

Techniques to Reduce Catch-and-Release Mortality

Learn how you can help reduce catch-and-release mortality.

By
Ron Taylor
Florida Marine Research Institute

Introduction

Fishing effort in Florida has increased dramatically over the past decade and is forecast to continue as Florida's resident population of 14.7 million increases daily by about 1,000 people. More than 40 million tourists visit the state annually, most with coastal destinations. Fishing is a favorite pastime of Florida's residents and visitors, and in 1997, saltwater anglers made about 24 million fishing trips and caught 141 million marine fishes, 71.5 million of which were released. Because increased exploitation could negatively impact Florida fisheries, scientists and managers must remain diligent and innovative in their efforts to utilize fishery resources wisely and conservatively.

Managers of Florida's fisheries use a combination of traditional regulations to control harvests and protect fish stocks. These measures include bag limits, minimum and maximum sizes, closed seasons and areas, and in some cases, no harvest is allowed unless a special permit is purchased. Bag limits reduce the number of fish that are harvested and allocate the catch over time so that the year's total harvest is not taken in one season. Aggregate bag limits are sometimes applied collectively to a complex of species such as grunts and snappers, so that the community is not overfished. Minimum and maximum sizes, or "slot," limits protect sexually immature fish and may be imposed to create a "trophy" fishery, i.e., a fishery that produces extremely large individuals. Closed seasons and closed areas protect a species during spawning, especially when fish return yearly for spawning at known locations. The "no harvest" rule is implemented when a stock or species, for example, Goliath Grouper (jewfish), is severely overfished. To succeed, Florida's fisheries management strategies of size limits and closed seasons depend on the survival of fish that are caught and released. The fate of hook-and-line caught fishes that are released largely depends on the expertise and dexterity of the angler. Anglers practicing a few straightforward and intuitive techniques can increase survival of released fishes.

"Limit your kill; don't kill your limit!"

After being caught and released by an angler, fish may die for a variety of reasons. The most common causes of death are the physiological stresses caused by the struggle during capture and injuries caused by the hook or the angler. Some fish may die even though they appear unharmed and despite efforts at revival. Fish that struggle intensely for a long time during capture are usually exhausted and stressed from the accumulation of excessive amounts of lactic acid in their muscles and blood. Severe exhaustion causes physiological imbalance, muscle failure, or death. Therefore, use the proper weight-class tackle; land your catch quickly, and when possible, leave the fish in the water while you release it. Any exhausted animal needs oxygen to recover!

Hook wounds may appear minor to anglers, but damage to the gills, eyes, or internal organs can be fatal. If the fish is hooked deep in the throat or gut, research shows that it is best to cut the

leader at the hook and leave the hook in the fish. Prolonged attempts to remove the hook often do more harm than good. In Florida Marine Research Institute's (FMRI) study of release mortality in snook, 24 snook were deep hooked. We removed the hooks from 12 snook, and we left the hook intact and cut the leader in the other 12 snook. We found that four of the 12 deep-hooked snook died after the hooks were removed. None died when we simply cut the leader and left the hook alone. Fish are capable of rejecting, expelling, or encapsulating hooks. Encapsulation is a process whereby the fishes' healing process causes the hook to be covered with an inert matrix of calcified material; or a-cellular tissue. Steel and bronze hooks are less toxic and are rejected or "dissolved" sooner than are stainless steel and cadmium-plated or nickel-plated hooks.

Two types of hooks, barbless and circle hooks, are known to reduce injury and mortality of released fishes. Barbless hooks reduce tissue damage and handling stress because they can be removed quickly and easily. Barbless hooks are popular in the freshwater trout fisheries and are becoming increasingly popular with saltwater anglers. A Florida study conducted on snappers and groupers demonstrated that catch rates are the same for barbed and barbless hooks. If barbless hooks are not available, simply use pliers to crimp or remove the barbs from regular hooks. A caveat is called for when using these types of hooks: after having hooked your quarry, don't give the fish any slack, because it will be more likely to escape from barbless hooks than from regular hooks.

