

self-supplied industrial water is withdrawn from wells, usually located on plant property.

Industrial production by the year 2000 is expected to increase two hundred percent above the 1977 value (United States Water Resources Council). In spite of this predicted increase in industrial output, total industrial water intake is expected to increase slightly from 1.3 mgd to 1.5 mgd. The self-supplied component of the projected industrial use of water is expected to increase from 0.6 mgd to 0.7 mgd. The current and projected self-supplied withdrawals and rates of consumption for industries located in Region One-B are presented in the following table.

**Table 44**

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	0.6	0.6	0.7	0.7
Consumption	0.2	0.2	0.3	0.4

**Rural Self-Supplied Water** An estimated 49,010 persons lived in homes supplied by individual wells in 1975. Approximately 2.9 mgd of water were used for residential purposes in 1975. An estimated 21,800 additional persons may depend on their own wells for household water by the year 2000. This withdrawal of rural self-supplied residential water may increase to 5.3 mgd by the year 2000.

In 1975 there were an estimated 260,000 head of livestock and about 545,400 chickens in Region One-B. Collectively, these animals consumed 1.8 mgd. By the year 2000, ground-water withdrawals for livestock are expected to increase to about 2.06 mgd.

The total withdrawal of rural self-supplied water may increase from the current 4.9 mgd to about 7.4 mgd by the year 2000, as projected here.

**Table 45**

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

<i>Rural Self-Supply</i>	1977	1980	1990	2000
Withdrawal	4.9	5.2	6.3	7.4
Consumption	4.9	5.2	6.3	7.4

**Irrigation Water** Soil associations with irrigation potential are located mainly in the northern half of the region, including an area in southeastern Jasper County. Figure 70 shows these potential irrigation areas. Based upon the survey of irrigated lands, approximately 12,050 acres were irrigated. The principal crop was corn, at 7,400 acres, followed by potatoes at

2,000 acres, and mint at just under 2,000 acres. Other crops irrigated included soybeans and vegetables.

Assuming 1977 as a normal growing year, these crops would have required about 31.7 mgd during the peak irrigation period of July and August. It is estimated that approximately 190,000 acres of croplands could be profitably irrigated. The 12,350 irrigated acres in 1977 are expected to increase to 23,500 acres by the year 2000. This expansion of irrigation acreage is expected to increase the peak July–August irrigation demand in an “average” year to about 62 mgd. The average ground-water use is expected to increase from the current 13.1 mgd to 33.7 mgd by the year 2000.

In addition to agricultural irrigation, there are about 93 acres of irrigated fairways and greens on the region’s golf courses. About 0.3 mgd is applied to golf courses during the peak July–August irrigation period.

The total withdrawal for irrigation of croplands and golf courses during the “average” season of 1977 was approximately 31.9 mgd. These withdrawals may increase to 62.1 mgd during the “average” growing season by 2000, as presented here.

