

JACK

Final Report

**A Survey for Fishes in Blue Rock Creek
at Newberry Wildlife Sanctuary**

and

In Small Streams at Sharon Woods

submitted by: Jeffrey G. Davis

*Bob,
Will you be
incorporating this report/info
into our State of Streams Report?
What is the status?*

Jack

November 4, 1998

INTRODUCTION

The initial proposal for this project to the Hamilton County Park District (HCPD) was to survey small streams at Sharon Woods (SW) and Silver Creek at Mitchell Memorial Forest. The project plan was altered to exclude Silver Creek and add Blue Rock Creek at Newberry Wildlife Sanctuary (NWS) when the first attempt to sample at Silver Creek resulted in the collection of no fish.

The scope of these surveys was to determine the community composition, species richness and relative abundance of fish in the small streams at SW and in Blue Rock Creek at NWS. No species were found that represent new distribution records for southwest Ohio.

Results indicate that the fish diversity in streams at both parks is low. At SW relative abundance is dominated by creek chubs (*Semotilus atromaculatus*) in the gorge and by bluegills (*Lepomis macrochirus*) in the lower gradient stretches of Sharon Creek downstream from the gorge. Sharon Creek, between Fields Ertel Road and Sharon Lake has the most balanced relative abundance, however the species diversity is still lower than what is expected for a second order stream in southwest Ohio.

Blue Rock Creek at NWS had very limited species diversity. It is dominated creek chubs and green sunfish (*Lepomis cyanellus*), both being species that are very tolerant of polluted conditions. No other species were found to be statistically significant members of the fish fauna in Blue Rock Creek.

MATERIALS AND METHODS

Maps of the drainages at both parks were studied and visits were made to all potential sample sites. Final selections were based on access, water flow, and the presence of both pool and riffle zone habitats. A small stream entering the east side of the lake at Sharon Woods was excluded. Very little of it actually flowed through park property and most of the fish in it would have been migrants upstream from the lake. The creek located in the southeast section of Sharon Woods along Cornell Road had water during the spring, but several attempts to electrofish and seine it produced no fish. Al Winstel, Sharon Woods Naturalist, explained that he had taken creek chubs from the stream in the past. By fall,

the extreme summer drought conditions had left the stream dry. No data was collected from that stream.

Newberry Wildlife Sanctuary - Sample Site Descriptions

At NWS, three sites were selected that provided both pool and riffle zone habitats. Sample site one was a section of stream parallel to Sheits Road at the western extreme of the park. The pools had a sand and gravel bottom with some bare limestone. The riffle zones were primarily limestone with good deal of undercuts and broken limestone forming the substrate. Samples were taken at this site on 27 May and 03 July, 1998.

A second sample site consisted of a deep sand and gravel bottom pool that had a high gradient riffle zone with a similar substrate on its upstream side. This site is located approximately 100 to 150 meters downstream from a waterfall at the edge of the Pebble Creek golf course. Samples taken at site two were conducted on 27 May, 3 July, and 18 August, 1998.

Site three was the first series of pools upstream from the water falls at Pebble Creek golf course. Broken slabs of limestone with some gravel and sand covered the bottom. Attempts to sample this site were conducted on 27 May and 3 July, 1998.

Sharon Woods - Sample Site Descriptions

At Sharon Woods, two sample sites were established in Sharon Creek below the dam. Site number one was downstream from the bridge that crossed Sharon Creek to the Nature Center and Rangers' Headquarters. Several deep pools with a sand and gravel bottom plus slabs of limestone and concrete were at the site. Riffle zones flowed through the same type of substrate. The first sample in a series of three was taken at this site on 29 May, 1998. The remaining samples were conducted on 01 July and 19 September, 1998.

Site two was in the gorge opposite the golf course. The substrate was primarily limestone slabs and rocks with some sand and gravel. Pools and riffle zones existed at this site. Spring sampling was too difficult because of the swift current during periods of higher water. Summer and fall samples were

taken at this site. The first sample was taken at site two on 01 July, 1998. The remaining samples were taken on 05 September and 19 September 1998.

Site three was in Sharon Creek above the lake and south of Fields Ertel Road. The substrate was sand and gravel in both the pools and riffle zones. The character of the stream at this site seemed less disturbed than at the others although there was some siltation. Site three was sampled on 29 May and 05 September, 1998.

