

# 11

## The Ozarks



Rivers in southeastern USA are used intensively for fishing and water sports.  
Photo by Bill Magnusson.

Lyn Branch talked about the fish and amphibians in the southeast of the USA. I had met her parents when they came to visit Brazil. Her father, Sidney<sup>88</sup> was a big conservative man who reminded me of Lyndon Johnson. Her mother was small, pretty and had a strong southern accent. They had been to the Tapajós River, and her father, who was a keen fisherman, was enthused about all the fish he had caught, and he even had a long list of names to show me. I offered to take them to the airport at 3.30 in the morning, but the old Volkswagen beetle had a flat tire and I had to flag down a taxi that already had occupants. He took them to the airport after discharging the other customers at Saramandaia, a local brothel. I was uncertain of the impression I had made, but they invited me to see the fish in Mississippi.

I always thought it ridiculous that people considered places with freezing winter temperatures as having temperate climates and assumed that such places were biologically impoverished, because the temperature or incoming radiation was too low to support many species. Although most Europeans and North Americans north of Mexico would not have agreed with me about the freezing temperatures not being temperate, at that time, most would have agreed about the limits to biological diversity.

In recent years, the simple story about the biodiversity in regions far from the tropics being mainly limited by energy has been re-evaluated. Rather than being limited by temperature or lack of sunlight, the evidence points to the number of species in these regions being limited by time. Glaciers covered the higher latitudes until a few tens of thousands of years ago, and the fauna and flora are only just starting to radiate within those zones. Lyn talked of the diversity of salamanders in the Appalachian Mountains in the southeast of the USA, and I would discover that the same region also had a great diversity of fish, especially in the family Centrarchidae, which is endemic to North America. There are said to be more species of freshwater fish in the State of Tennessee than there are in

the whole of Europe or Australia. With hindsight, the Appalachians being a diversity hotspot makes sense. The southern extremity of the mountain range was beyond the reach of the glaciers, and the ground was too high to have been submerged when sea levels were higher, as was Florida and most of the more southerly parts of the country.



*Photo 11.1 We stopped at the Grand Canyon on the way from California to Mississippi in December 1980. Photo by Bill Magnusson.*

Lyn returned to the USA in December 1980 to drive her car from California to Winona, Mississippi and invited me along. I was glad to have a local guide because I had difficulty communicating. I walked into a coffee house in Texas and asked for white coffee. The girl standing behind the raised counter had a gun on her hip and she was very intimidating when she looked down at me and said “Whaaa?” in a good imitation of a lamb being castrated. I repeated my request and she said “Whaaa?” again.

I thought for a bit and said “I want milk coffee.”

She repeated “Whaaa?” again and was leaning forward menacingly.

I scratched around in my memory for what the locals called milk coffee and said “Coffee with cream.”

She replied “Ahaaa!” and poured milk into my coffee. I soon learned to ask for coffee with cream, even though I generally got coffee with milk or soy-bean whitener. I also learned that you cannot just ask for tea, even at zero degrees with a snowstorm outside, because if you don’t ask for hot tea they will give you tea with chunks of ice floating around in it.

Lyn and I got lost on a street in Mississippi, and I said to a passerby in perfectly intelligible Australian “Scuse me mate, canya tell me where this place is?” He gave directions, but Lyn was shocked.

She said “You can’t call your seniors ‘mate’. You should have called him ‘Sir’.” Well, he didn’t look like he had a knighthood to me, but I filed away this bit of southern etiquette.

When we got to Winona, Lyn’s parents made me feel at home in their large farmhouse, and I enjoyed talking to them, but I become nervous around people when I am not sure of the social rules, and I was relieved when Lyn suggested that we go out and look for salamanders. When we were in the woods, I said to Lyn “I liked talking to your mother, but I only understood about half of what she said.”

Lyn replied “That’s funny; she said the same thing about you!”

The Branch’s house was nestled in the woods and, being an Australian, my first thought was “What do they do in a fire”. However, I soon found out that in this “temperate” region there was much greater danger of freezing to death in winter than being burned in summer.





