

## **FAWN RIVER (MIDDLE)**

*St. Joseph County (T8S, R9W, Sec. 9, 10, 13)*

**Surveyed July 27 and 28, 1994**

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### **Environment**

The middle portion of Fawn River is a second-order stream rated as top-quality, warmwater. Flowing through southern St. Joseph County and part of Branch County, the Fawn River originates as a chain of lakes north of Angola, Indiana. It flows in a northwesterly direction through the towns of Orland, Fawn River, and Scott before entering the St. Joseph River near Constantine.

The Fawn River is characterized as a straight to meandering stream that flows unconfined in a wide outwash plain. The topography of the watershed is that of gently rolling hills composed of well-drained moraines and flat outwash plains. Soils in the drainage include well-drained loamy and sandy soils (Oshtemo-Spinks and Hillsdale-Elmdale associations) with some poorly drained mucky and loamy soils (Adrian-Granby association). Land cover in the watershed is primarily agricultural and forested with wetlands and some urbanization.

The total length of Fawn River from headwaters to mouth is about 65 miles. This survey concentrated on about 5 miles of river. The average width of the middle portion of Fawn River was 48 feet and the average depth was 1.8 feet. Substrates were composed of sand (67%), silt (18%), rock and boulders (9%), and gravel (6%).

There are nine known dams on the river. Greenfield Mill, Fawn River Mill, and Star Mill dams were producing hydro-power at the time of the 1994 survey, and the Upper Constantine Dam was a retired hydro-power facility. The remaining five dams were being used as lake level control structures or for other purposes (Wesley and Duffy 1999).

Depending on the section surveyed, overall habitat varied from poor to good. Overhanging brush, pools, and aquatic vegetation were common to most sections and an occasional undercut bank and log were also found. Some areas had excessive silt indicating an accelerated rate of sedimentation to the river-most likely from poor agricultural management practices.

In July of 1990, Surface Water Quality Division (SWQD) conducted a biological and chemical survey to assess the effect of the Sturgis Waste Water Treatment Plant discharge on biological communities within the Fawn River (MDNR 1991). Their sampling sites were downstream of our survey sites. Fish and macroinvertebrate

communities were characterized as fair to good. Habitat was rated as poor to fair. Poor ratings were given due to significant amounts of silt deposition. Water chemistry results were within ranges normally found in southern Michigan. Acidity (pH) was between 8.0 and 8.1, and alkalinity ranged from 210 to 240 ppm. Many other chemical characteristics were also analyzed.

The macroinvertebrate community was qualitatively sampled at two locations in the middle Fawn River by SWQD (MDNR 1991). Up to eight families of the order Insecta—including mayflies, caddisflies, and stoneflies—were documented. Crayfish, scuds, and snails were also common. Some of the species found are classified as intolerant, meaning they concede easily to polluted waters.

There is no state-owned land along the banks of the middle Fawn River. However, access is good at most road crossings, and anglers easily obtain landowner permission.

### **Fishery Resource**

Other than two previous general fish surveys, there has been no active fisheries management on the Fawn River. No records have been found regarding fish stocking. Anglers report fair to good catches of smallmouth bass, rock bass, white suckers, and redhorse.

The middle Fawn River was surveyed at three locations in August of 1969. Fish were sampled while wading with standard 110-V DC stream electrofishing equipment equipped with three positive electrodes. At the Halsey Road site (T8S, R9W, Sec. 13), only five species of fish were collected, with rock bass being the only sport fish. Cover consisted of holes, logs, and overhanging brush. The substrate consisted of gravel, sand, and silt with no percentages of each reported. The County Farm Road site (T8S, R9W, Sec. 10) had 15 species, with rock bass, smallmouth bass, and northern pike being the primary sport fish with catch per efforts of 14.6, 1.3, and 1.3 fish per hour, respectively. Cover consisted of overhanging brush and aquatic vegetation, and the substrate composition was estimated to be 60% sand, 25% gravel, and 15% silt. Miller Road was too deep to shock effectively, but the survey reported smallmouth bass and minnows. The substrate consisted of 50% sand, 30% gravel, and 20% silt.

The Fisheries Section of the Indiana Department of Natural Resources surveyed upper portions of Fawn River in 1987 near the town of Orland, Indiana (Stefanavage 1988). The river has a discharge of 86 cfs and a drainage area of 86 square miles at that point. A total of 35 species of fish were collected using stream shocking gear. The golden redhorse was the most abundant species and rock bass and smallmouth bass were the primary sport fish. Catch per effort for rock bass and smallmouth bass were 21.4 and 16.2 fish per hour, respectively. The report indicated excellent fishing for rock bass and fair to excellent fishing for smallmouth bass.

The most recent Michigan survey was conducted in 1994. River sections near Halsey Road (T8S, R9W, Sec. 13), County Farm Road (T8S, R9W, Sec. 10), and Fawn River

Road (T8S, R9W, Sec. 9) were sampled using a 250-V DC stream shocker with three probes. The main purpose of the survey was to document potential impacts of the Fawn River Mill Dam. This dam, used for hydropower at the time of the survey, had a head of 5 feet and impounded 15 acres (Wesley and Duffy 1999).

