

Ecologist finds dire devastation of snake species following floods of '93, '95

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In science, it's best to be good, but sometimes it's better to be lucky. Ecologist Owen Sexton, professor emeritus of biology at Washington University in St. Louis, had just completed a census of snakes at a conservation preserve northwest of St. Louis, when the great flood of 1993 deluged the area, putting the preserve at least 15 feet under water.

The flood provided Sexton with a rare opportunity: His collected data and the flood would combine to make “the perfect study” of how an area rebounds from natural disaster.

He went back the following year and found that the flood had displaced or killed 70 percent of the pre-flood population of five snake species, and either eliminated the populations of three other species found there, or left the populations so low that they could not be detected.

Key to survival" Size. It matters to a snake when floodwaters roar through the environment. The bigger the snake, the better chance for survival, Sexton found, and arboreal species — those that hang out in trees — fared better than (surprise) aquatic ones.

Creating a natural lifeboat

Sexton proposes that “islands” of displaced soil be constructed at various locales in the conservation area that would serve as sanctuaries during subsequent floods. Such a natural “lifeboat” would serve as a temporary shelter for members of resident species of snakes and other fauna, as

well as a landfall for resident and non-resident species swept down from upstream.

Sexton's findings were published in the *Natural Areas Journal*, Vo. 27 (2), 2007. The work was supported by the Missouri Department of Conservation.

Often forgotten is that the flood of 1995 also involved both the Mississippi and Missouri rivers. The flood halted Sexton's pursuit of data, but he went back in 1996 and gathered data, and also in 2000.

Tale of three serendipities

Marais Temps Clair, in St. Charles County, Mo., is a 900-acre reconstructed marsh comprised of pools surrounded by levees. It serves primarily as habitat for migratory and residential birds and for recreations such as hunting, fishing, hiking and bird watching. The preserve lies slightly upstream of the convergence of the Missouri and Mississippi rivers. It is managed by the Missouri Department of Conservation, which, in 1990, sought out Sexton, a noted herpetologist, and asked him to try to find evidence for the presence of the fox snake at Marais Temps Clair, a northern species not known then to exist as far south as Marais Temps Clair.

Sexton found a fox snake sunning itself in the field on the very first day of this endeavor, but that was just the start of the serendipity. Because he and his colleagues statistician Judith Bramble, Ph.D., of the Environmental Science Program at DePaul University in Chicago, Wayne Drda, field research manager of the Rattlesnake Project at Washington University's Tyson Research Center, and Kenneth G. Sexton, a herpetologist and field assistant at the Tyson Research Station, already had placed numerous "hide boards" about Marais Temps Clair, they decided to broaden their reach and census the whole place. Hide

boards are plywood sheets about 3' by 3' under which snakes take refuge from predators and inclement weather. You lift the board and you frequently find a snake. The other method they used to identify snakes was simply handpicking them in the field to identify which species they are.

It had been known that 23 snake species occur or have occurred in St. Charles County, and Sexton and colleagues figured that their data would reflect that. One week before floodwaters spilled into Marais Temps Clair, they stopped gathering data.

The flood was another turn of serendipity.

“An ecologist can go several lifetimes and not experience a flood on the scale of those of 1993 and 1995,” Sexton said. “I saw the flood as unfortunate, on the one hand, but it presented a wonderful way to see the impacts on snake populations.”

The eight species present puzzled Sexton and his colleagues, given a richer panorama in the county.

Islands in a sea of development

“In retrospect, it became clear that floods over the centuries must have had a huge impact on species diversity there,” Sexton said, adding that the “island effect” also plays a role. That is the situation most natural areas, including Yellowstone Park, contend with: They are islands in a sea of development on every side, thus limiting, if not eliminating, the migration of non-resident species to a site.

The third serendipity came about a few months after the 1993 flood waters receded. Sexton heard of a farmer upstream of Marais Temps Clair whose house and farmyard did not suffer flooding but had been

completely surrounded by floodwater. The farmer removed 200 garter snakes alone that year found in his yard, machines, sheds and implements, and released them in safe areas.

The following year Sexton and his colleagues visited the farm and removed 55 snakes, three species of which they had not found at Marais Temps Clair, strong proof that they were displaced there by the flood. The evidence gave Sexton the idea of having a sanctuary for snakes and other species to wait out a flood. They would be like islands in a stream.

“Think of it, to escape a flood, any kind of high ground can save lives,” Sexton said. “When you see all the soil that is moved to make a road, to build homes and malls, you think the soil has to be dispersed some place. If we could get a program together to reward contractors to bring that excess soil to flood-prone refuges such as Marais Temps Clair and pile up several mounds of earth that would be at least 15 feet above the top of the levees, we’d allow more snakes and other species to survive future major floods and keep healthy populations at Marais Temps Clair.

“I think of it as a win-win situation.”

Source: Washington University in St. Louis

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