

WISCONSIN'S BLACK BASS MANAGEMENT PLAN



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WISCONSIN'S BLACK BASS MANAGEMENT PLAN

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EXECUTIVE SUMMARY

The Bass Management Team (BMT) was formed at the direction of the Natural Resources Board (January 1996) to address concerns with the early catch and release season in the northern zone, review and evaluate current management practices, and develop recommendations that would simplify existing bass regulations while maintaining a conservative approach to bass management. The Team met seven times between June 1996 and October 1998 to identify and analyze issues, formulate statewide bass management goals, develop specific objectives and strategies with the highest priority being to resolve issues related to the early catch-and-release season in the northern zone, to revise bass stocking strategies, and to develop a framework for bass regulations.

The purpose of this plan is to increase quality bass fishing opportunities in Wisconsin by protecting and enhancing existing bass populations and the environmental conditions upon which they depend, and by improving technical information and outreach, in full partnership with the anglers of the state. The following goals were developed to guide the department in meeting this vision:

- I. Protect, restore, and enhance habitat on Wisconsin waters.
- II. Ensure that adequate technical information is available for Wisconsin's bass fisheries.
- III. Protect and maintain Wisconsin's self-sustained bass fisheries and associated fish assemblages and aquatic communities.
- IV. Communicate with anglers and promote the recreational value of Wisconsin's black bass fisheries.
- V. Provide a variety of quality bass fishing opportunities within a flexible management system.

Since its formation, the Bass Management Team has proposed and implemented a uniform statewide 14" minimum length limit to simplify bass fishing regulations, with fewer exceptions to the statewide rules; Proposed and implemented a combined daily bag limit of 5 for largemouth and smallmouth bass; sought public input on the early catch-and-release season for bass in the northern zone and endorsed the 1997 northern zone vote to retain the early catch-and-release season; developed a category system for new regulation proposals that provides a variety of bass fishing opportunities within a standardized framework; proposed the new 14" minimum length limit for boundary waters with MI and endorsed the 14" minimum for bass on Green Bay and Lake Michigan; revised bass stocking guidelines; and proposed and implemented a special closure of waters determined to contain detrimental non-indigenous species to bait harvest in order to prevent their spread to other waters.

In order to achieve the goals of this plan, Department staff should pursue the following actions on an ongoing basis:

1. Identify and protect (through local ordinance, i.e., "slow-no-wake" or "no entry", administrative rule, or purchase) critical habitats.
2. Participate locally in non-point pollution control projects to ensure that fishery concerns are incorporated and that effective habitat protection/improvement practices are used.

3. Work with local tournaments to more fully utilize available data to conduct population estimates (e.g., by marking fish prior to the tournament) and collect growth (e.g., length and weight) and age data; and track population trends with catch-per-effort information.
4. Implement local voluntary creel surveys or diary programs on specific waters as needed.
5. Use stocking only as an interim measure to reestablish formerly self-sustained bass populations that have been extirpated or severely depressed by catastrophic natural, inadvertent, or intentional sources of mortality (e.g., winter-kill, fish-kill, chemical reclamation, disease, etc.). Where stocking is needed to reestablish a self-sustaining bass population, insure that it does not have a negative impact on extant self-sustained bass populations in the receiving or connected waters.; make every reasonable effort to obtain fish for stocking from 1) the same water, or, if not available, from 2) waters within the basin.

Over the next 5 years, the following objectives should be pursued:

1. Evaluate the current waterway, wetland, shore land, and aquatic plant management permitting procedures and ensure that input from local Fisheries Biologists and angling-interests are incorporated into decisions on proposed habitat alterations.
2. Endorse improvements to Shore-land Zoning Regulations (NR 115).
3. Endorse the "Wild Lakes" and "Northern" initiatives.
4. Identify and review information available on the impacts of recreational vehicle traffic on habitats and fisheries; develop recommendations, if needed, by 2006.
5. Review and/or develop educational material for lake-property owners and the Boating Safety Program on the importance and value of aquatic habitats.
6. Develop specific guidelines for aquatic habitat restoration and enhancement on lakes and streams (including aeration, fish cribs, tree drops, "Hoff" logs) for the Fisheries Management Handbook.
7. Conduct rigorous evaluations of warm-water habitat improvement projects and prepare a report on evaluations every 5 years to ensure practices are effective and cost-efficient.
8. Participate in the development of a statewide monitoring strategy that ensures sufficient data are available on bass fisheries.
9. Utilize the statewide tournament permit database to evaluate trends in bass fisheries. Prepare a report every 5 years.
10. Survey Wisconsin anglers to evaluate demand for various types of bass fishing opportunities.
11. Increase opportunities to catch "big" bass (the definition of which varies among anglers, so a range of simple, conservative opportunities should be provided) via the proposed category system.
12. Encourage the development of a waters classification system to aid in the management of bass fisheries.
13. Complete a smallmouth bass fact sheet and update the largemouth bass fact sheet, including an emphasis on distinguishing between the 2 species.
14. Because of its broad distribution to anglers, fully utilize the fishing regulations pamphlet as an educational tool; seek external funding or donations to improve the pamphlet
15. Improve the accessibility and distribution of the regulations pamphlet, as well as other educational materials.

