



Region Fourteen



Clark, Floyd, Harrison, Scott, and Washington Counties, located in the southwestern corner of Indiana, form Region Fourteen. The region contains approximately 1,720 square miles and is bounded by Jackson and Jennings Counties to the north; Jefferson County to the east; the Ohio River to the south; and Crawford, Orange, and Lawrence Counties to the west, as shown in Figure 239.

The 1975 population was 202,200. The official Indiana Population Projections indicate the region's population may increase by thirty-nine percent by the year 2000. The 1975 population and the projections for each county are tabulated below.

Table 191
The 1975 and projected populations for Region 14.

County	1975	1980	1990	2000
Clark	81,700	88,500	103,600	119,100
Floyd	58,100	60,800	66,000	70,100
Harrison	23,600	27,000	33,800	41,300
Scott	18,900	20,700	24,100	27,100
Washington	19,900	20,600	22,200	24,000
Total	202,200	217,600	249,700	281,600

The major urban areas are Salem in Washington County; Scottsburg in Scott County; Charlestown, Clarksville, and Jeffersonville in Clark County; and New Albany in Floyd County. The New Albany and Jeffersonville area has the region's highest concentration of population.

Agriculture is the dominant land use comprising more than fifty percent of the Region. Approximately

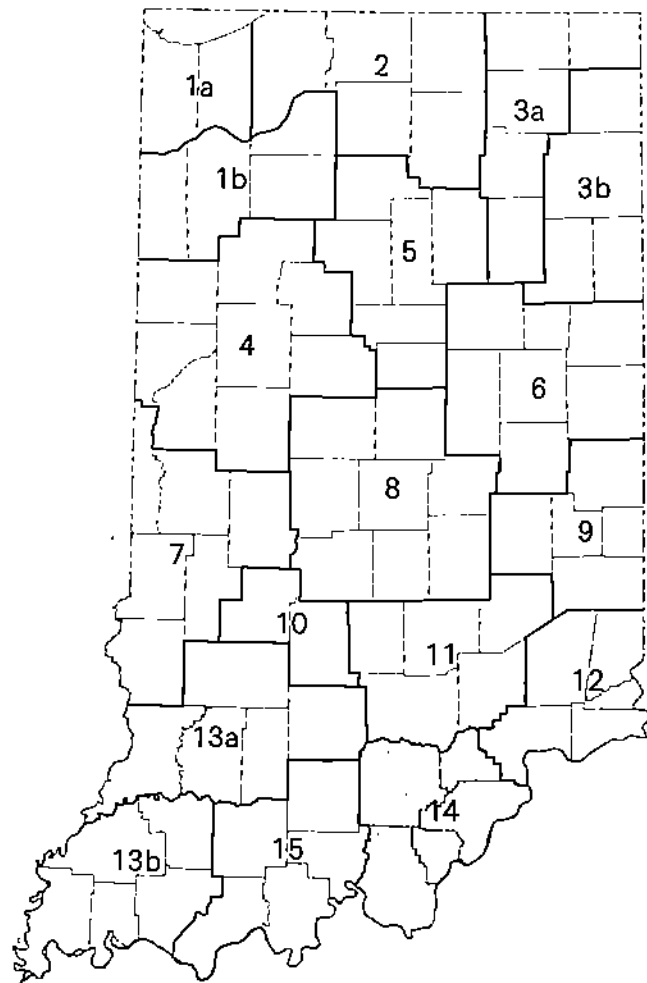


Figure 239
Map of Indiana showing the location of Region Fourteen.

forty percent of the land is forested while the remaining ten percent is devoted to urban and miscellaneous uses.

Manufacturing employs approximately thirty-nine percent of the work force within the region and the wholesale and retail trade employs about thirty-one percent. Other employers include construction, transportation, communication, finance, agriculture, and government. Approximately seventy-five percent of the region's employment is in Clark and Floyd Counties. Louisville, Kentucky, located directly across the Ohio River from New Albany and Jeffersonville, is a major center of employment.

The topography is quite varied, ranging from the high rolling knobs and rugged hills of Floyd, Clark, and Scott Counties to the sink-hole dotted limestone plain of Harrison and Washington Counties. To the east, the glaciated portions of Clark and Scott Counties are more subdued, and flat lakebed deposits of clay and silt are present in much of northwestern Scott County.

Average annual precipitation is approximately 44.0 inches, varying from a high of 4.9 inches in March to a low in October of 2.5 inches. Of the 44.0 inches received yearly, approximately 16.0 inches appear as streamflow while 28.0 inches are consumed through evapotranspiration.

