

## WATER USE

### EXISTING WATER UTILIZATION

Indiana's Water Resource Management Act (IC 13-2-6.1, Section 3) calls for an ongoing inventory of large-scale withdrawals of surface and ground water. Section 7 requires owners of "significant water withdrawal facilities" to register these facilities with the Natural Resources Commission (through the 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.

Fig. 24 shows the locations of registered facilities in the St. Joseph basin as of October 1986. Table 15 lists, by county, the number of facilities and summarizes both the withdrawal capability and 1985 usage of all registered facilities. Approximately 14 percent of the facilities had not yet reported their 1985 usage at the date of this compilation (October 1986).

Withdrawal capability represents the amount which could theoretically be withdrawn if all pumps were operating at their rated capabilities 24 hours a day. Few facilities operate in this manner, however, and reported uses generally comprise only a small percentage of total

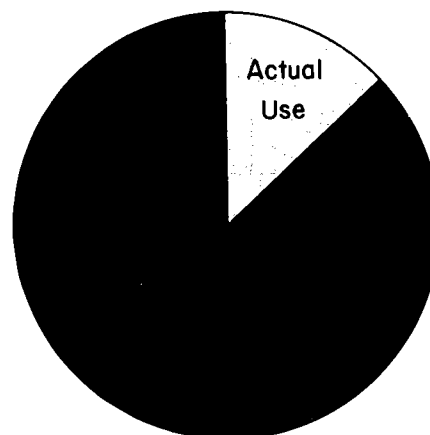


Figure 25. Water Use 1985 vs. Registered Capability

withdrawal capabilities (fig. 25). Estimates of total usage may be based on metering devices, the multiplication of pump capacity and total time of pumpage, or by other methods approved by the Division of Water.

TABLE 15. Withdrawal Capability and Use by Registered Significant Water Withdrawal Facilities: All Uses Combined (1985)

County	Number of Facilities	Withdrawal Capability (MGD)			Reported Use (MGD) <sup>1</sup>		
		Ground Water	Surface Water	Combined	Ground Water	Surface Water	Combined
Dekalb	1	0.36	0.00	0.36	0.01	0.00	0.01
Elkhart	215	203.86	73.16	277.02	27.41	6.25	33.66
Kosciusko	38	34.92	27.06	61.98	2.57	0.64	3.21
LaGrange	152	99.94	70.17	170.11	4.87	4.44	9.31
Noble	45	35.10	4.03	39.13	3.43	0.05	3.48
St. Joseph	53	122.31	13.81	136.12	34.67	4.05	38.72
Steuben	25	15.26	12.86	28.12	1.79	0.36	2.15
<b>Total</b>	<b>529</b>	<b>511.75</b>	<b>201.09</b>	<b>712.84</b>	<b>74.75</b>	<b>15.79</b>	<b>90.54</b>

<sup>1</sup>As of October 1986. Reports for approximately 14 percent of registered facilities had not yet been received at the date of this compilation.

TABLE 16. Water Use by Category 1985<sup>a</sup>

County	Registered Water Withdrawal Facilities						Non-Registered
	Public Supply	Irrigation <sup>b</sup>	Industry	Energy Production	Rural	Misc.	Domestic Self-Supplied
Dekalb	----- <sup>c</sup>	0	.01	0	0	0	0.03
Elkhart	15.33	9.78	8.55	0	0	0	5.08
Kosciusko	.49	2.00	.71	0	0	0	0.71
LaGrange	.59	7.07	.02	0	1.52	.11	1.81
Noble	2.42	.41	.65	0	0	0	0.88
St. Joseph	32.19	.43	5.03	0	1.08	0	3.69
Steuben	1.33	.52	.13	0	0.17	0	0.94
<b>TOTAL</b>	<b>52.35</b>	<b>20.21</b>	<b>15.10</b>	<b>0</b>	<b>2.77</b>	<b>.11</b>	<b>13.14</b>

<sup>a</sup>All values in million gallons per day.

<sup>b</sup>Estimated water use for non-registered livestock operations is 5.55 MGD. Less than 5 percent of this total is already accounted for in the "Irrigation" category. A minimal percentage is accounted for in the "Rural" category (one facility) and "Industrial" category (one facility).

<sup>c</sup>Data not available during report preparation.

