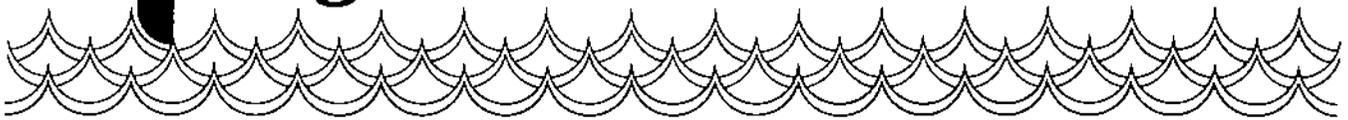




Region Twelve



Dearborn, Jefferson, Ohio, Ripley, and Switzerland Counties, located in southeastern Indiana, form Region Twelve. The region contains approximately 1,425 square miles and is bounded by Decatur and Franklin Counties to the north; Ohio to the east; the Ohio River to the south; and Scott and Jennings Counties to the west, as shown in Figure 204.

The 1975 population was 92,753 of which thirty-three percent resided in Dearborn County. The official Indiana Population Projections indicate the region's population will increase by twenty-six percent by the year 2000, with the major growth occurring in Dearborn and Jefferson Counties. The 1975 population and the projections for each county are presented below.

Table 162

The 1975 and projected populations for Region Twelve.

County	1975	1980	1990	2000
Dearborn	31,184	32,400	35,100	37,800
Jefferson	27,622	29,000	31,700	34,200
Ohio	4,628	5,200	6,100	7,200
Ripley	22,549	23,800	26,700	29,700
Switzerland	6,770	6,900	7,200	7,400
Total	92,753	97,300	106,800	116,300

The major population centers are Aurora and Lawrenceburg in Dearborn County, Madison in Jefferson County, Rising Sun in Ohio County, Batesville in Ripley County, and Vevay in Switzerland County. These urban centers accounted for thirty-seven percent of the region's 1975 population.

Agriculture is the dominant land use with more than sixty-five percent of the area devoted to farming.

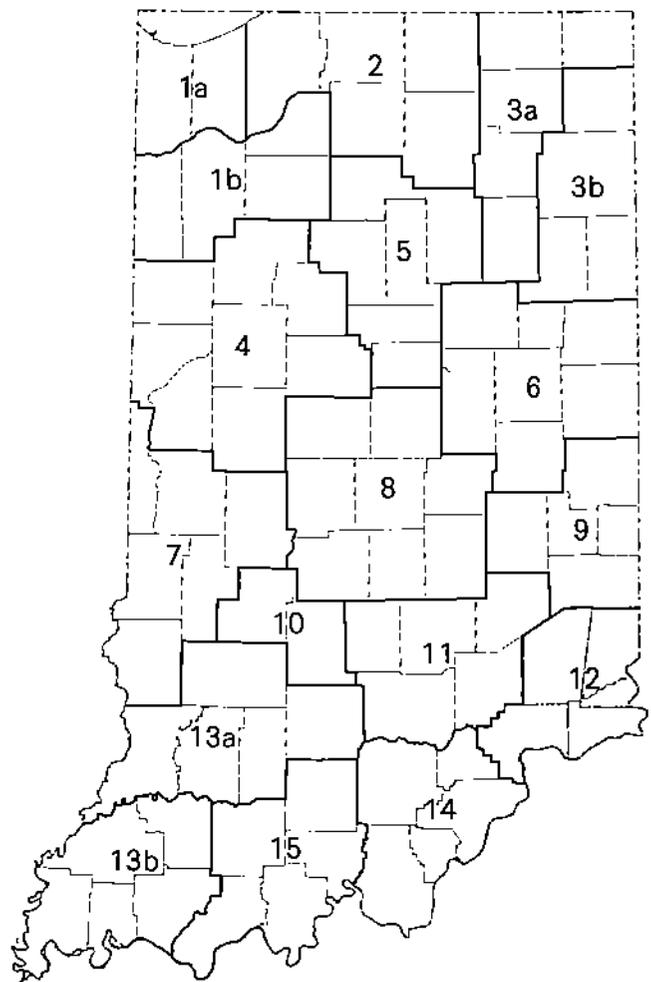


Figure 204

Map of Indiana showing the location of Region Twelve.

Approximately twenty-four percent of the land is forested while eleven percent comprises urban and miscellaneous uses. The region is characterized by a highly rolling, dissected topography.

Although agriculture is by far the major land use, it is not the major source of employment. Manufacturing employs over forty-eight percent of the total work force. Nonmanufacturing employment, including wholesale and retail trade, employs an additional twenty-two percent of the work force.

Average annual precipitation for the region is approximately 41.0 inches. This varies from a high of 4.3 inches in March to a low of 2.5 inches in October. Of the 41.0 inches falling annually, approximately 14.5 inches appear as streamflow while approximately 26.5 inches are consumed through evapotranspiration.

Average temperatures range from 31°F. in January to 75°F. in July. The average annual temperature is 53.5°F. Data from Cincinnati and Covington, Ohio, indicates the annual prevailing wind is from the south to southwest at approximately nine miles per hour.

THE WATER RESOURCE

Ground Water

Glacial deposits left by the Illinoian and older glacial advances consist predominantly of glacial till. Contained within the till are a few scattered lenses of water-bearing sand and gravel. Beneath the thin glacial deposits, usually 10 to 40 feet in thickness, is found layered bedrock, which ranges in age from Ordovician through Devonian. The interbedded shale and limestone bedrock in Dearborn, Ohio, and Switzerland Counties is an extremely poor water-bearing source. "Dry holes" and limited sources of ground water are common. A combination of Dolomitic limestone and shale occurs in the bedrock in Jefferson and Ripley Counties. The Silurian dolomitic bedrock aquifer may yield up to ten gallons-per-minute (gpm) to properly

constructed wells. In western Jefferson County the black shale and limestone of the Devonian period are present and have only limited ground-water potential. The black, New Albany shale and the Ordovician shale and limestone bedrock are nonwater-bearing under most conditions. Deeper wells in these deposits often obtain highly mineralized or saline water, if any at all.

The availability of ground water is associated with the nature and type of aquifer materials present in a given area. In this region, ground-water sources are minimal as shown in Figure 205. Major ground-water sources in the region are often confined to the Whitewater and Ohio River valley aquifers. Wells in these sand and gravel deposits range from 250 to 1,500 (gpm). Moderately productive wells have been obtained in Ripley County, with the exception of Sunman. Elsewhere, only limited, to essentially nonexistent, ground-water withdrawals are possible.

Major aquifers in the sand and gravel deposits of the Ohio and Whitewater River valleys usually contain water of good quality, although it is hard, containing 330 to 460 parts-per-million (ppm). Manganese concentrations may be locally high. However, iron contents are low and no removal is required in many instances. Hydrogen sulfide is present in the limestone aquifers below the New Albany shale.