The overall survey, combining all three sites, collected 24 species of fish. Common shiner was the most abundant species, comprising 26.1% of the catch by number ([Table 1](#)). Bluegill was the most abundant sport fish followed by smallmouth bass, rock bass, and largemouth bass. Smallmouth bass was the most abundant fish by weight, comprising 15.5 % of the catch. Smallmouth bass ranged from 1 to 18 inches, but only 14% were of legal size (>14 inches long). Rock bass ranged from 1 to 8 inches, and 44% were of acceptable size. Five age classes of smallmouth bass were collected. Sport fish that were aged (from scale samples) were growing at rates comparable to state averages for the species ([Table 2](#)). Recruitment of smallmouth bass was good. Forty-two percent of the smallmouth bass that were aged were age 1, from the 1993 year class ([Table 3](#)).

The Halsey Road site is located about 3 river miles upstream of the Fawn River Mill Dam Impoundment. Twenty species of fish were collected with smallmouth bass and rock bass representing sport fish. Species diversity was much higher in the 1994 survey than in the 1969 survey. Catch per effort was also higher for smallmouth bass (45/hr) and rock bass (20/hr), but the average size of smallmouth bass was only 3.4 inches. Cover was similar to 1969 with undercut banks, overhanging brush, aquatic vegetation, and logs present. The substrate consisted of 65% sand, 13% gravel, 10% rock, 10% silt, and 2% boulders. At 11:00 a.m., air temperature was 67°F and water temperature was 72°F.

The County Farm Road site is below the dam. Species diversity was the same as in 1969 with 15 species present. Smallmouth bass and rock bass were the primary sport fish collected. Northern pike were absent in this survey but were collected in 1969. Catch per effort of smallmouth bass and rock bass was 11.1 and 13.3 fish per hour, respectively. Catch per effort for rock bass was about the same but smallmouth bass had increased since 1969. Fish cover was the same as the previous survey, but the substrate contained more silt in the 1994 survey. The substrate consisted of 50% sand, 40% silt, and 10% boulders. At 1:30 p.m., both air and water temperatures were 72°F.

The Fawn River Road site, about 1 mile downstream of the dam, had never been sampled before. Fish diversity was good with 18 species present. Bluegill, rock bass, and smallmouth bass were the primary sport fish with catch per efforts of 38.9, 11.1, and 14.4 fish per hour, respectively. Fish cover consisted of overhanging brush, aquatic vegetation, and pools. The substrate was composed of 85% sand, 5% gravel, 5% rock and boulders, and 5% silt. Temperatures at 10:00 a.m. was 69°F for air and 68°F for water.

There appears to be an increased amount of silt below the dam compared to the other two sites. Since the 15-acre impoundment is nearly full with sediments (average depth

of 3 feet), silt is probably being released during drawdown events. Temperature was not a factor based on one reading, but this should be monitored on a long-term basis. The dam does fragment fish habitat and creates a barrier to migrating white sucker, shorthead redhorse, golden redhorse, and other species of fish that may require habitat located upstream of the dam.

Game fish populations in the middle Fawn River compared well to those in the upper portions of the river in Indiana ([Table 4](#)). Relative abundances of sport fish were similar, and size distributions and age structures of smallmouth bass were similar (Stefanavage 1988). Walleye were reported in the upper river but not in the lower river, but the walleye were probably escapees from the Fawn River Hatchery in Indiana. The upper river had a higher diversity of fishes than the middle river, 35 fish species compared to 24.

### **Management Direction**

Data collected in the 1994 survey indicated that a self-sustaining fishery exists in the middle Fawn River. The smallmouth bass population could probably improve with increased rock and gravel substrate. Restoration of high gradient areas through dam removal would improve habitat. Supporting Clean Water Act Section 319 grants in the watershed would also reduce silt inputs to the river by addressing non-point source pollution and implementing best management practices (BMP's). Temperature monitoring above and below the Fawn River Mill Dam is needed. Future surveys should concentrate where data is lacking in the lower Fawn River and would require an intermediate-sized boom shocker. Our management goal into the next century should be to maintain and improve the existing fishery by habitat protection and restoration.

Report completed: May 11, 2000.

### **References**

MDNR. 1991. A biological survey of Fawn River St. Joseph County, Michigan July 18, 1990. Michigan Department of Natural Resources, Surface Water Quality Division Report 89, Lansing, Michigan.

Stefanavage, T.C. 1988. Assessment of smallmouth bass populations at five northern Indiana rivers. Indiana Department of Natural Resources, Division of Fish and Wildlife, Fisheries Section, Indianapolis, Indiana.

Wesley, J.K., and J.E. Duffy. 1999. St. Joseph River Assessment. Michigan Department of Natural Resources, Fisheries Division, Special Report 24. Ann Arbor, Michigan.