INTRODUCTION AND BACKGROUND

Wisconsin is home to two black bass (*Micropterus*) species, largemouth bass (*M. salmoides*) and smallmouth bass (*M. dolomieu*). Together, they are the most widespread sport fish in the state. In fact, there are 83 lakes with the name "Bass".

The popularity of bass fishing has increased over the last 15 years, and bass fishing interest now surpasses northern pike, the long standing "number two" species in Wisconsin, behind walleye. Recently, over half (56.4%) of resident anglers in Wisconsin reported fishing for bass; 18% listed bass as their favorite fish, a close second to walleye, at 31% (Hewett and Simonson 1998). A 1981 report noted that 32% of Wisconsin anglers fished for bass, but an increase was predicted (Klingbeil 1981).

In 1975, 3.3 million angler-days were spent fishing for bass. It was expected at the time that 3.95 million angler days would be spent on bass by 1990. A 1991 national survey estimated that 3.42 million angler-days were, in fact, spent on bass fishing in Wisconsin. Current estimates suggest that 5.1 million angler-days were spent pursuing bass in Wisconsin during 1994.

The largemouth bass is known to occur in 4,151 lakes (65% of Wisconsin lakes) covering 865,331 surface acres; an estimated 9,800 additional lakes may also contain largemouth bass. The average size of lakes inhabited by largemouth bass is 216 acres. Largemouth bass is the most common, widely distributed game fish in Wisconsin. The greatest number of largemouth bass lakes is found in the northern third of the state, with other concentrations in east-central and southeast Wisconsin. Largemouth bass also occur in most of the large rivers of the state. Largemouth bass are commonly associated with panfish and northern pike. Smallmouth bass are known to occur in 757 (12%) lakes covering 608,585 surface acres. Most of these lakes (688 or 91%) also contain largemouth bass, but typically only one bass species is predominant; in only 4 lakes are both species listed as "abundant". An estimated 1,500 lakes may contain smallmouth bass. The greatest concentration of lakes is located in Vilas, Oneida, and Sawyer Counties. Lake Superior, Green Bay and Lake Michigan, particularly the waters surrounding Door County, also hold significant numbers of smallmouth bass. The average size of inland lakes inhabited by smallmouth bass is 856 acres. Smallmouth bass also occur in 214 named streams totaling 3,514 miles (Schneberger 1977). The majority of these streams are located in southwest and northwest Wisconsin.

The largemouth bass occurs in all Wisconsin basins; it is least widespread in the driftless region of southwest Wisconsin. Wisconsin is near the northern limit for the species and it has been suggested that its presence in the northern half of the state is largely the result of introductions. Bass habitat requirements, excerpted from Becker (1983), Stuber et al. (1982), and Edwards et al. (1983), is presented below. Largemouth bass occur in medium to large rivers, but flourish in lakes, ponds, sloughs and backwaters and in landlocked pools of the Mississippi and Wisconsin rivers, although it is rare in Lake Superior and its tributaries. Ideal habitat includes lentic environments with extensive (>25% of surface area) shallow (< 6 m deep) areas that support submergent vegetation (40-60% of littoral surface area) or other cover such as logs, brush or debris, with adjacent areas deep enough (3-15 m) to overwinter bass. During winter, oxygen levels below 3 ppm result in considerable mortality of bass, although largemouth have been known to tolerate dissolved oxygen levels down to 0.6 ppm. Both species are intolerant of suspended solids (turbidity > 25 ppm) and sedimentation.

The largemouth bass is truly a warmwater fish that prefers shallow, near-shore areas. They are rarely found at depths greater than 20 feet and typically occupy areas no deeper than the deepest rooted vegetation, except during winter, when they generally remain in deeper waters. Largemouth bass are encountered most frequently in clear to slightly turbid waters at depths to 1.5 m over sand, gravel, and mud substrates, mostly in shallow areas with sparse to dense vegetation. During daylight, they typically cruise above aquatic plants at depths of 3 to 10 feet, or lie under emergent vegetation or in the shade of overhanging trees, submerged brush, logs or other structures. In the evening, largemouth bass tend to move into shallower, near-shore areas, apparently to feed. After dark, they return to deeper water, where they rest on the bottom under logs or trees.

The smallmouth bass also occurs in all Wisconsin basins; its distribution has not changed substantially since the turn of the century, even though considerable transfer and stocking efforts have occurred over the years. Over 3,500 miles of stream contain smallmouth bass. The smallmouth is common in medium to large streams with abundant cover and shade and in large, deep (average depth > 9 m), clear lakes throughout Wisconsin, as well as in upper Green Bay of Lake Michigan and Chequamegon Bay of Lake Superior. In rivers, adults are present in moderate to swift currents associated with rocky substrate (> 45%), while young-of-year occur in eddies along the banks and are associated with cover (e.g., vegetation, rubble, banks, or other woody cover) because they generally avoid open water. In lakes, smallmouth bass are strongly associated with cover over rocky or sandy substrate; lakes over 20 feet deep, with rooted aquatic vegetation and clean, gravel shores with abundant cover provide optimum habitat. It often occurs near rock ledges and rocky bottoms, but may also be found along weedy shorelines. Smallmouth bass occur most consistently in shallow, near-shore waters (<15 feet deep) except during winter, when they generally remain in deep pools (rivers) or deeper areas of lakes. In rivers, smallmouth bass can migrate long distances seasonally, so habitat requirements vary spatially and temporally; unregulated rivers appear to be critical to smallmouth bass. Sedimentation is a major habitat factor in the viability of smallmouth bass populations.