Average temperatures range from 33°F. in January to 78°F. in July. The average annual temperature is 56°F. Information from Louisville, Kentucky indicates that the prevailing wind is from the south at 8.4 miles per hour.

THE WATER RESOURCE

Ground Water

Much of the region occurs within the "driftless" portion of Indiana which was untouched by continental glaciation. Glacial deposits are present in portions of Clark and Scott Counties and flat lakebed deposits of clay and silt are present in much of northwestern Scott County.

Beneath the glacial deposits and surficial overburden of the eastern portion of the region are a variety of bedrock formations. Alternating shale and limestone units are present near the Ohio River in eastern Clark County. These units are covered by dolomitic limestones, black carbonaceous shale, and finally by the tight shales and siltstones of the Borden Group, which forms the "knobs" areas. In Harrison and Washington Counties, thick deposits of limestone are present which are locally capped by shale and sandstone.

The availability of ground water is associated with the nature and type of aquifer materials present in a given area. In this region, there is a pronounced var-

iability in ground-water occurrence, as shown in Figure 240.

Ground-water availability is quite limited in much of the region with a substantial number of "dry holes" being reported in the eastern portions of Scott, Clark, and Floyd Counties. Locally, domestic supplies of water, less than ten gallons-per-minute (gpm), are available from the limestone units. In the western portion of this region, where thicker limestone units are present, well yields are greater and more consistent. Some areas in eastern Washington County are capable of producing over 100 gpm from large diameter wells. Above average yields are also possible from the limestone aquifer system in the Blue River valley of Harrison County.

Major ground-water sources occur in the thick deposits of sand and gravel in the Ohio River valley. Wells commonly yield in excess of 1,000 gpm. A locally anomalous area is present near New Washington where a small sand and gravel deposit is capable of yielding up to 200 gpm.

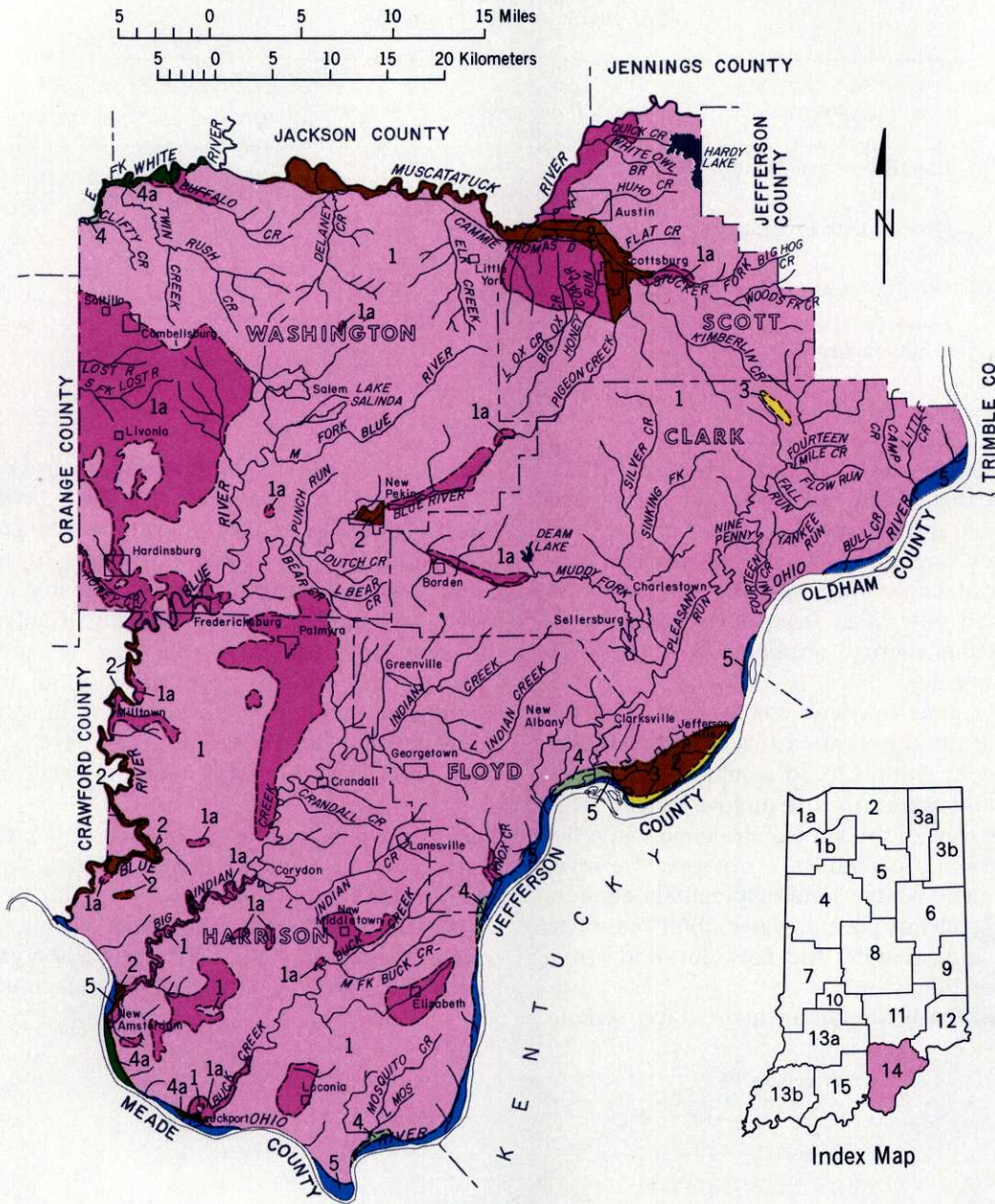
Water quality in the Ohio River valley sand and gravel deposits is generally good, with hardness levels ranging from 240 to 320 parts-per-million (ppm). Manganese levels in Sellersburg, Charlestown, and Jeffersonville may be sufficiently high to require some form of treatment or removal. Above average nitrate levels occur in Ohio River deposits. Occasional wells in Sellersburg exhibit nitrate levels around 6.0 ppm.

