Smith Mountain Lake Striped Bass Summer Catch & Release Mortality Study

Introduction:

Striped Bass anglers have debated freshwater summer catch and release survival for decades, which has produced several studies in southern U.S. reservoirs. These data have provided estimates of release mortality, aided management decisions, and informed anglers. These studies have documented high summer catch and release mortality of Striped Bass, but questions remained about their applicability for Smith Mountain Lake (SML). This is because SML has unique environmental conditions that provide better summer habitat for Striped Bass than other reservoirs studied. Consequently, a Striped Bass catch and release study was conducted by the Virginia Department of Wildlife Resources (DWR) and Coastal Carolina University in the summer of 2024 and 2025 to determine if previous study findings were relevant for SML.

The primary objectives of this study were to estimate the percentage of Striped Bass that die shortly after being released during the summer and identify factors that contribute to warm water catch-and-release mortality. Additionally, mortality rates for Striped Bass caught on live bait utilizing circle hooks were compared with other popular artificial baits. The SML study was confined to the summer period due to budget limitations and importance of accurately quantifying warm water release mortality. Data from other studies are comparable for SML during cool-water periods. While it is impractical to expect the study to answer every possible scenario encountered during summer Striped Bass fishing at SML, we are able to provide summer mortality estimates and offer guidance to minimize warm water catch-and-release mortality.

Study design:

Tagging was conducted and analyzed separately for two periods, the first three weeks of June and mid-July through August. The June period focused on night fishing during the later part of the alewife spawn when surface water temperatures reached upper 70's and low 80's. This part of the study was specifically directed at the use of large stick baits with treble hooks because of landing net entanglement, additional fish trauma from multiple hook wounds, and extended handling time incurred when removing several hooks. The July-August period was after warm water conditions were fully developed and during the summers highest surface water temperatures. These are the conditions when Striped Bass experience the greatest chance of dying after catch-and-release, as shown in other studies.

Most Striped Bass tagged in the study were caught in the downstream end of the Roanoke River arm (below Hales Ford bridge), 10% of tagged fish were caught in the Blackwater River arm.

Fishing equipment was chosen to mimic gear most anglers utilize at SML. Striped Bass were caught with 7-7.5 ft medium-heavy action rods outfitted with 20 lb. braided line and fluorocarbon leader and fish were retrieved quickly as possible to limit fight time. All fish were netted with knotless rubber nets to reduce slime coat removal and limit entanglement.

Immediately after netting, each Striped Bass was outfitted with a temperature sensing acoustic transmitter that was attached externally through the dorsal musculature and released at the capture site. Fish tracking was conducted via boat and GPS coordinates were recorded each time a tagged Striped Bass was located. Striped Bass were classified as dead if there was no movement for 3 or more consecutive days and transmitter temperature corresponded to the lake bottom temperature where the fish was located. Some angler released Striped Bass never submerge after release if fight and handling time are too long, but tagged Striped Bass in this study submerged and settled on the lake bottom if died.

Similar to other studies, stress-induced mortality from summer catch-and-release angling occurred within the first 24 hours so checking each fish for weeks or months later would not improve mortality estimates. It is likely that a small percentage of fish classified as surviving, later died due to infection from handling but this study design was focused on the immediate warm water mortality.

The following data were collected for each Striped Bass tagged; date, surface water temperature, depth of water where hooked, bait type, fish length, hook location, fight time, handling time, and other miscellaneous notes (i.e. temporarily floated,

bleeding, anomalies). Total time from hookset to release was recorded separately as fight and handling time. Fight time included hookset to landing and handling time covered landing to release.

June:

A total of 18 Striped Bass were tagged with acoustic transmitters at night in June, 17 fish were caught in shallow water from surface to 10 feet and one caught at approximately 20 feet. The average size tagged was 24.2 inches, ranging from 19.3-33.0 inches. Total time (fight and handling) range was 2.0 to 5.1 minutes, and surface temperatures ranged from 74°-82° F.

The only variable we examined that appeared to impact June survival was surface water temperature. More Striped Bass died after catch-and-release as surface water temperatures increased (Figure 1). Fish length and total time (fight and handling) did not appear to be a factor for survival.