Preferred bass spawning substrate is gravel, but spawning occurs on a variety of other materials, ranging from sand to plant fibers and roots or other exposed hard surfaces in otherwise soft muck or silt substrate. Water depth over nests averages about 2 feet. In waters containing both species, largemouth bass spawn earlier than smallmouth bass in shallower, protected spawning sites among emergent vegetation in quiet bays. Young bass remain in the nest for 6 to 15 days, after which they school together near the nest site for 10 to 28 days and then disperse throughout the shoreline. Predation is heavy during this period, so near-shore cover is important for survival of young bass.

Smallmouth bass spawn on rocky shoals, river shallows, or backwaters or move into tributaries to spawn. The species requires clean rock or gravel substrate for spawning. In lakes, smallmouth bass build nests first on the west and north shorelines, where waters warm faster and they are protected from prevailing winds. Nests are generally constructed on gravel and rubble, preferably beside a large obstruction such as a boulders or logs. Excessive siltation on fertilized eggs will result in parental abandonment and nest failure.

Clearly, littoral habitats with abundant cover (vegetation, rock, woody structure) and a variety of substrates, including rocky bottoms with very little deposition of fine sediments are crucial for both species. "Half-logs" have been used successfully to improve spawning cover for smallmouth bass in lakes lacking large woody structure such as downed trees (Hoff 1991).

Both bass species mature at 3 to 4 years of age, with the average length at sexual maturity ranging from 9 to 11 inches. Becker (1983) summarized much of the biological information about black bass spawning in Wisconsin; most of the information provided here is taken from that account. Because bass spawning is dependent on water temperature, actual spawning dates vary greatly from year to year. Kramer and Smith (1962) found spawning dates varied from April 20 to June 2 in Lake George, Anoka County, Minnesota. Spawning temperatures are similar between largemouth and smallmouth bass; in waters with both, largemouth bass tend to spawn first because they spawn in shallower areas that warm more quickly in the spring. In southern Wisconsin, smallmouth bass can spawn from mid-May through June, when water temperatures range from 55 to 75 F. In the St. Croix River, spawning occurred as early as May 11 and as late as June 7. In northern Wisconsin lakes, spawning occurs from mid-May through June, depending on water temperatures. Spawning of largemouth bass occurs in Wisconsin at water temperatures from 60-78 F from late April to early July (Marz et al. 1961). Nests were observed in Browns Lake, Racine County, as early as May 3 and as late as May 25. The average spawning date at the Burlington Hatchery (Racine County) was May 9, and May 15 at the Delafield Hatchery (Waukesha County). Largemouth bass spawn about 2 weeks later in northern Wisconsin than in southern Wisconsin. In Vilas County, largemouth bass have finished spawning by the third week of June, but this date can vary from year to year by about 3 weeks. Gross and Kapuscinski (1995) reported that on one lake, 48% (56) of the nests produced offspring surviving to the fall, with 20% (11) of these nests producing 55% of the fingerlings captured in the fall.

Males protect the nest against most intruders, but common shiners have reportedly spawned in active SMB nests. Guarding male largemouth bass strike at anything within a 20-foot radius of the nest (Eddy and Underhill 1976). Both species are vulnerable to angling during the nesting period; 48% of largemouth bass and 49% of smallmouth bass were captured when exposed to 5 casts of the three lures tested (Kubacki et al. 1992). Once hooked, however, they tend not to strike again during the remainder of the nesting period (Kramer and Smith 1962). Mraz et al. (1961) observed failure of many SMB nests due to predation by minnows and panfish. Males will re-nest several times each year if the nest is lost or abandoned due to predation, falling water temperatures, or other factors. A positive correlation has been observed between the size of the guarding male and nest success. Larger males tend to nest earlier in the season and are better able to protect the nest from predation.

Kramer and Smith (1962) found that removal of the male from the nest by angling resulted in loss of all the offspring within 2 days. Male bass that were caught and released returned immediately to their nests, as did fish hooked and lost before they were landed. In most cases, previously caught or hooked fish did not strike again during the remainder of the nesting period. Catch-and-release or hooking of nesting bass did not appear to be related to nesting success.

More recent studies have also been conducted to examine the impacts of angling on nesting bass. Kieffer et al. (1995) found that smallmouth bass hooked and played to exhaustion took four times longer to return to their nests than did fish played briefly and released, resulting in a higher probability of nest failure. Philipp et al. (1995), suggested that catch-and-release angling for bass was substantial enough to reduce fry production in some waters. However, Schneider et al. (1991) found that catch-and-release of bass during the otherwise closed season from April 1 to Memorial Day weekend did not appear to affect reproduction or recruitment.

In summary, conflicting evidence exists regarding angling impacts on bass spawning and recruitment.