**Table 46**

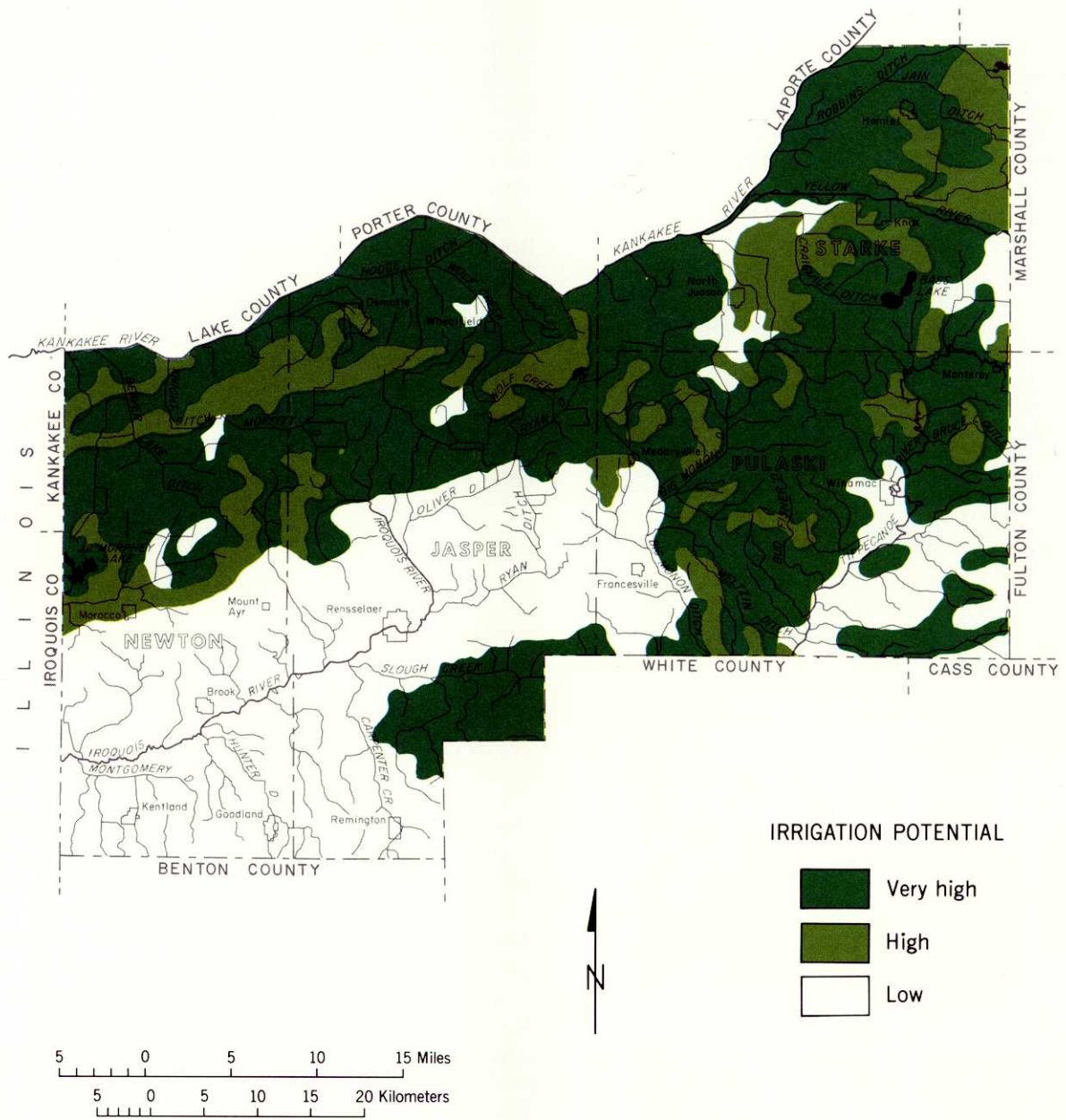
The 1977 and projected withdrawals of irrigation water for croplands and golf courses in million-gallons-per-day.

<i>Irrigation</i>	1977	1980	1990	2000
Withdrawal	31.9	35.9	49.0	62.1
Consumption	31.9	35.9	49.0	62.1

**Electric Energy** The Rensselaer Municipal Electric Utility and the R.M. Schahfer Generating Station are the electric generating stations located in this region. The Schahfer Generating Station, located northeast of Wheatfield in Starke County, is owned and operated by the Northern Indiana Public Service Company. Schahfer is the only generating facility located on the Kankakee River in Indiana.

The Rensselaer plant is rated at 18.3 megawatts (mg). It utilizes internal combustion devices to drive its turbines and consequently, has only minor water needs. The Schahfer plant is rated at 520.8 mw. It utilizes a closed cycle cooling system for its coal-fired steam turbine, and withdraws approximately 6.3 mgd from the Kankakee River. Of this total, 3.5 mgd is returned to the river, resulting in a net consumption of approximately 2.7 mgd.

The Northern Indiana Public Service Company is in the process of enlarging the generating capacity of the Schahfer plant. Construction is presently under way on Unit Number 15 which will have a capacity of 527 mw and is scheduled for operation in 1979. Tentative plans call for the ultimate installation of four units at this



**Figure 70**  
 Map of Region One-B showing the general location of the soil associations that appear to possess an economic potential for the irrigation of croplands.

site. The Northern Indiana Public Service Company has received a permit from the Department of Natural Resources for withdrawals from the Kankakee River of up to 68.5 mgd.