**Photo 11.2** *The Branch house was nestled in the woods, and the trees had no leaves when I first visited in December 1980. Photo by Lyn Branch.*

We walked down a short track through the forest, which was leafless and intimidating for someone who associated a lack of leaves with death of the tree and not just a winter break. Lyn started scratching around in the fallen leaves that had accumulated in a depression. She grabbed at what looked like a worm, but it flipped agilely away and disappeared into the leaves. The next time, she managed to catch the little animal and straightened up with it and a bunch of leaves clasped between her fingers. I had never seen a salamander before, except for the big white axolotls sold in pet shops. This was completely different. Not much thicker than a knitting needle, it was very thin and writhed around trying to free itself from Lyn's grasp.

It had a tiny head with bulging eyes, and if not for its tiny legs it might have been mistaken for a snake. I had expected salamanders to be sluggish, but this one

flipped around like spring wire before it finally exhausted itself. Lyn passed it to me and I was astounded at how delicate it was. I held it carefully around the neck with my thumb and two fingers and tried not to exert too much pressure.

Most of the salamanders in North America belong to the family Plethodontidae. They are long and slender, and the snake-like form is not just an adaptation for moving around in the leaf litter. At some time in the past, their ancestors lost their lungs. Modern plethodontids breathe through their moist skins and they cannot afford to be too thick or they would not be able to provide oxygen to the deep tissues. It was one of the weirdest creatures I had seen, but to Lyn it was just one of the common animals of her childhood.

I was unimpressed by Mississippi in the winter time. It seemed a barren land, despite the activity of a few squirrels and blue jays. I didn't have much time to search for animals, however. Lyn had just come up to bring her car home and I flew back to Manaus shortly after arriving in Winona.



I returned to the US in August 1981 to attend the Society for the Study of Amphibians and Reptiles annual meeting in Memphis, Tennessee, and I brought with me Cris, a young biologist who I thought would benefit from attending the meeting and later doing an internship with Ronn Altig at the Mississippi State University. Ronn was one of the foremost experts on amphibians in the southern US and I imagined that the experience might set Cris on a life-long career in biology. However, things didn't turn out quite as I planned. Cris found the southern culture too conservative and took a trip to New York, where she fell pregnant to a Costa Rican taxi driver. She still lives there with her daughter and has had a very interesting career, but not in biology.



**Photo 11.3** Lyn and Cris looking for salamanders. Photo by Bill Magnusson.

Cris and I arrived in Memphis about 3 p.m. and Lyn picked us up at the airport and took us to the house of Kemp, who was a friend of her father. His wife, Joyce, a plump, friendly southern lady invited us in for iced tea. Cris was fascinated by the stuffed fish, ducks and deer heads over the walls. She said “This is real American”. Kemp had a couple of beautiful big live owls in a cage out the back. It would have been illegal to have such pets in Australia or Brazil. Joyce showed us Kemp’s bear skin. One of two black bears he shot in Canada. I smiled, but inwardly I was astounded at what some people do for fun.

Lyn’s parents showed up at 4.30 p.m. and we set off almost immediately to one of Kemp’s cabins in the Ozark Mountains. The country out of Memphis is dead flat and we had to cross the Mississippi, which is one of the World’s biggest rivers, but not as impressive as it would have been if I had not seen the Rio Negro and the Amazon. The country remained flat for about 30 miles from

the cabin. The floodplain had only cotton and soybeans, but the Ozarks, which are in the State of Arkansas, are forested with hardwoods and they had leaves. They made quite a different impression from the naked stags of my last trip. The canopies were deep green and gave the place a shady look, even though the soil was dry and granity. After a bit of back tracking to find the place, we arrived at the cabin just after dark, which was about 8.30-9.00 p.m. here. Cris and I had a hard time getting used to the long twilight.

Kemp's cabin turned out to be about twice the size of my house in Manaus, and he had another two-story house about 40 m away. The walls of the cabin were decorated with heads of deer, a stuffed ground hog, rabbit, coyote, fish and other game. There were only two bedrooms, most of the area being taken up by a big living room. The one that Cris, Lyn and I got was decorated with mounted fish, coyote and bob-cat skins. Kemp had killed and stuffed all the animals himself, built this and 3 other cabins, and managed to get in trips all over the US and Canada. He was a fireman, but also worked part time as a builder. I couldn't image how he got time to do it all. Mrs Branch cooked a meal of spaghetti bolognaise. At that time, male Branchs did not cook, clear table or wash up, and I'm not sure that Lyn's father approved of me helping out.

