



## Fish Frozen in Ice

Also called winter kill, freeze out occurs during especially long, harsh winters. Because they require more oxygen, the large fish suffocate and die first. Winter kill begins with distressed fish gasping for air at holes in the ice. But species of fish vary in their tolerance of low oxygen. Trout are most sensitive; walleye, bass, and bluegill have intermediate sensitivity; and northern pike, yellow perch, and pumpkinseed are relatively tolerant. Bullheads and certain minnows are very tolerant

In J.D. Salinger's Catcher in the Rye, the novel's troubled anti-hero, Holden Caulfield, gets into a strange discussion with a cab driver in New York City. Wondering what happens to the fish when a large pond in New York's Central Park freezes over for the winter, the agitated cabbie informs Holden that the fish freeze right along with the pond. When the ice melts, the fish thaw out and go on their way.

Can fish and other aquatic creatures really survive in a state of suspended animation until spring? The surprising answer is yes, sometimes. It is true that some fish can spend the winter frozen in ice and come out swimming once the ice melts.

But what about fish that are caught in the ice? It stands to reason that the extreme cold would damage the fish's tissue, effectively killing it. Like all cells, fish cells contain saline, or salt water. Since salt water has a lower freezing point than pure water, even when encased in ice at thirty-two degrees Fahrenheit, cold-water fish are not technically frozen. Moreover, some fish contain a kind of antifreeze substance that allows them to survive very cold conditions.

Much like bears and other hibernating animals, some ice-bound fish are able to shut down basic bodily functions, slow their metabolism, and enter a dormant state. Cold but not frozen, these fish bide their time until spring, when the ice disappears.

Loren Eiseley, the famous natural science writer,



once found a fish frozen in a block of ice on the Platte River in Nebraska. He took the fish, a catfish, home and placed it in a pail, thinking to study it the next day. Overnight, the fish revived. Eiseley put the catfish in a tank and kept it alive for some time afterward, until one night the catfish leaped onto Eiseley's living room floor. The catfish gambled, as Eiseley saw it, on being able to flop over to the main river channel from the small pool of water in which it found itself\*

\* <http://www.helium.com/items/1550811-why-fish-dont-freeze-in-a-frozen-lake?page=2>