Because of its excellent sustained flow characteristics, the Kankakee River is a candidate for additional power sites and development. Another possible candidate is the Tippecanoe River in eastern Pulaski County.

The current and projected quantity of water withdrawals and consumption for the production of electricity in Region One-B are presented below.

**Table 47**

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

<i>Energy</i>	<i>1977</i>	<i>1980</i>	<i>1990</i>	<i>2000</i>
Withdrawal	6.3	13.0	13.0	13.0
Consumption	2.8	6.0	6.0	6.0

## EXCESS WATER

### Flooding

Approximately 147,000 acres, or seven to eight percent of Region One-B, are subject to flooding. The major flood plains are shown in Figure 71. Figure 72 indicates 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 two million dollars.

Virtually all of the streams in this region are subject to flooding. Flash flooding on streams in the area is uncommon due to the flatness of the topography. The Kankakee and Tippecanoe Rivers are the two major watersheds. These streams are subject to long flood durations.

Some flood protection is provided by a number of private levees in the Kankakee and Yellow River basins. Many of these levees were constructed from dredge spoil at the time of the original dredgings of these streams. Maintenance of these works has been poor in recent years.

**Flood Control** The Bailey-Cox-Newston Small Watershed Protection Project in Starke County is the only federally funded ongoing structural flood control project in the region.

The town of Kentland in Newton County has formed a conservancy district and has developed a plan to relieve its flooding and drainage problems.

The Iroquois Conservancy District was formed for

the purposes of providing flood control, improving drainage, and preventing soil erosion. The district has developed a plan to relieve the flooding and drainage conditions of the Iroquois River.

**Flood Plain Management** Several communities are participating in some phase of the National Flood Insurance Program. Remington and Rensselaer in Jasper County, Newton County unincorporated; Brook, Goodland and Kentland in Newton County; Monterey and Winamac in Pulaski County; and Hamlet and Knox in Starke County are participating in the emergency phase of the National Flood Insurance Program. De Motte in Jasper County is participating in the regular phase of the National Flood Insurance Program.