Removal of the guarding male from a nest clearly has negative impacts on that nest, especially if the male is not returned quickly. However, the loss or abandonment of individual nests is common, even in the absence of angling, and occurs for a variety of reasons (e.g., temperature changes, nest predation, fungus growth on the eggs, etc.). Further, male bass re-nest after a failure and apparently are less vulnerable to angling once they have been hooked. The impact of angling during the nesting period on subsequent reproduction and, ultimately, recruitment to the fishery is uncertain. Some researchers suggested the impacts were minimal (Kramer and Smith 1962; Schneider et al. 1991) while others felt the impact might be more substantial (Philipp et al. 1995).

Bass Fishing Regulations. - Closed fishing seasons are common management strategies for many states in the northern tier of the United State and for Canadian Provinces. The states of Minnesota, Wisconsin, Michigan, Pennsylvania, New York and most New England states generally use closed seasons to afford protection to spawning bass. Other states generally do not have closed seasons. The shorter growing season in more northern states and provinces apparently results in lower productivity of bass populations.

Wisconsin anglers were concerned about over-harvest of bass as early as 1880, when Fish Commissioners asked for protection of black bass during spawning. In 1881, the Legislature established an open season from May 1 to March 31. As angling increased, so did concern for the fishery. In 1907, the legislature set an 8" length limit on bass, with a daily bag limit of 15. In 1913, a 10" minimum length limit was in effect and the open season was reduced further (May 31 to March 1). The trend toward more conservative restrictions continued through the early 1950's, when the daily bag limit was reduced from 7 to 5 (1949) and the bass season did not open until June 20. This trend reversed in the mid-1950's and more liberal regulations began to predominate. From 1953 to 1989, there was no minimum length limit for largemouth or smallmouth bass, except in certain designated waters. In 1958, different seasons were established for waters north and south of State Highway 64. The southern zone season opened on May 1 while the northern zone opened later, on June 1. These zones were subsequently eliminated in 1970 and the season opened on the second Saturday in May statewide until 1974, when it was moved up to the first Saturday in May, due in part to conflicts with "Mother's Day".

From the 1950's to the 1980's, years of liberal seasons, length limits and bag limits, coupled with the increase in licensed anglers, resulted in a decline in the quality of many of bass fisheries. In order to improve the quality of bass populations, minimum length limits were re-established for largemouth and smallmouth bass, effective with the 1989 fishing season. At that time, the length limits were 14" in the "southern zone" and 12" in the "northern zone", with the dividing line between the zones formed, from west to east, by state highways 70, 27, 64 and 29. In 1998, a statewide minimum length limit was reinstated after analysis of statewide fisheries data that showed no significant differences in growth between bass populations in the northern and southern zones, or between largemouth or smallmouth bass. The statewide minimum length limit was set at 14", which protects, on average, about 80% of mature, spawning adult bass.

Effective with the 1992 season, the Natural Resources Board established an early, catch-and-release-only season for the northern zone from the first Saturday in May to the Friday nearest June 20. This was subsequently changed to the third Saturday in June (effective in 1997) due to year-to-year variations in the weekend (third versus fourth weekend in June) of the opener. This early catch-and-release season has been popular in the northeast but rather unpopular in the northwest. Dissatisfaction with this rule led

to a proposal to allow the harvest of 1 bass per day during this period, provided it was 18" or longer. However, this proposal was defeated at the 1993 spring hearings and was not advanced further.

In 1994, the Department was again asked by tourism interests from the northwest to review the possibility of allowing the harvest of 1 bass per day, provided it was 18" or longer. A survey of Fisheries Biologists revealed opposition to this change because it was thought that the larger fish, which were intended for protection under the catch-and-release season, would be targeted. Ultimately, dissatisfaction with the rule in northwest Wisconsin resulted in a reduction in the size of the northern zone. In 2000, the dividing line between the zones in Burnett, Washburn, and a portion of Sawyer County was moved north from State Highway 70 to State Highway 77. State Highways 77, 27, 64 and 29 now form the boundary between the northern and southern zones.

Estimates of bass harvest during May and June in the years prior to the early catch-and-release season indicated that up to 36% of the harvest occurred prior to June 20. However, many of the bass saved during the early season are probably harvested later in the year. Our primary opportunity for evaluation was to compare the southern (14" minimum length limit, beginning in 1989) and northern zones (12" minimum length limit beginning in 1989, and, 4 years later, the catch-and-release-season) before and after the implementation of the early catch-and-release season. The results indicated that the minimum length limits have improved abundance and size-structure of bass populations, even in the absence of an early catch-and-release season, as evidenced by populations in the southern zone with the 14" minimum length limit.

We found that the early catch-and-release season in the northern zone improved *summer bass fishing* because bass that would have been harvested in May and June are now available to be caught during the remainder of the season. Overall, however, the numbers and sizes of bass harvested in the northern zone have not changed. The re-establishment of minimum length limits in 1989 resulted in substantial improvements in bass populations in both the "northern" and "southern" zones, with or without an early catch-and-release season. Based on all the available information, we felt the added complexity of "regional" rules for bass had not significantly benefited the fisheries and that the early catch-and-release season was not needed to sustain quality bass populations. Fishery surveys indicated that early catch-and-release season had not improved bass fishing beyond what was accomplished with the 12" minimum length limit in the northern zone.