The next day, we woke to a late breakfast of coffee and donuts, then launched 5 m aluminum canoes and set off down the river to catch bait and swim. It was a sunny day. There were other cabins not far from Kemp's, but not too many people. The river wasn't deep and we had to get out to push on several rapids, but it was nice, and there were many long stretches where we could paddle. The river was not crystal clear, but a little greenish. Turtles were sitting on just about every log in the river, and they slid off as the canoe got near. The banks were lined by oaks, sycamores, cypress, mulberries and hornbeam, but the general impression was of a smaller version of the lower reaches of the Shoalhaven River in Australia.





**Photo 11.4** *Cris, Lyn Branch and her parents, Sidney and Louise, in the Spring River in 1981. Photo by Bill Magnusson.*

Many fish swam out as we pulled into a small creek. I saw top minnows, which are in the same family as the *Gambusia* that was introduced to Australia, and sun fish of the genus *Lepomis*, which are in the family Centrarchidae. There were also bass that looked like Australian bass, but were also centrarchids. The diversity and density of fish was incredible. Many rivers in the US have as many species of freshwater fish as there are in the whole of Australia. The diversity was more impressive because the structure of the rivers was so similar to those in Australia. We found a dead sucker of the family Catostomidae, which was about the same size and shape as the red mullet I had seen in the sea in Australia. Their mouths are directed downward and they suck gunk off the bottom.

We caught many minnows of the genus *Latrepis* with a seine net and I was

surprised to find that fishing with seine nets was not illegal. We also found a lot of darters under rocks. Those of the genus *Ethiostoma* were small with green stripes, and those of the genus *Percina* had large saddle-shaped markings on the back. They looked like marine blennies, and some were extraordinarily pretty, with red or green stripes underneath. There were also many little crayfish that we caught for catfish bait.

On the way back, we stopped at a place where there was a rope hanging over the river and Lyn's parents, who were in their 50's, surprised me by swinging out and jumping into the river. The rope was a long way up and you had to climb a tree to get to it. I wouldn't have had the nerve if there weren't so many women and old people doing it!

We went back for lunch and I was again surprised at how much the North Americans could eat. Afterwards, we fished in the rapids. It was in the middle of the day, but many fish were active. You fish mainly at dusk or dawn in Australia and I figured that things must work differently here. We ate a whole watermelon that was cooling in the river before starting. I was trolling with a crayfish, but Mr Branch changed over to a cork and crayfish tail and started catching sunfish that were about a ¼ pound. They were longeared sunfish and were beautiful with bright red on the sides. They made many tropical fish pale in comparison and I can't imagine why people don't keep them in aquariums. We released all the sunfish, and I caught a bass that weighed about ½ pound, which I let go thinking it was too small, but from Mr Branch's reaction it wasn't.

Lyn and Mrs Branch went back to get dinner ready and Cris, Mr Branch and I set a trot line, which was about 70 meters long with 100 hooks baited with live crayfish or dead minnows. Set lines and lines with multiple hooks are generally illegal in Australia and I was again astounded by the fishing pressure that the local rivers could take. We went back to the cabin for piles of lamb chops for dinner, then Lyn, Mr Branch and I checked the trot line about 10 p.m. We

caught only a few bullhead catfish, which don't grow very big, but they were eating size, and a 12 inch rainbow trout. I found it strange to catch a rainbow on a cord line in relatively warm water.



**Photo 11.5** Longear sunfish, *Lepomis megalotis*, like this one from the Spring River, can rival coral reef fish in color. Photo by Bill Magnusson.

The next day, we headed upstream to Mammoth Springs where the cold water of the Spring River comes out of a circular hole in the ground. We took one canoe on the top of the car and waited for Mr Branch to go back and get Mrs Branch and the other canoe. Unfortunately, it was then Saturday and there were more than 100 other canoes going in from a camping area further down.

Lyn and I talked to the manager of a trout farm that operates just below an old hydro-electric dam because we wanted to come back after dark to look for hellbenders, *Cryptobranchus alleganiensis*. Hellbenders are giant salamanders that can reach up to 74 cm in length and 2.5 kg, though most adults are only

about half that length. Individuals have lived in captivity for up to 30 years. Although hellbenders are orders of magnitude larger than any other New World salamander, the Japanese representative of the family has been reported to grow to 1.44 m, and the Chinese species can reach 1.8 m, which is longer than most people are tall. This is an ancient group and modern members of the family Cryptobranchidae are very similar to fossil salamanders that lived 160 million years ago<sup>40</sup>. At first, the hatchery manager said no, but after a bit of talking about animals, Australia, etc. he said we could go in after it got dark.

