

WATER USE AND PROJECTIONS

EXISTING WATER USE

Indiana's Water Resource Management Act requires owners of significant water withdrawal facilities to register these facilities with the Natural Resources Commission through the Department of Natural Resources, Division of Water and to report annual water usage. "Significant" facilities are those capable of withdrawing 100,000 gallons per day of surface water, ground water, or surface and ground water combined.

The Division of Water recognizes six water use categories for registered facilities: public supply, ir-

rigation, industrial, rural, energy production, and miscellaneous. As table 13 shows, the 44 registered facilities in the Whitewater Basin withdrew a total of 16.56 mgd in 1986. About 85 percent (14.11 mgd) of the total withdrawals in 1986 were for public supply uses, and about 15 percent (2.45 mgd) were for industrial uses.

Non-registered withdrawals, which primarily include domestic self-supplied uses and livestock operations, accounted for 6.41 mgd. Hence, registered and non-registered water withdrawals in the Whitewater Basin totaled nearly 23 mgd in 1986.

Fig. 29 shows the locations of the 44 facilities registered in the basin as of July 1987. The figure also shows the number of wells or intakes, the total withdrawal capability, and the reported 1985-86 usage for each facility. Reported water use is determined by metering devices, the multiplication of pump capacity and total time of pumpage, or by other methods approved by the Division of Water.

The term "withdrawal capability" represents the amount of water which could theoretically be withdrawn if all pumps were operating at their rated capability 24 hours a day. Because few if any facilities

Table 13. Total water use by category

{All values in million gallons per day; no basin facilities are registered in the energy production, rural, and miscellaneous categories.}

| County ¹ | Year | Public supply | Industrial | Irrigation |
|----------------------|------|---------------|------------|------------|
| Dearborn | 1985 | 0.32 | 0.24 | 0 |
| | 1986 | 0.35 | 0.25 | 0 |
| Decatur | 1985 | 0.04 | 0.04 | 0 |
| | 1986 | 0.05 | 0.05 | 0 |
| Fayette ² | 1985 | 4.22 | 0.02 | 0.01 |
| | 1986 | 4.46 | 0.03 | 0 |
| Franklin | 1985 | 0.77 | 0.29 | 0 |
| | 1986 | 0.80 | 0.28 | 0 |
| Henry | 1985 | 0.12 | 0 | 0 |
| | 1986 | 0.12 | 0 | 0 |
| Randolph | 1985 | 0.11 | 0 | 0 |
| | 1986 | 0.10 | 0 | 0 |
| Union | 1985 | 0.13 | 0 | 0 |
| | 1986 | 0.13 | 0 | 0 |
| Wayne | 1985 | 7.91 | 1.67 | 0 |
| | 1986 | 8.10 | 1.84 | 0 |
| Total ³ | 1985 | 13.62 | 2.26 | 0.01 |
| | 1986 | 14.11 | 2.45 | 0.00 |

¹Rush and Ripley Counties have no registered facilities within the Whitewater Basin boundary.

²The irrigator in Fayette County used 0.001 mgd in 1986.

³The 1986 total for all uses combined does not equal the total in table 14 due to round-off differences.

