

THE NORTH CAROLINA
BLACK BASS MANAGEMENT PLAN

A Plan for Managing North Carolina's Largemouth,
Smallmouth, and Spotted Bass Resources

Division of Boating and Inland Fisheries
North Carolina Wildlife Resources Commission

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STATEMENT OF PURPOSE

The black bass management plan (BBMP) defines the goals and sets the future of the North Carolina Wildlife Resources Commission's (WRC) black bass management program. The agency's black bass management objectives and activities will be consistent with this plan. Black bass related research and survey efforts will provide information necessary to execute a bass management program consistent with the plan's goals.

RESOURCE DESCRIPTION

There are 3 species of black bass (Micropterus spp.) common to North Carolina. The most prevalent species is the largemouth bass (M. salmoides). Most largemouth bass in North Carolina are genetic intergrades between the Northern and Florida subspecies. Northern subspecies genes are most common in largemouth bass from the mountains while Florida genes are more prevalent in coastal largemouth populations. Largemouth bass are common in most freshwater habitats of the state except for the coldest mountain streams and rivers. Smallmouth bass (M. dolomieu) are found primarily in the cool clear streams of the mountains and their foothills. Small isolated populations occur in the Uwharrie and upper Neuse river drainages. The third black bass in the state is the spotted bass (M. punctulatus). Spotted bass occupy some of the cool high elevation streams and reservoirs in southwestern North Carolina. The fish also was successfully introduced into W. Kerr Scott Reservoir in Wilkes County and Upper and Lower Little rivers north of Fayetteville.

Habitat Categories

Because of the variety of species and wide geographical distribution of bass across the state, we recognize five habitat categories in the BBMP.

1.) Coolwater rivers and streams are found in the mountains and their foothills. Smallmouth bass is the most commonly encountered black bass present but largemouth and spotted are sometimes present. The granitic geology of the region limits the productivity of the overlying waters. Geology, cool water, and a shorter growing season produce slower growth among bass in this habitat category.

2.) Coolwater reservoirs are also found in the mountains. Largemouth and smallmouth are often found together in these high mountain reservoirs. Spotted bass are less common. Again, geology, cool water, and short growing seasons slow fish growth.

3.) Warmwater reservoirs includes most of the impounded waters east of the mountains. Largemouth bass are usually the only black bass found in this habitat category. A more fertile underlying geology, higher levels of nutrient loading from human activity, warmer water, and a longer growing season places many warmwater reservoirs among the state's most productive bass waters. Fish from the best of these reservoirs have excellent growth rates.

4.) Warmwater rivers and streams are also found east of the mountains and support largemouth bass and a few spotted bass. The best fisheries are found in the coastal region. High flows and low productivity work to produce slow growth rates in most of the coastal rivers. The exceptions are found along the north side of the Albemarle sound. Here, slow moving water, nutrient runoff, and the seasonal presence of anadromous forage such as menhaden combine to produce better bass growth rates.

5.) Sounds and estuaries provide some habitat for largemouth bass. Changing salinity levels can temporarily create or destroy bass habitat in these environs. Bass growth is often slow.

RECREATIONAL IMPORTANCE

The 1985 statewide mail survey (Van Horn et al. 1987) of licensed freshwater anglers found 70% of survey participants indicated largemouth bass was the fish they most preferred to catch. The preference rate was lower for smallmouth bass (16%) and spotted bass (<1%). The United States Fish and Wildlife Service (1989) estimated 49% of North Carolina respondents to the 1985 National Hunting and Fishing Survey fished for black bass and contributed \$143 million dollars to the state's economy (U. S. Fish and Wildl. Service 1988).

Bass anglers are a diverse group. This is reflected in their fishing methods and expectations. The fish can be caught from the bank using a modest rod and reel and live bait or can be pursued using highly specialized boat and tackle. For many, trip success is measured by the number of bass harvested. For others, success is not measured by harvest but by the number of large fish caught and released.

There are in excess of 150 fishing clubs in North Carolina devoted to fishing for black bass. Bass populations also support the tournament schedules of several major fishing organizations and hundreds of independent tournaments annually.

Creel surveys indicate that anglers bass fish up to 40 hours per acre on North Carolina public waters each year. Creel surveys and tournament records indicate that anglers typically catch between 0.01 and 0.30 bass per hour on reservoirs and warmwater streams.

HISTORICAL PERSPECTIVE ON BASS MANAGEMENT

Size and Creel Limits

The WRC always has used length and creel limits to manage black bass. From the Commission's inception, the limits were 10 inches and 8 fish statewide. Concern over the effects on bass populations from the growing popularity of reservoir bass fishing in the early 1970s stimulated the agency to increase the length limit statewide to 12 inches in 1974.

