Post-Release Survival in California Sheephead

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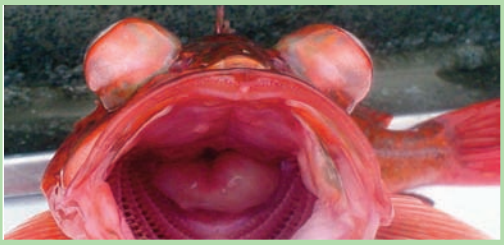

Background

If you've ever been on a sportfishing boat and seen the bulging eyes and distended intestines of undersized fish, you might have wondered if there were any point throwing them back. Amazingly, the answer is "yes," for some species–if they are returned to depth quickly. "If you get them down, they will live," said California State University, Long Beach, biology professor Chris Lowe, who has led several experiments on the effects of catch-and-release on nearshore fishes.

Findings

Lowe showed that survival rates of California sheephead–a popular sport fish that lives in kelp forests–could be pushed to nearly 100% if a fish's swim bladder was deflated before being released.

This surprising discovery–people have long assumed these fish usually die after being tossed back–led him to speculate that much of the pressure-induced trauma experienced by fish brought to the surface might be reversed by getting them back down fast.

Fish Get "Bends," too–As with SCUBA divers, fish that undergo rapid changes in depth are vulnerable to a host of physiological problems, including air embolisms and strokes. Sheephead and rockfish* have added issues with sudden depth changes because they have a special air-filled organ for maintaining proper buoyancy, called a swim bladder. When a fish is brought to the surface rapidly, this internal ballasting mechanism goes awry. The bladder expands, often with enough force to push a fish's stomach through its mouth or to distend its eyes. Anglers call these inflated fish "popped." Boats fishing for rockfish typically leave behind a slick of "floaters," fish too inflated to sink, Lowe said. "These fish are sitting ducks for sea gulls and sea lions. By venting the swim bladder, the fish has a way to get back down," he said. "Fish that look terrible when they are brought up actually can survive."

Not only survive, but maybe thrive. His tagging studies suggest that properly handled sheephead resume normal activity eight hours after being released. More recently, Lowe and graduate student Erica Jarvis have been studying the effects of pressure change on the survival rates of other common nearshore fishes–such as bocaccio and vermillion rockfish–and looking at whether returning these fish to depth also increases their chances. Again, the answer is "yes."

In experiments conducted off Palos Verdes in Los Angeles in June 2006 and funded by USC Sea Grant, Lowe and Jarvis caught 43 rockfish, representing 11 different species, in waters about 250 feet deep. These fish were placed in wire cages and lowered back down.

Two days later, the biologists returned to the cages to assess the fish. Twenty-six fish were found alive and were released. Two fish were missing from the cages and 15 were dead. This represents an overall survivorship of 63%, across all species. In other experiments, the scientists have shown that rate of survivorship can be increased to almost 90% if fish are returned to depth within ten minutes of being caught.

"Fisheries managers expect super high mortalities of rockfish because when they are brought to the surface they look so grotesque," Lowe said. "What we are seeing is that if you get a fish back down fast enough, fish that look dead at the surface sort of pop back to life."

Education to Enhance Sustainability–Marty Golden, the Pacific coast recreational fisheries coordinator for NOAA Fisheries in Long Beach, called the research results exciting. "Their research is adding a whole new level to the possibility of getting undersized fish back in the water alive," Golden said. "Generally, we thought most rockfish, unless brought up from very shallow water, died. A lot of rockfish species are depleted," he said. "Because of this, we've had to restrict sport fishing."

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It is illegal, for example, to keep canary, yelloweye and cowcod rockfish. "If we can develop effective ways to increase the survival of these fish, you open up the possibility of increasing sportfishing opportunities," Golden said.

Not only fisheries managers but also anglers are hopeful about the results. "I was amazed at the potential of what they (Lowe and Jarvis) are doing, and I think it's a wonderful thing," Tom Raftican, president of United Anglers of Southern California, a recreational fishermen's organization, was quoted as saying in the Daily Breeze newspaper in Los Angeles. "If you've got a fishery that's at risk and you could return those fish, we'd be willing to do that…. What we are concerned about is ensuring the future of these fisheries."

There are several inexpensive technologies for returning fish to depth, Lowe said. A Shelton Fish Descender is one; an upside down milk crate is another. "Angler education is going to be a very important part of enhancing these fish populations," Golden said.

For More Information, Visit:
www.csulb.edu/web/labs/sheephead.

Collaborators
California Department of Fish and Game, California State University, Long Beach, CSU Ocean Studies Institute, and USC Sea Grant

Publications
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* "Rockfish" refers to a group of long-lived, slow-growing fish that have been prone to over harvesting. Sheephead are not technically rockfish. However, they are managed within the "nearshore fishery group," which consists primarily of rockfish.

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