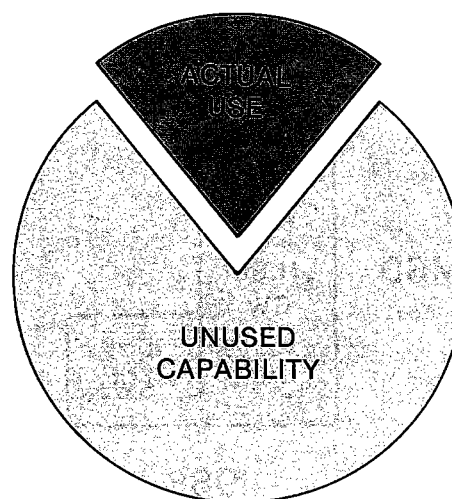


Figure 30. Comparison of 1986 water use with registered capability

Table 14. Total water withdrawal capability and use for all categories combined

{All values in million gallons per day.}

| County | Year | No. of facilities | Withdrawal capability | | | Reported use | | |
|-------------|------|-------------------|-----------------------|---------------|----------|--------------|---------------|----------|
| | | | Ground water | Surface water | Combined | Ground water | Surface water | Combined |
| Dearborn | 1985 | 2 | 3.60 | 0.00 | 3.60 | 0.56 | 0.00 | 0.56 |
| | 1986 | 2 | 3.60 | 0.00 | 3.60 | 0.60 | 0.00 | 0.60 |
| Decatur | 1985 | 2 | 0.11 | 3.02 | 3.13 | 0.04 | 0.04 | 0.08 |
| | 1986 | 2 | 0.11 | 3.02 | 3.13 | 0.04 | 0.05 | 0.09 |
| Fayette | 1985 | 7 | 15.34 | 0.86 | 16.20 | 4.23 | 0.02 | 4.25 |
| | 1986 | 7 | 15.34 | 0.86 | 16.20 | 4.46 | 0.03 | 4.49 |
| Franklin | 1985 | 7 | 7.75 | 0.72 | 8.47 | 1.01 | 0.05 | 1.06 |
| | 1986 | 7 | 8.61 | 0.72 | 9.33 | 1.05 | 0.02 | 1.07 |
| Henry | 1985 | 1 | 0.86 | 0.00 | 0.86 | 0.12 | 0.00 | 0.12 |
| | 1986 | 1 | 0.86 | 0.00 | 0.86 | 0.12 | 0.00 | 0.12 |
| Randolph | 1985 | 1 | 0.65 | 0.00 | 0.65 | 0.11 | 0.00 | 0.11 |
| | 1986 | 1 | 0.65 | 0.00 | 0.65 | 0.10 | 0.00 | 0.10 |
| Union | 1985 | 2 | 1.24 | 0.00 | 1.24 | 0.13 | 0.00 | 0.13 |
| | 1986 | 2 | 1.24 | 0.00 | 1.24 | 0.13 | 0.00 | 0.13 |
| Wayne | 1985 | 21 | 18.99 | 23.18 | 42.17 | 4.96 | 4.62 | 9.58 |
| | 1986 | 21 | 18.99 | 23.18 | 42.17 | 5.32 | 4.62 | 9.94 |
| Basin total | 1985 | 43 | 48.54 | 27.78 | 76.32 | 11.16 | 4.73 | 15.89 |
| | 1986 | 43 | 49.40 | 27.78 | 77.18 | 11.82 | 4.72 | 16.54 |

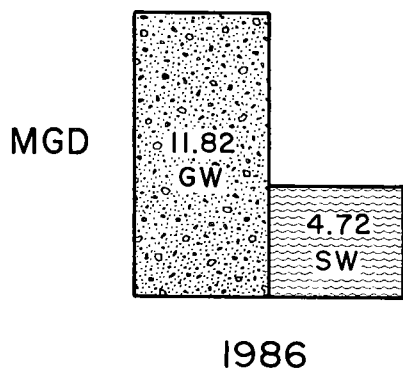


Figure 31. Total water use by source

in the basin operate in this manner, reported use constitutes only a small percentage of the total withdrawal capability, as fig. 30 illustrates.

Table 14 summarizes, by water source, the withdrawal capability and reported use by registered facilities in 1985-86. As the table shows, ground water was the source of 11.82 mgd, or 71 percent of all water withdrawn by registered facilities in 1986 (also see fig. 31). Eighty-three percent of ground-water withdrawals occurred within Wayne and Fayette Counties, primarily for public supply uses. Surface water was the source of 4.72 mgd of total registered withdrawals in 1986. Ninety-eight percent of surface-water withdrawals occurred in Wayne County (table 14), mainly for public supply and industrial uses.

Of the water withdrawn for various uses, a portion is generally returned to a ground- or surface-water system. However, a portion of the withdrawn water