The division recognizes six water use categories for registered facilities: public supply, irrigation, industrial, rural, energy production, and miscellaneous. Non-registered withdrawals (discussed in a later section) primarily include domestic self-supplied uses and large livestock operations. Total reported and estimated

withdrawals for 1985 for registered and non-registered facilities are as follows:

Registered water use	90.54 MGD
Non-registered water use	18.69 MGD
<b>Total</b>	<b>109.23 MGD</b>

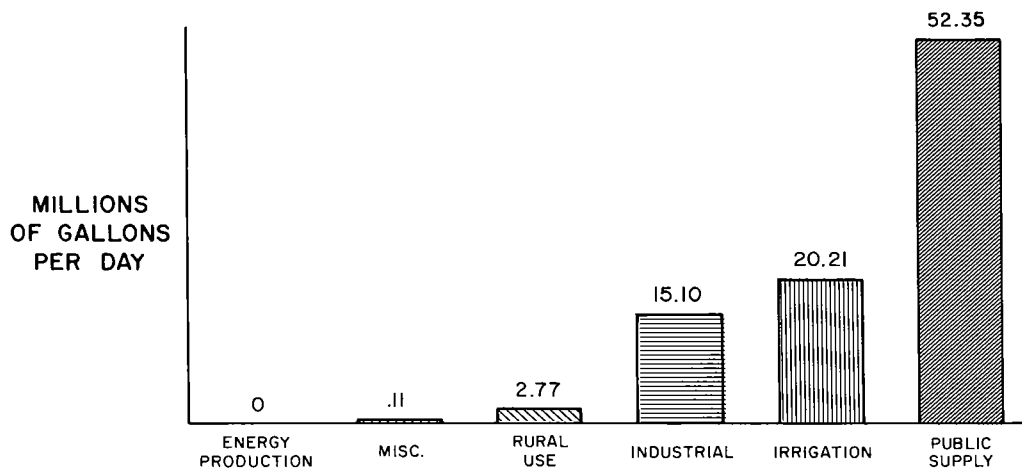
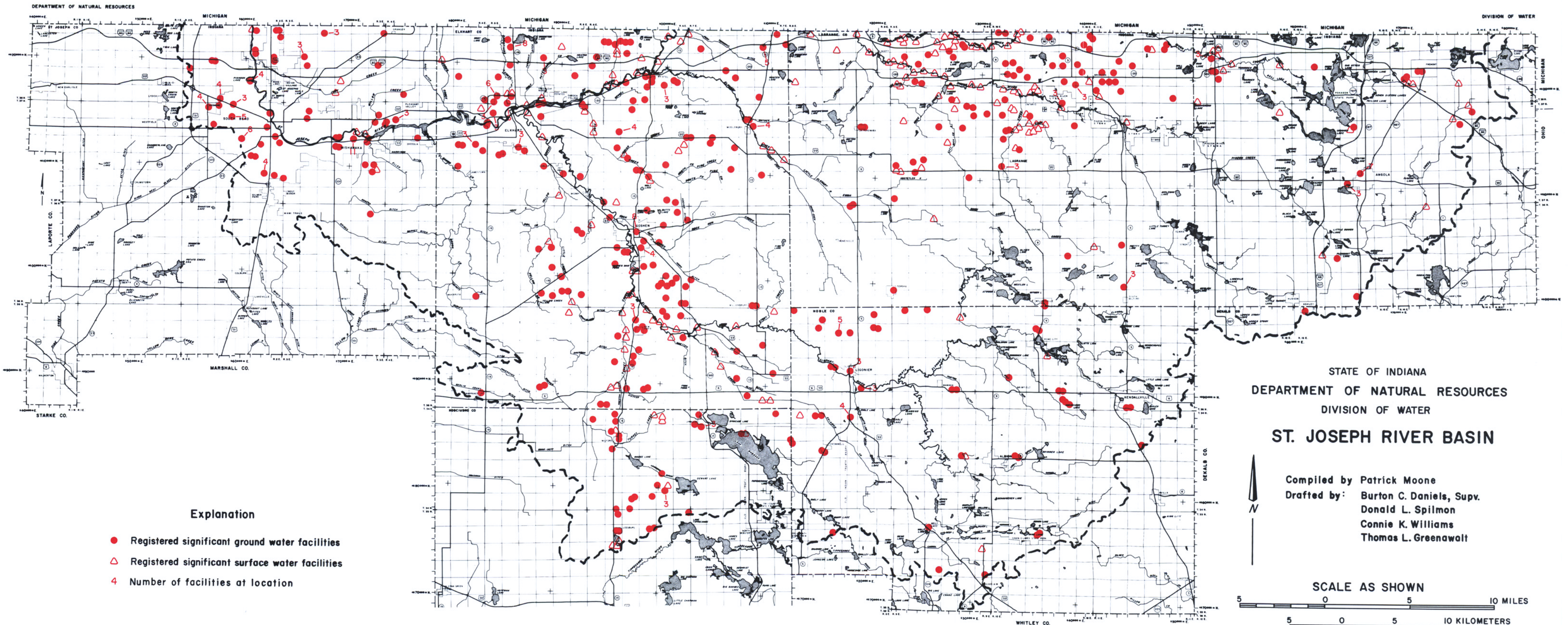


