# Region Three-B

Adams, Allen, DeKalb, and Wells Counties, located in northeastern Indiana, form Region Three-B. The region contains approximately 1,749 square miles and is bounded by Steuben County to the north, the State of Ohio to the east, Blackford and Jay Counties to the south, and Huntington, Whitley and Noble Counties to the west, as shown in Figure 98.

The population was 373,164 in 1975. The Indiana Population Projections for 1975 to 2000 indicate the population may increase to approximately 493,000 by the year 2000. The 1975 population and the projections for each county are tabulated below.

**Table 69**
The 1975 and projected populations for Region Three-B.

| *County* | *1975* | *1980* | *1990* | *2000* |
|---|---|---|---|---|
| Adams | 27,434 | 28,400 | 30,700 | 32,800 |
| Allen | 288,796 | 306,400 | 347,100 | 384,900 |
| DeKalb | 32,057 | 33,600 | 37,300 | 41,700 |
| Wells | 24,877 | 26,700 | 30,400 | 34,400 |
| Total | 373,164 | 395,100 | 445,500 | 493,800 |

The major population centers within the region are Fort Wayne and New Haven in Allen County, Auburn in Dekalb, Bluffton in Wells, and Decatur in Adams. These urban centers contained about fifty percent of the region's 1975 population.

Agriculture is the dominant land use within the region with more than seventy-nine percent devoted to agricultural purposes. Approximately ten percent of the land is forested while the remaining eleven percent

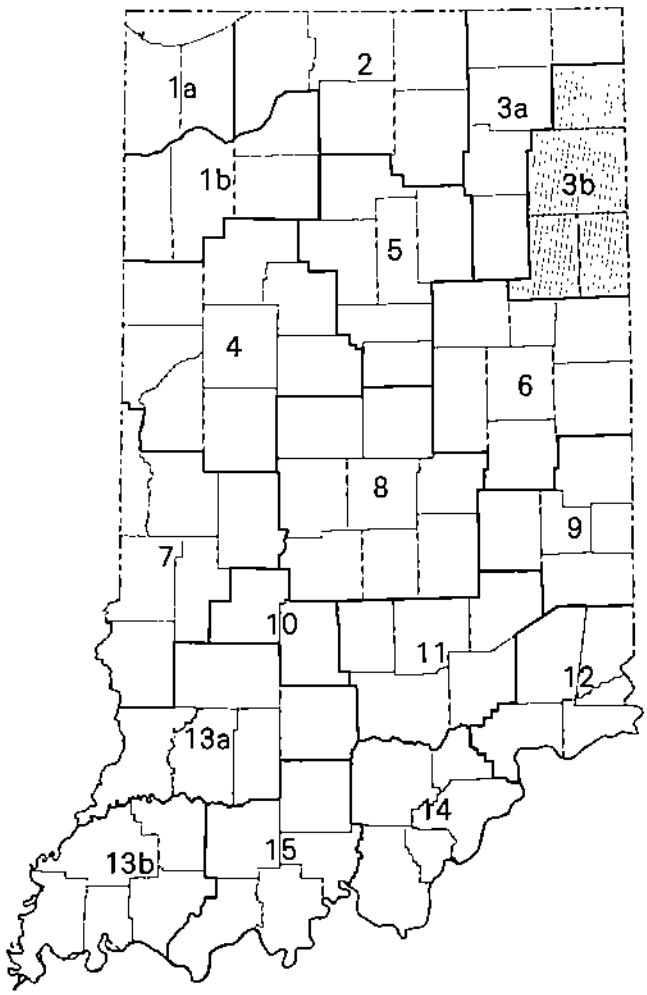


**Figure 98**
Map of Indiana showing the location of Region Three-B.

comprises urban and miscellaneous uses. The region is characterized by a flat to slightly rolling topography.

More than thirty-seven percent of the work force is employed within the region, along with an additional 8,300 nonresident employees. The major employers are electrical machinery, transportation, and nonelectrical machinery industries. Region Three-B is one of the major livestock and corn producing areas of Indiana.

The region receives approximately 36.0 inches of precipitation annually varying from a high of 4.0 inches in June to a low of 1.9 inches in February. Of the 36.0 inches of precipitation falling annually, approximately 10.0 inches appear as streamflow while 26.0 inches are consumed through evapotranspiration. Average temperatures range from 25°F. in January to 72.5°F. in July. The average annual temperature is 50°F. Data from Baer Field in Fort Wayne indicate that the annual prevailing wind is from the southwest at 10.3 miles per hour.

# THE WATER RESOURCE

## Ground Water

Multiple glacial advances during the Illinoian and Wisconsinan periods have left a thick mantle composed primarily of till, with scattered deposits of ice-contact sand and gravel, lake bed deposits, and some outwash sand and gravel throughout the region. Several end moraines of Wisconsinan age are present in the form of concentric lines lying diagonally across the area. The combined Fort Wayne–Wabash Moraines served in blocking meltwaters from the receding glacier and created ancient Lake Maumee which at one time covered most of east-central Allen County and large areas of northwestern Ohio.

Beneath the glacial deposits in southern Adams County are remnants of the buried valley of the former Teays River which flowed through central Indiana prior to the Ice Age. The Teays Valley contains drift materials in excess of a 300 foot thickness in places. In general, glacial drift ranging in thickness from 50 to 200 feet is common, with the thickest materials occurring in northwestern Allen County and the Teays Valley.

Bedrock formations of Silurian and Devonian ages underlie the region. Dolomitic limestone, dolomite, and limestone are the common bedrock types in the area with carbonaceous shale of Devonian age occurring in northwestern Allen County. Silurian bedrock occurs beneath much of Adams and Wells Counties, with younger Devonian rocks predominating in Allen County.

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 slight variability in ground-water occurrence, as shown in Figure 99. Exclusive of an area in east-central Allen County, large diameter wells will yield from 200 to 600 gallons-per-minute (gpm). Major ground-water supplies are present in the Berns and Geneva areas from sand and gravel deposits within the buried Teays Valley and from thick inter-till sand and gravel aquifers in northwestern Allen County.

The availability of ground water in Allen County is generally good in the western half with yields ranging from 200 to 600 gpm. Wells are expected to produce 50 to 200 gpm from the Silurian limestone and dolomite aquifers in eastern Allen County. Ground-water conditions in Wells and Adams Counties are quite similar, and well yields of 200 to 400 gpm are possible. The Silurian bedrock is the major aquifer in parts of Adams and Wells Counties, due to the absence of sand and gravel aquifers.

In DeKalb County, well yields range from 100 gpm in a few western areas to 1,000 gpm near Butler and Auburn. Remaining areas of the county contain aquifers capable of yielding 200 to 600 gpm.

Ground water, while generally of a quality satisfactory for most uses, contains one of the more unique mineral assemblages within the state. High hardness, with sulfate and fluoride contents, is common. Most hardness levels are in excess of 400 parts-per-million (ppm), and many are above 600 ppm. Sulfate levels greater than 250 ppm are present in nearly all of Adams County, much of eastern and northern Wells County, and the southeastern portion of Allen County. Fluoride concentrations above one ppm can be expected from most ground-water supplies. Locally, hydrogen sulfide is encountered in Adams, Allen, and parts of Wells Counties; however, its incidence is less than in northwestern Indiana.

## Surface Water

**Streamflow** The majority of the streams drain through the St. Joseph and St. Marys River systems to the Maumee River, and ultimately to Lake Erie. Two exceptions are the southwest quarter of the region which is drained westwardly by the Wabash River and the northwest corner which drains into the Pigeon River. None of the major streams have their origin within the region.

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 within Region Three-B are given in Table 70.