In a number of localities away from the Ohio River valley, water quality is quite questionable and mineralized and "sulfurous" waters are frequently encountered. In the eastern portions of the area mineralized waters are commonly associated with limestone formations, and hydrogen sulfide is present in aquifers overlain by the New Albany shale in Scott and Clark Counties. In Harrison and Washington Counties high hardness and sulfate levels are present near Ramsey and Campbellsburg.

Surface Water

Streamflow Region Fourteen is drained generally from the northeast to the southwest. The Ohio River and the Blue River flow to the southwest. Flowing from east to west is the Muscatatuck River which is a tributary of the East Fork of the White River.

The seven day, once in ten year (Q7-10), one day, once in thirty year, and the average annual flow in million-gallons-per-day (mgd) for streams with gaging stations within or near the region are presented in Table 192.



POTENTIAL YIELD

<p>1 10 gallons per minute</p> <p>1a 50 gallons per minute</p> <p>2 100 gallons per minute</p> <p>3 200 gallons per minute</p>	<p>4 400 gallons per minute</p> <p>4a 600 gallons per minute</p> <p>5 1000 gallons per minute or more</p>
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Figure 240
 Map of Region Fourteen showing the general location and potential yield of ground water from properly constructed large diameter wells.

Table 192
Flow characteristics of streams.

<i>Stream</i>	<i>Drainage Area (square miles)</i>	<i>Million-Gallons-Per-Day</i>		
		<i>Average Annual</i>	<i>Q7-10</i>	<i>Q1-30</i>
Blue River near White Cloud	476	400	8.4	6.2
Muscatatuck River near Austin	359	250	0.6	0.1
Ohio River at Louisville	91,170	113,600	8,240.0	na
Silver Creek near Sellersburg	189	140	0	0

na: not available.

Analysis of the low-flow characteristics of surface streams within the region indicates that the largest and most reliable streamflows are those in the Ohio River. The seven day, once in ten year low flows for the Ohio River at Louisville reveal that the river will have a sustained flow of at least 53 billion-gallons-per-day, while the average annual flow exceeds 73 billion-gallons-per-day.

The generally poor low-flow characteristics of the other streams in the region are a reflection of minimal ground-water contribution to streamflow. The contribution of ground water to streamflow ranges from about thirty percent of the annual streamflow in a dry year to about twenty percent in a wet year. However the Blue River near White Cloud may contain aquifers that provide significant ground-water contribution to streamflow as indicated by the flow duration curve shown in Figure 241.

To verify this, the technique of hydrograph separa-

tion was applied to three annual hydrographs at the gaging station, representing "dry," "average," and "wet" years. The results indicate that the ground-water contribution to streamflow amounts to seventy-two, sixty-four, and thirty-two percent for dry, average, and wet years, respectively. Conversely, from twenty-eight to sixty-eight percent of the flow, depending on the year, is due directly to surface runoff from runoff-producing precipitation events or from snowmelt. The Blue River near White Cloud will have a dependable flow of at least 20.1 mgd, ninety percent of the time.

Lakes The lakes that are at least 50.0 acres in size or have a storage capacity of 32.5 million gallons or more are presented in Table 193, and are located on Figure 242. These thirty-four lakes have a combined surface area of approximately 3,760 acres and a gross storage capacity in excess of 8,400 million gallons.

