County Sportsmen's Club	0.25	160	25	21	7				
Lake Louise	E ½ 22-10N-8E (Mattoon Quad)	Walter Rhoades	0.25	160	24	19	10				
Clark Cochonour	SE ¼ 25-10N-10E (Toledo Quad)	Clark Cochonour	0.18	90	20	15	5				

CUMBERLAND COUNTY



dam site and lake bed. Land acquisition and relocations would be moderately high. The dam site is geologically classified as probably feasible, indicating that the valley materials are generally satisfactory for dam construction from the standpoints of foundation stability, relative impermeability, and source of material for earth dams. This site should result in a moderately high cost project.

Site 4. A small deep reservoir could be created on Turkey Creek about 3 miles north of Montrose. The watershed is rectangular, 2.75 miles by 1.75 miles, and has gently sloping uplands, steep tributary valleys, and a narrow floodplain. Nearly all of the reservoir area is covered with mixed timber. A half mile of two-lane concrete road and its intersection with a gravel township road would require relocation or abandonment. This dam site is considered probably feasible geologically. Eelocation of a concrete highway would tend to make this project moderately high in cost.

Site 5. A very long deep lake could be created on Mule Creek, with bays on Brush and Point Creeks, by the construction of a dam about 6 miles northeast of Montrose and 9 miles west of Greenup. The watershed has gently rolling uplands, steeply sloping tributary valleys, and a rather wide alluviated floodplain. Most of the reservoir area is open land, and about half is under cultivation. The stream banks and the numerous tributary coves are covered with mixed timber. Development of this lake would inundate two sections of Illinois Route 121, seven county roads, and three old frame residences. Numerous smaller upstream sites could be developed in this watershed. The dam site and reservoir area are considered questionable geologically. Although the glacial drift in the valley walls is Illinoian till, the valley bottom may be underlain by sand and gravel which could provide a leakage path. The bedrock occurs at a shallow depth. This should make a good reservoir, but high costs of land acquisition, relocations, and construction would make the project cost moderately high to high.

Site 6. A good potential reservoir could be created by a dam on Bear Creek about 2.75 miles northwest of Toledo. The rectangular watershed is 6 by 2.5 miles and has gently rolling uplands, gently sloping valleys, and a narrow alluviated bottom. About 60 to 70 percent of the reservoir area is open land with mixed timber along the stream banks and in the coves. One finger of the reservoir near the dam site has already been developed and is known as Lake Louise. Development would inundate or adversely affect a two-story frame residence and the intersection of two township roads. Geologically the dam site and reservoir area are considered probably feasible. Depth to bedrock is not known, the valley walls are till, and the alluvium in the bottoms of the valley consists mostly of silt with some clay and sand. This should make a good reservoir at a normal project cost.

Site 7. Dicks Creek, a tributary of Muddy Creek, has a potential dam site 0.5 mile northeast of Johnstown. The watershed has nearly level uplands and gently rounding slopes into rather steep sided valleys. Sixty percent of the reservoir area is open land under cultivation or in pasture, and the remainder is timbered. No known residences, outbuildings, or utilities need relocation, but there is one township road that would have to be raised or abandoned. The dam site is classified as probably not feasible geologically, because of the presence of undesirable sand and gravel deposits. Otherwise the site possesses the same geologic characteristics of probably feasible sites in the area. This site should make a fair small reservoir at a moderately low cost.

Site 8. A dam site on Muddy Creek is located about 3 miles west of Toledo. The watershed has a drainage area of 62 square miles in the shape of a boomerang. The upper third is steeply rolling and the remainder relatively flat except near Muddy Creek. About 70 to 80 percent of the reservoir area is open land under cultivation. Timber is confined to the stream banks and areas subject to frequent flooding. Development of this site would inundate a two-story frame house along with a barn and several outbuildings, power transmission lines just above the dam site, a section of Illinois Route 121, and two township roads. There are a number of other dam site locations on Muddy Creek upstream from this site, but they would all have a smaller storage capacity. The dam site is considered probably not feasible geologically because of the possibility of sands or gravels, or both, that could cause leakage of reservoir water. Land acquisition, relocations, and construction costs would indicate a moderately high cost project.

Site 9. A dam site on Opossum Creek is located 7 miles northeast of Greenup on a long narrow watershed 4.75 miles by 0.25 mile. The reservoir area is 80 to 90 percent open land with some cultivation. The banks of the creek and edge of the floodplain are covered with medium size timber. The development of this site would inundate two old frame houses, two gravel roads, and one intersection of town roads along with several residence access roads. The reservoir site is considered questionable geologically because the valley bottom may largely consist of, or may be underlain by, sand and gravel that may be sufficiently permeable to allow the reservoir water to escape unless practicable means of preventing leakage are installed. This site should produce a fair reservoir at a normal project cost.

Site 10. A small reservoir could be created about 1 mile southeast of Toledo on a tributary of Cottonwood Creek. The reservoir area is about half timber, and open land is primarily in pasture. Development of this site would inundate short sections of township roads at four separate locations. Costs of land acquisition, relocation, and construction should be normal. The dam and reservoir site is considered probably feasible geologically since materials are generally satisfactory for dam construction from the standpoints of foundation stability, relative impermeability, and source material for an earth dam. This site would develop only a small reservoir at a normal project cost.

Site 11. A pear-shaped watershed, 6 by 3 miles, on Cottonwood Creek has a potential reservoir site that could develop a lake similar in shape to Lake Mattoon. The reservoir area is primarily under cultivation, and timber is restricted to the stream banks. Development of the site would inundate a township road intersection and perhaps adversely affect three frame residences because of their proximity to water level. The dam site is considered probably not feasible geologically because of undesirable sand and gravel deposits that might exist, although the other geologic characteristics are the same as for probably feasible sites in this area. The upper portion of the reservoir area would contain considerable shallow water. Land acquisition and construction costs would tend to make this a moderately high cost project.

Site 12. A large reservoir could be developed by constructing a dam on Hurricane Creek about 6 miles east and 2 miles north of Toledo. The reservoir area is 90 percent under cultivation, and timber is confined to the stream banks and edge of the floodplain. Development of the site would inundate about 1 mile of Illinois Route 130 and three sections of a two-lane blacktop county road. There is also a gravel pit operation and a two-story frame residence in the reservoir area. Considerable acreage of shallow water would occur in the upper reaches of this site. The reservoir area and dam site are considered probably not feasible geologically, because of the possibility of underlying sand and gravel deposits. This would make a fair reservoir at a moderately high cost.

Site 13. A reservoir site on Range Creek could be developed on a rectangular watershed 8 by 2.25 miles, located about 5 miles east and 2 miles north of Greenup. Over half of the reservoir area is open land and under cultivation. The upper reaches of the reservoir area contain several active oil wells and their associated pipe lines. Three sections of township road and a three-way intersection on a county highway would be inundated. There are numerous smaller sites upstream but their capacity-inflow relationships are not as desirable. The dam site and reservoir area are considered probably feasible geologically. The geologic materials consist of a downward succession of alluvium, glacial till, and bedrock which are generally satisfactory for earth dam construction from the standpoint of foundation stability, relative impermeability, and source of materials. Costs of land acquisition, relocations, and construction would be high, and therefore the total project cost would be moderately high.

Site 14. The Lost Creek reservoir site is located 2 miles northeast of Greenup on a long narrow watershed 9.5 by 2 miles. About 85 percent of the watershed is open land under cultivation, and any timber is confined to the stream banks and valley walls. The Cumberland County Sportsmen's Club has built a lake on one finger about 2 miles east and 3 miles north of Greenup. Development of this site would inundate three township roads that could be abandoned, relocated, or improved. There are several smaller sites available along Lost Creek and its tributaries. The site is probably feasible geologically since the materials are generally satisfactory for dam construction with regard to foundation stability, relative impermeability, and source of material for an earth dam. This site would make a good, long, many-fingered lake at a normal project cost.

Site 15. A dam site could be developed on Cottonwood Creek about 0.5 mile east of Toledo that would form a lake about 3 miles long and 0.5 mile wide. The reservoir area is about 90 percent farm land under cultivation, and any timber is confined to the stream banks. Several residences would be close to the water and one township road would be inundated. The dam structure would serve as a roadway for another county highway crossing the creek. The reservoir area and dam site are considered probably not feasible geologically because of the probable presence of undesirable underlying sand and gravel deposits. However, none of the sites should be definitely considered nonfeasible until additional studies and investigations are made at the site. Shallow water could be expected in the upper portion of the reservoir area. This site would make a fair reservoir, but because of high cost acquisition and relocations the project cost would be moderately high.

Site 18. A small reservoir site exists on Muddy Creek 5 miles north and 1 mile west of Toledo. About 80 percent of the reservoir area is in open land and under clean tilled cultivation, and the remainder is in brush. If this site were developed, one residence and a three-way county highway intersection would be inundated. The reservoir area and dam site are considered probably not feasible geologically because of the possibility of underlying sands and gravels that would cause leakage. Further geologic investigations might prove that seepage would not exist or could be controlled. This is a relatively poor site because of the small storage capacity for the volume of flow and the great possibility of loss by sediment. The project costs should be moderately low.

Douglas County was covered by at least two great glacial advances known as the Illinoian and Wisconsinan. The Illinoian glaciation leveled and rubbed down the preglacial hills and filled the preglacial valley with glacial debris known as till or drift. The Wisconsinan ice sheet buried the debris deposited by the Illinoian and left Douglas County relatively flat except for the morainal ridges in the northeastern and southeastern parts of the county and along a narrow fringe adjacent to the Embarras and Kaskaskia Rivers and their tributaries.

Pennsylvanian bedrock underlies all of Douglas County and consists of various combinations of weak, easily eroded shales, limestone up to 25 feet thick, coal seams, and locally developed sandstones. The bedrock surface is highest in the southern and northeastern portions of the county at 600 to 650 feet mean sea level (msl) and drops to less than 400 feet (msl) in the northwestern corner. No exposures of bedrock are known.

The nearly level topography makes all but very small reservoir sites impossible. The data from one small site that was studied are presented here.

Site 1. A small oval-shaped watershed 3 by 1.5 miles, located 2.25 miles north and 0.5 mile west of Oakland, has rolling uplands, gradually rounded tributary valleys, a narrow floodplain, and steep valley abutments. About 25 percent of the reservoir area is covered with mixed hardwoods. There are no known residences, buildings, utilities, or relocations. The upper abutments are silty and sandy Wisconsinan glacial till, and the lower abutments are stiff silty clay Illinoian till. There are occasional lenses of silty or sandy outwash material at the base of the Wisconsinan till. The alluvium at the dam site averages 8 feet thick and consists of dark gray clayey silt with some lenses of sand and gravel and is underlain by till. A core trench into the Illinoian till should be constructed using the Illinoian till material. The alluvium diminishes in width and thickness upstream from the dam site, and leakage should be slight. Some leakage might be possible through sandy or silty glacial outwash strata; however, these layers are believed to be discontinuous.

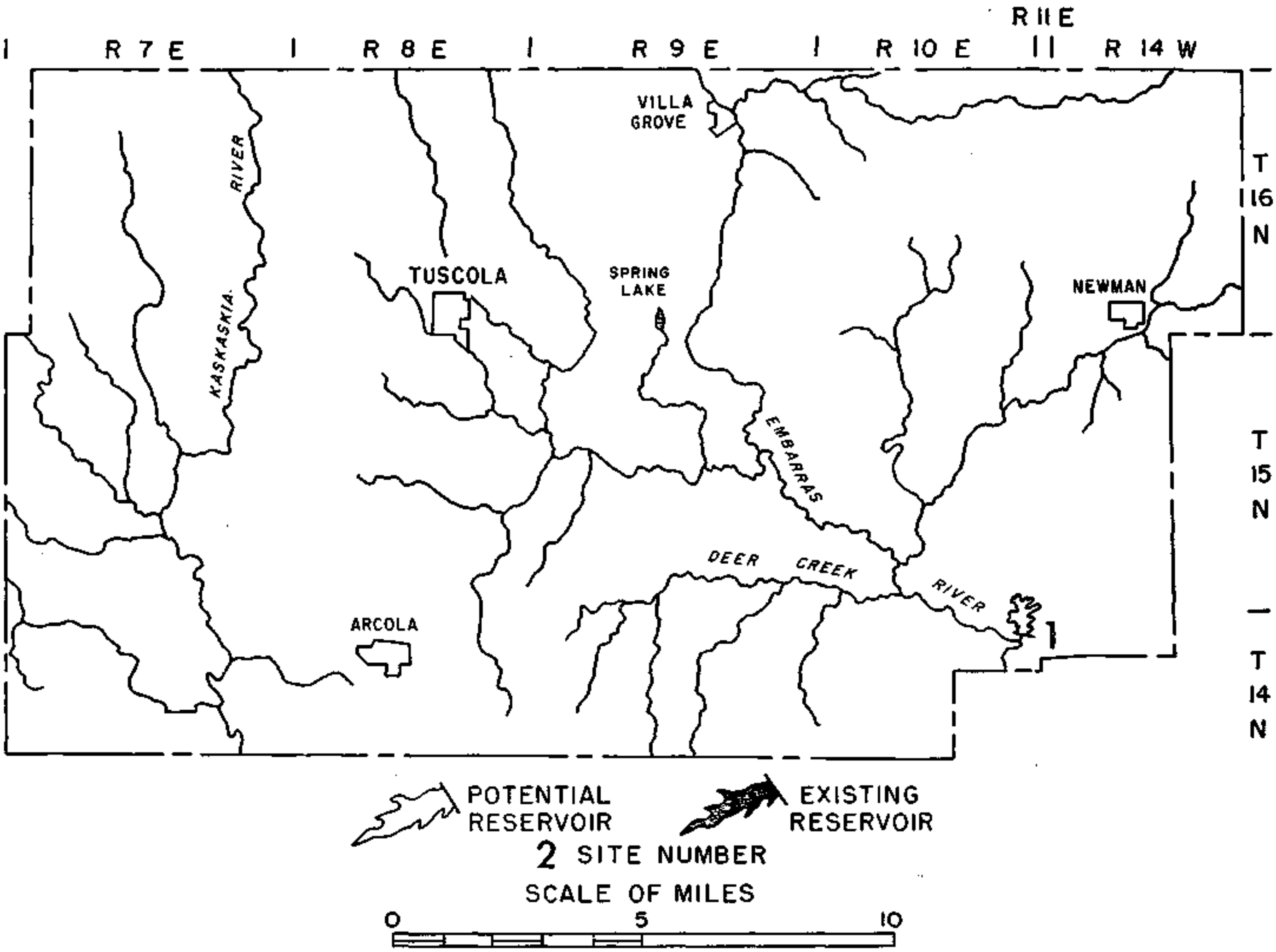
Potential Reservoirs in Douglas County

Site number	Waterway location	Spillway elevation (*ft*)	Pool area (*acres*)	Storage (*ac-ft*)	Storage (*mg*)	Watershed (*sq mi*)	Times filled per year	Depth at dam (*ft*)	Length of dam (*ft*)	Earth fill (*cu yd*)	Shoreline (*mi*)	Mean annual runoff (*mgd*)	Net yield (*mgd*) for given recurrence intervals: Full capacity 5 Yr	10 Yr	25 Yr	40 Yr	Half capacity 5 Yr	10 Yr	25 Yr	40 Yr
1	Trib. Embarras River NW ¼ NE ¼ 1-14N-10E (Oakland Quad)	640	59	673	219	4.0	3.3	30	450	78,230	5	1.99	1.0	.7	.5	.4	.6	.4	.3	.3
Sites partially in Douglas County (See Coles County for description)																				
1	Kaskaskia River NE ¼ NE ¼ 20-13N-7E	640	3,100	24,800	8,080	303.0	7.6	24	1,100	142,700	70	167.94	48.5	36.4	32.5	31.6	23.8	16.5	15.6	15.5

Existing Reservoirs in Douglas County

Reservoir name	Legal description	Owner	Watershed area (*sq mi*)	Watershed area (*acres*)	Height of dam (*ft*)	Depth of water at dam (*ft*)	Pool area (*acres*)	Storage capacity (*ac-ft*)	Storage capacity (*mg*)	Storage capacity (*in*)	Remarks and data source
Spring Lake (Patterson Springs)	SW ¼ 33-16N-9E (Villa Grove Quad)	An Association	2.5	1,560	15	9	20	184	59.9	1.44	Private recreation
New West Lake	NW ¼ 11-16N-9E (Villa Grove Quad)	C & E I					7	54	17.5		
Main Lake	NW ¼ 36-15N-7E (Tuscola Quad)	U. S. Indust. Chem. Co.				18	24	360	117.3		Near Ficklin, pumped from Kaskaskia River

DOUGLAS COUNTY



EDGAR COUNTY

The general topography of Edgar County varies from flat to slightly rolling except in the southeastern portion along Sugar Creek and its branches where it is quite hilly. These differences in topography are due to glacial action and water erosion. The Illinoian glacier acted as a leveling force, rubbing down the preglacial hills and filling the preglacial valleys with glacial debris known as till or drift. The later Wisconsinan glacier covered about 95 percent of Edgar County, depositing drift material to a depth varying from 20 to more than 100 feet to almost 200 feet in the moraines.

The underlying bedrock is Pennsylvanian which normally consists of easily eroded shales, limestone up to 25 feet thick, coal seams, and locally developed sandstone. Limestone, shale, and sandstone were all observed in valley exposures.

Three potential sites were studied in the southeastern quarter of Edgar County, and the results of these studies follow. The remainder of the county is topographically unsuited to reservoir development because of the shallow valleys and generally flat terrain.

Site 1. The potential reservoir site on Coal Creek has a watershed about 6 miles long and 1.25 miles wide, which has gently rolling uplands and sharply incised V-shaped valleys. The floodplain is mostly in pasture with a few scattered trees, but the valley walls are lightly covered with mixed hardwoods. There are no known residences or utilities in the lake area, and only one north-south two-lane gravel road which could be abandoned or raised. The dam would be founded on bedrock of shale which is at the level of the stream channel. Pennsylvanian shale is exposed to heights of 35 to 45 feet in the valley walls at the dam site. Glacial till derived from the underlying shale covers the ridges of the highest abutments. The alluvium is mostly sandy and contains shale fragments. Two distinct bench terraces are present on the right side of the channel just upstream from the dam site. These terraces are partly erosional and partly depositional. It is recommended that an impermeable core wall be constructed through the terraces and alluvium, and bonded to the shale bedrock. This site should develop at normal project cost.

Site 2. The site on Brouilletts Creek has a watershed of rolling hills and valleys incised through till and about 40 feet into sandstone and shale bedrock, and will make an excellent reservoir. Nearly the entire floodplain is under cultivation, and timber is restricted to the creek banks and valley walls. There are at least two residences in the reservoir area, a power transmission line crosses the upper reaches, and gravel roads cross the area in eight locations. A north-south road could be placed over the structure, and another in the center of the reservoir would have to be relocated and raised. Two east-west roads in the upper third could be raised and all others abandoned. The geologic conditions are favorable for the construction of an impoundment. The shale bedrock would provide a foundation of adequate bearing strength; however, the silty alluvium should be removed and a core wall of impermeable material constructed through the alluvial rubble. Glacial till, mostly sandy clay, covers the valley walls above bedrock and should not leak, but some leakage should be expected through the sandstone and lower shale members in the abutments near the dam site. This should make a good moderately low cost project.

Site 3. The watershed of the West Pork of Big Creek is fan-shaped and has moderately hilly uplands that slope gradually into broad V-shaped valleys. The floodplain is only weakly developed. The reservoir area is predominantly in meadow and pasture, but valley walls are in brush and light woods. The uplands are predominantly in clean tilled crops. Two east-west gravel roads cross the reservoir area; the road crossing the upper third of the reservoir would have to be relocated and the other could be abandoned. Two residences and their outbuildings would be inundated. No known utilities or obstructions would have to be moved. The site is located on an outcrop of Millersville limestone and the terminal moraine of the Wisconsinan glacier. The Millersville limestone is very shaley with the possibility of some enlarged joints, but these undoubtedly are filled with shale residuum or glacial till. The presence of shale beneath the alluvium is strongly suspected. Several gravelly terrace remnants about 12 feet above the general floodplain elevation occur near the dam site at the base of the valley walls. Only minor leakage would be expected through the shale in the lower reservoir abutments, but leakage would occur through the sandy alluvium unless intercepted with a core wall. This should make a good normal cost project.

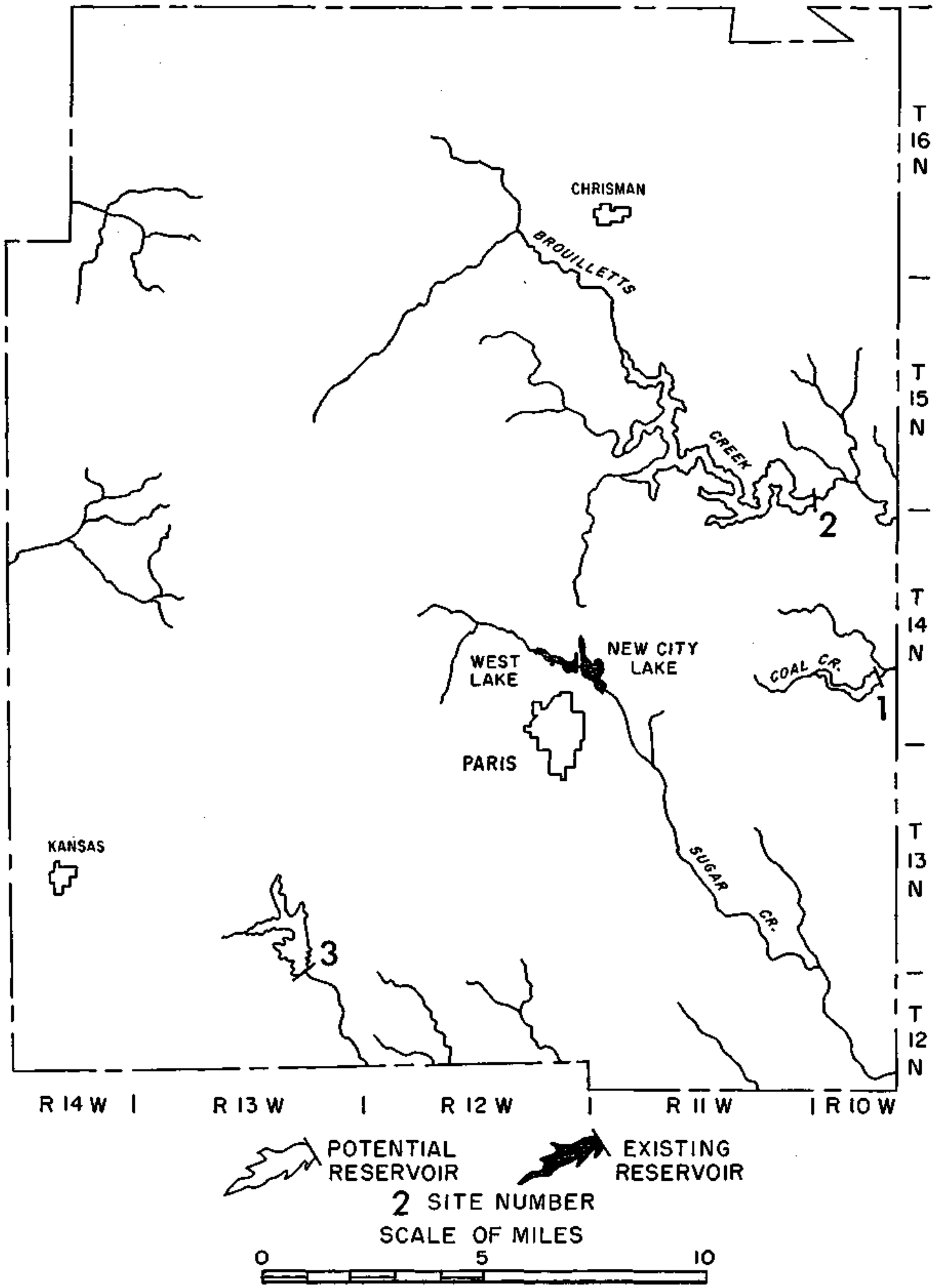
Potential Reservoirs in Edgar County

													Net yield (*mgd*) for given recurrence intervals							
													Full capacity				Half capacity			
Site number	Waterway location	Spillway elevation (*ft*)	Pool area (*acres*)	Storage (*ac-ft*)	Storage (*mg*)	Watershed (*sq mi*)	Times filled per year	Depth at dam (*ft*)	Length of dam (*ft*)	Earth fill (*cu yd*)	Shoreline (*mi*)	Mean annual runoff (*mgd*)	5 Yr	10 Yr	25 Yr	40 Yr	5 Yr	10 Yr	25 Yr	40 Yr
1	Coal Creek NE ¼ NE ¼ 29-14N-10W (Paris Quad)	610	200	4,200	1,368	6.8	.9	63	700	347,900	6	3.33	3.1	3.1	2.4	2.0	2.6	1.8	1.4	1.1
2	Brouilletts Creek SW ¼ SW ¼ 31-15N-10W (Paris Quad)	600	2,000	48,000	15,640	145.0	1.7	72	850	539,300	28	72.08	60.6	45.4	35.4	30.6	33.9	26.6	18.5	13.8
3	West Fork, Big Creek NW ¼ SE ¼ 2-12N-13W (Kansas Quad)	700	540	8,100	2,639	9.0	.6	45	900	257,000	7	4.47	3.9	3.9	3.2	2.8	4.0	2.9	1.8	1.4
Sites partially in Edgar County (See Coles County for description)																				
8	Little Embarras River NE ¼ SW ¼ 11-13N-10E	650	3,700	71,500	23,290	112.7	.9	58	800	351,100	60	59.50	56.0	55.9	40.0	35.3	45.9	31.3	24.7	18.4

Existing Reservoirs in Edgar County

			Watershed area			Depth of water at dam	Pool area	Storage capacity			
Reservoir name	Legal description	Owner	(*sq mi*)	(*acres*)	Height of dam (*ft*)	(*ft*)	(*acres*)	(*ac-ft*)	(*mg*)	(*in*)	Remarks and data source
West Lake	SW ¼ SE ¼ 25-14N-12W (Paris Quad)	Paris (C)	17.70	11,310	20	8	100	414	134.8	0.44	
New City Lake	NE ¼ NW ¼ 31-14N-11W (Paris Quad)	Paris (C)	20.00	12,800	30	26	133	1,550	504.9	1.45	Watershed area value includes the West Lake watershed
Eads Lake	S ½ 5-14N-11W (Paris Quad)	Richard Eads	0.13	81	21	20	10	100	32.6	14.76	Nearest town Paris
W. S. Logan Pond	SE ¼ SW ¼ 9-12N-11W (Paris Quad)	Wm. Logan II	0.50	320	14	16	5	40	13.0	1.50	Nearest town Dennison

EDGAR COUNTY



Bedrock outcrops in Edwards County consist mostly of shale and sandstone with thin seams of limestone. Some coal beds have been of great commercial importance but their total thicknesses are insignificant. Preglacial erosion left the county rough and broken, cut by numerous gullies and stream valleys. The Illinoian glaciation completely covered the county and left a heterogeneous gravelly mass of drift, varying from a few feet on the ridges to more than a hundred feet in the valleys. The northern part of the county was leveled to a flat plain, but the central and southern portions were not covered by a thickness great enough to hide the bedrock topography. After the ice sheet, weathering of deposited material left an accumulation of a wind-blown silty material, known as loess, on top of glacial drift. The loess came from the Wabash and Little Wabash Rivers, and varies in thickness from a few inches in the northern part to 10 feet on the bluffs along the Wabash River. Enough erosion has taken place since the Illinoian glaciation that the county has been reduced to a hilly topography. The southern half has large, flat valleys indicating more erosional progress than in the north where the bottomlands are narrow and have steep gullies.

The stream pattern of Edwards County is such that no large reservoir developments are available. Three small reservoirs were studied, however, and the results of these studies follow.

Site 1. The watershed of this reservoir site is bulb-shaped, about 1.5 miles long and 2 miles wide, and is located in an area 1 mile north of West Salem. The drainage is from rolling uplands having long gradual slopes into valleys with wide alluviated floodplains. Nearly all of the reservoir area is in pasture or row crops. The Illinois Central Railroad has fills across the two fingers of the upper portion of the reservoir, and protection to these fills may be required. A small spring-fed lake and a pumping station, now used as the West Salem water supply, would be inundated. One gravel road would require raising. The dam site would probably be founded on shale bedrock with an estimated 20 feet of overlying alluvium impermeable enough to form an adequate natural blanket. It might not be necessary to construct an impermeable core through more than a few feet of the upper alluvium. Stability and compactibility of the alluvium should be determined. This is a very good water retaining reservoir site and should develop a project of average cost.

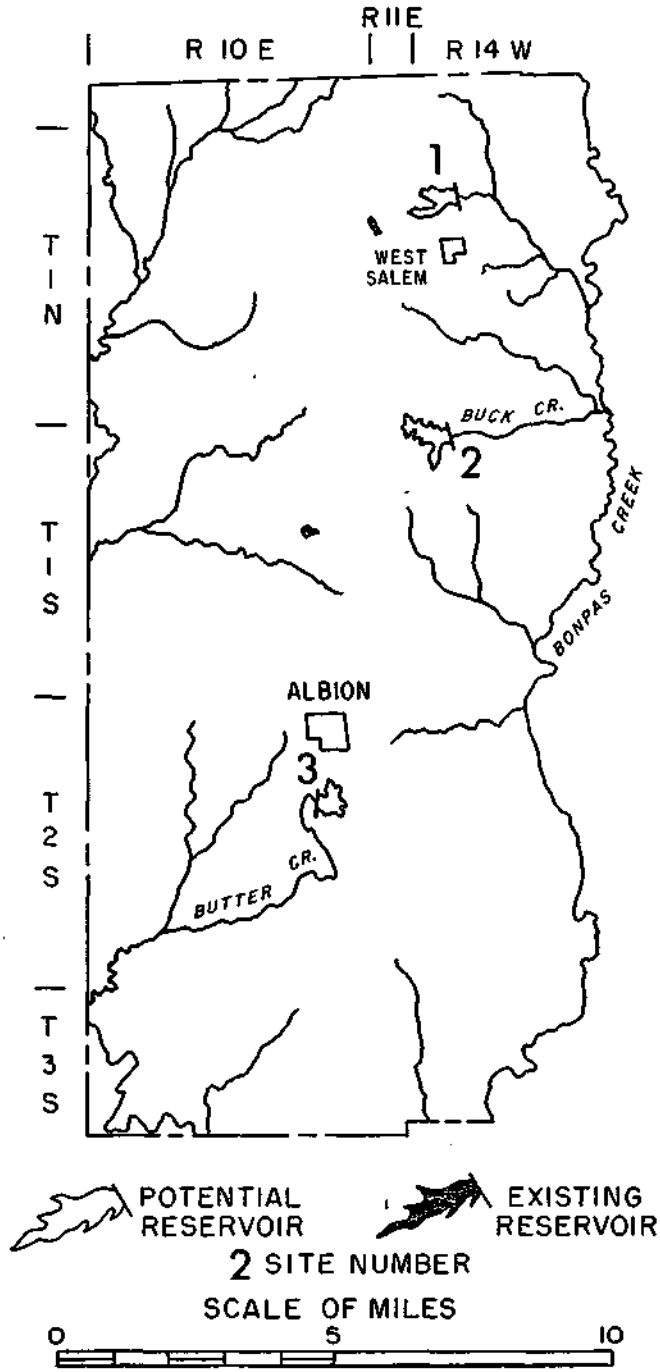
Site 2. Buck Creek has rolling uplands, gradual slopes into the valley, and a wide alluviated floodplain. The watershed is 1.75 miles long and 1.25 miles wide. About three-fourths of the reservoir area is open land under cultivation, and the remainder is in light timber. Two gravel roads cross the reservoir; one could be abandoned and the other relocated over the structure. One set of farm buildings would be inundated, but no other known obstructions exist. The dam site would probably be founded on shale bedrock with abutments of shale and sandstone. The alluvium consists of about 3 feet of clayey silt over 3 to 5 feet of stratified silty sand and gravel, 4 feet of sandy clay and 2 feet of silty sand over 4 feet of firm silty clay. The upper sandy strata in the alluvium should be intercepted by an impermeable core of compacted fill. Slight leakage through the sandstones may be expected, but lack of outlet would prevent serious loss. Soil tests should be made of the alluvial strata to determine their physical properties. This is a good dam site for this locality, where good sites are rare, and should result in a moderately low cost project.

Site 3. A reservoir site exists on Butter Creek about 1.5 miles south of Albion in hilly uplands which are almost indistinguishable from valley slopes. Nearly all of the reservoir area is cleared and under cultivation. There are no relocations involved. The dam site is readily accessible. No bedrock was observed at the dam site nor in the reservoir area. The alluvium is thin at the dam site and will not create any stability or leakage problems. Compact silty clay glacial till covers the abutments and probably underlies the reservoir area. This material is excellent foundation and fill material. Rapid downcutting of the channel has occurred just below the gravel road and has left a gully 20 feet wide and 8 feet deep. Stabilization of this gully with a drop-spillway structure would be necessary before a dam could be built. This site should produce an average cost project.

Potential Reservoirs in Edwards County

Site number	Waterway location	Spillway elevation (*ft*)	Pool area (*acres*)	Storage (*ac-ft*)	Storage (*mg*)	Watershed (*sq mi*)	Times filled per year	Depth at dam (*ft*)	Length of dam (*ft*)	Earth fill (*cu yd*)	Shoreline (*mi*)	Mean annual runoff (*mgd*)	Net yield (*mgd*) for given recurrence intervals: Full capacity 5 Yr	Full capacity 10 Yr	Full capacity 25 Yr	Full capacity 40 Yr	Half capacity 5 Yr	Half capacity 10 Yr	Half capacity 25 Yr	Half capacity 40 Yr
1	Trib. Crooked Creek SE ¼ NE ¼ 7-1N-14W (Olney Quad)	460	100	800	260	1.7	1.4	24	900	115,900	3	1.01	.8	.5	.4	.4	.4	.2	.1	1
2	Buck Creek NW ¼ NE ¼ 6-1S-14W (Albion Quad)	450	96	800	260	2.0	1.7	25	850	109,100	4	1.19	.9	.6	.4	.4	.5	.3	.1	.1
3	Butter Creek NE ¼ NE ¼ 14-2S-10E (Albion Quad)	460	115	1,150	342	0.8	.5	30	1,300	212,100	2	.48	.4	.3	.3	.3	.3	.3	.2	.1

EDWARDS COUNTY



Existing Reservoirs in Edwards County

Reservoir name	Legal description	Owner	Watershed area (sq mi)	Watershed area (acres)	Height of dam (ft)	Depth of water at dam (ft)	Pool area (acres)	Storage capacity (ac-ft)	Storage capacity (mg)	Storage capacity (in)	Remarks and data source
Bonpas Creek Res.	33-1S-14W (Mt. Carmel Quad)	Browns (V)	1.56	1,000	5	5	25	57	18.7	0.68	City water supply
Albion Moose Lake	14-1S-10E (Albion Quad)	Albion Moose Lodge	.3	200	18	16	10	24	7.8	1.40	Nearest town Albion
Krajec Lake	13-1N-10E (Olney Quad)	Dr. Andrew Krajec	.25	160	16	12	8	35	11.4	2.60	Nearest town West Salem
Harrison Lake	6-1N-14W (Olney Quad)	Dr. C. W. Harrison	.11	72	20	24	8	57	18.7	9.50	North of West Salem

The Illinoian glaciation completely covered previous glacial deposits and the bedrock surface in Effingham County. The deposits left were a heterogeneous gravelly mass of drift which varied from 20 to more than 100 feet in depth and was nearly level. Drainage and erosion have since created some rolling and rough land along the streams. Effingham County received from a few inches to not more than 3 feet of loess.

Bedrock is exposed in several locations in Effingham County. These exposures are of the typical Pennsylvanian forms such as shale, thin limestone layers, coal seams, and locally developed sandstones.

The topography is well suited to reservoir development, and there are no widespread geologic problems. The results of eight feasibility studies in Effingham County follow.

Site 1. An excellent site exists on a tributary of Wolf Creek, 1 mile east of Beecher City. The watershed has dimensions of 2 by 1.25 miles and has moderately rolling uplands with rather steep slopes into broad V-shaped valleys. The floodplains are narrow. Illinois

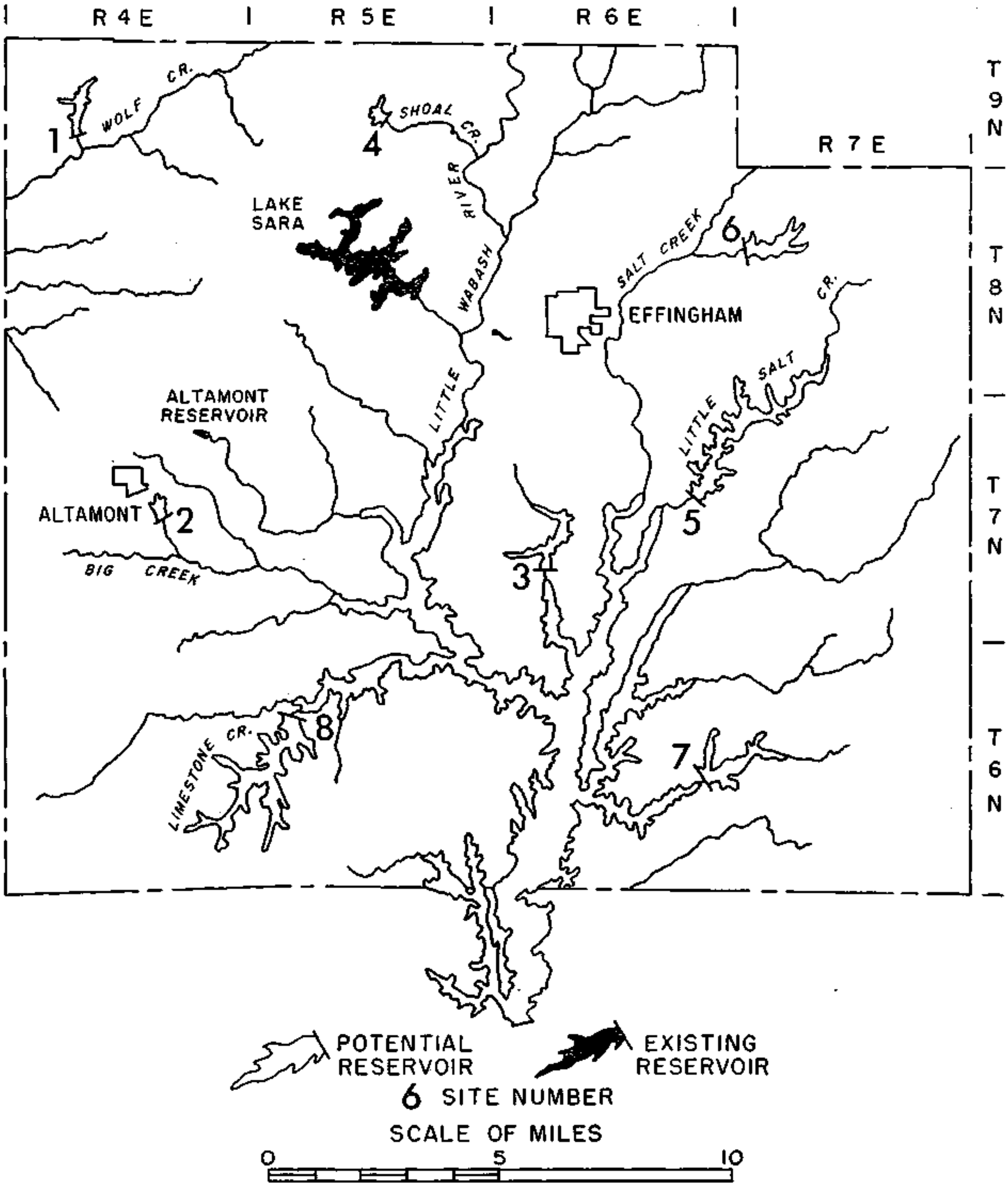
Potential Reservoirs in Effingham County

Site number	Waterway location	Spillway elevation *(ft)*	Pool area *(acres)*	Storage *(ac-ft)*	Storage *(mg)*	Watershed *(sq mi)*	Times filled per year	Depth at dam *(ft)*	Length of dam *(ft)*	Earth fill *(cu yd)*	Shoreline *(mi)*	Mean annual runoff *(mgd)*	Net yield *(mgd)* for given recurrence intervals: Full capacity 5 Yr	Full capacity 10 Yr	Full capacity 25 Yr	Full capacity 40 Yr	Half capacity 5 Yr	Half capacity 10 Yr	Half capacity 25 Yr	Half capacity 40 Yr
1	Trib. Wolf Creek SW ¼ NE ¼ 32-9N-4E (St. Elmo Quad)	590	90	900	293	2.3	1.4	30	600	87,700	2	1.12	1.0	.8	.5	.4	.5	.4	.3	.2
2	Trib. Big Creek NW ¼ SE ¼ 23-7N-4E (Effingham Quad)	580	45	450	147	1.0	1.3	30	500	57,800	3	.51	.5	.4	.3	.2	.3	.2	.1	.1
3	Trib. Salt Creek SW ¼ NW ¼ 29-7N-6E (Effingham Quad)	540	256	3,240	1,056	6.7	1.2	38	600	142,600	7	3.45	3.3	2.7	1.8	1.6	2.0	1.5	1.0	.8
4	Shoal Creek SW ¼ SW ¼ 27-9N-5E (Effingham Quad)	630	50	400	130	1.8	2.4	25	500	65,000	2	0.87	0.5	0.5	0.3	0.2	.2	.2	.1	.1
5	Little Salt Creek SE ¼ NE ¼ 14-7N-6E (Teutopolis Quad)	550	660	9,680	3,154	22.5	1.3	44	750	231,500	14	11.57	11.1	8.5	5.9	4.9	6.5	4.7	3.6	2.5
6	First Salt Creek SW ¼ NW ¼ 18-8N-7E (Teutopolis Quad)	580	166	1,100	358	10.6	5.5	20	600	62,200	5	5.45	1.8	1.5	1.1	0.7	.8	.6	.4	.3
7	Ramsey Creek SW ¼ NW ¼ 24-6N-6E (Sailor Springs Quad)	530	330	3,740	1,218	10.2	1.6	34	550	112,100	8	5.25	4.7	3.4	2.5	2.0	2.4	1.8	1.3	.9
8	Limestone Creek NW ¼ SW ¼ 8-6N-5E (Edgewood Quad)	560	900	16,500	5,376	12.6	.4	55	900		19	6.48	5.7	5.7	5.7	5.0	5.4	5.2	3.6	3.0
Sites partially in Effingham County																				
(See Fayette County for description)																				
5	Sugar Creek NW ¼ NW ¼ 14-7N-3E	600	473	6,320	2,059	8.0	.7	40	700	175,700	10	3.75	3.1	3.1	2.6	2.2	2.8	2.6	1.7	1.3
(See Clay County for descriptions)																				
1	Little Wabash River Ctr NE ¼ 19-5N-6E	500	12,000	160,000	52,130	572.0	2.1	40	1,900	534,200	150	294.15	213.3	166.9	123.2	94.4	116.8	95.4	68.7	46.2
2	Lucas Creek SE ¼ NE ¼ 20-5N-6E	500	900	12,000	3,910	17.2	.8	40	1,200	310,600	35	8.85	8.2	8.2	5.6	4.7	7.3	5.0	3.4	2.6

Existing Reservoirs in Effingham County

Reservoir name	Legal description	Owner	Watershed area *(sq mi)*	Watershed area *(acres)*	Height of dam *(ft)*	Depth of water at dam *(ft)*	Pool area *(acres)*	Storage capacity *(ac-ft)*	Storage capacity *(mg)*	Storage capacity *(in)*	Remarks and data source
Altamont Res.	SE ¼ 2-7N-4E (Effingham Quad)	Altamont (C)	2.00	1,280			25	230	74.9	2.16	
Lake Sara	9-15-16-17-21-28-8N-5E (Effingham Quad)	Effingham (C)	11.81	7,560		50	735	13,810	4,500.0	21.92	Completed 1958—water supply
Effingham City Res. (C.I.P.S. Lake)	E ½ 25-8N-5E (Effingham Quad)	Effingham (C)	0.84	540			20	282	91.8	6.27	Old water supply for the city
Kanaga Pond	SE ¼ 25-8N-5E (Effingham Quad)	Penn. R. R.	0.39	250			6	35	11.4	1.68	Nearest town Effingham
Effingham Country Club	NE ¼ 35-8N-5E (Effingham Quad)	Private Club	0.25	160	18	16	9	40	13.0	3.0	Nearest town Effingham
Effingham Sportsmen's Club	SE ¼ 22-8N-5E (Effingham Quad)	Private Club	0.19	120	24	22	6	30	9.8	3.0	Nearest town Effingham
Roberts Lake	SE ¼ 16-6N-4E (Kinmundy Quad)	L. J. Roberts & Sons	.23	150	23	19	11	61	19.8	4.92	Nearest town Altamont—SCS Supervision

EFFINGHAM COUNTY



Route 33 crosses the reservoir site but is on a high fill and probably would not have to be raised. A one-lane oiled road crosses the site upstream but could be abandoned. Probably about half of the lake bed is free of timber. The depth to bedrock and type of bedrock are unknown. The unconsolidated material is Illinoian glacial till consisting of silty and sandy clay, stiff, variegated yellowish brown, and light brownish green. The alluvium is mostly black, silty clay. The reservoir abutments consist of stiff, variegated silty and sandy clay of Illinoian glacial till. A cut-off core wall of compacted till should be installed through the upper 3 to 5 feet of alluvium. It would not be necessary to intercept the basal sandy gravel as it would not be in contact with the impounded water. Care should be taken not to expose the basal gravel to impounded water. For this reason the alluvium should not be used as borrow material. Compaction of alluvial material is not expected to exceed 7 percent, most of which will occur during construction.

