Fall Creek

Fish and Wildlife Research and Management Notes
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INTRODUCTION

Fall Creek and its tributaries drain approximately 318 square miles of central Indiana (Hoggatt, 1975). The stream originates near Sulphur Springs in Henry County and flows approximately 56 miles to the southwest before joining the West Fork of White River in Indianapolis. Geist Reservoir is a 1,900 acre impoundment located on Fall Creek 17.6 miles upstream from its confluence with White River. The lake acts as a sediment trap which allows for the creek downstream of the dam to be relatively silt free for some distance below the lake.

About a mile downstream of the Geist Reservoir dam, Fall Creek enters Fort Harrison State Park in northeast Marion County. Approximately 3.5 miles of Fall Creek flows through or forms the northern boundary of the 1,700 acre state park. With much of the park being forested, soil erosion is low which adds to the good water quality of the stream in this area.

Game fish population estimates were conducted at two reaches on Fall Creek in 1996, one within the state park boundaries and the other was a few miles downstream of the park along Fall Creek Parkway. The study was undertaken to evaluate primarily the black bass (smallmouth, largemouth, and spotted bass) fishery to determine if more restrictive bass regulations might benefit the Fall Creek fishery through Fort Harrison State Park. In 1996, the two Fall Creek stations had a diverse sport fishery, however, the black bass populations appeared low at both reaches sampled. Smallmouth and spotted bass were growing below normal which indicates that the bass populations were likely as large as could be expected. Geist Reservoir is likely serving as a nutrient trap for the lower portion of Fall Creek. This limits food production below the lake which reduces the size of the fish populations the stream can support. Because of this, it was unlikely that the bass populations would increase with more restrictive regulations than the current statewide 12-inch minimum black bass size limit and five fish bag limit on streams. Private groups, with approval from the Department of Natural Resources, placed signs along Fall Creek through the Fort Harrison State Park property labeling the reach as a “voluntary” smallmouth bass catch and release area.

In 1996, Fort Harrison State Park was just preparing to open which was expected to increase public use of the stream. Before ownership of the property by the state park, the property was owned by the military which limited public use. The present survey was conducted to determine if the increase in public use resulted in a decline in sport fish populations of Fall Creek which may then merit consideration of more restrictive regulations. Determining sport fish abundance, population size structures, and fish growth rates were key components of the survey.

METHODS

Sampling occurred on November 1 and 2, 2000 when the stream was low and clear. The station located within Fort Harrison State Park was nearly 700 feet in length and was located near the outlet of Delaware Lake at river mile 14.1. In the future, this station will be referred to as the "Fort Harrison reach." The Fall Creek Parkway station, located at river mile 11.1, was 1440 feet in length. This station will be called the "parkway reach" in the future.

In 1996, game fish populations were estimated using a mark-recapture method. For many species, population estimates were fairly unreliable due to low recaptures of marked fish. In the present survey, the "Depletion Method" was used to determine population numbers. This method is more reliable for determining population estimates since stations are sampled numerous time in the same day in an effort to collect all game fish. Shallow riffles formed the boundaries at each end of the stations which prevented migration into and out of the reach during sampling. An attempt was made to collect all black bass, rock bass, and channel catfish. Both banks of the entire length of each station and any fish attracting cover in the middle of the stream channel were sampled three to four times. Following an individual sampling run, collected fish were placed in a cage so they would not be collected in subsequent passes. The number of fish by species was counted and recorded for each sampling run. The population estimate of each species could then be determined for the reach based on declining catch rates for each pass. Population estimates were calculated using a computer program developed by Van Deventer and Platts (1989). Each estimate was then expanded to represent the number of fish per mile of stream.

Collected fish were measured to the nearest 0.1 inch and weighed to the nearest 0.01 pound. Scale samples were collected from the black bass and rock bass for age and growth determination. When sampling was completed, the fish were released back into the stream within the boundaries of the station.

RESULTS

The most numerous species collected that also had the highest average population estimate was smallmouth bass. Fifty-seven smallmouth that weighed 24.65 pounds were collected. The average population estimate was 132 smallmouth bass per mile, however, the two reaches had vastly different population estimates (Table 1). The estimate for the parkway reach was 194 per mile, but just 70 per mile for the Fort Harrison reach. The estimates for the present survey are nearly identical to those observed in 1996 (181 per mile at the parkway reach and 72 per mile in Fort Harrison

Table 1. Game fish population estimates (number per mile) for the Fort Harrison and parkway reaches of Fall Creek in the fall of 2000.