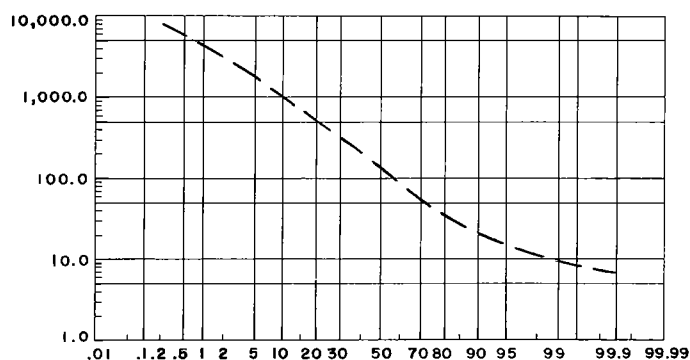


Figure 241
The flow duration curve for the Big Blue River near White Cloud.

Table 193
Lakes at least 50.0 acres in size or with a storage capacity of
32.5 million gallons or more.

<i>Lake Number</i>	<i>Lake Name</i>	<i>Drainage Area (square miles)</i>	<i>Surface Area (acres)</i>	<i>Gross Storage (million gallons)</i>
1	Delaney Creek Structure No. 1	3.00	27.3	71
2	Delaney Creek Structure No. 2	2.34	25.0	68
3	Elk Creek Structure No. 2	1.21	15.0	35
4	Elk Creek Structure No. 6	0.61	8.0	34
5	Elk Creek Structure No. 9	2.45	47.5	168
6	John Hay Lake	na	na	993
7	Lake Salinda	5.50	85.0	335
8	Palmyra Lake	na	8.0	35
9	Peek-A-Boo Lake	na	na	86
10	Twin Rush Creek Structure No. 3	4.69	14.8	36
11	Arthur S. Klingman Lake	0.12	5.0	37
12	David Garriott Lake	na	12.0	55
13	Hamilton & Rilden Lake	na	12.0	55
14	Lake Hardy	12.00	na	3,897
15	Leroy Smith Lake	na	15.0	48
16	Marysville Lake	7.11	23.0	89
17	Pine Lake	na	16.0	52
18	Scottsburg Reservoir	3.12	1,250.0	194
19	Stucker Fork Structure No. 5	11.20	30.0	33
20	Stucker Fork Structure No. 9	5.69	37.0	72
21	Thomas J. Miller Lake	0.63	15.5	62
22	Borden Reservoir	na	na	145
23	Country Lake	na	14.0	78
24	Deam Lake		1,890.0	928
25	Lake Hideaway	na	22.0	58
26	Schlamm Lake	na	19.0	130
27	Southern Hills Lake	na	52.5	260
28	Stumbler Lake	na	9.0	52
29	Buffalo Trace Lake	0.55	29.4	52
30	Corydon Water Works Dam No. 2	148.00	38.0	38
31	Lanesville Reservoir	0.65	13.5	42
32	St. Peters Lake	na	13.0	65
33	Georgetown Lake	na	10.7	38
34	Mt. St. Francis Proseminary Lake	na	11.0	130

na: not available.