Surface Water

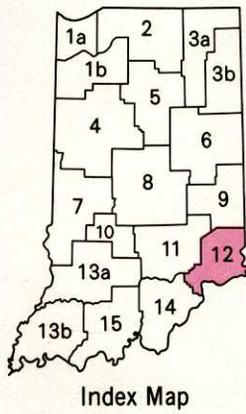
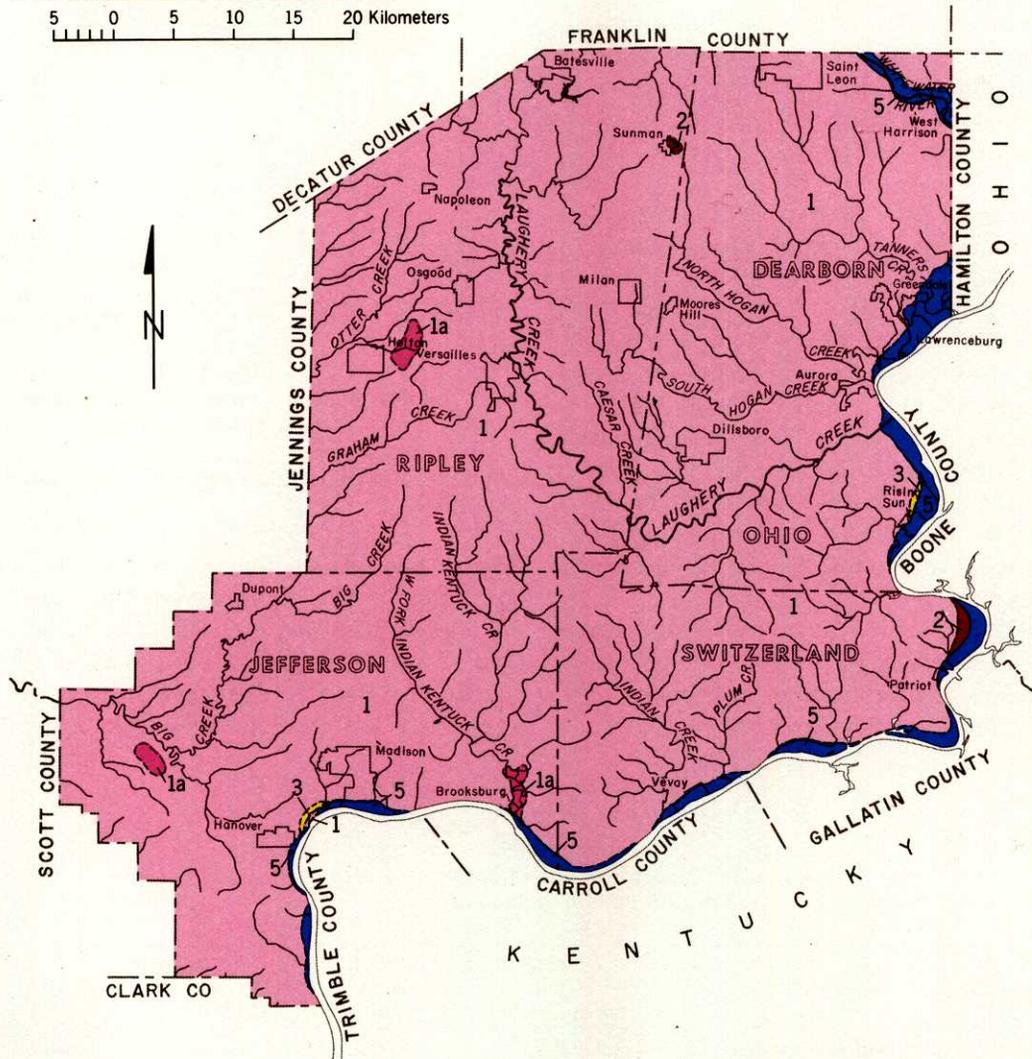
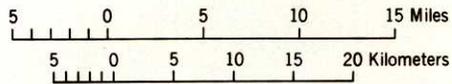
Streamflow Most streams are in the Ohio River basin. Next to Lake Michigan, in extreme northern Indiana, the Ohio River offers the largest supply of surface water within Indiana. The region is predominantly drained in a northwest to southeast direction by the Laughery Creek system and by many small tributaries to the Ohio River.

The seven day, once in ten year (Q7-10), one day, once in thirty year (Q1-30) and the average annual flow in million-gallons-per-day (mgd) for streams with gaging stations are tabulated below.

Table 163
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>
Whitewater River at Brookville*	1,224	804	56	43
Laughery Creek near Farmers Retreat	248	180	0	0
Muscatatuck River near Deputy	293	220	0	0

*Flow characteristics recorded prior to the construction of Brookville Lake.



POTENTIAL YIELD	
1	10 gallons per minute
1a	50 gallons per minute
2	100 gallons per minute
3	200 gallons per minute
5	1000 gallons per minute or more

Figure 205
Map of Region Twelve showing the location and potential yield of ground water from properly constructed large diameter wells.

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 Ohio River is the largest surface stream in the state, with an average flow at Cincinnati in excess of 62 billion-gallons-per-day. The flow of the Ohio River is increased downstream of Cincinnati by the discharge of the Great Miami River at the Indiana and Ohio state line and from the Kentucky River at Carrollton, Kentucky.

Prior to the construction of Brookville Lake, Whitewater River had an average discharge at Brookville of 804 mgd. The minimum release from Brookville Lake is 25.9 mgd.

With the exception of the Ohio River and the Whitewater River, streams draining the region run dry with great regularity. Flow in Laughery Creek can be characterized as a trickle or less at least five percent of the time. This is true of all the streams that drain into the Ohio such as both forks of Tanners and Hogan Creeks as well as the streams that drain westwardly into the Muscatatuck River such as Big Creek, Graham Creek, and Otter Creek.

The flow duration curve for Laughery Creek near Farmers Retreat, as shown in Figure 206, has a steep slope indicating a lack of ground-water contribution to streamflow. The curve also indicates that the stream

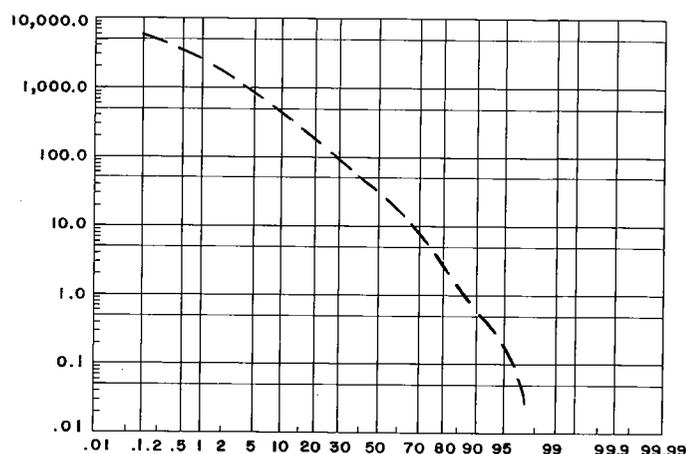


Figure 206
The flow duration curve for the Laughery Creek near Farmers Retreat.

will have a dependable flow of 0.7 mgd ninety percent of the time.

Lakes The lakes within the region that are at least 50.0 acres in size or have a storage capacity of 32.5 million gallons or more are listed in Table 164, and are located on Figure 207. These sixteen lakes have a combined surface area of approximately 841 acres and a gross storage capacity of 5,550 million gallons.

Table 164
Lakes at least 50.0 acres in size or having a storage capacity of 32.5 million gallons or more.

Lake Number	Lake Name	Drainage Area (square miles)	Surface Area (acres)	Gross Storage (million gallons)
1	Bischoff Reservoir	4.53	200.0	625
2	Hahn Reservoir	na	9.4	32
3	LaSarre Lake	na	14.8	97
4	Mullenkramer Lake	6.46	32.8	325
5	Oser Reservoir	na	11.9	39
6	Tall Oak Lake	1.45	52.0	158
7	Versailles Lake	168.00	232.0	967
8	Wood Lake	na	12.0	130
9	Bar-K-Lake	na	na	97
10	Hidden Valley Lake	2.94	166.0	2,593
11	Lake Dilldear	na	16.7	123
12	Hereford Lake	2.50	38.4	110
13	Jefferson Lake	na	15.6	81
14	Edwin Pray Lake	na	na	32
15	Lake Geneva	na	26.1	65
16	Lake Livingston	0.38	13.7	84

na: not available.