Site 2. A small tributary of Big Creek with gently rolling uplands and moderate valley slopes should provide a very good small reservoir. The reservoir area is partly in meadow, and both valley walls are covered with mixed hardwoods in good condition but on shallow soils. The stream has a fairly high gradient thus requiring a relatively high fill. There are no utilities, residences, buildings, or roads involved, yet the site is readily accessible from hard surface roads. There is undoubtedly a basal alluvial deposit of sand or sandy gravel under the valley floodplain. Although this deposit is permeable, it can be easily intercepted by the construction of an impermeable core wall. An alternate site was studied on the north-south road about 0.5 mile downstream from the proposed site. Geologically the sites are similar but the alternate downstream site would intercept the effluent from the Altamont sewage disposal plant. This should make an excellent small low cost reservoir that would be surrounded by woods, near hard surface roads, and have good land use on the watershed.

Site 3. A reservoir site is located about 1 mile east of Watson on a tributary of Salt Creek. Its watershed has almost level uplands and rather steep but rounded valley slopes. The floodplain is rather wide and has been cleared, but the valley walls are lightly covered with mixed hardwoods. There are no known residences, buildings, or utilities and only one oiled one-lane road. The reservoir area is readily accessible from hard surface roads. The valley of this site has been deeply incised into glacial drift and refilled with sandy and gravelly glacial outwash. The log of a water well recently dug by the village of Watson about 800 feet downstream from the dam site indicates a maximum depth to the firm impermeable till is between 25 and 30 feet. Since the well was pumped five hours without appreciable drawdown, it is assumed that the lower alluvium is quite permeable. If a dam is built on this site it would be mandatory that the lower alluvium be intercepted by an impermeable core wall. If this is done very slight leakage can be expected. This site could provide a very good low cost reservoir.

Site 4. The watershed of a site on Shoal Creek east of Shumway has very gently rolling uplands and moderate slopes into the valley. Very little floodplain development exists, and the entire lake area is in light timber. There are no relocations involved, and the reservoir area is readily accessible from hard surface roads. A two-lane blacktop road located on top of a very high fill downstream from the site should be investigated for the possibility of forming part of the structure. The dam site is located entirely on Illinoian glacial till which has adequate bearing strength and would make excellent fill material. Very little alluvium is present but what little there is should be removed below the fill. This site is well suited as a water retaining dam site, and should make a low cost project.

Site 5. The watershed of this site on Little Salt Creek is 9 miles long and 3.5 miles wide, and has very gently rolling uplands and rather sharp breaks into the valleys. The reservoir area is located on a broad alluviated floodplain which appears to be about three-fourths covered with light timber. No residences would be involved in development but Illinois Route 33 would have to be raised, and a two-lane blacktop road slightly relocated and raised. The Illinois Central Railroad crossing elevation is satisfactory, but the wooden timber trestle would have to be protected from inundation. The dam site and entire reservoir area are underlain with compact, relatively impermeable, Illinoian glacial till. The valley floor till is covered with 10 to 15 feet of slowly permeable alluvium, the upper silty portion of which should be removed from under the fill. The more permeable basal alluvium would not be in contact with the impounded water; however, a thorough investigation should be made of possible development of serious uplift pressures if the permeable layer is confined. All borings in a low terrace-like ridge forming part of the right abutment were in sandy clay; however, there is a faint possibility that this terrace may contain a permeable stratum. This should make an excellent site for a water retaining earth dam, and should result in a moderately low cost project.

Site 6. The watershed of a site on First Salt Creek 1 mile northeast of Teutopolis is about 5 miles long and 2 miles wide. The uplands are nearly level, and the valley walls slope gently except at the dam site. Very little of the floodplain has been developed, and nearly all of the lake bed area is timbered. One or two residences would be inundated. A three-way intersection of two one-lane blacktop roads would be inundated and require relocation, and two other crossings should be raised. There is a pipe line pumping station near the site and the possibility of a pipe line crossing. The dam site and entire reservoir area are underlain by Illinoian till. The alluvium at the dam site measures 8 to 10 feet deep, and no permeable basal alluvium was encountered, so that the need for an impervious core wall would be limited to the recently deposited upper 3 or 4 feet. This is an excellent site for an earth dam, but the capacity-inflow relationship is not desirable. This site would make an average cost project.

Site 7. An excellent water storage dam site is located on Ramsey Creek, a tributary of the Little Wabash River, approximately 5 miles northwest of Bible Grove. The watershed is about 5 by 2 miles and has very gently rolling uplands becoming rougher as valleys are approached. The valley walls are moderately steep. Land in the reservoir area has been cleared, but is mostly held in reserve or used as pasture. The banks of the lake site are in mixed timber. Development of the site would require raising a short seetion of a two-lane oiled road and abandoning two one-lane oiled roads. One frame residence would be inundated, and another is extremely close. New access roads would be needed for two farm residences. Bedrock was not encountered at the dam site nor in the reservoir area. The abutments are gray and brown variegated Illinoian till, which is stiff and relatively impermeable. The unconsolidated material is Illinoian glacial till, consisting of coarsely variegated brown and dark gray sandy clay which contains many pebbles and is very stiff. An impermeable core wall should be constructed through the entire alluvial deposit, and bonded to the underlying till. Leakage through the alluvium would undoubtedly occur and failure by piping is probable if a core wall is not constructed through the entire alluvial deposit. This should make an excellent water storage site, at a normal project cost.

Site 8. A potential dam site exists on Limestone Creek, a tributary of the Little Wabash River, about 3 miles northwest of Mason and 4 miles north of Edgewood. This watershed has gently rolling uplands with moderate slopes into rather narrow valleys. Floodplains are gently rolling. The floodplain of the reservoir area has been cleared, but is not in production. Development of this site would inundate a two-lane bituminous and a one-lane oiled road in two places, and two other one-lane oiled roads. The Baltimore and Ohio Railroad crosses the reservoir, and would be inundated. Two homes would be inundated, and five other homos and a cemetery would be adversely affected. The depth to bedrockis estimated at 15 to 18 feet, and the rock is shale. The bedrock shale is silty, fairly hard, medium gray with much iron stain, laminated about 0.25 inch thick, with interstratified 10-inch sandstone. The unconsolidated material is Illinoian glacial till, mostly sandy clay but with some silty clay zones, variegated medium yellowish brown and gray, containing some pebbles and cobbles. Almost all abutments are sandy and silty clay glacial till upstream from the dam site. The channel is eroded into the sandy basal alluvium so that impounded water will underpass the dam through the sand unless it is intercepted by an impervious core wall of compacted soil material. Shale outcrops in the lower dam site abutments appear to be permeable on the weathered surface; however, a foot or so below surface is tight, rather dense material. Sandstone layers about 6 to 10 inches thick occur at two horizons in the shale outcrop, but they appear to be lentieular and discontinuous. No unusual problems would be expected to occur at this site. The cost of this project would be high, because of the land easements, rights of way, and relocations of railroads and highways.

FAYETTE COUNTY

The Illinoian glaciation completely covered Fayette County, burying deposits of an earlier glacier. The deposits left were heterogeneous gravelly clay masses from 20 to more than 100 feet thick. This drift was later covered by 2 to 12 feet of wind-blown loess. Erosion has been continuously active so that drainage has worked headward, establishing definite channels. The maximum relief is somewhat more than 150 feet, but natural drainage is not very well developed because of large areas of nearly level land and slowly permeable substrata. The undulating and rolling land along streams, ridges, and knolls is well drained, but erosion from runoff is serious when the soil is cultivated.

Pennsylvanian rocks such as weak, easily eroded shales, limestones up to 25 feet thick, coal seams, and locally developed sandstones underlie the glacial drift in Fayette County and are exposed in a few locations.

The topography of the northern half of Fayette County is much more suitable to reservoir development than the level southern portion. The Carlyle Reservoir in the southern half will be of great importance to the entire county. The results of six feasibility studies in the county follow.

Site 1. The dam site for a potential lake on Bear Creek would be some 3 miles north and 1 mile west of Vandalia. This is the approximate location for a proposed Vandalia municipal water supply reservoir. The watershed above this point has gently rolling uplands sloping gradually into moderately steep-walled valleys that increase in steepness and depth as they proceed downstream. There is considerable timber on the valley walls, but the wide flat floodplain is generally under cultivation. The lake would have three fingers in the upper reaches and rather shallow water in all of these. No residences or major utilities were observed in the lake area. Access to the site is very good since U. S. Route 51 is only 1 mile to the east and Illinois Route 185 crosses a finger of the lake just 4 miles north of Vandalia. Land acquisition and a fairly long fill might make project costs moderately high. The right abutment is mostly stiff, yellowish brown, sandy clay till. The left abutment shows more sand in a clayey sand material that resembles till but could be outwash or a terrace. Although the material seems to be slowly permeable, testing would be imperative. The floodplain consists of 3 to 4 feet of clayey silt over 3 feet of mixed fine sand over 3 feet of wet sand and some gravel over 1 foot of very stiff silty clay till over sandstone. Some moderate leakage would be expected through the sandy till on the left abutment, and also through the sandstone foundation if the till overlayer is not continuous. The less sandy material on the right upstream abutment should be used for borrow.

Site 2. An excellent potential reservoir site exists on little Creek, with the dam 3 miles east and 4 miles north of Ramsey. The watershed exhibits nearly level to rolling uplands sloping into valleys that have steep and wooded walls and a wide gently rolling floodplain. The bottoms in the lake area are nearly all under cultivation. Many fingers and coves make this an especially attractive site with an abundance of shoreline. Adequate depth is carried well upstream into the fingers of the site. No residences were noticed within the lake area, but residential access would be needed in several areas. Township and county roads crossing the site are not a serious problem; one would probably be relocated north and south and another east and west. Although agricultural use might raise land costs, overall project costs should be moderate. U. S. Route 51 passes within 1 mile of the site providing excellent access to the area for recreational purposes. Geologic conditions appear to be favorable, although test borings would be required to determine the depth of permeable alluvium. The abutments are sandy clay glacial till, and although the upper portion of the right abutment appears to be gravelly, clay content is probably high enough to prevent leakage. Good quality borrow is abundant on the left upstream abutment.

Site 5. A potential reservoir site exists on the upper reaches of Sugar Creek about 2 miles northeast of St. Elmo and about 1 mile upstream from the new St. Elmo Reservoir. The watershed exhibits nearly flat uplands that drop rather suddenly into moderately deep valleys. The lake would have considerable shoreline with two major fingers of about equal size separated by a smaller one. Access to this general area is excellent since Illinois Route 128, U. S. Route 40, and Interstate Route 70 pass within 2 miles of the site. A township road crossing the site would be abandoned making new access roads to two residences necessary. Land use in the reservoir area is about a third pasture and row crops and two-thirds

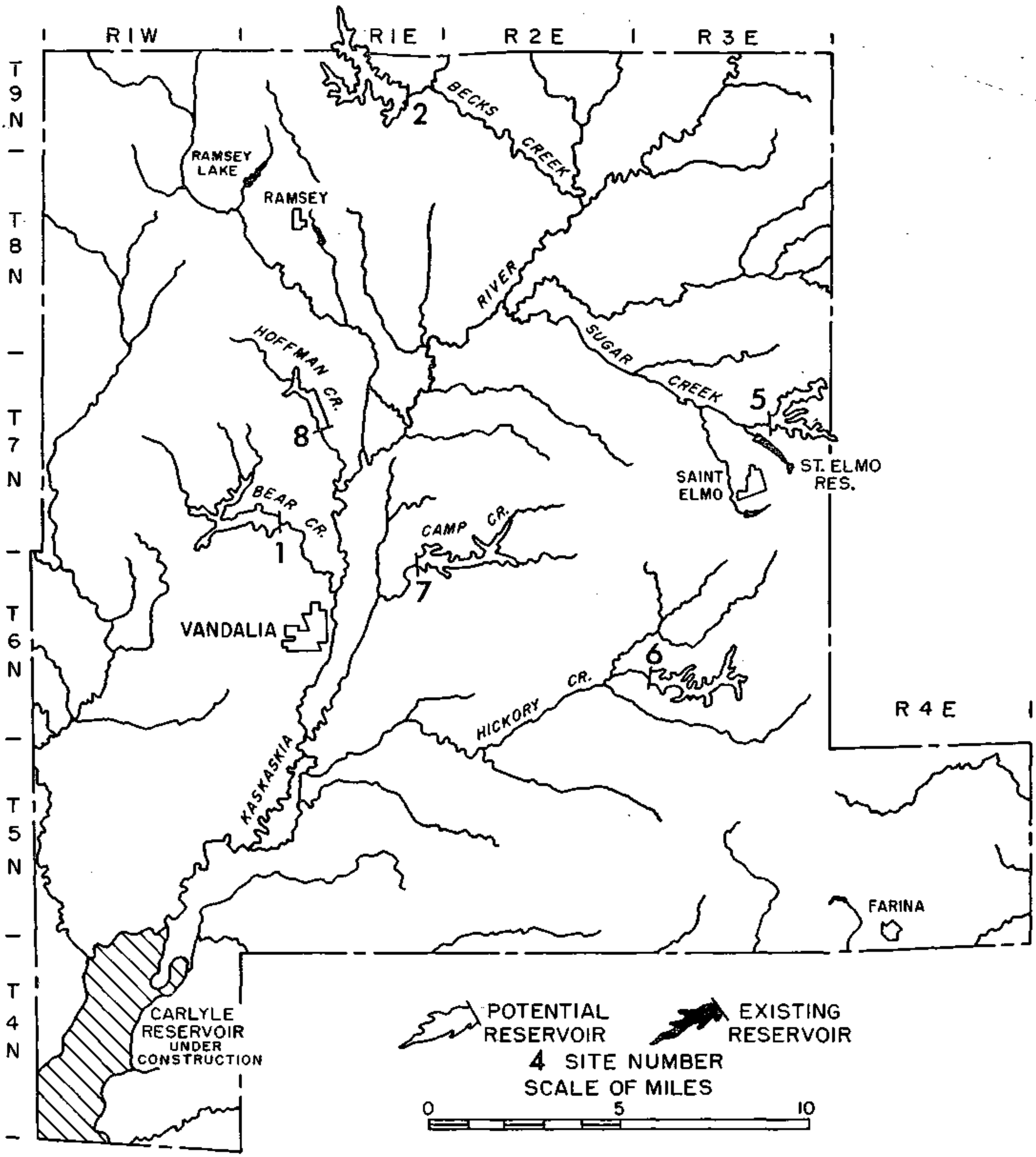
Potential Reservoirs in Fayette County

Site number	Waterway location	Spillway elevation (*ft*)	Pool area (*acres*)	Storage (*ac-ft*)	Storage (*mg*)	Watershed (*sq mi*)	Times filled per year	Depth at dam (*ft*)	Length of dam (*ft*)	Earth fill (*cu yd*)	Shoreline (*mi*)	Mean annual runoff (*mgd*)	Net yield (*mgd*) for given recurrence intervals: Full capacity 5 Yr	Full capacity 10 Yr	Full capacity 25 Yr	Full capacity 40 Yr	Half capacity 5 Yr	Half capacity 10 Yr	Half capacity 25 Yr	Half capacity 40 Yr
1	Bear Creek NW ¼ NW ¼ 32-7N-1E (Ramsey Quad)	520	625	7,280	2,372	25.0	1.8	35	1,400	323,400	12	11.71	9.8	7.8	4.5	4.1	4.9	3.8	2.2	1.7
2	Little Creek NE ¼ NE ¼ 26-9N-1E (Ramsey Quad)	590	704	14,080	4,587	12.2	.4	60	1,000	453,300	19	5.72	4.7	4.7	4.7	4.2	4.2	4.2	3.2	2.6
5	Sugar Creek NW ¼ NW ¼ 14-7N-3E (St. Elmo Quad)	600	473	6,320	2,059	8.0	.7	40	700	175,700	10	3.75	3.1	3.1	2.6	2.2	2.8	2.6	1.7	1.3
6	Stone Creek NE ¼ SW ¼ 19-6N-3E (Kinmundy Quad)	570	365	4,380	1,427	7.0	.8	36	1,000	174,600	14	3.19	2.7	2.7	2.1	1.7	2.6	1.9	1.2	1.0
7	Camp Creek NE ¼ NW ¼ 1-6N-1E (Vandalia Quad)	520	680	9,100	2,965	18.4	1.1	40	1,400	375,400	13	8.62	7.7	7.4	4.9	4.1	5.7	4.9	2.4	2.0
8	Hoffman Creek SE ¼ NW ¼ 16-7N-1E (Ramsey Quad)	520	270	2,700	880	10.0	1.9	30	800	143,200	5	4.69	3.8	3.0	1.8	1.6	1.8	1.3	.8	.5

Existing Reservoirs in Fayette County

Reservoir name	Legal description	Owner	Watershed area (*sq mi*)	Watershed area (*acres*)	Height of dam (*ft*)	Depth of water at dam (*ft*)	Pool area (*acres*)	Storage capacity (*ac-ft*)	Storage capacity (*mg*)	Storage capacity (*in*)	Remarks and data source
Lake St. Elmo	S ½ 27-7N-3E (St. Elmo Quad)	St. Elmo (C)	3.00	1,900	25	12	20	120	39.1	0.75	Sed. survey 1954, water supply
Fellers Lake	NE ¼ 28-7N-3E (St. Elmo Quad)		.50	320	20	15	5	54	17.5	2.02	
Burtschi Pond	S ½ 31-6N-1E, N ½ 6-5N-1E (Vandalia Quad)	Robert Sutton	.06	40	6	8	5				Levee ponds
St. Elmo Res.	14-15-23-7N-3E (St. Elmo Quad)	St. Elmo (C)	2.19	1,400		26	66	835	272.0	7.15	Water supply for city of St. Elmo
St. Elmo Sportsmen's Club	SW ¼ SW ¼ 16-6N-3E (Kinmundy Quad)		0.22	140	15	15	7				Nearest town St. Elmo
Kaskaskia Sports Club	NW ¼ NW ¼ 28-5N-1E (Vandalia Quad)		1.00	640	20	15	8				Nearest town Shobonier
St. Peter Spts. Club (Gatch Lake)	NW ¼ 9-5N-2E (Kinmundy Quad)	St. Peter Spts. Club	0.19	120	20	22	9				Nearest town St. Peter
Evans Lake	NE ¼ SW ¼ 7-6N-2E (Vandalia Quad)		4.70	3,000			8				
Lake Ramsey	SW ¼ SW ¼ 6-8N-1E (Ramsey Quad)	State of Ill.	2.34	1,500	40	26	45	575	187.3	4.6	Recreation

FAYETTE COUNTY



brush and timber. The low level of agricultural development, minimum watershed size, short fill, and lack of man-made obstructions should make this a low cost development. Geologically this appears to be a feasible site. Both abutments are sandy to silty clay glacial till, similar to the borrow used in the previously mentioned St. Elmo Reservoir. This material is available from several upstream locations. Test borings would be required to determine the depth of permeable materials in the floodplain.

Site 6. A dam across Stone Creek about 3 miles south and 2 miles east of Brownstown would create a fairly deep reservoir with many small inlets and bays. The watershed consists of gently rolling uplands that drop suddenly into moderately steep walled valleys. The floodplain is fairly wide and flat and about half of its area is free from timber and under cultivation. Although only one township road would be inundated by the development, access to the site is very good. Illinois Route 185 passes within 0.5 mile of the dam site. Several previously abandoned township roads could easily be incorporated into an around-the-lake road system and provide access to several points of the lake. From this preliminary examination it appears that only one residence would have to be acquired, but oil wells in the general vicinity of the lake might make land acquisition costs higher than average. If no serious right of way problem occurs this should be a moderate cost development. Geologic conditions appear favorable in all respects from a surficial examination. Both abutments and probably the valley walls are stiff sandy clay glacial till. The floodplain contains up to 4 feet of clayey silt over 2 feet of silty clay over 6 to 7 feet of silty medium to coarse sand over silty clay glacial till. The glacial till would provide an excellent impervious foundation. Similar material could be removed in abundance from the valley walls for borrow.

Site 7. A fair reservoir site exists on Camp Creek with the dam site some 3 miles east and 2 miles north of Vandalia. The watershed is composed of gently rolling uplands that slope gradually into the main valley which has been cleared and extensively developed agriculturally. Two township roads across the lake bed could be relocated and two others abandoned. With a few improvements the existing system of township roads would provide excellent access to most parts of the lake. U. S. Routes 40 and 51 provide good access to the area from other parts of the state. Although only two residences appear to be below water level, several others are quite close. Costs of acquisition, relocations, and rights of way might be above average making this a moderately high cost development. Geologic as well as economic questions need further study. A possibility of leakage through abutments would have to be investigated by a complete program of test borings. The abutments show sandy clay glacial till for about 14 feet above the floodplain, overlain by about 8 feet of fairly well stratified glacial outwash that is predominantly sandy clay and clayey sand with lenticular deposits of clayey silt. About 10 to 12 feet up from the channel in the till are 3- to 6-inch layers of highly permeable sands, which if continuous could pose serious leakage problems. Permeable alluvium does not appear to be a problem. The upper 3 feet of floodplain deposit is clayey silt over about 6 feet of firm silty clay over 5 feet of stiff silty clay over very stiff clay resembling till. Borrow material is available in quantity from either upstream abutment.

Site 8. A good potential reservoir site is available on Hoffman Creek with the dam site located about 1 mile east and 1 mile north of Vera. The watershed exhibits gently rolling uplands sloping into steep-walled valleys. In the vicinity of the lake the floodplain is wide, flat, and under intensive cultivation. The valley walls are heavily wooded with mixed hardwoods. There is considerable upland area in hardwood cover that would make an excellent park development. Although U. S. Route 51 passes within 0.25 mile of the lake, no roads, residences, nor utilities would be inundated by the development. There are no apparent problems that would make this an expensive project. Geologic conditions, while not ideal, do appear to be favorable. The abutments are composed of a very stiff to hard sandy clay glacial till which is nearly obscured by an overlying Kame deposit of coarse gravel that has slumped to cover the lateral portions of the till. It is believed that a depth of 35 feet of water at the dam could be maintained even though springs have been noted 10 to 12 feet above floodplain level. Although test borings would be required to substantiate this theory, it is believed that the till slopes upward into the gravel deposit to a much greater height than is apparent from the surface. The alluvium is quite sandy and permeable and would have to be sealed by a core wall, possibly 15 to 20 feet into the till. Till in the abutments should provide excellent borrow, but the gravel deposit must be wasted during excavation.

GREENE COUNTY

Although Greene County was entirely covered by the Illinoian glacier, the drift which it deposited is quite thin over the western half of the county. The deposits are somewhat heavier over the eastern half of the county, but the bedrock features are discernable. A heavy loess cover exists over the uplands and drapes into the valleys.

The upland bedrock surface of Greene County is gently rolling with an average elevation of about 550 feet mean sea level (msl). The surface plunges over 200 feet into the lower Illinois bedrock valley along the western border, and nearly as far into the Macoupin Creek bedrock valley in the southern half of the county. "Within these major buried valleys the bedrock consists of Mississippian limestones which are overlain throughout most of the county by Pennsylvanian strata consisting of weak shales, thin limestones, occasional coal seams, and locally developed sandstones.

Except in the western quarter of the county, which includes the Illinois River Valley, topographic and geologic conditions are suitable for reservoir development. The results of feasibility studies on 12 potential sites in Greene County follow.

Site 2. A potential dam site exists on Tar Hollow, a tributary of Macoupin Creek, located about 1 mile northeast of Spankey. The watershed has very hilly uplands and steep slopes into rather narrow valleys. Development of this site would inundate a gravel road and three frame residences. The bottomland is mostly partially cleared pasture. Access to the site is excellent. The depth to bedrock is estimated at 12 to 16 feet, and the type of bedrock is probably shale. This is the end of a terminal moraine of the Illinoian glaciation. The unconsolidated material is Illinoian glacial outwash and till, which appears in both abutments. The alluvium consists of about 8 feet of dark gray clayey silt over 5 to 8 feet of stratified silty sand and gravelly material. The alluvium at this site is rather deep and soft enough that removal or precompaction of material below the proposed dam would be necessary. The upper alluvium may be impermeable enough to act as a natural blanket over the sandy basal alluvium, but this should be verified by soil testing. Close examination of the dam site abutments is recommended during construction to locate and remove, or blanket, any permeable sand or gravel strata which may bypass the fill. Because of the heterogeneous nature of all terminal moraine deposits, a thorough subsurface investigation of this dam is strongly recommended. This should make a moderately low cost project.

Site 4. A potential reservoir site exists on "Wines Branch, a tributary of Macoupin Creek, located 7 miles northwest of Jerseyville. The watershed has very hilly uplands and steep rocky slopes into V-shaped valleys. Floodplains are rolling and contain much chert rubble. The reservoir area is covered with mixed timber. About 1 mile of gravel road would have to be abandoned. This road provides access to four old frame residences and an active stone quarry. Access to the site is good. Limestone bedrock is estimated to be about 15 feet below floodplain level. The Keokuk-Burlington limestone has bedding planes that are 1 to 2 feet apart in the lower half, separated by 1- to 6-inch chert layers. The unconsolidated material consists of Peorian loess, thickest on hilltops but present on the slopes. A thin mantle of loamy, cherty, soil material exists on the steep slopes. The alluvium is silt-covered chert rubble. There seem to be some solution channels but most exposures appear rather massive. Quarry walls about 500 feet upstream on the right abutment are quite dense and free from solution channels. The acquisition of sufficient good quality material for construction of the core of the dam could be the most serious problem at this location, although it may be possible to find sufficient suitable material in the Macoupin Creek bottom north of the dam site. The highly permeable cherty rubble in the valley floor must be intercepted by an impermeable core wall at the dam site, otherwise serious leakage will occur. This dam site should make a good reservoir but at a moderately high cost.

Site 5. A reservoir could be developed on Taylor Creek, with the dam site 3 miles east of Greenfield. The watershed is rather long and narrow and consists of very gently rolling uplands and steep rough slopes bordering the valleys. Except for numerous alluvial fans, the floodplain is flat. Cover in the lake area consists primarily of pasture and scattered timber. No residences are involved in the development. One township road crossing the upper reaches of the site could be raised slightly. The lack of intensive agricultural use and man-made obstructions together with the short fill required for the dam should combine to make this a low cost development. Both abutments and very probably the valley walls consist of sandy clay glacial till overlain by up to 5 feet of weathered loess on the ridgetops. The till would be suitable for a rolled earth dam, and occurs in sufficient quantity for this use. A core wall approximately 7 feet deep would be required to intercept the permeable basal alluvium in the floodplain.

Site 6. A reservoir could be developed on Taylor Creek with the dam site about 2 miles west of Rockbridge. The watershed consists of gently rolling uplands which are well drained by deeply incised valleys. The floodplain in the lake area is very wide and flat. An alternate site for a larger lake exists about 0.5 mile downstream from the suggested location. No residences are involved in this development, but a two-lane gravel road across the site would probably be abandoned. At the suggested elevation, U. S. Route 67 and the Chicago, Burlington, and

Quincy Railroad may need embankment protection. The entire floodplain is under intensive agricultural production, and a large area near the dam has been protected by a levee. Several factors such as acquisition of productive farm lands, spillway construction for a large watershed, and a fairly long earth fill seem to point to a moderately high cost development. The lower 15 to 20 feet of both abutments consist of stiff gray glacial till which is overlain by stratified glacial outwash containing irregularly shaped deposits of sandy gravel, sand, and silt. The wide floodplain is suggestive of a deep permeable alluvium. This alluvium at the dam site consists of about 12 feet of various silty clay layers, possibly underlain by sand. If the clay layers will support the dam, a shallow core trench and channel-blanketing would prevent leakage through the alluvium. An extensive program of boring and testing would be required to determine the nature of glacial outwash on the upper valley walls, to locate suitable borrow material, and to investigate the foundation conditions.

Site 7. A potential reservoir site exists on Rubicon Creek with the dam site in the northeast corner of the Greenfield city limits. The watershed shows nearly level uplands and steep rolling slopes into narrow valleys with irregular floodplains. There is considerable timber on

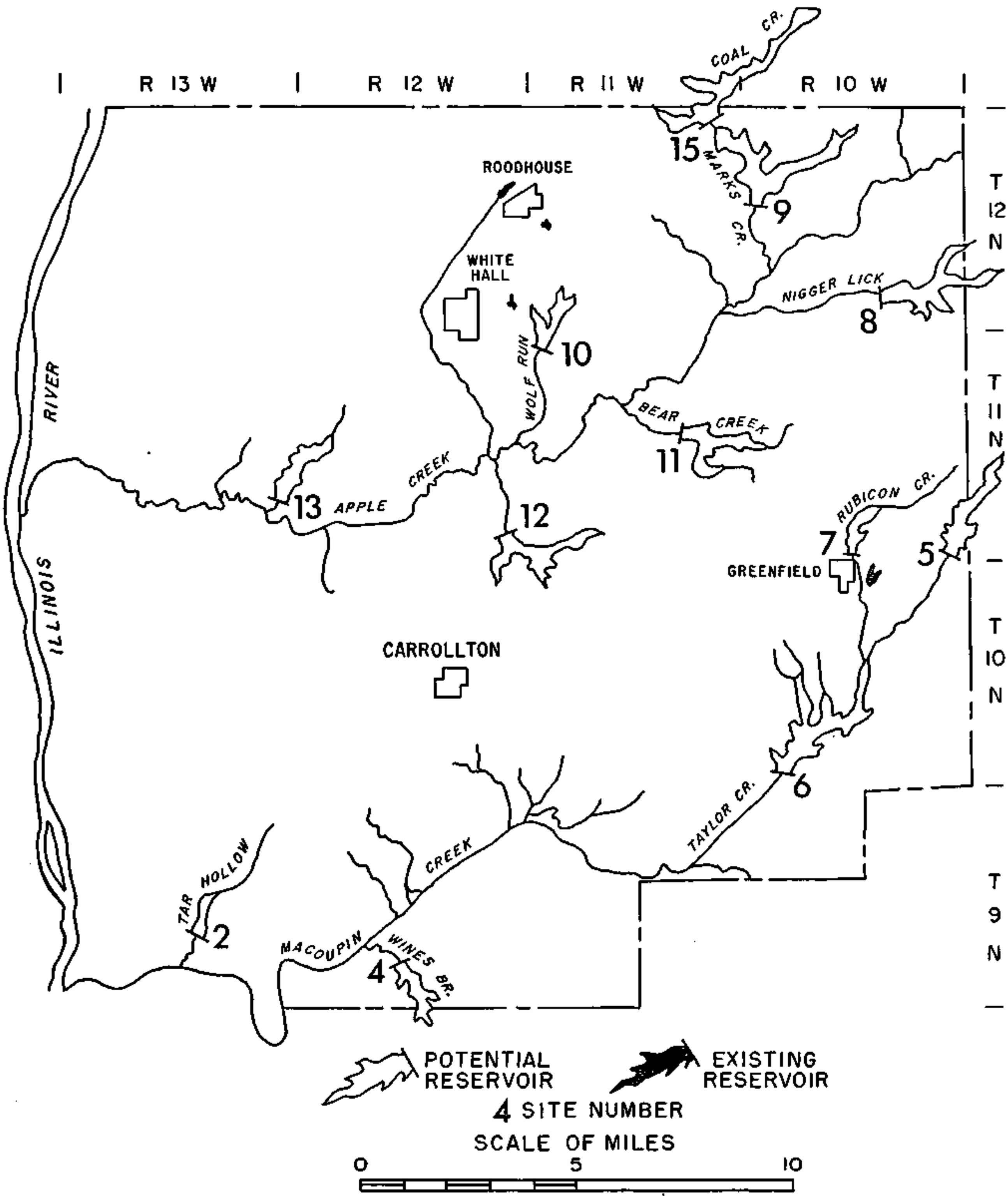
Potential Reservoirs in Greene County

Site number	Waterway location	Spillway elevation *(ft)*	Pool area *(acres)*	Storage *(ac-ft)*	Storage *(mg)*	Watershed *(sq mi)*	Times filled per year	Depth at dam *(ft)*	Length of dam *(ft)*	Earth fill *(cu yd)*	Shoreline *(mi)*	Mean annual runoff *(mgd)*	Net yield *(mgd)* for given recurrence intervals: Full capacity 5 Yr	Full capacity 10 Yr	Full capacity 25 Yr	Full capacity 40 Yr	Half capacity 5 Yr	Half capacity 10 Yr	Half capacity 25 Yr	Half capacity 40 Yr
2	Tar Hollow NE ¼ NW ¼ 27-9N-13W (Hardin Quad)	480	137	2,200	717	3.8	.9	48	1,000	365,300	3	1.85	1.8	1.4	1.0	.7	1.4	.8	.5	.4
4	Wines Br. Macoupin Cr. SE ¼ SE ¼ 28-9N-12W (Jerseyville Quad)	500	300	5,600	1,824	12.5	1.2	56	800	321,500	6	6.07	5.9	3.9	2.8	1.9	3.7	2.4	1.4	1.2
5	Taylor Creek SW ¼ SE ¼ 36-11N-10W (Greenfield Quad)	600	440	7,330	2,388	9.3	.5	50	700	250,500	4	3.45	3.1	3.1	2.6	1.8	2.8	2.0	1.4	.9
6	Taylor Creek SW ¼ SW ¼ 32-10N-10W (Greenfield Quad)	500	800	6,670	2,173	50.0	3.1	25	1,500	212,900	13	18.57	9.5	6.5	3.8	3.5	4.7	3.1	1.8	1.5
7	Rubicon Creek SE ¼ SE ¼ 33-11N-10W (Greenfield Quad)	570	130	1,200	391	7.0	2.4	28	400	63,700	4	2.60	1.6	1.0	.6	.5	.8	.6	.3	.3
8	Nigger Lick NE ¼ NE ¼ 34-12N-10W (Greenfield Quad)	570	400	6,670	2,173	17.2	1.4	50	800	295,500	10	8.35	7.5	4.8	3.6	2.4	4.4	2.9	1.6	1.3
9	Marks Creek NE ¼ SW ¼ 18-12N-10W (Roodhouse Quad)	540	1,030	14,400	4,692	40.6	1.5	42	850	230,900	19	19.72	16.8	10.3	7.8	5.3	9.4	6.1	3.4	2.8
10	Wolf Run SW ¼ NE ¼ 6-11N-11W (Roodhouse Quad)	520	200	2,350	766	9.5	2.2	35	700	152,200	6	4.61	3.1	2.0	1.3	1.0	1.7	1.1	.6	0.5
11	Bear Creek NW ¼ SW ¼ 14-11N-11W (Roodhouse Quad)	520	350	4,450	1,450	16.8	2.1	38	1,000	251,100	9	8.16	5.8	3.7	2.3	1.9	3.1	2.3	1.1	.9
12	Whitaker Creek SE ¼ NE ¼ 36-11N-12W (Roodhouse Quad)	500	400	4,650	1,515	24.5	2.9	35	1,000	216,300	9	11.90	6.7	4.4	2.7	2.2	3.4	2.6	1.4	1.2
13	Trib. Apple Creek SE ¼ NE ¼ 25-11N-13W (Roodhouse Quad)	500	365	7,300	2,378	8.5	.6	60	1,500	754,900	8	4.13	3.9	4.0	3.0	2.0	3.8	2.3	1.7	1.1
15	Coal Creek SE ¼ NW ¼ 1-12N-11W (Winchester Quad)	580	790	15,800	5,148	20.8	.7	60	1,300	608,400	17	10.10	9.5	9.4	6.5	4.6	8.7	5.3	3.8	2.5

Existing Reservoirs in Greene County

Reservoir name	Legal description	Owner	Watershed area *(sq mi)*	Watershed area *(acres)*	Height of dam *(ft)*	Depth of water at dam *(ft)*	Pool area *(acres)*	Storage capacity *(ac-ft)*	Storage capacity *(mg)*	Storage capacity *(in)*	Remarks and data source
White Hall City Res.	SE ¼ NE ¼ 36-12N-12W (Roodhouse Quad)	White Hall City	0.97	621		29	45	537	175.0	10.37	City water supply
G.M. & O. Res.	13-12N-12W (Roodhouse Quad)	G. M. & O. R.R.	1.50	960			30	25	8.1	0.31	Formerly C & A R.R.
Roodhouse Country Club Res.	S ½ 19-12N-11W (Roodhouse Quad)	Roodhouse Country Club	0.47	300			15	45	14.7	1.80	Recreation
Woodbine Country Club Lake	W ½ 16-11N-10W (Greenfield Quad)	Woodbine Country Club	0.31	200			8	24	7.8	1.44	Recreation
Reservoir	NE ¼ 10-10N-10W (Greenfield Quad)	Greenfield (C)	1.02	654		28	34	238	77.5	4.3	City water supply & recreation, 1 mi ESE of Greenfield
Cole Lake	NE ¼ 10-10N-10W (Greenfield Quad)	Finice Dale Cole	0.23	148		21	6	57	18.5	4.6	Sed. survey 1952, recreation

GREENE COUNTY



the valley walls and although the floodplain has been cleared, agricultural development is not a major factor. A two-lane gravel road along with two frame residences would be inundated. One additional residence might have to be acquired near the left abutment. Despite the residential inundations, the short fill required and low land values should make this a moderate cost development. The valley walls and abutments are composed of stiff gravelly glacial till, an excellent material for the earth fill. The floodplain contains 3 to 7 feet of lenticular interstratified sandy silts and clays over about 4 feet of silty clay over at least 1 foot of stiff sandy clay. A core trench would be required to intercept the upper 3 to 7 feet of this material. There are areas of the valley floor which display exposures of impermeable shale containing slabby limestone. The possibility that deep permeable alluvium might exist below the valley floor must be explored by a program of test borings.

Site 8. A dam across Nigger Lick just south of Athensville would create a deep many fingered reservoir. The watershed exhibits nearly level cultivated uplands, steep timbered valley walls, and a flat floodplain with cover consisting of about half pasture and half row crops. No residences are involved in the development, and one township road could be relocated as part of a lake access system. The site appears to have poor abutment and foundation conditions, and a thorough program of subsurface investigation and testing would be required. The right abutment is probably glacial outwash consisting of sandy clay and over 50 percent clayey sand and clayey gravel with some lenses of poorly graded sands and gravels. The left abutment is similar to the right but does not contain as much sand. The floodplain contains highly permeable materials to an unknown depth. Leakage would be intolerable unless a core wall could be extended through the alluvium.

Site 9. A dam across Marks Creek about 6 miles east of Roodhouse would create a large reservoir with the major fork on Coal Creek and a secondary fork on Lick Creek. The watershed, which is about equally divided between Coal Creek and Lick Creek drainage, exhibits gently rolling uplands and abrupt valley slopes dropping quickly to a somewhat narrow floodplain. Cover within the lake area consists of row crop development and some pasture on the valley walls. Several county and township roads would be inundated by the site, the most important of these a two-lane blacktop passing very close to the dam site. Three or four frame residences would have to be acquired. The abutments and valley walls are glacial till with cores composed of about 10 feet of fine grained sandstone over 2 to 3 feet of blocky coal over 4 feet of broken limestone over shale. The sandstone and limestone could allow considerable leakage, but exposures are not common. The floodplain shows 2 to 5 feet of rather weak permeable clayey silt over 5 feet of brown silty clay over bluish gray smooth silty clay. A core wall through the upper 2 to 5 feet of clayey silt would prevent any significant leakage beneath the dam. Sufficient till for borrow is available on the upstream valley walls.

Site 10. An excellent potential reservoir site exists on Wolf Run about 2 miles east of White Hall. The area exhibits gently rolling uplands and a well developed drainage pattern of steep-walled valleys with moderately wide floodplains. Cover in the site is about half timber and half low productivity agricultural lands. A two-lane gravel road across the site could easily be abandoned since a parallel road just below the dam site was recently improved. The existing township roads provide good access to several points of the lake. Since there are no apparent development problems, and land use and relocations are minimal, this should be a low cost development. Geologic conditions appear very favorable. The abutments and valley walls are composed of stiff silty clay till capped with 0 to 8 feet of weathered loess. The valley floor contains 1 to 2 feet of clayey silt over 7 to 8 feet of silty clay, probably over till. Only the upper few feet of clayey silt would need to be intercepted by a core wall, unless gravelly bed load deposits from former channels are discovered in the core trench. Abundant borrow material is available on either upstream abutment.

Site 11. A dam 1 mile north of Wrights on Bear Creek would create a lake extending about 1 mile past its confluence with Little Bear Creek. The area has gently rolling uplands which drop abruptly into a well developed drainage system of deep valleys having flat, rather narrow floodplains. A one-lane gravel road crossing the site would be inundated along with one frame house. One other township road passes just downstream from the dam site. From the dam site most of the floodplain appears to be generally free from timber and under moderate agricultural development. The valley walls are covered with timber and some pasture. The existing roads would have to be supplemented in order to provide good access to and around the lake. Favorable conditions exist geologically. Both abutments and the valley walls appear to be stiff sandy to silty clay till. This is an excellent borrow material, and much of it could be removed from a promontory near the left abutment. The dam foundation, and probably the entire valley floor, consists of 4 to 5 feet of clayey silt which must be intercepted by a core wall. The silt is underlain by 5 feet of silty clay over 5 feet of sandy clay. Borings would be required to determine the depth and consolidation of this alluvium.

Site 12. Several potential dam sites exist on Whitaker Creek. The site selected for study lies about 3.5 miles north and 1 mile east of Carrollton, and is probably as far downstream as the development could go. The watershed exhibits a well developed dendritic drainage pattern with rolling uplands sloping into steep-walled wooded valleys bordering broad flat floodplains in the vicinity of the lake. About three-fourths of the lake area, which occupies only the bottom portion of the deep valley system, is under cultivation and the remainder is in brush and timber. Two township roads cross the lake area and would probably be abandoned or incorporated into a system of lake access roads: At least two frame residences would probably be acquired, but the lack of major man-made obstacles should keep costs moderate on this development. The abutments are composed of gravelly to sandy clay till of irregular thickness over shaley limestone, all capped by 6 to 8 feet of loess. The floodplain generally contains 1 to 3 feet of clayey silt over 2 to 3 feet of silty clay over very slowly permeable sandy clay. A core wall should be placed into this sandy clay material to eliminate any serious leakage. The shale-limestone joints in the abutments appear sound, and although the till-limestone contacts may be gravelly, they probably are not continuous. Till in the upstream abutments would provide good borrow material but is thin and must be selectively excavated.

Site 13. A reservoir could be developed on a tributary of Apple Creek by construction of a dam about 1 mile south of Walkerville. The watershed land forms include rolling uplands sloping into steep-walled valleys which are V-shaped in the uplands but contain a wide flat floodplain in the vicinity of the proposed reservoir. At least one farm residence and its outbuildings would be inundated by this development. Poor road conditions at the time of inspection curtailed the investigation of other possible residences in the lake bed. The wide floodplain areas near the dam are under row crop development, but this changes to pasture and scattered timber upstream. Township roads surround the lake area providing a good basis for a lake access system. One of these roads would have to be relocated to provide residential access. The length of fill is somewhat long, but since this is the only cost factor that would be above average, overall cost should be moderate. The abutments contain about 35 feet of slabby and blocky limestone showing considerable solution activity, covered with 15 to 20 feet of weathered silty clay loess. Till may occur between the limestone and loess but was not encountered. Two factors improve the outlook of geologic feasibility: the solution channels may be filled with residual clays, and in most areas the limestone is covered with loess and some till. Extensive borings and testing would be required to determine the extent of leakage and the possibility of using the loess as borrow. Foundation conditions in the floodplain look fairly good. The alluvium consists of 4 feet of firm silty clay over 4 feet of stiff silty clay. A core wall through the first 4 feet would probably be sufficient except in former and present channel locations. In addition the channel should be blanketed for 500 feet upstream.

Site 15. A many-fingered reservoir could be developed on Coal Creek with the dam located just below its confluence with Marks Creek, about 4 miles southeast of Manchester. The watershed exhibits gently rolling uplands dropping into abrupt, steep, wooded valleys that have narrow irregular floodplains. Timber in the lake area is generally restricted to the valley walls, and the floodplain is under moderately productive agricultural use. One finger of the site contains a township road and four small residences that would be inundated. Improvement in existing township roads and two or three short relocations would result in a good lake access system. The several fingers of this site would provide an abundance of wooded shoreline. The four residences in the site might indicate slightly higher than average land acquisition costs, but overall costs should be moderate. Geologic conditions look fairly good. Both abutments are buff sandstone, but the left is heavily mantled by glacial till for about half of its height. The mantle on the left upstream abutment would be the principal source of borrow. The alluvium is quite permeable, consisting of sandy silt and sandstone rubble which would have to be removed. The dam would be founded on sandstone about 4 or 5 feet below floodplain depth. Permeability of the sandstone should be low to moderate.