In a typical Wisconsin bass population, about 80% of adults are protected from harvest by the 14" minimum length limit, essentially resulting in catch-and-release of most spawning bass during the nesting period throughout the state (north or south). Fishing for, and harvest of, bass greater than 14" during the spawning period, which occurs annually throughout southern and central Wisconsin, has not appeared to negatively impacted bass populations in these productive waters, based on available data on their abundance and size structure. However, a closed season during the spawning period defers harvest until later in the season and may have the potential to improve bass populations, particularly where spawning habitat is limited, reproductive success is sporadic, or in low-productivity waters.

Elimination of the early catch-and-release season would eliminate the need for "zones", which would greatly simplify bass regulations with no harm to bass populations. Opening the bass season on the same date statewide would decrease confusion among anglers and provide a "level playing field" for fishing-related businesses.

The daily bag limit for largemouth and smallmouth bass was "5 of each" at the time the BMT was formed. It was apparent, based on observations by Law Enforcement personnel, that many anglers have difficulty distinguishing between largemouth and smallmouth bass. The "5 of each" bag limit allowed 5 largemouth bass and 5 smallmouth bass daily, but required that the angler distinguish between the two species. A combined daily bag limit (effective 1998) allows 5 bass to be kept, regardless of the species, making it easier for anglers to comply with the regulations. This regulation will have little negative impact on bass anglers. Creel survey results from 1990 to 1996 indicated that only 3% of anglers **caught** more than 5 bass, and only 0.01% of anglers **kept** more than 5.

In Wisconsin, we have a wide variety of anglers who enjoy bass fishing. These anglers have a wide range of opinions on how to best manage bass. We also have a variety of different bass waters (4219 lakes in total). A single management strategy will not meet the desires of all anglers. Therefore, we believe it is important to provide a variety of fishing opportunities by managing groups of waters for specific fishery objectives. However, a diversity of fishing opportunities must be balanced with concerns of increasing complexity of regulations.

Minimum length limits are effective tools used to protect the reproductive potential of fish populations, prevent over-harvest, increase angler catch rates (but not necessarily harvest rates), create trophy fisheries, and promote predation on prey organisms (Noble and Jones 1993). Minimum length limits are generally accepted as an effective means of increasing bass population abundance and angler catch rates (Wilde 1997), particularly for fish populations characterized by low rates of recruitment, good growth, and relatively high mortality. Slot limits have also been successful in increasing bass abundance, as well as the proportion of larger fish, but generally do not result in increased angler catch rates (Wilde 1997). Slot limits are suited for fish populations with high recruitment and poor growth. Slot limits are more complicated and anglers are generally less supportive of slot limits. Generally, minimum length limits are most effective at increasing angler catch rates whereas slot-length limits are more effective at restructuring bass population size-structure. However, high minimum length limits can reduce opportunities for certain types of fishing tournaments by prohibiting the transport or possession of all fish under the length limit. Also, if applied inappropriately (e.g., to high density, slow growth populations), further reductions in growth rates may result. All things considered, minimum length limits appear to be the most effective and appropriate tool to achieve most fishery objectives.

Fish Community Interactions - It is important to recognize, consider, and, in some cases, take advantage of the interactions of bass with other species in an overall management strategy. Bass have an impact on other species, through both competition and direct predation, and can be impacted by other species. Any change in the population dynamics of a species can result in changes in the community and the entire ecosystem. For example, after walleye were stocked in Escanaba Lake, smallmouth bass, formerly the dominant piscivore, was virtually eliminated. However, in other studies, stocking of bass in predominantly "walleye" lakes have resulted in displacement of walleye.

The responses of ecosystems to population-level manipulations are highly unpredictable. Our current knowledge in this area is limited and the outcomes of inter-specific interactions are not well understood. Therefore, caution should be exercised when contemplating management actions that add or enhance any species in otherwise established fish communities (e.g., stocking, population manipulation through regulations, or habitat improvements).

Alternatively, judicious use of increased densities of existing piscivores has successfully affected changes in the population dynamics of prey species to manage for more desirable characteristics (e.g., increased growth of panfish, reduced abundance of crayfish) and even to affect changes in water quality (e.g., Lake Mendota, Delavan Lake).

Bass Stocking.- At the turn of the century, serious habitat loss and declining water quality prompted concerns for Wisconsin's fisheries. In 1903, a hatchery was established at Minoqua to produce bass for stocking. Klingbiel (1981), described the history of stocking in Wisconsin's bass management program from 1900 to 1980: Bass stocking increased steadily until about 1940, when there were 8 state-operated bass hatcheries stocking between 1.5 and 2.5 million fry and fingerling bass each year. Maintenance stocking was widespread throughout the state and was popular with anglers. During the 1950s, results from numerous research projects showed that maintenance stocking contributed little and that natural reproduction in most waters was adequate to reach carrying capacity. As a result, stocking of bass was drastically reduced and bass production in state facilities was virtually eliminated. Almost all stocked bass then came from federal hatcheries. By the late 1960s and early 1970s, many lake reclamation projects were carried out and state facilities were again geared-up to produce bass for chemically reclaimed waters. Production during this period (about 1960 to 1980) averaged about 850,000 fry and fingerling bass annually, with almost half originating from federal hatcheries. Most bass were stocked in chemically rehabilitated waters, waters having occasional winterkills, or in waters subject to some infrequent mortality.