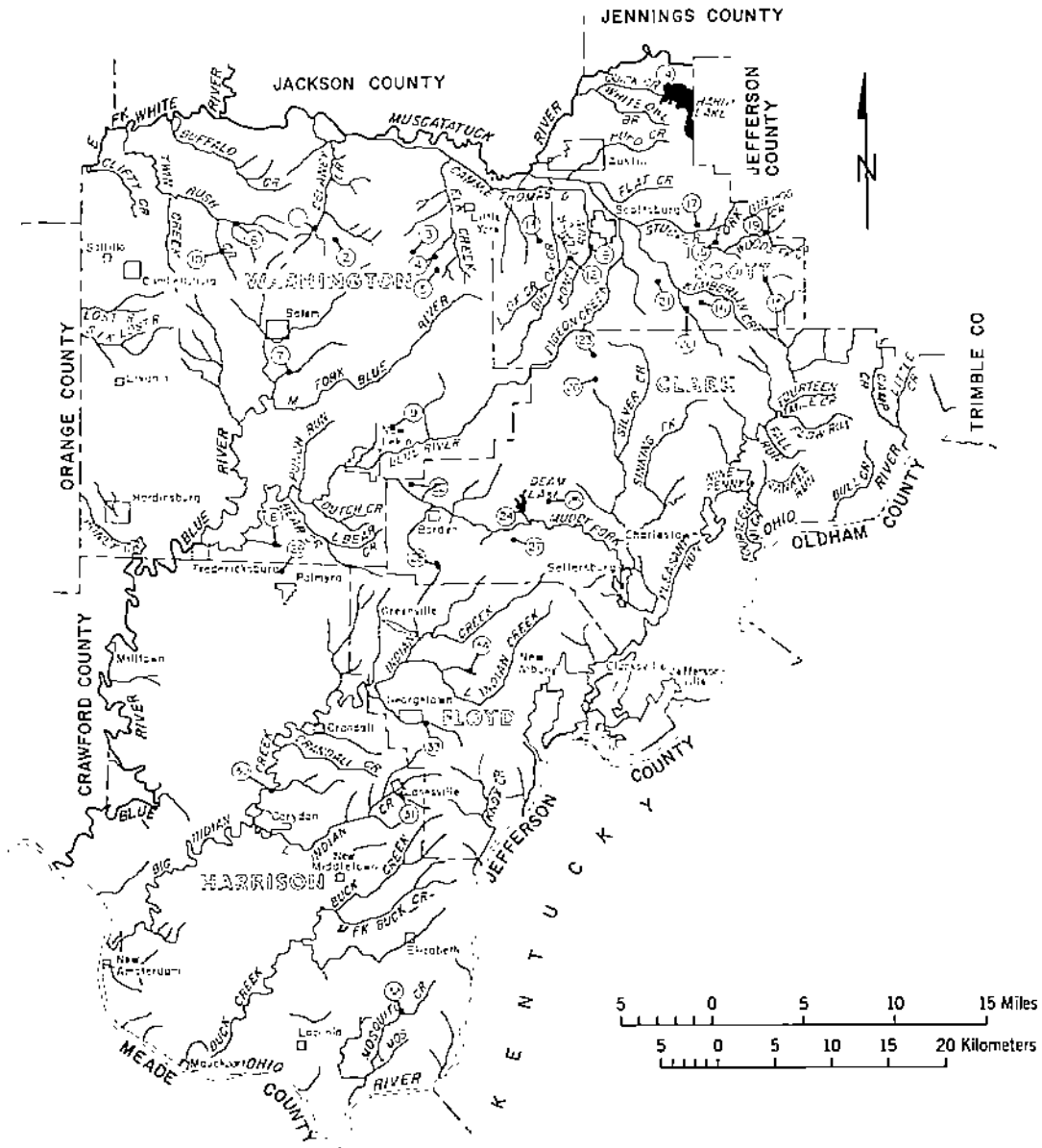


Figure 242
 Map of Region Fourteen showing the location of lakes that are at least 50.0 acres in size or with a storage capacity of 32.5 million gallons or more.

UTILIZATION OF THE WATER RESOURCE

Instream Uses

The supply and demand analysis for recreational uses of water by the residents of Region Fourteen is

presented in Table 194. The existing supply for recreational activity is expressed as a percentage of the demand. Therefore, when this percentage exceeds one hundred the supply exceeds the demand. Conversely, when the supply is less than one hundred the supply is less than the projected demand.

Table 194
Outdoor recreation demand and supply analysis.

Activity	Percent of Population Participating	Density Guidelines	Approximate Supply	Existing Supply as a Percentage of Projected Demand		
				1980	1990	2000
Boating	23	19.6 boats/acre/year	14,500 acres ^a	100+	100+	100+
Waterskiing	8	34.4 skiers/acre/year	12,000 acres ^b	100+	100+	100+
Canoeing	5	585 canoes/mile/year	104 miles	100+	100+	100+
Swimming	7	76,600 swimmers/acre/year	0 acres	0	0	0
Ice-Skating	38	6,678 skaters/acre/year	7 acres ^c	54	54	50
Fishing	52	66 persons/acre/year	25,700 acres ^d	100+	100+	100+

This table is based upon the 1979 Indiana State Outdoor Recreation Plan. Only the supply and recreational demands of residents of the region are displayed. The available recreational opportunities outside the region are not considered, nor are the recreational demands of nonresidents considered.

^aIncludes 11,500 acres of the Ohio River and 3,000 acres of inland waters.

^bIncludes 11,500 acres of the Ohio River and 500 acres of inland waters.

^cDoes not include the Ohio River.

^dIncludes 11,500 acres of the Ohio River and 14,200 acres of inland waters.

Boating and Waterskiing The recreational lakes contained in the region and the acreage available in the Ohio River constitute the major boating and waterskiing resources. It is estimated the available water acreage will meet the region's demand for boating and waterskiing through the year 2000.