Jasper County was covered by the Illinoian glacier. The glacial deposits throughout most of Jasper County are thin, and bedrock outcrops at many places, especially in the central part. In the northeast, the partially buried Embarras River Valley has relatively thick deposits of sand and gravel that are potential sources of large quantities of ground water. Jasper County is drained from north to south by the Embarras River and its tributaries in the eastern half, and by tributaries of the Little "Wabash in the western and southern parts of the county.

The bedrock consists of beds of shale, sandstone, and dolomite arranged one upon the other. These water sediments were buried, consolidated into rock, and later warped and in some places broken.

Except for the southeastern quarter of Jasper County, which lies in an area of relatively flat topography, both topographic and geologic conditions are well suited to reservoir development. The results of 10 feasibility studies in the county follow.

Site 1. A small deep reservoir could be developed by constructing a dam on Turkey Creek, a tributary of the Embarras River. More than half of the reservoir area is covered with mixed timber. There is some open land under cultivation near the dam site. Development of the lake would make it necessary to relocate or abandon two township roads. The reservoir area and dam site are considered probably feasible geologically, which means all materials are generally satisfactory for dam construction from the standpoints of foundation stability, relative impermeability, and source of material for an earth dam. Costs of land acquisition, relocations, and construction should be moderately low.

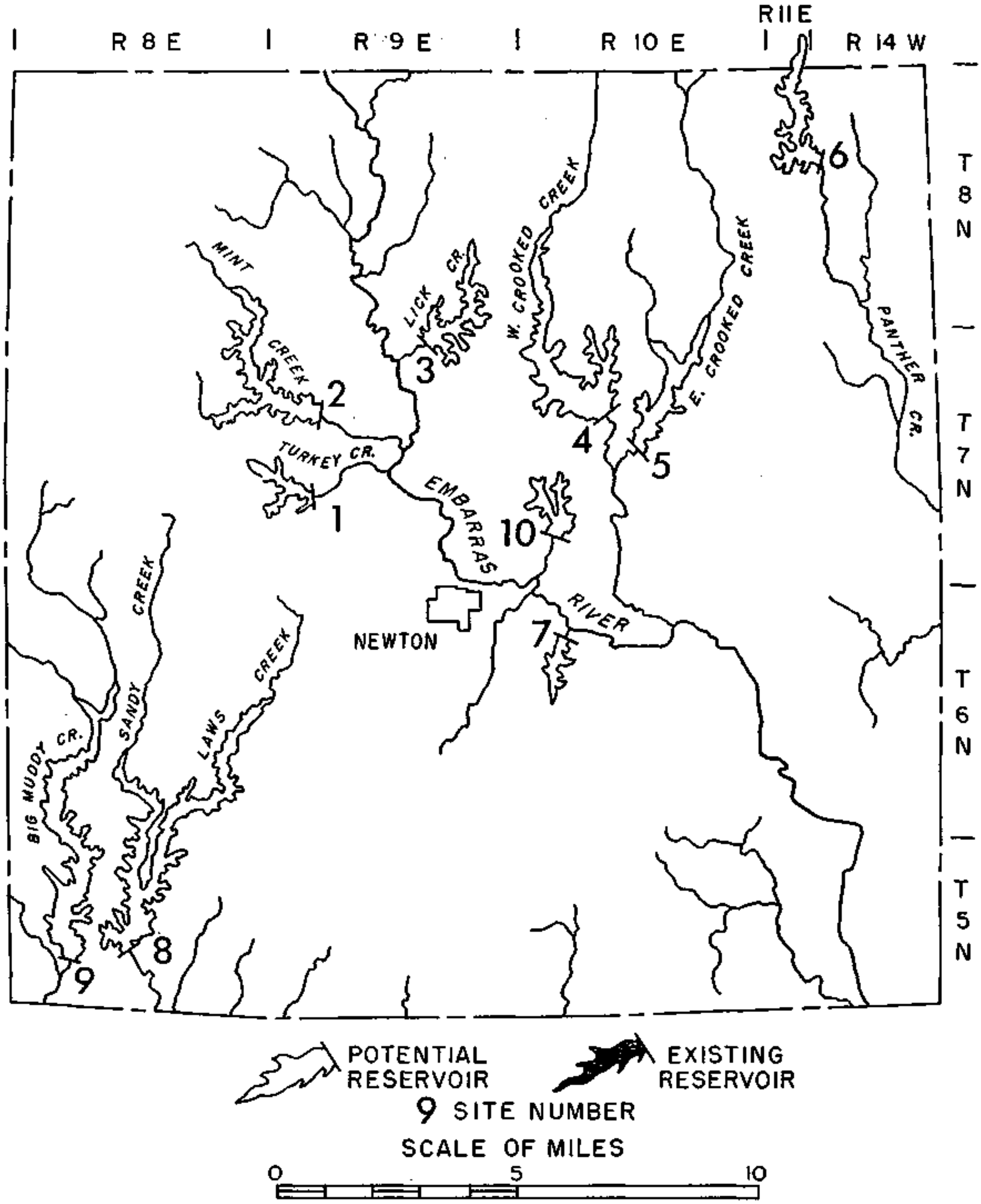
Site 2. Mint Creek, a tributary of the Embarras River, has a sweet potato shaped watershed, 5.5 by 3.5 miles, located 5 miles east and 1 mile north of Wheeler. A reservoir developed at this dam site would be long and fairly deep with several tributary fingers. Two single story frame residences and one section of township road would be inundated. The reservoir area is extensively farmed in the lower reaches, but the upper portion is 20 to 30 percent mixed timber. This should make a fairly good reservoir at a normal project cost. The reservoir area and dam site are considered probably feasible geologically.

Site 3. The Lick Creek watershed, 4 by 1.5 miles, is

Potential Reservoirs in Jasper County

Site number	Waterway location	Spillway elevation (ft)	Pool area (acres)	Storage (ac-ft)	Storage (mg)	Watershed (sq mi)	Times filled per year	Depth at dam (ft)	Length of dam (ft)	Earth fill (cu yd)	Shoreline (mi)	Mean annual runoff (mgd)	Net yield (mgd) for given recurrence intervals: Full capacity 5 Yr	Full capacity 10 Yr	Full capacity 25 Yr	Full capacity 40 Yr	Half capacity 5 Yr	Half capacity 10 Yr	Half capacity 25 Yr	Half capacity 40 Yr
1	Turkey Creek SW ¼ SW ¼ 21-7N-9E (Greenup Quad)	550	260	4,070	1,326	4.1	.6	47	750	246,700	7	2.11	1.8	1.8	1.8	1.4	1.7	1.7	1.1	.9
2	Mint Creek W ½ (9-16) 7N-9E (Greenup Quad)	550	940	17,540	5,714	14.9	.5	56	1,350	606,100	20	7.66	6.7	6.7	6.7	5.8	6.4	6.4	4.4	3.8
3	Lick Creek SW ¼ NE ¼ 2-7N-9E (Greenup Quad)	540	480	7,990	2,603	5.8	.4	50	850	285,000	16	2.98	2.5	2.5	2.5	2.4	2.3	2.3	1.8	1.5
4	W. Crooked Creek SE ¼ SE ¼ 9-7N-10E (Greenup Quad)	530	1,480	22,200	7,233	29.6	.8	45	1,850	560,900	24	15.22	13.7	13.7	11.0	9.2	13.5	10.7	5.9	4.9
5	E. Crooked Creek NE ¼ SE ¼ 15-7N-10E (Greenup Quad)	510	1,030	10,300	3,356	41.2	2.3	30	700	154,900	9	21.19	15.0	11.4	7.2	5.9	7.6	6.5	3.4	2.5
6	Panther Creek NW ¼ NW ¼ 17-8N-14W (Greenup Quad)	550	500	5,350	1,743	13.0	1.4	32	700	139,600	12	6.91	6.3	5.0	3.2	2.6	3.4	2.4	1.4	1.0
7	Wolf Creek NE ¼ NE ¼ 8-6N-10E (Newton Quad)	500	125	1,250	407	1.8	.8	30	700	116,900	6	.93	.8	.8	.6	.5	.7	.6	.3	.2
8	Weather Creek SE ¼ NW ¼ 15-5N-8E (Sailor Springs Quad)	500	1,750	26,200	8,536	46.9	1.0	45	1,000	327,400	25	24.12	22.4	20.5	14.3	12.0	15.9	12.5	9.0	6.5
9	Big Muddy Creek SE ¼ SE ¼ 17-5N-8E (Sailor Springs Quad)	500	1,550	22,200	7,233	48.8	1.3	43	1,300	402,600	19	25.10	24.0	19.0	13.1	11.1	14.4	10.5	7.8	5.5
10	Trib. Embarras River SW ¼ SE ¼ 29-7N-10E (Greenup Quad)	510	307	3,070	1,000	6.2	1.2	30	650	134,700	5	3.19	3.0	2.7	1.8	1.5	1.9	1.4	.7	.5
Sites partially in Jasper County (See Cumberland County for description)																				
3	Island Creek SE ¼ NE ¼ 34-9N-8E	570	1,200	22,800	7,428	18.8	.5	57	1,150	503,200	8	9.67	8.4	8.4	8.4	7.4	8.1	8.1	5.6	4.8
(See Richland County for description)																				
4	Fox River S ½ 9-4N-10E	460	2,500	25,000	8,145	54.0	1.4	30	1,600	275,600	36	32.40	29.9	25.4	15.2	13.3	18.1	13.7	6.8	5.2

JASPER COUNTY



Existing Reservoirs in Jasper County

Reservoir name	Legal description	Owner	Watershed area (sq mi)	Watershed area (acres)	Height of dam (ft)	Depth of water at dam (ft)	Pool area (acres)	Storage capacity (ac-ft)	Storage capacity (mg)	Storage capacity (in)	Remarks and data source
Burgett Lake	W ½ 22-6N-8E (Sailor Springs Quad)	Clarence Burgett	0.14	90	25	22	8.0	58	18.9	7.73	
Jasper Lake	32-7N-10E (Greenup Quad)	Lake Jasper Inc.	3.32	2,125	20	16	20.0	107	34.9	0.60	

shaped like an inverted cone. A dam site located 2 miles southwest of Rose Hill would create a deep many-fingered lake extending to the city limits of Rose Hill. The reservoir area has considerable pasture and 30 to 40 percent mixed timber. The development would inundate four township roads, two of which are unimproved dirt roads. The reservoir area and dam site are considered probably feasible geologically. This site would make a good recreational lake, because of its deep water, extreme length of shoreline, and ready access from Illinois Route 130. Land acquisition, relocations, and lack of construction problems would indicate a normal cost project.

Site 4. The "West Fork of Crooked Creek has a dam site located 4 miles southeast of Rose Hill and 4 miles west of Hunt City on a rectangular watershed 10.5 by 3.5 miles. The watershed has gently rolling uplands and steeply sloped tributary drainage into a broad alluviated floodplain. The reservoir area is almost free from timber, and a large portion is under clean tilled cultivation. Development of this reservoir would inundate two frame residences, three township roads, and a cemetery access road. The east-west township road east of Rose Hill could be raised and the others abandoned in favor of an existing north-south parallel system. The reservoir area and dam site are considered possibly feasible. This term indicates the same geologic conditions as probably feasible, except that the valleys and valley bottoms are wider, and therefore the alluvium may be thicker and may possess characteristics less desirable for dam construction. This site should make a good reservoir at moderately high cost.

Site 5. The East Crooked Creek dam site is located 4 miles northwest of Willow Hill and 5.5 miles southeast of Rose Hill on a long narrow rectangular watershed 14.5 by 4.5 miles. The watershed has gently rolling uplands and mildly sloping tributary valleys in the upper reaches but steep slopes in the lower reaches. The reservoir area covers a broad alluviated floodplain which is mostly open land under cultivation with mixed timber restricted to the stream banks and the floodplain extremities. Development of this lake would inundate four township roads and one residential access road, and would come extremely close to the Bookville Cemetery. Shallow water, less than 10 feet deep, would occur in the upper end. The reservoir area and dam site are considered possibly feasible geologically. This means that the soils and geology are generally satisfactory for dam construction from the standpoints of foundation stability, relative impermeability, and source of material for an earth dam. The valleys and valley bottoms are wide, however, and the alluvium may be thick and may possess characteristics undesirable for dam construction. This site could make a good medium size reservoir at a moderately high project cost.

Site 6. A narrow lake about 3 miles in length could be developed on Panther Creek about 2 miles northeast of Yale. The watershed is about 8 by 2 miles and has gently rolling uplands and increasingly steep tributary valleys in the downstream direction. The reservoir area is 70 to 80 percent open land mostly under cultivation, and mixed timber is confined to stream banks and floodplain extremities. Construction of this lake would require relocation of one township road and access to one residence. The reservoir area and dam site are considered probably feasible, since the soils and geologic conditions are generally satisfactory for dam construction from the standpoints of foundation stability, relative impermeability, and source of material to build an earth dam. This site should produce a normal cost project.

Site 7. The Wolf Creek dam site about 2 miles southeast of Newton has an inverted cone-shaped watershed 2 by 1.5 miles with pronounced dendritic drainage. The reservoir is about 80 percent open land, and mixed timber is confined to the stream banks and valley walls. If constructed, the lake created would inundate two township roads, two oil lines near the dam site, and several abandoned and possibly one active oil well. The north embankment is covered with till, and the upper half of the south embankment is broken sandstone (highly weathered), not fissured. The lower half of the south abutment is clayey fissile shale. Shale with thin limestone layers appears in the bed of the creek. The reservoir area and dam site are considered probably feasible geologically. This site should make a good reservoir but at a moderately high cost.

Site 8. A potential reservoir site exists on "Weather Creek, 7.5 miles east of Bible Grove. The watershed has gently rolling uplands and rather steep slopes into relatively shallow valleys with broad floodplains. The reservoir area is about two-thirds pasture and one-third crop land. Timber in the reservoir is restricted to the creek banks and floodplain extremities. Development of this reservoir would inundate township roads that could be abandoned at three locations. Pennsylvanian shale bedrock exists 9 to 12 feet below the floodplain. The shale has a high clay content, is very finely laminated, light gray to black, and contains scattered limonitic concretions. The unconsolidated material is Wisconsinan glacial till, sandy clay to clayey sand, mostly medium grayish brown, and contains many pebbles and some cobbles. There is some evidence of terraces at the base of the valley walls. Most of the alluvium has moderately rapid permeability. A few shale outcrops near the dam site and a few terrace remnants in the lower reservoir area are the only notable exceptions to a typical glacial till dam site. It is estimated that in the downstream quarter of the reservoir area, the alluvium is underlain directly by shale. Glacial till probably underlies the alluvium and overlies the shale in the upstream part. The generally permeable alluvium should be intercepted by an impermeable core wall, and the core wall should be bonded to the underlying shale. This appears to be an excellent dam site and should be developed at a normal project cost.

Site 9. A dam site exists on Big Muddy Creek about 6 miles east of Bible Grove. The watershed has gently rolling uplands and rather steep slopes into relatively shallow valleys with broad floodplains. The reservoir area is mostly pasture on what appears to be land held in reserve. Timber in the reservoir area is restricted to the creek banks and the valley walls. Three residences would be flooded in developing this site. Three gravel roads would be inundated but probably could be abandoned. The shale bedrock is estimated at 12 to 15 feet below the average floodplain level. The bedrock consists of light gray and light grayish-brown, moderately hard shale and a 12-inch layer of brown lithographic limestone. The unconsolidated material is glacial till, sandy clay and clayey sand, mostly medium grayish brown but somewhat variegated, containing numerous pebbles and cobbles. The alluvium consists of about 8 feet of indistinctly stratified silty clay and clayey silt over sandy materials over shale. The lower 12 to 15 feet of the abutments in the vicinity of the dam site consist of thinly bedded gray and brown shale. The remainder of the abutments is glacial till. The lower alluvium should be intercepted by an impermeable core wall at the dam site because it undoubtedly is in contact with the permeable shallow bed load in the reservoir area. No serious problems are anticipated at the dam site, and a normal cost project should be the result.

Site 10. A V-shaped reservoir could be created by the construction of a dam about 2.5 miles northeast of Newton on a small tributary of the Embarras River. The watershed is oval shaped, 4.5 by 2 miles, and has gently rolling uplands and, except for the steep abutments at the dam site, has gently sloping tributary valleys. The reservoir area is about one-third open land in cultivation, one-third in brush, and the remainder in brush and light timber. If developed, the lake would inundate a north-south township road and a one-lane dirt township road that could be abandoned. Several residences would be very close to the edge of the water. The geological conditions are considered probably feasible. This should make a fair small lake at a near normal cost.

JERSEY COUNTY

The Illinoian glacier advanced over Jersey County, except for a small portion of the western side, depositing rock debris known as glacial drift that smoothed bedrock irregularities and produced a broad, flat upland plain. The deposits left by the Illinoian glacier have been extensively eroded since their deposition. The composition of the remaining deposits is very complex. Much of the upland is covered by unsorted debris, called till, that was deposited by melting ice. Wind-blown silt deposits known as loess covered the till and some of the area which was unglaciated. The bedrock is further mantled by sediments of modern streams as well as the till, outwash, and loess of former eras. Drainage is primarily east to west via the Illinois River and the tributaries of Macoupin, Otter, and Piasa Creeks.

The bedrock consists of shale, coal, limestone, dolomite, and sandstone arranged in layers. The original deposits were loose sediments in a shallow continental sea, later buried and consolidated under pressure. For long intervals the bedrock formations were subject to erosion, tilting, and warping. In the southwestern corner of the county the bedrock formations have been sharply bent and in places broken along a line called the Cap au Gres faulted flexure.

Although Jersey County is not as ideally suited topographically to reservoir development as are some counties in this region of the state, feasible sites are available. The results of studies on nine sites in the county follow.

Site 1. A small reservoir could be developed on the head waters of the South Fork of Otter Creek, 2 miles south of Otterville. The watershed has very little rolling uplands since most of the drainage area slopes gradually into an irregular system of moderately steep walled, wooded valleys that increase rapidly in steepness and depth downstream. In the area of the lake, the floodplain is wide and gently sloping and is almost entirely under cultivation. The spillway elevation could be increased 10 feet over that used for the study. No roads or residences are involved in the development, but an abandoned township road crossing the dam site could be improved for construction and later access. Costs should be low except for expensive construction techniques which might be required on the limestone foundation and abutments. Both abutments are rather steep exposures of slabby light gray limestone which contains considerable gray and white chert in the form of nodular masses and discontinuous strata aligned in the same horizontal plane as the bedding of strata. No solution cavities were observed, and the formation is conspicuous in its lack of joints. In the floodplain, limestone is overlain with about 2 feet of limestone rubble which is overlain in a few places with up to 4 feet of sand and silts. The alluvium must be removed at the dam site and high clay content material bonded to the limestone along the center line of the dam up to water level. The limestone appears to be slowly permeable and leakage should be moderate. Borrow material is scarce near the site, although more thorough investigation may locate usable till or residuum deposits nearby. Adequate supplies of sandy and silty clay till are available downstream from the dam site on the valley walls and uplands.

Site 3. A potential reservoir site exists on an unnamed tributary of Macoupin Creek located approximately 1 mile west of Medora. The watershed has rolling uplands and moderate slopes into rather narrow valleys. The floodplain is narrow, and the alluvium is deep. Bedrock of Pennsylvanian shale exists about 14 feet below the average floodplain level. The Pennsylvanian shale is clayey, light olive gray, fairly hard, and contains broken blocky limestone 18 inches thick in the upper part. The unconsolidated material is Illinoian glacial till, consisting of stiff standing clay, medium yellowish brown with pinkish cast. The alluvium is 2 or 3 feet of silty clay over clayey sand and sandy gravel. The limestone is broken into large blocks which have slid down the valley slopes. The "in-place" limestone appears to be irregularly broken, but no definite joint planes were observed. An impermeable core wall should be installed to intercept the permeable lower alluvium which undoubtedly would be in contact with the reservoir water. A 6-inch thick layer of black carbonaceous shale exists below the 18-inch limestone layer. The shale shows evidence of solution but voids are filled with clay. Significantly, leakage is quite unlikely at this site. Land acquisition should be relatively simple since there are no residences or roads involved and the creek bed is nearly all light timber. This is an excellent site with fair access, and would create a twin-fingered reservoir with a lengthy shoreline. This site should result in a normal cost project.

Site 5. A deep reservoir could be developed on Sugar Creek by construction of a dam about 3 miles north of Fieldon. A small portion of the watershed is in rolling uplands which drop abruptly into steep-walled valleys as much as 140 feet deep. The floodplain is rather wide and flat, and near the dam site is under cultivation. As with most of the valleys in this area, the floodplain has been used for road and residential development. A township road runs the full length of the proposed lake, and six residences would be inundated. Land acquisition and relocation costs might make this an expensive project. Both abutments and the valley walls are composed of what appears to be Keokuk-Burlington limestone. A few solution channels are visible but seem to be well filled with clay. As with all sites in limestone areas some leakage in the form of new springs downstream should be expected; however, leakage from the limestone encountered in the abutments and valley floor should not be excessive. The upper portions of the limestone formations are covered with loess-derived soil and some clay residuum. The higher hills are covered with sandy or silty clay till, providing the only source of borrow for the earth fill. Transporting this material to the dam site will present a problem unless a closer source is located by further examination. The floodplain contains 3 to 7 feet of irregular alluvial silts, sands, and clayey silts over an undetermined thickness of chert rubble. This material would have to be excavated below the dam, and a high clay content material bonded to the limestone throughout the length of the center line. A thorough geologic investigation of this site before construction is imperative.

Site 7. Otter Creek, a tributary of the Illinois River, has a potential reservoir site 2.5 miles southwest of Fieldon. The east-west oriented drainage area is about 8 by 11 miles. The watershed is located in very rough uplands which have steep valley walls and broad alluviated floodplains with numerous terrace remnants. The reservoir area is under extensive cultivation, and development of the site would inundate about 20 residences ranging from excellent two-story frame farm homes with outbuildings to two-room shacks. A gravel road running the length of the valley provides access to many additional homes, and its elimination would cause serious relocation problems. A newly constructed pumping station on the north side of the potential dam site will pump municipal water to the city of Jerseyville. A pipeline has been laid through the reservoir area from the pumping station to Jerseyville. Bedrock is probably Wapsipinicon or Cedar Valley limestone of Devonian age. The unconsolidated material is very thick loess of Peorian or Roxana eras. The alluvium is very deep and mostly silty, while the terrace remnants are richer in clay than the lower level alluvium. Limestone of Devonian age forms the core of all abutments and quite probably underlies the entire reservoir area. A 200-foot high cliff occurs on the south valley wall downstream from the dam site. The limestone formations are not notoriously cavernous, but do have some solution-enlarged joints and bedding planes. Some leakage would occur, but it is not expected to be serious. The thick, soft clayey silt and silty clay alluvium was not penetrated by probing at least 22 feet. A very careful subsurface investigation and testing program is recommended to determine the suitability of potential borrow materials, consolidation potential of alluvial foundation, and permeability of alluvium beneath the dam site. It appears that the silty clay in the terrace remnants would be the best source of material for the core of the dam. This site would create a large lake which, on the average, would require one and a half years to fill. However, it would result in a high cost project.

Site 8. A potential reservoir site exists on a tributary of Macoupin Creek, about 1.5 miles southeast of Spankey. The watershed has very hilly uplands and long steep slopes into the valleys. The floodplains are rather wide and gently rolling. There are no residences in the reservoir area, most of which is under cultivation. A one-lane gravel road which runs the length of the reservoir area would have to be abandoned. Access to the site is excellent. The depth to bedrock of shale or limestone is estimated at 20 feet below floodplain level. The unconsolidated material is Peorian loess, 30 to 50 feet thick on the uplands. Some Illinoian glacial till is in evidence on the left abutment. The alluvium is very deep, distinctively stratified, and contains silt in the upper part, silty clay in the mid-portion, and sand in the lower part. There is some evidence of solution in large joints and bedding planes in reservoir abutments that are composed of Keokuk-Burlington limestone. The apparent scarcity of good quality borrow material is the most serious problem at this dam site. The silty clay alluvial material, about 5 feet below the alluvial surface, is satisfactory but is covered by about 5 feet of questionable material. There is a good possibility that deposits of Illinoian glacial till can be located in the abutments and that this material would be satisfactory for borrow. The possibility of leakage through the solution channel and the reservoir abutments has been decreased by the mantle of loess and associated soils and is not expected to be serious. The physical properties of the alluvial deposits should be thoroughly investigated prior to design. This should make a good large reservoir site with a normal cost.

Site 9. A dam across Otter Creek just upstream from its confluence with the South Fork and about 8 miles southwest of Jerseyville would create a major reservoir. At the proposed elevation, the lake would have a clear reach of almost 4 miles on the main body and also many protected fingers and coves. The watershed consists of rolling, cultivated uplands sloping into wooded, steep-walled tributary valleys with narrow, fairly high gradient floodplains. The main valley walls are steep and wooded, and border a wide flat floodplain, most of which is under intensive cultivation. Several township roads crossing the site would be inundated, but the major relocation would be a principal county road crossing north of Otterville. The Jerseyville water line would also require relocation in the vicinity of the structure. In addition to the relocations, the acquisition of 12 residences on the floodplain would make this a moderately high cost project. The abutments very probably contain a limestone core which is overlain by silty and sandy clay glacial till with numerous subangular to angular chert pebbles and cobbles, all capped by 7 to 15 feet of weathered loess on the higher slopes and ridges. The limestone formation is well covered throughout most of the lake area, and is generally exposed only on the higher portions of the valley walls. A fairly deep core wall would be required to reach the limestone foundation which is overlain by 3 feet of clayey silt over 1 foot of sandy clay which grades into sand at the 5-foot depth and into gravel at the 9-foot depth. Manual equipment was stopped at the 9-foot depth by what is probably chert rubble of undetermined thickness. The glacial till described earlier should be suitable for the earth fill and is probably most abundant on the left upstream abutment. An adequate program of test borings would be required to determine the best location of borrow and the depth to, and nature of, limestone in the floodplain.

Site 10. An excellent potential reservoir site exists on Little Piasa Creek with the dam site about 6 miles south and 3 miles east of Jerseyville. The watershed exhibits rolling uplands sloping into moderately steep and narrow valleys that increase to steep walled fairly wide valleys downstream. The lake would be quite deep and would carry its depth well into each of the three major fingers. A gravel road fording the creek near the dam site is the only inundation, and this could be relocated slightly downstream. About half of the lake area is free from timber and under cultivation. The site should make a good low cost development in a fairly well populated area. The left abutment appears to have a limestone core, which showed no joints or solution channels, overlain by stiff silty clay glacial till overlain by up to 8 feet of weathered loess on the gentler slopes and highest parts of the abutments. The overall structure of the right abutment is very similar to the left; however, the bedrock in the right is much more shaley and contains limestone members. The shale is silty and calcareous and contains scattered geodes. Till on the right abutment differs from that on the left in that it contains more angular chert fragments especially near the bedrock contact. The material in the floodplain is a highly variable cut-and-fill deposit, but in general contains about 6 feet of thinly interstratified layers of silt and sand over 1 foot of clayey silt and sand over 4 feet of coarse sand over an undetermined depth of chert rubble. All of this material would have to be penetrated by a core wall into the limestone or shale which underlies it. The limestone formation visible for study does not appear leaky or excessively permeable. Borrow, in the form of till described above, is abundant on both reservoir abutments adjacent to the dam site.

Site 11. A small reservoir could be developed on a tributary of Macoupin Creek with the dam 4 miles west and 2 miles north of Medora. Although a site of this size in this particular area does not appear to be of any great value at the moment, it does indicate the general availability of potential lake sites in Jersey County. Two township roads should be raised slightly, but no residences would be involved even if a 5- to 10-foot increase in lake level were considered for the future. Cover in the site is about half mixed timber and half pasture with scattered timber. Costs should be moderate on this development because of the lack of man-made obstructions and the low level of land use. Geologic conditions are quite favorable. Both abutments are stiff to very stiff glacial till. Borrow would be plentiful from these deposits just upstream from the dam. The alluvium consists of about 7 feet of cut-and-fill material over 4 feet of stiff silty clay. A core wall into the silty clay would be quite sufficient. Many borings throughout the floodplain and abutments would be required to substantiate these findings.

Site 12. A dam site exists on Boyer Creek, a tributary of Macoupin Creek, located 8.5 miles northwest of Jerseyville. The watershed has very hilly uplands and steep slopes into broad alluviated valleys. A one-lane gravel road and four frame houses would be inundated by development of this reservoir. The floodplain area in the reservoir is in pasture and row crops. One gravel road near the upper end of the reservoir area would have to be raised. Access to the site is excellent. Depth to bedrock was estimated at 20 feet. The bedrock is believed to be Burlington limestone. The unconsolidated material

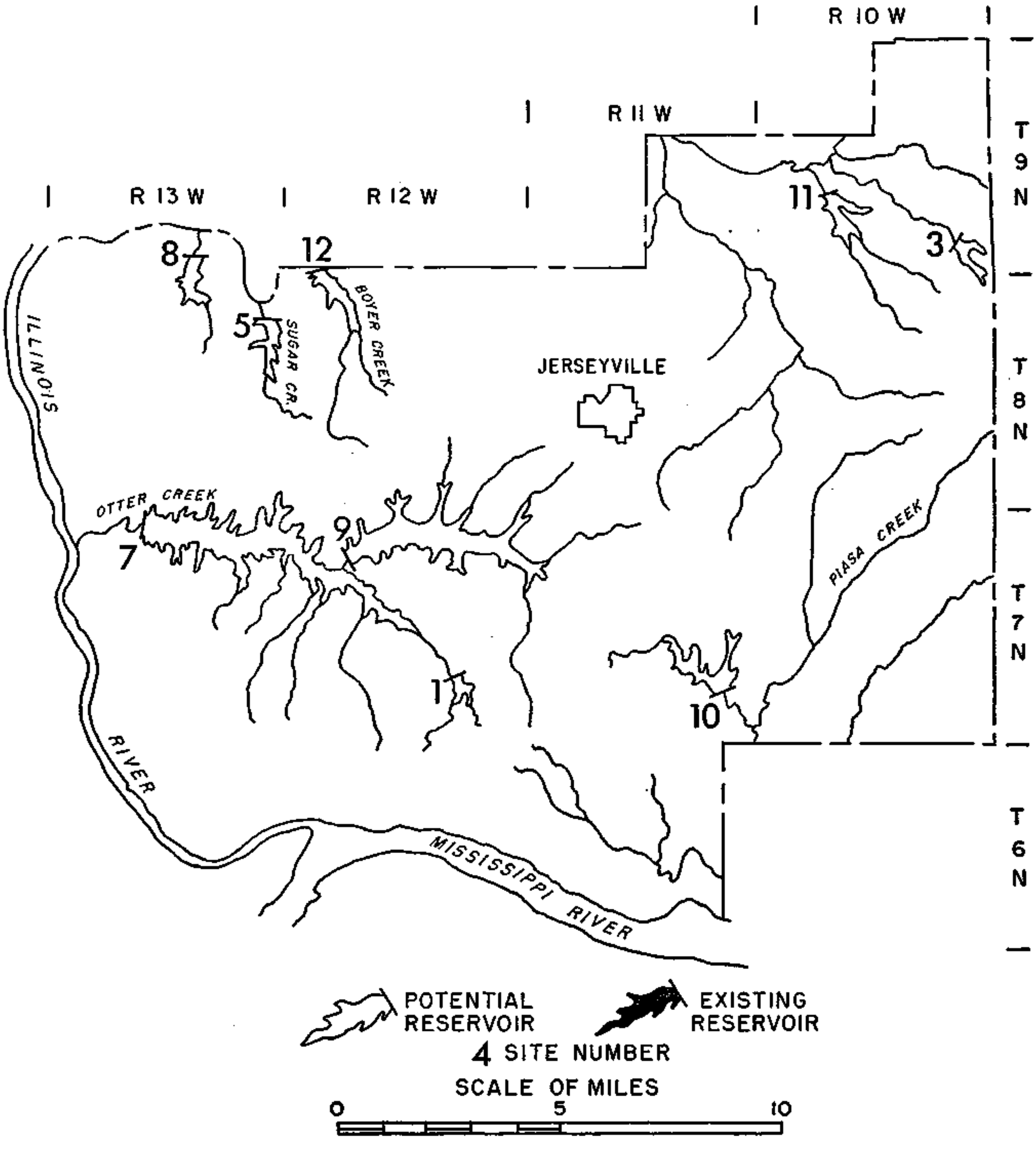
Potential Reservoirs in Jersey County

Site number	Waterway location	Spillway elevation (ft)	Pool area (acres)	Storage (ac-ft)	Storage (mg)	Watershed (sq mi)	Times filled per year	Depth at dam (ft)	Length of dam (ft)	Earth fill (cu yd)	Shoreline (mi)	Mean annual runoff (mgd)	Net yield (mgd) for given recurrence intervals: Full capacity 5 Yr	Full capacity 10 Yr	Full capacity 25 Yr	Full capacity 40 Yr	Half capacity 5 Yr	Half capacity 10 Yr	Half capacity 25 Yr	Half capacity 40 Yr
1	S. Fork Otter Creek SE ¼ NW ¼ 26-7N-12W (Jerseyville Quad)	580	100	1,300	433	5.9	2.4	40	700	187,700	2	2.87	1.9	1.2	.8	.6	1.0	.7	.4	.3
3	Trib. Macoupin Creek SW ¼ NW ¼ 36-9N-10W (Brighton Quad)	560	80	940	306	2.7	1.2	34	550	108,700	3	1.00	0.9	.6	.4	.3	.6	.4	.2	.2
5	Sugar Creek SW ¼ NE ¼ 12-8N-13W (Jerseyville Quad)	500	270	5,850	1,906	6.7	.6	65	1,350	814,500	6	3.25	3.1	3.0	2.4	1.6	2.8	1.8	1.3	.9
7	Otter Creek SW ¼ SW ¼ 2-7N-13W (Hardin Quad)	500	2,580	68,800	22,410	83.0	.7	80	2,700	2,332,400	40	40.31	38.5	38.5	27.7	19.0	36.4	23.3	17.0	11.2
8	Trib. Macoupin Creek SW ¼ SE ¼ 34-9N-13W (Hardin Quad)	500	220	4,030	1,313	4.0	.5	55	1,200	531,300	5	1.94	1.8	1.8	1.8	1.0	1.7	1.1	.8	.5
9	Otter Creek SW ¼ NE ¼ 8-7N-12W (Jerseyville Quad)	540	1,980	49,500	16,130	40.8	.4	75	900	642,000	27	19.82	18.3	18.3	18.3	12.0	17.9	13.8	9.8	6.5
10	Little Piasa Creek SE ¼ SW ¼ 25-7N-11W (Jerseyville Quad)	540	540	13,680	4,457	12.8	.4	76	1,100	683,500	11	5.19	4.6	4.6	4.4	3.7	4.4	4.2	2.8	2.7
11	Trib. Macoupin Creek SW ¼ NW ¼ 28-9N-10W (Brighton Quad)	500	140	1,260	410	6.8	2.9	27	800	121,800	4	3.30	1.8	1.2	.7	.6	.8	.6	.3	.2
12	Boyer Creek NE ¼ NE ¼ 6-8N-12W (Jerseyville Quad)	500	300	5,400	1,759	9.8	1.0	54	1,000	429,300	5	4.76	4.5	3.5	2.4	1.7	3.5	2.0	1.2	1.0
Sites partially in Jersey County (See Greene County for description)																				
4	Wines Br. Macoupin Cr. SE ¼ SE ¼ 28-9N-12W	500	300	5,600	1,824	12.5	1.2	56	800	321,500	6	6.07	5.9	3.9	2.8	1.9	3.7	2.4	1.4	1.2

Existing Reservoirs in Jersey County

Reservoir name	Legal description	Owner	Watershed area (sq mi)	Watershed area (acres)	Height of dam (ft)	Depth of water at dam (ft)	Pool area (acres)	Storage capacity (ac-ft)	Storage capacity (mg)	Storage capacity (in)	Remarks and data source
Little Lake	18-7N-13W (Hardin Quad)	USA in Ill. River bottoms					12				Managed by Ill. Dept. of Conser.
Fowler Lake	20-29-7N-13W (Hardin Quad)	USA in Ill. River bottoms					230				Managed by Ill. Dept. of Conser.
Upper & Lower Flat Lake	32-7N-13W (Hardin Quad)	USA in Ill. River bottoms					160				Managed by Ill. Dept. of Conser.
Deep Lake	29-32-7N-13W (Hardin Quad)	USA in Ill. River bottoms					43				Managed by Ill. Dept. of Conser.
Long Lake	29-32-7N-13W (Hardin Quad)	USA in Ill. River bottoms					55				Managed by Ill. Dept. of Conser.
Gilbert Lake	14-15-16-6N-13W (Brussels Quad)	USA in Ill. River bottoms					300				Managed by Ill. Dept. of Conser.
Piasa Lake	27-7N-10W (Brighton Quad)	American Dev. Co.	.08	50	40	33	20				
Hinson Lake	18-7N-11W (Jerseyville Quad)	Geo. Hinson	.13	80			5				
Clark Lake	23-7N-10W (Brighton Quad)	Harvey Clark	.25	158	25	20	6				SCS design
	2-6N-12W (Grafton Quad)	Nugent & Schpansky	.08	50	32	27	6	64	20.8	15.40	SCS design
	3-6N-12W (Grafton Quad)	Nugent & Schpansky	.07	40	29	22	7	66	21.5	19.80	SCS design
Crystal Lake	32-8N-10W (Jerseyville Quad)	Randolph	.04	20	35	30	5				SCS design
Feyerabend Lake	31-8N-10W (Jerseyville Quad)	Thomas Feyerabend	.09	65			6				Old CCC Lake
West Lake	20-8N-10W (Jerseyville Quad)	Country Club	.04	25			6				

JERSEY COUNTY



consists of Peorian and Roxana loess covering almost all of the uplands. Scattered till deposits are present, especially at the base of the valley walls. The alluvium is about 3 to 5 feet of silt over mixed sandy material. The abutments are undoubtedly limestone but this was not observed. There is a moderate to slight possibility of leakage through the mantle and into solution channels. Borrow for fill material is not too abundant, but should be adequate within 1500 feet of dam site. An impermeable core wall should be installed through the basal sandy alluvium, the base of which is estimated to be a maximum of 20 feet below floodplain level. Testing of potential borrow material is advised before construction. This should make a moderately low cost project.

LAWRENCE COUNTY

The bedrock in Lawrence County consists of shale, sandstone, limestone, and dolomite which were deposited as unconsolidated sediments in shallow seas and were later buried and consolidated into rock under pressure. The rocks were later warped and broken in some places. The bedrock surface is irregular because of preglacial erosion.

The Illinoian glacier covered Lawrence County, grinding off hills and filling old valleys with masses of glacial debris consisting of rock, gravel, sand, silt, and clay. After a long period of erosion the Wisconsinan ice sheet approached to within 50 miles of Lawrence County. As this ice sheet melted tremendous quantities of water drained through the "Wabash and Embarras Rivers depositing sediments on the bottomlands. After each cycle of flooding and drying, windstorms picked up silts and deposited them as loess on surrounding uplands. Weathering forces and erosion have reduced the thickness of these deposits. The major drainage is from northwest to southeast through the Embarras River and its tributaries emptying into the Wabash River. The southeast corner and south-central portion are drained by the Bonpas and Raccoon Creeks.

The results of a study on one potential reservoir in Lawrence County follow. The gentle topography and shallow valleys are not generally suited to reservoir development.

Site 1. A reservoir could be developed on Crabapple Creek about 1.25 miles southwest of Sumner. The reservoir area is about 70 to 80 percent open land under clean tilled cultivation, with the remainder in mixed timber along the stream banks. Development of this site would inundate two township roads, at least one oil well, and one residence access road. The watershed is almost round, and has gently rolling uplands and gentle slopes into the valleys and onto the wide floodplain. The reservoir area and dam site are considered to be probably feasible geologically since the soil and geologic conditions are generally satisfactory for dam construction with regard to foundation stability, relative impermeability, and source of material for an earth dam. This site would make a fair reservoir but at a moderately high project cost.

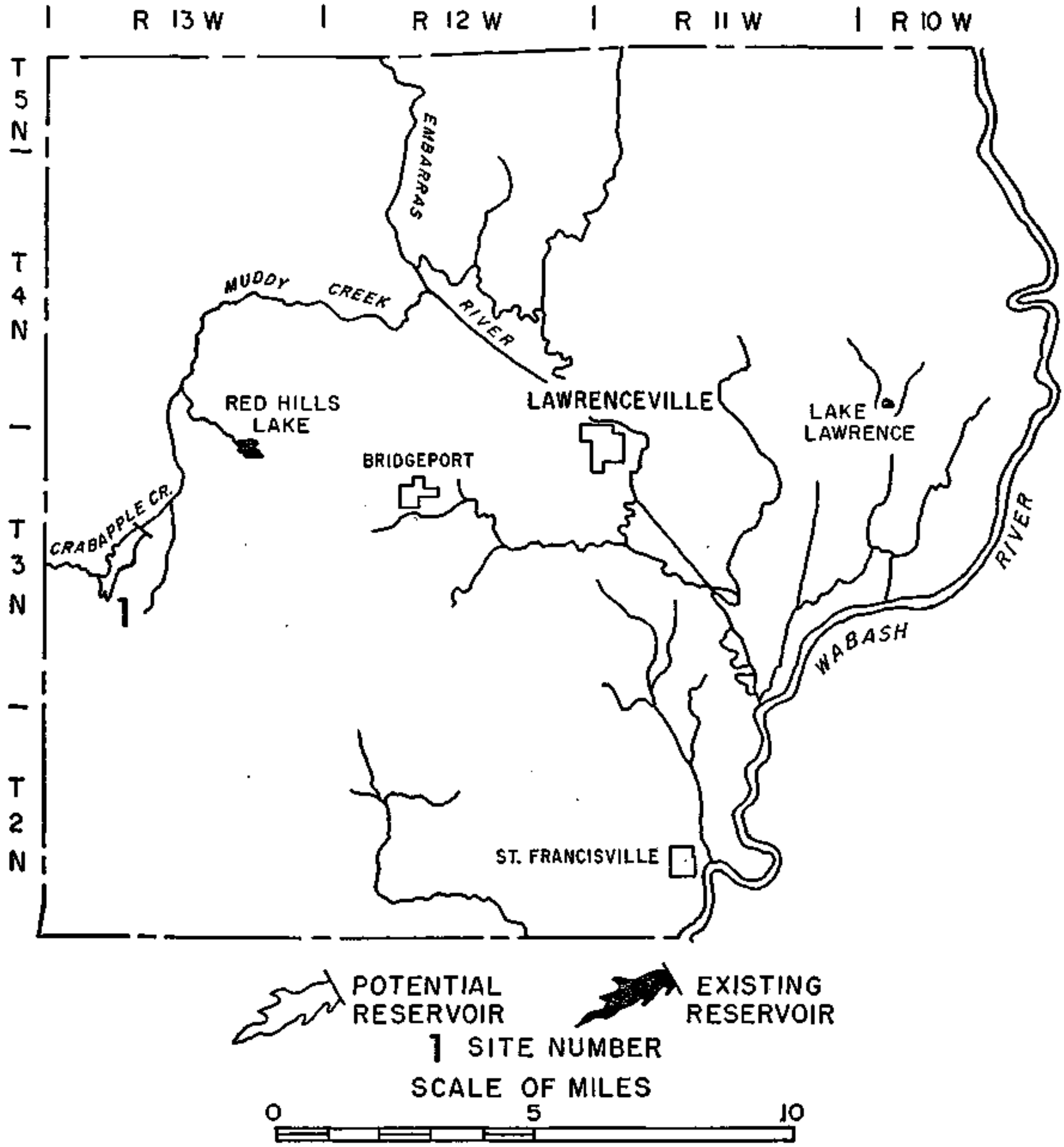
Potential Reservoirs in Lawrence County

Site number	Waterway location	Spillway elevation (*ft*)	Pool area (*acres*)	Storage (*ac-ft*)	Storage (*mg*)	Watershed (*sq mi*)	Times filled per year	Depth at dam (*ft*)	Length of dam (*ft*)	Earth fill (*cu yd*)	Shoreline (*mi*)	Mean annual runoff (*mgd*)	Net yield (*mgd*) for given recurrence intervals — Full capacity 5 Yr	Full capacity 10 Yr	Full capacity 25 Yr	Full capacity 40 Yr	Half capacity 5 Yr	Half capacity 10 Yr	Half capacity 25 Yr	Half capacity 40 Yr
1	Crabapple Creek SW ¼ NW ¼ 16-3N-13W (Sumner Quad)	480	210	1,400	456	4.7	2.3	20	1,200	125,500	3	2.82	2.0	1.6	.9	.7	.9	.7	.4	.2

Existing Reservoirs in Lawrence County

Reservoir name	Legal description	Owner	Watershed area (*sq mi*)	Watershed area (*acres*)	Height of dam (*ft*)	Depth of water at dam (*ft*)	Pool area (*acres*)	Storage capacity (*ac-ft*)	Storage capacity (*mg*)	Storage capacity (*in*)	Remarks and data source
Miller Pond	9-16-4N-10W (Birds Quad)	Rela Anderson	1.6	1,000			30	210	68.4		2 miles south of Russellville
Red Hills Lake	2-3-3N-13W (Sumner Quad)	State of Ill.	1.5	980		21	40	400	130.3	4.90	Red Hills State Park
Lake Lawrence	S ½ 31-4N-10W (Vincennes Quad)	Mina Meckimen		20			45	350	114.0		8 miles east of Lawrenceville
Beaver Pond	3-3N-11W (Vincennes Quad)	Geo. Plowman	7	4,500			8	48	15.6		4½ miles east of Lawrenceville
Robeson Pond	4-5-8-9-3N-10W (Vincennes Quad)	Warren Robeson	3	2,000			18	108	35.2		5 miles northwest of Vincennes, Ind.
Garvey Pond	4-2N-11W (Vincennes Quad)	Julius Gognat	8	5,000			12	72	23.5		3 miles north of St. Francisville
Rapid Pond	9-10-2N-10W (Vincennes Quad)	John M. Brevoort	8	5,000			10	50	16.3		2 miles north of St. Francisville
Lawrenceville Rod & Gun Club	31-4N-10W (Vincennes Quad)	Glenn Mahvenholz		10			35	315	102.6		Nearest town Lawrenceville

LAWRENCE COUNTY



MACOUPIN COUNTY

The Illinoian glacier covered all of Macoupin County. Unsorted clay, silt, sand, and pebbles, known as till, were laid down under the ice or dumped as the ice sheet melted and receded. Water-borne deposits of sorted sand, gravel, and fine material, known as outwash, partially filled the valleys. Wind-blown silts, known as loess, from river flats were deposited on the uplands. Till, outwash, loess, and modern stream sediments cover the bedrock surface. Sand and gravel deposits are rare in the thin glacial drift, but are present locally in the valleys of Otter and Bear Creeks and in the partially buried valley of Macoupin Creek. Macoupin County is drained from northeast to southwest by Macoupin Creek. The southern portion of the county drains through numerous tributaries that empty directly into the Mississippi River.