	Smallmouth bass	Spotted bass	Rock bass	Channel catfish	Largemouth bass
Fort Harrison	70	124	0	31	23
Parkway	194	132	154	7	7
Average	132	128	77	19	15

Smallmouth ranged from 3.3 to 18.1 inches long and averaged 7.8 inches (Table 2). Overall, nearly 23 percent of the smallmouth bass collected were 12 inches or larger and six were 16 inches or greater. In 1996, 33 percent of the smallmouth were a harvestable size. Smallmouth growth was slightly below normal in the present survey compared to smallmouth bass collected from other central Indiana streams (Table 3). Growth, however, is very similar to smallmouth growth observed from Fall Creek in 1992 and 1996. At 3-years-old, Fall Creek smallmouth are over one-half-inch smaller than the central Indiana average. The bulk of the smallmouth bass collected were spawned in 1999. The spring and summer of 1999 were very dry which generally results in strong year classes in streams. The spring and summer of 1997 and 1994 were also fairly dry, however, the 1997 year class of smallmouth was not extremely well represented. The 1994 year class on the other hand is still fairly well represented considering the age of those fish and their vulnerability to harvest (averaged 15.3 inches). Smallmouth bass average weights were slightly to well below normal.

Forty-eight spotted bass were sampled that collectively weighed 17.43 pounds. Spotted bass were nearly equally divided at the two reaches as the Fort Harrison station contained 124 per mile while the parkway reach had 132 per mile. In 1996, the two stations combined averaged 112 spotted bass per mile and they were nearly equally distributed, so the population has remained fairly stable over the four year period. Lengths of spotted bass ranged from 2.7 to 14.1 inches and averaged 7.8 inches (Table 4). Eight of the spotted bass (17 percent) were 12 inches or larger which is identical to that observed in 1996.

Growth of spotted bass was well below normal at all ages. It is currently taking spotted bass six years to reach legal size where normally it should take them about five years to reach 12 inches. Like smallmouth, the 1999 year class of spotted bass was very strong. The 1997 and 1994 year classes were also fairly well represented. Average weights of spotted bass from 6 to 10 inches long were generally below normal.

Table 2. Length frequency, average weight, and age of smallmouth bass collected from two stations on Fall Creek in the fall of 2000.

Length (inches)	Ft. Harrison Reach	Parkway Reach	Average Weight	Age
3.5	1	1	0.02	not aged
4.0		4	0.03	not aged
4.5		10	0.04	1
5.0		12	0.05	1
5.5	1	3	0.07	1
6.0	1	1	0.08	1
6.5	1		0.10	1
7.5	1	2	0.19	2
9.0		1	0.27	2
9.5		1	0.35	2
10.5		1	0.43	3
11.0		2	0.55	3
11.5		1	0.68	3
12.0	1	1	0.72	4
12.5		2	0.80	3,5
14.0		2	1.25	6
15.0	1		1.40	6
16.0	2	1	1.87	6,7
16.5		1	1.49	8
17.5		1	2.47	10
18.0		1	3.16	8
TOTAL	9	48		

Table 3. Average back calculated lengths (inches) of fish collected from Fall Creek in the fall of 2000

Species	Year Class	Number of Fish Aged	Back Calculated Length (inches) at each age							
			I	II	III	IV	V	VI	VII	VIII
Smallmouth bass	1999	12	3.7							
y-intercept = 1.4 in.	1998	5	3.6	5.9						
	1997	5	3.3	5.8	9.3					
	1996	1*	3.1	6.1	9.0	10.9				
	1995	1*	3.2	5.7	7.2	9.2	11.4			
	1994	4	3.0	4.7	7.1	9.9	12.0	14.0		
	1993	1*	4.1	7.9	10.3	11.6	12.6	13.8	15.3	
	1992	2*	4.0	6.4	8.1	10.1	12.2	14.1	15.2	16.7
	average length		3.4	5.5	8.2	9.9	12.0	14.0		
	number aged		26	14	9	4	4	4		