### Agricultural Drainage

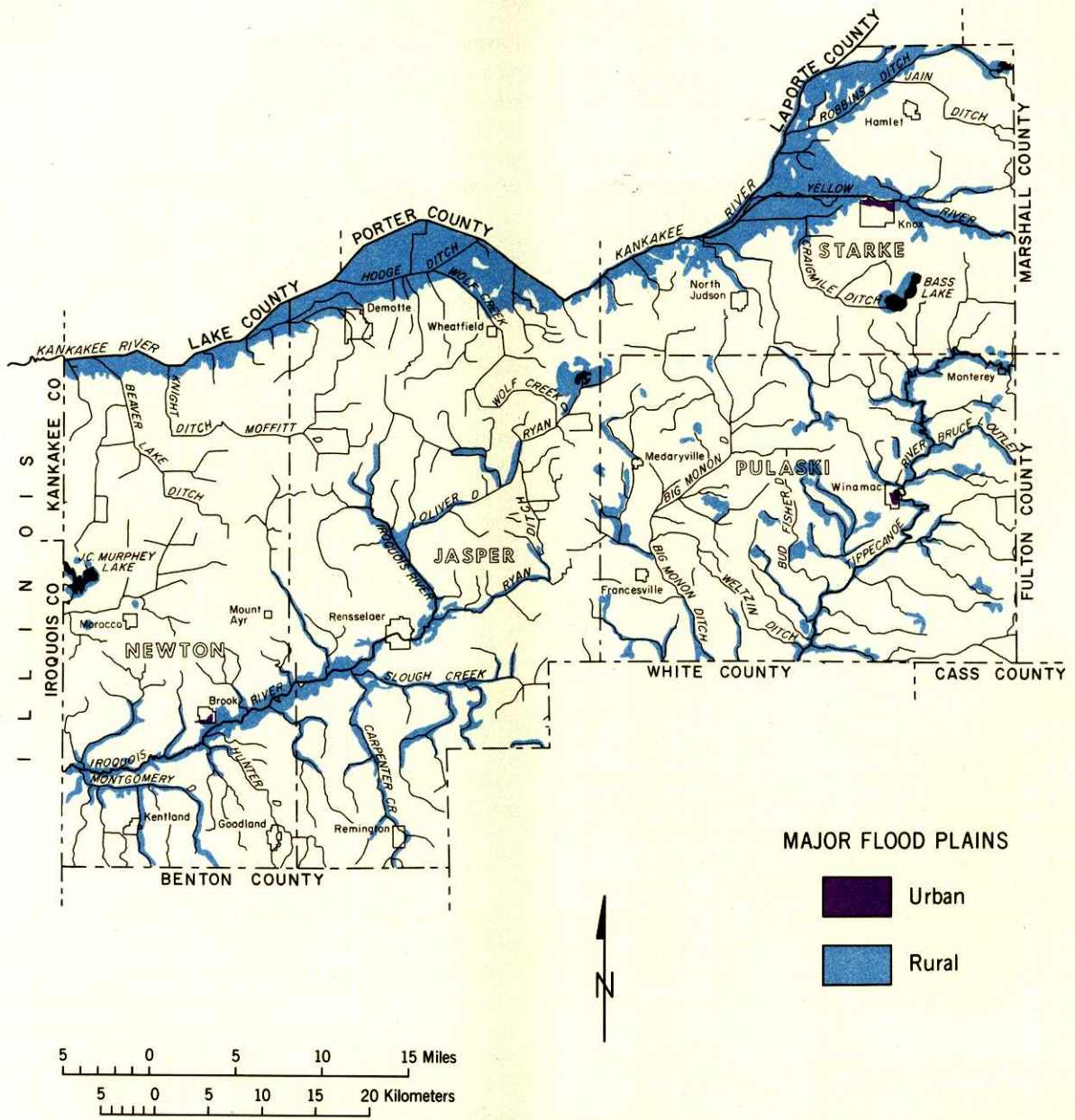
Approximately seventy-two percent of the soil associations have "severe" wetness characteristics, twenty-six percent have "moderate" wetness characteristics, while two percent have "slight" wetness characteristics. The general location of soil associations with these wetness characteristics is shown in Figure 73. There are 3,220 miles of legal drains in the four-county region. This highly complex network of drains serves as the main collector and outlet for on-farm drainage systems. The maintenance of this system of legal drains is the responsibility of the local county drainage board or, in a limited number of cases, of conservancy districts. This network of drains has enabled the region to become one of the most agriculturally productive areas in the nation.