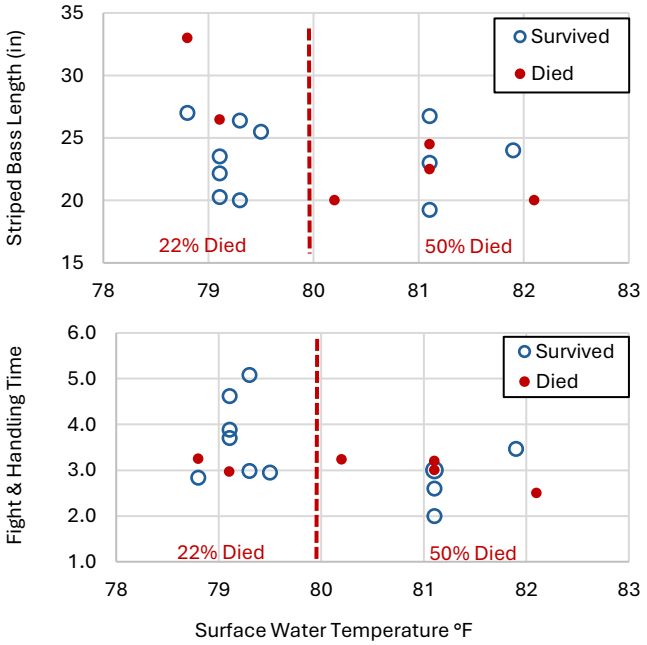

Figure 1. Fate of Stiped Bass caught on multiple treble hook baits and tagged during a telemetry study in June, at Smith Mountain Lake. Each dot or circle represents a tagged Striped Bass. When surface water temperatures get into the 80's, chance of survival decreases.

While we did not find that fight and handling time impacted mortality, keep in mind that all fish were caught with heavy gear for rapid retrieval and processed quickly as possible. With surface water temperatures at or reaching critical levels in June, taking too much time to retrieve and release Striped Bass can be lethal. Striped Bass require cool water to survive and stay healthy but can make short forays into warm water that would be fatal if forced to stay very long.

Live bait and planer board fishing are also popular techniques used during the June period, but no Striped Bass were tagged utilizing these methods due to limited funding and tags. We anticipate live bait survival to be better than nighttime fishing using stick baits when using "best practices". Refer to July-August analysis for more information on Striped Bass caught with live bait.

July-August:

There was a total of 106 Striped Bass caught and released during the daytime in July-August. The average size tagged was 25.6 inches, ranging from 19.0-32.8 inches. Tagged fish were caught at varying depths (30'-115'). Total time (fight and handling) ranged from 1.5 to 5.7 minutes. Surface water temperatures were between 78°-90° F.

Multiple bait types were used and based on common summer baits used by anglers at SML. Striped Bass were caught on single hook ¾ oz jigs equipped with soft plastics (68), 1.5 oz spoons (8), and live bait (30). Only in-line circle hooks (2/0-3/0) were used with live bait. Similar Striped Bass studies found using live bait with J hooks had higher mortality than artificial baits but more recent studies on various large fish species show in-line circle hooks reduce mortality. Consequently, we wanted to determine if live bait fishing with in-line circle hooks had similar mortality as artificial baits. Three of the 30 fish caught on live bait were hooked in the esophagus and the line was cut instead of attempting to remove the hook. Extra-large jigging spoons had just started to become popular but were not included due to limited tag availability.

There were no differences detected in survival for different bait types (jig, spoon, live bait with circle hooks). However, deep hooking around the gills or esophagus increased mortality so anglers may need to adjust their methods if they are experiencing deep hook sets. One example would be to set the hook quickly as possible when using live bait as opposed to delaying or waiting a short time before setting the hook. Two of the three fish that died using live bait were deep hooked due to delayed hookset.

It was expected that Striped Bass caught in deeper water would have higher mortality, but there was no correlation with the water depth fish were hooked and mortality (Figure 2). Other species such

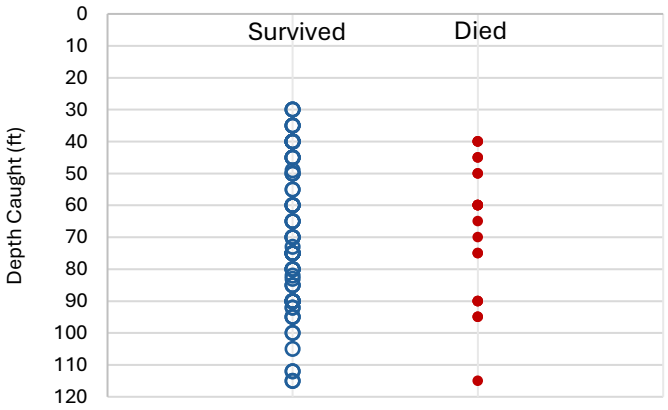

Figure 2. Fate of Striped Bass caught on single hook baits and tagged during a telemetry study in July-August, at Smith Mountain Lake. There were no differences in mortality based on the depth that fish were hooked.

as Largemouth Bass and Crappie do experience barotrauma, that can be fatal, when retrieved from deep water.