Species	Year Class	Number of Fish Aged	Back Calculated Length (inches) at each age							
			I	II	III	IV	V	VI	VII	VIII
Spotted bass	1999	15	2.8							
y-intercept = 0.0 in.	1998	5	2.6	5.5						
	1997	9	2.1	5.1	8.1					
	1995	1*	1.7	3.8	6.3	8.9	10.7			
	1994	4	1.8	4.5	6.7	8.4	10.7	12.1		
	1992	2*	2.0	5.8	7.1	8.8	10.2	11.6	12.5	13.5
	average length		2.3	5.0	7.4	8.4	10.7	12.1		
	number aged		33	18	13	4	4	4		

Species	Year Class	Number of Fish Aged	Back Calculated Length (inches) at each age							
			I	II	III	IV	V	VI	VII	VIII
Rock bass	1999	6	2.5							
y-intercept = 1.0 in.	1998	12	2.1	3.6						
	1997	10	2.1	3.8	5.3					
	1996	2*	2.1	4.1	5.6	6.7				
	1995	1*	2.2	3.5	4.3	6.3	7.3			
	1994	3	2.1	3.6	4.8	5.5	6.6	7.1		

AVERAGE LENGTH	2.2	3.7	5.1	5.5	6.6	7.1
NUMBER AGED	31	25	13	3	3	3

*Not included in average length calculations.

Table 4. Length frequency, average weight, and age of spotted bass collected from two stations on Fall Creek in the fall of 2000.

Length (inches)	Ft. Harrison Reach	Parkway Reach	Average Weight	Age
2.5		1	0.01	not aged
3.0	2	1	0.01	not aged
3.5		1	0.02	not aged
4.0		1	0.03	not aged
4.5		2	0.03	1
5.0		6	0.05	1
5.5	1	1	0.07	1
6.0	3	3	0.08	1
6.5	2		0.10	1
7.5		2	0.19	2
8.5		3	0.28	2
9.0		2	0.31	3
9.5	1	3	0.39	2,3
10.0		2	0.44	3
10.5	1	1	0.53	3
11.5	1		0.70	not aged
12.0	1		0.92	5
12.5		2	1.07	6
13.0	1		1.08	6
13.5	1	1	1.41	6,8
14.0	1	1	1.59	8,9
TOTAL	15	33		

Forty-one rock bass were collected from the parkway reach for a population estimate of 154 per mile. No rock bass were found in the Fort Harrison reach. In 1996, rock bass were far more abundant in the parkway reach (47 collected) compared to Fort Harrison (10 collected). A population estimate for rock bass could not be calculated at either reach in 1996 due to the low number of recaptures. In the present survey rock bass were collected up to 8.6 inches long and averaged 5.8 inches (Table 5). Of the rock bass sampled, 56 percent were six inches or longer which is identical to 1996. Growth of rock bass is near normal and is relatively unchanged since

1996. The most represented year classes collected in the present survey were spawned in 1998 and 1997. Surprisingly, the 1999 rock bass year class was not well represented. However, due to their small size, they may have been under sampled. Weights of rock bass were slightly to well below normal.

Only six channel catfish were sampled, four in the Fort Harrison reach and two in the parkway reach. In 1996, relatively few channels were collected and most of those were found in Fort Harrison. In the present survey, channel catfish ranged in length from 14.7 to 24.0 inches.

Table 5. Length frequency, average weight, and age of rock bass collected from two stations on Fall Creek in the fall of 2000.

Length (inches)	Ft. Harrison Reach	Parkway Reach	Average Weight	Age
3.5		2	0.03	1
4.0		3	0.04	1
4.5		5	0.06	1,2
5.0		4	0.08	2
5.5		4	0.10	2
6.0		6	0.14	2,3
6.5		6	0.20	3
7.0		5	0.26	3,4,6
7.5		5	0.28	3,5,6
8.5		1	0.48	not aged
TOTAL	0	41		

Three largemouth bass were collected from the Fort Harrison reach and two from the parkway reach. Largemouth bass are not commonly associated with stream fish communities, but are more frequently found in lakes and ponds, so their low abundance is not surprising. All of the largemouth sampled were small individuals that ranged from 3.3 to 6.4 inches long.