The Blue River also provides excellent habitat for its fishery, which includes the endangered Ohio River muskellunge. Many channelized streams in the more intensively farmed areas, especially Scott County, lack the diversity needed for good aquatic habitat. The East Fork of the White River and Muscatatuck River have good aquatic habitat but some of their tributaries have very little fisheries value. Clifty Creek is the only stream to be stocked annually with trout.

Canoeing There are approximately 104 miles of free-flowing streams that have a sufficient base flow to provide opportunity for canoeing. Included in this figure are approximately fifty-eight miles of Blue River, fourteen miles of the East Fork of the White River, and fourteen miles of the Muscatatuck River. This supply of canoeable streams is expected to meet the demand through the year 2000.

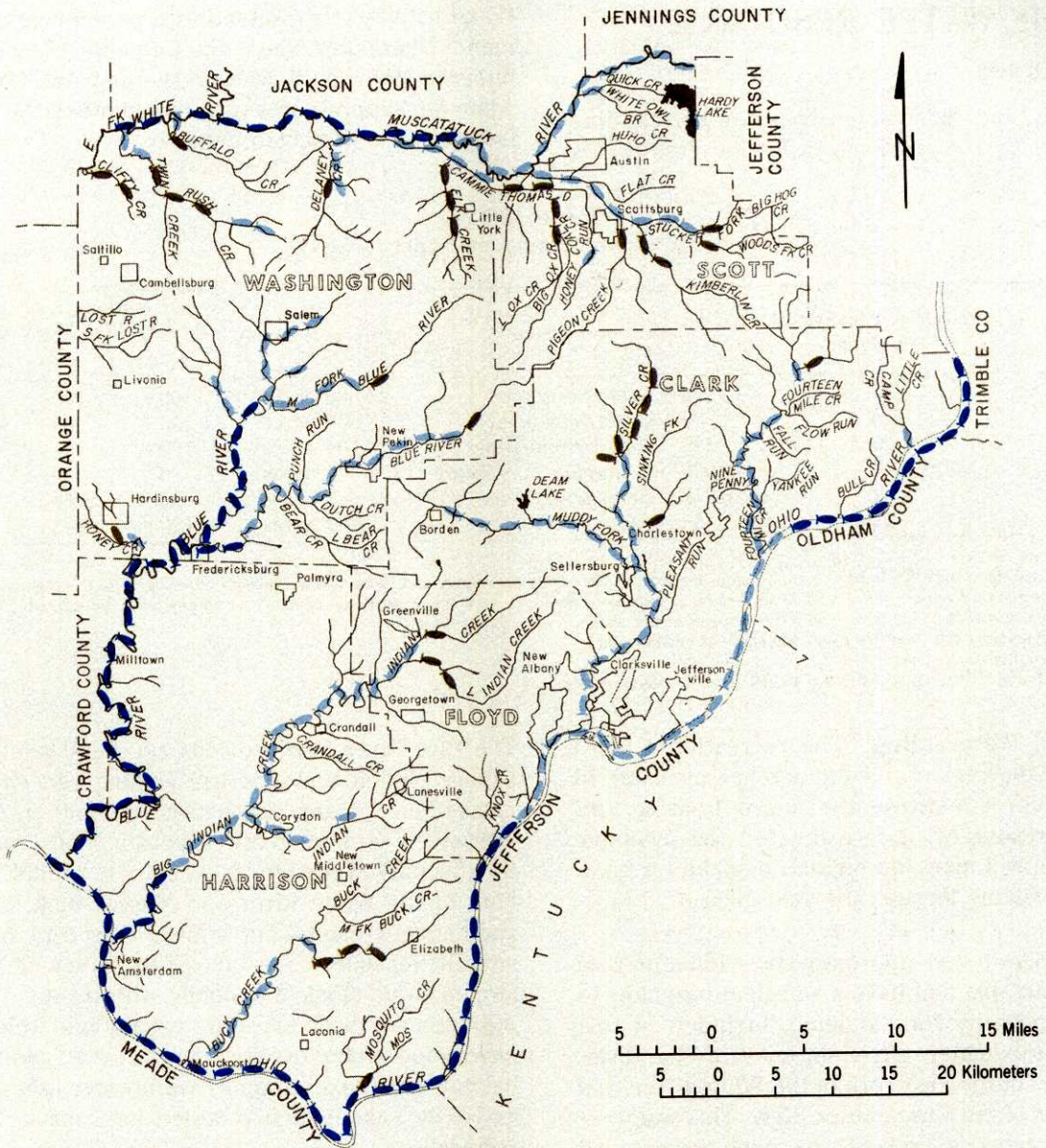
Since man-made lakes are usually undeveloped and have good water quality, they provide good aquatic habitat. Most lakes support warmwater fisheries, such as Hardy Lake, which is noted for sunfish, bullhead, and walleye.