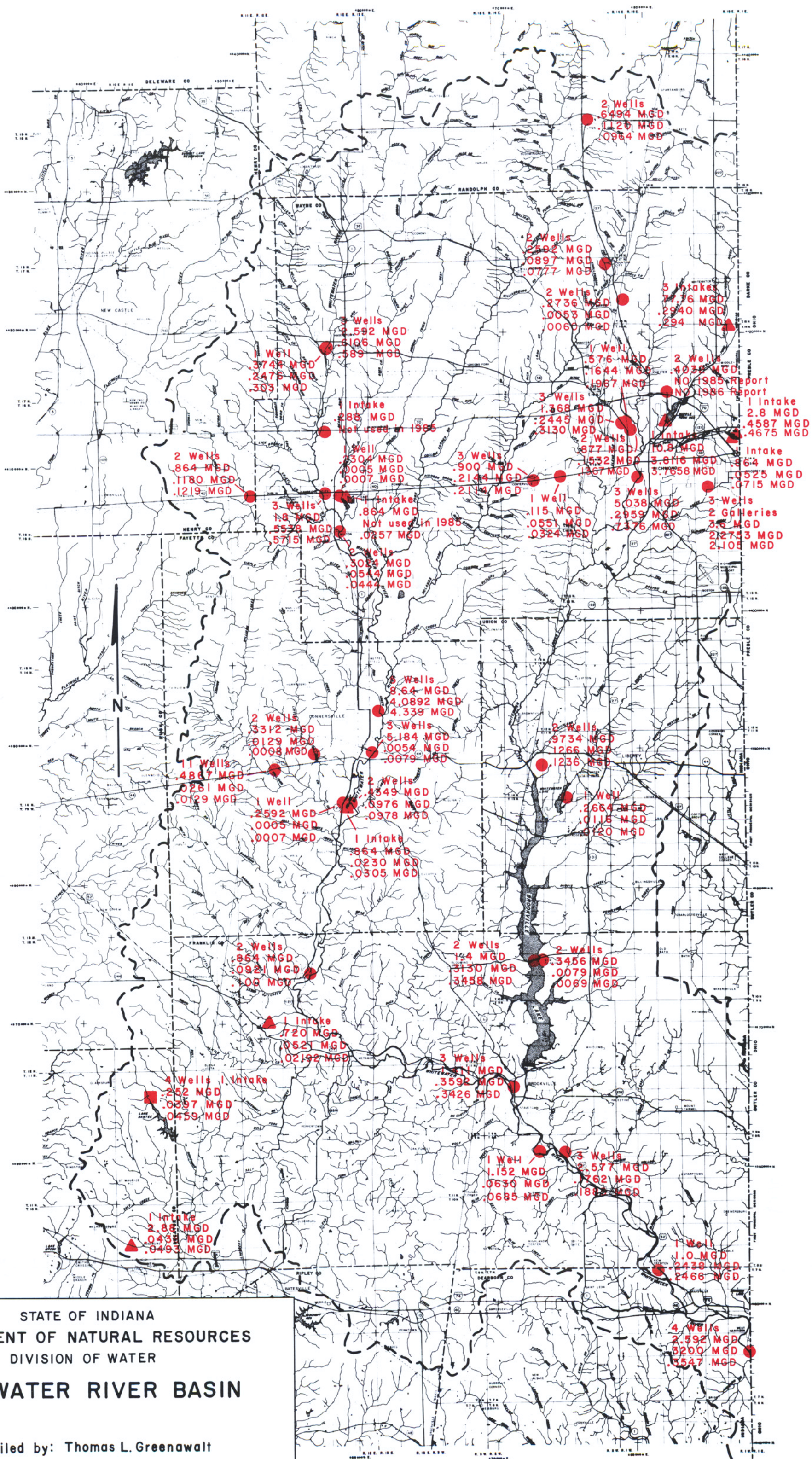


Figure 29. Location of registered water withdrawal facilities

may be evaporated, transpired by plants, incorporated into a product, or otherwise made unavailable for re-use within a short time period. The greater the amount of water consumed, the greater the potential for significant impacts on surface- or ground-water levels.

The percentage of withdrawn water that is consumed depends on the type of water use. Irrigation, livestock watering, and domestic self-supplied uses consume 80 to 100 percent of the utilized water. Public supply and industrial uses generally consume only 5 to 25 percent.

Table 15. Types of public water supply utilities

| County | Name | Type |
|----------|--|-------------|
| Dearborn | Tri-Township Water Corp. | Rural |
| Decatur | Santee Utilities, Inc. | Subdivision |
| Fayette | Pleasant View | Subdivision |
| | Everton Water Corp. | Rural |
| | Connersville Utilities | Municipal |
| Franklin | Brookville Water Works | Municipal |
| | Brookville Reservoir | — |
| | Franklin County Water Assn. | Rural |
| | Laurel Water Works | Municipal |
| | Oldenburg ¹ | Municipal |
| Randolph | Lynn Water Works | Municipal |
| | L&M Regional ² | Rural |
| Union | Corporation of Liberty | Rural |
| | Whitewater State Park | — |
| Wayne | Centerville | Municipal |
| | Fountain City | Municipal |
| | Northeastern Wayne Schools | — |
| | Hagerstown | Municipal |
| | Cambridge City | Municipal |
| | Milton Water Works | Municipal |
| | Indiana-American Water Co. (Richmond District) | Municipal |
| | Dublin ³ | Municipal |

¹Oldenburg purchases water from Batesville, which lies outside the basin boundary.

²Wells located just outside the basin boundary supply residents of Losantville and Modoc, which both lie within the basin.

³Wells are located in Henry County.

Registered Use Categories

Public supply withdrawals accounted for about 85 percent of the total water use in the Whitewater Basin in 1986. The public supply category includes withdrawals by public and private water utilities for domestic (household), industrial, and commercial purposes. Public supply systems include rural as well as municipal water supply systems. As defined by the Division of Water, public supply also refers to mobile home parks, schools, conservancy districts, not-for-profit organizations, and other facilities which have their own water supplies (usually wells) and which use water primarily for drinking water, washing, cooking, and sanitary purposes.

