

THE MYSTERY CAVE EXPEDITIONS
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Mystery Cave, located about 7 miles southeast of Spring Valley in southeastern Minnesota, was purchased in 1988 as an addition to Forestville State Park. The cave is the longest in Minnesota and contains over 12 miles of passages. A portion of the South Branch of the Root River flows through the cave, bypasses a five-mile meander bend, and rejoins the river at Seven Springs, about 1.5 air miles from the cave's entrance.

In January and February of 1992, I conducted fish surveys in the cave to determine species presence and abundance. Up to this time, my caving or "spelunking" experience was extremely limited, restricted to storm sewers and man-made caves. I never felt the least bit claustrophobic in those situations and was very sure that Mystery Cave would not be any different. I was to learn yet another of life's lessons in humility.

Preparation was intense. Everyone was required to wear a wet suit to prevent hypothermia. Then the coveralls went on to protect the wet suit. Knee and elbow pads went over the coveralls. Headlamps were strapped on our foreheads and huge battery packs were hooked to our belts. Our packs were filled with two additional flashlights, maps of the cave which made no sense to me at all, water, and several candy bars. I also had to be extremely picky in selecting collecting gear which had to fit through the narrow passages. When everyone was ready to go, we looked more like coal miners than biologists.

The first trip began at the cave's entrance called Mystery I. It started off easy enough on an interpretive trail which led us to a bridge spanning a black hole. The naturalist whom we thought of as more mole than man went over the railing without hesitation. On his descent, he instructed us how to wedge our bodies into the smooth, vertical crevices. I would have never considered trying that even in my invincible teenage years. Like sheep, we followed, with only a few tense moments. We proceeded down a passage for several minutes, when our guide started expressing doubts about where we were. My confidence in him began to ebb. We doubled back to what appeared to be a dead end, but it wasn't.

At the top of a very slick hill of mud was an incredibly small crawl space, which required laying on my side and shimmying along while pushing my pack ahead of me. It was unnerving to have a limestone wall about one inch from my face and the battery pack constantly sliding off my hip and wedging between my back and the other wall. I was using

muscles never used in my entire life and they were noticeably protesting. Our fearless leader kept us going by promising there would be a "roomy" place just up ahead. I soon learned his definition of roomy meant that two bodies could just squeeze by each other.

We got our breath and assessed the next gauntlet--a crevice even narrower than what we had come through. Since it was my first time, a veteran of two cave trips went through to the other side only about twelve feet away. I started in, got about halfway, and was hopelessly wedged. Now I was experiencing claustrophobia for the first time. I couldn't even fully inhale because the walls were tightly pressed against my rib cage and back. The only thought which went through my head was, I can't believe I'm doing this for some silly fish that might not even be down here. One guy pushed, the other pulled, and I squirmed, thrashed, and wiggled for at least ten minutes before I reached the other side.

I was exhausted. I couldn't help comparing this to a video game like dragons and dungeons. The closer I got to my quest, the more difficult it got. The other nagging reality was having to face a repeat performance on the way out.

Naturally, the next section didn't disappoint us. I could stand fully erect, but there was a fissure running along the entire length of the floor. We had to go sideways down the passage, spanning the gap with our boots. This went well in the beginning, but in many places the crack would widen to almost three feet across. We again resorted to using our bodies as wedges and I immediately appreciated the elbow and knee pads. It took some time getting the hang of it, but I had to brace my knees against both walls, lean forward, brace with my elbows, and swing my lower torso over the hole. This became even more stressful on the longer holes because I would constantly "lose altitude" with each swing and gradually slip into the dark abyss. This went on and on, but our agile mole again kept promising a rest stop "just ahead." Our coveted respite turned out to be a small rock wedged in the crevice--standing room for only one.

Finally, about three hours after entering the cave, we reached our destination--Coldwater Canyon. The stream was barely two feet wide and the "canyon" may have been fifteen deep. The naturalist commented that the flow was much less than the last time he had been in this part of cave. We headed upstream, but I had trouble finding habitat deep enough to support fish. I was puzzled and curious at the number of mussel shells which often covered the entire stream bed. Where did they come from? The naturalist thought raccoons may have been responsible; they had been spotted in the cave, though never this deep. The answer will just have to remain a "mystery."

We came to a waterfall (with a great stretch of imagination) and netted the scour hole which contained a single White Sucker. This gave me my second wind, which was unfortunately short lived because the stream ceased flowing just above the falls--another mystery. We headed downstream to a small pool called the Bath Tub. The naturalist did the noble deed and took the deep end--much appreciated because the water was up to his chest.

We pulled the seine up and caught two fish. One I could tell was another White Sucker, but the other one was chubby and very creamy. Could this be Minnesota's first Cavefish? I lunged, scooped, and put it under my headlamp's light. Disappointment--only a Creek Chub. This first expedition was definitely not worth the effort, but the naturalist promised (again) that the second trip would be better. I only hoped my body would have sufficient time to heal in only three short weeks.

The second expedition was scheduled to coincide with a bat survey to minimize disturbance in that part of the cave. They had scores of participants--biologists, spelunkers, and volunteers. We headed into Mystery II, which looked like an old pump house nestled in a wooded ravine. After descending several flights of stairs, we entered the cave. This time, the passages were indeed roomy. We walked for what seemed like a mile down an almost straight corridor, then took a side detour to a room filled with stalactites and stalagmites.

One of the "bat people" pulled a photo flash gun out of his pack and said, "You want to see something interesting?" We gathered around one of the formations and he hit it with a flash burst. I thought I was watching an episode of Star Trek. The top two feet of the stalagmite glowed an eerie green for two or three seconds. Not a mystery this time, just a concentration of photosensitive minerals.