There was debate among WRC staff biologists over the change to 12 inches. Size and creel limits are effective only when anglers are responsible for a significant portion of fish deaths each year. Biologists in 1974 did not know if fishing pressure and harvest of bass were high enough to make the new regulation effective.

The WRC decided to answer the debate experimentally. An 18-inch minimum size limit was established on four piedmont reservoirs in 1978 (Van Horn et al. 1981). Biologists reasoned that if fishing mortality was important in the study reservoirs, eliminating legal harvest of bass smaller than 18 inches should result in more larger size bass. The study concluded that at least some bass populations in the state were affected by bass fishing and that minimum size limits were useful bass management tools.

The WRC also took a second approach to measuring the effect of angling on bass populations. Fish were tagged on several reservoirs and rewards were offered for returned tags (Garner et al. 1984). The number of returned tags in a year was used to estimate the proportion of the overall bass population caught in the same year. Anglers caught over half of the tagged fish at two study lakes within a year. Many of the fish were caught and released after the tags were removed. About 20% of the fish were harvested. Martin (1957) found harvest as low as 15% perceptibly reduced the number of older larger bass present in a Virginia study.

If fishing mortality was an important factor shaping bass populations, the high mortality rates should be reflected by angler catches. The WRC collected tournament fishing success records from bass clubs (Van Horn and Birchfield 1981). The clubs reported a four-year decline in bass catch rates on reservoirs from 1978 to 1981.

The WRC response to the accumulated evidence that fishing affected bass populations was to again change the statewide size regulation. A 14-inch minimum size limit, a two fish exemption to the limit, and an eight fish creel limit were passed in 1982. Spotted bass and smallmouth bass were regulated with a 12-inch minimum size limit, two fish exemption, and eight fish limit. The latter regulation reflected slower growth for the mountain-based smallmouth and spotted bass.

Once again, the regulation change was evaluated on a number of reservoirs and coastal rivers (Van Horn et al. 1986). The study concluded the "14-2" was an effective general regulation.

It balanced the desire of some anglers to harvest small bass with the desire of others to practice catch and release and catch larger fish. It failed however, to increase the number of bass larger than 14 inches in the study lakes.

A 12-16 inch slot limit was placed on three reservoirs (Nelson and Little 1990, Chapman et al. 1991) in 1987 to create several fisheries meeting the needs of the catch-and-release angler. Finally, the statewide black bass creel limit was lowered to five fish in 1992.

Stocking

The WRC historically managed black bass as naturally reproducing populations. Stocking was restricted primarily to new impoundments, or to replace bass lost in fish kills. Recent work by investigators from North Carolina State University (Jackson et. al. 1991) demonstrated that bass reproduction may vary spatially within large reservoirs. They are currently evaluating the effectiveness of supplemental bass stocking to improve bass populations where bass reproduction is poor. The results may have implications for WRC bass stocking policy.

There were some attempts to expand the range of native black bass within the state. Smallmouth bass were stocked in some streams east of the mountains, with little success. However, populations were established in the Uwharrie and upper Neuse rivers during the 1960s. Spotted bass were successfully introduced in W. Kerr Scott Reservoir and Upper and Lower Little rivers above Fayetteville (Ashley and Buff 1985). Spotted bass from the latter introductions have moved into the Cape Fear River.

The agency evaluated Florida largemouth bass in the mid-1970s in response to interest in stocking the fish in North Carolina. Florida bass were more difficult to catch than native largemouth bass, displayed no early growth differences, and were intolerant of cold weather. A decision was made not to bring the fish into the state. A recent study (Dunham, unpubl.) shows that most largemouth bass east of the mountains are intergrades between the Florida and Northern bass. The number of Florida genes is highest in the coastal bass populations and decreases in the western populations. Intergrade status suggests that pure Florida largemouth bass are not adapted to survive long term anywhere in the state, have little sport fishery potential, and consequently will not play a role in North Carolina black bass management.

The WRC has stocked forage fish and other game fish (e.g. striped bass) in many waters populated by black bass. A few studies evaluated the effects of such introductions on black bass populations. Chapman and Harris (1982) found no changes in largemouth bass populations in Badin Lake following a decade of striped bass stocking. Threadfin shad are commonly introduced to provide additional forage but have shown no consistent effects on largemouth bass condition.