Stocking of bass fry or small fingerlings in waters with established populations is generally regarded as ineffective or unnecessary (Newburg 1975). However, bass have been the major beneficiary in about 65% of the more than 400 chemically treated waters prior to 1981. Many of these waters have developed outstanding, sustainable fisheries. Stocking small bass in waters devoid of fish or where they have been significantly reduced is often an effective management practice.

Recently, considerable work has been done on the differentiation, fitness, and performance of individual populations within a species (e.g., Philipp et al. 1983; Philipp 1991). The "stock concept" (i.e., managing individual breeding populations) has been bolstered over the last decade with improved technology (ability to discern stocks) and documentation of the superior performance of "locally adapted" populations (see, e.g., Philipp and Claussen 1995). Indiscriminate transfer and mixing of stocks negatively affects the genetic resources of a species by reducing genetic diversity among populations and by decreasing the genetic fitness of locally adapted populations through outbreeding depression (i.e., when genetically different populations interbreed to produce inferior offspring).

In an experiment conducted by Illinois researchers, bass from Florida, Illinois, Wisconsin, and Texas were stocked together in lakes in all four locations. In each location, the survival, growth, and reproduction of the "local" fish was best; nature had already produced the best adapted fish for the local conditions. However, the few surviving transplants interbred with the locals and, eventually, all the bass in the lakes were hybrids with inferior performance relative to the local stock (see Jennings 1996 for an overview). A similar experiment was conducted at a smaller scale by transplanting bass from two different watersheds in Illinois. In this study, similar results were found: local stocks had better performance (growth and survival) and fitness (reproduction).

Stocking is currently a minor component of the bass management program in Wisconsin. During the

1980s and 1990s an average of about 500,000 fry and fingerlings were stocked annually (374,629 to 622,416), with about 3,400 yearlings and adults stocked each year. Most stocking is used to re-establish severely depressed (intentionally or naturally) populations, although some stocking has been used to “maintain” existing bass populations. Stocking generally occurs on lakes that have had a winter-kill or have been rehabilitated using chemical fish toxicants. Supplemental stocking to enhance existing bass populations is currently done on a limited number of waters.

BASS MANAGEMENT TEAM

Charge: The Bass Management Team (BMT) was formed at the direction of the Natural Resources Board (January 1996) to: address concerns with the early catch and release season in the northern zone; review and evaluate current management practices and develop recommendations that would simplify existing bass regulations while maintaining a conservative approach to bass management.

Committee process: The Bass Management Team met seven times between June 1996 and October 1998 to: review available information, identify and analyze issues, formulate statewide bass management goals, develop specific objectives and strategies with the highest priority being to resolve issues related to the early catch-and-release season in the northern zone, to revise bass stocking strategies, and to develop a framework for bass regulations.

Committee Accomplishments:

Proposed and implemented a uniform statewide 14" minimum length limit to simplify bass fishing regulations, with fewer exceptions to the statewide rules (effective for the 1998 fishing season);

Proposed and implemented a combined daily bag limit of 5 for largemouth and smallmouth bass (effective for the 1998 fishing season);

Sought public input on the early catch-and-release season for bass in the northern zone and endorsed the 1997 northern zone vote to retain the early catch-and-release season;

Developed a category system for new regulation proposals that provides a variety of bass fishing opportunities within a standardized framework;

Proposed the new 14" minimum length limit for boundary waters with MI (effective in 1999);

Endorsed the 14" minimum for bass on Green Bay and Lake Michigan (effective in 1999);

Proposed and implemented a special closure of waters determined to contain detrimental non-indigenous species to bait harvest (effective in 1999).

Formed a Wild Bait Harvest sub-committee and recommended the Department initiate a separate effort to address the issues (this committee has been formed and is underway);

Formed a Tournament Rules sub-committee and recommended a separate effort be initiated to address the issues (this committee was formed and is underway).

WISCONSIN'S BLACK BASS MANAGEMENT PLAN

Purpose: Increase quality bass fishing opportunities in Wisconsin by protecting and enhancing existing bass stocks and the environmental conditions upon which they depend, and by improving technical information and outreach, in full partnership with the anglers of the state.

GOALS, ISSUES, AND OBJECTIVES

This plan identifies current issues that prevent attainment of the agreed-upon goals, and provides suggestions on how best to address these issues.

Goal I. Protect, restore, and enhance habitat on Wisconsin Waters

Issues

- The simplification or loss of littoral and riparian habitat (e.g., seawalls, loss of large woody cover, piers, etc.), including incompatible aquatic plant management, is a major threat to the state's bass fisheries.
- Riparian land uses impact fisheries habitat, yet enforcement of existing rules and development of more appropriate measures to protect near-shore habitat is lacking.
- Education of lakeshore property owners on the importance of habitat to fisheries seems to be inconsistent across the state.
- Recreational vehicle use (e.g., boats, snowmobiles, etc.) may impact fish habitat.
- Sedimentation, due largely to non-point source runoff, impacts many of Wisconsin's waters.

Objectives and Strategies:

A. Locate, document, and protect existing functional littoral and riparian habitat through joint local and state efforts.