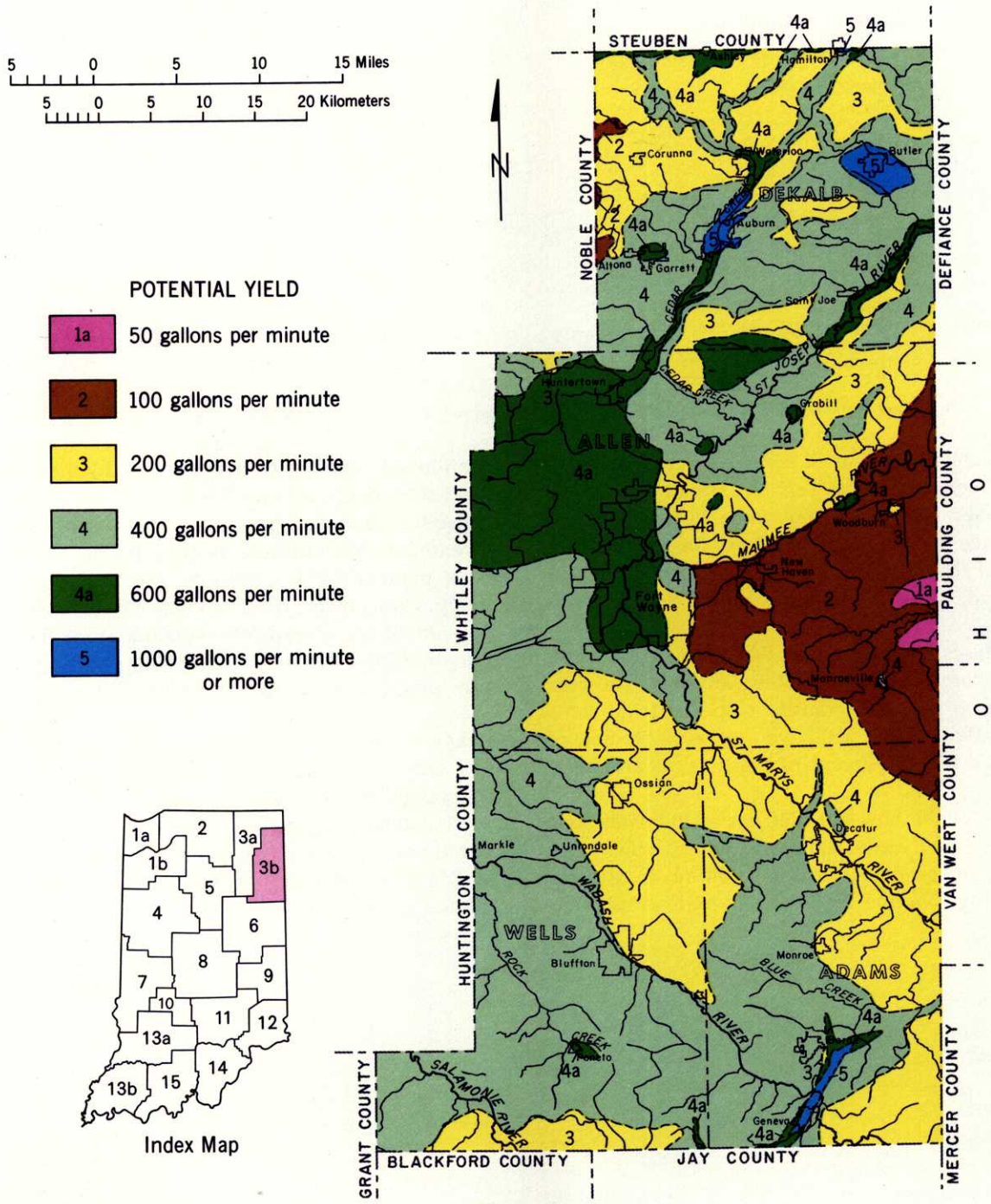


**Figure 99**

Map of Region Three-B showing the general location and potential yield of ground water from properly constructed large diameter wells.

**Table 70**
Flow characteristics of streams.

| *Stream* | *Drainage Area (square miles)* | *Million-Gallons-Per-Day* | | |
|---|---|---|---|---|
| | | *Average Annual* | *Q7-10* | *Q1-30* |
| Cedar Creek at Auburn* | 87 | 43 | 1.2 | 0.5 |
| Maumee River at New Haven | 1,967 | 1,000 | 45.0 | 31.0 |
| St. Joseph River at Cedarville | 763 | 380 | 17.0 | 13.0 |
| St. Joseph River near Fort Wayne | 1,060 | 630 | 30.0 | 23.0 |
| St. Joseph River near Newville | 610 | 320 | 12.0 | 9.0 |
| St. Marys River at Decatur | 621 | 320 | 6.1 | 4.0 |
| St. Marys River near Fort Wayne | 762 | 380 | 5.8 | 3.6 |
| Wabash River at Bluffton | 532 | 250 | 3.3 | 2.4 |

*Flow characteristics estimated from a stream gaging station with a short period of record.

The flow characteristics of surface streams indicate that the largest and most reliable streamflow is the Maumee River. The seven day, once in ten year and one day, once in thirty year low flows for the Maumee River reveal that the river has a sustained flow of at least 31 mgd, while the average annual flow exceeds 1,000 mgd.

The St. Marys River near Fort Wayne has an average annual discharge of approximately 380 mgd. The flow duration curve has a moderate slope and indicates that the St. Marys River will have a dependable flow of fourteen mgd ninety percent of the time, as shown in Figure 100.

The slope of the flow duration curve indicates that the Maumee River basin contains aquifers which provide significant ground-water contribution to streamflow. To verify this, the technique of hydrograph separation was applied to three annual hydrographs representing "dry," "average," and "wet" years. The results indicate that the ground-water contribution to streamflow amounts to twenty-seven, sixteen, and eight percent for dry, average, and wet years, respectively. Conversely, from seventy-three to ninety-two percent of the streamflow, depending on the year, is due to direct surface runoff from runoff-producing precipitation events or snowmelt.

**Lakes** The lakes within the region that are at least fifty acres in size or have a storage capacity of 32.5 million gallons or more are presented in Table 71 and are located on Figure 101. These thirteen lakes have a combined surface area of approximately 720 acres with a gross storage capacity of approximately 4,090 million gallons. Included with the region's lakes are