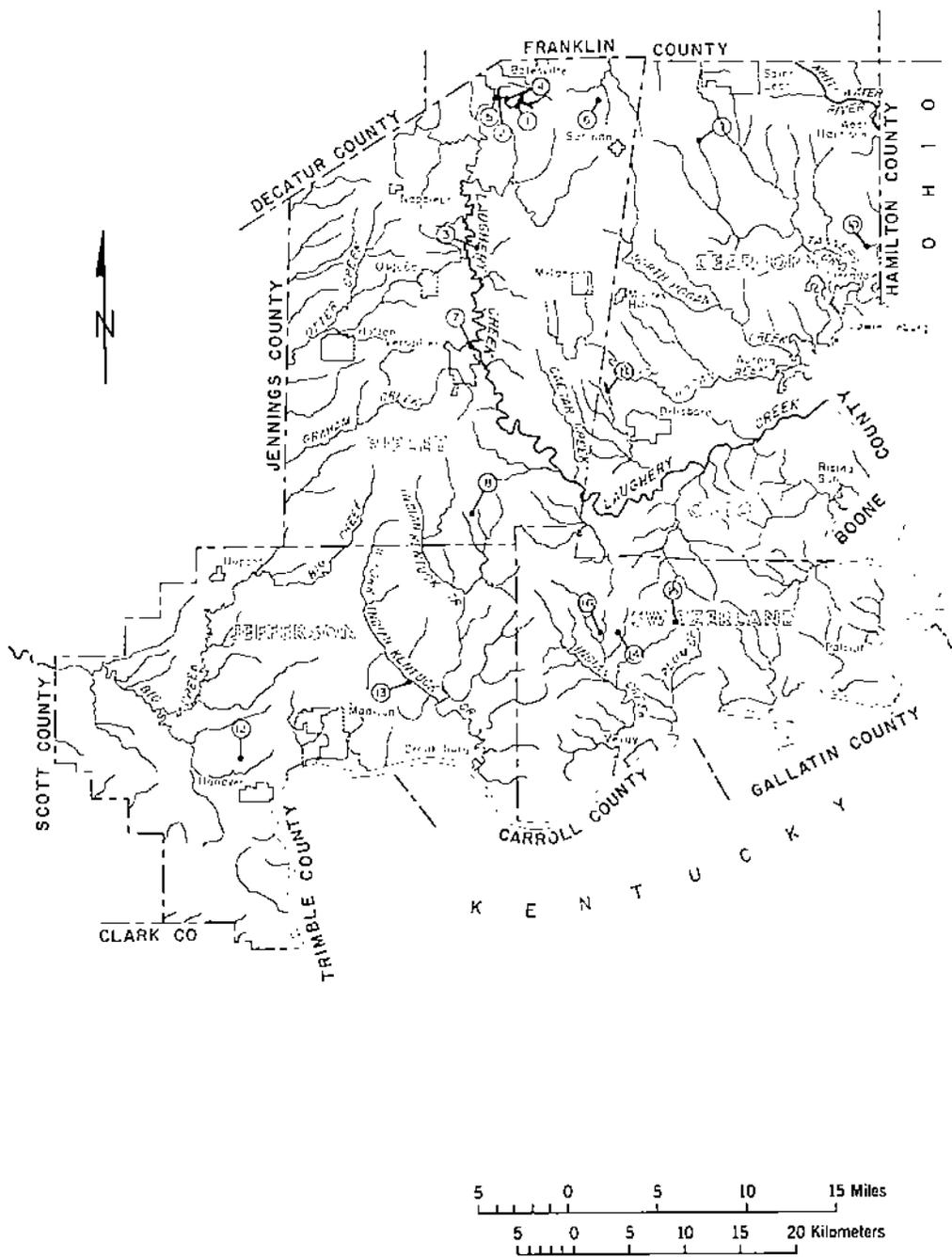


Figure 207
 Map of Region Twelve showing the location of lakes that are at least 50.0 acres in size or that have a storage capacity of 32.5 million gallons or more.

UTILIZATION OF THE WATER RESOURCE

Instream Uses

The supply and demand analysis for recreational uses of water by the residents of Region Twelve are presented in Table 165. 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.

Boating and Waterskiing Boating opportunities are available on the Ohio River, on some of the reservoirs, and on many streams in the region. The Ohio River provides excellent boating, particularly since the construction of Markland Dam. The current supply of water suitable for waterskiing exceeds the current and projected demand through the year 2000. The Ohio River provides excellent waterskiing opportunities which will also exceed the demand through the year 2000. Waterskiing is not allowed on any of the inland lakes.

Table 165
The outdoor recreation demand and supply analysis.

Activity	Percent of Population Participating	Density Guideline	Approximate Supply	Existing Supply as a Percentage of Projected Demand		
				1980	1990	2000
Boating	18	19.6 boats/acre/year	11,800 acres ^a	100+	100+	100+
Waterskiing	5	34.4 skiers/acre/year	10,400 acres ^b	100+	100+	100+
Canoeing	7	585 canoes/mile/year	15 miles	100+	100+	100+
Swimming	39	76,600 swimmers/acre/year	3 acres ^c	60	50	50
Ice-Skating	5	6,678 skaters/acre/year	1 acre	17	17	17
Fishing	49	66 persons/acre/year	21,200 acres ^d	100+	100+	100+

This table is based upon the 1979 Indiana State Outdoor Recreation Plan. Only the supply and recreational demands by 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 8,700 acres of the Ohio River and 3,100 acres of inland waters.

^bIncludes 8,700 acres of the Ohio River and 1,700 acres of inland waters.

^cDoes not include the Ohio River.

^dIncludes 8,700 acres of the Ohio River and 12,500 acres of inland waters.

Canoeing The only river recommended for canoeing is the fifteen-mile section of the Whitewater River which passes through the northeastern corner of Dearborn County. Other streams in the region, such as Laughery Creek, may at times provide canoeing opportunities. The demand for canoeing opportunities in the region is one of the lowest in the state. The minimal supply of canoeing opportunities should meet the projected demands of canoeists through the year 2000.

Swimming and Ice-Skating There is a deficiency of both swimming and ice-skating opportunities within the region. It is estimated that only sixty percent of the needed swimming acreage is currently available, while only seventeen percent of the needed ice-skating facilities are available. These shortages are projected to continue through the year 2000.

Fishing The quality of the fisheries habitat is indicated in Figure 208. The streams generally have good aquatic habitat, the best being located on Laughery Creek and the Ohio River. The Ohio River supports a good warmwater fish population that is used for sport and commercial fishing. The McAlpine and Markland

dams on the Ohio River increase the elevation of water in the tributaries, creating excellent habitat. During dry seasons, low flows limit the fisheries resource. Faster-flowing streams, such as Middle Fork, Graham, Big, and Grant Creeks are well known for good smallmouth bass and crappie fishing. Other streams support populations of sunfish, catfish, and various rough and forage fish. The pools and riffles caused by the rocky beds of upland streams increases their importance for fish production.

Although there are no natural public lakes in the region, several of the man-made lakes provide good aquatic habitat. Fisheries in the Versailles Lake and the Batesville Reservoirs are managed by the Indiana Department of Natural Resources. Feller Lake has a well-balanced warmwater fishery, whereas Bischoff and Liberty Park Lakes are rated lower for their aquatic habitats.

Public access is available at Laughery Creek, the Batesville Reservoirs, and Versailles Lake. The U.S. Army Corps of Engineers maintains public access sites to the Ohio River at Vevay, Patriot, and Bryants Creek. A Kentucky fishing license is required for boat fishing on the Ohio River. Other fishery access may be