It was apparent after the first samples were taken at both parks that diversity would prove to be limited and green sunfish and creek chubs, both pollution tolerant species were dominant. Below the dam at Sharon Woods, bluegills and yellow bullheads (*Ameiurus natalis*) were important species especially at site one, where the habitat provided deeper pools and the slabs of concrete and rock offered a great deal of cover. Both species are frequently caught in Sharon Lake and it is the probable source of both species in the creek below the dam. Sharon Creek drains into the Mill Creek. My own voucher specimens collected from the Mill Creek upstream from the confluence of Sharon Creek did not include yellow bullheads although green sunfish and bluegills had been collected. Because species richness was so low and some sample sizes were low, all data from each site was combined. For example, the data from site two at Sharon Woods gorge was collected on three separate dates. Some species were collected on only one date. Others were collected on all three but in such low numbers that they would be of no statistical significance when biomass was calculated. By combining all data from each sample, each species might prove to be statistically more significance

Samples were taken using a Smith Root Backpack Electrofisher for 600 seconds per sample per site. Two people with 16 inch "D nets" were situated on either side of the person operating the shocker. When fish were netted, they were immediately transferred to five gallon buckets filled with water from the sample site. Upon completion of the sampling effort, each fish was identified, counted, and weighed on an Ohaus electronic balance to the nearest gram. After processing, all surviving fish were released at their site of capture.

Mortality rates were less than two percent. Dead fish were placed in 10 percent formaldehyde for three days, then transferred to 70 percent ethanol for storage. All fish will be accessioned into the collections of the Cincinnati Museum of Natural History. They will be catalogued starting with museum number CSNH F-1089.

A visit was made to the bait shop at the Sharon Woods marina where the manager allowed us to examine the bait fish sold there. The bait tanks contained only fathead minnows (*Pimephales promelas*). Released bait fish is probably the source of fathead minnows collected in Sharon Creek.

RESULTS

Data compiled at each sample site at NWS and SW is reported in Adendum I and Adendum II.

Mitchell Memorial Forest

No fish were collected in Silver Creek at Mitchell Memorial Forest by electrofishing and none were observed visually. Occasionally the conductivity of water is insufficient for electrofishing so a second trip was made to Silver Creek with seines to insure that the lack of results was not due to poor conductivity. No fish were collected with seines.

Fish were observed in Silver Creek in the past during a herpetological survey. On May 17, 1998 streamside salamander (*Ambystoma barbouri*) larvae were abundant, and adult two-lined salamanders (*Eurycea cirrigera*) were also seen in addition to bullfrogs (*Rana catesbeiana*) and green frogs (*Rana clamitans melanota*). Amphibians are considered the best bio-indicator species among vertebrate animals. The presence of abundant amphibians in Silver Creek suggests that water quality is high. Considering this, the absence of fish might be due to an extended period of low water or a short term polluting event may have extirpated the fish populations.

Local minnows (Family Cyprinidae) and darters (*Etheostoma spp.*) have the remarkable ability to migrate upstream during periods of high water. Fish may repopulate Silver Creek in the future and it is probable that the stream alternates between having fish and lacking them depending on periodic

conditions. Certainly if the present is a period in which fish are absent, it has happened before. Headwater fish species such as creek chubs, blacknose dace (*Rhynchichthyes atratulus*), stonerollers (*Campostoma anomalum*), and darters are those that are able to repatriate streams. Creek chubs and darters were among the species observed in the past.

Newberry Wildlife Sanctuary

Blue Rock Creek at NWS possesses an interesting variety of habitats that are typically inhabited by a diversity of small stream species in southwest Ohio. Pools in Blue Rock Creek have either a sand and gravel substrate or a bedrock substrate. Riffle zones are similar. Fish are concentrated in the pools and riffles where the bottom is gravel and sand. The open solid bedrock offers little habitat for the invertebrates upon which the fish prey. Unfortunately Blue Rock Creek does not have a typical small stream fish community. The dominant species are green sunfish (*Lepomis cyanellus*) and creek chubs (*Semotilus atromaculatus*) both aggressive piscivores. Creek chubs are usually the top predator in headwater streams, but green sunfish are more typical of larger streams and ponds. Both are pollution tolerant species. Water conditions may also be a factor in the elimination of the less pollution tolerant.