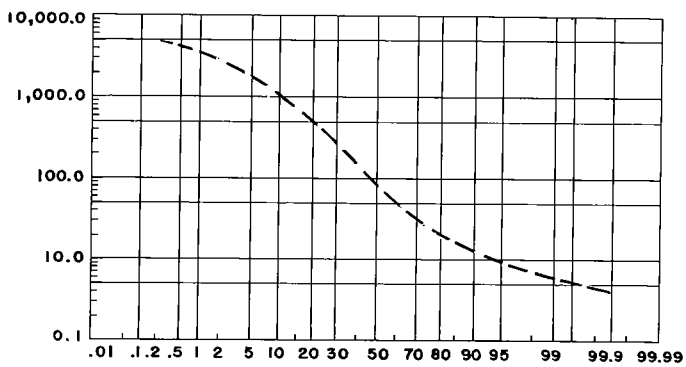


**Figure 100**
The flow duration curve for the St. Marys River near Fort Wayne.

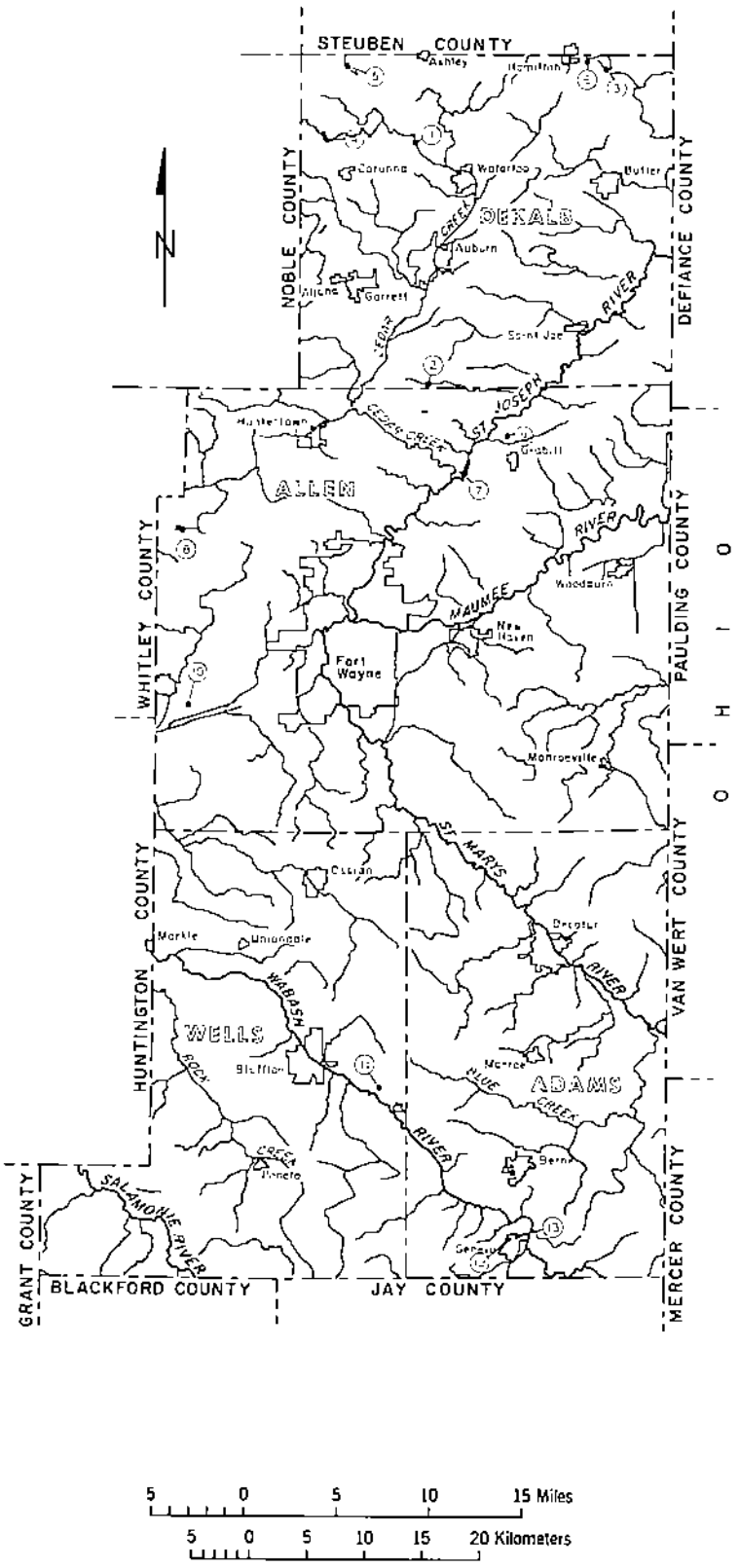


**Figure 101**
Map of Region Three-B showing the location of lakes that are at least 50.0 acres in size or that have a storage capacity of 32.5 million gallons or more.

**Table 71**
Lakes at least 50 acres in size or with 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 | Cedar Lake | 23.40 | 28.0 | 74 |
| 2 | Dunton Lake | na | 21.0 | 110 |
| 3 | Grey Stone Pond | na | na | 39 |
| 4 | Indian Lake | 3.76 | 56.0 | 397 |
| 5 | Story Lake | 3.16 | 77.0 | 332 |
| 6 | Terry Lake | na | 17.0 | 52 |
| 7 | Cedarville Reservoir | 764.00 | 366.8 | 694 |
| 8 | Everett Lake | 1.07 | 43.0 | 211 |
| 9 | Hurshtown Reservoir | na | na | 1,889 |
| 10 | Kekionga Lake | na | na | 32 |
| 11 | Kunkel Lake | na | 25.0 | 48 |
| 12 | Lake of the Woods | 0.26 | 37.0 | 61 |
| 13 | Rainbow Lake | na | 51.1 | 153 |

na: not available.

the Cedarville and Hurshtown Reservoirs, which are water supply sources for the city of Fort Wayne. Cedarville Reservoir has a storage of 554 million gallons while Hurshtown Reservoir has a storage of 1,889 million gallons.

# UTILIZATION OF THE WATER RESOURCE

## Instream Uses

The supply and demand analysis for recreational uses of water by the residents of Region Three-B is presented in Table 72. The existing supply for recreational activity is expressed as a percentage of the demand. Therefore, when this percentage exceeds one hundred the supply will exceed the demand. Conversely, when the supply as a percentage of demand is less than one hundred the supply will be less than the projected demand.

**Boating and Waterskiing** Only one percent of the needs for waterskiing are met by existing recreational facilities. No lakes within the region are suitable for waterskiing. Twenty acres of the St. Joseph River are available for waterskiing. About 1,100 acres of water are available for boating, but this supply will meet only four percent of the projected 1980 demand.

These shortages indicate that recreationists from the region are traveling to other regions to participate in boating and waterskiing activities. Data from the *Origin-Destination and Out-of-State Visitor Study*, compiled for the Department of Natural Resources, suggests that Region Three-B residents are traveling to Region Three-A to meet their water based recreation needs.

**Canoeing** Canoeing is available along forty miles of the St. Joseph River, thirty-nine miles of the Wabash River, and fourteen miles of Cedar Creek. The St. Joseph River and Cedar Creek present the most natural conditions for canoeing. Cedar Creek has been designated for protection under Indiana's Natural Scenic and Recreational Rivers System for the fifteen miles above the confluence with the St. Joseph River. The

**Table 72**
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 | 30 | 19.6 boats/acre/year | 1,100 acres | 4 | 4 | 4 |
| Waterskiing | 13 | 34.4 skiers/acre/year | 20 acres | 1 | 1 | 1 |
| Canoeing | 12 | 585 canoes/mile/year | 93 miles | 100+ | 100+ | 100+ |
| Swimming | 48 | 76,600 swimmers/acre/year | 3 acres | 11 | 10 | 9 |
| Ice-Skating | 13 | 6,678 skaters/acre/year | 29 acres | 100+ | 100+ | 100+ |
| Fishing | 44 | 66 persons/acre/year | 3,500 acres | 12 | 11 | 11 |

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.

supply of ninety-three miles of available canoeing streams and rivers is adequate to meet the region's demand for canoeing opportunities through the year 2000.

**Swimming and Ice-Skating** The demand for swimming opportunities currently exceed the available supply and may continue to exceed the supply through the year 2000. Ice-skating opportunities within the region are abundant. The projected demand is expected to be met by the current supply through the year 2000.

**Fishing** The quality of the fisheries habitat is indicated in Figure 102. The upper St. Joseph River, Cedar Creek, Eightmile Creek, Fish Creek, and the Salamonie River are noted for the best stream fishing in the region, although good aquatic habitat is also found in other streams. Because spawning is limited in the Wabash and St. Marys Rivers, the smaller tributaries maintain the game fish populations. Bluegill, smallmouth bass, catfish, and other warmwater species comprise the fishery resource.

Most lakes are bordered by residential development. The undeveloped shoreline is associated with deep marshes and swamps and is used by some fish for spawning. Warmwater fish also comprise lake fisheries. The most notable game fish are bluegill and largemouth bass. Aquatic habitat is good in all the lakes but limited mainly by water quality.

State-owned access for fishing is provided on Story Lake in DeKalb County. Otherwise public access is limited to roadways and bridges.

Region Three-B's supply of fishing lakes and streams for public use meets only twelve percent of the demand. By the year 2000, eleven percent of the projected demand may be fulfilled. Use of fishing waters in other regions, especially Region Three-A, is expected to compensate for the shortages.

**Riparian Habitat** The quality of the riparian habitat associated with streams is shown in Figure 103. Riparian habitat is rated from moderate to good on most large streams, with the best habitat occurring along the St. Joseph River and Cedar Creek in northern Allen and DeKalb Counties. Significant wetlands are limited to the undeveloped shorelines of natural lakes in the region. The expanding residential construction has become a primary limiting factor to wildlife habitat in the region. Areas of sufficient habitat support and are frequented by resident and migrant waterfowl, other birds, high populations of furbearers (especially raccoon and muskrat), and most native upland game. Hunting is not available on state properties within the region.

**Hydroelectric Power** Up-River Dam is the only hydroelectric plant located in Region Three-B. The dam is located on the St. Joseph River in Allen County, and is capable of producing 175 kilowatts. The plant is owned by the Fort Wayne Municipal Utility which uses the power to operate pumps for movement of water to a filtration plant. The potential for developing additional hydroelectric plants in the region is minimal.

## Withdrawal Uses

**Public Water Supplies** Adams, Allen, DeKalb, and Wells Counties are served by twenty-five public water utilities. An estimated 259,000 persons or sixty-nine percent of the population was served by a public utility in 1975. Allen, DeKalb, Adams, and Wells Counties contain twelve, six, four, and three public water utilities respectively.

The Fort Wayne Water Utility, the largest in the region, supplies an average of 28.8 mgd to approximately 185,300 customers. Auburn is the second largest, withdrawing an estimated 2.2 mgd. The four largest utilities in the region account for approximately twenty-five percent of the public water withdrawals in the region. The twenty-five public water utilities withdrew an average of 38.0 mgd in 1975. Maximum daily withdrawals are estimated at 65.3 mgd. The water service areas are shown in Figure 104.

The majority of public water utilities depend upon ground water as a source of supply. Most of these towns obtain their water from well fields located in or close to the corporate limits, although Decatur obtains its water from a well field located nearly fourteen miles from town. Fort Wayne obtains water from the St. Joseph River and Cedarville Reservoir to meet its present needs, and may utilize the Hurshtown Reservoir to supply future demands. New Haven purchases water from the Fort Wayne system. Bluffton obtains parts of its water needs from the Wabash River and the remainder from ground water.

