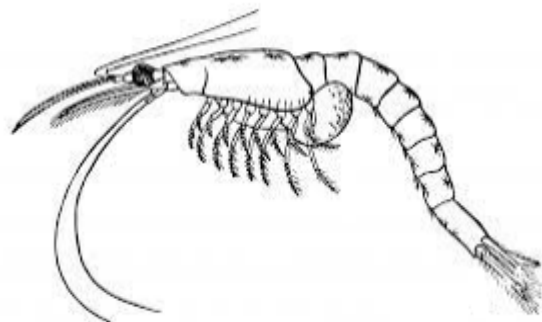


THE CREATURE THAT ATE FLATHEAD LAKE

By Rick Hull

It was a classic case of “At the time it seemed like a good idea.”

The chain of events started in 1968, when state fish managers planted Mysis in the Flathead Lake drainage. The freshwater shrimp, less than an inch long, had a history of dramatic success in British Columbia's Kootenay Lake. Not only had kokanee salmon numbers jumped, but the fish had grown larger, with some reaching world-record size.



The local introduction used Mysis taken from Waterton Lake at the north edge of Glacier National Park. The shrimp were planted in Ashley, Whitefish and Swan lakes.

They didn't stay put, and Mysis were first found in Flathead Lake in 1981.

In 1985 the annual kokanee catch by anglers was estimated at 100,000 tons – a trend that extended back to the 1920s.

In 1987 the catch was zero.

By now fish and wildlife managers throughout the West were in a panic. Not only had fish populations collapsed after the introduction of Mysis, but Lake Tahoe's celebrated water clarity had been damaged and bald eagles were no longer gathering by the hundreds in Glacier National Park.

It was the law of unintended consequences, with the impact cascading through the ecosystem like a line of falling dominoes. Biologists call it a “trophic cascade.”

It took years to figure out how and why.



Kokanee Salmon

As its name implies, *Mysis relicta* is a relic of the Ice Age. Left behind as the vast lakes bordering the continental ice cap vanished, it inhabits deeper lakes in the eastern and central U.S. and Canada. It is also known as the opossum shrimp, since it nurtures up to 40 eggs in a marsupial-style pouch.

Sensitive to bright light, Mysis rest on the lake bottom in water over 100 feet deep. After dark they move towards the surface, feeding on algae, zooplankton and whatever else they can find.

This nocturnal habit is the first strike against kokanee, which graze during the day and are not bottom feeders. The success in Kootenay Lake was a fluke – upwelling water currents brought the mysis within reach of the kokanee.

Mysis also compete directly against kokanee for food. Though kokanee are caught by trolling with lures, they actually feed on zooplankton nearly too small to see. Seventy percent of their diet is the tiny *Daphnia*, a nearly transparent crustacean. *Daphnia* are commonly known as water fleas for their hopping swimming motion.

Daphnia feed on algae. With Mysis gobbling up *Daphnia*, algae multiplied and water quality declined.

Kokanee also found themselves losing out to other fish. Kokanee had been introduced to Flathead Lake by mistake in 1914, somehow mixed in with other salmon species that were deliberately, but unsuccessfully, planted.

Other foreign species were planted in the Flathead drainage at the same time as part of an early philosophy that focused entirely on better fishing. Among the introductions were lake trout and Lake Superior whitefish. Lake trout, in particular, have no problems pursuing Mysis in their deep-water refuges. Lake trout populations exploded and kokanee were among their prey.

In another fallout from the cascade effect, the lake trout snatched up young bull trout and cutthroat trout as they migrated into the lake after upstream spawning. One result was the bull trout being listed as a threatened species in the United States. Lake trout are also good at invading rivers, like the Stillwater and Middle Fork, and sneaking into supposedly dam and waterfall protected drainages, like Swan Lake and Yellowstone Lake.

Another unintended consequence involved bald eagles. At four years of age, kokanee swim upstream to spawn and die. Flathead Lake's kokanee pioneered spawning sites in the Flathead River system, especially in McDonald Creek in Glacier National Park.

Bald eagles discovered the bonanza, and eventually as many as 500 gathered in the fall to feed off the dying fish. Anglers also took advantage of the kokanee migration, accounting for about half of the annual take. Since the salmon do not eat on their terminal journey upstream to spawn, they were snagged with treble hooks.

Both the eagle gathering and river fishing ended when the kokanee vanished.

Fish managers tried repeatedly to restore the kokanee. In one effort, a barge was rented, and hatchery fish planted mid-lake in hope of avoiding shoreline predators. Nothing worked.

In 1980 a moratorium was declared across the United States on further Mysis introductions.

Problems continued. In 2015, the kokanee population in Kootenay Lake abruptly collapsed, followed by a similar drop in rainbow trout. The speculation was the closing of a shoreline fertilizer plant, and corresponding reduction in nutrients, as the cause.

There has been some recent success battling the Mysis plague through brute force and money. Essentially it involves attacking the predators directly. In Idaho's Lake Pend Oreille, a \$15 bounty was placed on lake trout and on a large variety of rainbow trout known as Gerrad. The bounty and gill netting cost \$1 million, but restored both kokanee and rainbow.

Canadian officials are using a similar effort, with monthly \$1,000 rewards for bull trout and Gerrad. Nearly 3 million kokanee eggs were stocked in tradition spawning grounds, and nutrients added to the lake. Kokanee have returned to pre-2015 numbers.

On Flathead Lake, the Confederated Salish and Kootenai Tribes have sponsored "Mack Days" since 2011. Anglers try to catch as many lake trout (also known as Mackinaw) for prizes currently totaling \$225,000. This spring a total of 35,089 lake trout were removed from the lake during the contest. Kolton Turner of Kalispell was the winner with 2,283 fish, averaging 100 a day over 18 days.

Mysis, especially the ocean variety, are sold to commercial aquariums and tropical fish hobbyists as fish food. There have been proposals to net Mysis from problem lakes. In an ironic move, Mysis could be then used to feed fish in state and federal hatcheries.

A trial netting in Lake Tahoe discovered Mysis are packed with omega 3. So they could soon be joining the fish oil supplements on the shelf at Costco.