Swimming and Ice-skating The demand for both swimming and ice-skating acreage exceeds the supply. There are no ice-skating facilities in the region. The demand for swimming and ice-skating is expected to exceed the supply through the year 2000.

Public fishing sites are available at the confluence of the East Fork White River and East Fork of the Muscatatuck River, on the mainstream of the Muscatatuck River, the Ohio River, in the Harrison-Crawford State Forest and on Elk Creek in Washington County. Sharps Mill Pond provides access to the Blue River. Indian Creek is accessible from the Indian Creek Dam Number 3. Hardy Lake, Dean Lake State Recreation Areas, and Clark State Forest also offer public access for fishing. City or county parks and bridges may provide public access for fishing. The region has a surplus of fishing water which is projected to continue through the year 2000.

Fishing The quality of the fisheries habitat is shown on Figure 243. Warmwater fish, including sunfish and catfish, are located in most of the region's streams and lakes. Except for dams along the Blue River, Indian Creek, Silver Creek, and the Ohio River, the streams in the southern counties are relatively unaltered. The Ohio still provides excellent fisheries habitat and is used for commercial fishing as well as sport fishing.

Riparian Habitat The quality of the wildlife habitat associated with streams and lakes is shown on Figure



AQUATIC HABITAT VALUE

- █ High
- █ Moderate
- █ Low

Figure 243
Map of Region Fourteen showing the quality of the fisheries habitat.

244. The rugged terrain of the southern part of the region promotes riparian habitat of high value. Habitat along some streams passing through the intensively farmed areas has been reduced by channelization. Other areas are revegetated by young and intermediate age hardwoods which increase their wildlife value. Upland and woodland game animals utilize the wooded streambanks as well as furbearers and some waterfowl. Wetlands created by the backwaters of the Ohio River provide excellent wood duck nesting habitat and are also used by migrating waterfowl, other birds, and various furbearers and other wildlife.

Many of the lakes are located on state-owned property and are relatively undeveloped, providing very good wildlife habitat. The habitat around nonstate-owned lakes is generally good, although Buffalo Trace Lake, Georgetown Lake, and Iola Lake have low habitat values due to insufficient cover. A shallow marsh at Hardy Lake provides good waterfowl habitat. Public hunting is permitted on the Jackson-Washington, Harrison, Crawford, and Clark State Forests.

Hydroelectric Power Due to limitations of topography and streamflow characteristics, there are no current commercial hydroelectric installations here. However, the best potential for future sites is on the Ohio River at the U.S. Army Corps of Engineers dam projects.

Commercial Navigation The Ohio River is an important branch of the nation's system of navigable inland waters. McAlpine Dam, a large dam and lock system, is located near Jeffersonville in Clark County. This structure was redesigned in 1965 and passed an esti-

mated thirty million tons of cargo in 1974. Studies by the Ohio River Basin Commission indicate the McAlpine locks and dam may reach their cargo capacity by the year 2000. The commission has recommended that the U.S. Army Corps of Engineers conduct a preliminary investigation of the need for modification of the locks and dam to accommodate increased cargo.

There are three components of the Ohio system outside the region that affect the overall system efficiency and, therefore, the future volume of traffic on the waterway. These are the locks on the dam at Gallipolis upriver and the two older dams (locks 52 and 53) downriver in Illinois.

Application for a permit for dock facilities to be used in conjunction with a proposed industrial port was made to the U.S. Army Corps of Engineers by the Indiana Port Commission in April of 1974 for the Clark County Maritime Center. This project was planned on the Ohio River upstream from Jeffersonville, Indiana. The port facilities will require about two hundred acres of land and will be built on the flood plain of the Ohio River behind Six Mile Island.

Withdrawal Uses

Public Water Supply Clark, Floyd, Harrison, Scott, and Washington Counties are served by forty public water utilities. Thirteen of these are municipal systems, twenty-two are rural systems, and five are subdivision systems. Information for these public water utilities is presented in the following table.