During a herpetological survey at NWS in the early 1990's, large goldfish (*Carassius auratus*) were observed in several of the deeper pools below some of the small water falls in Blue Rock Creek. There was once an active fish hatchery north of Poole Road between Springdale Road and Colerain Avenue. Local residents reported that during periods of heavy rain, the ponds at the hatchery would overflow into the streams that form Blue Rock Creek. These ponds are probably the source of the green sunfish and the four fingerling largemouth bass (*Micropterus salmoides*) collected there. No goldfish were observed during the present study.

Electroshocking samples from Blue Rock Creek have collected only green sunfish, bluegills, hybrids between the two, creek chubs, four bluntnose minnows (*Pimephales notatus*), and largemouth bass.

A cause for concern at NWS is the total absence of fish above the water falls at Pebble Creek Golf Course (Site 3). The water quality appeared to be high as indicated by abundant mayfly larvae, a few hellgrammites, and water pennies. A large electric pump was submerged in the creek about 20 meters upstream from the aforementioned water falls. It pumped considerable amounts of water to the golf course. During dry weather, when the stream flow is low, significant quantities of water could be prohibited from flowing downstream. There is concern not only for the conditions in the stream itself, but also for the adjacent water table that supports the state endangered cave salamander (*Eurycea lucifuga*). If this situation has not been observed by park district personnel, it should be further investigated.

Sharon Woods

The streams at Sharon Woods do not hold a great deal of promise for good small stream fish communities. Like most streams that are impounded to make reservoirs, stocked fish species move upstream into tributaries and downstream over spillways and dams. The diversity of fish in Sharon Creek is low, but certainly higher than in Blue Rock Creek. It is, however, dominated by species that have been stocked in the lake at Sharon Woods. Yellow bullheads are abundant and individuals from 7 grams up to 120 grams have been collected. Fingerling largemouth bass have been collected, but to date none have been larger than 5 grams. Most frequently caught are bluegills, all of which were stunted, probably by a lack of food for such dense populations. A few green sunfish and a very large 55 gram hybrid between a green sunfish and a long ear sunfish (*Lepomis cyanellus X megalotis*) were also collected. Although the habitat is suitable, no darters were collected. This is possibly due to several factors. Most probable is predation by introduced species from the lake. The enormous blooms of macrophytes on the lake also suggest that Sharon Lake also receives a good deal of nitrates from some source. Pollution intolerant species such as darters would be the first to die if nitrogen levels are extreme. The draining of the lake and subsequent lack of water in the stream below the dam in the 1980's may also have had an impact if darters occurred at that time.

Most promising about Sharon Creek is the fact that some minnows still persist despite the heavy competition for insect larvae with small sunfish. Creek chubs are most abundant. This is no surprise because they can compete with other predatory fish and are among the most pollution tolerant species in southwest Ohio streams. Bluntnose minnows, and stonerollers still occur in riffle zones and shallow pools. Striped shiners (*Luxilus chrysocephalus*) were also collected but only in small numbers. These occasionally are occasionally released into reservoirs by anglers. The boathouse manager allowed us to thoroughly inspect the bait minnows they offered for sale. Only fathead minnows (*Pimephales promelas*) were observed.

DISCUSSION

The streams at both parks have been altered by human intervention. There were species present in Sharon Creek that suggest that its water quality is better than what is suggested by its limited species diversity, particularly blacknose dace. However the abundant of bluegills and yellow bullheads will probably preclude the establishment of a well diversified community that includes abundant minnows.

Site number one, the farthest downstream sample site at Sharon Woods, had the greatest species richness. Of the eight species recorded there, largemouth bass, bluntnose minnows, and striped shiners comprised a statistically insignificant portion of the total biomass at .09 percent, 1.6 percent, and 1.5 percent respectively. 52.7 percent of the biomass at that site consisted of bluegills, but the average fish weighed only 16 grams. In other aquatic systems in southwest Ohio, it is common for one species to comprise such a large percentage of the total biomass. In the Ohio and Great Miami Rivers, gizzard shad accounted for over 50 percent of the biomass. However, gizzard shad are a forage species that occupy a low trophic level as plankton feeders. In Sharon Creek, bluegills are at or near the higher trophic levels and serve as predators. They are probably the major factor in limiting the populations of forage species like minnows, which should represent the greater percentage of total biomass.