### Soil Erosion

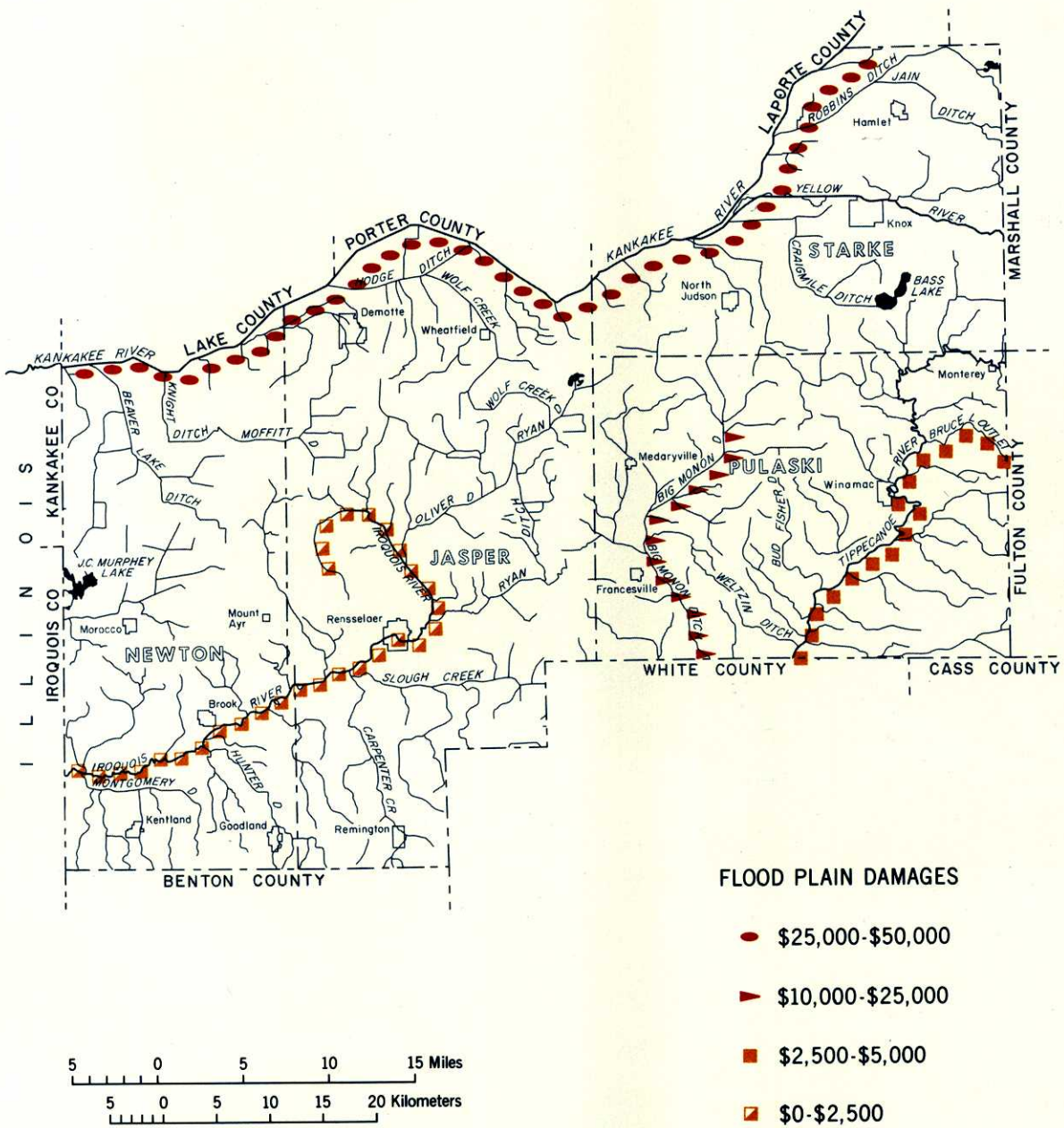
The soils of the region were evaluated as to their potential for erosion and classified as to high, medium, or low erosion hazards as shown in Figure 74. Fewer than three percent of the 1,098,000 acres in Region One-B has a "medium" soil erosion hazard. The remaining ninety-seven percent is ranked as having a "low" erosion potential for land in a fallow state. Surface water runoff from these areas is slow, and erosion control methods are primarily associated with the construction of drainage ditches and the maintenance of outlet ditches and prevention of siltation.