Projections of public water supplies indicate that withdrawals of the region's public water supplies should increase to about 55.8 mgd by the year 2000 as shown here.

**Table 73**

The 1977 and projected water withdrawal and consumption rates of public water supplies, in million-gallons-per-day.

| *Public Water* | *1977* | *1980* | *1990* | *2000* |
|---|---|---|---|---|
| Withdrawal | 38.0 | 40.2 | 48.4 | 55.8 |
| Consumption | 3.8 | 4.0 | 4.8 | 5.6 |

**Industrial Water** Industrial establishments had an estimated water intake averaging 62.3 mgd in 1977. Ten mgd of the intake was consumed. Of the total indus-

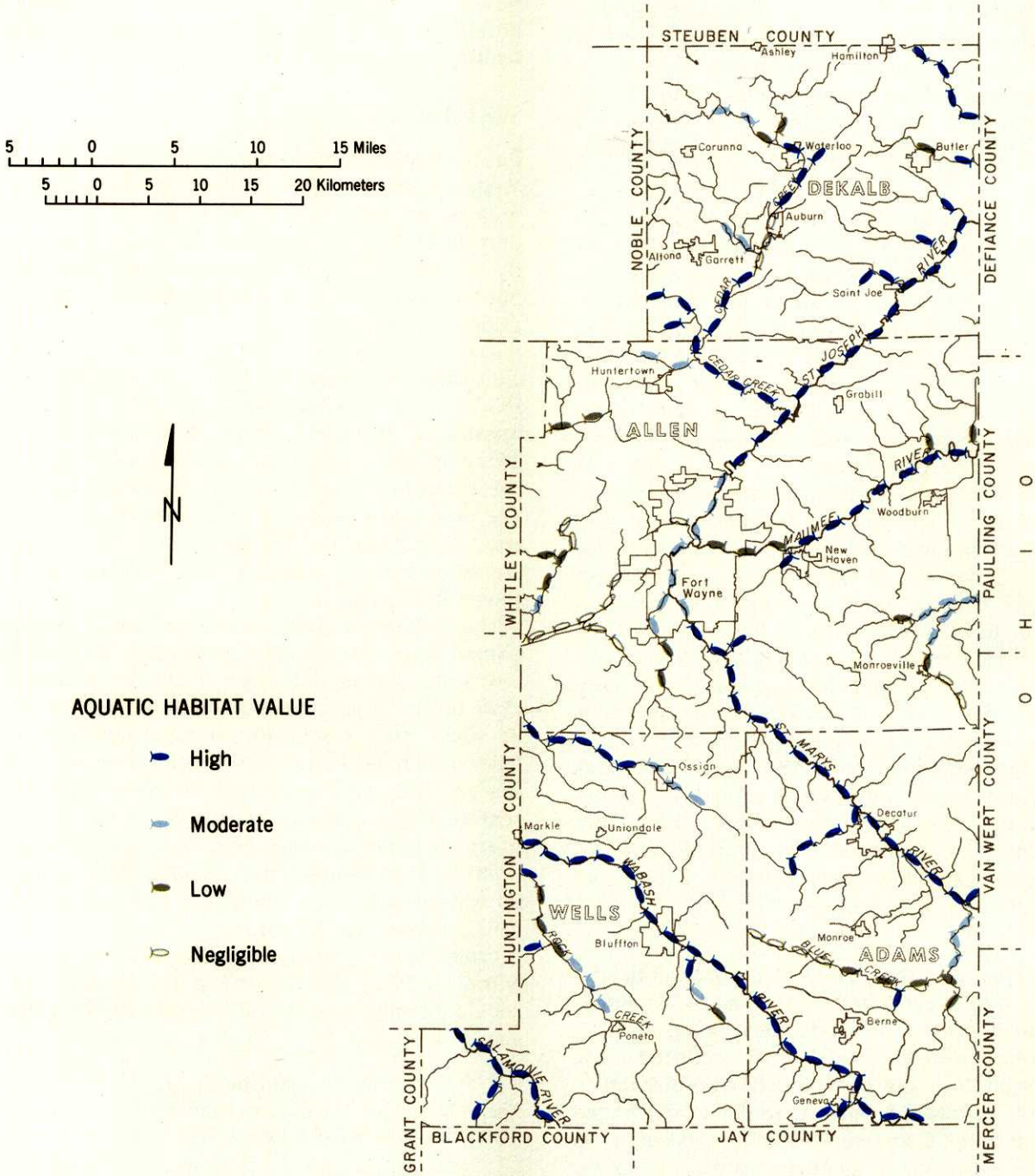


**Figure 102**
Map of Region Three-B showing the quality of the fisheries habitat.

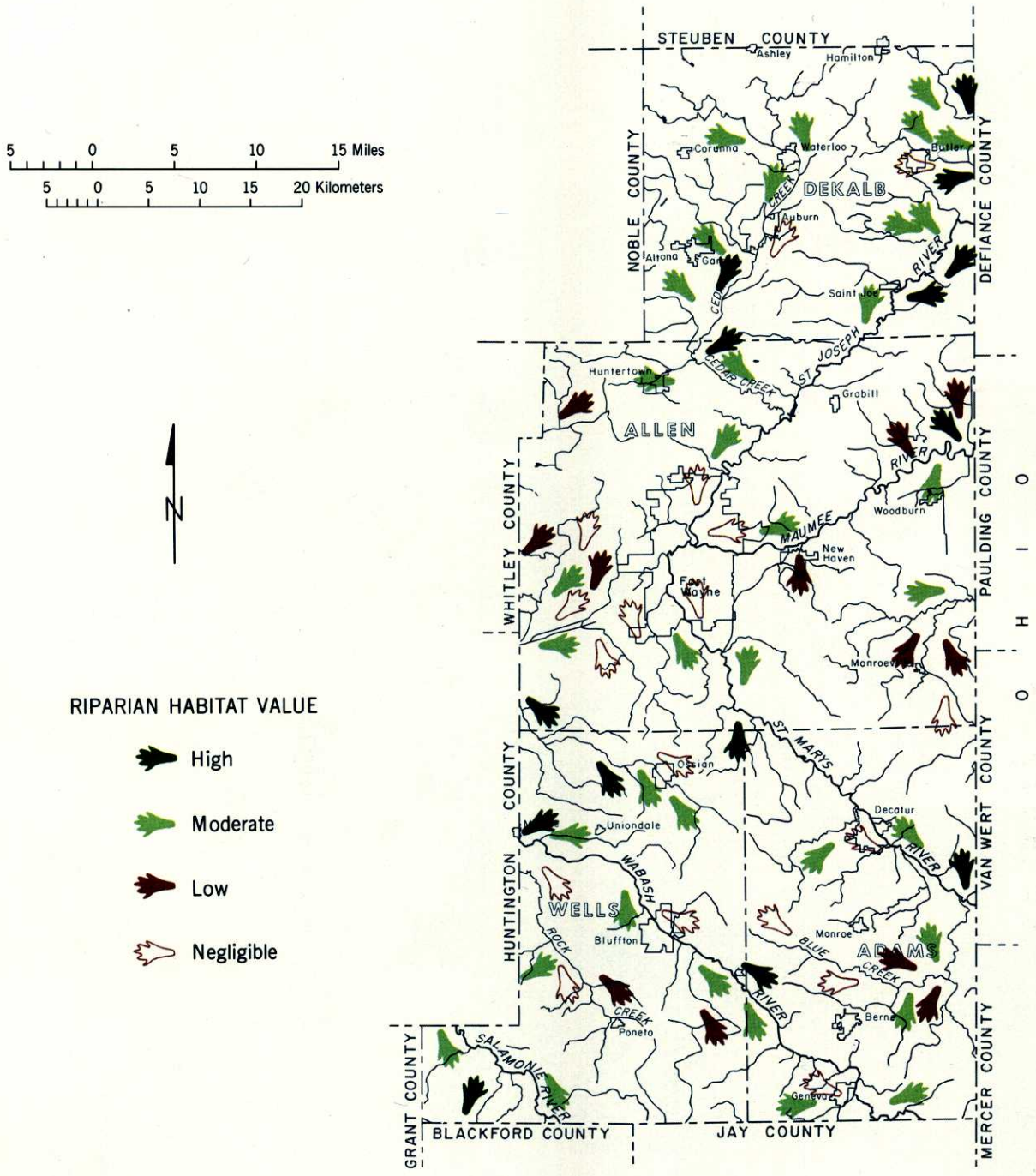


**Figure 103**
Map of Region Three-B showing the quality of the riparian habitat.

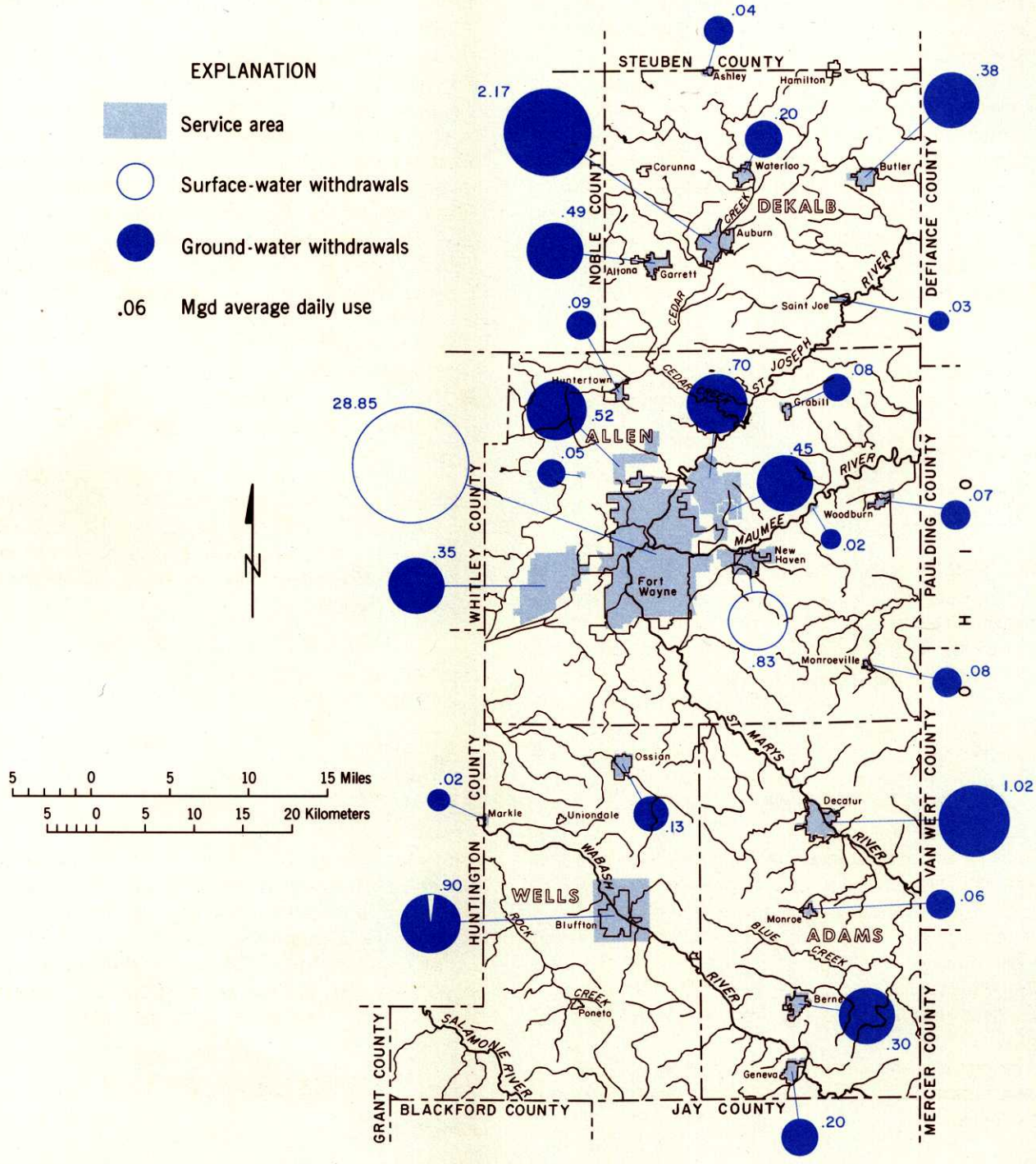


**Figure 104**

**Map of Region Three-B showing the service areas of the public water utilities and average daily use in million-gallons-per-day.**

trial intake, approximately 39.7 mgd is self-supplied while approximately 22.6 mgd is purchased from public water utilities. Most of the self-supplied water is withdrawn from ground-water sources.

Small industries withdrew approximately 29.0 mgd in 1977. Processors of food and related products withdrew over 13.0 mgd.

Growth in industrial production over the next twenty-five years could result in an increase of water withdrawal to 69.0 mgd by the year 2000. The self-supplied component is expected to increase to nearly 48.0 mgd. Total industrial water intake is expected to fall initially due to increased plant efficiency and then increase slowly as output increases. Information of industrial self-supplied withdrawals are presented in the following table.

**Table 74**
The 1977 and projected self-supplied withdrawal and consumption rates for industries, in million-gallons-per-day.

| *Industrial Self-Supplied* | *1977* | *1980* | *1990* | *2000* |
|---|---|---|---|---|
| Withdrawal | 39.7 | 39.9 | 43.7 | 47.8 |
| Consumption | 6.4 | 7.0 | 9.6 | 12.8 |

**Rural Self-Supplied Water** The majority of rural self-supplied water is withdrawn from ground-water sources. An estimated 114,000 persons lived in homes supplied by individual wells in 1975. It is estimated that these residents withdrew approximately 6.7 mgd during 1975. By the year 2000, an estimated 39,400 additional persons may withdraw ground water for household use. These residents, along with the anticipated general rise in the standard of living, are expected to increase rural water use to about 11.5 mgd by the year 2000.

In 1975, an estimated 309,000 head of livestock and about 906,000 chickens and turkeys were raised in Region Three-B. Collectively, these animals consumed approximately 2.1 mgd. The amount of water required by the domestic animal population may increase to approximately 2.4 mgd by the year 2000. The water for animals is usually withdrawn from wells on individual farms.