At site two in Sharon Creek (Sharon Woods Gorge) the percentage of the total biomass represented by bluegills is only 5.8. However 84.4 percent of the total biomass is composed of creek chubs. Creek

chubs are piscivorous predators. They wait in ambush for smaller fishes, especially other minnow species, darters, and the juveniles of sunfishes. It is apparent from the data that they have reduced the populations of other species in the gorge. The difference in the biomass of bluegills between site one and site two can be explained by the variance in habitats. Site two has deeper pools and slower flowing water. Site one has broken slabs of limestone with shallow pools suitable only for creek chubs and other headwater species. Although the presence of blacknose dace at site two is promising, they only comprised 3.3 percent. Stonerollers, another important headwater species made up 3.2 percent of the total biomass at site two.

Site three, a stretch of Sharon Creek upstream from the lake had the most balanced fish community. Stonerollers, bluntnose minnows, and blacknose dace comprised 46.7 percent of the total biomass. The first two these forage species are primarily herbivorous and represent the base of the food web. 25.9 percent of the total biomass is represented by creek chubs, a species that should fill the niche of primary predator in a first or second order headwater stream. The balance is represented by yellow bullheads and bluegills combining to compose about 26 percent of the total biomass at site three. The diversity at this site is low. Other southwest Ohio streams of comparable size often have southern redbelly dace (*Phoxinus erythrogaster*), white suckers (*Catostomus commersoni*), striped shiners (*Luxilus chrysocephalus*) which was found in Sharon Creek at site three, silverjaws (*Notropis buccatus*), and perhaps two species of darters (*Etheostoma spp.*). Yellow bullheads are not typical inhabitants of a first or second order stream and probably moved upstream from the lake.

Blue Rock Creek at NWS is deceiving. The richly wooded hillsides bordering the creek and the series of waterfalls in the it make the Blue Rock Creek appear pristine. Unfortunately the species richness of the fish community and the unbalanced biomass of fish species suggests the opposite. Only two fish species were significant. At site one, adjacent to Sheits Road, creek chubs represented 89.6 percent of the biomass. This site is densely wooded and the water is very cool as it flows over solid bedrock that is constantly shaded by a dense canopy. Such conditions are ideal for creek chubs. Green sunfish comprised 9.2 percent of the biomass at site one. The remaining 1.2 percent of biomass at site

one was represented by two bluegills and four bluntnose minnows collected during a total of 1200 seconds of sample time. The latter two species are statistically of no significance.

At site two the fish community was reversed nearly 180 degrees but with similar unbalance. Only three species were collected (disregarding the hybrid sunfish). 89 percent of the biomass was represented by green sunfish and 8.4 percent by creek chubs. The single hybrid sunfish and four fingerling largemouth bass comprised only 2.5 percent of the total biomass. Site two was at the fringe of the area where the canopy was broken just downstream from the golf course. Sunny, open, warmer water is superior habitat for green sunfish and less desirable for creek chubs. Other species were of no statistical significance.

Site three at NWS had no fish. Water was being removed by the golf course for irrigation. Two attempts were made to collect fish, once in the spring when water flow was substantial and once during the summer when the water level was very low. No attempts to sample upstream from the pump station were made. Water quality at the pump site was sufficiently high to support some macroinvertebrates. Numerous crayfish and mayfly larvae were present and a few hellgramites and water pennies were observed under rocks.

I have always had concerns about the quality of water in Blue Rock Creek because of the population of cave salamanders along its margins near the seep pool at the second water fall upstream from Sheits Road. Highway salt, runoff from the golf course, and fertilizers from the neighborhoods south of Interstate 275 could create water quality problems for the creek. The present condition of the fish community could be the result of any one or any combination of those. The loss of water to irrigation of the golf course might also be an issue.