Mr Branch got back about 11 a.m. and we put the canoes in, Mr Branch and I in one and Lyn, Mrs Branch and Cris in the other. The river in this part was clearer and colder. I tried fishing while we were waiting for the others to catch up. I didn't catch anything, but had a few strikes from bass. I found this amazing because I was literally casting around canoes with their occupants shouting at each other and beating the water with paddles.

Shooting the rapids was fairly anticlimactic as we often had to get out and push, but a few of the runs were fast enough to get adrenalin flowing. We were back at our fishing spot near the cabin by 4.30 p.m. It was supposed to be a 15 mile run, but it seemed shorter. We ate another watermelon, swam, slept and fished for a bit without catching anything.

Lyn, Cris and I then set off back up to Mammoth Springs to get the car that we had left there. It wasn't quite dark enough to catch hellbenders, so we went to the township and drank coffee. By 9.30 p.m., night had fallen and we went back to the river. We couldn't find any hellbenders on the near part of the river, which splits in two with the hatchery in the middle, but I grabbed a trout about 2 ft long by hand, which was the biggest I have ever caught, and there were thousands of crayfish in the water that we didn't have time to catch. They weren't big, but they were the size of the yabbies, *Cherax destructor*, I had eaten in Australia and would have made a good meal.





**Photo 11.6** Crayfish, were common in the Spring River and, though small, could have made a good meal. Photo by Bill Magnusson.

We found no hellbenders in the near channel, so we asked permission to cross the hatchery and try the other side. After about half an hour of diligent searching I was ready to give up. Even the many types of fish couldn't keep my interest in that cold water. Although the water was clear, the turbulence over the rocks reflected our lights and made it difficult to see the bottom. It was also hard to walk because our feet often slipped into the cracks between the rocks, which were much larger than our boots. I eventually pushed up near the overflow from the dam and there it was; a brown shape two hand spans long lying in the rapids. I called Lyn and Cris to come because I didn't want to scare it, but it started to move off and I had to risk trying to catch the hellbender.

After the experience with the tiny salamanders in Lyn's back yard, I thought that it would be difficult to catch the hellbender, but it was sluggish and we

easily edged it onto land. It was a foot long, and had tiny eyes and skin that seemed much too big for it. Although hellbenders have functioning lungs, they are not dependent on them, and gain most of the oxygen they need from the folds of skin in contact with the water. In my hand, it felt spongy and it was not as strong as I had imagined. They probably don't have to be very fast as they patrol their territories in search of crayfish and other small animals, but I wondered how such a sluggish beast could survive in a river with so many fish.

We released the hellbender exactly where we had found it and it slowly walked off over the rocks as though it had not been disturbed. While it was on the concrete below the dam wall it was easy to see, but as soon as it was among the rocks, its dark grey color and indistinct outline made it disappear into the background. If it had not been near the dam wall, we may never have found it.

Hellbenders are now endangered, and all the populations that have been studied seem to be declining. All they need is to be left alone in patch of clean cool water, but there are very few places left where people have not sullied, heated or diverted the water from rivers. I hope that they can hold on so that whatever intelligence is around will still be able to find them 160 million years from now.

Within a few days we had caught more fish than I could expect in the freshwater of any Australian river, and we had barely scratched the surface. The Missouri Department of Conservation lists 86 species from the Spring River basin, some of which, such as the catfish and paddle fish, are veritable giants. I would have liked to stay longer, but we had to get back to Memphis to attend the SSAR conference.

The conference was very interesting, but I was even more interested when I heard that some of the participants were planning a field trip. It was scheduled to start after the last lecture and we should meet on the sidewalk near the bus stop. I donned my shorts and field shirt, and had a light strapped around my

head, but I was surprised when the only group at the designated spot consisted of men with formal clothes and shiny black shoes. I asked “Does anyone know where the field-trip group is?”