## WATER QUALITY

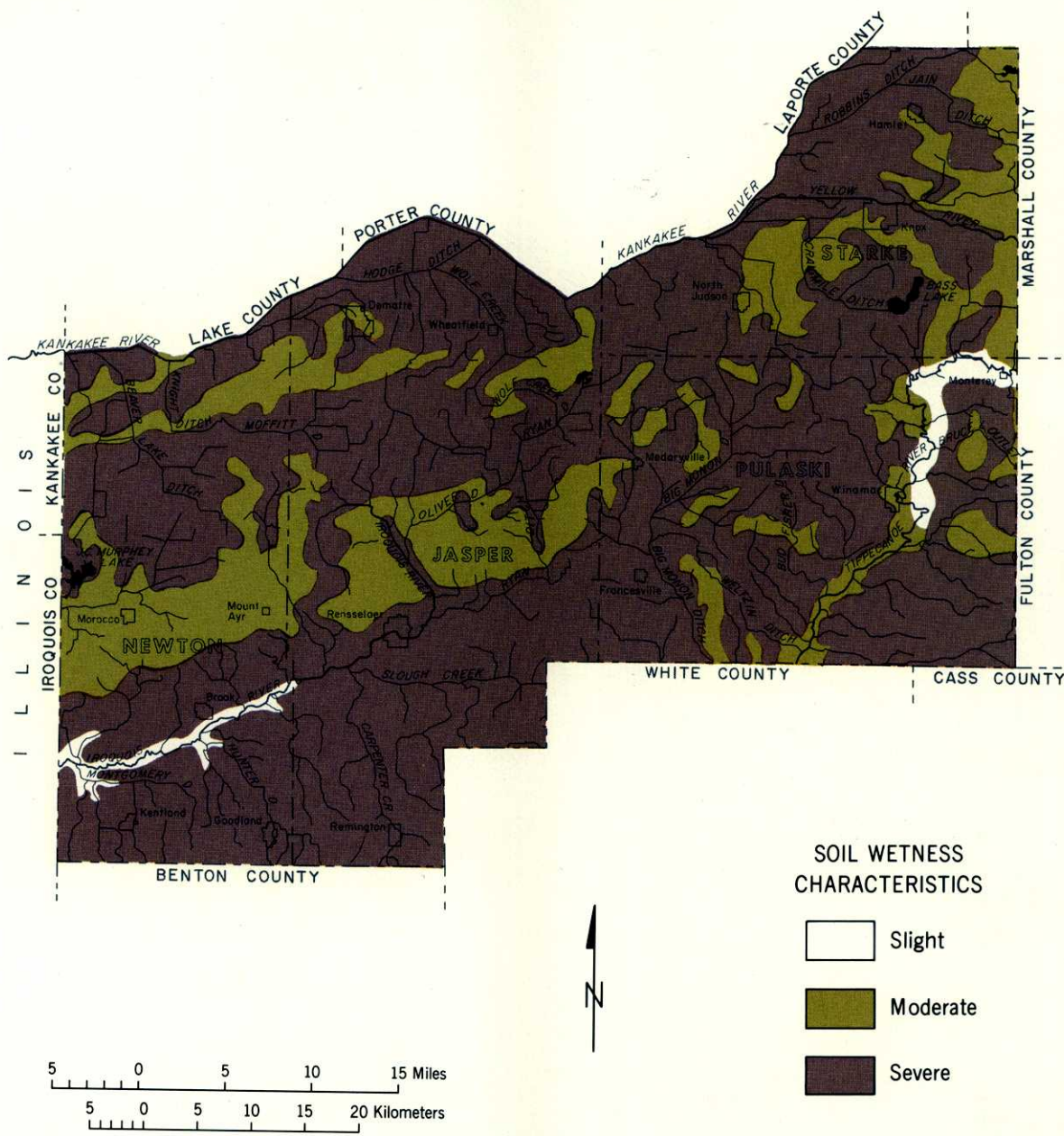
The surface streams routinely surveyed for water quality by the Indiana State Board of Health are the Iroquois, Kankakee, and Tippecanoe Rivers. Water quality standards for the region are established by the