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Addendum I

Sample Results from Blue Rock Creek at Newberry Wildlife Sanctuary

27 May 1998
03 July 1998
18 August 1998

	Date	Common Name	Species	No. of Fish	% of catch	Mass	% of Mass
1	27 May 1998	Green Sunfish	Lepomis cyanellus	28	26%	140 grams	9.20%
2	03 July 1998	Bluegill	Lepomis macrochirus	2	2%	8 grams	0.50%
3		Bluntnose Minnow	Pimephales notatus	4	4%	10 grams	0.70%
4		Creek Chub	Semotilus atromaculatus	74	68%	1370 grams	89.60%
5							
6	SITE NO. 1	NEWBERRY WILDLIFE	TOTALS	54		1528 grams	
7		SANCTUARY					

	Date	Common Name	Species	No. of Fish	% of catch	Mass	% of Mass
1	27 May 1998	Green Sunfish	Lepomis cyanellus	57	58%	2166 grams	89.00%
2	03 July 1998	Largemouth Bass	Micropterus salmoides	4	4%	7 grams	0.30%
3	18 August 1998	Creek Chub	Semotilus atromaculatus	36	37%	204 grams	8.40%
4		Hybrid Sunfish	Lepomis macrochirus X cyanellus	1	1%	54 grams	2.20%
5							
6	SITE NO. 2	NEWBERRY WILDLIFE	TOTALS	98		2431 grams	
7		SANCTUARY					

	Date	Common Name	Species	No. of Fish	% of catch	Mass	% of Mass
1	27 May 1998			0	0%	0 grams	0.00%
2	03 July 1998			0	0%	0 grams	0.00%
3							
4	SITE NO. 3	NEWBERRY WILDLIFE	TOTALS	0		0 grams	
5		SANCTUARY					

Addendum II

Sample Results from Sharon Creek at Sharon Woods

29 May 1998

01 July 1998

05 September 1998

19 September 1998

	Dates	Common Name	Species	No. of Fish	% of catch	Mass	% of Mass
1	29 May 1998	Yellow Bullhead	Ameiurus natalis	21	4%	525 grams	14.30%
2	01 July 1998	Stoneroller	Campostoma anomalum	36	7%	204 grams	5.50%
3	19 Sept. 1998	Green sunfish	Lepomis cyanellus	3	2%	207 grams	5.50%
4		Bluegill	Lepomis macrochirus	120	69%	1938 grams	52.70%
5		Striped Shiner	Luxilus chrysocephalus	2	1%	57 grams	1.50%
6		Largemouth Bass	Micropterus salmoides	3	2%	36 grams	0.09%
7		Bluntnose Minnow	Pimephales notatus	7	4%	60 grams	1.60%
8		Creek Chubs	Semotilus atromaculatus	18	10%	486 grams	13.20%
9		Hybrid Sunfish	Lepomis cyanellus X megalotis	3	>1%	165 grams	4.50%
10							
11	SITE NO. 1	SHARON WOODS	TOTALS	519		3678 grams	

	Dates	Common Name	Species	No. of Fish	% of Catch	Mass	% of Mass
1	01 July 1998	Yellow Bullhead	Ameiurus natalis	33	7%	105 grams	2.80%
2	05 Sept. 1998	Stoneroller	Campostoma anomalum	48	10%	119 grams	3.20%
3	19 Sept. 1998	Bluntnose Minnow	Pimephales notatus	4	1%	6 grams	0.20%
4		Fathead Minnow	Pimephales promelas	6	1%	14 grams	0.40%
5		Blacknose Dace	Rhinichthys atratulus	46	10%	126 grams	3.30%
6		Creek Chub	Semotilus atromaculatus	277	59%	3186 grams	84.40%
7		Bluegill	Lepomis macrochirus	55	12%	219 grams	5.80%
8							
9	SITE NO. 2	SHARON WOODS	TOTALS	469		3775 grams	
10		GORGE					

	Date	Common Name	Species	No. of Fish	% of catch	Mass	% of Mass
1	29 May 1998	Yellow Bullhead	Ameiurus natalis	10	4%	78 grams	13.00%
2	05 Sept. 1998	Stoneroller	Campostoma anomalum	101	39%	154 grams	25.60%
3		Bluegill	Lepomis macrochirus	39	15%	80 grams	13.30%
4		Bluntnose Minnow	Pimephales notatus	20	8%	51 grams	8.50%
5		Blacknose Dace	Rhynchichthyes atratulus	42	16%	76 grams	12.60%
6		Creek Chubs	Semotilus atromaculatus	47	18%	162 grams	26.90%
7							
8	SITE NO. 3	SHARON CREEK	TOTALS	259		601 grams	
9		ABOVE LAKE					