The bedrock consists of shale, sandstone, limestone, and dolomite beds arranged one upon the other. Such rocks are the result of unconsolidated sediments that were deposited in shallow seas, buried, and later consolidated under the pressure of overburden. The rocks have been warped and broken and covered with glacial debris.

Feasible reservoir sites are available nearly anywhere in Macoupin County. The results of studies on 21 sites follow.

Site 3. An excellent dam site and reservoir area exist on a tributary of Macoupin Creek, 1 mile east of Carlinville. The floodplain area is pastured and contains some mixed hardwoods; the valley walls are covered with mixed hardwoods. There are no residences, roads, nor obstructions in the reservoir area, except for one east-west town road that could be raised or abandoned. The abutments are sandy clayey glacial till, medium yellowish brown grading to medium gray, about 2 to 3 feet above channel level. The glacial till is stiff and impermeable. The permeable alluvium, consisting of gravelly clay with some lenses or layers of clayey gravel, is overlain with 5 to 6 feet of black silty clay grading to gray and finally to medium gray brown. It would be necessary to remove or core through the permeable alluvium which should be no more than 10 feet thick. There are no apparent significant problems at this site. This site should produce a near normal cost project.

Site 4. Bear Creek, a tributary of Hodges Creek, has a potential dam and reservoir site located 1 mile north of Chesterfield. The uplands are gently rolling, and the slopes into the valleys are moderately steep. The wide, level floodplains are slightly irregular because of the terraces and are devoted to raising row crops. Illinois Route 111 crosses the center of the reservoir and 'would have to be raised or relocated. No known residences nor obstructions occur in the reservoir except a town road crossing the upper third which could be abandoned. Both abutments are yellowish brown sandy clay glacial till which is stiff, impervious, and contains subangular pebbles, mostly chert. Some medium reddish brown weathered loess covers the upper abutments to a depth of 5 feet. The alluvium is highly variable but in general consists of 2 feet of very dark gray clayey silt over 3 to 4 feet of light grayish brown heavy clayey silt containing some fine sand over at least 5 feet of silty sand and sand. Low terraces, 3 or 4 feet higher than the alluvium level, consist of 1 to 2 feet of very dark brown clayey silt over at least 3 feet of light grayish brown silty clay. The total depth of alluvium may be 20 to 25 feet, and it probably is highly permeable at the base. Depth and characteristics of alluvium must be investigated. The site is readily accessible and should produce a moderate cost project.

Site 5. Joes Creek, a tributary of Hodges Creek, has a potential dam site 2 miles west and 1.5 miles north of Hettick. The reservoir area is currently in row crops and pasture. The valley walls are covered with brush and trees. There are no known residences or obstructions in the project area except one town road which could be raised. Access to the dam site and reservoir is good. The right abutment is medium yellowish brown and some medium reddish brown sandy clay till with numerous subrounded and subangular pebbles. The left abutment has reddish brown sandy clay till in the upper 30 feet, but the lower 15 to 20 feet is considerably lighter textured and contains some 6-ineh to 1-foot sand layers between sandy silt and sandy clay. The lower till may have moderately slow permeability, but is moderately stiff and not expected to leak significantly if sand lenses are removed or intercepted. The alluvium consists of about 3 feet of very dark brownish gray clayey silt over discontinuous light brown silty sand, 6 inches thick, over 3 feet of light textured silty clay over 4 feet of gravelly and sandy silt over at least 7 feet of saturated fine sand, coarse sand, and sandy gravel. The alluvium is probably not more than 20 feet deep. This should make a good site, but the deep sandy alluvium must be intercepted and care must be taken to prevent sandy lenses in the lower till from bypassing water through the earth embankment. The reservoir should result in a moderate cost project.

Site 6. A small tributary of the West Fork of Wood River has a potential dam site 1 mile southeast of Brighton. The reservoir area is partly open land currently in clean tilled cultivation. There are numerous small farm ponds and two fishing ponds along the side tributaries. Two town roads would have to be relocated, raised, or abandoned. The Chicago, Burlington, and Quincy Railroad would require some protection. Effluent from a sewage treatment plant presently being constructed on the west tributary by the city of Brighton, would have to be piped below the structure. Both abutments consist of sandy clay glacial till which is unusually stiff, 3 to 4 tons per square foot (tsf) bearing strength. The color is yellowish brown in the upper 20 feet, grading to gray at floodplain level and medium bluish gray below the permanent water level. Not more than 5 feet of weathered loess caps the hills. The alluvium at the dam site consists of very dark grayish brown clayey silt grading to clayey sand, sand, and gravel glacial outwash over till at 6 to 12 feet below general floodplain level. The alluvium thins to nothing about 1000 feet upstream from the dam site. The till is relatively impervious stiff silty clay of good bearing strength. An impervious core wall would have to be placed through the highly permeable glacial outwash. This could result in a good reservoir but would be developed at a moderately high cost.

Site 7. A small tributary of the East Fork of Wood River has a potential dam site located 1 mile west of Woodburn. The uplands are gently rolling farm land, but become rolling as tributary streams are approached. The valley slopes are steep at the dam site but moderate throughout the reservoir area. The floodplain is narrow and in agricultural production. There are no obstructions in the reservoir area except a short stretch of town road that can be raised. The abutments at the dam site consist of sandy clay and silty clay glacial till which is medium yellowish brown, stiff, and very slowly permeable. The alluvium does not exceed 6 or 7 feet and consists of lightly variegated grayish brown silty sand, clayey silt, and thin sand strata. The gravel at the base ranges from 1 inch to 1 foot thick and is underlain by gray silty clay till. This is a very good site with plenty of excellent material to construct an earth dam, and should result in a normal project cost.

Site 9. A potential reservoir site exists on Otter Creek immediately below its confluence with Massa Creek about 1.5 miles southeast of Hettick. The U-shaped reservoir area is extensively used for clean tilled cultivation and contains some farm residences and outbuildings. A county highway crosses through the center of the reservoir area in an east-west direction and would have to be relocated. Two north-south town roads would have to be abandoned. Both abutments are mixed and highly variegated glacial till consisting of sandy clay, silty clay, clayey sand, and many discontinuous thin sand layers. The till does not appear to be excessively permeable even though it does contain sand layers. The same till occurs throughout the reservoir area, and although more permeable than normal, this till does not present a serious problem. The alluvial floodplain is very wide and intensively cultivated; soil conditions are so highly variable that a general description is difficult. The upper 3 to 5 feet is mostly clayey silt and fine sandy silt, and the next 9 to 11 feet is mostly lenticular deposits of fine brownish gray and gray sand and some clayey sand, sandy clay, and silt. Manual borings could not determine the depth of alluvium. There is a plentiful supply of good fill material for the construction of an earth embankment. A good reservoir could be created at this site, at a moderately high cost.

Site 10. A long narrow reservoir could be created on Solomon Creek, a tributary of Hodges Creek. The dam site is located 2.5 miles west and 2 miles south of Hettick. The uplands are gently rolling, the valley slopes steep, and the floodplain long, narrow, and nearly level. The reservoir area is clean tilled where the drainage is good, and in poor pasture or idle in the remaining area. The valley walls are steep and covered with timber. There are no known residences nor obstructions other than three town roads, two of which could be abandoned and the third raised. Both abutments are glacial till but the clay content is unusually low. The material is light grayish brown sandy silt or silty sand. The lower till is very stiff silty clay, varying from light gray to grayish brown. The upper till is stiff but may be moderately permeable. Several thin sandy lenses were encountered in the abutment borings. The alluvium consists of 1 foot of brown clayey silt over 2 feet of dark grayish brown silty clay over 2 feet of mottled silty clay over 4 feet of stiff medium gray silty clay over at least 2 feet of greenish gray silty sand. Some sand lenses should be expected anywhere in the alluvium. The site is considered probably feasible, subject to verification by an adequate program of materials testing and boring. This site should make a good reservoir with a lengthy shoreline, and at a near normal cost.

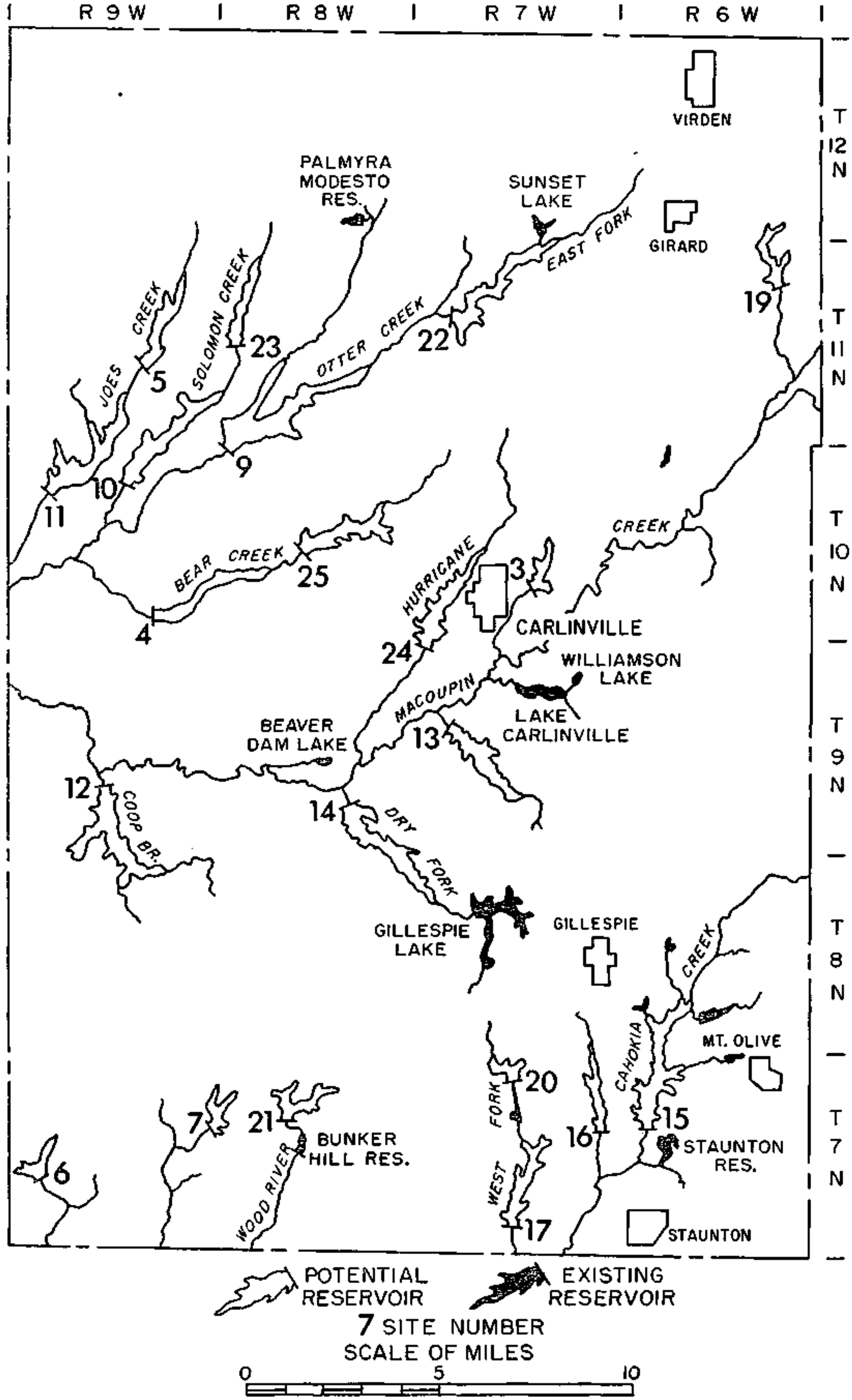
Site 11. Joes Creek, a tributary of Hodges Creek, has a potential reservoir site located 5 miles east and 1 mile south of Greenfield. The reservoir area has broad level bottoms, tilled and primarily in corn. One farm residence and outbuildings are subject to inundation. Three east-west and one north-south town roads cross the reservoir. These could be either abandoned or in two cases raised. Both abutments are light yellowish brown clayey sand or silty sand glacial till, much the same as in *site 10.* The till is rather stiff but moderately permeable. The alluvium consists of 7 feet of mixed medium brown clayey silt, fine sandy silt, and silty clay, over 5 feet of dark gray soft silty clay containing much rotten wood over 4 feet of mixed sand strata and sandy clay. Borrow is available from both abutments but is not of the best quality. The reservoir abutments are mostly till like that at the dam site, but are covered by a well developed subsoil that should decrease the leakage potential. This is not an ideal dam site because of moderate seepage through reservoir abutments and deep permeable alluvial deposits which include some organic deposits. The organic material has very high compaction potential as well as permeability and should be removed from the fill. A detailed investigation of materials and borings should determine the extent of organic bodies and both vertical and lateral permeability. This would make a good reservoir, but has a poor physical dam site and might result in a moderately high project cost.

Site 12. Coop Branch, a tributary of Macoupin Creek, has a potential dam site located 3 miles east and 1.5 miles north of Medora. The uplands are gently rolling, but the reservoir abutments are rolling and the dam site abutments are steep. The reservoir floodplain is wide and flat, and over 50 percent in agricultural production. A two-lane oiled road, crossing Coop Branch on the center

Potential Reservoirs in Macoupin County

Site number	Waterway location	Spillway elevation *(ft)*	Pool area *(acres)*	Storage *(ac-ft)*	Storage *(mg)*	Watershed *(sq mi)*	Times filled per year	Depth at dam *(ft)*	Length of dam *(ft)*	Earth fill *(cu yd)*	Shoreline *(mi)*	Mean annual runoff *(mgd)*	Net yield *(mgd)* for given recurrence intervals: Full capacity 5 Yr	Full capacity 10 Yr	Full capacity 25 Yr	Full capacity 40 Yr	Half capacity 5 Yr	Half capacity 10 Yr	Half capacity 25 Yr	Half capacity 40 Yr
3	Trib. Macoupin Creek SW ¼ NE ¼ 27-10N-7W (Carlinville Quad)	610	190	2,500	814	3.6	.6	40	800	195,100	4	1.34	1.2	1.2	.9	.6	1.0	.7	.5	.3
4	Bear Creek NE ¼ SW ¼ 35-10N-9W (Greenfield Quad)	550	500	6,670	2,174	25.6	1.6	40	750	200,400	9	9.51	8.0	4.9	3.7	2.5	4.5	3.1	1.6	1.6
5	Joes Creek NE ¼ NE ¼ 27-11N-9W (Greenfield Quad)	600	590	9,400	3,062	18.5	.8	48	1,100	381,300	12	6.87	6.4	5.5	3.9	2.7	5.4	3.1	2.0	1.5
6	Trib. W. Fork Wood River SW ¼ SW ¼ 20-7N-9W (Brighton Quad)	620	112	1,800	586	2.3	.6	50	600	190,600	4	.93	.8	.8	.6	.5	.7	.5	.4	.3
7	Trib. E. Fork Wood River SW ¼ NW ¼ 18-7N-8W (Brighton Quad)	620	210	3,010	980	2.8	.4	43	550	148,800	5	1.14	.9	.9	.9	.7	.8	.8	.5	.4
9	Otter Creek SW ¼ NE ¼ 6-10N-8W (Greenfield Quad)	550	1,800	21,600	7,037	107.0	2.1	36	1,950	470,000	17	39.74	28.2	17.8	11.6	9.1	16.0	11.5	5.7	5.7
10	Solomon Creek NE ¼ SW ¼ 10-10N-9W (Greenfield Quad)	550	790	12,100	394	27.0	.9	46	1,200	385,600	13	10.03	9.4	7.3	5.1	3.6	7.4	4.2	2.8	2.0
11	Joes Creek NE ¼ SW ¼ 8-10N-9W (Greenfield Quad)	550	850	11,900	3,877	31.0	1.1	42	1,150	322,600	15	11.51	10.9	7.4	5.6	3.7	7.2	4.4	2.5	2.2
12	Coop Br., Macoupin Creek SW ¼ NW ¼ 27-9N-9W (Brighton Quad)	540	900	12,000	3,910	52.0	1.8	40	1,500	401,700	13	19.31	15.2	9.2	6.7	4.8	8.6	5.7	3.1	3.1
13	Spanish Needle Creek NW ¼ NW ¼ 17-9N-7W (Gillespie Quad)	580	610	10,100	3,290	16.0	.7	50	950	349,200	13	5.94	5.5	5.5	3.8	2.6	5.2	3.0	2.2	1.4
14	Dry Fork, Macoupin Creek NE ¼ SW ¼ 26-9N-8W (Gillespie Quad)	560	670	8,900	2,900	31.0	1.5	40	1,300	366,900	12	11.51	10.1	6.3	4.7	3.1	5.7	3.8	2.0	1.3
15	Cahokia Creek NW ¼ NW ¼ 17-7N-6W (Gillespie Quad)	580	1,180	15,700	5,115	55.0	1.5	40	700	190,700	20	20.43	17.9	11.2	8.3	5.6	10.2	6.8	3.5	3.5
16	Big Br., Cahokia Creek NW ¼ SE ¼ 13-7N-7W (Gillespie Quad)	580	230	4,000	1,303	7.0	.7	52	900	367,800	7	2.60	2.4	2.3	1.6	1.0	2.2	1.3	1.0	.6
17	W. Fork Cahokia Creek NW ¼ NW ¼ 34-7N-7W (Gillespie Quad)	560	660	8,800	2,867	14.0	.7	40	1,000	278,800	13	5.20	4.7	4.7	3.2	2.2	4.5	2.5	1.8	1.1
19	Horse Creek SE ¼ NE ¼ 11-11N-6W (Raymond Quad)	650	390	3,900	1,271	7.0	.6	30	600	99,500	10	2.08	1.5	1.5	1.2	1.1	1.3	1.3	.5	.4
20	W. Fork Cahokia Creek SW ¼ SW ¼ 3-7N-7W (Gillespie Quad)	620	175	1,920	626	5.1	1.1	33	800	159,600	47	1.89	1.8	1.2	.8	.6	1.1	.7	.4	.3
21	E. Fork Wood River SW ¼ SE ¼ 9-7N-8W (Gillespie Quad)	620	330	3,740	1,218	5.6	.6	34	950	203,700	75	2.08	1.8	1.8	1.4	.9	1.4	1.0	.7	.4
22	E. Fork Otter Creek NE ¼ NE ¼ 17-11N-7W (Carlinville Quad)	600	660	8,140	2,652	34.0	1.4	37	800	185,200	14	10.10	9.0	6.5	3.6	3.2	4.4	3.2	1.9	1.6
23	Solomon Creek SW ¼ NE ¼ 19-11N-8W (Greenfield Quad)	600	260	3,030	987	13.3	1.8	35	850	188,000	6	4.94	3.8	2.3	1.7	1.2	2.2	1.4	.8	.7
24	Hurricane Creek SE ¼ SW ¼ 31-10N-7W (Carlinville Quad)	600	450	7,050	2,297	19.2	1.1	47	800	248,000	11	7.13	6.8	4.6	3.3	2.3	4.4	2.7	1.6	1.4
25	Bear Creek SW ¼ NE ¼ 21-10N-8W (Carlinville Quad)	600	380	5,060	1,648	15.0	1.2	40	800	201,100	9	5.57	5.3	3.3	2.5	1.6	3.2	2.0	1.1	1.0
Sites partially in Macoupin County (See Greene County for description)																				
5	Taylor Creek SW ¼ SE ¼ 36-11N-10W	600	440	7,330	2,388	9.3	.5	50	700	250,500	11	3.45	3.1	3.1	2.6	1.8	2.8	2.0	1.4	.9
8	Nigger Lick NE ¼ NE ¼ 34-12N-10W	570	400	6,670	2,173	17.2	1.4	50	800	295,500	10	8.35	7.5	4.8	3.6	2.4	4.4	2.9	1.6	1.3

MACOUPIN COUNTY



Existing Reservoirs in Macoupin County

Reservoir name	Legal description	Owner	Watershed area (sq mi)	Watershed area (acres)	Height of dam (ft)	Depth of water at dam (ft)	Pool area (acres)	Storage capacity (ac-ft)	Storage capacity (mg)	Storage capacity (in)	Remarks and data source
Meyers Lake	NW ¼ 20-9N-8W (Brighton Quad)						30				
Bunker Hill Res.	SW ¼ 16-7N-8W (Gillespie Quad)	Bunker Hill (C)	7.19	4,602		15	17	36	11.7	0.94	June 1954 sed. survey data
Old Gillespie Res.	10-15-8N-7W (Gillespie Quad)	Gillespie (C)	5.73	3,665		26	71	696	226.7	2.28	1954 sed. survey
New Gillespie Res.	8-9-10-16-21-8N-7W (Gillespie Quad)	Gillespie (C)	12.9	8,256		30	208	2,350	765.6	3.42	Constructed 1956
Mine No. 1 Pond	NW ¼ NW ¼ 29-8N-6W (Gillespie Quad)	Superior Coal Company	0.47	300			15	66	21.5	2.64	
Mine No. 2 Pond	SW ¼ NE ¼ 6-7N-6W (Gillespie Quad)	Superior Coal Company	1.45	930			16	75	24.4	0.97	
Mine No. 3 Pond	SE ¼ SE ¼ 26-8N-7W (Gillespie Quad)	Superior Coal Company	0.76	485			20	100	32.6	2.47	
Mine No. 4 Pond	SE ¼ SW ¼ 10-7N-7W (Gillespie Quad)	Superior Coal Company	5.29	3,385			37	142	46.3	0.50	Sed. survey 1958
Coal Washer Pond	SW ¼ SE ¼ 18-8N-6W (Gillespie Quad)	Superior Coal Company					30	55	17.9		Not currently used
Coal Washer Pond	SE ¼ SW ¼ 17-8N-6W (Gillespie Quad)		2.02	1,290			15	46	15.0	0.43	Located on Spring Creek a branch of Cahokia Creek
Beaverdam Lake	N ½ 22-9N-8W (Gillespie Quad)	State of Ill.	0.47	300		10	59				Dept. of Cons.
Old Mt. Olive Res.	SE ¼ 34-8N-6W, NE ¼ 3-7N-6W (Mt. Olive Quad)	Mt. Olive (C)	1.0	640			43	614	200.0	11.51	
New Mt. Olive Res.	SW ¼ S ½ 27-28-8N-6W (Gillespie Quad)	Mt. Olive (C)	5.21	3,333		33	56	335	109.1	1.21	Built 1937, sed survey 1958
Lake Staunton	E ½ W ½ 16-17-7N-6W (Gillespie Quad)	Staunton (C)	3.68	2,355		32	90	1,139	371.0	5.80	Built 1926, data from sed. survey 1954
Mine No. 7 Res.	SW ¼ 21-7N-6W (Gillespie Quad)	Consolidated Coal Co.	0.30	192			15	46	15.0	2.87	
C B & Q Res.	SW ¼ 5-12N-6W (Waverly Quad)	C B & Q R.R.	0.23	150			15	246	80.0	19.68	
Kings Lake, Mine No. 15	NE ¼ NW ¼ 9-7N-6W (Gillespie Quad)	Consolidated Coal Co.	0.38	240			15	139	45.3	6.95	Sed. survey 1958
Lake Edwards	SE ¼ 17-8N-6W (Gillespie Quad)		0.70	448			10	68	22.2	1.82	Built 1949, sed. survey 1958
Sunset Lake	34-35-12N-7W (Carlinville Quad)										4 miles west of Girard
Standard City Lake	E ½ 5-10N-6W (Carlinville Quad)										½ mile south of South Standard
Lake Carlinville	10-11-9N-7W (Gillespie Quad)		26.06	16,678			176	1,389	452.5	1.00	Data from 1959 sed. survey
Williamson Lake	NW ¼ 11-9N-7W (Gillespie Quad)		0.53	339			16	148	48.2	5.24	Known as Arctic Lake
Rinaker Lake	E ½ 6-9N-7W (Carlinville Quad)	Macoupin County Lake Club	0.49	316			16	136	44.3	5.16	Data from 1958 sed. survey
Gillespie Country Club	SW ¼ 19-9N-6W (Gillespie Quad)										5½ miles north of Gillespie
Evergreen Lake	SW ¼ 21-7N-9W (Brighton Quad)										2 miles east of Brighton

line of the dam site, could be relocated below the structure. Two other town roads could be abandoned since they are often impassable. No residences would be inundated, and only minor utility relocations would be required. The left abutment consists of weathered reddish brown loess, mostly silty clay, over 7 to 10 feet of sandy clay glacial till with pebbles. Under this, about 50 feet above the floodplain level, is moderately hard sandstone bedded from 0.25 to 2 inches, quite silty and shaly, medium brown, fine grained with no signs of jointing. The sandstone bedding is essentially horizontal and probably has medium to slow permeability. Underlying the sandstone is shale which is brownish gray, medium hard, laminated 0.25 to 0.5 inch and blocky (1 by 2 inches) with a weathered surface. Only 15 feet of shale is exposed, but it probably underlies the entire valley. The right abutment is entirely covered with reddish brown sandy clay and glacial till with numerous pebbles. Bedrock was not reached with auger, but it is believed to be approximately the same elevation as the left abutment. Borrow for an earth embankment is plentiful, especially from the right reservoir abutment and high upon the left abutment. The alluvium in mid-valley is at least 12 feet deep and consists of silty clay with some sandy clay at about 10 feet, grading into sand and gravel at the base of the alluvium. Bottom of alluvium or top of bedrock was not reached with a hand auger. This site would result in a good many-fingered reservoir, at a near normal project cost.

Site 13. A potential dam site is located on Spanish Needle Creek, a tributary of Macoupin Creek, about 7 miles north and 5 miles west of Gillespie. The bottomland in the reservoir area is used primarily for clean tilled cultivation. One farm residence and a town road would have to be abandoned along with access roads to farm fields on the bottoms. Several residences would require access roads. Both dam site abutments are entirely medium yellowish brown silty clay glacial till which contains some intermixed sand, gravel, and cobbles. The till is stiff and relatively impermeable. Borrow material is plentiful in both abutments and is a good quality till. The reservoir abutments are much the same as at the dam site. The wide floodplain has an alluvium consisting of 6 feet of mixed clayey silt and fine sandy silt. Beneath this is at least 5 feet of fine and coarse sand, saturated and loose. Because of loose caving sand the depth of this material is not known, and this material could be a real problem since it would have to be removed and an impermeable core wall constructed. This could become an excellent reservoir, and would be developed at or above normal costs depending on difficulty in construction.

Site 14. Dry Fork, a tributary of Macoupin Creek, has a potential dam site located 8 miles west and 5 miles north of Gillespie. The lower half of the reservoir area has a broad level bottom which is being cultivated in row crops. The upper portion is covered with brush, woods, and swamp. Access to the dam site and reservoir area from the west is good, but from the east it is poor. There are no known residences nor obstructions except two town roads which could be abandoned or raised. The valley is deeply entrenched with steep valley walls. The left abutment is sandy clay glacial till underlain by hard gray shale, which readily breaks into fragments on the weathered surface but is dense a few feet under the surface. The slope above the gray shale is highly variegated medium yellowish brown silty clay and sandy clay shale. There is a small amount of gravelly clay at the shale contact but it is not excessively permeable. The right abutment is entirely till but lacks the variegation of the left abutment. The sandy clay is stiff and relatively impermeable. Borrow of very good quality is plentiful in both reservoir abutments. Shale particles in the creek bed indicate that shale outcrops in the reservoir, but none was observed. The alluvium consists of 3 feet of dark grayish brown clayey silt and silty clay (smooth with no grit) and perhaps some underlying sand. The only problem might be sandy material at the bottom of the alluvium which would have to be cut off with an impermeable core wall. This site should result in a good reservoir at a near normal project cost.

Site 15. A potential dam site could be located on Cahokia Creek 3 miles north of Staunton and 3 miles south and 1 mile east of Benld. The reservoir area is in clean tilled cultivation. Two roads cross the reservoir area, Illinois Route 138 between Sawyerville and White City and a town road from White City to Illinois Route 4. Both of these roads could be relocated west-southwest of White City over or downstream from the dam structure. Other obstructions and relocations would be minor. Both abutments are entirely sandy clay till which has some zones of clayey sand. The till is finely variegated yellowish brown and medium grayish brown. The material is stiff and slow to very slowly permeable with no evidence of sand or gravel lenses. The valley walls are all sandy clay glacial till which is stiff and medium greenish brown in color. This material is abundant, of good quality, and should make borrow for an earth embankment. The alluvium consists of 8 feet of dark grayish brown light textured silty clay over 4 feet of medium gray clay over clean saturated light brown sand which could be 8 or 10 feet thick. An impermeable core wall would have to be constructed through the alluvium. The stream bed of sandy gravel is heavily contaminated with iron oxide from mine waste water. The creek water is yellowish, has a bad smell, and would not make a good water supply without extensive treatment. The area has been undermined, and investigations should be made to determine if subsidence would be a problem. This site development would produce a many-fingered reservoir at a moderately high cost.

Site 16. Big Branch, a tributary of Cahokia Creek, has a potential dam site located 2 miles west and 2.5 miles north of Staunton. The reservoir area has good physical characteristics, and few obstructions, and only one town road from Issoc School to Sawyerville would require raising. Other town roads have already been abandoned. The right abutment is sandy clay glacial till which is medium yellowish brown, somewhat variegated, and contains numerous pebbles. No sand lenses were observed in the till. The left abutment appears to be all till similar to the right abutment, but there are some exposures of silty shale that are bedded about 0.5 to 0.75 inch. Shale may be encountered when the core trench is excavated; however, it is relatively dense and practically impermeable beneath the weathered surface. There exists the possibility of a sand or gravel layer at the till-shale contact which could produce leakage. The alluvium consists of 6 to 8 feet of brown silty clay over mixed sandy and gravelly material, for which depth could not be determined by manual equipment. Glacial till borrow material of good quality is plentiful in both reservoir abutments. The creek bed is covered with an industrial waste that appears to be iron oxide and colloidal sulphur. The pollution would have to be completely stopped before desirable water could be stored. The area has been undermined, and the possibility of subsidence should be investigated. The reservoir could be developed at a near normal cost.

Site 17. A potential dam site is located on the West Fork of Cahokia Creek 4 miles west of Staunton. The reservoir area is open land primarily in clean tilled cultivation. A two-lane oiled road between Bunker Hill and Staunton could be relocated south of the dam site and a town road could be abandoned. A power line crosses the valley approximately at the dam site, and oil lines cross the impoundment area. There are no known residences or other obstructions that would be inundated. Both right and left dam site abutments consist of light brown gray silty clay or sandy clay till that contains many pebbles and cobbles. The till is stiff and apparently impermeable except for a few sandy or gravelly lenses especially in the lower 15 feet. The permeable lenses are not expected to be of great lateral extent but should be carefully located. The alluvium consists of 6 feet of fine sandy brown silt with some zones of fine sandy clay, over at least 10 feet of gray fine sandy clay, clayey sand, and some layers of sand. The lower material is soft and contains highly permeable zones. The creek bed of gravelly sand is in contact with the lower sandy alluvium. The valley walls are till similar to the abutments, and the sandy lower alluvium extends up the reservoir floor but is expected to thin farther upstream. An impermeable core wall would have to be constructed through the alluvium. Mine wastes have colored the stream bed bright orange from precipitated iron oxide, and colloidal sulphur exists in stagnant areas. The area has been undermined, and subsidence could be a serious problem. This development could be a moderately high cost project.

Site 19. Horse Creek, a tributary of Macoupin Creek, has a potential dam site located 4 miles west and 2 miles south of Farmersville. The watershed is gently rolling farm land and the bottom in the reservoir area is in pasture and mixed hard woods. A large chicken ranch and outbuildings would have to be relocated. An east-west town road could be relocated below the structure. The left abutment is yellowish brown sandy clay till that is stiff and relatively impermeable. The right abutment has 1 foot of sand covering a sandstone outcrop, probably about 8 feet thick, which extends to about 15 feet above the floodplain. The thickness and exact nature of the sandstone cannot be determined by manual augers but it can be bored into with some difficulty. The color is light brown indicating weathering. There are occasional lenses of clay which are probably partings. The alluvium consists of 6 feet of mixed clayey silt, silty sand, and sandy silt with occasional silty clay lenses. The lower 3 feet is gray silty clayey sand that is fairly loose. Gray silty clay till was encountered at 9 feet and could be as much as 12 feet deep in some old channels. Borrow should be taken from the left reservoir abutment where it is of good quality and plentiful. The sandstone is moderately permeable, and if the natural cover is left intact leakage should not be serious. The dam site is located in a narrow portion of the valley and would require a low volume of fill. The reservoir site is well suited for water storage but some moderate seepage should be expected. This should make a moderately low cost project.

Site 20. A potential dam site exists on the "West Fork of Cahokia Creek about 3.5 miles west and 1.5 miles south of Benld. The watershed lands are gently rolling while the valley slopes are moderately steep. The reservoir area consists of a narrow floodplain almost entirely covered with timber. No town roads nor residences would be involved in development of this site. Both of the abutments consist of stiff silty clay glacial till that contains intermixed sand and pebbles. The valley walls also consist of the same till. The alluvial floodplain is only about 70 feet wide at the dam site and diminishes in thickness and extent within half a mile. The alluvium is quite sandy in the reservoir area but is underlain by glacial till at about 3 to 10 feet. The alluvium at the dam site consists of 1 to 3 feet of dark brown clayey silt and silty clay over 1 to 3 feet of silty sand over several feet of brown clayey sand over till. An impermeable core wall should be keyed into the till in both abutments and across the floodplain. Borrow material is of excellent quality and plentiful, and can be taken upstream from both reservoir abutments. There are active coal mines in the vicinity which might create some problems. This site could develop a small but good reservoir at a moderately low project cost.

Site 21. The Bast Fork of "Wood River, a tributary of the Mississippi River, has a potential dam site 2 miles west and 1 mile north of Bunker Hill. The watershed area is gently rolling farm land, but the reservoir valley has fairly steep wooded slopes. Nearly the entire reservoir area is in mixed woods although some bottomland is partially cleared. One town road would have to be raised in three locations, but there are no other roads, residences, or obstructions involved in the development of this site. Both abutments have variegated yellowish brown, medium gray and some greenish gray sandy clay glacial till with some small sand lenses. The till is stiff and appears to be quite impermeable. The alluvium consists of 4 feet of brownish gray clayey silt over 2 to 3 feet of mixed sandy silt and clayey silt with some sand layers over 4 to 5 feet of wet coarse sand over stiff silty clay till. An impermeable core wall should be keyed into the till abutments and the valley floor. The reservoir abutments that were observed were of the same till as the dam site abutments and should furnish a plentiful supply of borrow material of good quality. This site should develop a good reservoir, at a moderately high project cost.

Site 22. A very good dam site is located 7 miles west and 3 miles south of Girard on the East Fork of Otter Creek. The drainage area includes Sunset Lake. The uplands away from the streams are nearly level but become rolling near the drainage ways. The valley slopes are rounded hills which become very steep where the stream has been directed against them. The bottoms in the reservoir area are nearly all under cultivation. Timber is restricted to the creek banks and valley walls. No residences are involved, but one town road could be raised, another abandoned. The upper end of this reservoir area would be only 0.5 mile from Sunset Lake. Both abutments are yellowish brown sandy clay glacial till which is stiff and contains numerous pebbles and cobbles. All observed exposures on the valley walls were also composed of the same type of till. The alluvium is a typical cut-and-fill deposit, but in general consists of 6 feet of moderately firm grayish brown silty clay over 2 feet of brownish gray silty clay and clayey silt over at least 4 feet of fairly compact gray sand with lenses of silty clay. Depth of alluvium could not be determined with manual augers. A plentiful supply of good quality borrow material is available upstream from both abutments. This site should make a very good reservoir at a near normal cost.

Site 23. Solomon Creek, a tributary of Hodges Creek that empties in Macoupin Creek, has a potential dam site located 2 miles north and 0.5 mile east of Hettick. The watershed has rolling uplands in agricultural production, but the narrow valleys have steep walls which are covered with mixed timber. The reservoir area would be long and narrow and is currently covered with mixed timber. There are no roads nor residences involved, but there are several farm ponds in the tributary drains to the reservoir area. The valley walls and abutments consist of stiff sandy clay glacial till which will not present any leakage problems. Manual borings in the alluvium encountered saturated fine sand at depths as great as 15 feet below the floodplain. The depth of the permeable alluvium could not be determined but might present a significant problem. An intensive subsurface examination should be made. Borrow material for an earth dam is plentiful and of a good quality. The Soil Conservation Service has a proposed dam site, 1.5 miles upstream, as a part of the Solomon Creek Watershed Plan. This site should produce a good reservoir at a near normal project cost.

Site 24. Hurricane Creek, a tributary of Macoupin Creek, has a potential dam site located 2 miles west and 1.5 miles south of Carlinville. The watershed lands are nearly level and under heavy agricultural development. Hurricane Creek is rather deeply entrenched and has fairly steep valley walls. The narrow floodplain downstream from Illinois Route 108 is covered with mixed timber, but tends toward brush with some trees upstream. Illinois Route 108 would have to be raised or relocated, and a blacktop town and access road could be raised. At least one new residence would be inundated, along with local public utilities. In the right abutment, about 500 feet downstream from the center line of the dam, a 5-foot outcrop of Carlinville limestone appears about 10 to 15 feet above the floodplain. There is some indication that the limestone is present at the dam site but this could not be verified, nor could it be located in the left abutment. The left abutment is entirely silty clay and sandy clay glacial till. The till is stiff and relatively impervious but does contain a few lenses of clayey sand and poorly graded sands about 15 feet above the floodplain. Several outcrops of limestone occur in the valley walls about three-fourths of a mile upstream; however, most abutments are covered with till. None of the bedrock strata are expected to permit any significant leakage either in foundation or abutments. Loess covers the highest ridges to a depth of about 6 feet, is mostly weathered, and has a well developed silty clay subsoil. Borrow material is of good quality and plentiful upstream from the left abutment. The alluvium consists of 6 to 8 feet of very dark grayish brown mixed clayey silt, silty clay, and silty sand (typical cut-and-fill deposits) over at least 9 feet of saturated gravelly sand. This should make a good reservoir at a moderately high project cost.

Site 25. Bear Creek is a tributary of Hodges Creek and has a potential dam site located 6 miles west and 1 mile north of Carlinville. The watershed area is long and narrow and nearly level. The stream is deeply entrenched, has steep abutments, and a very narrow valley. Most of the reservoir area is under cultivation or in pasture with scattered trees. About a fourth of the area is in brush and timber. Two town roads could be abandoned. Three small dams in the tributaries along the right abutment would have tailwater. There are new residences built on the shores of the ponds which would be close to water level. Both dam site abutments are silty clay glacial till with numerous pebbles and some sand. The till is finely variegated yellowish brown and light brownish gray, stiff, and contains a few small sandy or gravelly lenses. The left abutment is covered with not over 6 feet of a colluvial deposit of silty clay, dark and medium brown, which is underlain by till. The valley walls are till and would provide plentiful borrow of good quality. The alluvium consists of 2 to 3 feet of very dark clayey silt and sandy silt over 3 to 4 feet of nearly black silty clay over 4 or 5 feet of sand over till. An impermeable core should be tied into the glacial till. This should make a very good water storage site, and should develop as a normal cost project.

Madison County was subjected to earlier ice advances, but the Illinoian glacier erased much of the effects of earlier glaciation and left the bedrock covered with an unsorted debris, known as till, and water-sorted outwash deposits. Later wind-blown deposits of silt known as loess covered the glacial materials. In most of the major valleys of the county modern stream deposits cover the bedrock. Sand and gravel deposits in most of the major valleys provide ground-water supplies and could be somewhat troublesome to dam construction.

Bedrock is exposed along the Mississippi River bluffs where it consists of massive deposits of Mississippian limestone. To the east these rocks are overlain by younger Pennsylvanian strata which may consist of weak shales, thin limestones up to 25 feet thick, coal seams, and locally developed more resistant sandstones.

The topography and geology of Madison County are generally suited to reservoir development. The results of 11 feasibility studies within the county follow.

Site 1. East Fork of Silver Creek has a potential dam site located 1 mile east and 0.5 mile north of Grantfork. This is approximately 3 miles upstream from Silver Lake, the water supply for the city of Highland. The reservoir area is primarily in pasture and clean tilled crops, and some parts of the site have light timber. An east-west town road 2 miles north of Grantfork would have to be raised in three locations and two other north-south roads could be abandoned. Other farm access roads would have to be constructed. In the many-fingered lake created at this site there would be some shallow water in the tributaries. There is a shale exposure in the base of the left abutment, the upper contact being about 15 feet above the channel level. At least 8 feet of shale exists. The shale is moderately hard, medium gray, and when broken down contains numerous 1- to 3-inch limonitie concretions. Above the shale is 15 to 20 feet of very stiff glacial till. The lower 5 feet of the till is clay or silty clay, medium grayish brown, containing numerous limonitic concretions and a few erratic pebbles. The upper 10 to 15 feet is predominantly sandy clay with some sandier zones (clayey sand or silty sand). Above the till is 5 to 7 feet of highly weathered loess consisting mostly of silty clay and light silty clay below 3 feet of subsoil. The right abutment indicates the same conditions as those on the left, but the slope is covered by a thick mantle of colluvium. The alluvium is alternately interstratified thin layers or lenses of silt, clayey silt, fine sand, and a small percentage of silty clay about 8 feet thick over at least 6 feet of saturated coarse sand with some gravel. Foundation material could not be reached by manual equipment. The valley walls are sandy clay till covered with loess, and no shale outcrops were indicated. The alluvium diminishes rapidly in thickness above the junction of major tributaries about 1.5 miles upstream and becomes increasingly sandier. Borrow material of good quality is plentiful in abutments of immediate upstream tributaries. This should make a good site at a near normal cost, but might infringe on Silver Lake.

Site 2. Sugar Fork, a tributary of the East Fork of Silver Creek, has a potential dam site located 1.5 miles east and 1.25 miles north of Marine. The watershed lands are nearly level and under cultivation. The stream valley is long, narrow, and has many dendritic tributaries that would assist creation of an extensive shoreline. There are active oil wells in the area and at least one of these is below spillway crest. Two east-west town roads would have to be abandoned. There are several residences which would be very near water's edge and would require new access roads. Both abutments consist of a lower zone of unleached glacial till, a zone of leached till, and a loess deposit on the upper gentle slopes. The lower unleached till is light brownish gray silty sand or light sandy clay, stiff, highly calcareous, containing many pebbles and cobbles and an abundance of unusual calcareous concretions. The leached zone (8 to 10 feet thick) is dark yellowish brown sandy clay, stiff, noncalcareous, with many cobbles and pebbles but no concretions. The loess deposit varies from 3 to about 8 feet thick and contains 2 feet of well developed subsoil. Borrow is plentiful and of good quality upstream from both abutments. The leached till should be reserved for the impermeable core of the dam. Loess deposits should not be used as borrow. The alluvium consists of about 6 feet of cut-and-fill deposit that is mostly silt and silty clay but some silty sand, over at least 5 feet of thinly interstratified gray silt, clayey silt, and sand. Sand increases in percentage toward the bottom. Leakage will not be significant unless sand lenses are allowed to bypass the ends of the fill. Leakage through unleached till in the reservoir should not be significant because of the very small area of exposures. This should make a fair reservoir at a moderately high project cost.