The current and projected withdrawals and rates of consumption for rural self-supplied water are tabulated here.

**Table 75**
The 1977 and projected withdrawal and consumption rates of self-supplied rural water, in million-gallons-per-day.

| *Rural Self-Supplied* | *1977* | *1980* | *1990* | *2000* |
|---|---|---|---|---|
| Withdrawal | 9.2 | 9.8 | 11.9 | 13.9 |
| Consumption | 9.2 | 9.8 | 11.9 | 13.9 |

**Irrigation Water** The few areas of soil associations with irrigation potential within Region Three-B are mainly located in river valleys, as shown by Figure 105. Based upon the survey of irrigated lands, approximately 839 acres were irrigated in the region in 1977. Assuming 1977 as a normal growing year, these crops would have required about 2.2 mgd during the peak irrigation period of July and August.

It is estimated that 15,000 acres of croplands could be profitably irrigated. Approximately 2,000 acres may be irrigated by the year 2000. This expansion of cropland acreage may increase the peak July and August irrigation demand in an "average" season to 5.2 mgd. The "average" season increase in ground-water withdrawal for the irrigation of croplands may increase from the current 0.4 mgd to 2.6 mgd by the year 2000.

In addition to the irrigation for agricultural use, water is withdrawn to irrigate fairways and greens on the region's golf courses. About 2.2 mgd is applied to these areas during the peak July– August irrigation period.

The total withdrawal for the irrigation of croplands and golf courses during the "average" irrigation season of 1977 was approximately 4.4 mgd. These withdrawals may increase to 8.2 mgd during the "average" irrigation season by the year 2000 as tabulated here.

**Table 76**
The 1977 and projected withdrawal of irrigation water for croplands and golf courses, in million-gallons-per-day.

| *Irrigation* | *1977* | *1980* | *1990* | *2000* |
|---|---|---|---|---|
| Withdrawal | 4.4 | 4.9 | 6.6 | 8.2 |
| Consumption | 4.4 | 4.9 | 6.6 | 8.2 |

**Electric Energy** Up-River Dam, a hydroelectric power facility, is the only generating station located in the region. It does not require water withdrawals and is, therefore, discussed within "Instream Uses."

There are no rivers in the region that possess a sustained streamflow capable of supporting generating stations of the type currently being built.