The use of circle hooks has been researched and compared to regular hooks—often called "J" hooks—in several fisheries. In all of them except in the flatfish, or flounder, fishery, circle hooks were shown to result in significantly lower hooking mortality and higher catch rates. In one study, tunas and billfishes were hooked in the jaw 90% of the time. Circle hooks reduced deep hooking fourfold in the striped bass fishery while "J" hooks were 21 times more likely to cause a bleeding injury. Circle hooks are a bit more tedious to use, especially with live bait, but the advantages should compel anglers to give them an honest trial. Overall, research shows that circle hooks improve catch rates and reduce hooking mortality which results in positive impacts on exploited fish stocks.

Studies on striped bass, spotted seatrout, and snook have shown that live bait was used in most cases of hook-related mortality and that "gut hooking" was the primary cause of death. Artificial lures are generally in motion, so the fish takes the bait and the hook is set before the lure can be swallowed. To avoid internal damage from gut hooking, when you use live or dead bait try to set the hook immediately; with natural bait, there is less motion—the fishes' immediate reaction is to swallow the bait. If you allow the fish to run with the bait, the chances of gut hooking the fish increase.

Survival rates for some Florida fishes

Controlled studies have shown that most fish released after hook-and-line capture, survive. Researchers working in Boca Grande Pass tagged 27 tarpon with sonic transmitters and found that 26 of these hook-and-line-caught fish survived. The one fish that died had been lifted from the water for a prerelease photograph. Scientists repeatedly caught bonefish held in a large pond in the Florida Keys and found that 96% survived capture. A few of the bonefish that ultimately died had been caught five to ten times each, which suggests that bonefish hooked and released in

the wild probably have an even higher survival rate. Angler-caught snook held in large net-pens throughout Florida had a 98% survival rate. Most of the snook that died were caught with live bait, consistent with studies showing that fish caught with lures generally survive. Spotted seatrout caught in Tampa Bay had a 95% survival rate. Hook position affected survival rates; trout hooked in the gills or gut had lower survival rates than those hooked in the mouth. Redfish survival rates range from 84% in Georgia waters to 96% in Texas waters. Like seatrout, hook position affected survival rates; more than 50% of the throat or gut hooked fish died. These studies demonstrate that catch-and-release-fishing works—most fish that are released survive. By following a few simple guidelines, anglers can maximize survival rates.

Venting distended gas bladders

Release of sublegal-sized groupers and snappers is imperative because of increased minimum sizes and implementation of bag limits. When these fishes are hauled from depths greater than about 30 feet, their air bladders become distended and many times cause their stomachs to evert, or turn inside out, through their mouths. Research is inconclusive regarding the benefits of venting snappers. The uncertainty may be due to injury of internal organs resulting from improper insertion of the venting tool into these narrow-bodied fishes. In snappers, to avoid puncture of the heart, liver, intestine, or gonad, it is crucial to insert the needle or cannula just posterior to the tip of the pectoral fin. Groupers, being wider bodied, better survive deflation, and venting has been shown to positively increase their survival. The technique is the same for both kinds of fishes.

The venting device should be a hollow needle no longer than 1½ inches with an inside diameter of about 1/8 inch or less, anything much larger and you run the risk of improper healing or infection. Puncture the body wall at the tip of the pectoral fin until you hear the escape of trapped air. The angle should be about 60-75 degrees, which improves the ease of insertion. Do not insert the needle too deep. If resistance is encountered, stop and try in a slightly different location or angle. Leave the needle in place until you are sure that most of the swelling or distension has been relieved. Never puncture the stomach or try to force the stomach back into the body. The fish will accomplish this better than we ever could!