CONCLUSIONS

Over a four year period from 1996 to 2000, despite a likely increase in the public use of Fall Creek through Fort Harrison State Park due to the opening of the park, the sport fishery of Fall Creek remains nearly unchanged. In 1996, the average smallmouth population at the two stations surveyed was 127 per mile while it was 132 per mile in the present survey. The spotted bass population estimate was only slightly higher in 2000, 128 per mile, compared to 1996, 112 per mile. When all black bass species are combined, the population estimate was 284 per mile in 1996 and 275 per mile in 2000. Size structure of the dominant game species is also very similar between the two surveys. In 1996, one third of the smallmouth collected were of harvestable size, and in the present survey, 23 percent were 12 inches or longer. The percent of harvestable size spotted bass (17 percent) and rock bass (56 percent) were identical in 1996 and 2000. Growth of smallmouth and spotted bass continues to be slightly to well below normal. Growth of

smallmouth is unchanged since 1996, but spotted bass growth is now slightly slower than 1996. Rock bass are growing near normal and growth is very similar to that observed in 1996.

While there are quality fish available to catch in the area of Fall Creek from Fort Harrison State Park to Fall Creek Parkway, the game fish populations are low. Game fish population estimates were conducted on Sugar Creek in west central Indiana in the fall of 2000 using the same procedures as the Fall Creek survey. Smallmouth bass population estimates at the six stations surveyed on Sugar Creek ranged from a low of 83 per mile to a high of 875 per mile with the average being 362 per mile (Keller, 2001). The Sugar Creek average for smallmouth was about 2.7 times higher than Fall Creek. The spotted bass population in Sugar Creek is fairly low, and they are only found in the very lower portion of the stream. The overall black bass population estimate for Sugar Creek was 446 per mile compared to 275 per mile for Fall Creek. The rock bass population of Sugar Creek was 2.2 times higher than that found in Fall Creek. In the upper half of Sugar Creek, upstream of Crawfordsville, game fish are growing much slower than they are downstream of Crawfordsville, however, growth in all parts of Sugar Creek is still much better than growth observed at Fall Creek. At age 3, Fall Creek smallmouth bass average 8.2 inches long while Sugar Creek smallmouth averaged 9.1 and 10.6 inches at the same age upstream and downstream of Crawfordsville, respectively. Rock bass growth at 3-years-old upstream of Crawfordsville was 0.6 inches longer than 3-year-old Fall Creek rock bass, and 1.4 inches longer for rock bass found downstream of Crawfordsville compared to Fall Creek.

One unique aspect of the Fall Creek black bass fishery is that smallmouth and spotted bass are nearly equal in abundance and there are quality size individuals of both species. For other central Indiana streams similar in size to Fall Creek, it is almost expected that both species would be present, but one species is usually far more abundant than the other. Smallmouth prefer cool, high gradient streams that are relatively silt free, so they are usually found in the upper portion of a stream. In the lower portion of a stream, spotted bass tend to begin showing up since the water is usually warmer and gradient is less which usually results in finer bottom substrates. In the areas surveyed on Fall Creek, conditions look more suitable for smallmouth bass since there are clean substrates primarily composed of sand, gravel, and cobble, there is a good riparian canopy which maintains cool water, and there is a moderate gradient. Therefore, it is surprising that there is a well established, quality spotted bass fishery.

As observed in 1996, it does not appear that angler harvest is limiting the sport fishery of Fall Creek. Once again, there is a low density of black bass and rock bass, and they are growing fairly slow. If angler exploitation was limiting the population size, growth would be good due to less competition for food. As expressed in 1996, since the bass populations of Fall Creek appear to be at a level the stream can support, special regulations limiting harvest would likely cause little change in the game fish populations. Fall Creek will remain under the statewide 12-inch black bass size limit and the five fish daily bag limit. However, anglers are still encouraged to release all bass. This would maintain adequate broodstock populations that could reproduce successfully in years that have low spring and summer flows.

The best fishing opportunities on Fall Creek would be for smallmouth and spotted bass. Rock bass fishing is likely much better downstream of Fort Harrison State Park. Channel catfish are

found throughout the stream, but in fairly low numbers. Other species to catch would include a variety of sunfish species, crappie, yellow bass, carp, and suckers.

LITERATURE CITED

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