Of the 22 public water supply utilities in the Whitewater Basin, more than half have been identified by the Division of Water as municipal utilities (table 15). Five utilities considered as rural utilities serve residences along rural roads. Two subdivision utilities serve residences within a single development. Three utilities do not fit any of these major categories (table 15).

In some cases, public systems may purchase and/or supply water across the basin boundary. Oldenburg Water Works purchases water from outside the Whitewater Basin; hence, withdrawals for public supply uses are not included in water use computations for this report. Withdrawals by L & M Regional are not included because the wells which supply Losantville and Modoc are located outside the basin boundary. Tri-Township Water Corporation derives its water from inside the basin boundary but supplies some of the water to non-basin residents. These inter-basin water transfers affect less than four percent of the population served by public water suppliers within the Whitewater Basin.

In 1986, public supply uses in the Whitewater River Basin averaged 14.11 mgd, or approximately 28 percent of the total withdrawal capability (table 16). Five registered facilities in Wayne, Fayette, and Franklin Counties accounted for 88 percent of reported public supply uses in 1986 (fig. 32).

Seventy-three percent of the water withdrawn by all public supply registrants in 1986 was derived from ground-water sources. The remaining 27 percent of public supply water was used by the city of Richmond and was withdrawn from Middle Fork Reservoir.

Water purchased at Brookville Lake by the Franklin County Water Association is registered as a ground-water use, even though a water-supply contract with the Indiana Department of Natural Resources considers

Table 16. Water withdrawal capability and reported use for public supply

{All values in million gallons per day.}

| County | Year | Withdrawal capability | | | Reported use | | |
|----------------------|------|-----------------------|---------------|----------|--------------|---------------|----------|
| | | Ground water | Surface water | Combined | Ground water | Surface water | Combined |
| Dearborn | 1985 | 2.59 | 0 | 2.59 | 0.32 | 0 | 0.32 |
| | 1986 | 2.59 | 0 | 2.59 | 0.35 | 0 | 0.35 |
| Decatur ¹ | 1985 | 0.11 | 0.14 | 0.25 | 0.04 | 0 | 0.04 |
| | 1986 | 0.11 | 0.14 | 0.25 | 0.05 | 0 | 0.05 |
| Fayette | 1985 | 14.75 | 0 | 14.75 | 4.22 | 0 | 4.22 |
| | 1986 | 14.75 | 0 | 14.75 | 4.46 | 0 | 4.46 |
| Franklin | 1985 | 4.02 | 0 | 4.02 | 0.77 | 0 | 0.77 |
| | 1986 | 4.88 | 0 | 4.88 | 0.80 | 0 | 0.80 |
| Henry | 1985 | 0.86 | 0 | 0.86 | 0.12 | 0 | 0.12 |
| | 1986 | 0.86 | 0 | 0.86 | 0.12 | 0 | 0.12 |
| Randolph | 1985 | 0.65 | 0 | 0.65 | 0.11 | 0 | 0.11 |
| | 1986 | 0.65 | 0 | 0.65 | 0.10 | 0 | 0.10 |
| Union | 1985 | 1.24 | 0 | 1.24 | 0.13 | 0 | 0.13 |
| | 1986 | 1.24 | 0 | 1.24 | 0.13 | 0 | 0.13 |
| Wayne | 1985 | 14.76 | 10.80 | 25.56 | 4.10 | 3.81 | 7.91 |
| | 1986 | 14.76 | 10.80 | 25.56 | 4.33 | 3.77 | 8.10 |
| Basin total | 1985 | 38.98 | 10.94 | 49.92 | 9.81 | 3.81 | 13.62 |
| | 1986 | 39.84 | 10.94 | 50.78 | 10.34 | 3.77 | 14.11 |

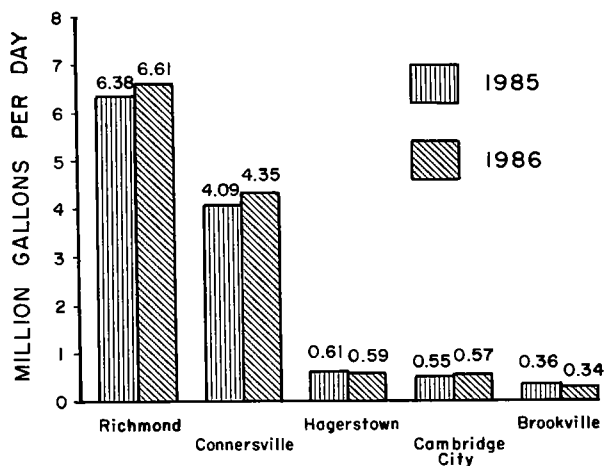
¹A public supply registrant in Decatur County used a total of 0.004 mgd of surface water in 1985-86.