BLACK BASS MANAGEMENT GOALS

The WRC will maintain black bass species representation, population densities and size diversity sufficient to support and promote bass fishing in North Carolina by pursuing the following goals:

- A. Protecting and managing the environments occupied by black bass to perpetuate or enhance bass populations;
- B. Monitoring the experiences and expectations of the major groups of black bass anglers;
- C. Managing black bass to reflect the diverse expectations of bass anglers while exercising good stewardship of bass resources;
- D. Taking advantage of management opportunities created by the unique traits of the different black basses and the types of bass habitat present in the state;
- E. Managing fish stocking activities (forage introductions, non-black bass predator introductions, and black bass stocking, including supplemental stocking) in a manner compatible with black bass management objectives; and,
- F. Supporting black bass research which promotes the successful accomplishment of A-E.

STRATEGIES ADDRESSING BLACK BASS MANAGEMENT GOALS

Goal A. Protect and manage the environments occupied by black bass to perpetuate or enhance bass populations.

Black bass fisheries are ultimately dependent upon their habitat quality. Habitat components such as water quality, water quantity, water level fluctuations, and structure are important to bass populations. The WRC will work closely with environmental regulatory agencies and resource users to protect and enhance black bass habitat. The agency will also continue to identify physical components of the habitat which are important to bass and can be manipulated to manage bass populations. The agency will address this goal by pursuing the following strategies:

1. Participate in environmental permit reviews to minimize the impacts of development and other activities which may reduce the quality of bass habitat;

2. Promote research and development on the relationship between bass and their habitats; and incorporate those findings with demonstrated utility into the agency's black bass management program.

Goal B. Monitor the experiences and expectations of the major black bass user groups.

Every sport fishery has three major components, habitat, the fish being sought and the anglers seeking them. The BBMP recognizes the obligation of the WRC to serve anglers within the limits of good stewardship of the black bass resources of the state. The agency must recognize the expectations of bass anglers and relate its bass management activities to the fishing experiences of bass anglers. The process will improve angler access to the black bass management process. The WRC will address this goal by pursuing the following strategies:

1. Develop partnerships and improve communications between WRC bass fishing organizations and anglers to increase angler participation in black bass management;
2. Obtain regular measurements of licensed angler's opinions on bass fishing and bass management activities using an opinion survey;
3. Relate WRC bass stock assessment results to angler success;
4. Evaluate the effect of changes in WRC bass management strategies on angler success through creel surveys and bass tournament records.

Goal C. Manage black bass to reflect the diverse expectations of bass anglers while exercising good stewardship of bass resources as follows:

Black bass are almost universally popular among North Carolina's freshwater anglers. The majority of licensed anglers indicate bass is the species they most prefer to catch. Most anglers fishing in inland waters are using techniques which may catch one of the black basses. The different types of anglers seeking to catch bass produce a diversity of bass fishing expectations to be addressed by fisheries managers. Among the more important issues in angler expectations are size and number of fish in the catch, harvest vs. catch and release, and species preferences. The agency will manage black bass to reflect the diverse expectations of bass anglers by pursuing the following strategies:

1. Manage the majority of the state's bass fisheries under regulations that represent a balance between anglers that harvest their catch and those that release fish.
2. Manage approximately 20% of black bass waters under more restrictive regulations to promote more catch and release fishing and increase the average size of bass caught.
3. Develop an experimental program to explore the limits of size and creel limits as a tool to develop trophy bass fisheries on a limited number of sites.
4. Pursue a management policy which maintains black bass species diversity within the state. However, that policy will be conservative towards range expansion by species or subspecies introductions.

Goal D. Take advantage of management opportunities created by the unique traits of the different black basses and the types of bass habitat present in the state.

The management potential of black bass is related to the growth, body condition, age distribution, and reproductive success typical of each black bass species within each of the five habitat units described in the RESOURCE DESCRIPTION section. Good growth and body condition, few old fish, and poor reproductive performance will generally be managed to delay harvest (higher size limits and/or lower creel limits). Slow growth, poor body condition, old fish, and consistently good reproductive performance generally will be managed for more liberal harvest (lower size limits and/or more generous creel limits). The agency will address this goal as follows:

1. Largemouth bass from coastal and high mountain habitats are generally characterized by slow growth and low condition and should be managed to permit harvest at a smaller size (lower size limits and size limit exemptions);
2. Largemouth bass from piedmont reservoirs with diverse forage generally exhibit good growth and body condition and low reproductive success. Except where growth is poor, reservoir bass populations can often be managed with more harvest restrictive general regulations;
3. Smallmouth bass are restricted primarily to cool mountain water where growth is slow, and will be managed to permit harvest at a smaller size (lower size limits and/or size limit exemptions);
4. The maximum size potential of the spotted bass is poorest among the state's black bass. Most fish are located in

the mountains (there are a few coastal populations) where growth is slow, warranting less restrictive regulations;

- Goal E. Manage fish stocking activities (forage introductions, non-black bass predator introductions, and black bass stocking, including supplemental stocking) in a manner compatible with black bass management objectives.

