

Catch & Release Fishing; Effects on Bass Populations

By PFBC Staff



Catch-and-release fishing is often seen by the public as an effective way of keeping good-sized largemouth bass and smallmouth bass in a population so that these fish can be caught again. But does it work? That is, how well do bass survive catch and release, and are there things anglers can do to improve the odds? A lot of research has been conducted on this topic. Here we will discuss the facts of catch-and-release mortality and how anglers can help improve bass survival.

Catch-and-release fishing has become the norm, instead of the exception. Anglers proudly proclaim they release their catch with bumper stickers, hats and t-shirts. But just because the bass swims away, its survival isn't guaranteed. Many anglers wonder about bass survival after fishing tournaments, and if catch and release works to keep good-sized bass in their local lakes and rivers. Much research on this topic has been done in Pennsylvania and elsewhere. There are many issues that affect if a bass will survive being caught or not. By using the best practices possible, anglers can help bass survive.

Mortality

Mortality can come about two ways in fish; naturally and through fishing. Natural causes include disease or being eaten by a predator. Fishing mortality can come from either the fish being harvested by an angler or from injuries or stress from catch and release. The mortality rate of a waterway is a measure of how many fish die or are removed over a year. It can be determined by monitoring the population from year to year. Data from "young of the year" surveys, electrofishing and creel surveys (how many fish are caught and kept) may all be used to determine those rates. Managers used to look only at how many fish were kept or harvested. As angler attitudes and use of catch and release have changed, the fisheries research on the influence of catch and release on fish mortality



and populations has followed. Like many anglers, we too want to know: “Will that released bass survive to be caught again?”

Fishing mortality

Biologists look at two types of fishing mortality: Immediate and delayed. When a fish is kept for the dinner table, or when it dies before it can be released, it is dead and instantly removed from the population. However, a released fish that dies later has the same effect. A good intention—to release a fish—doesn’t guarantee its survival. Anglers should be aware that even with bass that are immediately released, some still die. The amount of this loss is often estimated to be between 5 percent and 20 percent, but the loss can be greater. Three primary factors influence bass survival after release. These are the way the bass was hooked, how it was handled, and the specific conditions and actions involved in its release.

Many studies have examined these factors, but it is difficult to point a finger at a specific one as causing delayed mortality. A clear relationship between a type of stress and a level of mortality is rare unless extreme conditions prevail. Anglers generally avoid exposing fish to extreme stress, because they want to release the bass they catch successfully. This means that delayed mortality in practice is often a combination of several factors that don’t cause mortality singly but do cause it with their combined effects. A fish that is stressed in multiple ways may swim away, but later that stress leads to poor health, possible infections, and in some cases, death.

Fishing Mortality Factors

1. Types of Bait, Hooking, and Hook Removal

Many anglers are concerned with the use of lures, scented lures, and bait for bass fishing. Studies examining the effects of these different baits on bass mortality have been done. Not all of the research available is in agreement on this issue. One study found that mortality was 11

percent for smallmouth bass hooked on minnows, 0 percent for those hooked on spinners, and 4 percent for those not hooked at all. This was observed over a period of two weeks for each study group of bass. Another study examined scented plastic lures. These types of lures are very popular in bass fishing at this time. It compared minnows, scented artificial and non-scented artificial baits. All were fished on jigs with a single hook. This study found no initial mortality in the first hour for all bass. It also found no difference in bass mortality out to 72 hours after the fish had been hooked. On the whole, studies have found that bass hooked with natural baits may suffer higher delayed mortality rates. This result is from deeper hook ingestion and the associated increased potential for hook removal injuries and greater handling stress. Regardless of the bait used, anglers looking to release their fish successfully should strive to avoid deeply hooking fish.

2. Landing and Handling

The way that a fish is played and handled when it is caught can affect its survival. Playing bass to physical exhaustion vs. playing them quickly has been shown to affect bass negatively. One study measured the length of time required for a spawning male smallmouth bass to return to its nest. In that study, fish played to exhaustion took four times longer to return to the nest than fish that were played briefly. Roughly handling bass and keeping them out of the water for long periods negatively influence bass survival. Keeping bass out of the water increases the amount of time that it takes them to recover from being caught.

3. Release Conditions

Initial mortality in bass that have been released has been shown to be related to higher water temperatures. One study indicated that initial bass mortality was higher at water temperatures over 77 F. Largemouth bass in control situations that are not stressed by fishing do not encounter mortality at high temperatures. However, bass that are caught and released in warmer water do



not survive as well as do those caught in cooler water.