Site 3. A small tributary of Cahokia Creek has a potential dam site located 1 mile west and 0.5 mile north of Worden. This is an excellent reservoir site that has broad level bottoms, which are in cultivation or pasture, and steep valley walls partially covered with timber. The dam site has easy access and few if any relocations would be necessary. A north-south town road could be raised in two locations. The left abutment consists of sandy clay glacial till which is very stiff, coarsely variegated yellowish brown and brownish gray and contains numerous erratic pebbles. Soils on the upper slopes apparently have been developed in loess but are mostly silty clay. The right abutment is also sandy clay glacial till, but is mostly yellowish brown with a few grayer streaks. The upper third of the abutment is covered with 5 feet of loess, none of which is calcareous. No sandy lenses were observed in either abutment. The valley walls are the same glacial till as the abutments. The alluvium consists of at least 10 feet of mixed interstratified clayey silt, fine sand, sand, and light textured sandy clay. It is estimated that shale occurs at about 18 feet below the floodplain level. Excellent borrow material can be obtained in plentiful quantities from both abutments adjacent to the dam site. There is an old coal mine about 100 feet downstream from the road which appears to have been abandoned over 40 years ago so that subsidence has undoubtedly occurred. This site should develop a good water-storage reservoir at a moderately low project cost.

Site 5. A small tributary of the Bast Fork of Silver Creek has a potential dam site located 1 mile north and 0.75 mile west of St. Jacob. The small reservoir area is open and readily accessible. A two-lane blacktop road north from St. Jacob crosses the reservoir and could be raised. Both abutments are covered by a 4- to 6-foot thick mantle of loessial colluvium (mostly clayey silt and silty clay). Under the colluvium is sandy clay and clayey sand glacial till, mostly medium grayish brown and moderately stiff. Saturated gravelly sand exists in thin lenticular bodies throughout the till. The extent and quantity of these permeable bodies were not determined, but they seem to be numerous enough to warrant a more detailed investigation. Loess about 6 to 8 feet thick occupies the upper abutment slopes and extends down the steeper slopes as colluvium. The lower 2 to 4 feet of the loess deposit is quite silty and light buff color. The upper 4 feet of the loess is weathered and may be usable as fill. Borrow material may also be obtained from lower abutment slopes in the reservoir area. The alluvium consists of about 4 feet of very dark grayish brown silty clay over at least 5 feet of medium brownish gray clay that is saturated. No sand or gravel was encountered in the alluvial borings. The alluvium may be used as fill if not too wet. Some blanketing may be necessary to prevent leakage around the dam, through permeable lenses in the abutments. This would make a good small reservoir at a moderately low project cost.

Site 6. Mill Creek, a tributary of Silver Creek, has a potential dam site located 6.5 miles due east of Collinsville. The reservoir area is used extensively for cultivated crops. A two-lane blacktop road between Troy and O'Fallon crosses the middle of the reservoir area and would have to be raised or relocated. Power and telephone utilities would have to be raised, but there are no residences or other obstructions. Both abutments are covered by 3 to 7 feet of clayey silt or silty clay loessial material. Beneath the loess, the till is stiff highly variegated clayey silt or silty fine sand with some larger sand grains and a few pebbles. Borrow material of good quality is not plentiful. The loessial materials and silty till may be satisfactory subject to compaction testing. The lower till in the right abutment, which is composed of silty clay, is the best material available if it can be obtained in quantity. The alluvium is not usable as borrow. It consists of 4 feet of brown silt and clayey silt over 5 feet of clayey silt which grades downward into light silty clay over 5 feet of interstratified silty clay and clayey silt, considerably stiffer than the material above. Depth to bedrock could not be determined, but is believed to be 20 to 25 feet. This should make a fair reservoir at a normal project cost.

Site 7. Wendell Branch, a tributary of Silver Creek, has a potential dam site located 1 mile east and 1 mile north of Troy. The reservoir area covers a narrow floodplain that is presently idle and has valley walls covered with brush, weeds, and scrub hardwoods. Two residences would be inundated, and a town road would have to be abandoned. An existing reservoir fill would have to be protected from backwater in one of the tributary drains. A sewage treatment effluent line might have to be piped below the structure. Both abutments consist of glacial till covered on the upper gentle slopes by 6 to 8 feet of loess. The lower half of the till is very stiff silty clay with intermixed sand and pebbles but no sand or gravel lenses. The till 20 feet above the floodplain is sandier and contains several sand lenses about 2 feet thick and at least 15 to 20 feet in diameter. Borrow material of good quality is available in both abutments near the dam site. The lower silty clay till should be used in the core of the dam. The alluvium is not suited for fill. It consists of 3 feet of silt and clayey silt over 2 feet of dark brownish gray clayey silt over 4 feet of stiff medium gray silty clay over at least 3 feet of very stiff yellowish brown and gray silty clay glacial till. An impermeable core should extend through the upper 9 feet of alluvium and bond to the underlying till. This site would develop a fair reservoir at a normal project cost.

Site 9. A potential dam site is located 3.5 miles east and 4 miles south of Highland on Spanker Branch, a tributary of Sugar Creek. The reservoir area land is used primarily for corn and pasture. No residences would be inundated, but a county and town road would have to be relocated or raised. The many-fingered reservoir created by this site would have a relatively long shoreline because of the dendritic tributary drains. The right abutment consists mostly of yellowish brown sandy clay glacial till which contains numerous erratic pebbles and cobbles. About 6 feet of weathered loess covers the upper gentle slopes and extends almost to the floodplain in thinner colluvial deposits. No unweathered loess was encountered. About a third of the lower left abutment (the 15 feet above the floodplain) consists of reddish brown gravelly clay or clayey gravel or clayey coarse sand. The interstices between the coarse grains seem to be filled with clay and therefore should not be very permeable. Since there can be zones of very permeable material in this deposit, it should not be exposed to the reservoir water. Above this coarse material there is a 10-foot till deposit, almost entirely silty clay with very little intermixed sand. Borrow material of good quality is plentiful from both reservoir abutments adjacent to the dam site, but it may be advisable to obtain the borrow from valley slopes downstream from the dam in order to leave the existing natural blanket on the permeable lower till in the left abutment. The alluvium consists of 7 feet of grayish brown silt and clayey silt over 6 feet of dark gray interstratified silty clay, sandy clay, and coarse sand over a base deposit of at least 1 foot of stiffer silty clay. Leakage will not be a problem if an impermeable core is used in the dam and if the lower till is not exposed to reservoir water. This site should develop a fair reservoir with some shallow water, at a normal project cost.

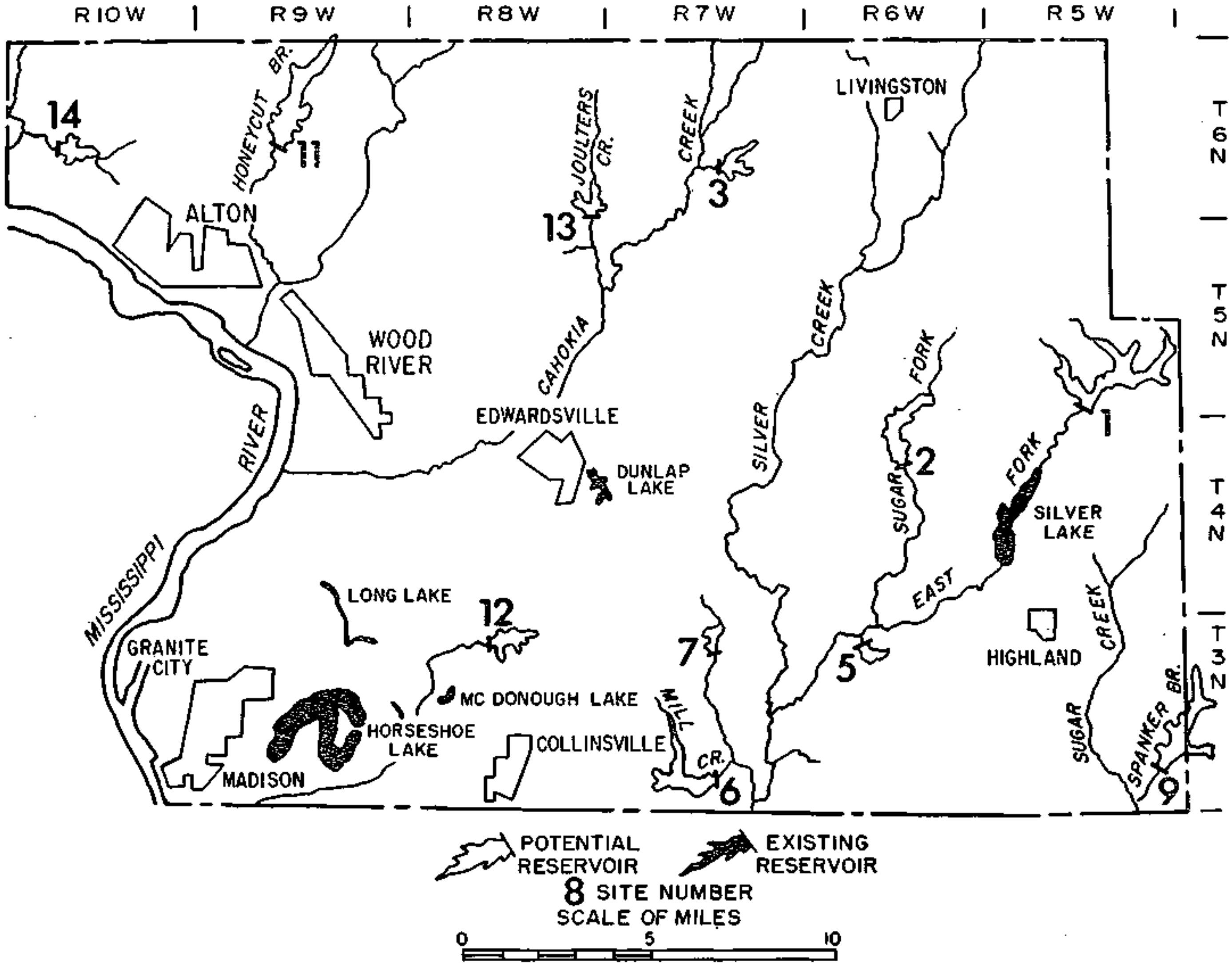
Site 11. Honeycut Branch, a tributary of the West Fork of Wood River, has a potential dam site located 4 miles north and 1 mile east of Milton. The reservoir area has many agricultural improvements such as dikes, waterways, surface drains, and tile drains. Land use of the bottomland is primarily clean tilled crops. The valley walls are fairly steep and covered primarily with mixed hardwoods. Two town roads crossing the reservoir area would have to be abandoned, causing several access road relocations. Both abutments at the dam site and all observed reservoir abutments are silty clay glacial till which is stiff and relatively impermeable. Six feet of weathered loess, consisting of reddish brown silty clay, caps the hills and ridges. Borrow of very good quality is plentiful on both reservoir abutments. The alluvium consists of about 6 feet of medium brown silty fine sand, clayey silt, and some sand lenses, over 3 to 4 feet of coarse clean sand over about 2 feet of dark gray firm clayey silt over stiff silty clay glacial till containing numerous pebbles. The till is about 12 to 14 feet below the general floodplain level but may be slightly deeper in the old abandoned channels. This will make a good reservoir, but at a moderately high project cost.

Site 12. A tributary of Judys Branch has a potential dam site located 1 mile south and 0.75 mile west of Glen Carbon. The valley floor is fairly narrow, and the steep valley walls are covered with mixed hardwoods. A northwest-southeast town road crosses the center of the reservoir area, and a subdivision of eight residences along this road would be inundated. Two power lines cross the southern tributary. Basements, rights of way, acquisitions, and relocations would be expensive. Both abutments consist of 5 to 7 feet of loess (mostly silty clay subsoil) over 15 to 20 feet of sandy clay glacial till that is stiff and has numerous pebbles, over 20 to 30 feet of

Potential Reservoirs in Madison County

Site number	Waterway location	Spillway elevation (ft)	Pool area (acres)	Storage (ac-ft)	Storage (mg)	Watershed (sq mi)	Times filled per year	Depth at dam (ft)	Length of dam (ft)	Earth fill (cu yd)	Shoreline (mi)	Mean annual runoff (mgd)	Net yield (mgd) for given recurrence intervals: Full capacity 5 Yr	Full capacity 10 Yr	Full capacity 25 Yr	Full capacity 40 Yr	Half capacity 5 Yr	Half capacity 10 Yr	Half capacity 25 Yr	Half capacity 40 Yr
1	E. Fork Silver Creek NW ¼ SW ¼ 34-5N-5W (New Douglas Quad)	530	875	8,700	2,834	36.9	2.3	30	1,300	225,100	18	17.71	12.7	9.8	6.0	5.6	7.0	5.4	3.2	3.1
2	Sugar Fork NW ¼ SE ¼ 10-4N-6W (Edwardsville Quad)	520	440	4,400	1,433	13.2	1.6	30	700	126,400	11	6.34	5.5	4.2	2.6	2.3	3.4	2.8	1.4	1.4
3	Trib. Cahokia Creek SE ¼ NW ¼ 27-6N-7W (Edwardsville Quad)	540	150	1,900	619	3.2	0.8	38	750	179,200	5	1.30	1.2	1.1	.7	.6	1.0	.6	.4	.3
5	Trib. E. Fork Silver Creek SW ¼ SW ¼ 4-3N-6W (Belleville Quad)	480	100	870	283	1.9	1.2	26	450	61,100	3	.91	.8	.6	.5	.4	.6	.4	.2	.2
6	Mill Creek SW ¼ SE ¼ 27-3N-7W (Belleville Quad)	500	236	3,420	1,114	7.6	1.2	43	1,050	290,000	8	3.65	3.3	2.8	2.0	1.6	2.4	1.8	1.0	1.0
7	Wendell Branch SW ¼ NE ¼ 3-3N-7W (Belleville Quad)	500	100	933	304	2.3	1.3	28	900	148,500	4	1.10	1.0	.8	.6	.4	.6	.5	.2	.2
9	Spanker Branch SW ¼ SW ¼ 25-3N-5W (Breese Quad)	480	800	8,000	2,606	14.5	.8	30	1,000	172,500	15	6.05	5.5	5.0	3.3	2.7	4.5	2.8	1.2	1.2
11	Honeycut Branch NW Cor-28-6N-9W (Alton Quad)	520	420	7,010	2,283	15.0	.9	54	1,700	747,100	15	6.09	5.7	5.0	3.4	2.8	4.6	2.8	2.1	1.8
12	Trib. Judys Branch NE ¼ NW ¼ 9-4N-8W (Belleville Quad)	500	147	2,600	847	2.7	.6	53	950	258,300	10	1.30	1.1	1.1	1.0	.8	1.1	.9	.6	.5
13	Joulters Creek SW ¼ SE ¼ 36-6N-8W (Edwardsville Quad)	500	120	800	261	5.0	2.8	20	700	73,700	5	2.03	1.1	.7	.5	.5	.5	.4	.2	.1
14	Rocky Fork SW ¼ NW ¼ 20-6N-11W (St. Charles Quad)	500	285	6,650	2,166	9.3	.6	70	700	412,800	7	3.77	3.5	3.5	2.6	2.1	3.6	2.2	1.4	1.3

MADISON COUNTY



calcareous sandy clay glacial till. The alluvium consists of 6 to 8 feet of finely laminated dark grayish brown silt, clayey silt, and fine sandy silt over at least 5 feet of dark gray interstratified clayey silt and silty clay, over stiff sandy till at about 15 to 20 feet below the floodplain level. There is a plentiful supply of good quality borrow in the reservoir abutments. This site could develop a very good reservoir, but the project cost would be high.

Site 13. Joulters Creek, a tributary that enters Paddock Creek which in turn enters Cahokia Creek, has a potential dam site located 5 miles west and 1 mile south of Worden. The reservoir area is under cultivation, and there is mixed timber along the stream banks. There are no residences nor relocations involved in development of this site. Two town roads would have to be raised slightly. The left abutment is entirely composed of sandy clay glacial till which is mostly yellowish brown in mid-abutments but somewhat grayer at the base. A few thin 6-inch sandy lenses were encountered in the upper part of the abutments but should cause no leakage problems. The right abutment is also entirely sandy clay till but is more reddish brown and contains a higher percentage of sub-rounded pebbles. A few thin lenses of clayey sand or silty sand were observed but are not extensive enough to cause a leakage hazard. The reservoir abutments were similar to conditions at the dam site. Borrow material of very good quality is readily available from both reservoir abutments adjacent to the dam site. The upper 7 feet of the alluvial deposit is thinly laminated dark grayish brown clayey silt. The lower 3 feet, at least, consists of variegated dark gray and medium brownish gray silty clay and some sandy clay. Total thickness of alluvium was not determined. This should make a very good water storage site but with some shallow water in the headwaters. The project cost should be moderately low.

Existing Reservoirs in Madison County

Reservoir name	Legal description	Owner	Watershed area (sq mi)	Watershed area (acres)	Height of dam (ft)	Depth of water at dam (ft)	Pool area (acres)	Storage capacity (ac-ft)	Storage capacity (mg)	Storage capacity (in)	Remarks and data source
Godfrey Pond	NW ¼ 23-6N-10W (Godfrey Quad)	Chicago & Alton R.R.	0.05	30			15	23	7.5	9.20	Located on Rocky Fork
Camp Warren Levis Lake	NE ¼ 28-6N-10W (Godfrey Quad)	Boy Scouts					25				1½ miles west southwest at Godfrey
	NW ¼ 35-6N-10W (Godfrey Quad)	Alton-Wood River Sportsmen's Club	0.11	72			12	38	12.4	6.47	1½ miles south of Godfrey
New York Central Res.	W ½ 11-6N-6W (New Douglas Quad)	New York Central R.R.	3.12	2,000			22	123	40.0	0.74	Located on Branch of Silver Creek
Mt. Olive-Staunton Coal Co. Reservoir	SW ¼ 3-6N-6W (Edwardsville Quad)	Mt. Olive-Staunton Coal Co.	.98	630			20				1 mile north of Williamson
McDonough Lake	SW ¼ 17-3N-8W (Monks Mound Quad)		5.31	3,400			75				Private fishing, dry years little water
Long Lake	2-3-10-11-12-3N-9W, 22-27-34-4N-9W (Monks Mound Quad)						85				
Horseshoe Lake	15-16-21-22-23-26-27-29-3N-9W (Monks Mound Quad)						2,500				
Dunlap Lake	12-13-4N-8W, 18-4N-7W (Edwardsville Quad)	Mrs. Jane Dunlap, Coultas	4.30	2,750		26	125	1,252	408.0	5.46	1 mile east of Edwardsville
Drda Pond	SW ¼ 17-4N-7W (Edwardsville Quad)	John C. Drda	0.50	320			6	18	5.9	0.70	Little Mooney Cr. 3 miles east southeast of Edwardsville
Marine Res.	E ½ 17-4N-6W (Edwardsville Quad)	Marine (V)	2.19	1,400			17				Northwest of town
Shaefer Pond	NW ¼ SE ¼ 30-5N-7W (Edwardsville Quad)	Willibald Schaefer	0.12	80			5	15	4.9	0.77	
Silver Lake	8-17-18-19 N ½ 30-4N-5W (New Douglas Quad)	Highland (C)	47.50	30,400		30	740	10,400	339.0	4.10	New water supply for Highland
Country Club Lake	SW ¼ 21-4N-8W (Edwardsville Quad)	Country Club (Sunset Hill)	0.16	100		28	6				
Grigsby Lake	NE ¼ NW ¼ 2-4N-7W (Edwardsville Quad)	L. J. Grigsby	0.78	500		16	5	22	7.2	0.53	
Edelhardt Lake	NE ¼ 24-3N-9W (Monks Mound Quad)	Richard Rees					40				Sloughs and low areas, shallow
	W ½ SW ¼ 23-3N-8W (Belleville Quad)		0.11	72		20	5	22	7.2	1.23	
Stout Lake	NE ¼ 22-3N-8W (Belleville Quad)	K. M. Stout Estate	0.44	284		14	5	20	6.5	0.28	
Old City Res.	NE ¼ 30-4N-5W (New Douglas Quad)	Highland (C)	0.29	187		21	21	370	120.5	23.74	
Goodview Lake	NE ¼ NE¼ 11-3N-8W (Collinsville Quad)		0.22	140		14	5	20	6.5	0.55	½ mile northeast of Maryville, Ill. (Chinatown)
Highland Country Club	W ½ 22-4N-5W (New Douglas Quad)	Highland Country Club	0.15	97		16	5	30	9.8	1.22	Recreation
Mt. Olive-Staunton Coal Co. Res.	NW ¼ 36-6N-6W (New Douglas Quad)	Mt. Olive-Staunton Coal Co.	0.35	225		18	20	80	26.1	1.40	
John A. Perradotti Lake	SW ¼ 8-4N-7W (Edwardsville Quad)	John A. Perradotti	0.22	144		23	5	35	11.4	0.97	Gully control and recreation
Wm. J. Schlemer Lake	NW ¼ 17-4N-7W (Edwardsville Quad)	Wm. J. Schlemer	0.21	133		20	6	48	15.6	1.39	Gully control and recreation
Christ Pfister Lake	NW ¼ 16-3N-5W (Breese Quad)	Christ Pfister	0.56	360		24	12	65	21.2	0.71	Gully control and recreation
Magin Lake	36-3N-8W (Belleville Quad)	Sam Magin	0.10	65		42	11	121	39.4	7.39	Gully control and recreation
Gontermann Lake	SW ¼ 17-4N-7W (Edwardsville Quad)	J. Wilbur Gontermann	0.13	85		10	7	20	6.5	0.94	Recreation
Hill Crest Lake	E ½ 33-4N-8W (Edwardsville Quad)	Louis A. Ruder	0.26	165		30	6	60	19.5	0.75	
Highland Sportsmen's Lake	NE ¼ 31-4N-5W (New Douglas Quad)	Highland Sportsmen's Club	0.11	68		20	10	48	15.6	2.66	Recreation
	33-4N-7W (Edwardsville Quad)	Wilbur H. Link	0.11	70		14	6	35	11.4	1.94	

Site 14. Rocky Fork, a tributary of Piasa Creek, has a potential dam site located 3 miles west of Godfrey. The valley is narrow and has steep walls. The reservoir area is covered with scattered mixed hardwoods. There are no town roads nor residences involved; in fact, access to the area is presently difficult. Limestone (either St. Genevieve or St. Louis Formation, Mississippian) probably occurs in the lower part of both abutments. The limestone exposures do not appear to be extensively solutionized, although some joints are enlarged and filled with either glacial materials or residual clays. No sinkholes nor caverns were observed, and none are indicated on the topographic map. Undoubtedly sandy clay glacial till overlies the limestone at the dam site and in turn is overlain by about 10 feet of loess, some of which may be silty and calcareous. The upper half of the reservoir is

probably in the Pennsylvanian strata which are either sandstone or shale in this area. Glacial till probably covers most of the bedrock. Plentiful borrow material of good quality exists in the reservoir abutments above the limestone and consists of sandy clay glacial till. The overlying light textured silty clay loessial material could be used, but not for the impermeable core. The alluvium is cut-and-fill deposits of clayey silt and sandy silt in the upper 8 feet and probably has at least a 5-foot basal deposit of coarse sand or chert rubble over limestone. This site will probably be satisfactory for water storage, but an extensive investigation should be made including pressure testing of the limestone. This should make a good reservoir at a moderately low project cost.

MARION COUNTY

The Illinoian glacier deposited most of the present unconsolidated material in Marion County. In the northwestern half of the county the glacial drift, which consists primarily of an unsorted debris known as till, has an average depth of 18 to 25 feet. In the southeast the depth averages about 12 feet with cover on the ridges sometimes no more than 5 feet. In the Sandoval bedrock valley located in the west-central part of the county, drift may be up to 100 feet deep. A wind-blown deposit of silt size particles known as loess ranges from a few inches deep on the east to several feet on the west.

The bedrock surface throughout Marion County is Pennsylvanian and consists primarily of weak shales with some thin limestones, coal seams, and sandstones. Small exposures of bedrock are common in Marion County.

Topographic and geologic conditions are generally suitable for reservoir development throughout the county. The results of feasibility studies on 10 sites follow.

Site 1. A potential reservoir site exists on a 4.7-square-mile tributary drainage of the East Fork of the Kaskaskia River, about 2.5 miles west of Kinmundy. The site is located in moderately rolling uplands that have rather steep valley slopes into a flat alluviated valley floor. The reservoir floor is covered with brush and light timber and has little cultivation. Development would involve abandoning sections of a two-lane blacktop county road and raising several sections of a gravel township road. One road could be relocated over the structure. Access to several residences would have to be provided. No bedrock was encountered at the dam site or in the reservoir area. The unconsolidated material consists of Illinoian glacial till (silty clay and sandy clay with numerous pebbles and cobbles). The till underlies the valley at depths of 9 to 15 feet below the floodplain, and is overlain by a sandy and silty alluvium. The lower alluvium (6 to 10 feet) is highly variable with numerous sand lenses. The upper alluvium is 3 to 4 feet in depth and mostly clayey silt. The abutments are sandy clay and silty clay glacial till and would provide abundant fill material of good quality. The alluvium should not be used for borrow material, and would have to be effectively intercepted at the dam site to prevent serious leakage. Although present access to the area is poor, this site is well-suited for a water retaining reservoir and should result in a normal cost project.

Site 2. Deer Creek, a tributary to the North Fork of the Kaskaskia River, has a potential reservoir site about 1 mile northeast of Patoka. The watershed is 3.5 miles long and 1.5 miles wide, and has nearly level uplands and long gradual slopes into a broad shallow valley. This dam site would create a shallow lake on a valley floor that is about 30 percent free of timber. A short section of gravel road would have to be raised or abandoned. It should be pointed out that a finger of the Carlyle Reservoir will come within 2 miles of Patoka. Depth to bedrock at the dam site was not determined. The alluvium consists of about 3 feet of brown silty clay over a maximum of 6 feet of silty sand and sand, over sandy clay glacial till. The lower sandy alluvium should be intercepted by an impermeable core wall of compacted sandy clay bonded to the underlying glacial till. This site should produce a moderately high cost project and a reservoir that might be troubled with shallow water in the upper reaches.

Site 3. A potential reservoir site exists on Jims Creek, a tributary of the Kaskaskia River, located 3 miles west and 5.5 miles north of Salem. The watershed is 4 by 3 miles, has gently sloping uplands, steep abrupt valley slopes, and moderate floodplain development. Most of the reservoir area is in mixed timber but small plots are cleared for cultivation. The total area of cultivation is about a fourth of the reservoir area. In development of this reservoir area, an existing one-lane oiled road could be relocated over the top of the dam. A new road facility around the reservoir area would make possible the abandonment of a two-lane blacktop, two one-lane oiled roads, and one gravel road. One frame residence and outbuildings would have to be acquired. Bedrock is shale, with the depth to bedrock of 4 feet at the base of the left abutment and at least 8 feet deep in mid-valley. The shale is moderately hard, bluish gray, and has no known outcrops. The unconsolidated material is Illinoian glacial till consisting of variegated brownish gray and yellowish brown silty clay with much sand and some pebbles intermixed. The alluvium in the upper 3 to 5 feet is yellowish brown clayey silt with some sand lenses, over at least 8 feet of wet loose sand. The sandy alluvium is highly permeable but is confined by the abutments and can be intercepted by an impermeable core at the dam. Apparently there are no serious problems to prevent the construction of an earthen dam at this site. This site would make a good many-fingered reservoir, at a normal project cost.

Site 6. Sutton Fork, a tributary of Skillet Fork, has a potential reservoir site located 6 miles northwest of Xenia. The watershed is pear-shaped, about 8 miles long and 6 miles across the top. The gently rolling uplands drop abruptly into steep-walled valleys with flat alluviated floors. Nearly the entire reservoir site has been cleared and is mostly in pasture. Relocations would not be excessive since most of the east-west roads could be abandoned in favor of the north-south roads, some of which would have to be raised. One east-west road could be located over the structure. The Illinois Central Railroad crosses the reservoir at a satisfactory elevation but its embankment would have to be strengthened. Bedrock is exposed in the lower right abutment and consists of gray, moderately hard Pennsylvanian shale. The unconsolidated material is Illinoian glacial till consisting of stiff to very stiff sandy clay with numerous pebbles. The alluvium is at least 16 feet thick, but is estimated not to exceed 20 feet, and consists of clayey silt overlying deposits of sandy and silty clay, which have many interspersed permeable sand lenses. The deep alluvium with its permeable sand lenses should be intercepted by an impermeable core to prevent serious leakage. This site is well-suited for a water storage reservoir and should result in a normal cost project.

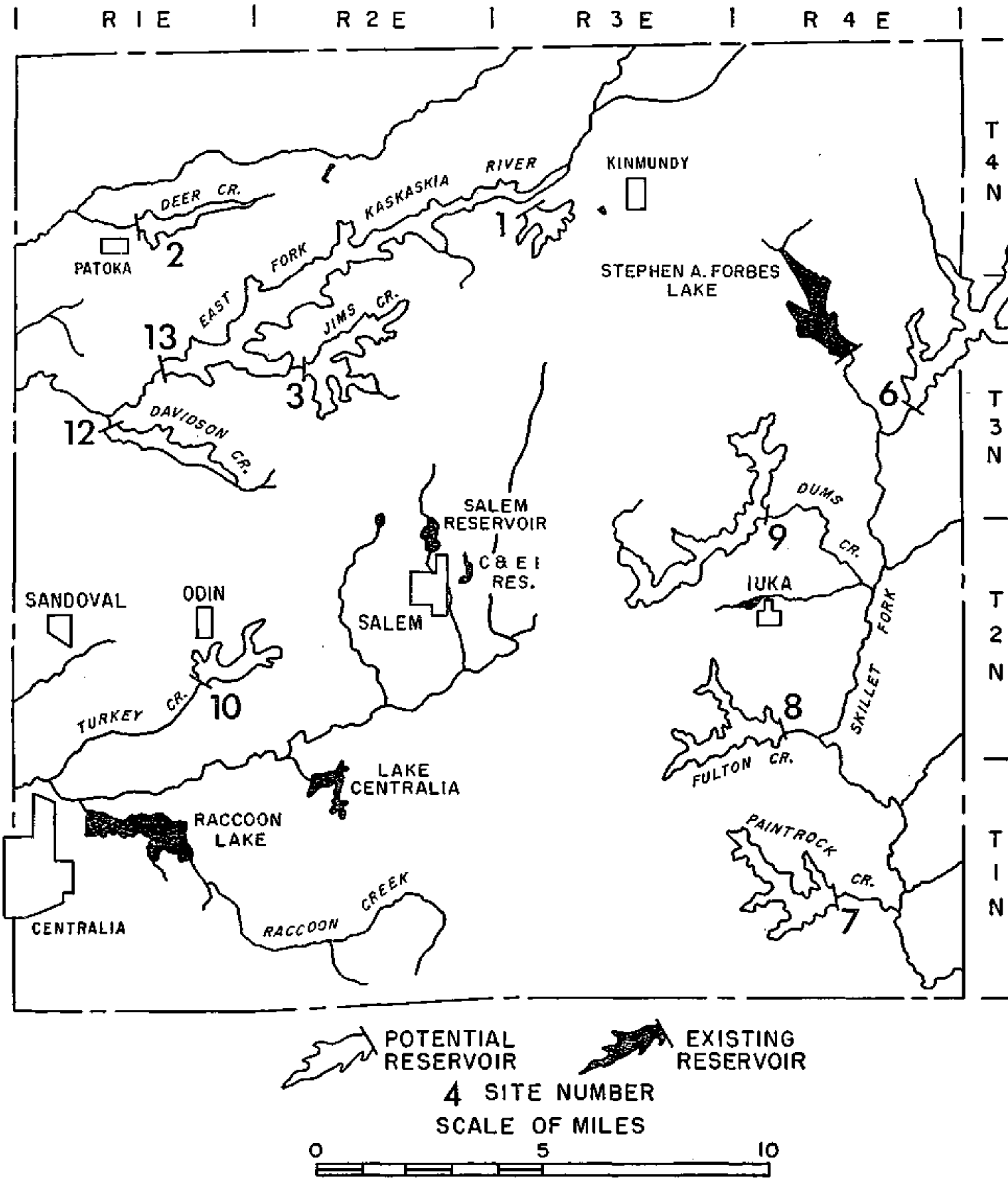
Site 7. A potential reservoir site exists on Paintrock Creek, a tributary of Skillet Fork, located 7 miles south and 2 miles east of Iuka. Nearly all of the land in the reservoir area is under cultivation or in pasture. Relocation of highways would be a serious problem. Two two-lane blacktop roads and two one-lane oiled roads would have to be relocated. There are no residences in the reservoir area, but new access roads would have to be provided. The depth to bedrock at the dam site is estimated at 15 to 20 feet. Bedrock of sandstone outcrops in the area but not at the dam site. The sandstone is massive, medium grayish brown, has medium sized grains, and is fairly well cemented. The unconsolidated material comprising both abutments is Illinoian glacial till, mostly sandy clay with zones of silty clay. The color is variegated yellowish brown and light gray. No outcropping sandstone was encountered in either abutment, but may occur within several feet of the surface of the lower abutments. The right wall of the tributary stream northwest of the dam site has massive sandstone forms which are slightly overhanging outcrops that have been undercut by the stream. The sandy basal alluvium is undoubtedly in contact with the bedload in the stream channel, so that it would be necessary to intercept the alluvium with an impermeable core wall at the dam site. This should make a good many-fingered reservoir at a moderately high project cost.

Site 8. A potential reservoir site exists on Fulton

Potential Reservoirs in Marion County

Site number	Waterway location	Spillway elevation *(ft)*	Pool area *(acres)*	Storage *(ac-ft)*	Storage *(mg)*	Watershed *(sq mi)*	Times filled per year	Depth at dam *(ft)*	Length of dam *(ft)*	Earth fill *(cu yd)*	Shoreline *(mi)*	Mean annual runoff *(mgd)*	Net yield *(mgd)* for given recurrence intervals: Full capacity 5 Yr	Full capacity 10 Yr	Full capacity 25 Yr	Full capacity 40 Yr	Half capacity 5 Yr	Half capacity 10 Yr	Half capacity 25 Yr	Half capacity 40 Yr
1	Trib. E. Fork Kaskaskia R. NW ¼ NW ¼ 29-4N-3E (Kinmundy Quad)	560	256	3,400	1,108	4.7	.7	40	500	116,900	7	2.20	1.8	1.8	1.5	1.2	1.6	1.5	.9	.7
2	Deer Creek NE ¼ NW ¼ 27-4N-1E (Vandalia Quad)	500	137	900	293	4.6	2.7	20	700	73,100	3	2.16	1.2	1.0	.6	.4	.6	.4	.2	.1
3	Jims Creek SE ¼ SW ¼ 8-3N-2E (Centralia Quad)	540	736	10,790	3,515	10.1	.5	44	1,200	314,900	15	4.73	3.2	3.2	3.2	3.1	2.9	2.9	2.1	1.6
6	Trib. Skillet Fork NE ¼ NE ¼ 23-3N-4E (Xenia Quad)	500	1,300	13,000	4,235	40.0	1.8	30	1,100	200,200	21	21.03	13.9	9.5	7.5	7.0	7.4	5.1	3.3	2.9
7	Paintrock Creek SW ¼ NE ¼ 21-1N-4E (Salem Quad)	490	1,100	17,600	5,734	15.0	.5	48	1,400	500,700	20	7.89	7.0	7.0	6.1	5.2	6.8	5.1	4.0	3.7
8	Fulton Creek NE ¼ NW ¼ 32-2N-4E (Salem Quad)	490	960	13,400	4,366	15.0	.7	42	2,000	554,600	14	7.89	7.1	7.1	5.2	4.6	5.6	4.1	3.3	2.9
9	Dums Creek SW ¼ SW ¼ 32-3N-4E (Salem Quad)	500	1,270	12,700	4,138	40.0	1.9	30	1,200	217,000	20	21.03	13.7	9.3	7.6	7.0	7.2	5.0	3.3	3.0
10	Turkey Creek SW ¼ SE ¼ 23-2N-1E (Centralia Quad)	510	520	3,800	1,238	12.5	1.9	22	600	70,900	11	6.57	4.0	2.7	2.1	1.9	1.9	1.3	.8	.6
12	Davidson Creek NE ¼ NW ¼ 21-3N-1E (Centralia Quad)	505	750	9,250	3,014	18.0	1.0	37	800	189,800	12	8.43	7.4	7.2	5.0	4.1	5.4	4.7	2.3	2.2
13	E. Fork Kaskaskia River 10-11 3N-1E (Centralia Quad)	530	3,200	53,300	17,360	96.1	1.0	50	1,500	567,400	40	44.98	40.8	40.8	27.5	23.2	36.2	27.7	14.9	14.3
Sites partially in Marion County (See Wayne County for description)																				
1	Nickolson Creek NW ¼ NW ¼ 31-2N-4E	500	820	12,000	3,910	13.6	.7	44	900	258,200	18	7.15	6.5	6.5	4.8	4.2	5.1	3.7	3.0	2.7

MARION COUNTY



Creek, a tributary of Skillet Fork, located 3 miles south of Iuka. The watershed has dimensions of 5 by 3 miles, and it has hilly uplands dissected by numerous tributary streams. The valley slopes are steep while the floodplains are broad and flat. A one-lane oiled road, about 1.5 miles long, crosses the northern boundary of the proposed reservoir. This road services three frame homes and a frame church, all of which are very close to the proposed water level. A two-lane blacktop road and a one-lane oiled road cross the reservoir area in the north-south direction and would require relocation. Nearly all of the reservoir area is under cultivation. The north-south two-lane blacktop

Existing Reservoirs in Marion County

Reservoir name	Legal description	Owner	Watershed area (sq mi)	Watershed area (acres)	Height of dam (ft)	Depth of water at dam (ft)	Pool area (acres)	Storage capacity (ac-ft)	Storage capacity (mg)	Storage capacity (in)	Remarks and data source
I.C.R.R. Res.	27-28-4N-3E (Kinmundy Quad)	I.C.R.R.	0.55	351		16	24	149	48.5	5.09	Sed. survey July 1959
Raccoon Lake	8-9-10-11-1N-1E (Centralia Quad)	Centralia (C)	48.40	30,974		16	707	4,143	1,350.0	1.60	Sed. survey 1959
Old Res.	S ½ 32-2N-1E (Centralia Quad)		44.00	286			7				
C.B. & Q. Res.	NW ¼ 31-2N-1E (Centralia Quad)	C.B. & Q. R.R.	0.57	368			29	276	90.0	9.00	Not in use—high alkalinity
Salem Res.	S ½ 35-3N-2E, E½ 2-2N-2E (Salem Quad)	Salem (C)	4.02	2,573		15	74	531	173.5	2.48	Sed. survey 1960, water supply
Centralia Res.	4-5-9-1N-2E (Centralia and Salem Quads)	Centralia (C)	7.00	4,480		24	266	2,916	950.0	7.81	
C. & E.I. Res.	S ½ 1-N ½ (Salem Quad)	C. & E.I.R.R.	3.91	2,500			58	368	119.9	1.77	
C. & E.I. Res.	SW ¼ SE ¼ 31-2N-3E (Salem Quad)	C. & E.I.R.R.	0.05	35			8	42	13.7	14.40	
B. & O. Res.	SE ¼ NE ¼ 7-18-2N-4E (Salem Quad)	B. & O. R.R.	2.15	1,377			12	58	18.9	0.50	
Shambrok Lake	NE ¼ NE ¼ 31-2N-1E (Centralia Quad)	John Shambrok	0.50	320			6				
Country Club Lake	NW ¼ 13-2N-2E (Salem Quad)	Country Club	0.09	60			7				
McMacken	SW ¼ 34-3N-2E (Salem Quad)	Helen McMacken	0.55	350			6				
Moose Lake	SW ¼ 31-3N-3E (Salem Quad)	Moose Lodge	0.20	126			6				Two small ponds
Omega Lake	4-9-10-3N-4E (Xenia Quad)	State of Ill.	21.56	13,800		27	585	8,800	2,867.0	7.65	Average depth 15 feet—Cons. Dept. Recreation
H. C. Neff	8-2N-4E (Salem Quad)	H. C. Neff	0.11	70	25	20	6	34	11.1	5.70	
Patoka-Vernon Res.	NE ¼ 21-4N-1E (Vandalia Quad)		0.03	20			5				Nearest town Patoka
Patoka Club 100	SW ¼ 16-4N-2E, NW¼ 21 (Kinmundy Quad)	Patoka Club	0.66	425			25				Near Patoka
Rochester-Goodell	S ½ 11-3N-2E (Salem Quad)	Rochester-Goodell	0.94	600		13	28				Near Salem
King's Lake Resort	NW ¼ 36-2N-1E (Centralia Quad)		0.22	141			26				Near Odin
Adolph Schwartz	22-1N-1E (Centralia Quad)	Adolph Schwartz	0.11	70	165	14	6	23	7.5	3.9	
Frosty Acres Lake	S ¾ 20-3N-3E (Salem Quad)	Dr. Jack Frost	0.10	65	17	13	11	23	7.5	4.3	
Salem Sportsmen's Club	25-2N-2E (Salem Quad)	Salem Sportsmen's Club	0.09	57	17.5	13	10	48	15.6	10.2	Completed 1957
Hecks'	25-2N-2E (Salem Quad)	Cliff Heck	0.22	144	18	14	22	118	38.4	9.8	Completed November 1959

road could be relocated over the top of the structure. Massive buff-colored, cross-bedded sandstone is exposed in several places in the reservoir area and downstream. At the dam site the depth to bedrock is estimated at 15 feet with shale being the underlying material. The unconsolidated material is Illinoian glacial till consisting of yellowish brown silty clay with sandy clay zones containing numerous pebbles and cobbles. The till is stiff and relatively impermeable. The alluvium consists of predominantly silty and clayey material in the upper 5 to 8 feet over 3 to 6 feet of sand or gravel. The sandy stratum encountered in the lower alluvium in several borings is in contact with the sandy and gravelly bedload on the channel floor. This will provide a certain path of leakage unless it is intercepted by an impermeable core wall at the dam site. The observed sandstone is massive and fairly well cemented. Loss of reservoir water through the sandstone would be negligible. The bluish gray silty clay encountered in borings is highly micaceous, a fair indication that it is the upper weathered zone of the shale bedrock. This material is fairly stiff and impermeable, and would be an adequate foundation. This dam site would create a three-fingered reservoir at a normal project cost.

Site 9. A potential surface water reservoir site exists on Dums Creek below its confluence with Bee Branch about 2.5 miles north of Iuka. The drainage area above this point is mushroom shaped (about 5 by 8 miles). The watershed is situated in gently rolling uplands, and it has steep valley slopes and nearly level floodplains. The reservoir area has been cleared and is divided between row crops and pasture. Road relocations would involve abandoning two two-lane oiled roads, raising U. S. Route 50, and providing new access roads to about four residences. No known major utilities would require relocation except local residential services. No bedrock was encountered in the dam site borings, but outcrops of sandy shale occur 1.5 miles southwest and 1 mile north of the dam site. The abutments are Illinoian glacial till consisting of yellowish brown sandy clay and silty clay. The alluvium is estimated to be about 15 feet deep with the upper 3 feet being soft clayey silt over stratified 20 percent sandy clay and 80 percent sand and clayey sand. The upstream bedrock outcrop showed no jointing but distinct bedding planes are about 0.75 to 1.5 inches apart. Plentiful quantities of glacial till are available in the abutments for borrow material. The alluvial material is unsatisfactory for borrow, and would have to be intercepted with an impervious core wall. Leakage through the sandy shale or sandstone would be insignificant, since only small areas would be exposed to the reservoir water.

Site 10. A reservoir site exists on Turkey Creek about 2 miles south of Odin. The watershed is 5 miles long and 3 miles wide and has gently rolling uplands, long gradual slopes into broad valleys, and wide almost level floodplains. The floodplain in the lake area is about 50 percent open land. Brush and timber are confined to stream banks and valley walls. There are no residences below water level but access relocations would be required. A high pressure natural gas line would be under water for a length of 1 mile. A north-south two-lane oiled road would have to be abandoned, and short sections of several other one-lane oiled roads would have to be raised. Depth to bedrock was not determined, but the alluvium consists of 4 feet of clayey silt over 10 feet of silty sand. The depth of alluvium at the dam site is estimated to be 20 feet, requiring an impermeable core wall to prevent considerable leakage and internal erosion. The abutments are till providing a good source of borrow. Maximum depth of water would be only 22 feet, and a mean depth perhaps less than 7 feet, so that this would make an extremely shallow lake. The cost of removing or protecting obstructions, along with costly construction, would make this a moderately high cost project.

Site 12. Davidson Creek, a tributary of the East Fork of the Kaskaskia River, has a potential reservoir site on a watershed about 8 by 3.5 miles. The watershed has rolling uplands, rather abrupt slopes into the valleys, and a wide alluviated floodplain. Two north-south roads through the reservoir area have already been abandoned and a third could be raised or abandoned. There are no known utilities or obstructions. The bottomland is not highly developed, and the valley walls are covered with mixed hardwoods. Bedrock is probably shale, estimated to be present at a depth of 20 feet. A very stiff gray clay encountered in the lower alluvium appears to be glacial till, while the upper silty alluvium consists of highly dispersed materials that would be subject to internal erosion under the proposed hydraulic head. The gray clay material forms an unyielding and impermeable foundation; however, the upper silty alluvium must have an impermeable core wall constructed through it and bonded to the stiff gray clay. This site should make a good, moderately low cost project.