There are many examples where species introductions have made important contributions to sport fish management. The Commission will continue to use hatchery fish to meet fish management objectives in the future. Anglers and biologists alike may be interested in adding to the diversity of sport fish in the state by introducing a new game fish. Heavy fingerling stocking may be prescribed to correct perceived declines in fishing quality. Also, forage introductions will benefit certain game fish. However, fish stocking can create difficulties. How will popular native game fish be affected by new game species introductions? What will the impacts be on nongame and endangered species? Unwarranted fingerling stocking can be expensive and a waste of valuable fish production space. There is an example of the forage base of a reservoir being collapsed by stocking too many game fish. Forage introductions which benefit one fish may have undesirable consequences for other fish.

The WRC recognizes the value of the state's black bass fisheries and the BBMP seeks to ensure that fish stocking activities within North Carolina are compatible with black bass fishery management objectives. The agency will address this goal as follows:

1. Adopting as policy the following guidelines for predator/prey introductions: "Stocking of new species in public waters with established fish communities shall be dependent on the findings of a study to determine the possible effects of such an action on the fish community and a review by appropriate resource agencies outside the WRC. Exceptions to the policy must be approved by the Division Chief.";
2. Adopting as policy the following guidelines for stocking black bass: "Stocking black bass will be restricted to public waters of the State. Situations under which stocking is acceptable are: 1) research; 2) following reclamation of a water body or fish kill; 3) establishing a fishery in a new lake; 4) supplemental stocking. Supplemental stocking will be considered upon documentation of poor recruitment. Black bass introductions will be evaluated to determine their success. Exceptions to the policy must be approved by the Division Chief.";

3. Providing short-term restrictive harvest regulations to protect newly opened fisheries.

Goal F. Support black bass research which promotes the successful accomplishment of A-E.

The BBMP provides a framework to make decisions required to serve anglers and the state's black bass resources. Good decision-making requires good information. Many of the previously mentioned goals indicated specific research needs. Those research needs are summarized here to provide direction for future agency research funding.

1. Develop and adopt standardized stock assessment techniques for each species and habitat combination for black bass.
2. Develop linkage between stock assessment data and creel results.
3. Determine the limits of trophy bass management within species and habitats.
4. Support basic research on community and habitat interactions of black bass to develop non-regulatory bass management alternatives.
5. Support research to develop an understanding of the socio-economics of black bass angling and management.
6. Promote the WRC bass research fund.

CONCLUSIONS

Bass fishing in North Carolina is characterized by a variety of habitats, species, and angler experiences. This variety presents an opportunity to fishery managers to improve bass fishing. The BBMP seeks to recognize and support this diversity. The Plan provides a framework for the Wildlife Resources Commission and black bass anglers to work in partnership to ensure a future for quality bass fishing in North Carolina.

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APPENDIX I. Proposed Structure for Developing Black Bass Regulations

A general regulation is needed to manage the majority of black bass water and a quality bass regulation is needed to provide some catch-and-release directed fishing. The two-regulation concept is complicated by differences in growth and recruitment present in the state's waters. The Wildlife Commission currently uses two general regulations to manage waters where bass growth is poor and good. This strategy is biologically sound and should continue. The regulations should also recognize bass waters supporting poor and good bass recruitment. Minimum size limits are most appropriate for poor recruitment locations and slot limits or exemptions to the minimum size limit are appropriate for high recruitment locations. Within this framework, we recommend the following regulation structure:

1. The general regulation for managing black bass with good growth rates will be the "14/2" and 5 fish creel. The regulation is the compromise between harvest and catch-release oriented anglers mentioned in the Management Plan (C-1). The two fish size limit exemption allows an acceptable harvest of small bass where bass reproductive success is not exceptionally poor. No bass populations are jeopardized by harvest under the "14/2" regulation at current levels of fishing pressure.
2. The "14/2" is easily modified to serve as a short term regulation on newly opened fisheries (E-3) and as a good general regulation on waters where recruitment is poor by dropping the two fish exemption.
3. The "12-16" slot limit and 5 fish creel limit will be used as a special regulation to promote quality black bass waters described in C-2. Where recruitment is low, the objective of the slot may still be addressed by using a simple 16-inch size limit.
4. The general regulation for black bass with poor growth rates (primarily high mountain lakes and cool water streams) will be "12/2" and 5 fish.

The Wildlife Resources Commission will try to keep its general regulations consistent within Habitat Category or major basin.