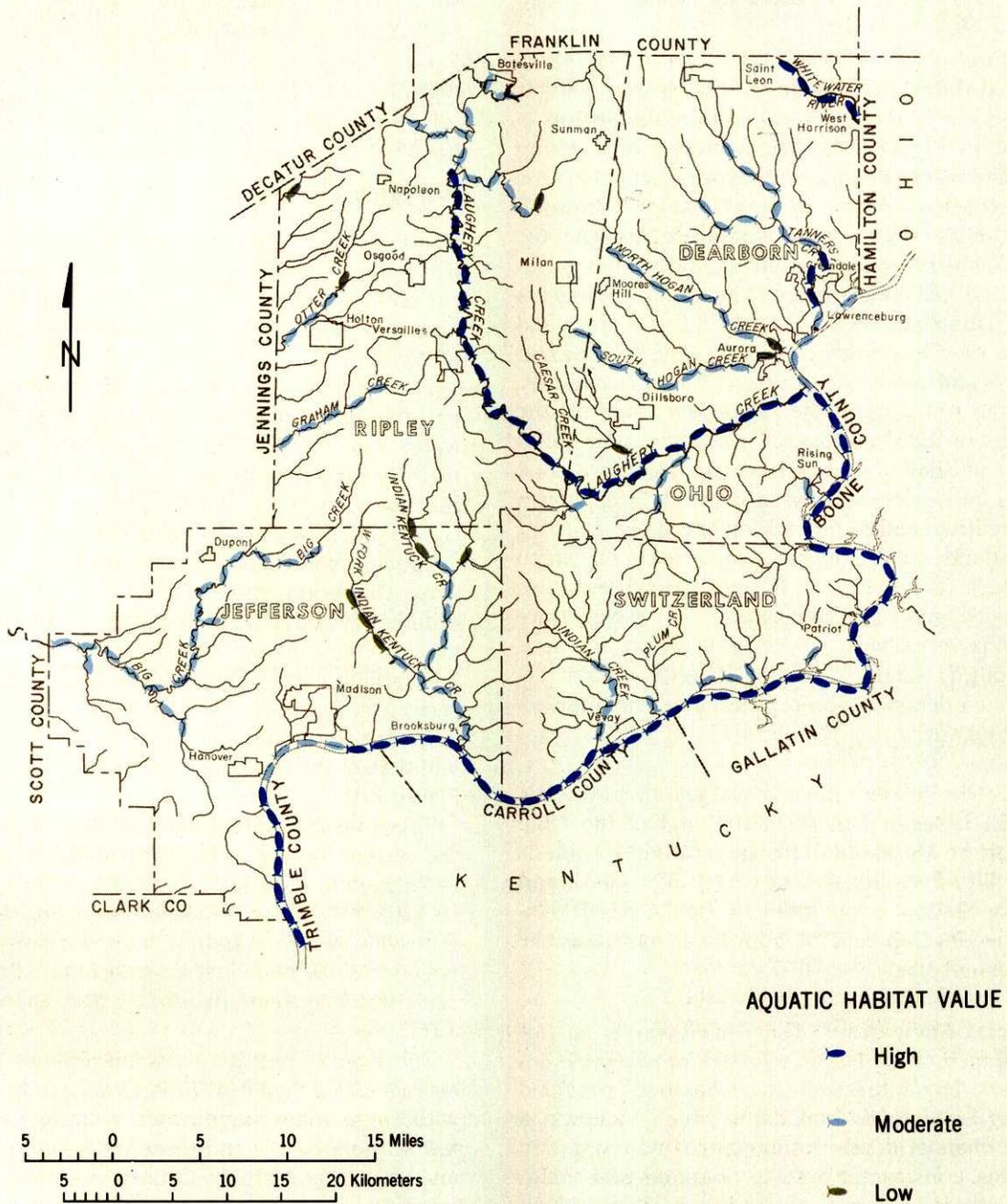


Figure 208
Map of Region Twelve showing the quality of the fisheries habitat.

provided by local governments and where roads cross surface streams.

The supply of public fishing waters exceeds the demand and is projected to exceed the demand through the year 2000.

Riparian Habitat The quality of the riparian habitat associated with lakes and streams in the region is indicated in Figure 209. The wooded hills along streams and lakes support many types of upland game and are occasionally used by waterfowl such as wood ducks. Laughery Creek is especially notable for stretches of very good riparian habitat that is vegetated with trees and shrubs. The poorest riparian habitat occurs along the Ohio River in urban areas and where the river has eroded its banks. The best habitat is to be found along small streams and tributaries. Most of the wetlands in the region are found in the backwaters of the Ohio River. These deepwater shrub swamps and shallower marshes offer abundant food and cover for waterfowl, especially wood ducks, muskrats, shorebirds, and frequently upland game animals. Small wetland areas can also be located on North Hogan Creek. The Batesville Reservoirs and Versailles Lake provide good riparian habitat. Their banks are primarily covered with woody vegetation. Because public hunting lands in Region Twelve are scarce, hunters must depend upon private landowners for access to hunt within the region.

Hydroelectric Power Indiana's largest hydroelectric installation is located in the north end of the Ohio River Dam at Markland. This generating station is rated at fifty-five megawatts (mw). The Markland Generating Station is operated by Public Service Indiana. The development of additional hydroelectric facilities is not likely.

Commercial Navigation The Ohio River is an important branch of the nation's system of navigable, inland waters. The entire Ohio River has been provided with a series of locks and dams which maintain a minimum channel depth of nine feet. This navigation system was constructed and is operated and maintained by the U.S. Army Corps of Engineers.

One of the large navigation dams across the Ohio is located at Markland in Switzerland County. This structure was completed in 1964 and passed an estimated thirty million tons of cargo in 1975. Below the Kentucky River (opposite Lamb in Switzerland County) the Ohio River carried about thirty-five million tons of cargo in 1975.

Many Ohio River communities have some port facilities on the river bank. Such port facilities are found in Madison, Vevay, Aurora, and Lawrenceburg.

Studies by the Ohio River Basin Commission show that the Markland locks and dam should be adequate to carry projected cargoes of eighty million tons by the year 2000. There are three key components of the Ohio River system outside the region which 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.

Withdrawal Uses

Public Water Supplies Dearborn, Jefferson, Ohio, Ripley, and Switzerland Counties are served by twenty-nine public water utilities. In 1975, an estimated 62,900 persons were served by a public water utility.

These public water utilities are classified as municipal utilities, supplying adjacent rural areas, and rural water systems. The utilities serving only their immediate municipal areas are Madison, Batesville, Lawrenceburg, Vevay, Versailles, Milan, Osgood, Sunman, Greendale, Rising Sun, and West Harrison. The utilities supplying municipal and adjacent rural areas are Aurora, Dillsboro, and Patriot. The remaining fifteen utilities are rural water systems. These systems provide service along most of the rural roads in Dearborn, Switzerland, Ohio and Jefferson Counties. Rural water service in Ripley County is limited to the eastern and southern sections. The service areas and rates of withdrawal for the public water utilities are shown in Figure 210.

The largest water utility operating in the region is the system located in Madison. It withdrew an average of 2.1 mgd in 1975, and supplied an additional 0.4 mgd to adjacent utilities. Other large utilities include Batesville, which withdrew 0.8 mgd; Aurora, 0.7 mgd; Greendale, 0.6 mgd; and Lawrenceburg, 0.5 mgd. Most rural water systems distributed less than 0.2 mgd in 1975.

The twenty-nine public water utilities pumped an average of 7.5 mgd in 1975. Approximately 6.4 mgd was withdrawn from ground water. With the exception of a few scattered wells and those wells supplying Sunman and Osgood in Ripley County, all production wells supplying public water systems are located in the narrow belt of alluvium along the Ohio River. Sunman's water supply is obtained from a local geological anomaly in the form of a "sand pocket" which has been tapped to furnish a reasonably productive well field.

Systems utilizing ground water radiate from the Ohio River and up the hills to the north and west. Ground-water sources along the Ohio River have not been utilized to any extent in Ripley County because the population is too small to support the cost of new, long diameter supply lines.

