

High Country News

FOR PEOPLE WHO CARE ABOUT THE WEST

Brine shrimp by the billions in the Great Salt Lake

Why is this shrimp fishery nearly conflict-free?

Sam Wotipka | June 11, 2014 | *From the print edition*

In October of 1951, a letter appeared in *The Aquarium*, a magazine for fish hobbyists. There were "brine shrimp by the billions!" in Utah's Great Salt Lake, local resident C.C. Sanders enthusiastically proclaimed. The shrimp themselves were nothing new – they'd occupied the lake for some 15,000 years – but Sanders had discovered that they made great live feed for Siamese fighting fish. He formulated a plan to sell the shrimp to aquarium supply stores. Using nets crafted from surplus Army parachutes, his small crew gathered the tiny crustaceans into inflatable children's swimming pools, packaged them, then shipped them off. It was the start of something big.

Adult brine shrimp, which resemble miniature silverfish, are about the size of a Tic Tac. In the Great Salt Lake, most *Artemia franciscana* die off in autumn, leaving massive red "slicks" made up of cysts, highly fortified eggs that survive cold temperatures to hatch in spring. Cysts are easier to package and ship than live adults, and today they fuel a \$30 million industry. The annual winter harvest has evolved into a precisely orchestrated operation involving spotting planes and global positioning systems. Seventeen companies patrol the Great Salt Lake, gathering cysts with equipment designed to contain oil spills. This winter, an above-average year, they collected over 27 million pounds of biomass – cysts plus shrimp shells, brine fly larvae, plant debris and bird feathers.

The harvest is also a rare example of a commercial fishery that is nearly conflict-free. After a 20-year effort, the Utah Division of Wildlife Resources has developed a science-based management strategy that's successfully united industry members and conservationists and spurred the first comprehensive biological research conducted on "America's Dead Sea."

For the first 30 years, Sanders' crew had the lake mostly to themselves. Their only competitors were migratory birds like eared grebes and Wilson's phalaropes, and there were plenty of shrimp to go around.

In the 1980s, though, South Asian fish farms began to use brine shrimp as feed, and cysts became a global commodity. Newcomers flocked to the lake, and the mostly unregulated harvest became fast-paced and intensely competitive. There are tales, possibly exaggerated, of guns being drawn and boats used as battering rams.

It was the fishermen themselves who first demanded increased state oversight. The early '90s saw the collapse of several globally important fisheries due to over-harvesting and poor management, including North Atlantic cod, a fish once considered impossible to overfish.

"That was a warning to us," said Don Leonard, director of the Great Salt Lake Artemia cooperative, which was formed in 2006 by concerned harvesters to advocate for better management.

Rather than limiting the harvest by amount, Utah permitted companies to gather as many cysts as possible while the season was open. The state, however, carefully monitors the average number of cysts present in a liter of lake water. If levels drop below a certain threshold, the season ends. The challenge is determining that threshold.

Gary Belovsky, a former Utah State University biology professor, was hired by the Utah Division of Wildlife Resources in the '90s to help the state sustainably manage the harvest. He found that the Great Salt Lake ecosystem had scarcely been studied. "We knew virtually nothing about how it worked," he said.

Now in its 20th year, Belovsky's study has determined that 21 cysts per liter must remain in the water for the shrimp to repopulate the lake each year. The state has strictly adhered to this number, even when it means shortening the season. Belovsky's models have also shown that if too many eggs hatch, the brine shrimp swiftly exhaust their food supply – a mixture of algae – and then crash. This knowledge helps justify the harvest to conservationists worried about maintaining an adequate shrimp supply for the millions of migratory birds that visit Salt Lake. Fisheries management can be maddeningly complex, but this particular ecosystem is far simpler than other water bodies, Belovsky says, since few plants or fish can survive in its salty water.

A few years into state regulation, cyst populations were found to be extremely low. Belovsky insisted on ending that season early. The state agreed, provoking controversy within the industry. But the population rebounded, much to the benefit of the harvesters. Since then, and especially since the cooperative's formation, industry has supported the state's efforts. Over the past 10 years, cyst populations and harvests have been more stable.

John Luft leads the state's Great Salt Lake Ecosystem Project, which oversees the harvest. Brine shrimp might not seem very exciting, he admits, but he appreciates the opportunity to focus on the science rather than juggling personalities and politics. "What I found here is you actually get to do what you went to school for, which is biology, not just putting out fires."