Unlike the June period, warmer surface water temperatures did not increase mortality (Figure 3).

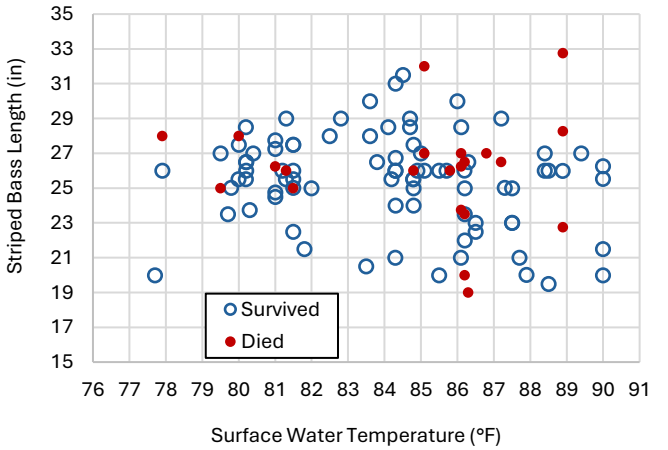

Figure 3. Fate of Striped Bass caught on single hook baits and tagged during a telemetry study in July-August, at Smith Mountain Lake. Each dot or circle represents a tagged Striped Bass. Mortality was similar for all sizes and across all surface water temperatures.

There are a couple possible explanations for different results between June and July-August periods. Sample size may have been too low in June, so tagging more fish could have resulted in a different conclusion. Another probable explanation is that some of the Striped Bass caught in June already had elevated body temperatures when hooked due to foraging in shallow warm water. Striped Bass caught during July-August are usually hooked in deep water that is considerably cooler than the surface so internal body temperatures may have been cooler when caught in the July-August period. Much higher summer mortality was reported in other reservoirs that did not have cool water available due to elevated body temperatures when caught and the lack of available cool water for catch-and-release recovery.

Mortality was lowest when fight time was less than 2.0 minutes. However, the additional time required to remove hooks, get measurements, and take pictures (handling time) is a very important component of total time (hookset to release) as the opportunity for survival decreases the longer a Striped Bass is removed from cool water.

The best chance of survival for Striped Bass at SML during the July-August period was to have the fish released and swimming to deeper water in less than 2.5 minutes after hookup (14% mortality). Between 2.5-4.5 minutes, mortality increased moderately to 23%. There were only two Striped Bass tagged that had a total time longer than 4.5 minutes, both died (Figure 4). Keeping the combined fight and handling time short as possible is a very important factor for improving survival during the summer.

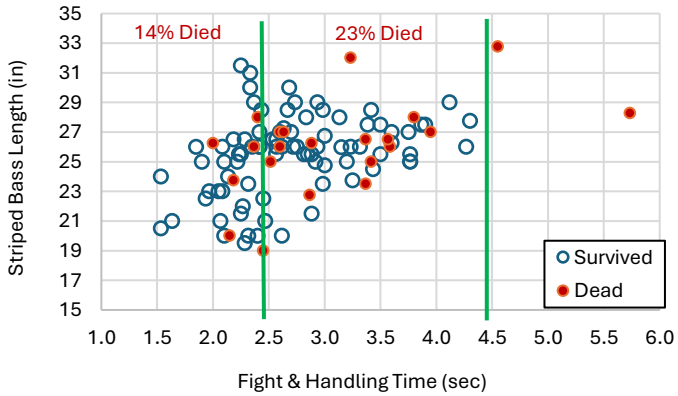

Figure 4. Fate of Stiped Bass caught on single hook baits and tagged during a telemetry study in July- August, at Smith Mountain Lake. Each dot or circle represents a tagged Striped Bass. Mortality was lowest when fight and handling time was less than 2.5 minutes. There were no differences in mortality for Striped Bass length.

Summary:

Summer Striped Bass anglers should bring a cooler with ice and be prepared to harvest some of

the Striped Bass they catch! Despite making every effort to reduce mortality, some summer caught Striped Bass will not survive. Sixty-seven percent of Striped Bass released in July-August that were hooked in esophagus, had moderate to heavy bleeding, or floated for any duration did not survive. Responsible anglers can reduce the number of wasted Striped Bass that die in the summer if using "best practices" and harvest fish that sustain obvious injuries or struggle to submerge quickly. Total mortality for all 106 Striped Bass tagged during July-August was 21% but declined to 12% for fish released with no obvious injuries (i.e. bleeding, deep hooked) and did not experience any floating.