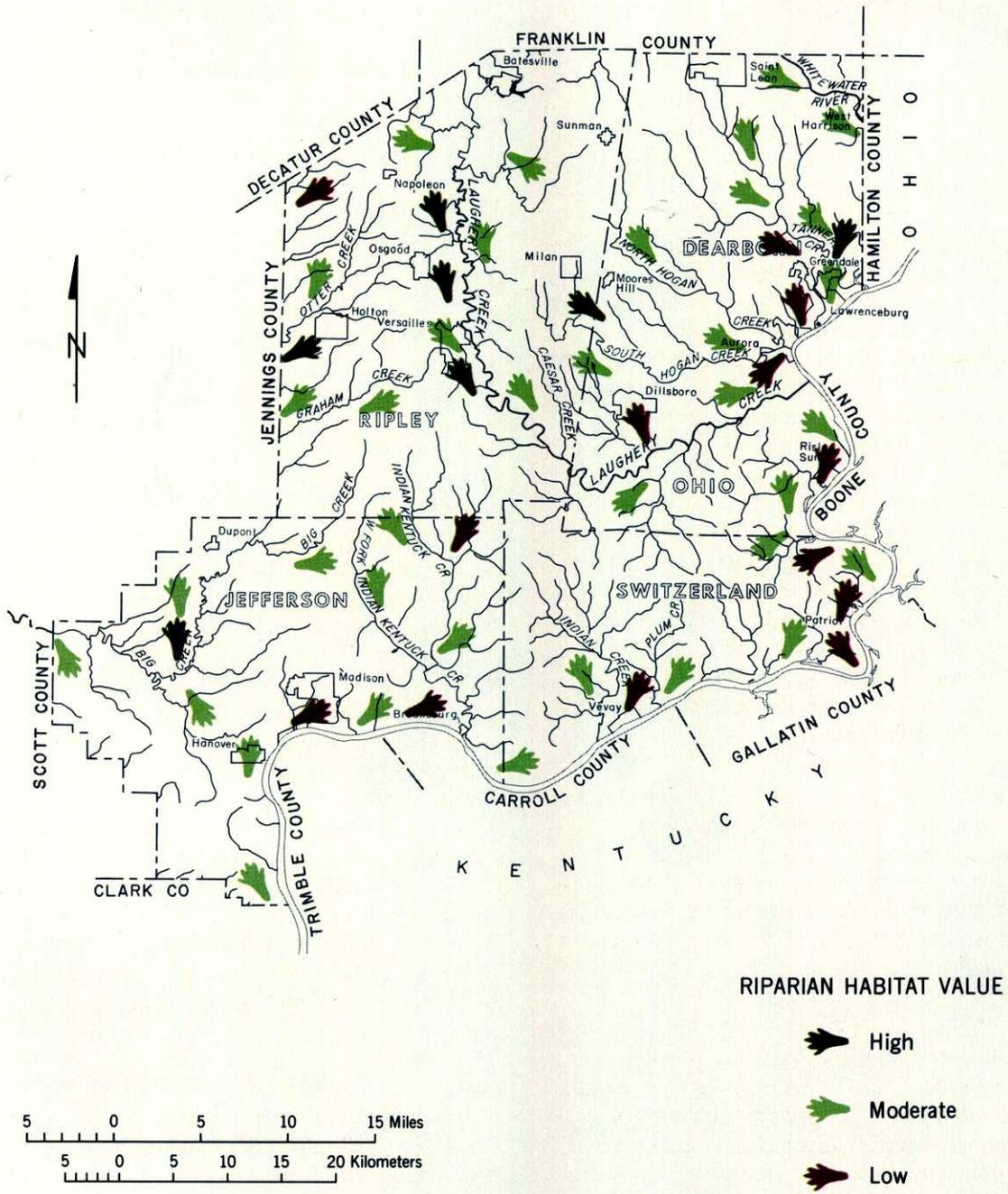


Figure 209
 Map of Region Twelve showing the quality of the riparian habitat.

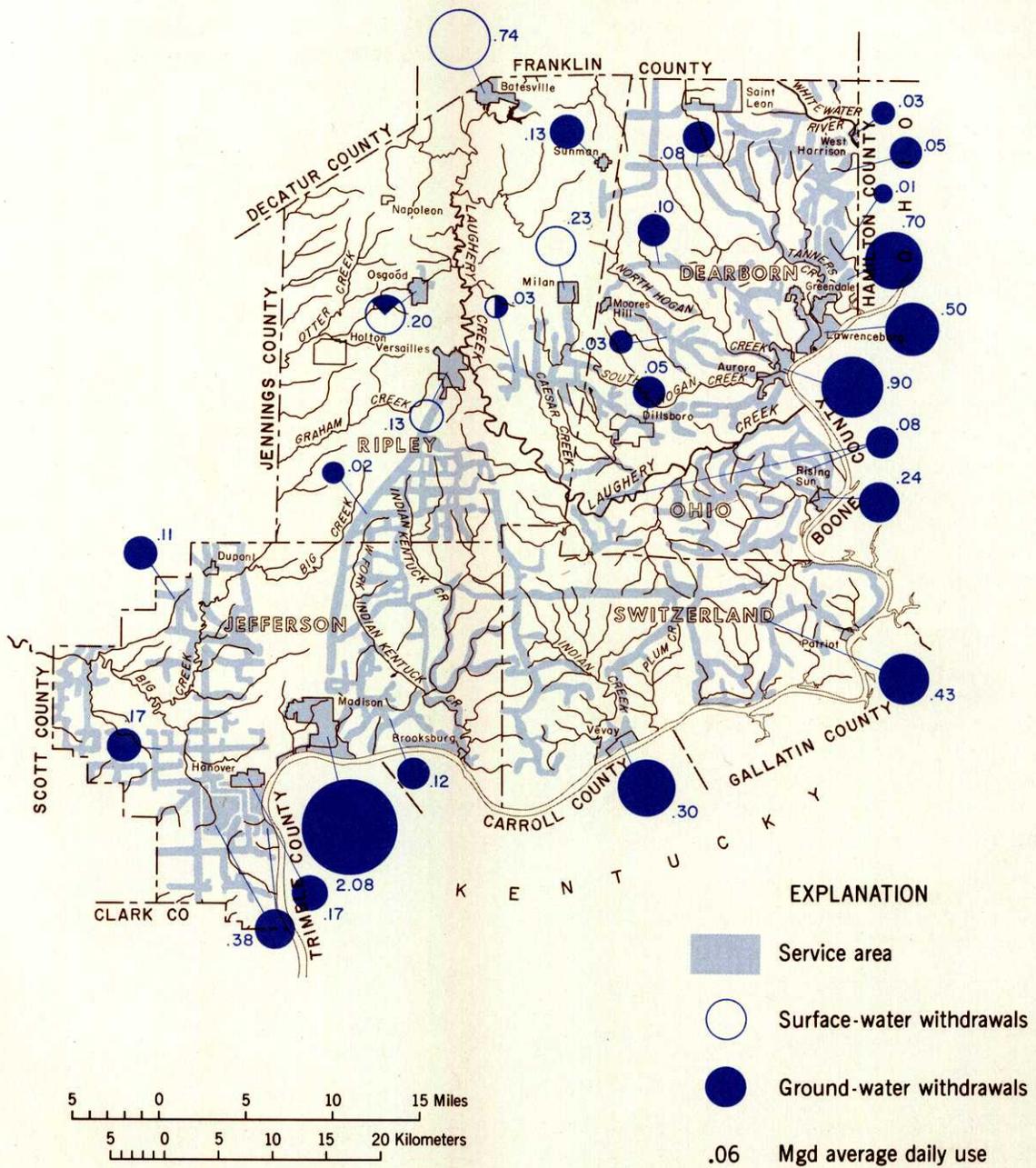


Figure 210
Map of Region Twelve showing the service areas of the public water utilities and average daily use in million-gallons-per-day.

Projections of public water utilities indicate that withdrawals for water supplies should increase to approximately 11.6 mgd by the year 2000. The 1977 and projected water withdrawal and consumption rates by public water utilities are shown below.

Table 166

The 1977 and projected withdrawal and consumption rates for public water supplies by the year 2000, in million-gallons-per-day.

<i>Public Water Supply</i>	1977	1980	1990	2000
Withdrawal	7.5	7.9	9.7	11.6
Consumption	2.2	2.4	2.9	3.5

Industrial Water Industrial establishments had a water intake averaging 8.2 mgd in 1977. Of the total industrial intake, over sixty percent is purchased from the region's public water utilities, while the remainder is developed by the industries themselves. Usually, self-supplied industries obtain their water from wells in the Ohio River alluvium.

Industrial production for the year 2000 is expected to increase ninety percent above the 1977 value (U.S. Water Resources Council). Although industrial output is expected to increase, total industrial water intake is expected to decrease initially due to plant efficiency and then rise slowly as output increases. Water withdrawals are expected to increase by only six percent to approximately 8.7 mgd, by the year 2000. Data for the current and projected industrial self-supplied water withdrawals and rates of consumption is now presented.

Table 167

The 1977 and projected self-supplied withdrawal and consumption rates for industries, in million-gallons-per-day.

<i>Industrial Self-Supply</i>	1977	1980	1990	2000
Withdrawal	3.2	3.2	3.1	3.1
Consumption	0.3	0.3	0.4	0.5

Rural Self-Supplied Water Most rural, self-supplied water is withdrawn from ground-water sources. An estimated 29,300 persons lived in homes supplied by individual wells in 1975.