Site 13. A potential reservoir site exists 1 mile west and 5.5 miles north of Odin, on the East Pork of the Kaskaskia River. The watershed has gently sloping upland areas which break abruptly into the steep-sided valleys that have broad floodplains. The river has meandered over the bottom, and many old stream channels are in evidence. The river is not deeply entrenched and stream bank control has been a problem. The valley floor has been developed for agricultural use but is subject to frequent flooding. Several town roads crossing the East Pork and Jims Creek have already been abandoned. Other town roads crossing north-south would have to be abandoned. The east-west road from Patoka to Kinmundy would have to be raised. Several residences on the valley walls would have to be acquired, but very little building has taken place on the valley floor of the East Pork or the Patoka River. Considerable clearing of valley walls would be required, and several public utilities such as transmission lines would have to be raised. The depth to bedrock was not determined; however, the bedrock is probably medium gray shale laminated with several layers of shaley sandstone. The unconsolidated material is fairly stiff Illinoian glacial till consisting of sandy clay with some silty clay zones. Dark gray dense clay exists between the shale and till. The upper 12 feet of alluvium is mostly clayey silt with some silty clay over 7 feet of silty clay over what resembles till. All observed abutments are yellowish brown sandy clay or silty clay glacial till. Although no significant problems that would complicate the design of an earthern dam at this site are apparent, it must be emphasized that this a preliminary investigation. A thorough program of exploratory boring, sampling, and testing is strongly recommended prior to design. This should make a fairly good large reservoir, but at a moderately high project cost.

MONROE COUNTY

During the ice age glaciers covered Monroe County leaving behind quantities of rock debris. Thin deposits of unsorted clay, silt, sand, and pebbles known as till cover much of the county. Sediment-laden meltwaters escaped down valleys, partially filling them with deposits of sand, gravel, and finer material called outwash. Wind-blown sediments from bare floodplains were deposited on the uplands to form the loess soils of today. Drainage of the western half of the county is to the west by tributaries to the Mississippi River, but the eastern half of the county drains southeast through tributaries of the Kaskaskia River.

The bedrock surface in Monroe County is complex in both topography and composition. The bedrock surface slopes down to the east and west from a centrally located ridge. Although the composure of the bedrock is primarily limestone, sandstones and shale occur also. The age of the bedrock varies from the relatively young Pennsylvanian strata on the east to the older Ordovician on the west.

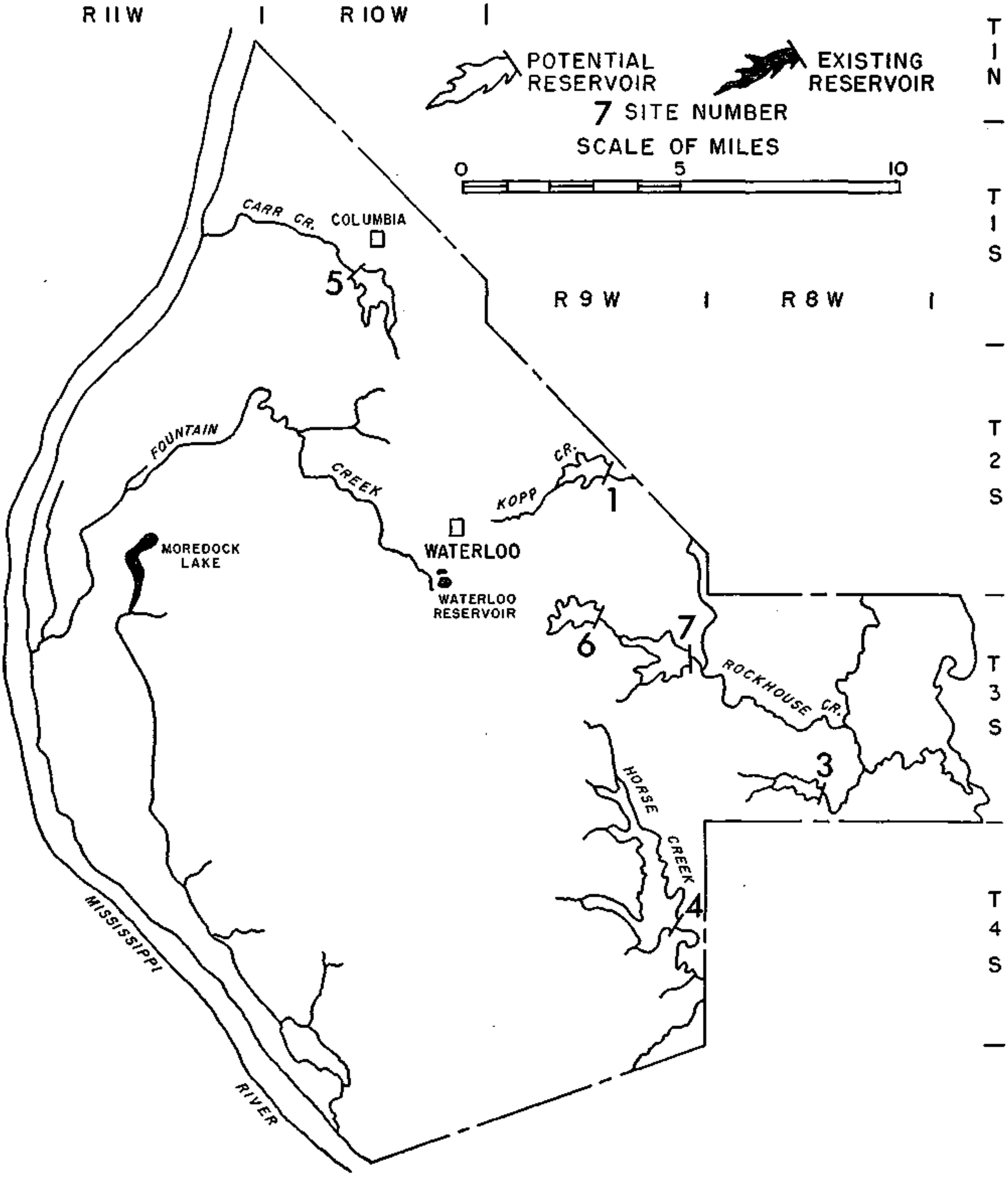
Potential Reservoirs in Monroe County

Site number	Waterway location	Spillway elevation (ft)	Pool area (acres)	Storage (ac-ft)	Storage (mg)	Watershed (sq mi)	Times filled per year	Depth at dam (ft)	Length of dam (ft)	Earth fill (cu yd)	Shoreline (mi)	Mean annual runoff (mgd)	Net yield (mgd) for given recurrence intervals: Full capacity 5 Yr	Full capacity 10 Yr	Full capacity 25 Yr	Full capacity 40 Yr	Half capacity 5 Yr	Half capacity 10 Yr	Half capacity 25 Yr	Half capacity 40 Yr
1	Kopp Creek SW ¼ SW ¼ 15-2S-9W (Waterloo Quad)	520	163	2,440	795	3.2	.7	45	700	212,500	4	1.54	1.3	1.3	1.1	.9	1.2	1.0	.7	.5
3	Black Creek SW ¼ NW ¼ 34-3S-8W (Baldwin Quad)	420	212	1,400	456	5.8	2.6	20	600	62,800	5	3.25	1.8	1.2	.9	0.7	.7	.6	.3	.2
4	Horse Creek SW ¼ SW ¼ 13-4S-9W (Renault Quad)	460	1,480	21,700	7,070	33.0	1.0	44	700	190,000	18	18.48	17.0	15.3	9.3	8.5	13.3	7.8	5.6	4.9
5	Carr Creek NW ¼ SE ¼ 21-1S-10W (Waterloo Quad)	480	390	6,500	2,118	6.6	.6	50	1,500	567,300	7	3.17	2.6	2.6	2.6	2.1	2.4	2.2	1.6	1.3
6	Rockhouse Creek NE ¼ SW ¼ 3-3S-9W (Waterloo Quad)	540	390	4,830	1,574	8.7	1.1	50	500	166,800	5	4.83	4.6	3.6	2.3	2.2	3.0	1.9	1.4	1.4
7	Rockhouse Creek SW ¼ SE ¼ 12-3S-9W (Waterloo Quad)	460	380	5,700	1,857	19.5	2.2	45	850	241,500	7	10.92	10.6	9.6	6.0	5.4	3.6	2.9	1.7	1.5

Existing Reservoirs in Monroe County

Reservoir name	Legal description	Owner	Watershed area (sq mi)	Watershed area (acres)	Height of dam (ft)	Depth of water at dam (ft)	Pool area (acres)	Storage capacity (ac-ft)	Storage capacity (mg)	Storage capacity (in)	Remarks and data source
Porter Lake	SE ¼ NW ¼ 24-1S-11W (Kimmswick Quad)	Wenkel Bros.	.57	365		4	14	28	9.1	.46	Natural depression
Moredock Lake	3-4-3S-11W, 33-34-35-2S-11W (Kimmswick Quad)	Luhr Bros., Nelson Schneider, R. L. Erd	16.00	10,240	13	10	540	3,240	1,055.0	.63	
Fish Lake	31-32-1N-10W (Waterloo Quad)	Phelps, Kuni, Ziebold, Stemler			8	7	42	126	41.0		
Gilmore Lake	SW ¼ NE ¼ 25-1S-10W (Waterloo Quad)	Winford Stanhope	.27	175		25	10	150	48.9	.68	
Steppig Lake	SW ¼ NE ¼ 29-1S-10W (Waterloo Quad)	Louis Steppig	.70	450		30	5	70	22.8	.13	
Vogt Lake	NE ¼ SW ¼ 6-2S-9W (Waterloo Quad)	Gertrude Vogt	.35	225	20	15	7	50	16.3	.40	
Waterloo Country Club	SE ¼ NE ¼ 13-2S-10W (Waterloo Quad)	Waterloo Country Club	.45	285		15	17	85	27.7	.71	
Waterloo City Res.	SW ¼ NW ¼ 36-2S-10W (Waterloo Quad)	Waterloo (C)	.83	530	20	15	44	270	88.0	1.00	
Reine Lake	NW ¼ NW ¼ 9-3S-10W (Waterloo Quad)	Walter Dann	.09	60		12	10	75	24.4	2.00	
Beaver Lake	SE ¼ NE ¼ 10-11-3S-10W (Waterloo Quad)	Beaver Lake Assoc. Inc.	.08	50		10	5	25	8.1	6.00	
	1-11-1S-11W (Kimmswick Quad)	Erwin Vogt	.16			4	20	40			Borrow pit
Diehls Lake	4-1S-10W (Kimmswick Quad)	Albert Diehl	.12	80	22	16	7	50	16.3	7.50	
Columbia Spts. Lake	4-1S-10W (Kimmswick Quad)	Columbia Sportsmen's Club	.12	78	25	20	9	90	29.3	13.0	
Lake Loudel	5-3S-10W (Waterloo Quad)	Delbert Mueller	.10	65	18	15	13	150	48.9	2.4	
Fisher's Lake	27-3S-9W (Renault Quad)	Russell Fisher	.12	80	15	13	18	85	27.7	2.7	

MONROE COUNTY



The wide Mississippi Valley occupies much of western Monroe County; therefore, most of the potential reservoir sites are in the eastern part of the county. Leaky limestones are probably the most serious threat to the success of lake sites in this area. The results of six feasibility studies in Monroe County follow.

Site 1. A potential dam site exists on Knopp Creek about 3.5 miles east and 1.75 miles north of Waterloo. About three-fourths of the reservoir area has been cleared and is under cultivation. One frame house and two gravel roads would be inundated. One gravel road could be abandoned, one raised, and a new access road provided.

The right abutment consists of weathered loess and colluvium over sandy clay glacial till of irregular thickness over moderately stiff gray shale over hard fine grained sandstone over stiff reddish gray clay shale over hard fine grained sandstone that has bedding planes every 3 to 6 inches with no discernable joint pattern. The left abutment is probably very similar to the right but is covered by a thick mantle of colluvium, till, or loess. Borrow material seems to be plentiful on the upper part of both reservoir abutments, especially the left abutment. Shale, till, and weathered loess could be mixed and used, if sizeable deposits of till are not encountered. The alluvium is not suitable borrow material. The alluvium consists of about 9 feet of interstratified thin layers of silt, clayey silt, small percentage of sand, and some silty clay over 2 feet of gray clayey sand over at least 2 feet of stiff gray silty clay. Leakage is not expected to be significant because most of the sandstone is covered by a natural blanket and is not in itself highly permeable. An impermeable core wall should be constructed through the alluvium and into the stiff gray silty clay. This site should develop a fair, small reservoir at a near normal project cost.

Site 3. Black Creek, a tributary of Richland Creek, has a potential dam site located 1.5 miles north and 0.75 mile east of Red Bud. About half of the reservoir area is cleared and under cultivation. Illinois Route 159 might have to be raised where it crosses the reservoir. A dirt road near the dam site would provide access and could be abandoned after construction. Both abutments are silty clay glacial till which is very stiff, highly variegated yellowish brown and medium gray, relatively impermeable, and contains a small percentage of intermixed sand and very few pebbles. The reservoir abutments are much the same as those at the dam site. Borrow material is of excellent quality and is available from both reservoir abutments adjacent to the dam site. The alluvium consists of about 8 feet of dark grayish brown silty clay and clayey silt over 0 to 2 feet yellowish brown clayey coarse sand over very stiff gray silty clay glacial till. An impermeable core wall through the alluvium should be bonded to the glacial till. This is a very good dam site for water storage. The project cost should be moderately low.

Site 4. Horse Creek, a tributary of the Kaskaskia River, has a potential dam site located 3 miles west and 2 miles south of Red Bud. The reservoir area is primarily open land under clean tilled operation, and timber is restricted mostly to the creek banks and the valley walls. The reservoir area is crossed by three gravel and one blacktop road, all of which could be abandoned in favor of one road around the east side of the site. One frame residence and local service utilities would be inundated. Land acquisition and relocations should not be excessive for a reservoir of this size. The right abutment consists of a soft to moderately hard shale overlain by light grayish limestone whose joints and bedding planes appear filled with clay and in part with till. Above the irregular upper surface of the limestone is a brown silty clay glacial till overlain with weathered loess. The left abutment is yellowish brown and gray silty clay till overlain with weathered loess. Limestone probably is present in the core of the hill at approximately the same elevation as the right abutment. The stream is entrenched in the alluvium and has sand and gravel exposed in its bed. The alluvium consists of clayey silt over gray silty clay over silty sand or clayey sand. There exists the possibility of permeable material at the base of the alluvium so an impermeable core wall should be constructed. Leakage through the abutments is a possibility. Limestone sinks appear in the headwater of the South Fork of Horse Creek and the tributary to the north. The dam site and reservoir area are considered feasible for development, pending further testing of materials and borings. There appears to be sufficient material of good quality to create an earth embankment. This should make a good large reservoir at a moderately low project cost.

Site 5. Carr Creek, a tributary drain of the Mississippi River, has a potential dam site located 1 mile south and 0.5 mile west of Columbia. This is a good site from a physical standpoint, but it would involve costly land acquisition and relocations. A two-lane blacktop road up the south branch, which has east and west connecting roads, is a main artery into Columbia. Along this road two new brick houses and probably four frame houses and local service utilities would be inundated. At the base of the right abutment stiff gray clay with a purple tint lies against the alluvium. The right abutment consists of approximately 10 feet of brownish gray shale which is soft to moderately hard on the weathered surface but appreciably harder 5 feet beneath the surface. Above the shale is coarsely crystalline, light gray limestone about 10 to 15 feet thick that has had half of its bulk removed by solution along the joint and bedding planes. The solution channels have been filled with till in the upper part and reddish brown clay in the remainder. Above the irregular upper surface of the limestone is a very tough reddish brown silty clay till that varies in thickness from a few feet to 20 feet. Above the till is 7 feet of weathered loess and a very stiff subsoil. The left abutment is variegated yellowish brown and light gray, stiff silty clay till with few sand grains and scattered pebbles, overlain by 5 to 8 feet of weathered loess. Limestone is believed to be present in the core of the hill at approximately the same elevation as the right abutment. The valley walls are either till or loess. Borrow material of very good quality is available from the upper parts of both reservoir abutments adjacent to the dam site. Till should be used for the impermeable core that is keyed into bedrock and the main body of the fill. The alluvium consists of about 5 feet of grayish brown clayey silt over about 8 feet of indistinctly interstratified clayey silt and silty clay over at least 1 to 2 feet of gray silty clay over at least 2 feet of silty sand or clayey sand. All alluvium is saturated below an 8-foot depth. Bedrock was not encountered but is expected to occur at about 20 feet below floodplain level. The presence of highly solutionized limestone below the proposed water level constitutes a probable leakage problem; however, only one sink hole was observed at about water line and the solution channels in the limestone exposures appear to be completely filled with red clay residuum. It is believed that the reservoir would retain a pool at the proposed elevation and that a dam could be constructed on this site. This should make a good large reservoir at a moderately high project cost.

Site 6. Eockhouse Creek, a tributary of Prairie du Long Creek, has a potential dam site located 2 miles south and 4 miles east of Waterloo. The site is about 3 to 4 miles upstream from dam *site 7.* The bottomland in the reservoir area is under cultivation, but the remainder is in brush and light timber. There are no roads and only one summer lodge that might be inundated by this development. The north abutment consists of loess over silty clay glacial till of Illinoian age and of low permeability. The south abutment has a very thin mixture of slope wash and decomposed sandstone overlying massive sandstone. The alluvium varies in thickness from 10 to 15 feet and consists of fine sandy silts, and silty sands with occasional strata of cleaner permeable sand. Because of the permeable nature of the alluvium, the natural silty blanket comprising 2 to 3 feet of valley subsoil should not be disturbed within 300 feet upstream from the dam. Impermeable material should be placed in the existing channel. An impermeable core wall must be constructed and tied into sound bedrock in the abutments. Suitable materials in sufficient quantities are readily available for the construction of an earth embankment. There are some sink holes present in the upper portion of the drainage area. Seepage should not be serious if precautions are taken in the construction of the embankment. This site should develop a good reservoir at a moderately low cost.

Site 7. Rockhouse Creek, a tributary of Prairie du Long Creek, has a potential dam site located 6 miles east and 4 miles south of Waterloo. The reservoir area is under cultivation. The valley walls and stream banks are covered with mixed timber. One county road and one summer cottage would be inundated. There is an exposure of highly weathered, hard, light gray sandstone about 7 feet thick at the base of the right abutment on the edge of the creek channel. Exposures also occur 0.25 mile upstream on the right abutment and extend from the water level 5 to 8 feet up the bank. This hard light gray sandstone is evenly bedded about 2 inches thick with very distinct partings along bedding planes. Thin deposits of silty clay glacial till, which is stiff, medium grayish brown, highly leached, and contains very few pebbles, overlie the sandstone in some places but do not appear to be continuous. The thickness of till was not determined but probably does not exceed 15 feet. Weathered loess, consisting of brown silty clay and clayey silt, overlies the till or the sandstone and attains a probable thickness of 15 feet. The left abutment has a small exposure of highly weathered buff colored sandstone about 25 feet up on the abutment. Undoubtedly some till deposits overlie the sandstone but none were encountered, and only weathered loess was observed. Good borrow material is scarce, but with carefully controlled compaction the weathered loess may be satisfactory. What silty clay glacial till can be found should be used in the core of the dam. The alluvium consists of about 12 feet of mixed and thinly interstratified silt, fine sand, silty sand, and some silty clay. Below 12 feet is about 1 foot of medium gray saturated silty fine sand which grades downward into at least 2 feet of increasingly coarse gravel. Bedrock could not be definitely identified but is believed to be at about 17 feet below average floodplain level. Possibility of leakage through the sandstone is slight; however, sufficient quantity of good borrow would be a problem. An impermeable core wall would have to be tied to bedrock in the bottom and both abutments. This should make a fair reservoir at a moderately high project cost.

Running water and glacial ice have shaped present day topography in Montgomery County. The Illinoian glacier left a thin drift sheet, primarily till composed of unsorted clay, silt, sand, and pebbles, which was laid down under the advancing ice or dumped as the ice melted and receded. Sediment-laden meltwaters partially filled the valleys with sorted sand, gravel, and finer material known as outwash. Wind erosion caused great volumes of silt from the floodplains to be deposited on the uplands. This material is known as loess. The drift is thin, and water-yielding sand and gravel are rare but some occur in narrow discontinuous northeast-southwest belts. Drainage of Montgomery County is to the south through tributaries of the Kaskaskia River such as the West, Middle, and East Forks of Shoal Creek and Ramsey Creek.

The bedrock consists of beds of shale, sandstone, limestone, and dolomite, one upon the other. This material was deposited as unconsolidated sediments in a continental sea, buried, and slowly consolidated into rock.

Although permeable outwash deposits are a hazard to reservoir development in Montgomery County, the topography is well suited and feasible sites are common. The results of studies on eight sites follow.

Site 1. A potential reservoir site exists on Ramsey Creek about 2 miles west of Oconee. The watershed above this point consists of rolling uplands sloping into moderately steep-walled valleys. The reservoir is surrounded by good township and county roads, and one township road would have to be raised slightly in one or two places. Accessibility to the site is good; by U. S. Route 51 to the east or Illinois Route 16 to the north, it is only 8 miles from Pana. Since there are no residences in the lake area and only moderate agricultural development has taken place, project costs should be relatively low. From a surficial geologic examination, conditions do not appear suitable for a reservoir in this location. Although test borings would be required to make any final determination, the lower half of both abutments seem to contain a gravel outwash deposit of high permeability. This material is overlain by 10 to 15 feet of stiff clay on the right abutment, and by sandy clay till on the left abutment. If the gravel layer proves to be a terrace remnant instead of an earlier outwash deposit as is suspected, the reservoir would be feasible. A continuous gravel deposit of this nature would, however, create excessive leakage. Only 4 or 5 feet of silty alluvial material overlies clay and till deposits in the floodplain. This till is stiff and impermeable and would provide an excellent foundation. Borrow is available on the upper half of either abutment.

Site 2. A small shallow reservoir could be developed on a tributary of Shoal Creek about 1 mile east of Nokomis. The watershed has rolling cultivated uplands sloping into the valley very gradually with no perceptable change from floodplain to valley wall. Four residences near the site would need new access roads, and one of these might have to be acquired. A township road across the site would probably be relocated to the north thus solving most of the residential access problems. Access to the site is quite good since the dam is just 1 mile from Illinois Route 16. The entire lake and watershed areas are under clean tilled cultivation. Although the watershed is fairly small, land use and the fairly shallow lake might create a siltation problem. Land costs, relocations, and rights of way would probably make this a relatively high cost project for its size. Geologic conditions are very good at this location. Both abutments are stiff sandy clay glacial till overlain by 4 to 5 feet of weathered loess. Just downstream from the left abutment are gravel terrace remnants that should be avoided or removed from under the fill. Borrow is available upstream from either abutment. The alluvium consists of 2 feet of clayey silt, which should be excavated, over 2 to 3 feet of silty clay over stiff sandy clay till.

Site 5. A good reservoir site is available on a tributary of Bearcat Creek 1.5 miles north of Donnellson. This would be a narrow deep lake with several fingers and more shoreline than most lakes of this size. The watershed has gently rolling clean-tilled uplands sloping into moderately steep V-shaped valleys. Except for brush and light timber on the valley walls, most of the lake area is free from timber and under moderate agricultural development. Since land acquisition costs should be low and since only one township road and no residences would be inundated, project costs should be low. From a surficial geologic examination, conditions appear to be favorable. Both abutments are composed of stiff sandy clay glacial till containing numerous pebbles and cobbles overlain by about 5 feet of weathered loess on the higher gentler slopes. Near the left abutment are several terrace remnants of clayey sand and silty sand that should be avoided or excavated. The terraces appear to be 25 to 50 feet thick laterally and about 25 feet vertically. The sandy clay glacial till should make excellent fill material and is available on either upstream abutment. Alluvium at the dam site consists of about 2 feet of recently deposited clayey silt over 4 feet of moderately firm silty clay grading into 3 feet of sandy clay over at least 1 foot of stiff silty clay. No particular problems should be anticipated if the terrace remnants are avoided as abutments and as borrow.

Site 6. A small reservoir could be developed on a tributary to the East Fork of Shoal Creek. The dam would be located 1 mile northeast of Coffeen. Of two township roads crossing the site, one could be raised slightly and the other abandoned. A much closer inspection would be required to determine whether a small cemetery would be high enough to avoid inundation. The suggested elevation is probably maximum, so that a 4 or 5 foot reduction in pool level would protect the cemetery. The lake area is generally free from timber, and is used for pasture or has other modest agricultural development. The watershed has rolling uplands which slope into a moderately steep valley. This should be a low cost development since the earth fill required would be quite short, the outlet works would be small, and no relocation nor acquisition problems are anticipated. Geologic conditions are good since both abutments are composed of stiff sandy clay glacial till. Although there are some layers on the left abutment that contain a very high percentage of gravel or sand, enough clay is present to make the material slowly permeable. Borrow is available on either upstream abutment near the dam site. Till in the floodplain is believed to be under about 10 feet of typical sandy, silty, clayey alluvial material.

Site 8. A possible reservoir site exists on Little Creek with the dam located about 1 mile northwest of Irving. The watershed exhibits very gently rolling uplands and a moderately steep-walled valley with a narrow floodplain. Prom a surficial geologic examination, the site appears doubtful. Although a complete program of test borings would be required to determine the feasibility, leakage through the abutments and valley floor seems to be the major problem. Hand auger borings in the abutments are inconsistent, with materials ranging from sandy clay to gravel. The heterogeneous character of these findings suggests that both abutments and the valley floor are composed of glacial outwash. Permeability varies from slow in the sandy clay to rapid in the gravel. The alluvium consists of 1 to 3 feet of clayey silt over 5 to 6 feet of very firm silty clay over irregular outwash to an undetermined depth. The silty clay is relatively impermeable, but the channel would have to be blanketed upstream to prevent leakage or piping through the lower outwash. Should future borings prove the site to be feasible, costs should be moderate. One north-south township road could be abandoned and another raised. Access to the site via township roads is very good. Cover consists of pasture and some row crop development.

Site 10. A reservoir larger than any thus far completed in the state could be developed on Shoal Creek. The proposed dam site would be located 1 mile west of Panama and 2 miles northeast of Sorento. The proposed area of inundation is presently being protected from flooding by a watershed protection plan developed by the Soil Conservation Service. A group of flood control structures are currently being constructed in the watershed above Litchfield and Hillsboro. Although these plans would stop any immediate proposal for such a large scale reservoir development, the water storage capabilities of this area might, at a future date, become much more important than the bottomlands presently being protected. In this event the storage potential would still exist, and the flood protection structures upstream would be quite valuable from a standpoint of sediment reduction in the main reservoir.

The largest body of water on the lake would extend from the dam site north to the confluence of Shoal Creek and Middle Fork. Above the confluence the lake would be slightly narrower and extend about 6 miles farther north on each tributary. The Lake Fork and Grove Branch fingers to the south of the dam site would be much smaller than the northern branches. Nearly the entire floodplain, which comprises 80 to 90 percent of the lake area, is under cultivation and most of the fields appear to be artificially drained. Cost of acquiring these lands would probably be quite high, especially after completion of the present flood control projects which will encourage further development. Although eight or nine residences would be inundated and several others close to the lake would have to be acquired, the number would be small for a project of this size. Road relocations would be minimal, including only six township or county all-weather road crossings and no major highways. A serious relocation problem does exist, however, where the New York Central Railroad crosses the site near the Middle Fork confluence. A power transmission line north of the dam site would also have to be relocated. Geologic conditions appear quite good. The upper 8 feet of the alluvium is mostly silty clays or clayey silts over sandy materials to a depth of at least 20 feet and possibly more. Both abutments are predominantly silty clay glacial till overlain by loess on the higher gentler slopes. The lower third of the abutments seem to contain a higher percentage of clay. Although not encountered, it is almost certain that a stratum of limestone, 6 to 8 feet thick which is overlain and underlain by shale, exists farther back in the abutments. Borrow in the form of glacial till is plentiful near both abutments. The test borings necessary to explore the floodplain and abutments would be helpful in locating the best source of borrow.

Site 11. A good potential reservoir site exists on Long Branch about 4 miles southeast of Litchfield. The watershed is long and narrow and includes the Walton Park Lake south of Litchfield and a portion of the Litchfield city limits. The gently rolling uplands break abruptly into steep, wooded valley walls bordering a wide flat floodplain which is nearly all under cultivation. Many of the uplands near the lake are wooded and should make an ideal park development. Township roads surround the site within about a half mile forming the basis for a good lake access system. A new road would probably be placed over or downstream from the structure. One township road presently crossing the site could be abandoned. No particular problems are apparent, and project costs should be moderate. The dam site appears to be satisfactory from the surfieial examination of geologic conditions. Although the abutments are composed of glacial outwash, the materials contain enough clay to make them not more than moderately permeable. Except for the cap of 6 or more feet of weathered loess, the upper third of the abutments seem to contain more clay and should be used for core-wall borrow. The lower two-thirds is adequate for the flanks of the dam. The alluvium consists of 6 to 8 feet of mixed and interstratified clayey silt, clayey sand, sandy silt, and silty sand over at least 8 feet of sand and gravelly sand. The depth to till or bedrock must be determined by future borings. Great care should be taken to intercept any continuous sand layers around the ends of the abutments.

Site 13. A dam across Lake Fork, about 1 mile northeast of Walshville, would create a reservoir extending 1.5 miles up each tributary. The watershed exhibits gently rolling uplands which drop sharply into a steep-walled valley on Lake Fork but slope more gradually into the shallow East Branch valley. No roads or residences are involved in the development. The Chicago, Burlington, and Quincy Railroad crossing might need slight

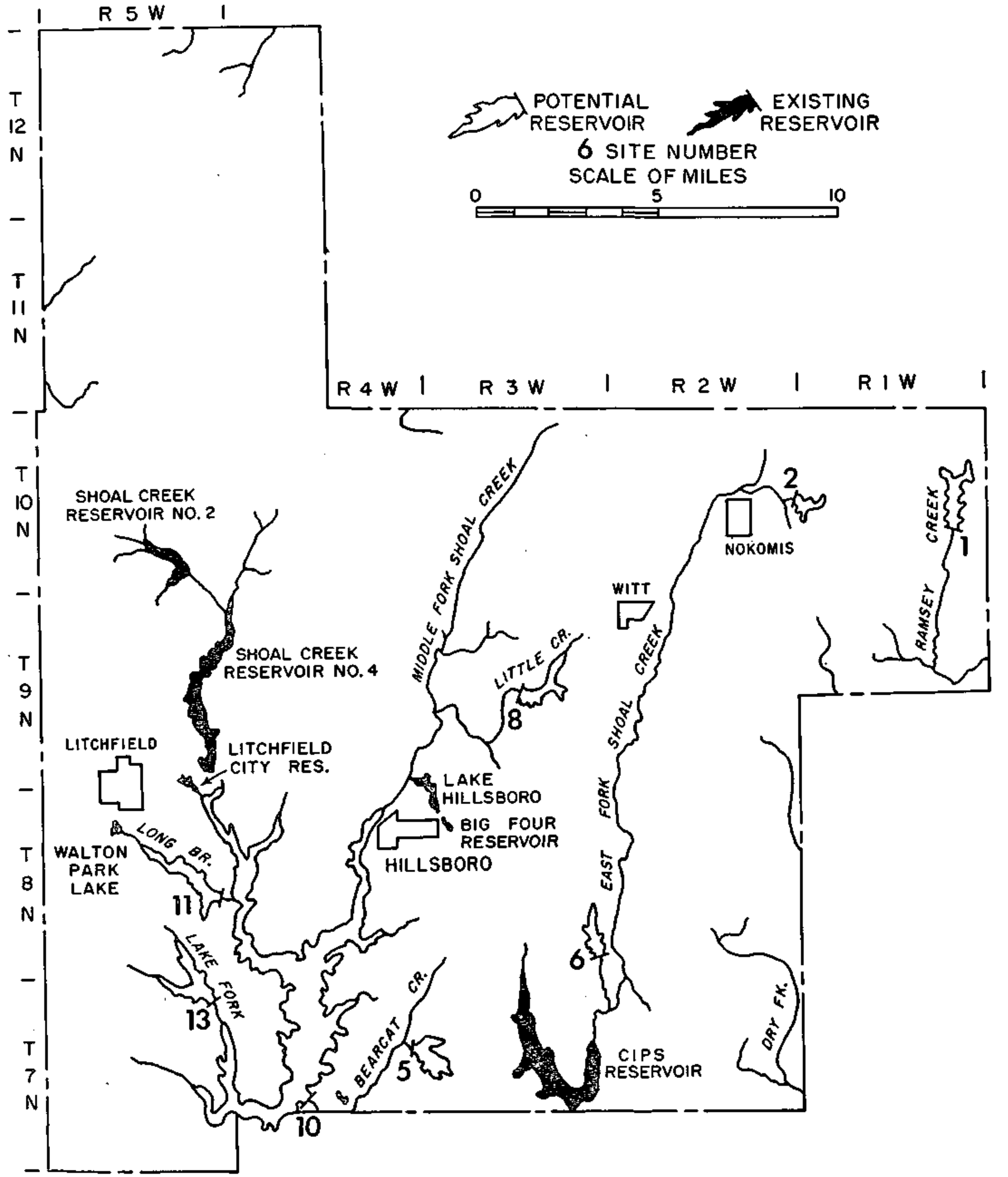
Potential Reservoirs in Montgomery County

Site number	Waterway location	Spillway elevation (*ft*)	Pool area (*acres*)	Storage (*ac-ft*)	Storage (*mg*)	Watershed (*sq mi*)	Times filled per year	Depth at dam (*ft*)	Length of dam (*ft*)	Earth fill (*cu yd*)	Shoreline (*mi*)	Mean annual runoff (*mgd*)	Net yield (*mgd*) for given recurrence intervals — Full capacity 5 Yr	10 Yr	25 Yr	40 Yr	Half capacity 5 Yr	10 Yr	25 Yr	40 Yr
1	Ramsey Creek SE ¼ SE ¼ 23-10N-1W (Pana Quad)	640	320	3,630	1,183	12.0	1.8	34	1,050	199,000	6	5.76	4.7	3.2	1.9	1.5	2.4	2.0	1.0	.7
2	E. Fork Shoal Creek SE ¼ SE ¼ 13-10N-2W (Nokomis Quad)	700	192	1,280	417	1.8	.8	20	800	83,000	3	.86	.7	.7	.5	.3	.6	.3	.1	.1
5	Trib. Bearcat Creek NW ¼ NE ¼ 13-7N-4W (Hillsboro Quad)	600	210	2,940	958	4.2	.7	42	600	158,700	5	1.75	1.5	1.5	1.2	.9	1.3	1.0	.7	.6
6	Trib. E. Fork Shoal Cr. NW ¼ NE ¼ 36-8N-3W (Hillsboro Quad)	620	128	1,700	553	1.8	.5	40	400	93,600	3	.75	.6	.6	.6	.4	.6	.5	.3	.3
8	Little Creek SW ¼ SW ¼ 15-9N-3W (Hillsboro Quad)	640	275	2,750	896	5.5	.9	30	650	107,500	6	2.29	2.0	1.8	1.2	1.0	1.6	1.0	.5	.5
10	Shoal Creek SW ¼ NW ¼ 21-7N-4W (Mt. Olive Quad)	560	20,000	367,000	119,500	340.0	.4	55	1,500	604,000	80	141.82	120.1	120.1	120.1	97.1	118.0	108.6	71.5	57.9
11	Long Br. Shoal Creek SW ¼ NE ¼ 24-8N-5W (Mt. Olive Quad)	590	294	4,604	1,500	7.0	.7	47	600	149,400	10	2.92	2.6	2.6	2.0	1.5	2.4	1.6	1.1	.9
13	Lake Fork Shoal Creek NE ¼ SW ¼ 1-7N-5W (Mt. Olive Quad)	600	370	3,700	1,205	17.5	2.2	30	800	138,900	8	7.30	5.0	3.6	2.1	2.1	2.2	1.7	.8	.7

Existing Reservoirs in Montgomery County

Reservoir name	Legal description	Owner	Watershed area (*sq mi*)	Watershed area (*acres*)	Height of dam (*ft*)	Depth of water at dam (*ft*)	Pool area (*acres*)	Storage capacity (*ac-ft*)	Storage capacity (*mg*)	Storage capacity (*in*)	Remarks and data source
Lake Hillsboro	SE ¼ 36-9N-4W, SW ¼ 31-9N-3W, 6-8N-3W (Hillsboro Quad)	Hillsboro (C)	7.50	4,800	35	27	96	1,237	403.0	3.09	Hydrographic survey 1954
Big Four Res.	6-7-8N-3W (Hillsboro Quad)	New York Central R.R.	4.69	3,000	18	13	48	276	89.9	1.10	
Eagle Pitcher Res.	SW ¼ 1-8N-4W (Hillsboro Quad)	Eagle Pitcher Lead Co.			18	15	6	6	1.9		
Lower Lake	SE ¼ SW ¼ 14-8N-14W	American Zinc Co.					46	829	270.0		
Middle Lake	NE ¼ NW ¼ 23-8N-23W										
Lower	SW ¼ NW ¼ 23-8N-23W (Hillsboro Quad)										
Litchfield City Res.	35-9N-5W (Mt. Olive Quad)	Litchfield (C)	1.25	800			57	927	302.0	13.90	
Chautauqua Park Lake	SE ¼ SE ¼ 1-8N-5W (Mt. Olive Quad)		1.30	830	26	20	10	37	12.1	0.53	Recreation
Walton Park Lake	NW ¼ 9-8N-5W (Mt. Olive Quad)	Litchfield (C)	2.04	1,302			31	187	60.9	1.72	Old city reservoir
Panama Lake	NW ¼ 22-7N-4W (Mt. Olive Quad)	Gosgrove Meecham Coal Co.	0.85	541			18	152	49.5	3.37	
Mine Res.	NW ¼ 32-10N-2W (Nokomis Quad)		2.19	1,400			17	25	8.1	0.21	½ mile north of Witt
Coffeen C.I.P.S. Res.	3-10-14-15-22-23-7N-3W (Hillsboro Quad)	C.I.P.S.			70	60	1,096	22,035	7,179.0		Water for steam generated electricity

MONTGOMERY COUNTY



protection. The lake area is generally free from timber and under cultivation, although there is some brush and scattered timber on the valley walls. Project costs should be moderate since all cost factors seem to be below average except perhaps the outlet works required by the watershed which would be slightly large for a lake of this size. A complete program of test borings would be required before any final determination of geologic feasibility could be made. The most important question to be answered is the extent of a wet, seepy, sand layer at the base of the right abutment. The entire right abutment appears to be stratified glacial outwash deposits of sandy clay and clayey sand. Permeability appears to be moderate in all but the sand layer. The left abutment is considerably different from the right and seems to be all sandy clay glacial till. The alluvium consists and 2 feet of clayey silt over 6 feet of silty clay over at least 5 feet of medium and fine textured soft silty sand. A core wall into the silty clay might be sufficient, but the channel would have to be carefully blanketed upstream. The best source of borrow would be the left upstream abutment, but some of the glacial outwash on the right should be tested.

MOULTRIE COUNTY

Moultrie County was covered by the Illinoian glacier and later by the Wisconsinan glacier. The average depth of materials deposited by these glaciers is nearly 200 feet. These deposits, referred to as drift, are primarily till which consists of an unsorted mixture of particles from clay through boulder size. The deeper glacial deposits may be outwash which is a water-sorted permeable material consisting of sands and gravels. A wind-blown deposit of silt size particles called loess overlies the glacial materials to a depth of 3 to 6 feet.

If encountered, the bedrock surface would probably consist of weak, easily eroded shales with a possibility of thin limestones up to 25 feet thick, coal seams, and locally developed sandstone.

The Shelbyville Reservoir development will extend well into Moultrie County providing a large body of water for recreation and water supply. Smaller developments could be undertaken in Moultrie County, and the results of studies on five such sites follow.

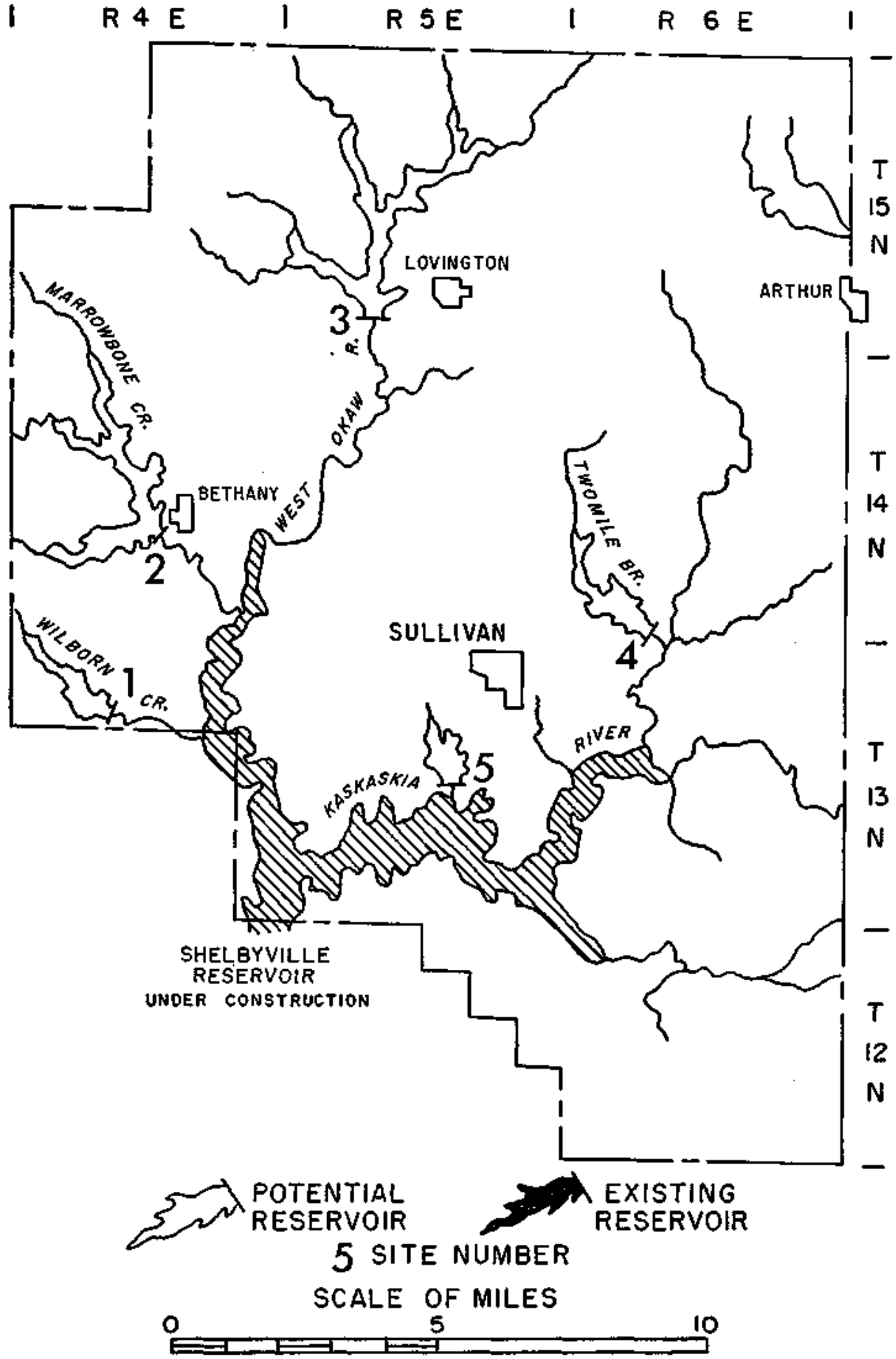
Site 1. A dam site on Wilborn Creek, a tributary of the West Okaw River, has a watershed of nearly level uplands and steep-sided, V-shaped valleys. The bottomland is mostly in pasture or idle, and would require minor clearing and grubbing. A north-south township road could be raised or abandoned, while an east-west township road would have to be abandoned. There are no known residences or obstructions and only minor utility relocations. The reservoir area would be readily accessible from hard surface roads. The dam site and reservoir area would be founded on preconsolidated glacial till consisting of silty and sandy clay with numerous pebbles. The silty alluvial deposit is not expected to exceed 10 feet, but 5 to 10 percent settlement can be expected in this material during construction. Very little seepage should be expected through the foundation or abutments at the dam site, and there are no indications of leakage potential throughout the reservoir area. This site should be capable of developing a good, normal cost project.