1. Purchase critical habitats where possible (ongoing).
2. Protect sensitive habitats by promoting "slow no wake" or "no entry" areas through local boating ordinances (ongoing).
3. Endorse improvements to NR 115, shoreland zoning regulations.
4. Endorse the "Wild Lakes" and "Northern" initiatives.
5. Identify and review information available on the impacts of recreational vehicles on habitats and fisheries; develop recommendations by 2006.

B. Ensure that local concerns for the fishery are incorporated into decisions on proposed habitat alterations. Evaluate the current waterway, wetland, shoreland and aquatic plant management permitting procedures and ensure that the fisheries biologists and angling-interests are included in the process.

C. Review/develop educational material on the value of aquatic habitats for lake property owners associations and identify opportunities for interaction/input.

D. Ensure that effective, cost-efficient habitat protection, restoration, and enhancement procedures are documented and used consistency throughout the state.

1. Develop specific guidelines for aquatic habitat restoration and enhancement on lakes and streams (including aeration, fish cribs, tree drops, "Hoff" logs) and improve consistency among regions in the application of these guidelines by incorporating them into the Fisheries

Management Handbook by 2006.

2. Promote rigorous evaluation of warm-water habitat improvement projects and prepare a report on evaluations every 5 years to ensure practices are effective and cost-efficient.

3. Review/participate locally in non-point pollution control projects through the "Priority Watershed Program"; ensure that fishery concerns are incorporated into the projects and that effective habitat protection/improvement practices are used (ongoing).

E. Improve enforcement of existing habitat protection regulations.

1. Develop an educational package on fish habitat for use in the Boating Safety Program by 2006.

Goal II. Ensure that adequate technical information is available for Wisconsin's bass fisheries

Issues

- There is often insufficient information on bass populations and angler use to make informed management decisions.

Objectives and Strategies

A. Promote/develop cooperative efforts with external partners to obtain information on specific fisheries.

1. Seek private funding sources for surveys through local interactions; work more closely with organized groups on a regular basis (ongoing).

2. Implement local voluntary creel or Diary programs (as needed locally).

3. More fully utilize available data from tournaments; to the extent possible, work with local tournaments to conduct population estimates (e.g., by marking fish prior to the tournament) and collect growth (e.g., length and weight) and age data; utilize catch per unit effort information (ongoing).

4. Work with private groups and the university system to set up a fund to support graduate students to work on specific bass-related information needs (to be initiated by an external partner).

B. Develop a statewide strategy to insure sufficient information is available on bass fisheries.

1. Endorse the development of the statewide monitoring strategy.

2. Fully utilize the tournament permit database to evaluate trends in bass fisheries. Prepare a report by 2006.

3. When appropriate, incorporate the reports from "Scientific Collectors Permits" into the statewide database. Review the reporting forms and procedures for "Scientific Collectors" by 2006 to ensure usable data are reported.

4. Survey Wisconsin anglers to determine demand for various types of bass fishing opportunities (completed).

Goal III. Protect and maintain Wisconsin's self-sustained bass fisheries and associated fish assemblages and aquatic communities.

Issues

- Stocking of bass occurs to a limited degree by the Department, mainly for the reestablishment of populations lost to fish kills, rehabilitation, etc., but may be occurring to a greater degree through

stocking permits issued to lake property owners associations, clubs, etc.

- Often, native bass fisheries are stocked with walleye and muskellunge (or visa versa). Is there a predictable outcome? If so, can guidelines be developed to address these situations?
- Bass can interact strongly with other components of the fish community, but the outcomes are poorly documented. We have long believed that a quality bass population can improve panfishing.
- Wild harvest of minnow and rough fish species could deplete forage for gamefish, facilitate the spread of diseases, facilitate the transport of undesirable detrimental species, and results in some incidental harvest of gamefish, yet little is known about the impacts of bait harvesting activities.

Objectives and Strategies

A. Maintain Wisconsin's existing self-sustained bass populations. Use stocking only as an interim measure to reestablish formerly self-sustained bass populations that have been extirpated or severely depressed by catastrophic natural, inadvertent, or intentional sources of mortality (e.g., winter-kill, fish-kill, chemical reclamation, disease, etc.). See revised bass stocking guidelines (Appendix 1).

B. Maintain the genetic integrity of Wisconsin bass populations. Where stocking is needed to re-establish a self-sustaining bass population, insure that it does not have a negative impact on extant self-sustained bass populations in the receiving or connected waters. Implement the proposed guidelines (Appendix A) within Wisconsin's 3 major basins (Mississippi River-Wisconsin River, Lake Michigan, and Lake Superior); make every reasonable effort to obtain fish for stocking from 1) the same water, or, if not available, from 2) waters within the basin (ongoing).

Goal IV. Communicate with anglers and promote the recreational value of Wisconsin's black bass fisheries.

Issues

- The public is poorly informed of the reasons behind management actions.
- The differences between largemouth and smallmouth bass may warrant difference in management practices.
- The regulations pamphlet is not distributed to every license buyer, either because a particular outlet runs out, or they just don't remember to hand them out.