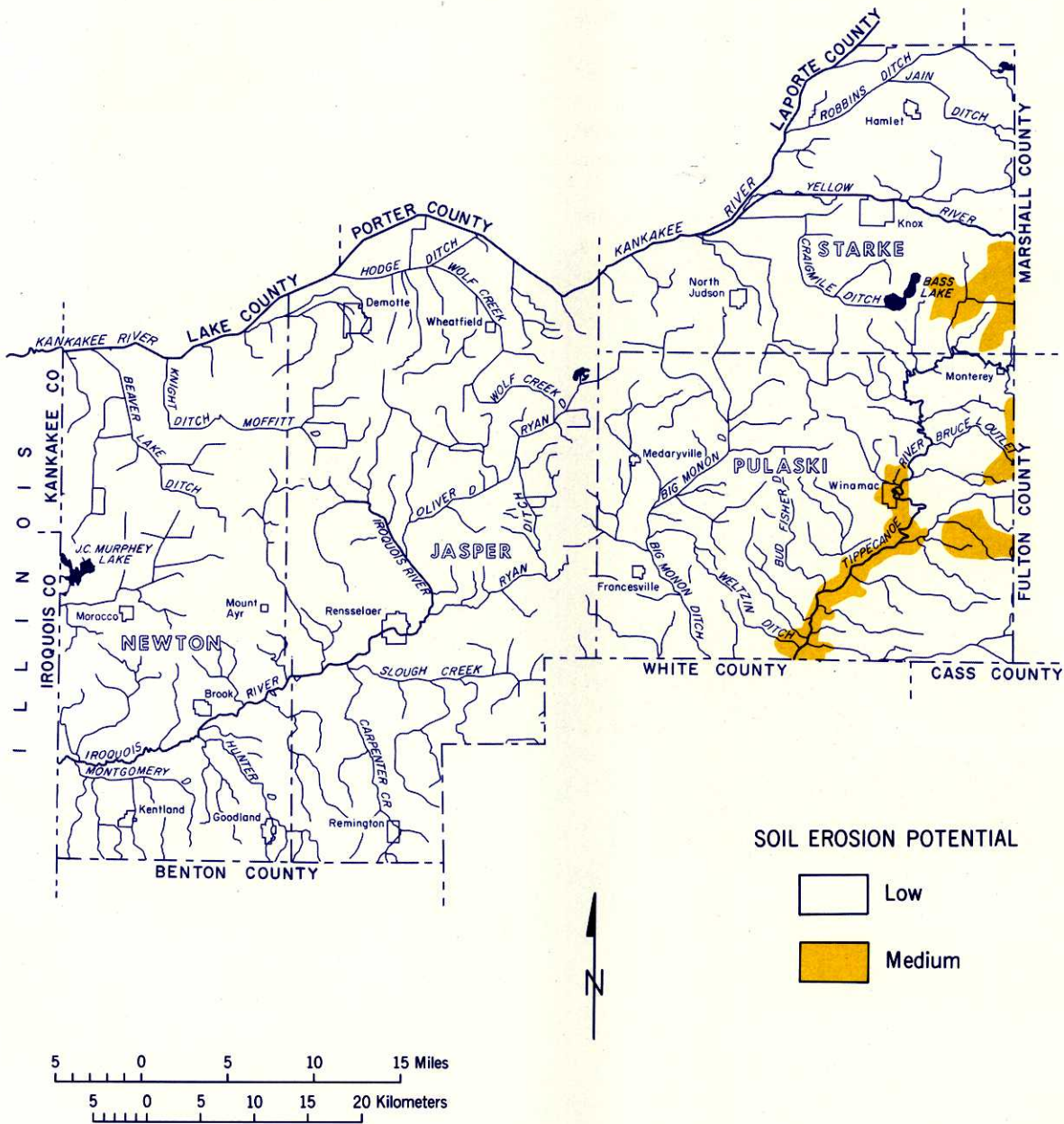
**Figure 71**  
Map of Region One-B showing the major floodplains.



**Figure 72**  
Map of Region One-B showing the estimated average annual flood damages per mile along selected streams.



**Figure 73**  
 Map of Region One-B showing the general location of the wetness characteristics of soil associations.



**Figure 74**  
 Map of Region One-B showing the erosion potential of the soil associations.

Stream Pollution Control Board regulation SPC IR-4, the Water Quality Standards for the State of Indiana.

The Iroquois River at Foresman met both the temperature and dissolved oxygen standards established by SPC IR-4. The biochemical oxygen demand, a measure of the amount of oxygen consumed in the biological processes that breakdown organic matter in water, generally remained within acceptable levels. The pH, a measure of the acidity and alkalinity of a substance, ranged between the permissible values in the Iroquois River at Foresman.

Data obtained from the Kankakee River near Shelby indicated that temperature, dissolved oxygen, nitrates, and the biochemical oxygen demand were within ac-

ceptable levels. The Tippecanoe River also has shown acceptable levels for these parameters.

The trophic, or age classification, of those lakes surveyed by the Stream Pollution Control Board in Region One-B follows.

**Table 48**  
Trophic classification of lakes surveyed.

<i>Lake</i>	<i>County</i>	<i>Age Classification</i>
Bass	Starke	II
Hartz	Starke	I
Longenbaum	Starke	III