Figure 26. Water Use



**Explanation**

- Registered significant ground water facilities
- △ Registered significant surface water facilities
- 4 Number of facilities at location

STATE OF INDIANA  
 DEPARTMENT OF NATURAL RESOURCES  
 DIVISION OF WATER  
**ST. JOSEPH RIVER BASIN**

Compiled by Patrick Moone  
 Drafted by: Burton C. Daniels, Supv.  
 Donald L. Spilmon  
 Connie K. Williams  
 Thomas L. Greenawalt

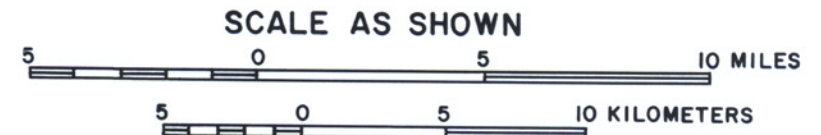


Figure 24. Registered significant withdrawal facilities

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TABLE 17. Withdrawal Capability and Use: Public Supply

County	Withdrawal Capability (MGD)			Reported 1985 Use (MGD)		
	Ground Water	Surface Water	Combined	Ground Water	Surface Water	Combined
Dekalb	----- <sup>a</sup>	0.00	----- <sup>a</sup>	----- <sup>a</sup>	0.00	----- <sup>a</sup>
Elkhart	63.60	0.00	63.60	15.33	0.00	15.33
Kosciusko	5.01	0.00	5.01	0.49	0.00	0.49
LaGrange	8.15	0.72	8.87	0.59	0.00	0.59
Noble	14.44	0.00	14.44	2.42	0.00	2.42
St. Joseph	94.35	0.29	94.64	32.18	0.01	32.19
Steuben	4.80	0.00	4.80	1.33	0.00	1.33
<b>Total</b>	<b>190.35</b>	<b>1.01</b>	<b>191.36</b>	<b>52.34</b>	<b>0.01</b>	<b>52.35</b>

<sup>a</sup>Data not available during report preparation.

Table 16 categorizes by county the reported 1985 water use (reported as of October 1986) for registered facilities. Fig. 26 summarizes total in-basin water use by registration category. As the exhibits show, withdrawals for public supply, which constitute the largest daily average use in the basin (approximately 52 MGD), occur primarily in St. Joseph and Elkhart counties. During the summer crop season, however, daily public supply withdrawals (as averaged over one year) may be exceeded by irrigation withdrawals (which average 82 MGD for a 90-day period or 130 MGD for a 60-day period).

Ground water is the source of 83 percent of all water withdrawn by registered facilities, or nearly five times the amount of surface water (fig. 27). Eighty-five percent (85%) of ground-water withdrawals occur within St. Joseph and Elkhart counties, primarily for public supply uses. Ninety-seven percent (97%) of all surface-water withdrawals occurred within St. Joseph, Elkhart, and LaGrange counties, primarily for agricultural irrigation.

#### Registered Use Categories

*Public supply* (table 17) refers to water withdrawn by public and private water utilities and delivered for domestic (household), municipal, industrial, and commercial uses. In 1985, public supply uses in the St. Joseph basin totalled approximately 52 MGD (27 per-

cent of the total withdrawal capability). Over 99 percent of the water withdrawn was derived from ground-water sources. The small amount of surface water withdrawn under the "Public Supply" category in St. Joseph County was used for non-drinking purposes.