4. Live Wells

Anglers commonly place bass that they will later release in live wells. Anglers need to monitor the water condition in their live wells very carefully. Water temperature is directly tied to the amount of dissolved oxygen in the water. Higher water temperatures lead to lower amounts



of dissolved oxygen. This can stress fish and can cause mortality. Dissolved oxygen concentrations should be maintained above 5 mg/L for bass. Dissolved oxygen levels below or approaching 3.0 mg/L can be lethal to largemouth bass. The difference in the water temperature in the live well from that of the lake or river can cause bass undue stress. While cooler water in live wells helps increase the amount of dissolved oxygen, large water temperature differences can lead to mortality. Water temperature differences should never exceed 10 degrees F. Other water chemistry factors such as pH level, high ammonia, and carbon dioxide levels can also negatively affect bass that will later be released.

The Effect of Catch and Release Mortality on Bass Populations

Research has shown that catch-and-release angling does have an effect on bass populations. Even though anglers attempt to practice their

best techniques, even catch-and-release fishing does have an effect on total bass mortality.

A good example of the effect of catch-and-release angling mortality in Pennsylvania is from a recent Commission study at F.J. Sayers Lake in Centre County. The 2004 study estimated initial, delayed and total mortality associated with catch-and-release tournament and non-tournament bass angling on the lake. The study examined both largemouth and smallmouth bass that were brought to tournament weigh-ins together. All bass examined were over the 12-inch minimum legal size limit on the lake. The study estimated harvest mortality during the tournaments. It also approximated catch-and-release mortality for non-tournament anglers.

The total loss from the initial bass population during the fishing season due to tournament angling was estimated to be 12 percent. Loss due to non-tournament angling was estimated to be 34 percent. In Pennsylvania, about 25 percent of anglers have indicated that they participate in catch-and-release bass angling tournaments, and 75 percent do not participate. Tournament catch-and-release bass angling and non-tournament bass angling appear to inflict similar levels of mortality in proportion to angler participation in Pennsylvania. Neither type of fishing activity appears to cause greater proportional mortality to the bass population.

Both tournament and non-tournament catch-and-release losses were estimated to total 58 percent of the fishing-related mortality in the lake. Overall loss due to fishing was estimated to be 46 percent of the initial population size.



What You Can Do

Actions that help bass released by anglers survive can enhance the bass population in your local lake or river. The three factors that influence bass survival that were discussed above are a good place to look for improvements that you can make when you release bass.

- 1. Way the bass was hooked.** Adjust your fishing techniques to avoid injury to the bass. Try to hook bass near the front of the mouth. This helps avoid injuries to the gills and soft tissues
- 2. How it was handled.** When landing and handling your bass, touch them as little as possible. Keep them out of the water for only a short time, and make sure your hands are moist if you touch the fish's body. If holding the fish horizontally, support the weight of the fish with two hands--don't hold the fish up just by the jaw or head.
- 3. How it was released.** Allow the fish to swim from your hands. If the fish is sluggish, or rolls to its back, attempts to revive it may pay dividends. Do so by moving the fish back and forth in the water, to move fresh water over its gills. This isn't necessary in moving water. But, don't release a sluggish fish into fast current either.

You may also want to avoid fishing during the hottest part of the summer. The success rate for releasing bass is lower at that time.

Live Wells

There are also things that you can do to your live well to help fish survive. Start by keeping it aerated and recirculating. Maximizing the exchange of lake or river water with the water in your live well has been recommended as one way to combat the cumulative effects of many different stressors that lead to bass mortality.

Take the time to treat your bass well and handle them carefully. Anglers should check out *Keeping Bass Alive: A Guidebook for Anglers and Tournament Organizers*. The guidebook can be ordered directly from BASS by calling 1-877-BASSUSA. The cost for the guide is \$3.00. It can be viewed on-line by visiting www.bassmaster.com. This informative guide offers many tips and ideas that can help keep your catch in good shape when it goes back into the water.

Bass will occasionally die in association with catch-and-release angling. Responsible anglers know it is acceptable to take that fish for the table if it meets size and creel limits. But one thing is true—a bass 'released' into a cooler, for the grill or frying pan has 100 percent mortality!

Reference

Lorantas, R. M. and Kristine, D.P., 2004. Black Bass Fishing Loss at F. J. Sayers Lake: Results of Partitioning Tournament and Non-Tournament Losses. Pennsylvania Fish & Boat Commission, Bellefonte. USA.

A copy of this report is available from the PFBC. Many additional references reports and articles from the scientific literature been used in the preparation of this fact sheet.