Within the five-county region, 13,600 of these persons lived in Ripley County, 10,500 in Dearborn County, 3,300 in Jefferson County, 900 in Switzerland County, and 1,500 in Ohio County. It is estimated that 2.5 mgd was withdrawn for residential purposes in 1975. By the year 2000, rural water systems are expected to expand, resulting in a ten percent decrease in rural, self-supplied water for residential demands.

In 1975 an estimated 190,000 head of livestock and 508,000 chickens consumed 1.6 mgd of self-supplied,

rural water. A slight increase in water withdrawals is expected for these animals by the year 2000. Much of this water is withdrawn from farm ponds.

The total rural, self-supplied water withdrawals are expected to remain constant at approximately 4.1 mgd through the year 2000.

Table 168

The 1977 and projected withdrawal and consumption rates for rural, self-supplied water, in million-gallons-per-day.

<i>Rural Self-Supply</i>	1977	1980	1990	2000
Withdrawal	4.1	4.1	4.1	4.1
Consumption	4.1	4.1	4.1	4.1

Irrigation Water Region Twelve contains a few soil associations that would profitably respond to irrigation. As a consequence only an estimated sixty-four acres are currently irrigated. Crops irrigated include vegetables and tobacco.

Assuming 1977 as a normal growing year, the vegetables and tobacco irrigated would have required about 0.2 mgd during the "average" irrigation season of July and August.

In addition to the irrigation for agricultural use, there are about 100 acres of irrigated fairways and greens on the region's golf courses. About 1.2 mgd is applied to these areas during the peak July–August irrigation season. It is estimated that irrigation withdrawals for both cropland and golf courses will increase to 0.7 mgd by the year 2000 as presented in the following table.

Table 169

The 1977 and projected withdrawals of irrigation water for croplands and golf courses, in million-gallons-per-day.

<i>Irrigation</i>	1977	1980	1990	2000
Withdrawal	0.3	0.4	0.5	0.7
Consumption	0.3	0.4	0.5	0.7

Electric Energy The region contains two fossil-fueled electric generating plants and one hydroelectric plant. The fossil-fueled plants are Clifty Creek at Madison, which is owned and operated by the Indiana-Kentucky Electric Corporation, and the Tanners Creek Generating Station at Lawrenceburg, which is owned and operated by the Indiana and Michigan Electric Company. Both of these plants employ once-through cooling. No significant water withdrawals are required by the hydroelectric plant, located at Markland Dam.

There are two additional plants located immediately outside the boundaries of the region on the Ohio River. One of these plants, Miami Fort, is in Ohio, slightly upstream of the Indiana–Ohio state line. It is

owned and operated by the Cincinnati Gas and Electric Company. The Ghent plant is located in Kentucky, across the Ohio River from Vevay Indiana. It is owned and operated by the Louisville Gas and Electric Company.

Clifty Creek was the largest generating facility in Indiana for a number of years. It is rated at 1,304 mw. The energy generated in this plant is used in a nuclear processing facility in Pike County, Ohio. The Tanners Creek Station is rated at 1,066 mw and serves the areas of Fort Wayne, South Bend, Marion, and Muncie.

The generating capacity of the two fossil-fueled plants within the region, and that of the two plants immediately outside the region boundaries, totals 4,489 mw. The hydroelectric plant adds 55 mw to this capacity.

The Indianapolis Power and Light Company has announced plans for the construction of a major new generating station on the Ohio River just upstream from Patriot in an area known as the Mexico Bottoms. The station will be known as the Patriot Generating Station and will be rated at 1,950 mw. The cooling-water cycle will use mechanical draft cooling towers with make-up water withdrawn from the Ohio River.

Public Service Indiana plans to construct the Marble Hill nuclear plant along the Ohio River in Jefferson County, downstream from Madison. The planned capacity of 2,380 mw is expected to consume thirty-six mgd from the Ohio River.

The Cincinnati Gas & Electric Company has announced plans for the construction of another large plant on the Kentucky shore at East Vend, across and just upstream from the Patriot Station. In addition, the Louisville Gas & Electric Company plans to build a new plant in Kentucky across from the Jefferson-Clark County Line to be known as the Trimble County Station. The American Electric Power Company has another site across from Madison under consideration for development as an electric generating facility.

Water withdrawals for energy in the region during 1977 were approximately 2,547 mgd, but they are expected to decrease to 689 mgd by the year 2000, as shown below.

Table 170

The 1977 and projected water withdrawal and consumption rates for the production of energy, in million-gallons-per-day.

Energy	1977	1980	1990	2000
Withdrawal	2,547.0	2,547.0	2,675.0	689.5
Consumption	0	0	62.0	62.0

EXCESS WATER

Flooding

Approximately 7,000 acres of the region, or about one percent of the total area, are subject to flooding. The major flood plains are shown in Figure 211. Figure 212 delineates the average annual flood damages along selected streams within the region. The average annual damages due to flooding were estimated in 1977 to be over \$750,000.

Virtually all of the streams in Region Twelve are subject to flooding. Flash flooding on streams in the area is commonly due to the steepness of the slope on tributaries of the Ohio River. The Ohio River is the major watershed in the region. It is subject to long flood durations.

Flood Control The city of Lawrenceburg is protected by a major levee. This project was constructed in cooperation with the U.S. Army Corps of Engineers. It protects the city of Lawrenceburg against a flood equal in magnitude to that of January 1937 on the Ohio River.

The federal government had at one time authorized the construction of levees at Rising Sun, Vevay, Patriot, and Madison, but all of these projects were eventually judged as economically infeasible. In the early 1970s, the U.S. Army Corps of Engineers was asked to investigate an extension to the Lawrenceburg floodwall in order to provide protection for a proposed industrial park. That extension was also found to be infeasible.

In addition to the protective works at Lawrenceburg, the U.S. Army Corps of Engineers has constructed fifty-six major reservoirs on tributaries of the Ohio River upstream from Region Twelve. These dams reduce, but do not eliminate, flooding problems on the river. In addition to these federal dams, several large floodwater-retarding dams in the Miami River basin provide a minor degree of flood protection on the Ohio River.

Flood Plain Management Participants in the emergency phase of the National Flood Insurance Program include all the unincorporated areas of the five counties as well as Brooksbury in Jefferson County; Greendale, Lawrenceburg, and West Harrison in Dearborn County; Rising Sun in Ohio County; and Patriot and Vevay in Switzerland County. Aurora in Dearborn County and Hanover and Madison in Jefferson County are participating in the regular phase of the program. Residents in these areas may purchase insurance against property losses due to flooding.