**Photo 11.7** A hellbender, *Cryptobranchus alleganiensis*, from the Spring River.  
*Photo by Bill Magnusson.*

One of the fancily dressed academics looked at me with a bemused smile and said “This is the field trip. Don’t you know that ‘field trip’ is just a code for a trip to a strip club so our wives won’t know what we are up to.” Well, I didn’t have a wife to deceive and I felt a real dunce standing among the well dressed citizens with bare legs in my grungy field clothes. Luckily, at that moment, Wayne Van Devender, a researcher famous for his studies of lizard growth, walked past and he must have seen my discomfit. He asked what had happened and, when I explained my rather inappropriate wish to see some wildlife, he said that he would be happy to take me into the field.

Wayne and I headed out to a local park on the Mississippi River to look for *Amphiuma*, which are giant aquatic salamanders endemic to the USA that are said to have 25 times more DNA than humans. We didn't find any, but the park was very pretty. The forest hadn't been cut in quite a while and there were large oaks typical of the original forest on this rich floodplain. The canopy was dense, with little understory except the occasional dogwood or the omnipresent poison ivy. There was a stinging nettle mixed in with the poison ivy, but it was very mild.

I was pleased to see that I was not allergic to poison ivy, but Wayne was. He dived off the road once to grab a green snake, which has much the same habits as an Australian green-tree snake, but less specialized for arboreal life. He came back with the snake and a contrite expression on his face, saying that it had been sitting in poison ivy. There were literally thousands of American green tree frogs, *Hyla cinerea*, sitting in the ditches on the side of the road. I was thrilled to see them because I had read so much about them. In terms of research, they are the white mice of the frog world.

Moving along a dry creek bed, we didn't find any salamanders, but I found a small brown, white-bellied mouse with big round ears and eyes. It was pretty dum and it let me catch it. Wayne's on-the-spot identification was *Peromyscus leucopus* – sort of the white mouse of the wild-mouse world! I was surprised to find one in broad daylight.

Pushing our way through the poison ivy, I was again pleased that I was not allergic to it because I was wearing only shorts. We came to some shallow canals, like sloughs, covered in duckweed. We caught only an American toad, *Anaxyrus americanus*, a bullfrog, *Rana catesbeiana*, and a water snake of the genus *Nerodia*. We found no salamanders and we were back by 11 p.m. Nevertheless, it was a good outing and I will be eternally grateful to Wayne for saving me from my embarrassment on the sidewalk.





**Photo 11.8** *Poison ivy, Toxicodendron radicans, is not really an ivy, but causes severe allergic reactions in most people who touch it. Photo by Bill Magnusson.*

Science grows on what has been done before, and it is important to register everything you do so that others can build on your work and don't have to repeat your mistakes. When I was in Australia, I identified the frogs from Harold Cogger's book *Reptiles and Amphibians of Australia* and the fish from books written by Gilbert Whitley and John Lake. These were the basic ones that gave a start to many young naturalists, many of whom would write their own books. When I arrived in Manaus, I got a start into the literature on frogs mainly from Bill Duellman's book *The Biology of an Equatorial Herpetofauna* in Amazonian Ecuador.

I was interested to meet Duellman, and sort him out at the conference. Bill was talking to a group of distinguished scientists during the opening cocktail party and I introduced myself and said that I was starting work in Manaus. I had obviously interrupted an ongoing conversation and he said "Yes, yes, but I am busy at the moment. Let's get together later." It seemed an appropriate brush off for a young researcher newly arrived in the Americas who could contribute little

to a discussion of the South American herpetofauna. Somewhat embarrassed, I wandered off and decided not to bother him anymore.

On the last day of the conference, the attendant handed me a note when I went to collect the key to my room. It was from Bill Duellman and he wrote that we seemed to have missed the opportunities to talk during the conference and that I should go to his room before he left. I was astounded that he would remember our encounter on the first day, and even more surprised that he remembered my name. Our conversation was illuminating and I realized that he did not consider his book the last word on Amazonian amphibians. He was interested in supporting anyone who wanted to live in the Amazon and deepen our knowledge of the amphibians. He encouraged me to make photographic records of the species I found near Manaus so that I could write a book, and he wrote the preface to that book when we finally wrote it 30 years later<sup>41</sup>.



**Photo 11.9** *The bullfrog, Rana catesbeiana, is an invasive species in many parts of the World, but I was thrilled to see it in its native habitat. Photo by Bill Magnusson.*