# EXCESS WATER

## Flooding

Approximately 31,700 acres of the region are subject to flooding. The major flood plains are shown in Figure 106. The flood plains of these rivers are broad and prone to frequent and severe flooding, particularly in winter and spring. Floods in these areas usually occur when warm rain falls on frozen or snow-covered ground, and runoff from these storms often exceeds

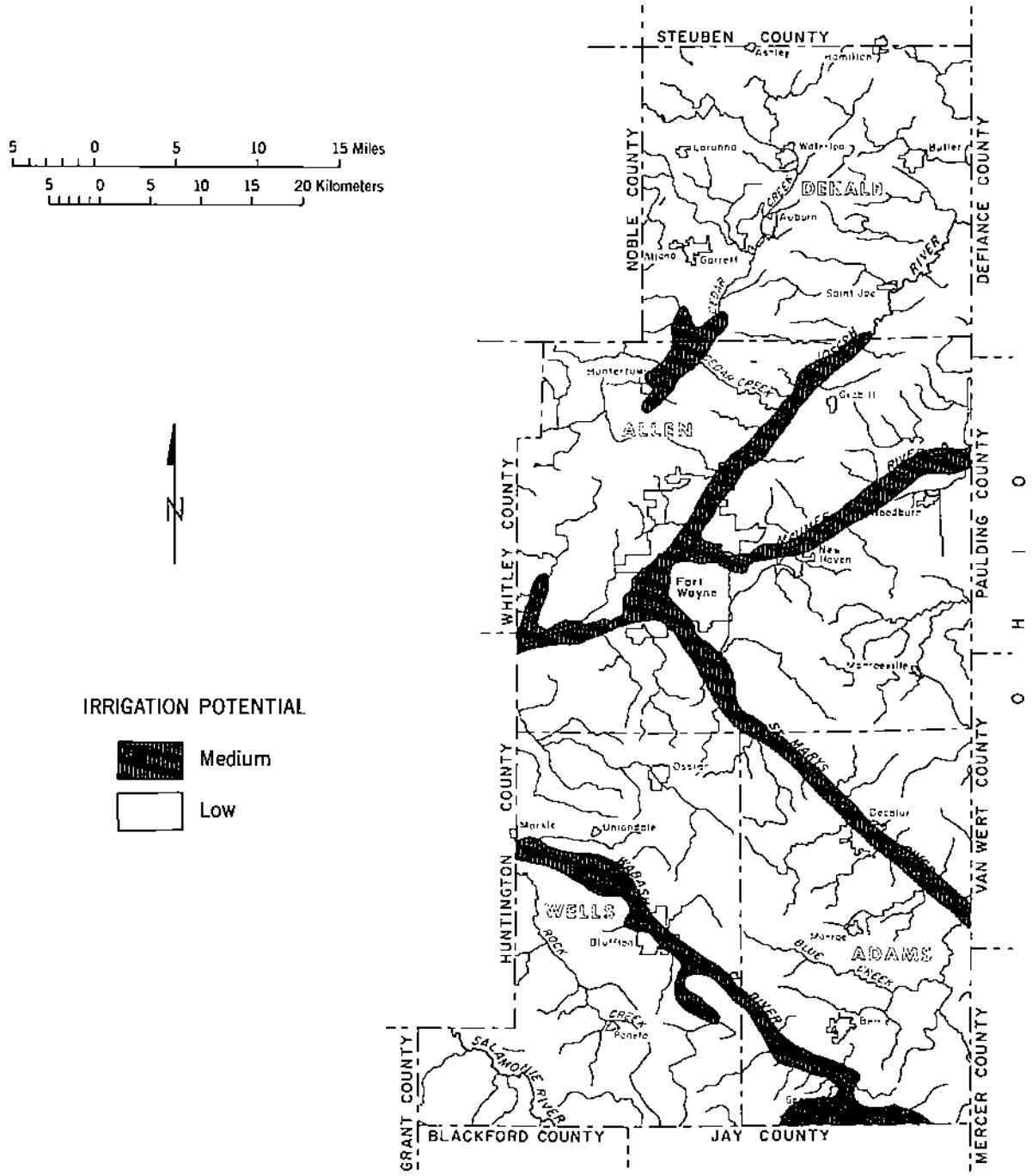


**Figure 105**
Map of Region Three-B showing the general location of the soil associations that appear to possess an economic potential for the irrigation of croplands.

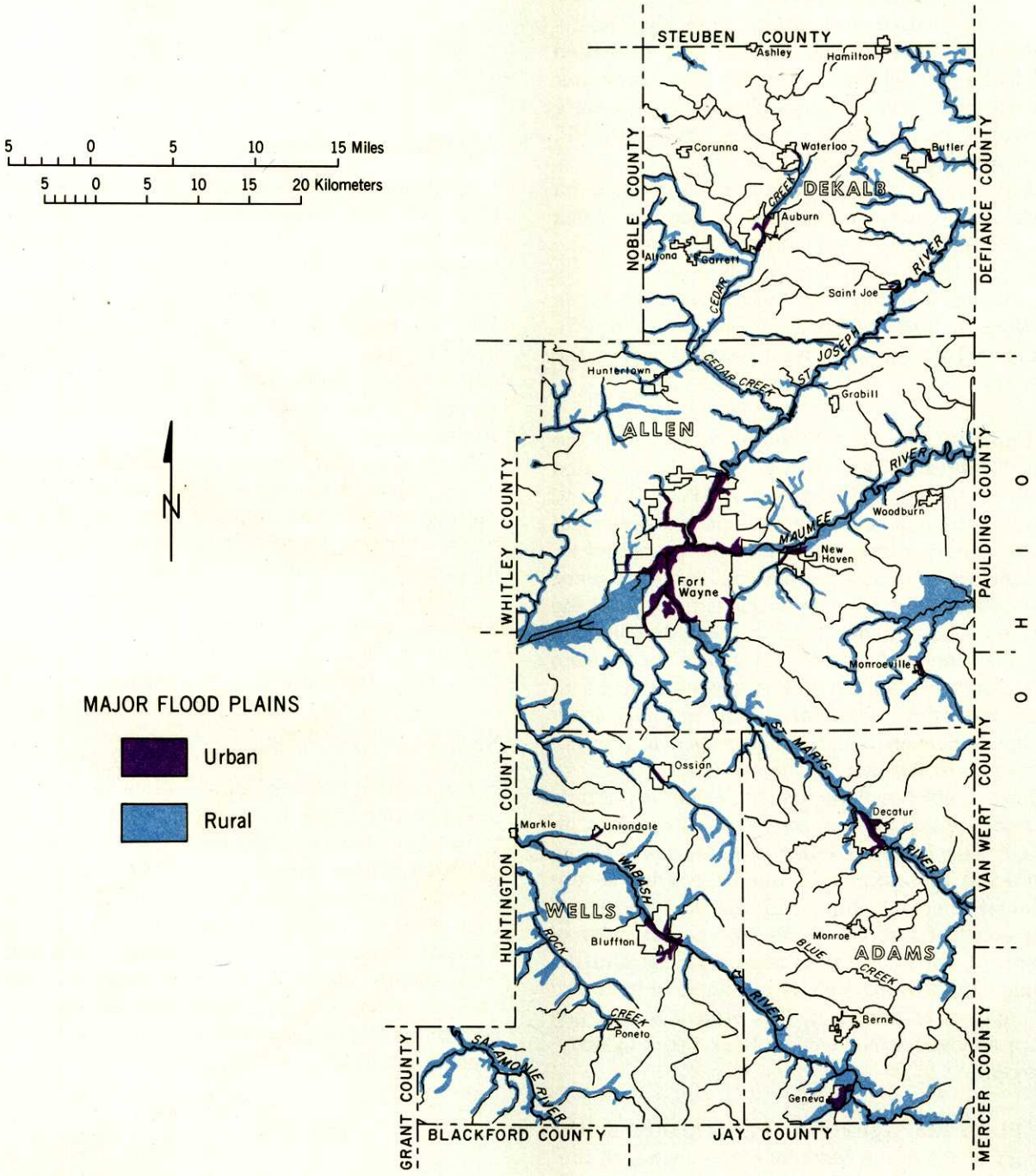


**Figure 106**
Map of Region Three-B showing the major floodplains.

the capacities of the major waterways. Winter flooding problems are sometimes complicated by ice jams. Flooding along the smaller streams and ditches can occur any time during the year, but it is most prevalent during the late fall and early spring.

Figure 107 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 $10,241,000, of which some eighty-four percent occurred in urban areas. These damages were concentrated in the Maumee River Basin, the St. Joseph River, and the Wabash River.

The major rivers usually exhibit a low to medium slope which increases the potential for flooding. When storms are localized over one of the rivers, the Maumee or a tributary may flood while nearby rivers remain inbank. Flooding may occasionally occur in the St. Joseph River when floodwater from the St. Marys cuts across the fairly level terrain between the two rivers.