Figure 32. Public water supply use for selected municipalities

the use to be met by surface water from the reservoir. This contractual arrangement is based on the assumption that the reservoir enhances the production capability of the underlying aquifer system which supplies the utility's two wells.

Industrial water use refers to process water, waste assimilation, dewatering, and some cooling and mineral extraction uses. Under the Division of Water's categorization system, industrial use includes withdrawals by companies who develop their own water supplies. If an industry also purchases water from a public supply utility, only the water withdrawn from the industry's private water supply would be classified as industrial use. The amount purchased from the utility would be included in the public supply category.

In 1986, industrial self-supplied water use averaged 2.45 mgd, or approximately 9 percent of the total withdrawal capability (table 17). Of the total amount

Table 17. Water withdrawal capability and reported use for industry and irrigation

{All values in million gallons per day; values are for industrial use unless denoted as irrigation (IR).}

| County | Year | Withdrawal capability | | | Reported use | | |
|---------------------------|------|-----------------------|---------------|----------|----------------|---------------|----------------|
| | | Ground water | Surface water | Combined | Ground water | Surface water | Combined |
| Dearborn | 1985 | 1.01 | 0 | 1.01 | 0.24 | 0 | 0.24 |
| | 1986 | 1.01 | 0 | 1.01 | 0.25 | 0 | 0.25 |
| Decatur | 1985 | 0 | 2.88 | 2.88 | 0 | 0.04 | 0.04 |
| | 1986 | 0 | 2.88 | 2.88 | 0 | 0.05 | 0.05 |
| Fayette | 1985 | 0.26 | 0.86 | 1.12 | 0 | 0.02 | 0.02 |
| | 1986 | 0.26 | 0.86 | 1.12 | 0 | 0.03 | 0.03 |
| Fayette ¹ (IR) | 1985 | 0.33 | 0 | 0.33 | 0.01 | 0 | 0.01 |
| | 1986 | 0.33 | 0 | 0.33 | 0 | 0 | 0 |
| Franklin | 1985 | 3.73 | 0.72 | 4.45 | 0.24 | 0.05 | 0.29 |
| | 1986 | 3.73 | 0.72 | 4.45 | 0.26 | 0.02 | 0.28 |
| Wayne | 1985 | 3.54 | 12.38 | 15.92 | 0.86 | 0.81 | 1.67 |
| | 1986 | 3.54 | 12.38 | 15.92 | 0.98 | 0.86 | 1.84 |
| Wayne (IR) | 1985 | 0.69 | 0 | 0.69 | — ² | 0 | — ² |
| | 1986 | 0.69 | 0 | 0.69 | — ² | 0 | — ² |
| Total | 1985 | 9.56 | 16.84 | 26.40 | 1.34 | 0.92 | 2.26 |
| | 1986 | 9.56 | 16.84 | 26.40 | 1.49 | 0.96 | 2.45 |
| Total (IR) | 1985 | 1.02 | 0 | 1.02 | 0.01 | 0 | 0.01 |
| | 1986 | 1.02 | 0 | 1.02 | 0 | 0 | 0 |

¹The irrigator in Fayette County used 0.001 mgd in 1986.²Of the two registered irrigation facilities in Wayne County, one was not required to report 1985 or 1986 usage and the other did not utilize his irrigation equipment in 1985 or 1986.

of water used, 61 percent was derived from ground water and 39 percent from surface water. About three-fourths of the registered industrial self-supplied water usage occurred in Wayne County, primarily in or near the city of Richmond. More than half of the industrial withdrawals in the basin are for sand and gravel operations.

Of the three registered **irrigation** facilities in the basin, two are golf courses in Fayette and Wayne Counties and the third is an agricultural irrigator in Wayne County. For 1986, irrigation water use averaged only 0.001 mgd for the entire year (table 17), and was reported for only one golf course.

As of July 1987, no facilities had registered in the **energy production, rural, or miscellaneous**

categories. During the interim between the compilation of water use data and report publication however, an energy production facility in Richmond was registered.

Energy Production includes any self-supplied water withdrawal related to the energy production process, such as coal preparation, oil recovery, cooling water, mineral extraction, power generation, heating/air conditioning, and dewatering. Rural usage by registered facilities includes water withdrawals by fish hatcheries and large-scale livestock operations. (Non-registered, self-supplied domestic withdrawals are not categorized as rural uses, unlike an earlier classification utilized by the Governor's Water Resource Study Commission, 1980). Miscellaneous usage includes water withdrawn

Table 18. Estimated 1985 domestic self-supplied water use

{All values in million gallons per day.}

| County | Self-supplied population | Use |
|-------------|--------------------------|------|
| Dearborn | 3,789 | 0.28 |
| Decatur | 1,226 | 0.09 |
| Fayette | 6,333 | 0.47 |
| Franklin | 11,856 | 0.87 |
| Henry | 5,739 | 0.44 |
| Randolph | 3,902 | 0.30 |
| Ripley | 1,199 | 0.09 |
| Rush | 641 | 0.05 |
| Union | 3,595 | 0.26 |
| Wayne | 16,775 | 1.28 |
| Basin total | | 4.13 |

for fire protection and for recreational purposes such as water slides and snow-making.