The two most populous counties, St. Joseph and Elkhart, accounted for 91 percent of total withdrawals, as well as 91 percent of ground-water withdrawals. Public supply constituted the largest water use for Noble and Steuben, as well as Elkhart and St. Joseph counties. This usage is a reflection of the population (fig. 3) for cities within these four counties.

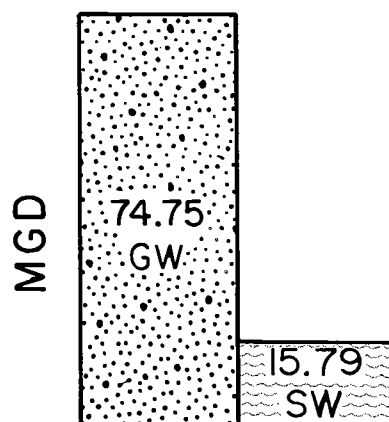


Figure 27. Total Use By Source

TABLE 18. Withdrawal Capability and Use: Irrigation

County	Withdrawal Capability (MGD)			Reported 1985 Use (MGD)		
	Ground Water	Surface Water	Combined	Ground Water	Surface Water	Combined
Dekalb	0.00	0.00	0.00	0.00	0.00	0.00
Elkhart	97.29	58.04	155.33	5.06	4.72	9.78
Kosciusko	24.56	9.22	33.78	1.55	0.45	2.00
LaGrange	81.52	67.22	148.74	4.26	2.81	7.07
Noble	16.11	2.59	18.70	0.36	0.05	0.41
St. Joseph	13.62	5.33	18.95	0.31	0.12	0.43
Steuben	6.39	12.10	18.49	0.31	0.21	0.52
<b>Basin Total</b>	<b>239.49</b>	<b>154.50</b>	<b>393.99</b>	<b>11.85</b>	<b>8.36</b>	<b>20.21</b>

*Irrigation* (table 18) refers to both agricultural and non-agricultural uses (such as for golf courses). Irrigation uses in the St. Joseph basin totalled 20 MGD, only 5 percent of total capability. Sixty percent (60%) of irrigation water was derived from ground-water sources. Surface-water withdrawals occurred primarily along Pigeon and Fawn Rivers (LaGrange County), the Elkhart and St. Joseph Rivers (Elkhart County), and portions of Turkey Creek (Kosciusko and Elkhart Counties).

Ninety-four percent (94%) of all irrigation uses occurred in Elkhart (49%), LaGrange (35%), and Kosciusko (10%) Counties. These three counties also accounted for similar percentages of ground-water withdrawals for irrigation (42%, 36% and 13%, respectively). Irrigation usage is generally confined to outwash areas.

*Industrial self-supplied* (table 19) refers to process water, waste assimilation, dewatering, and some cooling and mineral extraction uses. In 1985, self-supplied industrial water use totalled 15 MGD (approximately 14 percent of the total withdrawal capability). Nearly 63 percent of industrial water was derived from ground-water sources. Approximately 90 percent of all industrial uses occurred in Elkhart and St. Joseph counties. This usage reflects the economic activities of the two counties. As discussed earlier in the "Economy" section of this report, major types of manufacturing in these two counties include machinery, fabricated metals, and transportation equipment.

TABLE 19. Withdrawal Capability and Use: Industrial

County	Withdrawal Capability (MGD)			Reported 1985 Use (MGD)		
	Ground Water	Surface Water	Combined	Ground Water	Surface Water	Combined
Dekalb	0.36	0.00	0.36	0.01	0.00	0.01
Elkhart	41.10	15.12	56.22	7.02	1.53	8.55
Kosciusko	5.35	17.84	23.19	0.53	0.18	0.71
LaGrange	0.82	0.00	0.82	0.02	0.00	0.02
Noble	4.55	1.44	5.99	0.65	0.00	0.65
St. Joseph	12.18	8.19	20.37	1.10	3.93	5.03
Steuben	2.84	0.00	2.84	0.13	0.00	0.13
<b>Basin Total</b>	<b>67.20</b>	<b>42.59</b>	<b>109.79</b>	<b>9.46</b>	<b>5.64</b>	<b>15.10</b>