Site 2. A potential reservoir site exists below the confluence of Brush and Marrowbone Creeks 0.5 mile west of Bethany. The watershed is fan shaped and has rolling hills on the outside flank of the Cerro Gordo glacial moraine. The reservoir area has numerous highways, bridges, residences, and a railroad that would be subject to

Potential Reservoirs in Moultrie County

													Net yield *(mgd)* for given recurrence intervals							
													Full capacity				Half capacity			
Site number	Waterway location	Spillway elevation *(ft)*	Pool area *(acres)*	Storage *(ac-ft)*	Storage *(mg)*	Watershed *(sq mi)*	Times filled per year	Depth at dam *(ft)*	Length of dam *(ft)*	Earth fill *(cu yd)*	Shoreline *(mi)*	Mean annual runoff *(mgd)*	5 Yr	10 Yr	25 Yr	40 Yr	5 Yr	10 Yr	25 Yr	40 Yr
1	Wilborn Creek NE ¼ SW ¼ 9-13N-4E (Dalton City Quad)	650	360	4,560	1,486	14.8	1.6	38	900	202,100	5	6.60	5.5	4.1	2.6	2.3	2.7	2.1	1.2	.8
2	Marrowbone Creek SW ¼ SE ¼ 22-14N-4E (Sullivan Quad)	650	946	10,400	3,390	15.6	.8	33	800	160,600	19	6.95	5.6	5.6	4.2	3.5	5.5	3.8	2.2	1.9
3	West Okaw River SE ¼ NE ¼ 32-15N-5E (Sullivan Quad)	650	760	5,570	1,815	66.5	6.0	22	650	77,000	17	29.64	7.7	4.2	4.1	2.4	3.3	2.0	1.4	.7
4	Twomile Branch SW ¼ SW ¼ 32-14N-6E (Sullivan Quad)	640	173	1,211	395	14.4	5.9	21	1,100	105,500	8	6.42	1.7	.9	.9	.5	.7	.4	.3	.1
5	Campfield Branch 22-15-13N-5E (Sullivan Quad)	640	125	2,080	678	3.0	.7	50	725	254,900	5	1.39	1.2	1.2	.9	.8	1.2	.8	.5	.4

MOULTRIE COUNTY



Existing Reservoirs in Moultrie County

Reservoir name	Legal description	Owner	Watershed area (sq mi)	Watershed area (acres)	Height of dam (ft)	Depth of water at dam (ft)	Pool area (acres)	Storage capacity (ac-ft)	Storage capacity (mg)	Storage capacity (in)	Remarks and data source
Elm Springs Park	SE ¼ 1-13N-4E (Sullivan Quad)		0.27	170	24	20	7	68	22.2	1.54	Nearest town Sullivan

inundation. There is also a small cemetery in the reservoir area that would require relocation. The bottomland is primarily in pasture or idle. If the reservoir were lowered to elevation 640, there would be considerable shallow water. This dam site is located in an area where glacial till forms the foundation, abutments, and source of borrow material, and underlies the entire reservoir area. If sound construction practices are employed, no significant problems should occur. This site would have a high project cost primarily because of the relocations.

Site 3. An excellent dam site exists 0.5 mile below the confluence of Springtown Branch and the West Okaw River, about 1.5 miles west of Lovington. The watershed area is located on the backslope of the Cerro Gordo glacial moraine, and has a drainage area in excess of 66 square miles. The watershed has gently rolling uplands and broad alluviated valleys. The bottomland is not intensely cultivated, but there are several residences and numerous township roads to be abandoned or relocated. One highway, Illinois Routes 32 and 133, crosses under the Pennsylvania Railroad bridge and over the Okaw River on a reinforced concrete six-span bridge set on concrete piers. This highway would have to be raised or perhaps relocated. The Pennsylvania Railroad crosses the Okaw River on a timbered trestle that would require protection. Bedrock was not observed, and the unconsolidated material is glacial till which consists mostly of gray silty and sandy clay with small sandy or gravelly pods. It must be determined whether or not the permeable basal alluvium is in contact with the reservoir periphery. If it is, an impermeable core wall should be installed which would extend through the alluvium and bond to the till. This may be a good site, but it would be an extremely costly project.

Site 4. Twomile Branch of Jonathan Creek, a tributary of the Kaskaskia River, has a watershed, 7.5 by 3 miles, of nearly level uplands and gently sloping valleys except at the dam site where the abutments are considerably steeper. There are no residences, buildings, or utilities in the reservoir area, and only a two-lane gravel township road would require raising. The dam site is situated on the backslope of the Cerro Gordo moraine (Wisconsinan), is easily reached, and should present little if any construction problems. Glacial till forms the foundation material and underlies the entire reservoir area. The alluvium is probably no more than 10 feet deep, with the possibility of some permeable basal alluvium which, if present, should be intercepted by a core wall. Geologic conditions are favorable for construction ; however, there would be considerable shallow water in the upper reaches if the elevation is raised above 640 feet. This area has been extensively artifically drained, and is intensively cropped. This site would make only a fair reservoir. The project costs would be moderately high because of high land acquisition costs.

Site 5. Campfield Branch watershed is 3 miles long by 1 mile wide, has very gently rolling uplands, abrupt breaks into narrow V-shaped valleys, and only slight floodplain development. The stream has meandered across the narrow bottom which is covered with brush and light woods. The valley walls for the most part are covered with mixed woods. The impoundment would have two mile-long branches producing a relatively long shoreline. The upland is under clean tilled cultivation. The bottoms exhibit infertile overwash of sands and gravels. There are no known man-made obstructions. In general this is a very good water storage dam site; no unusual construction problems are anticipated, although an impervious core should be constructed through the permeable sandy alluvium. Some slight leakage should be expected through the till in the reservoir abutments, but this would diminish as the water table adjusts. This site should make a good, moderately low cost project only 2 miles south and 1 mile west of Sullivan. The reservoir is completely surrounded by a gravel access highway which is about 0.75 mile west of Illinois Route 32.

The Illinoian glacier in Richland County left only thin drift in which the topography is primarily bedrock controlled. The glacial deposits, primarily till, are lacking in sands and gravels. Local areas, such as the bottomlands of the Fox River and tributaries of the Little Wabash River, contain scattered deposits that should yield ground water for farm and domestic use. Drainage from Richland County is to the south via tributaries of the Little Wabash River on the western edge, the Fox River in the center, and Bonpas Creek on the eastern edge.

The bedrock consists of beds of shale, sandstone, limestone, and dolomite arranged one upon the other. The bedrock has an irregular surface formed by erosion prior to glaciation.

The topography and geology are moderately well suited to reservoir development. The results of seven feasibility studies follow.

Site 1. Calfkiller Creek, a direct tributary of the Embarras River, has a mushroom-shaped watershed, 4.75 by 3 miles. The watershed has gently rolling uplands, gradually sloping tributary valleys, and a wide alluviated floodplain. A site for a dam on Calfkiller Creek has been located 4.5 miles east and 1.25 miles south of Dundas. The reservoir area has 60 to 70 percent open land most of which is under cultivation. The remainder of the site is in mixed timber. Development of this lake would inundate three sections of a township road. The average annual runoff would be expected to fill the reservoir once a year. The alluvium is clayey silt, while the abutments are composed of glacial till. The geologic conditions are considered probably feasible since the materials are generally satisfactory for dam construction from the standpoints of foundation stability, relative impermeability, and source of material for an earth dam. This site should make a fair reservoir at a normal cost.

Site 2. The East Fork of the Fox River above the dam site has a drainage area of 13.7 square miles, which includes the 3.36 square mile drainage of the Olney Reservoir on Goose Creek. The watershed has gently rolling uplands, moderate valley slopes, and a wide alluviated floodplain. The reservoir area land use is equally divided between pasture and mixed hardwood timber. The developments that would be inundated include one two-lane blacktop road, one gravel intersection, two oil tanks, a pump house, and at least one oil well. Part of the area is in a game reserve controlled by the Department of Conservation. The base elevation of the Olney Reservoir embankment is 447 feet mean sea level (msl), thus tailwater would exist and might create a problem of embankment protection. The serious problem at this dam site is the high piping potential created by the silty and sandy alluvium. The dam site would be founded on glacial till and would require an impermeable core of compacted till constructed through the alluvium and bonded to the underlying till. Further soil testing should indicate whether a graded filter would be needed. There exists a remote possibility that the Illinois Central Railroad fill across the valley could be incorporated into a structure. This site has high potential as an excellent water storage and recreational facility, but would be a moderately high cost project.

Site 3. A reservoir site exists on Mash Creek, a tributary of the Fox River, approximately 2 miles northwest of Olney. The watershed is 4 by 2 miles and has gently rolling uplands with rather long slopes into a broad alluviated floodplain. Land use in the reservoir area is about equally divided between row crops and mixed hardwoods. One frame residence, one gravel access road, and one gravel township road would be subject to inundation. Pennsylvanian sandstone outcrops in the channel bank about 1 mile upstream from the dam site. Bedrock at the dam site is probably shale at an estimated depth of 20 feet, overlain with an alluvium consisting of variable layers of clayey silt, sandy silt, sandy clay, and possibly some clean sand. An impermeable core wall should be constructed into the alluvium deep enough to break the line of seepage at the contact of fill and alluvium. Some leakage may occur through the sandstone outcrop, but should not be significant. This is a fair site physically, and should be constructed for a near normal cost.

Site 4. The Fox River site is located 8 miles north of Olney. The watershed is 11.5 by 8 miles, and has gently rolling uplands, long valley slopes, and a wide flat alluviated floodplain. The reservoir area is about half in pasture, between one-fourth and one-third in heavy timber, and the remainder in brush. Development of this site would inundate 16 residences and associated outbuildings, several active oil wells, 0.75 mile of Illinois Route 130, eight gravel township roads, and one two-lane blacktop county highway. Many of the east-west roads could be abandoned in favor of a north-south system. A single bedrock outcrop was observed in the center of the reservoir area and is believed to be an erosional remnant consisting of shale, coal bloom, and a thin sandstone member. The unconsolidated material is Illinoian glacial till, mostly sandy clay. The alluvium resembles lacustrine sediments but lacks the distinctive layering; however, it is a very smooth gray clayey silt or fine silt having very low strength in bearing and resistance to shear. The probability of leakage is very low, but shear testing should be included in any future detailed subsurface investigations. This is an excellent water storage and recreational reservoir site, and should result in a normal cost for a project of this size.

Site 5. A dam site located on Sugar Creek 1 mile north of Parkersburg and 3 miles south of Calhoun will produce a many fingered lake. The watershed is mushroom shaped, 5 miles wide and 2.5 miles long. About three-fourths of the reservoir area is in timber. There are no known residences, buildings, utilities, or other obstructions in the reservoir area, except two gravel township roads which could be raised. There are, however, several oil wells in the general area. Bedrock at the dam site is probably sandstone, at a depth of about 15 feet, covered by an alluvium consisting of the upper 3 to 5 feet in brown sandy silt grading to silty sand and probably to clean sand downward. The two problems at this dam site are instability of the alluvial material and probable leakage from the lower sandy alluvium into the soft sandstone bedrock. Consolidation tests should be made of the alluvium. Leakage through the sandstone abutments should be expected, but can be minimized by leaving the present alluvium in place. Eventual coating with fine clayey sediment would reduce original seepage. This site should make a good reservoir at a normal cost.

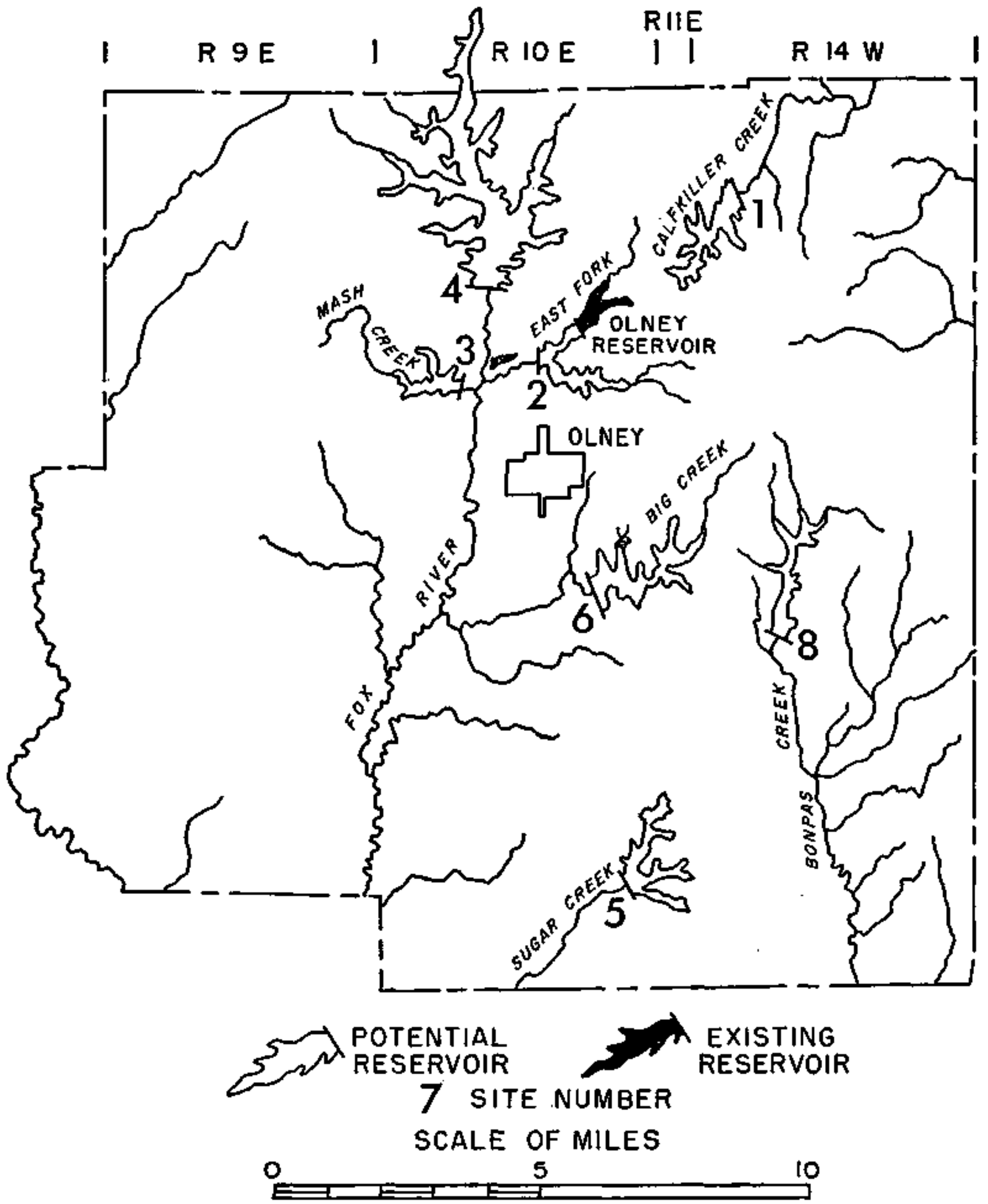
Potential Reservoirs in Richland County

Site number	Waterway location	Spillway elevation (ft)	Pool area (acres)	Storage (ac-ft)	Storage (mg)	Watershed (sq mi)	Times filled per year	Depth at dam (ft)	Length of dam (ft)	Earth fill (cu yd)	Shoreline (mi)	Mean annual runoff (mgd)	Net yield (mgd) for given recurrence intervals: Full capacity 5 Yr	Full capacity 10 Yr	Full capacity 25 Yr	Full capacity 40 Yr	Half capacity 5 Yr	Half capacity 10 Yr	Half capacity 25 Yr	Half capacity 40 Yr
1	Calfkiller Creek NE ¼ NE ¼ 6-4N-14W (Newton Quad)	480	630	5,880	1,916	8.6	1.0	25	1,150	155,000	11	5.16	4.5	4.5	3.1	2.7	4.0	2.6	1.3	.9
2	E. Fork Fox River NE ¼ SW ¼ 22-4N-10E (Newton Quad)	450	326	2,480	808	13.7	3.7	20	1,000	106,200	6	8.22	4.1	3.3	1.9	1.5	2.0	1.6	.9	.6
3	Mash Creek NE ¼ NW ¼ 29-4N-10E (Newton Quad)	450	225	1,650	538	6.8	2.8	22	1,200	142,700	6	4.08	2.6	2.0	1.2	.9	1.2	.9	.5	.3
4	Fox River S ½ 9-4N-10E (Newton Quad)	460	2,500	25,000	8,145	54.0	1.4	30	1,600	275,600	36	32.40	29.9	25.4	15.2	13.3	18.1	13.7	6.8	5.2
5	Sugar Creek SE ¼ SW ¼ 13-2N-10E (Olney Quad)	480	465	6,230	2,030	7.9	.8	40	500	120,900	12	4.69	4.2	4.0	3.0	2.7	3.4	1.9	1.3	1.3
6	Big Creek NW ¼ SE ¼ 14-3N-10E (Olney Quad)	470	615	6,560	2,137	12.8	1.3	32	600	112,900	14	7.68	7.1	6.4	4.0	3.4	4.9	3.5	1.8	1.3
8	Bonpas Creek SE ¼ NE ¼ 20-3N-14W (Sumner Quad)	480	430	4,300	1,401	9.5	1.5	30	500	862,200	10	5.70	5.3	4.5	2.7	2.2	3.1	2.4	1.2	.9
Sites partially in Richland County (See Clay County for description)																				
9	Hurricane Creek NE ¼ NE ¼ 24-4N-8E	450	540	4,140	1,349	23.0	3.2	23	850	103,400	14	11.83	5.8	4.6	3.4	2.4	2.8	2.5	1.5	.9

Existing Reservoirs in Richland County

Reservoir name	Legal description	Owner	Watershed area (sq mi)	Watershed area (acres)	Height of dam (ft)	Depth of water at dam (ft)	Pool area (acres)	Storage capacity (ac-ft)	Storage capacity (mg)	Storage capacity (in)	Remarks and data source
Vernor Lake	SW ¼ 21-4N-10E (Newton Quad)	Olney (C)	0.47	300			35	767	249.8	30.68	Maintained by pumping from Fox River
Olney City Res.	NE ¼ NW ¼ 23-4N-10E (Olney Quad)	Olney (C)	3.36	2,154		26	137	1,516	493.9	8.44	Built Sept. 1954 for water, sed. survey 1960
James Miller	12-3N-10E (Olney Quad)	James Miller	1.56	1,000			25				2 miles southeast of Olney
Donovan D. McCarty	SW ¼ 35-4N-9E (Olney Quad)	Bill Borah	.25	160			7				4½ miles west of Olney
C. L. Jordan	24-3N-10E (Olney Quad)	C. L. Jordan	0.23	150			14				3 miles southeast of Olney
H. E. Coen	W ½ 20-3N-14W (Olney Quad)	Homer Fritschle	0.19	120			8				5 miles southeast of Olney
E. J. Hahn	14-3N-10E (Olney Quad)	E. J. Hahn	0.20	130			15				3 miles southeast of Olney
Paul Weber	23-4N-10E (Newton Quad)	Paul Weber	0.08	50			7.5				3 miles north of Olney
J. W. Rudy	SE ¼ 31-3N-9E (Olney Quad)	J. W. Rudy	0.12	75			5				5 miles south of Noble
Albert Nix	SW ¼ 5-4N-9E (Newton Quad)	Albert Nix	0.03	20	32	27	7				12 miles northwest of Olney
Karl Gaffner	SW ¼ 19-4N-10E (Newton Quad)	Karl Gaffner	0.23	150			10				5 miles northwest of Olney
Black & Houchin	SE ¼ 8-3N-14W (Sumner Quad)	Black & Houchin	0.06	40			6				2 miles southwest of Claremont
H. E. Coen	SW ¼ 32-4N-10E (Olney Quad)	H. E. Coen	0.16	100			8.5				1 mile west of Olney

RICHLAND COUNTY



Site 6. Big Creek, a tributary of the Fox River, has a reservoir site located about 2 miles southeast of Olney. The watershed is cone shaped, 5.5 by 5 miles, and has gently rolling uplands, and long and rather gentle valley wall slopes on the tributaries. The abutments on the main stream are steep with several sandstone outcrops on the south wall and in tributary channels. The reservoir area cover is about half timber and the rest mostly in pasture or soil bank. Development would inundate a brick residence that has a 15-acre lake, one oil well, an east-west gravel road in two places, a north-south gravel road, and a high pressure gas pipe line in three different locations. The bedrock at the dam site is probably sandstone at an estimated depth of about 18 feet. The alluvium is brownish gray silty clay which may be sandier in the lower part especially near the bedrock contact. If deeper borings revea] the lower alluvium to be permeable, then the upper material should be undisturbed in the reservoir area in order to seal off the permeable material. Sandstone outcrops in the lower 12 feet of the left abutment at the centerline of the fill, and should be blanketed by compacted impermeable fill material. This site should make a good reservoir at a moderately high project cost.

Site 8. The watershed above the dam site on Bonpas Creek is diamond shaped (6 by 3 miles), has rolling uplands and gradual slopes into rather narrow valleys which have a moderate floodplain development. The reservoir created by this dam site would be a long many-fingered lake with a longer than normal shoreline. Most of the upland is clean tilled, and the valley slopes are in pasture and timber. The bottom is brush or meadow except for the lower third which is clean tilled. Two east-west and one north-south gravel roads could be abandoned in favor of existing north-south highways. Relocations and acquisition costs should be normal for a project of this size. The bedrock at the dam site is probably shale at an estimated depth of 15 feet. The abutments are sandy clay or silty clay glacial till except for a few sandstone outcrops. The alluvium is light silty clay over gray silty sand, but actual depth was not determined. Leakage through the permeable lower alluvium can be prevented by installing an impermeable core of compacted till through the sand bonded to the shale. This site should make a good but long and narrow reservoir, and would result in a moderately high cost project.

SHELBY COUNTY

The Illinoian and later the Wisconsinan glaciers had much influence on present Shelby County topography and soils. The Illinoian covered the entire county, grinding off hills and filling old valleys with masses of glacial debris consisting of rock, gravel, sand, silt, and clay. When the ice sheet melted back, it left a broad gently rolling plain which still persists in the southern and western parts of the county. Later, the Wisconsinan glacier advanced from the northeast covering about 40 percent of the county. The Wisconsinan till plain varies from 25 to 75 feet above the Illinoian, and its end is marked by a broad ridge of rolling topography known as the Shelbyville moraine. Outwash plains from the Wisconsinan melt formed on the old Illinoian plain, depositing thick beds of sand and gravel into the channels of such streams as the Kaskaskia and the Little Wabash and their tributaries. Wind-blown fine silts and clay sediments were deposited on the uplands, varying in thickness from 6 feet on the western edge to about 3 feet on the eastern edge of the county. Drainage is from north to south, primarily through the Kaskaskia River and its tributaries on the western side and the Little Wabash and its tributaries in the eastern third of the county.

Most of the bedrock exposures observed in Shelby County were sandstone. Other deposits which might be encountered are shale, thin limestone, and possible coal seams. All of these materials are common to Pennsylvanian strata which underlie this area.

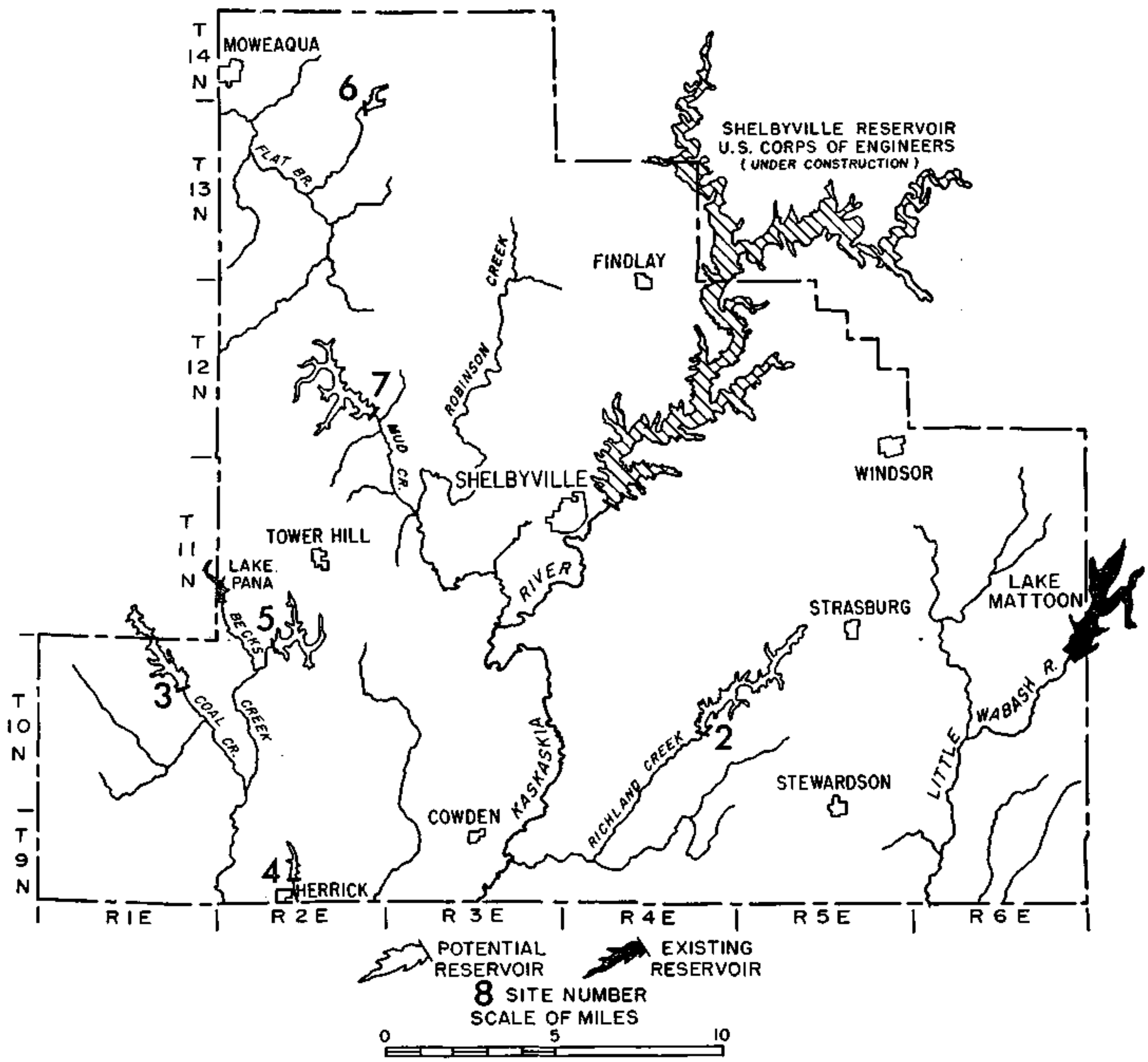
Neither the geology nor the topography in Shelby County is ideally suited to reservoir development, but the proposed dam for Lake Shelbyville shows that such developments may be found. Feasibility studies were made on six smaller developments in this county, the results of which follow.

Site 2. A reservoir site is available on Richland Creek 5 miles southwest of Strasburg. The watershed is about

Potential Reservoirs in Shelby County

Site number	Waterway location	Spillway elevation (ft)	Pool area (acres)	Storage (ac-ft)	Storage (mg)	Watershed (sq mi)	Times filled per year	Depth at dam (ft)	Length of dam (ft)	Earth fill (cu yd)	Shoreline (mi)	Mean annual runoff (mgd)	Net yield (mgd) for given recurrence intervals: Full capacity 5 Yr	Full capacity 10 Yr	Full capacity 25 Yr	Full capacity 40 Yr	Half capacity 5 Yr	Half capacity 10 Yr	Half capacity 25 Yr	Half capacity 40 Yr
2	Richland Creek NE ¼ NE ¼ 23-10N-4E (Stewardson Quad)	600	700	10,500	3,421	39.5	2.0	45	450	141,600	13	19.18	14.4	11.7	8.1	6.3	7.3	6.4	4.0	3.2
3	Coal Creek NE ¼ SE ¼ 11-10N-1E (Pana Quad)	635	510	9,860	3,212	10.8	.6	58	1,000	419,600	11	5.18	4.7	4.7	3.6	2.6	4.6	3.2	2.3	1.4
4	Section Creek NE ¼ NE ¼ 16-9N-2E (St. Elmo Quad)	580	125	1,250	407	2.4	1.0	30	650	108,200	4	1.08	1.0	.9	.6	.5	.8	.6	.3	.3
5	Becks Creek SE ¼ SE ¼ 4-10N-2E (Shelbyville Quad)	620	500	6,170	2,010	12.6	1.1	37	850	200,500	12	6.05	5.5	4.5	3.0	2.0	4.1	2.2	1.3	1.1
6	Trib. Flat Branch NE ¼ NW ¼ 1-13N-2E (Dalton City Quad)	700	120	1,200	391	4.8	2.0	30	700	115,500	3	2.14	1.5	1.2	.8	.6	.6	.5	.3	.2
7	Mud Creek SW ¼ NE ¼ 25-12N-2E (Shelbyville Quad)	620	900	12,900	4,203	18.0	.8	43	1,100	337,000	19	8.64	7.7	7.7	5.4	3.7	7.3	4.6	2.6	2.1
Sites partially in Shelby County (See Fayette County for description)																				
2	Little Creek NE ¼ NE ¼ 26-9N-1E	590	704	14,080	4,587	12.2	.4	60	1,000	453,300	19	5.72	4.7	4.7	4.7	4.2	4.2	4.2	3.2	2.6

SHELBY COUNTY



Existing Reservoirs in Shelby County

Reservoir name	Legal description	Owner	Watershed area (sq mi)	Watershed area (acres)	Height of dam (ft)	Depth of water at dam (ft)	Pool area (acres)	Storage capacity (ac-ft)	Storage capacity (mg)	Storage capacity (in)	Remarks and data source
Westervelt Fishing Club	SE ¼ NE ¼ 21-12N-3E (Shelbyville Quad)	Westervelt Fishing Club	0.28	182			5.5				Nearest town Westervelt
Hanfland Sand & Gravel	NW ¼ NW ¼ 36-11N-3E (Shelbyville Quad)	Hanfland Sand & Gravel Co.				9	5.5	50	16.3		Gravel pit

10 miles long and 5 miles wide, and has rolling uplands and long, moderately steep slopes into narrow alluviated valleys. Approximately half of the reservoir area has been cleared and was once cropped but is now apparently held in reserve. A one-lane east-west blacktop road could be abandoned and replaced by a road over the structure. Two short sections of township roads would have to be raised and one north-south gravel road abandoned. No known residences, utilities, or installations would require relocation. Land acquisition costs should be moderate. The dam site would be founded on bedrock of massive sandstone or possibly shale, overlain with about 15 feet of alluvium of predominantly silty sand and sand. Sandstone underlies most of the reservoir. The abutments at the site and for at least 500 feet upstream consist of 12 to 25 feet of loosely cemented sandstone thinly bedded with interstratified gray shale. Glacial till of Illinoian age, mostly sandy clay, overlies the sandstone. Gravel appears at the till-sandstone contact with several seeps showing. Since this could become a path of leakage, the contact area might have to be blanketed unless naturally covered or proven to be discontinuous. This site should make an excellent long, narrow reservoir, at a moderately low cost.

Site 3. A reservoir site exists in a 6 mile long by 2 mile wide watershed on Coal Creek, a tributary of Opossum Creek about 4 miles south of Pana. The watershed lies in a northwest-southeast direction, and has rolling uplands and gradual slopes into tributary valleys. No known residences would require relocation, and only one oiled road crosses the site. Approximately half of the reservoir area is free of timber, and all of the area is accessible by good roads. Headwaters of the reservoir would be about a mile from the city of Pana. Neither depth to bedrock nor type of bedrock was determined, but estimated thickness of alluvium is 18 feet. The alluvium consists of clayey silt and clayey sand over basal sand which would have to be cut off with an impermeable core wall. Careful attention should be given so that one of the scattered sandy lenses in the abutments does not bypass the fill. There are abundant quantities of till for fill material within 1000 feet of the dam site. The alluvium should not be considered for fill material. This is an excellent potential reservoir site and should produce a low cost project.

Site 4. A reservoir site is located about 1 mile north of Herrick on Section Creek, a tributary of Mitchell Creek which is a part of the Kaskaskia River system. The watershed has rolling uplands and gradual slopes into broad valleys with narrow floodplains. The reservoir area is lightly covered with timber. There are no known relocations of residences, roads, or other developments. No bedrock exposures exist at the dam site nor in the reservoir area. The alluvial floodplain is very narrow, and alluvium consisting mostly of brown silty clay is not over 10 feet deep. There is a moderate bed load of sand. Numerous springs are reported in the headwaters and are apparently issuing from the contact between high level sands and gravels and the relatively impermeable glacial till. Since the springs are above the proposed water level they could not have an adverse effect on the reservoir. This site is very well suited for a water supply reservoir. Land acquisition easements, rights of way, and relocations indicate this would be a low cost project.

Site 5. A potential reservoir site exists on Becks Creek 3 miles south of Tower Hill. The watershed is about 6 miles long and 2.5 miles wide, and has rolling hills on the outer edge of the Illinoian glacial moraine. The valleys are deeply incised into bedrock. About half of the reservoir area is open land, and there is timber on the valley walls. The reservoir would have two major branches, the easterly branch being crossed twice by a two-lane asphalt road that could be raised or relocated. The westerly branch would have a one-lane oiled road that could be abandoned. No known residences or utilities would require relocation. The dam site would be founded on sandstone. The alluvium consists of 5 feet of clayey silt over 4 feet of sandy silt over 11 feet of coarse material over bedrock. The abutments have 10 to 15 feet of sandstone covered with 15 to 20 feet of leached glacial till. Settlement can be expected in the alluvial valley fill, and the structure would require a positive cut-off core wall of impermeable material. Seepage through the sandstone which is moderately permeable is not expected to be significant, but the natural soil cover should not be disturbed. Glacial till fill material is available in a ridge 100 feet northeast of the dam site. This should be a moderately low cost project.

Site 6. A potential site exists on a tributary of Flat Branch about 4 miles east of Moweaqua. The watershed is round, about 2.5 miles in diameter, and is located on the front slope of the Shelbyville moraine. It has rolling hills and moderate V-shaped valleys. The entire reservoir site is cleared and mostly in pasture. An east-west single lane blacktop crosses the center of the reservoir area, but could be abandoned or relocated across the top of the structure. There are no residences, utilities, or obstructions to be relocated or moved, and the site has good accessibility. The dam site foundation abutments and the reservoir area are covered with a good quality glacial till that makes a very favorable material for the construction of a water-retention reservoir. This site should make a very good small reservoir at a low project cost.

Site 7. This site is on Mud Creek about 8 miles northwest of Shelbyville in gently rolling uplands that have rather abrupt slopes into wide alluviated valleys. The watershed is 7 miles wide but only 4 miles long. The drainage pattern has numerous branches which would make a many-fingered lake. There are several frame farm residences in the reservoir area, numerous local utilities, and nearly the entire area has been cleared for the present use of row crops and pasture. Relocations or abandonment of highways would be critical. Two east-west two-lane blacktop roads crossing the reservoir area would be abandoned. The easternmost north-south one-lane blacktop crossing the lower third of the reservoir would be abandoned. A north-south two-lane blacktop on the western side crosses four fingers of the reservoir and probably would be raised. The dam site would be founded on shale bedrock which is overlain with about 15 feet of alluvium consisting of 5 feet of silty clay grading into 5 feet of clayey fine sand over stiff medium gray silty clay. There seems to be no need for any core wall, if the upper several feet of alluvium is removed during site preparation. This site should make a very good water-retention reservoir at a high cost. The Chicago and Easern Illinois Railroad embankment immediately downstream from the dam site increases the hazard classification of this site.

ST. CLAIR COUNTY

At least two major ice sheets covered St. Clair County, the most recent the Illinoian which leveled off hills and filled old valleys with deposits of rock material known as glacial drift. Till is the primary drift material and consists of an unsorted mixture of particles from clay to boulder size. Wind-blown fine sediments from the deposits of the Wisconsinan melt were deposited upon the upland as loess. The thickness of the loess, except where eroded, varies from 30 feet in the northwest to less than 4 feet in the southeast. Drainage is primarily from north to south through the Kaskaskia River and its tributaries which drain to the south and southwest. The western edge of the county is drained by direct tributaries to the Mississippi River.

Most of the county is underlain by Pennsylvanian beds that are dominantly weak shales, easily eroded, but include thin limestones of generally less than 25 feet thick and locally developed sandstones which are more resistant to erosion.

Mississippian limestone forms the bedrock surface in the extreme western portion of the county and is visible in many exposures there. Near Dupo is an area of limestone sinks varying in size from an acre to 20 acres. The crater-like sinks were formed by erosion of the glacial deposits through small fissures in the limestone. In some instances the underlying limestone has become sealed, and the craters have filled with water.

In general the topography of St. Clair County is such that only relatively small reservoir sites are available. The geology does not present serious problems except in some of the extremely leaky limestones. The results of feasibility studies on nine sites follow.

Site 1. A good small reservoir site is available on Lively Branch 1 mile south of New Athens. The watershed is gently rolling and slopes uniformly into a shallow V-shaped valley. Access to the site is provided by a two-lane blacktop road which might have to be raised slightly near the upper reaches of the lake. Another gravel road crossing could be abandoned. No residences or utilities would be affected by the development. Nearly the entire lake area is in mixed timber and brush, and has little or no agricultural development. All factors point to a very low cost development. Geologic conditions are excellent. The abutments are moderately sloping, rounded hills which consist of very stiff, sticky, silty clay glacial till. This material is quite impermeable and contains a very small percentage of intermixed sand grains. The alluvium consists of 5 to 7 feet of silty clay over the same till as that described in the abutments. Borrow material of excellent quality is available anywhere on the valley walls.

Site 2. A very good small reservoir site is available 0.5 mile west of Millstadt on Prairie du Pont Creek. The watershed has rolling uplands which slope uniformly into shallow V-shaped valleys. About half of the lake area is free from timber and under moderate agricultural development. A two-lane blacktop road that crosses the site would have to be raised or relocated. Two residences might have to be acquired and access provided for one other. Costs for the project would be moderate to moderately high, depending on the relocation and residence acquisition costs. The right abutment is composed of silty clay glacial till overlain by about 10 feet of loess. The left abutment shows a limestone outcrop 8 feet high and 25 feet in lateral extent. The outcrop can be avoided by moving the site upstream from it. Material similar to that on the right abutment overlies the till. The alluvium consists of 1 or 2 feet of silt over 5 feet of interstratified sand, silty sand, and silt over 1 to 2 feet of dirty gravel over at least 1 foot of very stiff (2 tons per square foot bearing strength) silty clay which resembles the abutment material. A core wall should be placed into this material which probably overlies limestone at very shallow depths. Limestone in the lake bed shows definite jointing and should be blanketed where it is exposed.

Site 3. A good potential reservoir site exists on Rock Spring Branch 1 mile northeast of O'Fallon. The watershed has gently rolling uplands sloping into moderately steep-walled V-shaped valleys. About a third of the lake area is free from timber and under moderate agricultural development. No residences would be inundated by the development, but several are quite close to lake level and would have to be acquired. Abandonment of a two-lane blacktop road that crosses the site would make new access necessary for several residences. Although property costs might be high for this site because of residential development, project costs should be moderate since no major relocations or other problems exist. The surfieial examination raised several geologic questions that require a complete program of borings and testing before any answers can be given. The right abutment consists of 25 to 35 feet of fairly hard shale laminated one-fourth to one-half inch thick. The shale is overlain by stiff sandy clay glacial till, the thickness of which could not be determined because of thick overlying loess. The loess is a silty clay, weathered, Eoxana Formation in the lower portion of the 20-foot layer, and light calcareous clayey silt Peorian on top. The left abutment is probably similar to the right, but thick loess prevented examination. Alluvium consists of at least 9 feet of silty clays, clayey silts, and sandy silts, the full extent of which is unknown. A basal deposit of permeable sand and gravel is another possibility. Borrow material of good quality may be difficult to obtain because of the thick loess. Any available deposits of till should be reserved for the core since the Roxana loess may, with careful compaction control, be used on the flanks.

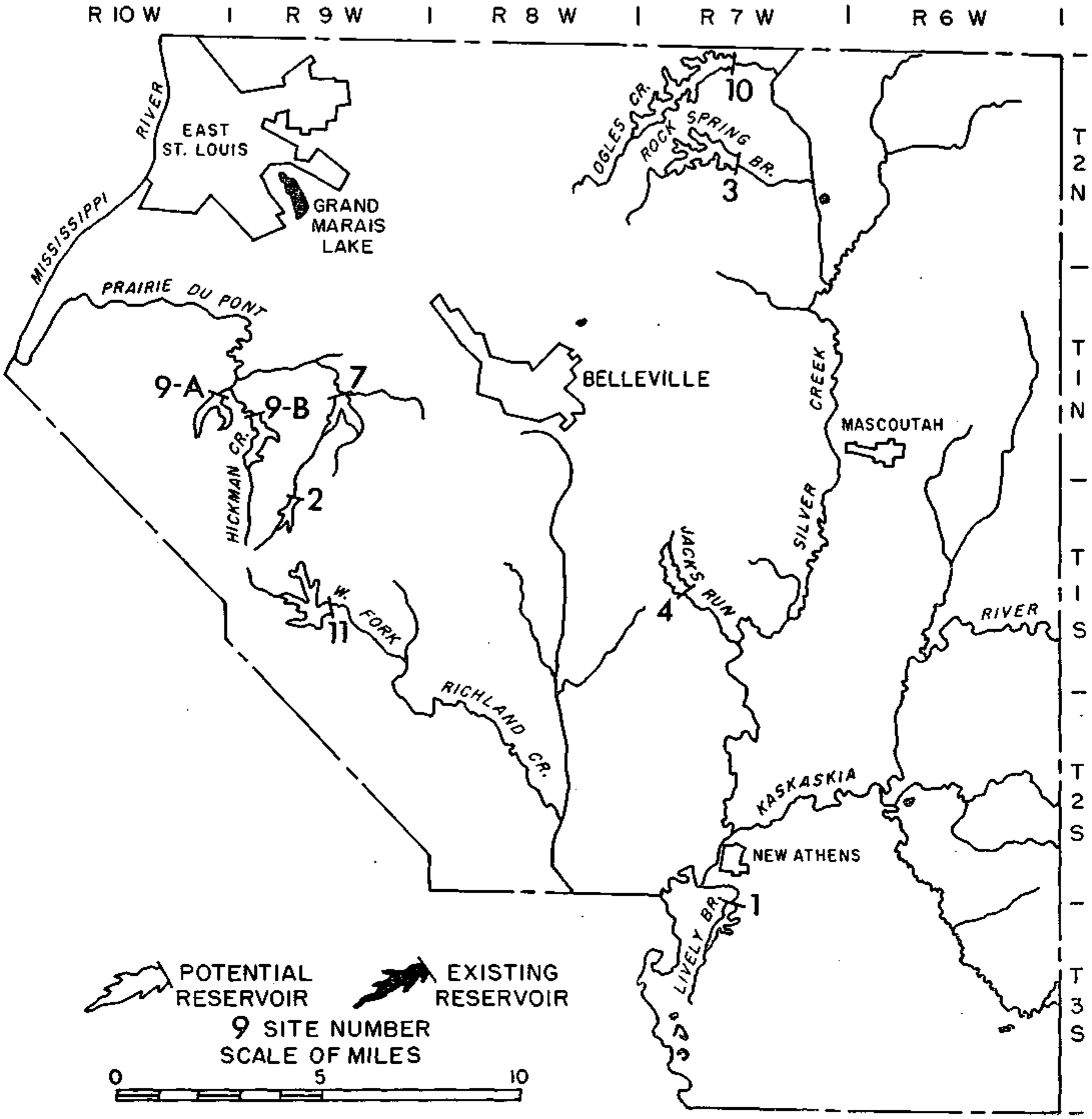
Site 4. An excellent small reservoir could be developed on Jacks Run 0.25 mile northeast of the Freeburg city limits. The northwest boundary of the watershed is rather steep, but the remainder of the uplands are gently rolling and slope uniformly into the narrow V-shaped valley. Cover in the lake area consists of light timber. No roads, residences, or utilities would be involved in the development. The lack of relocations, low level of land use, small watershed, and short fill should combine to make this a very low cost project. A preliminary examination indicates that this location is less than ideal geologically, but should be feasible. Both abutments and the channel floor at the dam site are exposures of Pennsylvanian sandstone. The sandstone is intricately cross-bedded and thinly laminated. The thickest member is nearly 3 feet, but most laminae are fractions of an inch to several inches thick. The sandstone is generally fine grained and rather poorly cemented with limonite. The rock is jointed but the joints are closed except where enlarged by weathering. Alluvium consists of 2 to 4 feet of sandy silt over 3 to 5 feet of sandstone rubble, all of which should be removed beneath the fill. The outcroppings become less common upstream and the valley walls consist of very stiff and sticky silty clay glacial till. Borrow could probably be taken from this area possibly as far as 0.5 mile from the dam site. Seepage should be expected to occur through bedding planes and more open joints, and through the sandstone itself. The seepage is not expected to reach serious proportions; however, if large open joints are uncovered during site preparation they should be blanketed or grouted.