Non-Registered Uses

Domestic self-supplied refers to water users who obtain water from private water wells rather than from public supply systems. Table 18 lists the estimated domestic self-supplied water withdrawals for 1985. (Withdrawals for 1986 are nearly identical, and hence are not included.) The values were obtained by multiplying the estimated self-supplied population within the basin portion of each county by a calculated average daily usage per person of 76 gallons or 74 gallons, depending on the particular county (Indiana Department of Natural Resources, 1982a). As table 18 shows, about half of the domestic self-supplied water withdrawals occur in Wayne and Franklin Counties.

Livestock water use (table 19) has been determined by multiplying the estimated population of a particular livestock category by an estimate of the amount of water consumed daily per animal (Indiana Department of Natural Resources, 1982a). Almost 81 percent of the water for livestock was utilized by beef cattle and hogs.

Instream (non-withdrawal) uses primarily include recreation and fish and wildlife habitat. Other instream uses include waste assimilation, navigation, and hydroelectric power generation.

Table 19. Estimated livestock water use by livestock category

{Water use values in million gallons per day.}

| Livestock category | Estimated population within basin | Total use |
|--------------------|-----------------------------------|-----------|
| Beef cattle | 78,600 | 0.90 |
| Dairy cattle | 10,200 | 0.23 |
| Hogs | 234,600 | 0.94 |
| Chickens | 191,900 | 0.19 |
| Sheep | 5,100 | 0.01 |
| Turkeys | 37,400 | 0.01 |
| Basin total | | 2.28 |

Water-based recreational activities in the Whitewater River Basin are primarily available in the vicinity of Brookville Lake, a multi-purpose reservoir in Union and Franklin Counties. The Brookville Lake dam and *tailwater* area is managed by the U.S. Army Corps of Engineers, but the reservoir itself and 11,200 acres surrounding it are managed by the IDNR. Recreational facilities at Brookville Lake include boat launching ramps, camp grounds, picnic areas, a swimming beach, a tailwater fishing area, and other facilities. Two large state recreation areas (Mounds and Quakertown) and smaller recreation areas along the shoreline provide a wide range of outdoor opportunities. A variety of activities is also available at Whitewater Memorial State Park, which is located on the northeast side of the reservoir along Silver Creek. Nearly all of these recreational areas offer easy access to good fishing waters.

Brookville Lake has become an important fishery in Indiana. The reservoir has one of the state's best walleye fisheries, supports the only population of striped bass, and is one of only two places where pure-bred muskellunge is stocked. The lake can support supplemental stockings of these predators because of its deep, cool water and abundant forage. Due to the large populations of these three fish, the reservoir is also used for broodstock collections.

Large naturally-reproducing populations of white crappie, white bass and channel catfish are present in Brookville Lake, in addition to populations of bluegill,

largemouth bass, and smallmouth bass. A put-and-take trout fishery is maintained by IDNR in the tailwaters of the reservoir. The East Fork Whitewater River upstream of Brookville Lake provides very good fishing for white bass and walleye during annual spring spawning runs.

The Whitewater River in Franklin County is not only heavily used for canoeing, but also supports an excellent sport fishery. At least 41 species of fish have been identified in recent fisheries surveys. These include smallmouth, rock and largemouth basses, flathead and channel catfish, crappie, sunfish, bullhead, madtom and stonecats, sculpin, suckers, shad, gar, paddlefish, American eel and numerous minnows, shiners and darters. Trout from the put-and-take stockings may be present at times.

Some of the fish in Whitewater Lake include black crappie, bluegill, largemouth bass, and sunfish. Middle Fork Reservoir near Richmond contains white crappie, bluegill, channel catfish, white sucker and largemouth bass. Tiger muskellunge have been stocked in recent years by the IDNR.

A 28-mile segment of the Whitewater River in Franklin County has been recommended for inclusion in Indiana's Natural, Scenic, and Recreational Rivers

System (Indiana Department of Natural Resources, 1986b). River segments included in the system are at least partially protected from detrimental impacts resulting from development and construction projects. Although the segment has not been designated by the Indiana Natural Resources Commission, the IDNR is continuing to work with riparian landowners and the local planning commission on matters involving the river.

WATER USE PROJECTIONS

Registered Use Categories

As mentioned in a previous section, there are 22 **public supply** utilities in the Whitewater Basin, including Oldenburg, which purchases its water from Batesville. Table 20 presents the 1985 reported withdrawals and the projected withdrawals for the years 1990 and 2000.