TABLE 20. Withdrawal Capability and Use: Rural

County	Withdrawal Capability (MGD)			Reported 1985 Use (MGD)		
	Ground Water	Surface Water	Combined	Ground Water	Surface Water	Combined
Dekalb	0.00	0.00	0.00	0.00	0.00	0.00
Elkhart	0.32	0.00	0.32	0.00	0.00	0.00
Kosciusko	0.00	0.00	0.00	0.00	0.00	0.00
LaGrange	5.13	1.73	6.86	0.00	1.52	1.52
Noble	0.00	0.00	0.00	0.00	0.00	0.00
St. Joseph	2.16	0.00	2.16	1.08	0.00	1.08
Steuben	1.23	0.76	1.99	0.02	0.15	0.17
<b>Basin Total</b>	<b>8.84</b>	<b>2.49</b>	<b>11.33</b>	<b>1.10</b>	<b>1.67</b>	<b>2.77</b>

*Rural* uses (table 20) in the St. Joseph Basin only include fish hatcheries, although large-scale livestock operations also constitute a rural use. 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).

Rural water use totalled nearly 3 MGD for 1985. In contrast to public supply, irrigation, and industrial uses, rural water use was primarily derived from surface-water sources.

*Energy Production* includes any self-supplied, water withdrawal use involved in the energy production process including: coal preparation, oil recovery, cooling water, mineral extraction, power generation, heating/air conditioning, and dewatering.

The St. Joseph River basin, as defined in this study, has no registered withdrawal facilities for energy

production within its boundaries. However, a South Bend ethanol plant lies approximately one-half mile outside the western topographic boundary. The plant uses ground water from the St. Joseph Aquifer System and discharges most of its water to the St. Joseph River, and must therefore be considered when examining water use within the basin. The ethanol facility has a registered capability of 12.4 MGD and a reported usage of approximately 3 MGD for 1985. Existing hydro-power plants are discussed as instream uses.

*Miscellaneous* (table 21) includes water withdrawn for recreational purposes (for example, water slides and snow-making) and fire protection. Only three facilities in the basin are classified as miscellaneous. In 1985, miscellaneous uses totalled 0.11 MGD (approximately 2 percent of the registered capability). Less than 40 percent of the water withdrawn was derived from ground-water sources.

TABLE 21. Withdrawal Capability and Use: Miscellaneous

County	Withdrawal Capability (MGD)			Reported 1985 Use (MGD)		
	Ground Water	Surface Water	Combined	Ground Water	Surface Water	Combined
Dekalb	0.00	0.00	0.00	0.00	0.00	0.00
Elkhart	1.55	0.00	1.55	0.00	0.00	0.00
Kosciusko	0.00	0.00	0.00	0.00	0.00	0.00
LaGrange	4.32	0.50	4.82	0.00	0.11	0.11
Noble	0.00	0.00	0.00	0.00	0.00	0.00
St. Joseph	0.00	0.00	0.00	0.00	0.00	0.00
Steuben	0.00	0.00	0.00	0.00	0.00	0.00
<b>Basin Total</b>	<b>5.87</b>	<b>0.50</b>	<b>6.37</b>	<b>0.00</b>	<b>0.11</b>	<b>0.11</b>

### Non-Registered Uses

*Domestic self-supply* refers to water users who obtain water from individual water wells rather than municipal (public supply) systems. Table 22 lists the estimated amount of domestic self-supplied water use for 1985. The values were obtained by multiplying estimated self-supplied population by a calculated average usage of 76 gallons per day per person (IDNR, 1982a).

*Livestock* water use (table 23) has been estimated by multiplying the estimated population of a particular livestock category by an estimate of the amount of water consumed daily per animal (IDNR, 1982a). In a few cases, water used for livestock purposes by large farm operations may have also been included in the "Irrigation" category of registered significant water withdrawal facilities.

*Consumptive* use refers to the amount of withdrawn water which is evaporated, transpired by plants, incorporated into a product, or otherwise made unavailable for re-use within a short time period. The percentage of withdrawn water that is consumed depends on the type of water use.

Irrigation and rural uses consume most of the utilized water (90 to 100 percent). Industrial and public supply consume relatively little water (5 to 25 percent). Once-through cooling for energy production generally consumes a minimal amount (1 to 2 percent).