We proceeded trying to keep our conversations to a minimum and at a whisper so we wouldn't wake the bats, but some were very light sleepers. They would fly in and around us constantly. Initially, I had the impulse to dodge these acrobats, but knew their radar would not fail them. Countless times, they passed through my headlamp's beam only inches from my face, but I never heard a sound or even felt a breeze. Amazing creatures.

We reached our first crawl space, which wasn't bad at all, thirty feet tops, but ended at Dragon's Jaw Lake (another stretch of the imagination). We used a rubber raft to "ferry across" and headed down another long passage. One final crawl way led us to the Triangle Room. This was the "jumping off" point. On the far side of the room, there was

a sheer crevice about 30 feet deep. We could hear the roar of Formation Route Creek. Using the all-too-familiar "Wedge Technique," we descended to the stream.

This one appeared to have some potential. There was much more flow and lots of habitat. The stream ranged from three to six feet wide and the ceiling was about thirty feet high. Fish were by no means abundant or even diverse, but much more numerous than at Coldwater Canyon. I found Central Stonerollers, Blacknose Dace, Longnose Dace, White Suckers, Fantail Darters, and Johnny Darters.

Bathing in the limelight, I headed upstream to the exit, where I realized the cave was not going to let me off easy. I had gravity helping me down the crevice, but nothing going for me up. The naturalist, of course, scampered up in easy fashion and started giving directions. I made it about halfway up and just couldn't go any further. He kept shining his light on what he insisted was an excellent foothold. I looked it over and said, "You mean that tiny little bump?" I couldn't trust it, so I tried reaching for a handhold just beyond my grasp and I heard (and felt) a loud "pop" resonate from my rib cage. Intense pain shot across my chest to my shoulder. This wasn't fun any more!

That arm was useless to me for climbing so the naturalist had to come down and serve as a human foothold. It was a long, slow process, but it was very nice to finally roll out of the crevice onto the floor of the Triangle Room. I was now certain of my escape; however, the cave managed to inflict one last indignity. I had looked forward to changing into some dry clothes, but it was winter up above in the real world, and the zipper froze on my overalls. I couldn't budge it. Thank goodness one of the volunteers had a pliers in his tool box.

For comparison, I completed additional surveys with much less effort and fanfare in the South Branch of the Root River at the Mystery Cave entrance and Seven Springs. The overall results sampled 675 fish representing 20 species in seven families (Table 1).

Only seven species were found in the cave, and they are not likely permanent residents. Fish are probably being washed into the cave, become trapped there, and likely do not reproduce. Feeding behavior would eliminate many species. Some fishes are nocturnal and very adept at finding food at night or under turbid conditions (e.g., catfish), but most are sight feeders which respond to movements of their prey. Dietary requirements would also exclude some species. The Central Stoneroller is a herbivore and its long-term survival is doubtful in an environment void of photosynthesis.

Finally, very few freshwater fishes have evolved to reproduce in permanent darkness. In North America, exceptions would include the Deepwater Sculpin (*Myoxocephalus thompsoni*) which inhabits great depths of Lake Superior (Scott and Crossman 1973) and members of the cavefish family (*Amblyopsidae*). Most species require a significant increase in temperature, gradually lengthening photoperiod (daylight), or a combination of both to trigger spawning behavior (Becker 1983).

I hope fish surveys will continue in Mystery Cave even on a semi-regular basis and summer trips may yield "new" species. However, this cave collector will never be coaxed out of retirement at any price.

Table 1. Mystery Cave 1990 - 1993 fish survey results.

Common Name	FAMILY Scientific Name	Catch		Overall
		River	Cave	Percent
SALMONIDAE - TROUTS				
Brown Trout	<i>Salmo trutta</i>	2	0	0.3
CYPRINIDAE - MINNOWS				
Central Stoneroller	<i>Campostoma anomalum</i>	13	2	2.2
Common Shiner	<i>Luxilus cornutus</i>	129	0	19.1
Hornyhead Chub	<i>Nocomis biguttatus</i>	38	0	5.6
Bigmouth Shiner	<i>Notropis dorsalis</i>	1	0	0.1
Southern Redbelly Dace	<i>Phoxinus erythrogaster</i>	143	0	21.2
Bluntnose Minnow	<i>Pimephales notatus</i>	3	0	0.4
Fathead Minnow	<i>Pimephales promelas</i>	5	0	0.7
Blacknose Dace	<i>Rhinichthys atratulus</i>	85	5	13.3
Longnose Dace	<i>Rhinichthys cataractae</i>	11	2	1.9
Creek Chub	<i>Semotilus atromaculatus</i>	63	1	9.5
CATOSTOMIDAE - SUCKERS				
White Sucker	<i>Catostomus commersoni</i>	17	3	3.0
Northern Hog Sucker	<i>Hypentelium nigricans</i>	1	0	0.1
GASTEROSTEIDAE - STICKLEBACKS				
Brook Stickleback	<i>Culaea inconstans</i>	10	0	1.5
CENTRARCHIDAE - SUNFISHES				
Green Sunfish	<i>Lepomis cyanellus</i>	14	0	2.1
PERCIDAE - PERCHES				
Rainbow Darter	<i>Etheostoma caeruleum</i>	4	0	0.6
Fantail Darter	<i>Etheostoma flabellare</i>	44	3	7.0
Johnny Darter	<i>Etheostoma nigrum</i>	11	10	3.1
COTTIDAE - SCULPINS				
Mottled Sculpin	<i>Cottus bairdi</i>	44	0	6.5
Slimy Sculpin	<i>Cottus cognatus</i>	11	0	1.6
Totals:		649	26	100.0

Literature Cited

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- Scott, W.B., and E.J. Crossman. 1973. Freshwater Fishes of Canada. Fisheries Research Board of Canada, Ottawa. Bulletin 184. 966 pp.

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