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**Table 1:** Number, weight, and length (inches) of fish collected from Fawn River with 250-V DC shocker, May 27 and 28, 1994.

Species	Number	Percent by number	Weight (Pounds)	Percent by weight	Length range (inches) <sup>1</sup>	Average length	Percent legal size <sup>2</sup>
Common shiner	194	26.1	3.4	4.3	1-7	3.2	...
Honeyhead chub	122	16.4	3.5	4.5	1-6	3.3	...
Northern hog sucker	68	9.2	13.9	17.7	1-15	6.1	...
Bluegill	62	8.4	2.5	3.1	2-5	4.1	0
Smallmouth bass	59	8.0	15.5	19.7	1-18	6.5	14 (14)
Rock bass	38	5.1	6.5	8.3	1-8	5.7	44 (6)
Johnny darter	27	3.6	0.1	0.1	1-2	1.9	...
Bluntnose minnow	27	3.6	0.1	0.1	1-3	2.0	...
Rainbow darter	23	3.1	0.1	0.1	1-2	2.1	...
White sucker	21	2.8	1.4	1.7	1-10	4.5	...
Blackside darter	19	2.6	0.1	0.1	1-3	2.7	...
Spotfin shiner	19	2.6	0.3	0.4	2-4	3.5	...
Stonecat	11	1.5	0.5	0.7	3-8	4.5	...
Shorthead redhorse	11	1.5	11.8	15.1	4-16	13.2	...
Bullheads (Family)	11	1.5	0.1	0.1	4-9	7.4	...
Largemouth bass	8	1.1	0.3	0.4	1-8	2.8	...
Rosyface shiner	7	0.9	0.1	0.1	2-3	2.9	...
Hybrid sunfish	3	0.4	0.1	0.2	2-4	4.0	...
Grass pickerel	3	0.4	0.1	0.1	4-4	4.5	...
Golden redhorse	3	0.4	4.2	5.4	15-16	15.8	...
Lampreys (Family)	2	0.3	0.0	0.0	5-8	7.0	...
Warmouth	2	0.3	0.2	0.2	4-5	5.0	...
Green sunfish	1	0.1	0.0	0.0	2	2.5	...
Common carp	1	0.1	13.8	17.6	31	31.5	...
Total	742	100	78.5	100			

<sup>1</sup> Note some fish were measured to 0.1 inch, others to inch group: e.g., "5"=5.0 to 5.9 inch "12"=12.0 to 12.9 inches: etc.

<sup>2</sup> Percent legal size or acceptable size for angling. Legal size or acceptable size for angling is given in parentheses.

**Table 2:** Average weighted total length (inches) at age, and growth relative to the state average, for fish sampled from the Fawn River with 250-V DC shocker, May 27 and 28, 1994. Number of fish aged is given in parentheses.

Species	1	2	3	Age 4	5	6	7	Mean growth index <sup>1</sup>
Bluegill	2.5 (4)	4.0 (21)	5.2 (1)	...	...	...	...	-0.3
Largemouth bass	...	8.7 (1)	...	...	...	...	...	...
Smallmouth bass	5.7 (8)	8.7 (2)	10.5 (4)	13.5 (4)	...	15.8 (1)	...	+0.1

<sup>1</sup> Mean growth index is the average deviation from the state average length at age.

**Table 3:** Estimated age frequency (percent) of fish caught for fish sampled from the Fawn River with 250-V DC shocker, May 27 and 28, 1994.

Species	1	2	3	Age 4	5	6	7	Number aged
Bluegill	15	81	4	...	...	...	...	26
Largemouth bass	...	100	...	...	...	...	...	1
Smallmouth bass	42	11	21	21	...	5	...	19

**Table 4:** Relative abundance (percent by number) of fish collected using electrofishing gear on the upper Fawn River near Orland, Indiana (Stefanavage 1988).

<b>Species</b>	<b>Relative abundance</b>
Golden redhorse	17.5
Common shiner	14.8
Northern hog sucker	10.7
Carp	8.0
Steelcolor shiner	7.6
Rock bass	6.8
Bowfin	6.2
Smallmouth bass	5.0
Bluegill	3.6
Longear sunfish	3.0
Yellow perch	2.7
Bluntnose minnow	2.4
Pumpkinseed	2.4
White sucker	1.6
Shorthead redhorse	1.2
Largemouth bass	1.2
Walleye	0.8
Lake chubsucker	0.6
Blackside darter	0.6
Creek chub	0.4
Brown bullhead	0.4
Northern pike	0.4
Central stoneroller	0.3
Green sunfish	0.3
Grass pickerel	0.3
Golden shiner	0.2
Black crappie	0.2
Yellow bullhead	0.2
Spotted sucker	0.2
Hybrid sunfish	0.1
Channel catfish	0.1
Madtom	0.1
Johnny darter	0.1
Rainbow darter	0.1
Brook silverside	0.1

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