TABLE 22. Estimated Domestic Self-Supplied Water Use, 1985

County	Use (MGD)
Dekalb	0.03
Elkhart	5.08
Kosciusko	0.71
LaGrange	1.81
Noble	0.88
St. Joseph	3.69
Steuben	0.94
<b>Basin Total</b>	<b>13.14 MGD</b>

*Instream* (non-withdrawal) uses primarily include recreation and fish and wildlife habitat. In addition, two hydroelectric power plants within the basin are also categorized as instream uses because no diversion channels are involved. The two hydropower plants, Twin Branch at Mishawaka and Elkhart Dam at Elkhart, are both owned and operated by the Indiana and Michigan Electric Company. The Twin Branch facility has six units with a total rated capacity of 7260 kilowatts. Elkhart Dam's three units have a total rated capacity of 3440 kilowatts.

Water-based recreational activities are available throughout the basin, and many additional activities such as picnicking, camping, and hiking are generally enhanced by the presence of water. Most in-basin lakes are surrounded by land in private ownership and therefore are not legally accessible by the public. However, public lake access is available within state properties such as parks and nature preserves, as well as on dozens of other lakes, particularly in the basin's "lake zone" extending from northwest Steuben to northeast Kosciusko county. River access sites administered by the IDNR are located on the St. Joseph, Elkhart, North Branch Elkhart, South Branch Elkhart, and Pigeon Rivers. Public fishing areas are located on Lake Wawasee (no boat ramp available) and on Pigeon River's Scott Mill Pond.

Boating, fishing, canoeing, swimming, ice skating, and water skiing are six major water-related activities in the St. Joseph basin. Table 24 shows estimates of instream uses and needs for these activities for 1985, 1990, and 1995. As the table shows, there are projected shortages in boating, fishing and ice skating needs, and

TABLE 23. Estimated Livestock Water Use, 1985

Livestock Category	Estimated Population Within Basin	Total Water Use (MGD)
Beef Cattle	148,600	1.71
Dairy Cattle	40,100	0.90
Hogs	239,300	0.96
Chickens	1,962,400	1.96
Sheep	9,800	0.01
Turkeys	39,800	0.01
<b>Basin Total</b>		<b>5.55 MGD</b>

TABLE 24. Recreational Instream Uses and Needs

Activity	Activity Occasions	Density Guidelines	Demand	Supply	Needs
Boating					
1985	1765055	58.8 Boaters/AC/YR	30018 Acres	16990 Acres	-13028 Acres
1990	1781928	58.8 Boaters/AC/YR	30305 Acres	16990 Acres	-13315 Acres
1995	1854430	58.8 Boaters/AC/YR	31538 Acres	16990 Acres	-14548 Acres
Canoeing					
1985	68037	1170 Canoeists/Mi/YR	58 Miles	89 Miles	+ 31 miles
1990	67265	1170 Canoeists/Mi/YR	57 Miles	89 Miles	+ 32 Miles
1995	69005	1170 Canoeists/Mi/YR	59 Miles	89 Miles	+ 30 Miles
Water Skiing					
1985	156835	34.4 Skiers/AC/YR	4559 Acres	7017 Acres	+ 2458 Acres
1990	155057	34.4 Skiers/AC/YR	4507 Acres	7017 Acres	+ 2510 Acres
1995	156537	34.4 Skiers/AC/YR	4550 Acres	7017 Acres	+ 2467 Acres
Swimming					
1985	3241891	76608 Swimmers/AC/YR	42 Acres	59 Acres	+ 17 Acres
1990	3331748	76608 Swimmers/AC/YR	43 Acres	59 Acres	+ 16 Acres
1995	3463450	76608 Swimmers/AC/YR	45 Acres	59 Acres	+ 14 Acres
Fishing					
1985	3647863	66 Fishermen/AC/YR	55271 Acres	20319 Acres	-34952 Acres
1990	3629646	66 Fishermen/AC/YR	54995 Acres	20319 Acres	-34676 Acres
1995	3693144	66 Fishermen/AC/YR	55957 Acres	20319 Acres	-35638 Acres
Ice Skating					
1985	81419	4200 Skaters/AC/YR	19 Acres	6 Acres	-13 Acres
1990	81301	4200 Skaters/AC/YR	19 Acres	6 Acres	-13 Acres
1995	83857	4200 Skaters/AC/YR	20 Acres	6 Acres	-14 Acres