The largest county-wide use of water is attributed to the eighteen systems in Clark County. These utilities

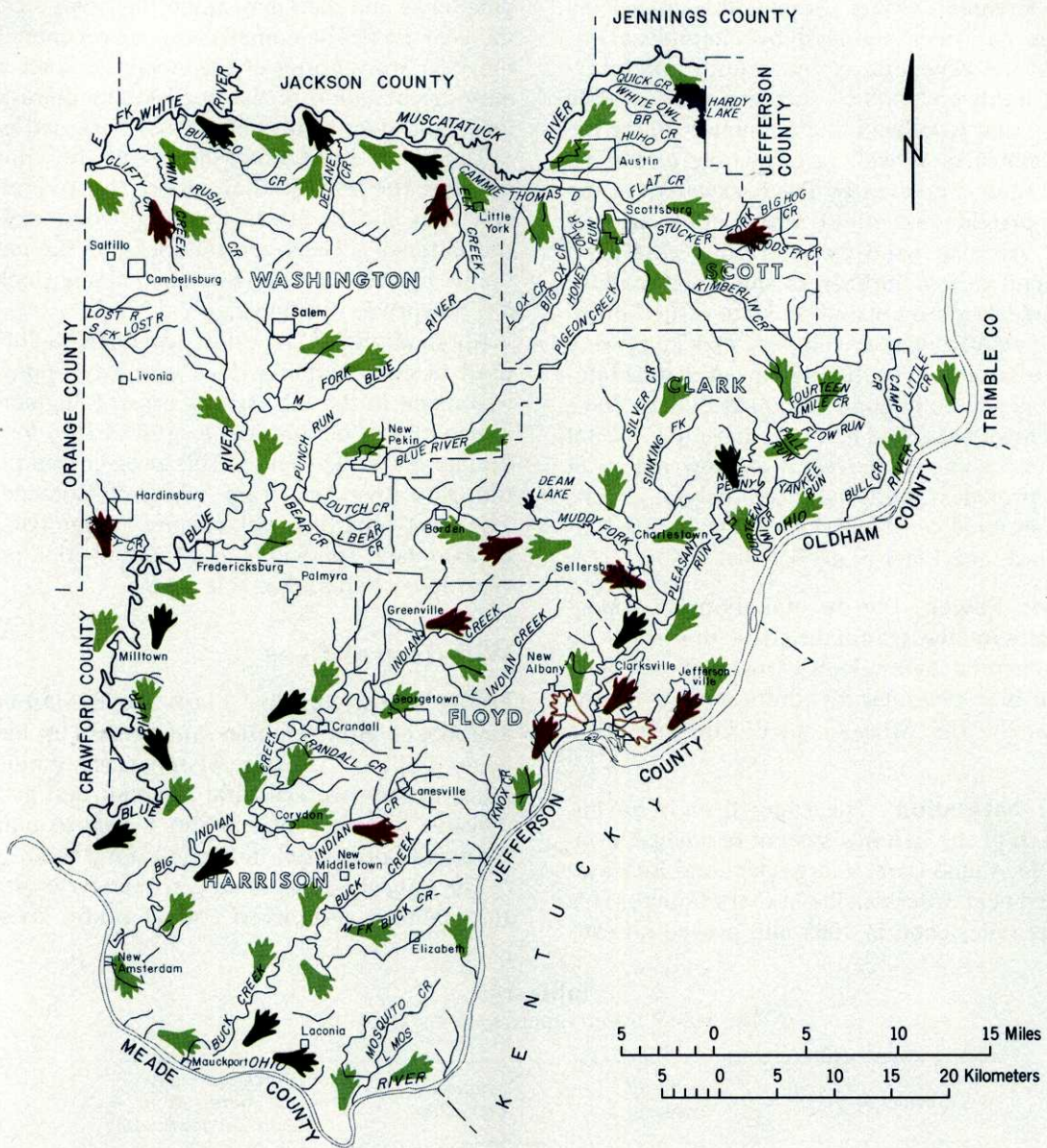
Table 195
The public water supply systems as of 1975.

<i>Counties</i>	<i>Number of Systems</i>	<i>Service Population</i>	<i>Average Daily Withdrawals in Million-Gallons-Per-Day</i>
Clark	18	61,160	7.7
Floyd	9	45,600	5.3
Harrison	11	9,000	1.3
Scott	6	15,200	1.4
Washington	9	7,800	.8
Total	53*	138,700	16.5

*Regional total does not equal sum of county totals due to several multi-county systems.

served about 61,160 persons in 1975 and supplied an average of 7.7 mgd. The eight systems in Washington County had the smallest county-wide use of water in the region. They served 7,800 persons and supplied an average of 0.8 mgd. Figure 243 shows the water service areas and the rate of water withdrawals by public water utilities.

Several of the systems in the region not only supply their own water but also sell water to one or more other systems in the region. The relationship between system sellers and buyers is presented in Table 196. Several are multi-county systems extending into two or more counties. As a result, some utilities export and import water from one county to another.



RIPARIAN HABITAT VALUE

- | | |
|--|--|
|  High |  Low |
|  Moderate |  Negligible |

Figure 244
Map of Region Fourteen showing the quality of the riparian habitat.