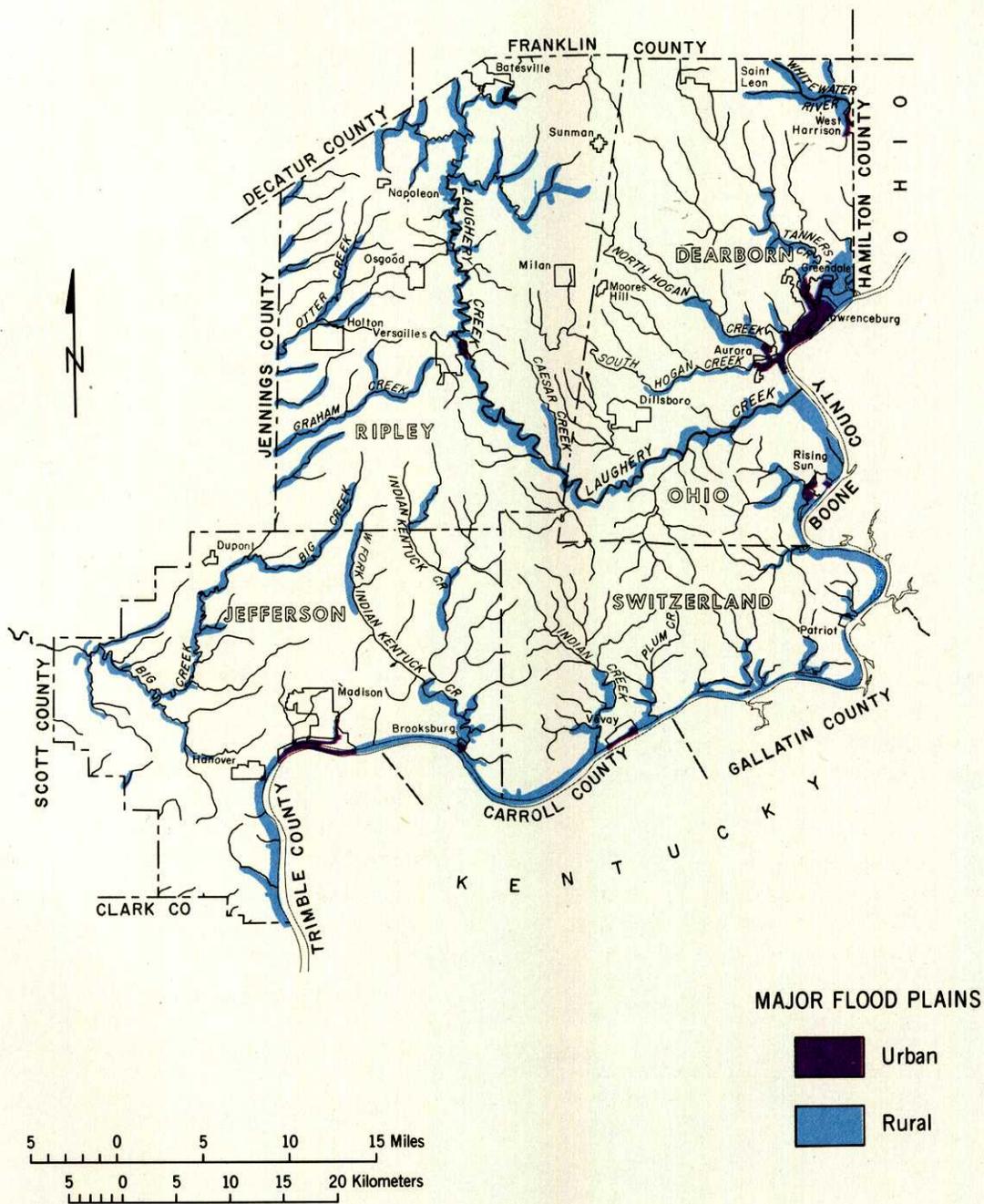


Figure 211
Map of Region Twelve showing the major flood plains.

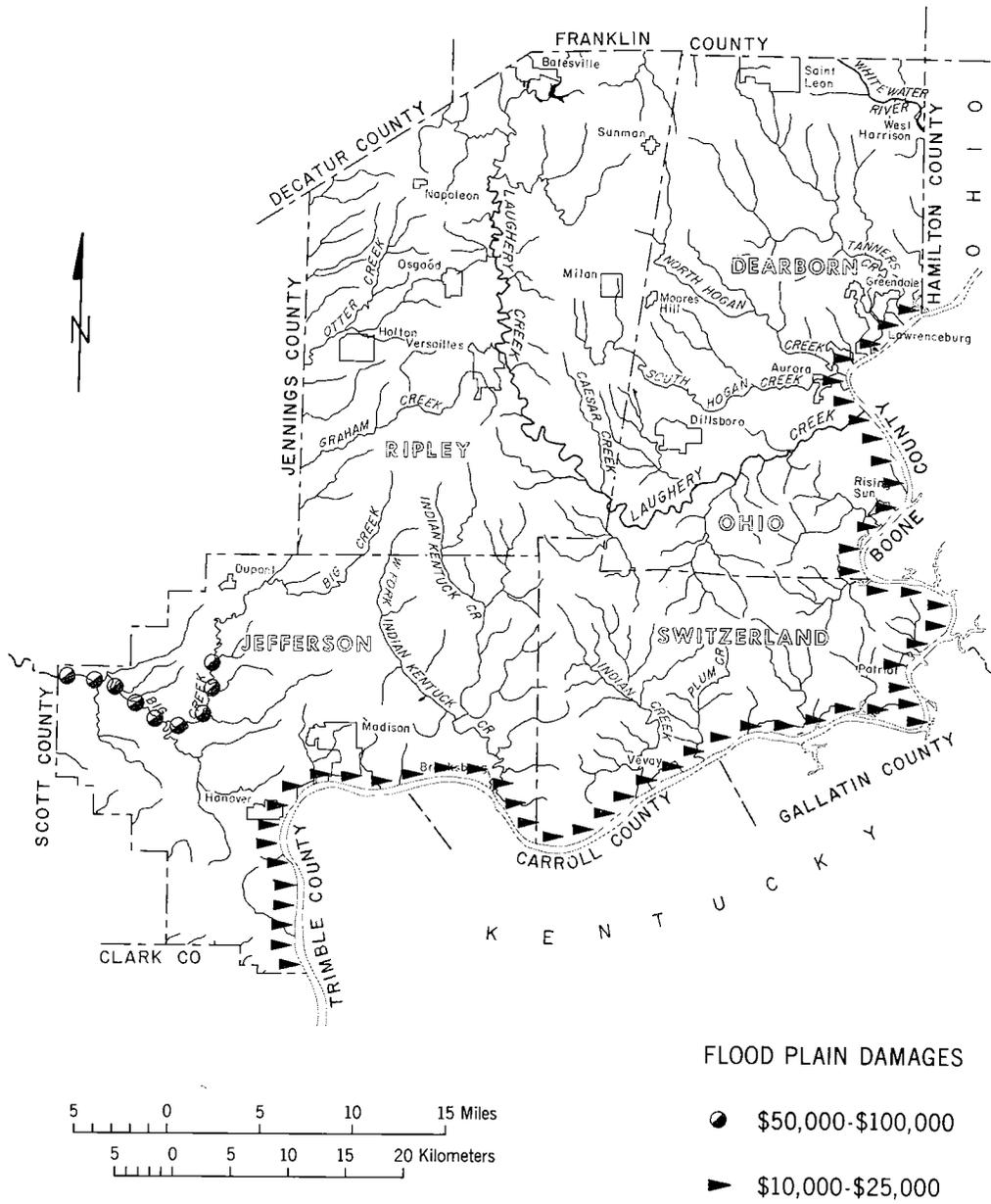


Figure 212
 Map of Region Twelve showing the estimated average annual flood damages per mile along selected streams.

Agricultural Drainage

Approximately twenty percent of the soil associations in the region have "severe," two percent have "moderate," while seventy-eight percent have "slight" wetness characteristics. The general location of the soil associations with these wetness characteristics are shown in Figure 213.

There are only twelve miles of legal drains in the region which serve as the main collectors and outlets for on-farm drainage systems. The maintenance of these systems of legal drains is the responsibility of the local county drainage boards or, in a limited number of cases, of conservancy districts.

Soil Erosion

The erosion potential of soil associations are shown in Figure 214. Forty-eight percent of the region is rated as having a "high" potential hazard. These areas need a good protective cover of trees and grasslands. Vegetative cover is extremely difficult to reestablish on the severely eroded sites. Twenty-four percent of the area has a "medium" potential and the remaining four percent is classified as having a "low" erosion hazard potential for land left in a fallow state.

WATER QUALITY

The surface streams within Region Twelve routinely surveyed for water quality by the Indiana State Board of Health are the Ohio River and Laughery Creek. Water quality standards are established by the Stream Pollution Control Board regulation SPC IR-4, the Water Quality Standards for the State of Indiana.

Water samples from Laughery Creek indicate the concentration of dissolved oxygen, and pH values were in compliance with state regulations.

Water quality conditions of the Ohio River at Markland in 1977 indicated that dissolved oxygen, temperature, and pH values were in compliance with state standards.

Five fish kills have been recorded between 1974 and 1977. Three have occurred in Ripley County, two near Batesville in Little Laughery Creek and one near Sunman in Ripley Creek. One of the fish kills in Little Laughery Creek was caused by an industrial spill and the cause of the other was not determined. The fish kill in Ripley Creek was caused from inadequate sewage treatment. An undetermined number of fish were killed in each of these occurrences. Another fish kill occurred in Tanner's Creek near Lawrenceburg in Dearborn County, but the cause and numbers of fish killed were not determined. The other fish kill occurred in Harbert's Creek near Wirts in Jefferson County. Approximately one hundred fish were killed by an unknown cause.