Mortality was generally less for shorter Striped Bass, but the differences were too small to indicate any meaningful differences, the shortest (19.0") and longest (33.0") Striped Bass caught in this study, both died. We were unable to catch Striped Bass over 33 inches and had limited data for 30-33 inches. There were only 11 Striped Bass caught and tagged between 30-33 inches during the pilot studies, June, and July-August periods. Striped Bass tagged between 30-31 inches, had good survival but four of the five that were 32-33 inches did not survive. While this data is not at all conclusive due to low sample size, it does raise questions that we were unable to answer concerning catch-and-release of the largest Striped Bass in the summer but does highlight concerns for targeting large striped bass during the summer.

One of the simplest but most important thing anglers can do to reduce summer mortality is to retrieve and release Striped Bass as quickly as possible. Of all the parameters examined in July-August, the amount of time it took from hookset to release was one of the most important and emphasizes the need to use heavy gear and keep handling time to a minimum.

Reviving or resuscitating Striped Bass boatside has been recommended by some to aide recovery. While this practice may have benefits when water temperatures are cooler, it will not improve survival during the summer because the additional time held in warm water increases the fish's body temperature and mortality. A "torpedo" style release is the quickest method for getting fish back to deeper and colder water needed for recovery. Striped bass in this study that could not quickly submerge on their own, did not survive even when a descending device was used.

Additional Information:

There have been some questions as to the validity of this study, did it provide reliable data? A pilot study was conducted in July-August of 2023 to better develop the final study design. During this pilot study, 14 telemetry tags were quickly and easily inserted into Striped Bass stomachs with a livestock bolus. Due to the potential of tag regurgitation, it was decided to externally attach transmitters in 2024-2025. Results from the two different tagging techniques (stomach verses external), conducted by different investigators were very similar, providing confidence that data acquired in this study provided valid results.

There has been a debate among some summer anglers that the lack of or no floating Striped Bass in an area where they recently released fish, was proof that most Striped Bass they released survived. We found that released Striped Bass almost always had an immediate flight response and left the vicinity where they were released, even those that died soon after release. Tagged Striped Bass that were identified as dead often could not be located approximately a week later, adding some questions to the judgement of mortality. To answer these questions, eight Striped Bass were sacrificed and placed on the lake bottom at various depths that dead Striped Bass in this study occupied (30'-50'). Each fish was equipped with both acoustic and telemetry tags so they could be located in water or on land. Acoustic tags used during other parts of the Study only worked if fish stayed in the water.

It took 4 days for the first Striped Bass and 10 days for all 8 Striped Bass to move (float) from where placed on the bottom. None of these Striped Bass were found actively floating, all (sometimes only the tags) were located along the shoreline or had been moved upland. This data shows that most released Striped Bass that die, had swam away from capture site and typically require about a week to resurface where they quickly get blown or drift to the shoreline and are consumed by scavengers.

Additional tagging was initiated in the winter of 2025 to determine what portion of the angler catch and harvest occurs throughout the year. A total of 330 Striped Bass were tagged with external reward tags for anglers to return to DWR. This data provided

estimates of what percentage of the population is caught in the summer and the potential population impacts from summer Striped Bass fishing. Results from the reward tagging indicate that current summer fishing effort has limited impacts to the population when anglers use “best practices” described at the end of this document.

The intent of this study was to provide summer Striped Bass catch-and release mortality estimates at SML and provide anglers with a better understanding of how different fishing practices impact mortality. The study was not conducted with the purpose to change regulations, but DWR was certainly open to any changes if the study indicated they were biologically warranted and desired by most anglers. While the results have been informative, there are no findings that indicate changing regulations at this time would have a measurable impact on the fishery.

Dan Wilson, Fishery Biologist
Smith Mountain Lake
7/21/26

Best Practices and guidelines for Striped Bass <u>summer</u> catch-and-release fishing at SML:

- **Use rubber or rubber coated net** – protect the fish's slime coat.
- **Wet your hands** before handling Striped Bass.
- When surface water temperatures exceed 70° F **use heavy gear for quick retrieval** and reduce handling time as much as possible. Always keep combined retrieval and handling time to less than 2.5 minutes if possible - do not exceed 4.5 minutes.
- **Keeping a Striped Bass in the water to unhook is generally best**. Lifting net and fish into the boat allows for a better "torpedo" type release in summer.
- **Remove one of the three treble hooks** from plugs and stick baits.
- Always **use in-line circle hooks** when live-bait fishing.
- **Harvest (keep) any Striped Bass that are:**
    - hooked in the esophagus (throat, stomach)
    - show moderate to heavy bleeding
    - do not quickly submerge (float long enough to be net again)
    - caught using topwater or multiple treble hook baits when water temp > 80° F