Small, narrow-bodied fishes such as porgies, grunts, angelfish, and most snappers do well if they are simply returned to the water as quickly as possible. A study conducted in the Florida Keys showed that over 90% of individuals of these species are able to return to the bottom without venting. Survival of groupers, tilefish, and large snappers is increased when their distended gas bladders are vented.

Some guidelines for catch-and-release angling

The most important steps an angler can take to ensure a successful release are to hook and land the fish as quickly as possible, leave the fish in the water while removing the hook, and release the fish quickly. There are several other ways to improve survival rates:

* Whatever you do, do it quickly. Keeping an exhausted fish out of water is like holding a bag over a runner who has just completed a marathon. They both need oxygen to recuperate.

* Wet your hands or gloves before handling the fish. Do not injure the eyes or gills. Placing the fish on a wet towel will help the fish retain its protective slime. To keep the fish still, place it on its back or cover its eyes with a wet towel. Control the fish at all times! If you drop the fish, its chances of injury and death increase.

* Decide beforehand which fish are to be kept; immediately release all others. Do not engage in a prolonged debate over whether or not to release the fish after the fish has been landed. Never place a fish in your live well intending to release it later if you catch a larger one. Once you make a decision to keep a fish, stick with it. The fishes you release from your live well have a decreased chance of survival.

* Avoid the use of gaffs, and never remove large fish such as tarpon from the water. Large fish can injure themselves and the crew and should, therefore, be treated with respect. Take a photograph of the fish in the water and release it.

* Refrain from holding fish in a vertical position when inspecting or photographing them. Internal organs are displaced and stress is increased in this unnatural position. Large fish should never be held by the bottom jaw only, with a boca grip or otherwise (any tool designed to grip the lower jaw of caught fish to facilitate handling). Hold the fish horizontally by the lower jaw with one hand, and support the belly with the other hand. If unsupported, many large fish, especially snook, will rupture the isthmus—a cartilaginous bundle of ligaments that connects the head and body--and the fish will die a slow death from starvation. This connection is necessary for the tremendous gulping action during feeding.

* If the hook is difficult to remove by hand, use long-nosed pliers or a hook-removal tool. Do not tear additional tissue by removing the hook. Back the hook through the original wound. If this fails, cut the leader and pull the hook forward through the injury. Regardless whether or not you intend to keep the fish cut the leader close to the hook when releasing large Goliath Grouper (jewfish), tarpon, sharks, and other fishes that are gut hooked. Do not lift a gut-hooked fish out of the water by the leader; this can increase damage to the fish.

* Try fishing with barbless hooks, or crimp and remove the barb. Catch rates using barbed or barbless hooks are not significantly different. Barbless hooks are easier to remove, and they cause less physical damage to the fish.

* Use circle hooks. They cause less injury and increase catch rates.

* If your fish is in good shape, immediately return it to the water headfirst. If it does not swim or is lethargic or erratic, some “resuscitation” may be needed until the fish can swim on its own. Revive exhausted, but otherwise healthy fish by first placing one hand under the tail and holding the bottom lip with the other. If the fish is in fair to good shape, merely hold it headfirst into the current. If it is severely lethargic, depress the bottom lip to cause the jaw to gape and gently move the fish forward. Moving the fish in an erratic back and forth motion will just induce more stress. Have you ever seen a fish swim backward and forward? At the first sign of the fish attempting to swim away—let it go. Prolonged attempts at resuscitation will be stressful to the fish.

* Large pelagic species such as sharks and tarpon should be brought alongside the boat within 20 minutes of being hooked. If you are consistently landing exhausted fish that require extensive efforts at resuscitation, you should consider using heavier tackle.

* To vent or not to vent? Several studies have been conducted to determine if venting distended air bladders of fishes hauled from deep water increases survival. It is inconclusive whether it is beneficial to vent snappers; however, venting groupers has been shown to positively increase survival. It is important to learn and use proper procedures.

Practice and share these techniques! Teach your children and inexperienced anglers these few simple procedures to help ensure abundant fish populations for the future.