**Flood Control** The Fort Wayne levee system is the only flood control project in the region. It is located along the St. Joseph, Maumee, and St. Marys Rivers to help confine streamflow during periodic high water. Although flooding is prevented within the protected localities, the areas up and downstream can experience flooding as the water spreads out at either end of the levee system. Levees also tend to foster the illusion that an area protected by such a system is secure from flooding. Constant maintenance is needed in order to prevent tree roots and burrowing animals from weakening the levees. Such maintenance is particularly essential in the Fort Wayne system.

The Rock Creek Small Watershed Project is the only such project within the region. The major works include 24.1 miles of debris removal on Mossberg Drain. Supplemental additions to reduce the adverse environmental effects include 14.7 miles of one-sided channel construction, fish pools throughout most of the length of the Rock Creek main channel, and the replanting of approximately fifty-one acres of trees and shrubs adjacent to the berm. This project is designed to reduce floodwater damages on Rock Creek by sixty-four percent.

**Flood Plain Management** Participants in the emergency phase of the National Flood Insurance Program include the unincorporated areas of Adams, Allen, DeKalb, and Wells Counties as well as the communities listed in Table 77. Garrett, Ossian, Ponets, and Uniondale are participating in the regular phase of the National Flood Insurance Program. Residents in these areas can purchase insurance against property losses due to flooding.

**Table 77**
Communities participating in the emergency phase of the National Flood Insurance Program.

| | |
|---|---|
| Altona | Geneva |
| Auburn | Huntertown |
| Bluffton | New Haven |
| Butler | St. Joe |
| Decatur | Vera Cruz |
| Fort Wayne | Waterloo |

## Agricultural Drainage

Approximately fifty-two percent of the soil associations in Region Three-B have "severe," forty-one percent have "moderate," while seven percent have "slight" wetness characteristics. The soil associations with these wetness characteristics are shown in Figure 108. The few areas that do not require drainage in order to maximize crop production are located in the northern and central parts of the region along the St. Joseph, Maumee, and St. Marys Rivers and, in the southern portion, along the Wabash River.

There are approximately 5,505 miles of legal drains in the region, which serve as the main collectors and outlets for on-farm drainage systems. The maintenance of this system of legal drains is the responsibility of the local county drainage boards or, in a limited number of instances, of conservancy districts. Inadequate maintenance can limit the effectiveness of the system. No legal entity exists to maintain drainage along the other streams in the region.

## Soil Erosion

The erosion potential of soil associations is shown in Figure 109. Thirty-five percent of the 1,118,600 acres is rated as having a "medium" soil erosion hazard potential. These areas are located primarily in the northwest corner of DeKalb County, the central portion of Allen County, along the north bank of the Wabash River, Salamonie River and Rock Creek in Wells County, and in the northwest and southeast corners of Adams County. The remaining sixty-five percent of the land is predominantly level and has a "low" erosion potential.

# WATER QUALITY

The surface streams routinely surveyed for water quality by the Indiana State Board of Health are the Maumee, St. Marys, Wabash, and St. Joseph Rivers and Cedar Creek. Water quality standards for the region are established by the Stream Pollution Control Board regulation SPC IR-4, the Water Quality Standards for the State of Indiana.