Unlike table 16, table 20 includes reported and projected withdrawals for L & M Regional, which lies within the basin in Randolph County but derives its water from wells lying outside the basin boundary. In addition, table 20 includes reported and projected withdrawals for Dublin in the values for Wayne County, even though Dublin's wells are located in Henry County. Furthermore, because a portion of the ground water withdrawn by one of Richmond's three water treatment plants is returned to the East Fork Whitewater River, table 20 shows reported and projected use for Wayne County rather than total withdrawals.

As table 20 shows, the projected withdrawals are increasing in all counties except Fayette. Withdrawals in Fayette County are decreasing primarily because the projected daily consumption per person (gallons per capita per day) appears to be decreasing.

Although the population of Wayne County is decreasing, increases in public water supply use are projected for this county because the rate of growth of the per capita consumption is larger than the rate of decline in population.

Because Richmond is the largest city in the basin, its public water supply use was projected to the years 1990 and 2000. Water use was projected to be 5.94 mgd in 1990 and 6.37 in the year 2000.

Projections were also made for Batesville because it supplies water to Oldenburg, which lies just inside the basin boundary. Water use in Batesville, which totaled 1 mgd in 1985, is expected to increase to 1.17

Table 20. Public water supply projections

{All values in million gallons per day.}

| County | 1985 ¹ | 1990 | 2000 |
|-----------------------|--------------------------|--------------|--------------|
| Dearborn | 0.32 | 0.40 | 0.55 |
| Decatur | 0.04 | 0.05 | 0.07 |
| Fayette | 4.22 | 4.20 | 4.12 |
| Franklin | 0.77 | 0.84 | 0.99 |
| Randolph ² | 0.13 | 0.15 | 0.17 |
| Union | 0.13 | 0.14 | 0.16 |
| Wayne ^{3,4} | 7.39 ⁴ | 7.64 | 8.20 |
| Total | 13.00⁵ | 13.42 | 14.26 |

¹Reported use.

²Includes withdrawals from L&M Regional.

³Includes withdrawals from the town of Dublin, whose wells are located in Henry County.

⁴Reported 1985 withdrawal for Wayne County was 8.03 mgd, 0.62 mgd of which was not used.

⁵Reported 1985 withdrawal for the basin was 13.62 mgd.

Table 21. Industrial water use projections

{All values in million gallons per day.}

| County | 1985 ¹ | 1990 | 2000 |
|--------------|-------------------|-------------|-------------|
| Dearborn | 0.24 | 0.27 | 0.28 |
| Decatur | 0.04 | 0.05 | 0.05 |
| Fayette | 0.02 | 0.02 | 0.02 |
| Franklin | 0.29 | 0.31 | 0.28 |
| Wayne | 1.67 | 1.86 | 1.89 |
| Total | 2.26 | 2.51 | 2.52 |

¹Reported use.

mgd by 1990 and 1.51 mgd by 2000. In a study of water supply in southeast Indiana (Indiana Department of Natural Resources, 1983), Batesville was reported to have a water supply capacity of 2 mgd. A reconnaissance in 1987 by the Division of Water for a future hydrographic survey indicates that only slight sedimentation has occurred in Batesville's water supply reservoirs. Hence, any reduction of this reported water supply capacity is assumed to be minimal.

Industrial self-supplied use, as defined by the Division of Water, mainly comprises manufacturing processes. However, the industrial category also includes water uses for mineral extraction processes not related

Table 22. Industrial water use projections by industry type

{All values in million gallons per day.}

| SIC ¹ | Industry | 1985 ² | 1990 | 2000 |
|------------------|------------------------------|-------------------|-------------|-------------|
| 30 | Rubber, misc. plastics | 0.18 | 0.18 | 0.15 |
| 33 | Primary metal products | 0.15 | 0.18 | 0.20 |
| 34 | Fabricated metal products | 0.16 | 0.19 | 0.18 |
| 35 | Machinery, except electrical | 0.55 | 0.60 | 0.59 |
| 14 | Mining (sand and gravel) | 1.21 | 1.35 | 1.38 |
| | Other | 0.01 | 0.01 | 0.02 |
| | Total | 2.26 | 2.51 | 2.52 |

¹Standard industrial classification code.²Reported use.

to energy production (for example, sand and gravel operations).

Industrial self-supplied water use projections in tables 21-23 were derived from data of the U.S. Bureau of Census (1958, 1963, 1971, 1975, 1981, 1984b and 1986) and the U.S. Bureau of Economic Analysis (1985a and 1985b). Table 21 presents the reported and projected water withdrawals for industry in the Whitewater Basin. As table 22 shows, mining (primarily sand and gravel excavation) accounts for more than half of the withdrawals by industry. Table 23 presents reported and projected withdrawals for industries in and near Richmond.