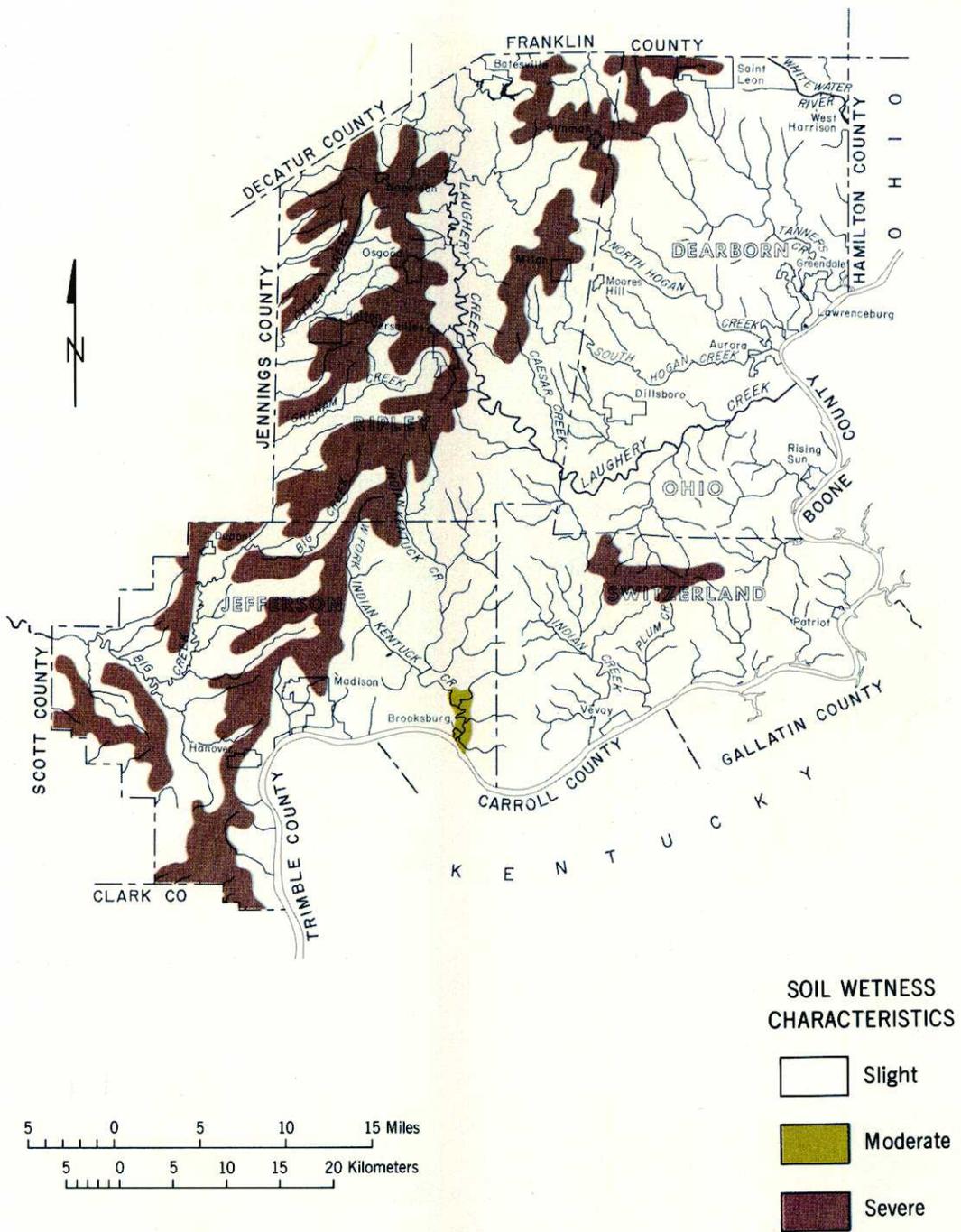


Figure 213
 Map of Region Twelve showing the location of the wetness characteristics of soil associations.

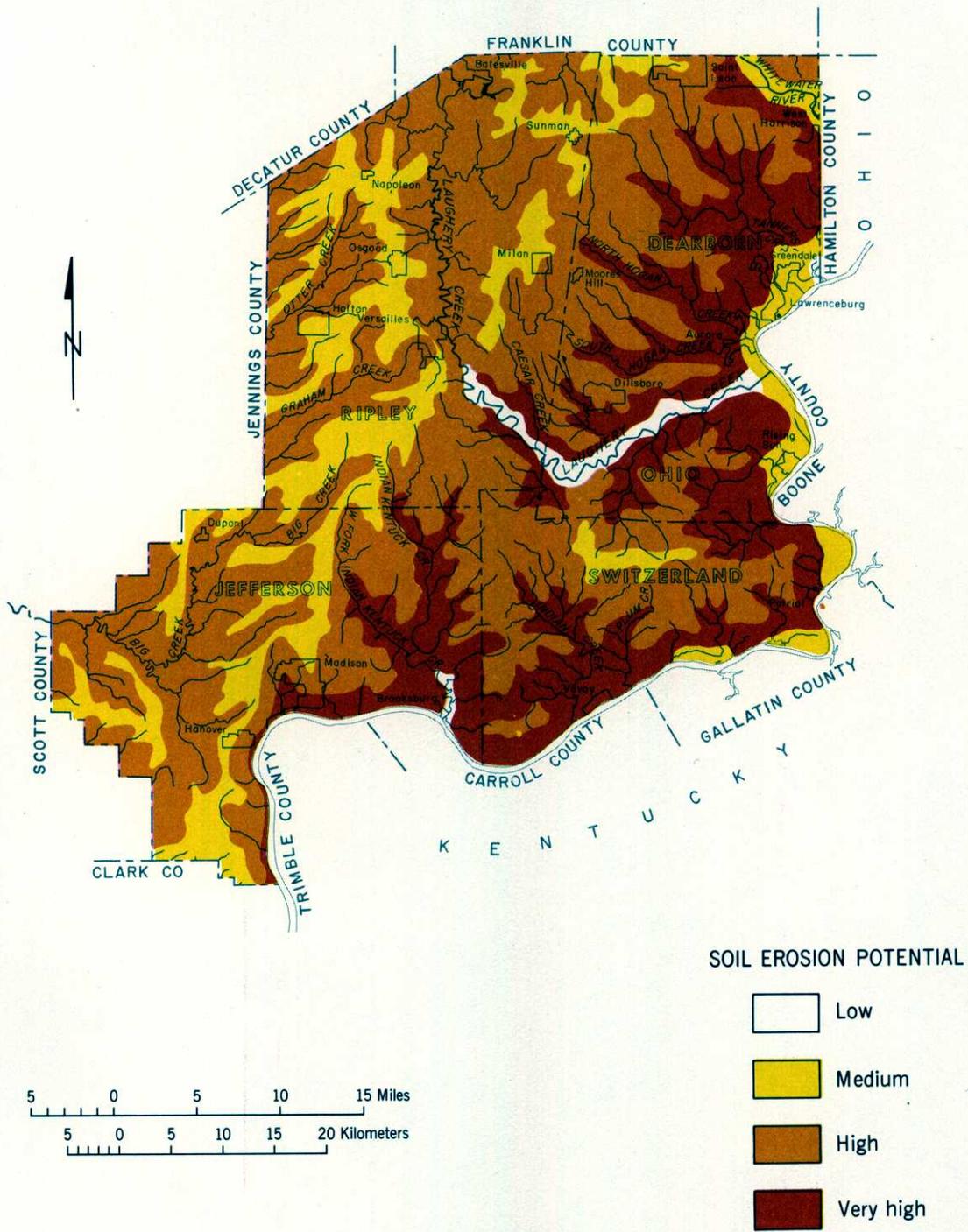


Figure 214
Map of Region Twelve showing the erosion potential of the soil associations.