Fisheries Research Summary

Division of Inland Fisheries N.C. Wildlife Resources Commission

The Influence of Growth and Mortality on Largemouth Bass Size in Coastal Rivers


Duane Raver/USFWS

Largemouth bass anglers fishing popular coastal rivers such as the Tar-Pamlico, Neuse, New and White Oak rivers know that catching big largemouth bass is challenging. Compared to the productive reservoirs of the Piedmont, like Shearon Harris, High Rock and Gaston, many coastal anglers will fish countless hours a year and catch few bass that exceed 18 inches.

For many anglers, catching a single 18-inch bass may require sorting through a large number of 12 to14 inch-bass. Although catching big bass may only be icing on the cake for anglers looking to fish scenic rivers for solitude and relaxation, other anglers spend substantial amounts of effort and money to catch big bass during tournaments.

In a coastal bass tournament, a single big bass may mean the difference between getting paid and going home empty handed. However, it's difficult to argue that catching an 8-pound bass from a coastal river can bring a great deal of satisfaction to dedicated anglers and young anglers alike. Being such, the rarity of big bass from coastal rivers naturally causes some concern among anglers and fisheries biologists.

In any aquatic system, the absence of big bass can be the result of several factors. If you assume that big bass are old bass (sometimes true, but not always), then you might believe that mortality has removed the big bass from the population. This may be true in systems that experience high rates of angler harvest, excessive movement of tournament-caught bass, extremely toxic water quality, or rapid consumption of bass by other predators. In fact, high rates of bass harvest by anglers 30-plus years ago resulted in the need for harvest restrictions designed to protect bass long enough for them to grow to a quality size. The absence of big bass may also be related to growth patterns.

In coastal rivers where bass growth is slow, few fish will reach this size. However, improvements in growth rates and average size can be achieved using angler harvest as a management tool.

The assumption that big bass are also old bass often doesn't hold. In the case of many coastal rivers, old bass are common but are often the same size as their younger counterparts. For example, in the Neuse and Tar-Pamlico rivers, bass up to 13 years old were collected during 2008. Despite being much older than the bulk of the fish in the population, these 13-year olds weighed less than 3 pounds. Growth among younger fish is considerably faster with fish reaching 14 inches by the time they are 3 to 4 years old. After fours years, bass growth in some coastal rivers slows dramatically.

Other fish community data from these rivers suggest that bass are too numerous to be supported by the available prey base. Big prey (adult bluegill and shellcrackers) are needed to support the continued growth of big bass, but few of these prey appear to survive intense feeding and predation by 10 to 14-inch bass. In short, above average reproductive success and lower mortality as a result from favorable conditions have increased the numbers of bass in some systems, and at the same time increased competition for available forage. The downside is that bass growth rates have declined as their numbers have increased.

It's well known among anglers and biologists that bass are not alone near the top of the food chain in coastal rivers. Other species such as gar, bowfin, flathead catfish, black crappie, striped bass and, occasionally, red drum, flounder and alligators may consume bass during some point in their lives. Largemouth bass themselves are highly cannibalistic and start to eat each other by the time they have reached only 2 inches in length. If growth has slowed as the numbers of bass increased, some consumption of bass by predators may be important for stabilizing the bass fishery in coastal rivers and preventing growth rates from declining too much. When big bass aren't present, a common misconception is that some source of mortality has removed the larger, older fish from the population. In the case of some coastal rivers, large fish are absent because growth beyond 14 inches rarely occurs.

The adoption of catch-and-release fishing practices by anglers has been nothing short of incredible. Creel and angler opinion surveys conducted on coastal North Carolina rivers show that bass anglers, with few exceptions, release more than 90 percent of their catches. Anglers who practice catch-and-release understand that bass can be "recycled" and caught multiple times. In productive bodies of water, catch-and-release is a great technique for allowing fish to reach a large size because released bass can be expected to continue growing. In bodies of water with slow growth rates, releasing bass may allow them to be caught again, but there's a small chance the fish will be bigger when caught again. In these systems, removal of bass may improve growth rates and the numbers of bigger fish. As fish are removed, competition for food is reduced, which allows for faster growth and the accumulation of bigger fish in the population. Although not obvious at first, the strategic removal of legal-sized fish can help improve your favorite bass fishery!

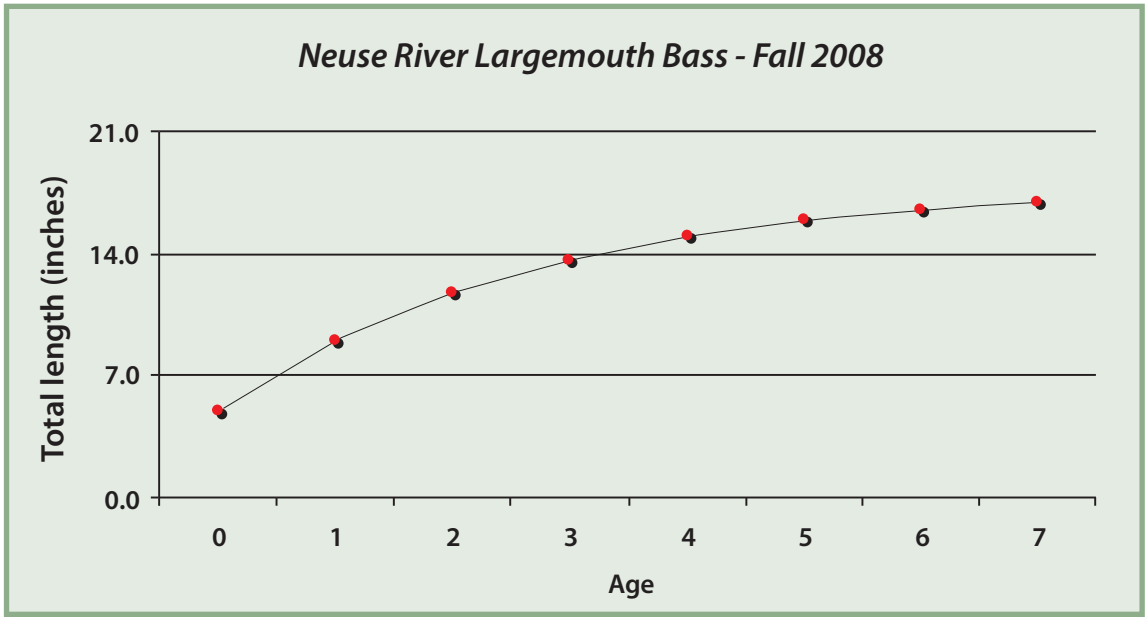

Figure 1. Neuse River largemouth bass growth is slow. Most fish will grow up to 14 inches, but few fish will grow beyond 18 inches despite the presence of old fish in the population.