Site 7. A good small reservoir site is available on Prairie du Pont Creek about 4 miles west of Belleville. The watershed has a small percentage of rolling uplands, but most of the area is drained by a well-developed dendritic pattern of deep narrow valleys. There are

Potential Reservoirs in St. Clair County

													Net yield (*mgd*) for given recurrence intervals							
													Full capacity				Half capacity			
Site number	Waterway location	Spillway elevation (*ft*)	Pool area (*acres*)	Storage (*ac-ft*)	Storage (*mg*)	Watershed (*sq mi*)	Times filled per year	Depth at dam (*ft*)	Length of dam (*ft*)	Earth fill (*cu yd*)	Shoreline (*mi*)	Mean annual runoff (*mgd*)	5 Yr	10 Yr	25 Yr	40 Yr	5 Yr	10 Yr	25 Yr	40 Yr
1	Lively Branch NW ¼ NE ¼ 4-3S-7W (New Athens Quad)	400	140	980	319	1.3	.8	21	600	66,900	4	.73	.5	.5	.3	.3	.4	.2	.2	.1
2	Prairie du Pont Creek NW ¼ NW ¼ 9-1S-9W (Millstadt Quad)	600	80	1,300	424	1.4	.4	50	600	214,700	3	.48	.4	.4	.4	.3	.4	.4	.3	.2
3	Rock Spring Branch SE ¼ NE ¼ 21-2N-7W (O'Fallon Quad)	500	410	5,740	1,870	5.9	.5	42	650	173,300	13	2.83	2.3	2.3	2.3	1.9	2.2	1.9	1.3	1.1
4	Jacks Run SE ¼ NW ¼ 20-1S-7W (Freeburg Quad)	500	165	2,200	717	2.0	.5	40	450	111,200	3	.96	.7	.7	.7	.6	.6	.6	.5	.4
7	Prairie du Pont Creek NE ¼ NW ¼ 27-1N-9W (French Village Quad)	500	120	1,360	443	8.0	3.2	34	600	124,200	5	3.84	2.2	1.8	1.1	1.0	1.3	1.1	.6	.5
9-A	Sparrow Creek NE ¼ NE ¼ 25-1N-10W (Cahokia Quad)	500	180	3,300	1,075	8.5	1.4	55	400	155,300	5	4.08	3.9	3.0	2.1	1.7	2.6	2.0	1.1	1.1
9-B	Hickman Creek NE ¼ NE ¼ 30-1N-9W (Cahokia Quad)	500	200	3,330	1,085	4.0	.6	50	950	350,800	4	1.92	1.6	1.6	1.4	1.1	1.5	1.3	.9	.7
10	Ogles Creek SE ¼ NW ¼ 4-2N-7W (Collinsville Quad)	500	540	9,900	3,225	15.0	.8	55	550	224,500	15	7.20	6.5	6.5	4.8	3.8	6.0	4.5	2.7	2.5
11	W. Fork Richland Creek NE corner 28-1S-9W (Millstadt Quad)	580	370	6,160	2,007	6.1	.5	50	550	190,800	9	2.93	2.4	2.4	2.4	2.0	2.2	2.0	1.5	1.2

ST. CLAIR COUNTY



several ponds and strip mines on the eastern extremity of the watershed. A two-lane blacktop road crossing two fingers of the site might have to be raised slightly in one place, but the only required road relocation is a gravel access road serving three residences. A power transmission line crossing the site could possibly be raised. With the exception of trees along the creek banks the lake bed is under cultivation. The right abutment appears to consist of very stiff Roxana loess. Sandy clay glacial till may underlie the loess but was not discovered. The left abutment contains the same type of loess as the right, but the lower 10 feet is sandy clay glacial till. Alluvium consists of about 8 feet of silty fine sand and fine sandy silt over at least 3 feet of clayey silt. Future borings would be required to determine the extent of the alluvium. Shale outcroppings were located upstream and may com-

Existing Reservoirs in St. Clair County

Reservoir name	Legal description	Owner	Watershed area (sq mi)	Watershed area (acres)	Height of dam (ft)	Depth of water at dam (ft)	Pool area (acres)	Storage capacity (ac-ft)	Storage capacity (mg)	Storage capacity (in)	Remarks and data source
Marissa Res.	SW ¼ 23-3S-6W (Okawville Quad)	Marissa	.24	152	25	20	10	100	32.6	.79	
Spring Lake	SW ¼ 11-2N-9W (Monks Mound Quad)		.22	140	22	18	7	56	18.2	.60	
Forest Inn Lake	NE ¼ 36-3S-6W (Coulterville Quad)		.20	132	15	13	6	48	15.6	.54	
Grand Marais State Park	21-27-28-33-34-2N-9W (French Village Quad)	State of Ill.			8	5	208	1,040	338.0	18.90	
Freeburg Sportsmen's Club	NW ¼ 28-1S-7W (Freeburg Quad)	Freeburg Sportsmen's Club	31	200	25	20	10			.60	
Lake Christine	S ½ 11-1N-8W (O'Fallon Quad)	Private Assn.	.33	212	30	25	18	144	47.0	1.00	
Stolberg Lake	SE ¼ 28-1N-8W (O'Fallon Quad)	Home owners on shoreline	.16	100	12	10	11	88	28.7	1.32	
Midwest Mine	34-1N-9W (Millstadt Quad)	Peabody Coal Co.	1.1	700	25	22	22	264	86.0	3.8	
	SE ¼ 29-2N-7W (O'Fallon Quad)		.26	168	20	18	5	50	16.3	.36	
Beil Lake	SE ¼ 11-1S-9W (Millstadt Quad)	Charles Beil	.07	48	30	25	13	156	50.8	3.2	
Long Lake	SE ¼ 32-1S-6W (New Athens Quad)		.				5				Old oxbow lake
Cherry Lake	NE ¼ 20-2S-6W (New Athens Quad)						36				Old oxbow lake
Brushy Lake	SW ¼ 29-2S-7W (New Athens Quad)						20				Old oxbow lake
Winter Lake	SW ¼ 18-19-3S-7W (New Athens Quad)						8				Old oxbow lake
Freeburg Lake	SW ¼ 20-1S-7W (New Athens Quad)		.07	48	22	20	6	60	19.5	1.5	
	NW ¼ 35-2N-8W (O'Fallon Quad)		.19	120	15	12	9	54	17.6	.9	
Randle Lake	SW ¼ 2-1N-8W (O'Fallon Quad)				20	18	5	40	13.0		
	SE ¼ 10-1N-8W (O'Fallon Quad)		.45	288	25	22	10	80	26.0	3.33	
	NW ¼ 25-2N-7W (Lebanon Quad)						22	88	28.7		Lake formed by building levee in bottomland
Mascoutah Sportsmen's Club	NW ¼ 19-1N-6W (Lebanon Quad)	Mascoutah Sportsmen's Club					7	28	9.1		Formed by highway fill through bottomland
Scott Air Force Base	NE ¼ 11-1N-7W (Lebanon Quad)	U.S. Air Force	.23	150	18	13	11	55	17.9	1.46	
Kamper Lake	NE ¼ 7-1S-7W (Freeburg Quad)	Mrs. Anna Kamper	.07	46	23	23	5	35	11.4	1.30	
Marissa Rec. Area Assn.	NE ¼ 35-3S-6W (Coulterville Quad)	Mrs. Anna Kamper	.20	133	27	10	24	384	125.1	2.2	
Marissa Rec. Area Assn.	SE ¼ 26-3S-6W (Coulterville Quad)	Mrs. Anna Kamper	.33	209	25	18	16	192	62.5	.92	
St. Clair Anglers Assn.	NW ¼ 12-1S-9W (Millstadt Quad)	Mrs. Anna Kamper	.23	145	30	25	11	99	32.2	.91	
Biebel Lake	SE ¼ 4-2S-7W (Freeburg Quad)	Al Biebel	.26	165	25	20	18	216	70.4	1.31	
Peabody Lake	SE ¼ 15-1S-7W (Mascoutah Quad)	Peabody Coal Co.	1.32	860	20	15	24	192	62.5	.33	

prise the foundation material. Enough till is probably available on the lower left abutment for the core of the dam. Roxana loess may be used for the flanks and is available almost anywhere in the reservoir area.

Site 9-A. A potential reservoir site is available on Sparrow Creek 3 miles east and 1 mile south of Dupo. The valley walls are very steep and generally wooded, but the floodplain is fairly wide and flat and under cultivation. Most of the contributing watershed for the site drains through a tributary of Sparrow Creek cntering just upstream from the dam. The watershed of Sparrow Creek proper is covered with pot holes and would be difficult to evaluate. Development of the site to the suggested elevation would inundate a three-way township road intersection and three camp-type residences. In general, this should be a moderate cost project since agricultural use is not intensive, the man-made obstructions are minimal, and the earth fill would be quite short. Geologic conditions at the dam site are far from ideal, but construction of a dam appears to be possible. Both abutments are exposures of limestone which are partially covered by loess. Very little evidence of solution enlarged joints or bedding planes exists, but there may be solution channels farther beneath the surface. Over the limestone is a 3- to 10-foot deposit of silty clay with some angular chert fragments. Roxana loess consisting of silty clay or clayey silt overlies the previous deposit and is in turn overlain by clayey silt Peorian loess which is calcareous in its lower levels. The alluvium consists of interstratified clayey silt, fine sandy silt, and fine sand over limestone 15 to 20 feet below average floodplain level. Borrow would be difficult to obtain and would have to be selectively excavated. The silty clay should be reserved for core material and mixed with Roxana loess for the flanks. Careful testing of these materials before design is imperative. Small scale leakage through fissures in the limestone should be expected but should not reach significant proportions.

Site 9-B. If rather unfavorable geologic conditions can be overcome, a reservoir could be developed on Hickman Creek some 6 miles west of Belleville. The abutments are limestone overlain by at least 20 feet of loess. The loessial material made an examination of the limestone difficult, and the possible existence of glacial till between these materials could not be determined. Joints in the limestone have been widened by solution but appear to be filled with residual clays and silts. Water standing in pot holes on the uplands seems to confirm this opinion. The scarcity of good quality borrow is the most important problem, but if future borings locate a suitable deposit or if tests indicate that the loess is suitable the dam site should be feasible. If the site does prove geologically feasible, it should make a moderate cost development. Only one township road crosses the site and this would have to be raised only slightly. The floodplain is fairly wide and flat and is almost entirely under cultivation. There are timbered areas on the uplands for recreational development, and some clearing would be required on the valley walls. Proximity of the site to such heavily populated areas as Belleville and East St. Louis should increase its potential even against adverse conditions.

Site 10. A good potential reservoir site exists on Ogles Creek some 3.5 miles north and 1 mile east of O'Fallon. The site is very well located geographically, being within 5 miles of Troy, Collinsville, O'Fallon, and Lebanon. The watershed extends southwesterly to just west of O'Fallon and exhibits a well-developed dendritic drainage pattern with deep, steep-walled valleys. The floodplain in the vicinity of the lake is wide, fairly flat, almost entirely free from timber, and under cultivation. Development of the site would inundate two east-west roads, one north-south blacktop road and one new frame residence. Adequate depth is carried well into the upstream fingers. Geologic conditions appear to be quite good. Both abutments consist of sandy clay glacial till which is calcareous in the lower part, stiff, and contains numerous pebbles. The upper 10 to 15 feet is leached and has a slightly higher percentage of clay. The till is covered by 12 to 18 feet of loess. Alluvium consists of 6 to 8 feet of silt and clayey silt with some lenses of fine sand over silty clay with an approximate bearing strength of about 0.8 ton per square foot. This material could serve as a foundation, and a core wall of till could effectively stop leakage. Future borings would be required to test and determine the full extent of the alluvium. Borrow material of good quality is available from till deposits in both upstream abutments. Loess may be used in part on the flanks of the dam.

Site 11. A good dam site is available on the West Fork of Richland Creek 2 miles south of Millstadt. The watershed has rolling cultivated uplands sloping into a well-developed valley system with moderately steep wooded walls and a narrow floodplain which is under modest agricultural development in the lake area. The lake would have four main fingers, all with many inlets and coves providing an extremely long shoreline for a lake of this size. Only one residence would be inundated by the development although many new houses have been built on township roads near the site. One road crossing the site would be abandoned and access would be required for several residences. No serious problems are anticipated and costs should be moderate. The right abutment consists of hard shale overlain by 1.5 to 2 feet of coal containing clay seams overlain by about 7 feet of high clay content shale overlain by 2 feet of shaley limestone overlain by 15 to 20 feet of silty and sandy clay glacial till, all overlain by 5 to 10 feet of weathered loess. The left abutment is similar if not identical to the right, but 3 to 5 feet of colluvial mantle makes indentification of the stratigraphic units difficult. The alluvium consists of 8 feet of clayey silts and sands over possibly 15 feet of dirty sand and gravel. Exact depth and nature of the basal alluvium could not be determined but shale is expected to underlie the basal alluvium. Good quality borrow is available from the till deposits on both upstream abutments. The overlying loess could be used on the flanks of the dam. Leakage through the coal and limestone formations is expected to be minor.

WABASH COUNTY

The present topography of Wabash County reflects the action of the Illinoian glacier which leveled hills and deposited rock debris along with outwash of sand, gravel, and finer materials. Wind-blown silts (loess) from sediments of melted glaciers were picked up and deposited on the uplands adjacent to the valleys. Loess varies from less than 3 feet in the northwest to a maximum of 10 feet in the east near the Wabash River Valley. Half of the total area of Wabash County consists of bottomland and terrace formations deposited largely by the Wabash River on the east and Bonpas Creek on the west. The drainage is primarily by tributaries to Bonpas Creek and the Wabash River.

The bedrock consists of layers of shale, sandstone, limestone, dolomite, and chert arranged in beds one upon the other. These rock strata, which were deposited in horizontal beds, have been warped and broken, and now slope down to the west.

The level topography and the shallow nature of streams in Wabash County are not suited to reservoir development, particularly of the size considered in this study. Therefore, no sites were investigated in this county.

Existing Reservoirs in Wabash County

Reservoir name	Legal description	Owner	Watershed area (sq mi)	Watershed area (acres)	Height of dam (ft)	Depth of water at dam (ft)	Pool area (acres)	Storage capacity (ac-ft)	Storage capacity (mg)	Storage capacity (in)	Remarks and data source
Mesa Lake	NW ¼ 10-1N-13W (Sumner Quad)	Morris Kemper	.91	580	31	26	125	1,670	544.0	34.4	Data obtained from owner
Highland Hills Lake	(Sumner Quad)						7				Near Lancaster

WASHINGTON COUNTY

The bedrock in Washington County consists of layers of shale, sandstone, limestone, dolomite, and chert arranged in beds. These solid rocks were deposited as loose sediments in shallow seas, and later were buried and compacted by great heat and pressure. The horizontal layers were later warped, broken, and sheared off by glaciers.

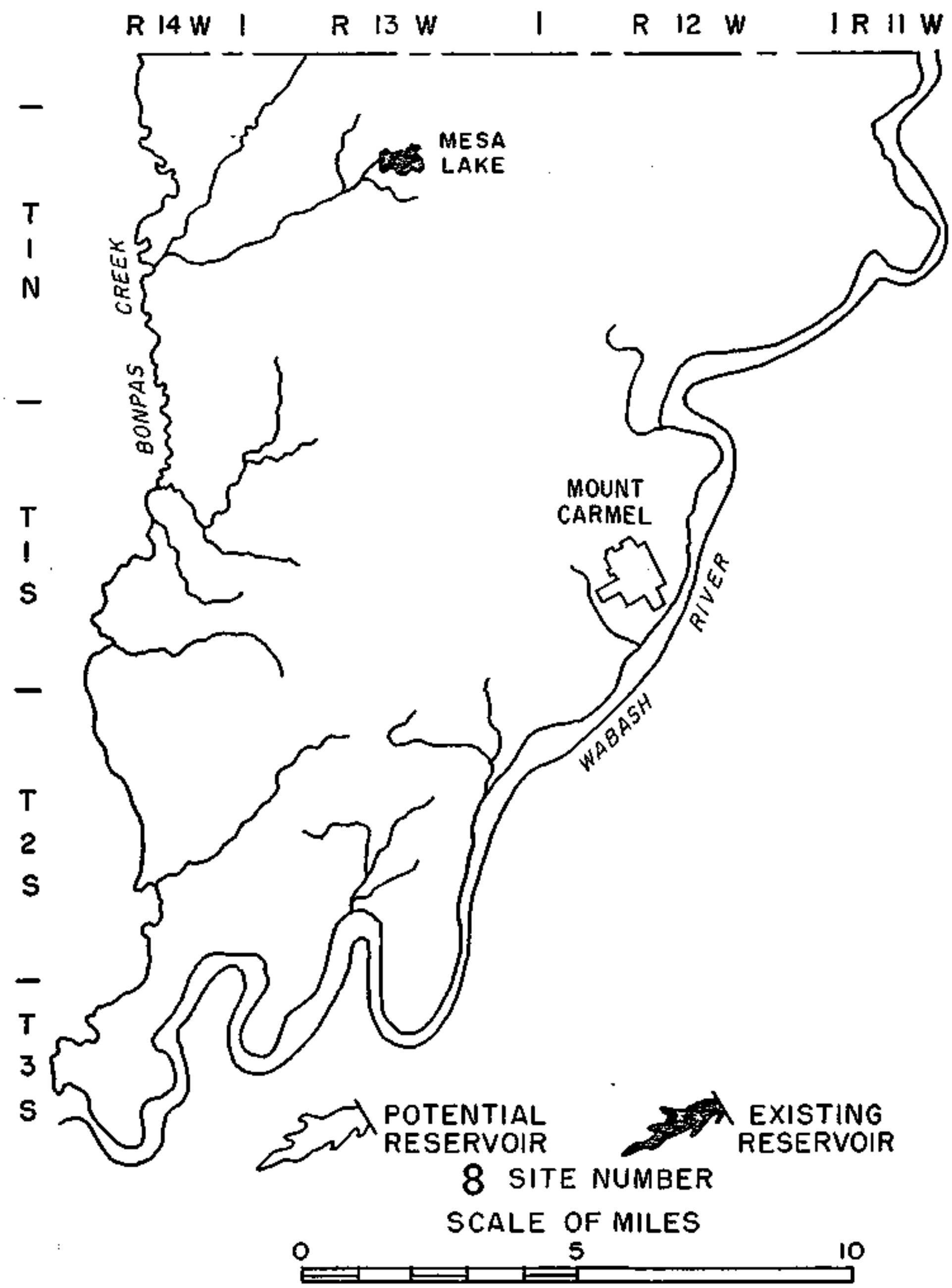
At least two great ice sheets moved over Washington County. The Illinoian, the most recent, completely buried and altered the earlier deposits. Later, wind-blown deposits of silt from sediments of melting glaciers were deposited over the uplands as dust. The thickness of this material, known as loess, varies from a minimum of 4 feet in the eastern part to a maximum of 12 feet in the western part of the county. Drainage of the greater portion of the county is through northward or westward flowing tributaries to the Kaskaskia River. About a fourth of the area drains southeast through tributaries to the Big Muddy River.

Topographic and geologic conditions in Washington County are moderately well suited to reservoir development. The results of eight feasibility studies in the county follow.

Site 4. A potential dam site exists on Plum Creek just east of the Okawville city limits. Although this site appears to be too shallow for serious consideration, a more detailed study would be required to determine the extent of shallow water. The watershed is very gently rolling and slopes gradually into the creek bed. Both the watershed and lake area are in clean tilled cultivation with timber restricted to the banks of the ereek. One gravel road across the site could be raised and another relocated. Two small frame residences might be inundated and several others are close to water level. If it is possible to develop satisfactory depth, this should be a moderately low cost structure. Geologic conditions at the site are very good. Both the right and left abutments consist of stiff silty clay glacial till overlain by 4 to 6 feet of loess on the higher gentler slopes. The same till deposit is believed to occur in the floodplain under an alluvial deposit of about 6 feet of clayey silt of about 0.7 tsf (tons per square foot bearing strength) over 3 feet of 0.5 tsf clayey silt over silty clay of about 1.0 tsf. Excellent quality borrow is available from either upstream abutment.

Site 6. A shallow reservoir could be developed on Mud Creek with the dam located 1 mile upstream from the Missouri-Illinois Railroad crossing and about 3 miles northeast of Coulterville. The watershed has rolling uplands sloping gradually into a wide shallow valley upstream but increasing in depth and steepness downstream in the vicinity of the lake. About half of the lake area is free from timber and under cultivation. Timber on the upper valley walls would provide good park de-

WABASH COUNTY



velopment areas. Two township roads crossing the site could be raised or relocated. The Missouri-Illinois Railroad crossing is probably high enough although the fill might require stabilization. If no problems occur with the railroad crossing this should be a moderately low cost development. A preliminary geologic investigation of the site indicates that the abutments are stiff shale overlain by soft, highly micareous, cross-bedded sandstone overlain by very stiff sandy clay glacial till. Alluvium consists of 8 feet of thinly stratified clayey silt and silty clay with lenses of sandy silt. Below 8 feet is at least 5 feet of homogeneous light sandy clay which is highly dispersed. It appears that this lower material may cause some piping conditions and should be thoroughly investigated prior to design. The sandstone would probably provide only slight seepage but should also be thoroughly investigated. Good quality till for borrow exists on both abutments above the sandstone.

Site 7. A dam across Beaucoup Creek about 4 miles east and 4 miles south of Nashville would back water almost 3 miles north of its confluence with Back Creek.

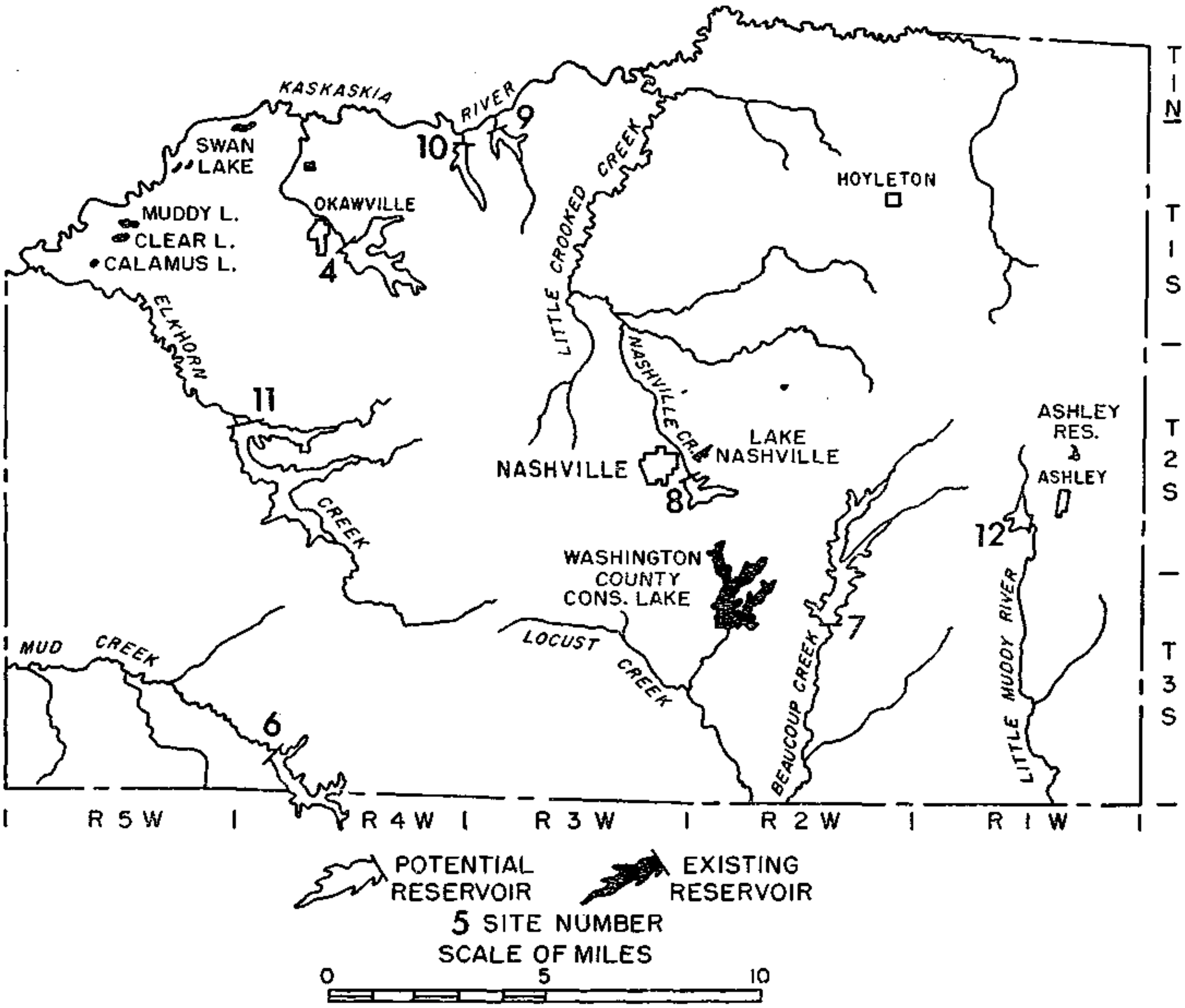
Potential Reservoirs in Washington County

Site number	Waterway location	Spill-way elevation (ft)	Pool area (acres)	Storage (ac-ft)	Storage (mg)	Watershed (sq mi)	Times filled per year	Depth at dam (ft)	Length of dam (ft)	Earth fill (cu yd)	Shoreline (mi)	Mean annual runoff (mgd)	Net yield (mgd) for given recurrence intervals: Full capacity 5 Yr	Full capacity 10 Yr	Full capacity 25 Yr	Full capacity 40 Yr	Half capacity 5 Yr	Half capacity 10 Yr	Half capacity 25 Yr	Half capacity 40 Yr
4	Plum Creek NW ¼ SE ¼ 21-1S-4W (Okawville Quad)	440	750	5,750	1,873	11.2	1.0	23	500	60,500	11	5.06	4.2	3.8	2.5	2.4	3.2	1.7	1.5	1.0
6	Mud Creek NW corner 32-3S-4W (Coulterville Quad)	480	600	4,200	1,368	14.0	2.1	21	1,000	111,200	9	7.84	5.1	3.2	2.0	2.0	2.1	1.6	.7	.5
7	Beaucoup Creek SW ¼ NE ¼ 10-3S-2W (Nashville Quad)	500	1,020	13,600	4,430	19.7	.7	40	950	247,100	18	8.89	7.8	7.8	5.7	5.1	7.0	4.5	3.5	2.9
8	Nashville Creek NW ¼ SW ¼ 19-2S-2W (Nashville Quad)	500	199	1,590	518	6.3	2.0	24	850	112,200	4	2.84	2.0	1.3	1.1	.9	.9	.7	.3	.3
9	Buckingham Branch SE ¼ NE ¼ 6-1S-3W (Nashville Quad)	430	114	1,140	371	2.8	1.2	30	1,000	179,000	3	1.26	1.2	.8	.6	.5	.7	.4	.3	.2
10	Trib. Kaskaskia River SE ¼ SE ¼ 1-1S-4W (Nashville Quad)	430	137	1,370	446	4.4	1.6	30	800	145,400	3	1.99	1.6	1.1	.8	.7	.8	.6	.5	.3
11	Elkhorn Creek NW ¼ NW ¼ 18-2S-4W (Okawville Quad)	440	1,460	13,140	4,281	52.2	2.5	27	1,200	182,700	17	29.12	17.5	11.1	8.7	8.2	7.3	5.8	3.1	2.6
12	Trib. Little Muddy River NE ¼ SE ¼ 28-2S-1W (Ashley Quad)	530	134	800	261	5.0	3.2	18	600	56,300	3	2.26	1.0	.8	.5	.5	.4	.4	.2	.1

Existing Reservoirs in Washington County

Reservoir name	Legal description	Owner	Watershed area (sq mi)	Watershed area (acres)	Height of dam (ft)	Depth of water at dam (ft)	Pool area (acres)	Storage capacity (ac-ft)	Storage capacity (mg)	Storage capacity (in)	Remarks and data source
Ashley Res.	SW ¼ 14-2S-1W (Ashley Quad)	Ashley (C)	1.24	796	20	15	18	138	45.0	2.08	From sed. survey 1954
Muddy Lake	NW ¼ 22-1S-5W (Okawville Quad)	Richard Kampe	0.02	10		6	15				River bottom slough
Clear Lake	NW ¼ 22-1S-5W (Okawville Quad)	Wendell Scanlon	0.02	10			15				River bottom slough
Calamus Lake	21-28-1S-5W (Okawville Quad)	Venedy Hunting Club	0.07	45			20				River bottom slough, near Venedy
Swan Lake	W ½ 6-1S-4W (Okawville Quad)		0.06	38			30				River bottom slough, near Okawville
Halfmoon Lake	11-1S-5W (Okawville Quad)		0.02	10			5				River bottom slough
Washington Lake	SW ¼ NW ¼ 21-1S-4W (Okawville Quad)	Bert Cohn	0.02	10	15	12	5				
Lake Nashville	N ½ 19-2S-2W (Nashville Quad)	Nashville (C)	1.39	890	22	17	40	288	93.8	3.88	From sed. survey 1954
Lanes Lake	NW ¼ NE ¼ 3-3S-3W (Nashville Quad)	Kenneth Lane	0.10	65	18	15	5				
Washington Lake	N ½ 18-3S-2W (Nashville Quad)	State of Ill.	10.62	6,800		25	335	3,400	1,107.0	6.00	From Dept. of Cons.
I.C.R.R. Res.	SE ¼ NW ¼ 21-3S-1W (Ashley Quad)	Southern Illinois Synod, United Church of Christ	0.28	180	20	18	15				
Luehder's Lake	NE ¼ NW ¼ 7-1S-4W (Okawville Quad)	Herb Luehder	0.25	160	24	20	7				
Maroon's Lake	NW ¼ NW ¼ 27-1N-1W (Centralia Quad)	John Maroon	0.25	160	17	12	12				
Haier's Lake	NW ¼ SW ¼ 8-1S-4W (Okawville Quad)	Fred Haier	0.40	260	24	20	13				
Habbe's Lake	NE ¼ NW ¼ 1-3S-3W (Nashville Quad)	Ralph Habbe	0.25	160	25	22	6				
Morris Lake	SE ¼ NW ¼ 15-1S-3W (Nashville Quad)	Jack Morris	0.47	300	18	15	10				
Huegely's Lake	NE ¼ NW ¼ 9-2S-2W (Nashville Quad)	J. W. Huegely	0.10	60	22	20	7				
Richview Farms Lake	NE ¼ NE ¼ 1-2S-1W (Ashley Quad)	Frank Martoccio	0.12	80	15	12	5				
Richview Farms Lake	SE ¼ NW ¼ 1-2S-1W (Ashley Quad)	Frank Martoccio	0.05	30	18	15	5				

WASHINGTON COUNTY



The watershed exhibits a very small percentage of rolling uplands since most of its area is composed of a well-developed dendritic drainage pattern; steep-walled valleys provide rapid drainage and cover most of the area. There are four township road crossings, the most important of which is a rebuilt two-lane gravel road that would have to be relocated. The only residence located within the lake area is very old and has been abandoned. Most of the floodplain is under cultivation but is subject to frequent overflow and does not appear to be well drained. Many of the uplands near the site are wooded, providing an excellent recreational potential. The lack of man-made obstructions and the relatively low level of agricultural development should make relocation and acquisition costs low. Geologically the site appears feasible from a superficial examination, although a program of borings and testing would be required. The depth and strength of the alluvium would be the primary geologic question. Hand auger borings encountered 2 to 3 feet of clayey silt over 7 feet of sandy silt over 5 feet of clayey sand. The abutments and valley walls are stiff silty and sandy clay glacial till. This material is quite impervious and would provide excellent borrow near either abutment.

Site 8. A reservoir could be developed on Nashville Creek just southeast of the Nashville city limits. Most of the lake area is free from timber but there are wooded areas on the nearby uplands. The watershed consists of rolling uplands sloping into moderately steep-walled narrow valleys which widen considerably in the lake area. A township road crossing several western fingers of the site would be improved by raising or relocating around the fingers. No residences would be inundated, but two are close to water level. This should be a moderately low cost structure although the degree of hazard downstream is high. A surficial geologic examination shows the site to be favorable, although borings and testing are imperative in the floodplain. The alluvium is deep and consolidation may be a problem. Materials located in the floodplain by hand augering include 2 feet of clayey silt over 7 to 8 feet of 0.5 tsf silty clay over at least 2 feet of 0.8 to 1.0 tsf clayey sand. A core wall into the silty clay would apparently stop leakage, but the channel should be blanketed upstream. The abutments are both sandy clay glacial till which would provide a good source of borrow upstream on either valley wall.

Site 9. A good small reservoir site is available on Buckingham Branch 4 miles east and 2.5 miles north of Okawville. Cover in the lake area consists of pasture and scattered timber. No residences lie within the lake area but two are close. A township road across the site would probably be relocated across or downstream from the structure. Although the fill is somewhat long for a lake of this size, project costs should be moderately low. The abutments and valley walls are composed of stiff sandy clay glacial till with some loessial overlay on the higher portions. The alluvium contains 2 feet of clayey silt over at least 8 feet of thinly interstratified clayey sand, silty sand, sandy clay, and lenses of clean sand. The alluvium is not expected to be over 18 feet deep and is probably underlain by till. Future test borings would be required to determine the exact nature of the deeper alluvium. Glacial till from the upstream reservoir abutments is excellent borrow material. The dam would have to be constructed so as to be unaffected by backwater from the Kaskaskia River during flood stages.

Site 10. A good reservoir site is available on a tributary of the Kaskaskia River about 3 miles east and 2 miles north of Okawville. The watershed exhibits rolling, cultivated uplands sloping into a wooded V-shaped valley. No road nor residence relocations would be involved in the development. A problem would exist with a private lake of about 40 acres on a finger of the proposed site. If the fill for the existing site could not endure the backwater that would be imposed, an alternate site is available just upstream from the existing site. Cover in the lake area is nearly all timber but includes a small portion of pasture. If problems with the existing fill can be resolved, this should make a low cost project. This appears to be an excellent site geologically. The abutments consist of stiff sandy clay glacial till overlain on the gentler higher slopes by 5 feet of weathered loess. Till is believed to underlie the alluvial floodplain at relatively shallow depths. The glacial till described in the abutments should make an excellent borrow material and is available in quantity near the dam site.

Site 11. A possible dam site exists at the confluence of Weaver and Elkhorn Creeks 4 miles south and 2 miles west of Okawville. The reservoir produced by a dam in this location might be too shallow for serious consideration, but a careful examination would be required before this determination could be made. The watershed has gently rolling uplands sloping into wide V-shaped valleys. Only about half of the lake area is free from timber and under agricultural development. One two-lane blacktop should be raised in two locations and another abandoned. U. S. Route 460 might have to be raised slightly, but together with Illinois Route 153 provides excellent access to the lake. No residences nor major obstructions would be inundated. Testing of the alluvium would be imperative because it may consolidate excessively upon loading, but the site seems to be geologically feasible. The left abutment is a low ridge that extends into the valley and consists entirely of stiff silty or sandy clay glacial till which is highly leached and quite impermeable. The right abutment is similar to the left except that the till contains less intermixed sand. "Weathered loess with well-developed "claypan" subsoil occurs on uplands bordering the valley. Alluvium at the dam site consists of 8 to 12 feet of 0.6 tsf clayey silt over at least 5 feet of 0.8 to 1.0 tsf silty clay. Clay till probably occurs at a depth of about 20 feet. Borrow of stiff clay till is available from both upstream abutments.

Site 12. A good small reservoir could be developed on the headwaters of the Little Muddy River by construction of a dam just southwest of the Ashley city limits. The watershed shows cultivated uplands that slope uniformly into a moderately deep wooded valley. Two problems may be encountered. A cemetery a half mile west of Ashley would be very close to water level, and U. S. Route 460 crosses the valley where water would be about 5 feet deep. Relocation or protection requirements on either the highway or cemetery would raise project costs which otherwise appear to be quite low. Township roads surrounding the lake make access to the site very good. A preliminary geologic investigation indicates that conditions at the dam site are good. The abutments are composed of stiff silty clay glacial till which contains about 10 percent intermixed sand and pebbles. The till is relatively impermeable and no lenses of coarse material were encountered. Good quality borrow may be obtained in quantity adjacent to either abutment. Alluvium consists of 2 feet of clayey silt over 4 to 5 feet of thinly interstratified silty clay, clayey silt, and silty fine sand over 1 to 2 feet of coarse sand over at least 5 feet of 1.0 tsf silty clay. Till was not reached by borings, but should be expected at about a depth of 15 feet. A core wall into the silty clay should be sufficient to stop leakage beneath the dam.

The bedrock in Wayne County consists of sedimentary layers of shale, sandstone, limestone, dolomite, and chert arranged in beds one upon the other. Erosion, tilting, and breaking eventually made these flat surfaces rough and broken so that hills and valleys were formed.

The glacial period covered the county with at least one glacier, the Illinoian, which managed to level off the hills, fill the valleys with glacial debris, and create a broad undulating ridge or moraine of outwash and till. This heterogeneous gravelly and clayey mass varies in thickness from 10 to more than 100 feet. Later wind-blown silts from sedimentary deposits were blown upon the uplands as loess. Today's accumulation varies from 1 to 3 feet except where it has been eroded. Wayne County is drained by numerous tributaries of the Little Wabash River and its principal tributary, Skillet Fork Creek.

The topography in Wayne County does not lend itself to abundant reservoir sites. The stream valleys are usually wide and shallow. However, the results of four site studies are presented here.

Site 1. A potential reservoir site exists about 5 miles southwest of Xenia on Nickolson Creek, a tributary of Skillet Fork. The watershed has gently rolling uplands, heavily dissected valley borders, and rather narrow floodplains. An 18-inch high pressure gas pipeline crosses the reservoir area in the upper reaches. There are no known residences or buildings in the reservoir area. Only dirt roads cross the reservoir and could be abandoned. Although most of the floodplain is free from timber, it is land of low productivity. There is a considerable amount of light timber on the stream banks and along the proposed reservoir shoreline. Land acquisition cost should be low. No bedrock was exposed at the dam site nor in the reservoir area. The unconsolidated material is Illinoian glacial till consisting mostly of yellowish brown silty clay which is stiff and contains some sand and pebbles. The alluvium is predominantly silty and clayey in the upper 8 feet and sandy in the lower part. Compaction increases downward. The alluvial deposits could not be penetrated with manual equipment, but it seems that the lower alluvium should be intercepted by an impermeable core wall. Further subsurface investigations may reveal that the permeable strata are adequately blanketed by the upper alluvium. This would make a rather large reservoir with average project cost.

Site 2. The Pond Creek reservoir site is located 2 miles east of Fairfield on a 2 by 1.5 mile rectangular watershed. The reservoir area is almost entirely cleared and in row crops or pasture. There are a number of oil wells in the reservoir area as well as a frame bungalow and a two-lane gravel road. The length of fill required for the dam is excessive but this is offset by the desirable depth and storage which is somewhat uncommon for this part of the state. The storage capacity/inflow ratio indicates the reservoir would fill in one and two-thirds years. The dam site foundation is probably shale at an estimated depth of 18 feet. The dam site abutments are long gradual slopes of glacial till covered with developed soil. The alluvium consists of 8 feet of stratified silty clay with a small percentage of clayey silt and silt sand over 4 to 6 feet of stiff gray sandy clay which could be weathered till. Land acquisition would be costly because of its present high value use. The construction costs would be high on the basis of the size of structure required. This is an excellent dam site for this part of the state and would make a good reservoir, but the project costs would be high.

Site 3. A potential reservoir site exists on Crooked Creek, a tributary of Skillet Fork 4.5 miles north and 1 mile west of Wayne City. The watershed has rolling uplands with long gradual slopes into broad valleys. The floodplains are wide and almost level. The reservoir area is cleared, except for one 40-acre tract and along the creek bed and valley walls. Land acquisition, easements, rights of way, and relocations would be high since two frame residences and three gravel roads would be inundated by the proposed reservoir. The storage capacity/inflow ratio indicates that the reservoir would fill about one and a fourth times per year. The depth to bedrock and type of bedrock were not determined. The unconsolidated material is Illinoian glacial till and outwash. The till is variegated yellowish brown and brownish gray sandy clay grading to gray in the unweathered zone. Outwash is silty and sandy. The alluvium consists of 5 feet of light grayish brown to light gray clayey silt over 3 feet of brownish gray silty clay over till. The silty and sandy deposits of glacial outwash occur mostly halfway up in both abutments. This deposit appears to be most prevalent on the left abutment. Although the dam site abutments seem to be composed predominantly of sandy clay glacial till, it is quite possible that a permeable layer could have been missed by a manual boring. For this reason, a thorough subsurface investigation should be made prior to design. The upper silty alluvium should be intercepted by a core wall of impermeable material to prevent leakage and a possibility of piping. This should make a good reservoir, but at a moderately high cost.

Site 4. A potential site exists on a tributary of Fourmile Creek, 3 miles southwest of Keenes and 3 miles southeast of Bluford. The watershed's gently rolling uplands have short, steep breaks into very broad and shallow valleys. There are no roads nor homes involved in the reservoir area. The reservoir site is in pasture or row crops except along the timbered creek banks. The depth to bedrock and type of bedrock are not known. The unconsolidated material is Illinoian glacial till composed of silty and sandy clay, mostly medium reddish or yellowish brown but gray below the permanent water table. The alluvium consists of 2 feet of clayey silt over 5 feet of variegated light and medium brown silty clay over 1 to 8 feet of brown clayey sand over till. Several borings in the floodplain indicated that the till surface underlying the alluvium is very irregular. This phenomenon may be the result of an original deposition but more logically is due to erosion by meandering channels. The upper silty clay deposit seems to be uniform, but the basal sandy deposit ranges from 1 to 8 feet thick. The lower alluvial sand is in contact with the stream's bed load, and therefore would be in contact with impounded reservoir water. To prevent leakage and consequent piping, an impermeable core wall should be constructed through the alluvium and bonded to the underlying till. An alternative solution would be to back-fill the channel at least 500 feet upstream. This should make a good reservoir at a normal project cost.

Potential Reservoirs in Wayne County

Site number	Waterway location	Spillway elevation (ft)	Pool area (acres)	Storage (ac-ft)	Storage (mg)	Watershed (sq mi)	Times filled per year	Depth at dam (ft)	Length of dam (ft)	Earth fill (cu yd)	Shoreline (mi)	Mean annual runoff (mgd)	Net yield (mgd) for given recurrence intervals: Full capacity 5 Yr	Full capacity 10 Yr	Full capacity 25 Yr	Full capacity 40 Yr	Half capacity 5 Yr	Half capacity 10 Yr	Half capacity 25 Yr	Half capacity 40 Yr
1	Nickolson Creek NW ¼ NW ¼ 31-2N-4E (Xenia Quad)	500	820	12,000	3,910	13.6	.7	44	900	258,200	18	7.15	6.5	6.5	4.8	4.2	5.1	3.7	3.0	2.7
2	Pond Creek SE ¼ NW ¼ 4-2S-8E (Fairfield Quad)	440	335	3,350	1,091	3.1	.5	30	1,800	298,300	5	1.63	1.3	1.3	1.1	1.0	1.2	.8	.8	.5
3	Crooked Creek SW ¼ NW ¼ 25-1S-5E (Wayne City Quad)	430	375	3,400	1,107	6.5	1.1	27	1,200	178,500	6	3.42	2.9	2.2	1.8	1.6	1.8	1.0	.7	.5
4	Trib. Fourmile Creek SE ¼ SE ¼ 4-30-2S-5E (Wayne City Quad)	460	130	870	283	3.1	2.1	20	900	93,600	3	1.63	1.0	.6	.5	.4	.4	.3	.2	.1
Sites partially in Wayne County (See Clay County for description)																				
7	Brush Creek NE ¼ SE ¼ 14-2N-5E	500	125	1,040	389	2.4	1.4	25	600	81,600	6	1.26	.9	.7	.6	.5	.6	.3	.2	.1

Existing Reservoirs in Wayne County

Reservoir name	Legal description	Owner	Watershed area (sq mi)	Watershed area (acres)	Height of dam (ft)	Depth of water at dam (ft)	Pool area (acres)	Storage capacity (ac-ft)	Storage capacity (mg)	Storage capacity (in)	Remarks and data source
Steiner Lake	NW ¼ 33-1S-8E (Fairfield Quad)	A. I. Steiner	0.31	197	18	14	9	49	16.0	2.96	2 miles northeast of Fairfield
Lake Johnsonville	SE ¼ 12-1N-5E (Xenia Quad)	State of Ill.	7.15	4,570	26	18	194	1,530	498.5	4.02	From Dept. of Cons.
Fairfield Res. (old)	SW ¼ 31-1S-8E (Fairfield Quad)	Fairfield (C)	0.53	340	16	12	12				Near Fairfield
Maple Leaf Sportsmen's Club	SE ¼ 7-1N-8E (Flora Quad)	Enterprise Sportsmen's Club	.20	125	25	21	12				Near Enterprise
Dry Fork Sportsmen's Club	NW ¼ 25-1N-6E (Fairfield Quad)	Wayne Bundy	.10	65	15	12	6				Near Cisne
Briar Patch Club	NW ¼ 2-3S-8E (Fairfield Quad)	Ellis Shaw	.19	120	22	18	19				Near Burnt Prairie
Fairfield Country Club	SE ¼ 36-1S-7E (Fairfield Quad)	Fairfield Country Club	.19	120	12	9	6				Near Fairfield
Ed Cox	SE ¼ 30-2S-8E (Fairfield Quad)	Ed Cox	.50	320	17	14	13				
George Cullom	SW ¼ 27-1S-8E (Fairfield Quad)	George Cullom	.11	70	20	16	7	35	11.4	5.96	Near Fairfield
Dr. H. B. Warren	SE ¼ 33-1N-5E (Wayne City Quad)	H. B. Warren	.10	65	20	16	6	37	12.0	6.94	
Carl Robinson	NW ¼ 1-1N-8E (Flora Quad)	Carl Robinson	.34	210	13	10	6	7			
Milner Lake	SE ¼ 25-1N-5E (Wayne City Quad)	John Milner	.11	70	30	26	7				
Bill Williamson	NE ¼ 22-1N-6E (Xenia Quad)	Bill Williamson	.39	250	20	17	7				
Shady Lake Club	SW ¼ 30-1S-8E (Fairfield Quad)	Shady Lake Club	.12	75	14	11	7				Near Fairfield

WAYNE COUNTY