Irrigation development is influenced by many factors, such as soils, topography, water availability, pumping distance, energy costs, crop prices, rainfall, length of growing season, and the availability of labor, parts, and repairs. An evaluation of soils, topography, and water availability indicates that there is little potential for significant increases in agricultural irrigation within most of the Whitewater Basin. Regions near the major streams, roughly coinciding in areal extent with the Whitewater Valley Aquifer System (pl. 3), may have a greater potential for irrigation of traditional row crops.

Non-Registered Uses

Projections for **domestic self-supplied** water uses are shown in table 24. Although withdrawals are expected to decrease in Wayne County as the self-

Table 23. Industrial water use projections for Richmond

{All values in million gallons per day.}

| SIC ¹ | Industry | 1985 ² | 1990 | 2000 |
|------------------|------------------------------|-------------------|-------------|-------------|
| 33 | Primary metal products | 0.15 | 0.18 | 0.20 |
| 34 | Fabricated metal products | 0.16 | 0.19 | 0.18 |
| 35 | Machinery, except electrical | 0.30 | 0.33 | 0.33 |
| 14 | Mining (sand and gravel) | 0.81 | 0.90 | 0.92 |
| | Total | 1.42 | 1.60 | 1.63 |

¹Standard industrial classification code.²Reported use.

Table 24. Domestic self-supplied water use projections

{All values in million gallons per day.}

| County | 1985 ¹ | 1990 | 2000 |
|----------|-------------------|------|------|
| Dearborn | 0.28 | 0.29 | 0.32 |
| Decatur | 0.09 | 0.09 | 0.09 |
| Fayette | 0.47 | 0.48 | 0.49 |
| Franklin | 0.87 | 0.91 | 0.99 |
| Henry | 0.44 | 0.44 | 0.43 |
| Randolph | 0.30 | 0.30 | 0.31 |
| Ripley | 0.09 | 0.09 | 0.10 |
| Rush | 0.05 | 0.05 | 0.04 |
| Union | 0.26 | 0.26 | 0.27 |
| Wayne | 1.28 | 1.25 | 1.22 |
| Total | 4.13 | 4.16 | 4.26 |

¹Estimated current use.

supplied population decreases, withdrawals in other counties are expected to increase slightly or remain fairly stable.

Table 25 shows estimates of **instream** uses and needs for six water-related activities for 1990 and 1995. These estimates were derived from surveys taken in 1976 (Indiana Department of Natural Resources, 1979). As the table shows, there are projected shortages in boating, swimming, fishing, and ice skating needs, and projected surpluses in canoeing and water skiing needs.

Table 25. Projected supply and demand for recreational instream uses

{Modified from Indiana Department of Natural Resources, 1979.}

| Activity | Activity Occasions | Density Guidelines | Demand | Supply | Needs |
|--------------|--------------------|----------------------|-------------|------------|-------------|
| Boating | | | | | |
| 1990 | 281678 | 58.8 Boaters/AC/YR | 4790 Acres | 4363 Acres | -427 Acres |
| 1995 | 284013 | 58.8 Boaters/AC/YR | 4830 Acres | 4363 Acres | -467 Acres |
| Canoeing | | | | | |
| 1990 | 20997 | 1170 Canoeists/Mi/YR | 18 Miles | 63 Miles | + 45 Miles |
| 1995 | 21457 | 1170 Canoeists/Mi/YR | 18 Miles | 63 Miles | + 45 Miles |
| Water Skiing | | | | | |
| 1990 | 48616 | 34.4 Skiers/AC/YR | 1413 Acres | 1845 Acres | + 432 Acres |
| 1995 | 48749 | 34.4 Skiers/AC/YR | 1417 Acres | 1845 Acres | + 428 Acres |
| Swimming | | | | | |
| 1990 | 681416 | 76608 Swimmers/AC/YR | 9 Acres | 6 Acres | -3 Acres |
| 1995 | 691994 | 76608 Swimmers/AC/YR | 9 Acres | 6 Acres | -3 Acres |
| Fishing | | | | | |
| 1990 | 785815 | 66 Fishermen/AC/YR | 11906 Acres | 5429 Acres | -6477 Acres |
| 1995 | 776586 | 66 Fishermen/AC/YR | 11766 Acres | 5429 Acres | -6337 Acres |
| Ice Skating | | | | | |
| 1990 | 17754 | 4200 Skaters/AC/YR | 4 Acres | 2 Acres | -2 Acres |
| 1995 | 18116 | 4200 Skaters/AC/YR | 4 Acres | 2 Acres | -2 Acres |