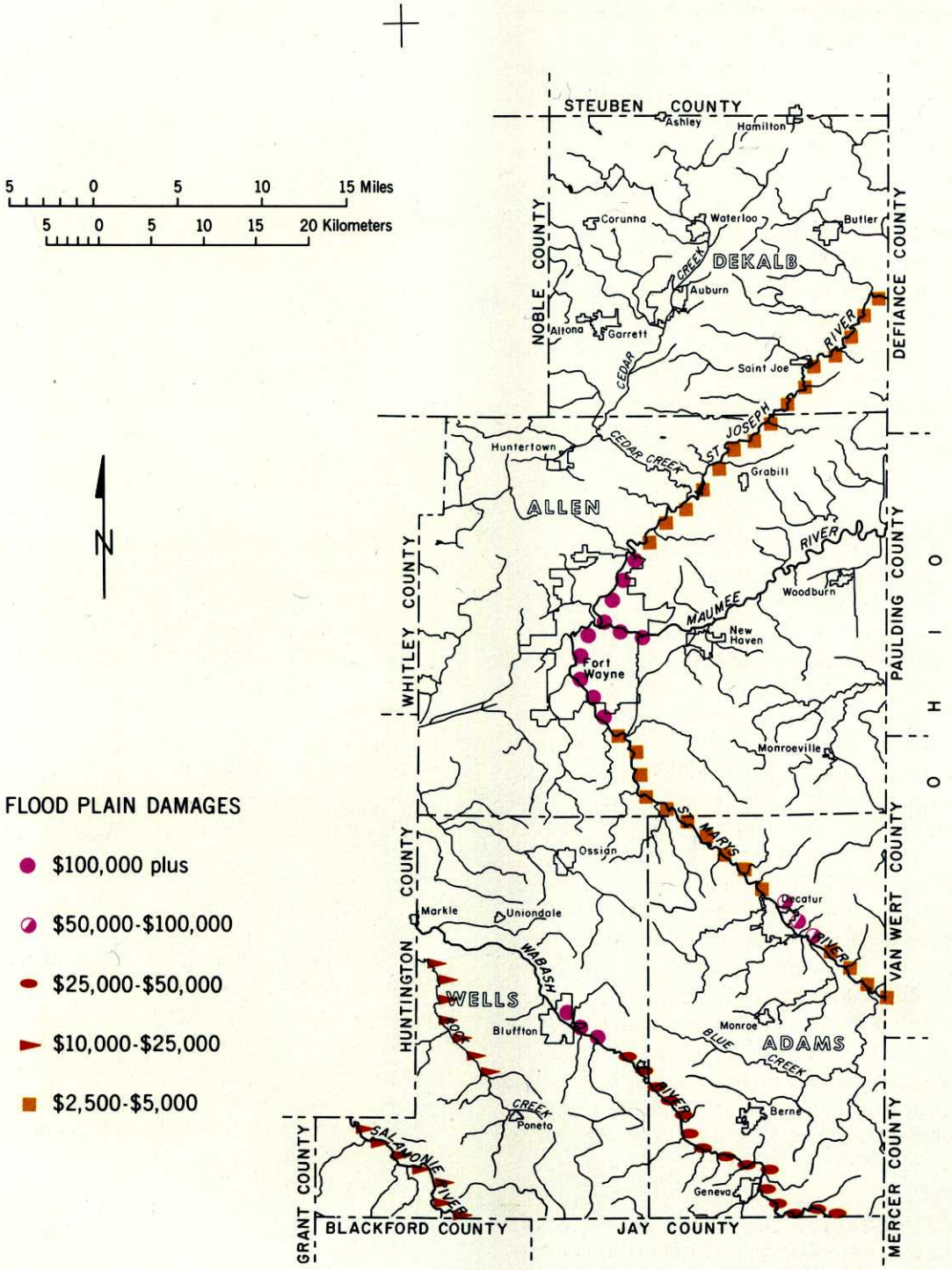


**Figure 107**
Map of Region Three-B showing the estimated average annual flood damages per mile along selected streams.

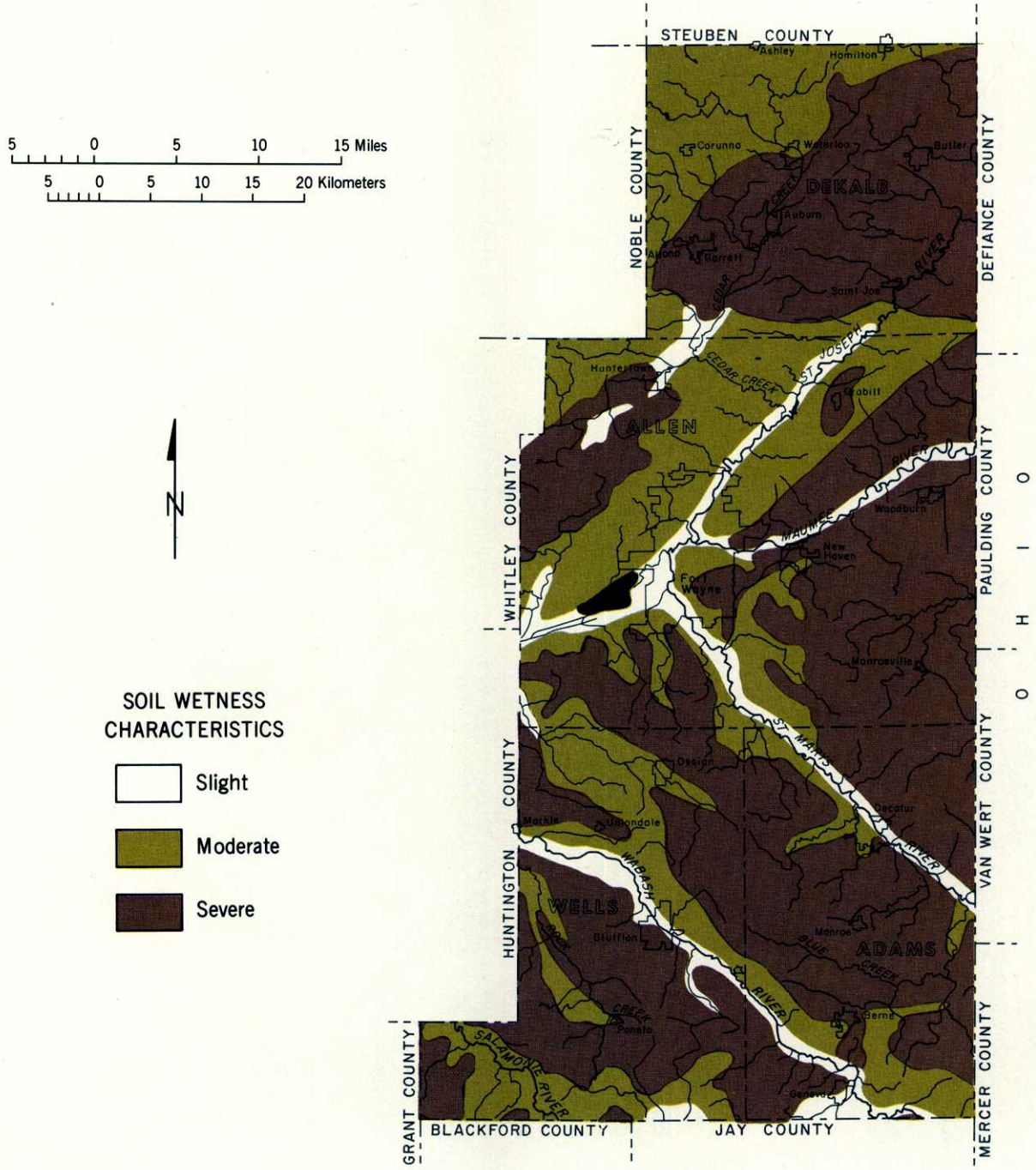


**Figure 108**
Map of Region Three-B showing the general location of the wetness characteristics of soil associations.

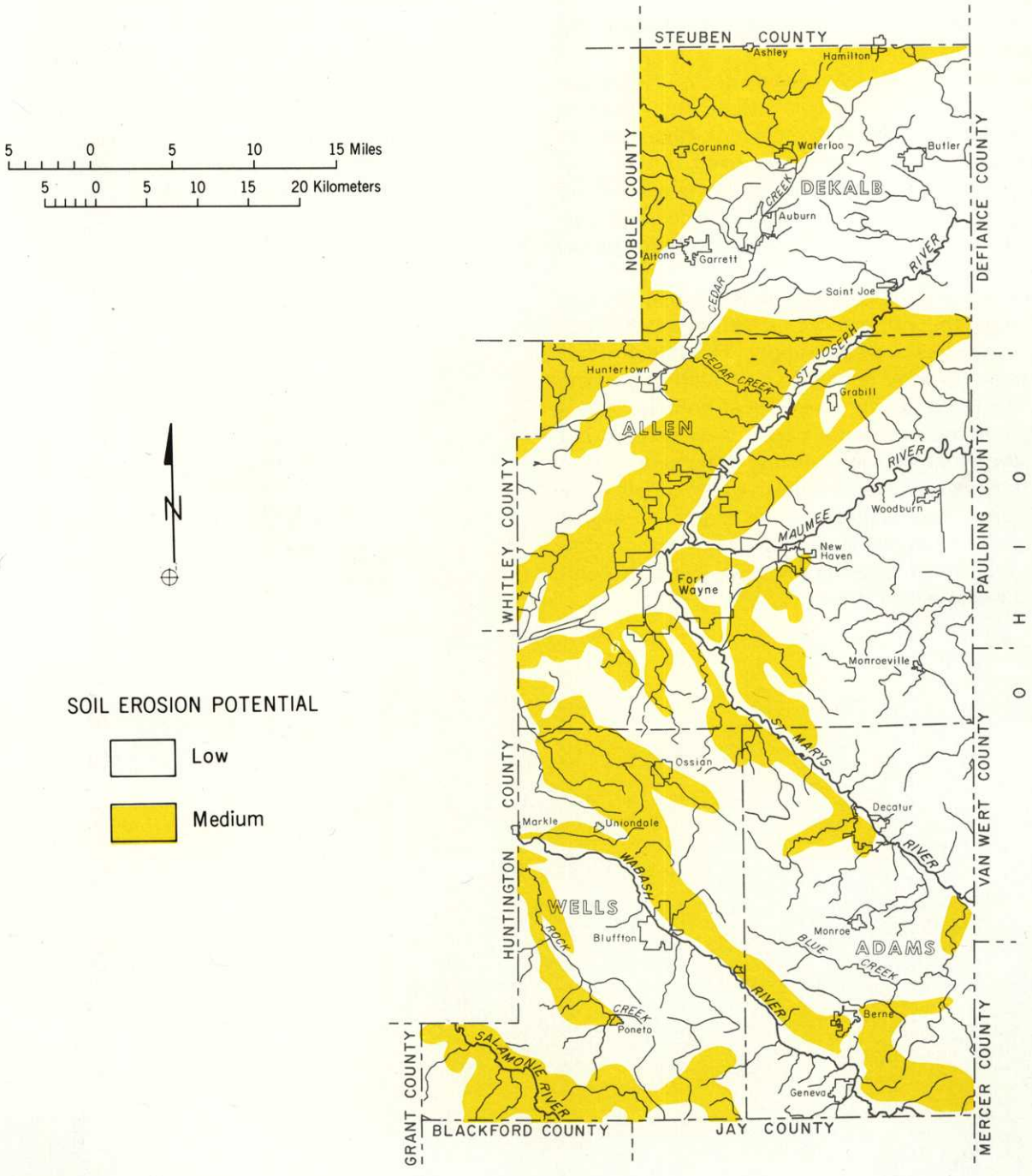


**Figure 109**
Map of Region Three-B showing the erosion potential of the soil associations.

Water quality in the St. Marys River at Ft. Wayne indicated that dissolved oxygen concentrations, temperature, and pH, were in compliance with the standards. Nitrate values were high in May and June and were very close to exceeding the suggested limit for drinking water. Fecal coliform bacteria levels met the criteria for partial body contact with occasional minor violations.

The Maumee River's water quality at New Haven had minimum dissolved oxygen levels in August which were in violation of the state standard. High levels of biochemical oxygen demand occurred during June through August, indicating water quality was adversely affected by upstream discharges. Fecal coliform bacteria levels were in excess of those allowed for partial body contact.

The water quality of the Wabash River near Bluffton should meet the criteria for drinking water since Bluffton uses it as a water supply. The major water supply problems were related to the coliform bacteria and nitrate levels in the river. Fecal coliform levels generally met the criteria for partial body contact, but total coliform limits set for drinking water supply were exceeded. Nitrate levels for public water supply were also exceeded occasionally. In the month of August 1975, dissolved oxygen levels fell below the recommended criterion but generally have been in compliance the rest of the time.

Water quality assessment for the St. Joseph River indicated that all water quality indicators were within state standards. However, problems did arise in localized tributary streams where inadequately treated effluents occurred.

The combined discharges of industrial and municipal effluents decreased the levels of dissolved oxygen in Cedar Creek. The values did, however, remain above minimum standards and no unusually high biochemical oxygen demand values were noted in the stream.

The tropic classification of those lakes surveyed by the Stream Pollution Control Board in Region Three-B are indicated in the following table.

**Table 78**
Trophic classification of lakes surveyed.

| *Lake* | *County* | *Age Classification* |
|---|---|---|
| Cedar | DeKalb | II |
| Dunton | DeKalb | II |
| Everett | Allen | III |
| Indian | DeKalb | II |
| Lintz | DeKalb | III |
| Story | DeKalb | III |
| Viberg | Allen | II |
| White | Allen | II |