Objectives and Strategies

A. Increase awareness of the importance of bass to maintaining balance in many aquatic systems.

B. Increase public awareness of the importance of quality bass fisheries to Wisconsin's economy.

C. Educate anglers on the differences between largemouth and smallmouth bass.

1. Complete the smallmouth bass fact sheet and revise/update the largemouth bass fact sheet by 2006.

D. Increase education efforts on the identification, biology, and management of black bass species.

1. Pursue funding for educational materials (reprints, signs) through cooperative efforts with private organizations interested in promoting black bass by 2006.

2. Fully utilize the regulations pamphlet as an educational tool; seek outside (non-profit only?) donations to improve the pamphlet (ongoing).

3. Improve the accessibility and distribution of the regulations pamphlet, as well as other

educational materials (ongoing).

Goal V. Provide a variety of quality bass fishing opportunities within a flexible management system.

Issues

- The current regulatory framework may result in sub-optimal management.
- There aren't enough "large" bass available to satisfy some anglers.
- Protection during spawning may unduly limit fishing opportunities.
- Fishing regulations are getting too complex.
- Tournaments may negatively affect bass populations.
- User conflicts.
- There are too many violations of fishing regulations.
- It is impossible to obtain sufficient information to manage every bass fishery on a lake-by-lake basis.
- The current 5 daily bag limit creates the wrong perception about the productivity of most bass fisheries and their ability to consistently provide bag limits of 5 bass per angler per day.

Objectives and Strategies

- A. Provide fisheries biologists with more flexibility to manage for a variety of bass fishing opportunities with different minimum length limits through pre-established criteria.
1. Implement a "category" system for bass regulations with specific fishery objectives and pre-defined goals, and provide these opportunities throughout the state (Appendix B).
- B. Increase opportunities to catch "big" bass (the definition of which varies among anglers, so a range of simple, conservative opportunities should be provided) via the proposed category system (ongoing; see additional criteria in Appendix C).
- C. Encourage the development of a waters classification system by 2006.
- D. Educate anglers on the ability of our fisheries to realistically provide 5 bass per-angler each day (ongoing).
- E. Maintain the current season structure. Further efforts to address concerns with the season structure should focus on establishing uniformity, perhaps by creating a deferred-harvest season statewide.

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Appendix A. Revised bass stocking guidelines.

Types of Stocking (in priority order)

1. Rehabilitation – This includes waters that have experienced a precipitous decline in bass abundance, with no evidence of recruitment for the previous 5 years. The size of fish stocked should depend upon the predation expected; stocking of fingerlings may continue for 3 consecutive years. Adults may also be introduced for brood stock purposes, which may be the most effective and efficient stocking method to reestablish extirpated bass populations. No winterkill lakes may be stocked with largemouth bass if serious mortality occurs more frequently than 2 times in 10 years unless a plan to minimize the risk of future winter-kills is developed and approved.

Size of fish – Large Fingerling (2”+) or adult transfers.

Source of fish – From the same major basin.

Stocking rate – Large fingerlings up to 25/acre. Adults up to 5/acre.

Frequency – Three consecutive years.

Evaluation - If natural reproduction is not reestablished after 6 years from the onset of stocking, discontinue efforts until action is taken to identify and correct the reason(s) for the poor natural recruitment.

2. Initial Introductions - Fingerlings may be stocked for 3 consecutive years in newly created waters.

3. Maintenance - No maintenance stocking should be done. We do not recommend development or maintenance of bass fisheries dependent upon stocking due to the expense, the ubiquitous nature of bass, and availability of fisheries throughout the state. Other management activities should be pursued to enhance natural reproduction of bass.

4. Research and Evaluation – Very little need exists to conduct evaluations on bass stocking; we do not recommend development of projects or requests for evaluation quotas.

Appendix B. A category system for bass regulations, with specific fishery objectives, management strategies, and criteria.

Fishery Objective (Category)	Regulation	Criteria	Daily Bag Limit	Current number of bass waters (% of 4,219)
A. Sustainable Harvest Opportunity	<p>1. No minimum length limit.</p> <p>2. No minimum length limit but bass from 14 through 18 inches may not be kept, and only 1 may be larger than 18"</p>	<p>(1) Slow growth (take more than 6 years to reach 14"), high density, and consistent, above-average recruitment;</p> <p>(2) Bass 14" to 17" group 2 or 3 on contaminant advisories for PCB or pesticides; groups 3 or 4 for mercury;</p> <p>(3) Total adult mortality is <30%;</p> <p>(4) Exploitation of legal fish is <15%;</p> <p>OR</p> <p>(5) Frequent (at least twice in the last 10 years) fish kills prevent bass from reaching 14"</p>	<p>1. 5 in total</p> <p>2. 3 in total, only 1 of which may be longer than 18"</p>	<p>19 (0.5%)</p> <p>1 (0.02%)</p>
B. Quality Fishing Opportunity	14" minimum Length Limit	1) Average growth (bass take 5 to 6 years to reach 14") and recruitment;	5 in total	4,113 (97.5%)*
C. Memorable Fishing Opportunity - (Catch rates of bass are high, with limited harvest of 18" or 22" and larger fish allowed)	<p>1. 18" minimum length limit</p> <p>2. 22" minimum length limit</p>	<p>1) Excellent growth (bass take 4 to 5 years to reach 14") or proven potential for large bass; 2) An approved management plan that recommends increased predation on other components of the aquatic community (e.g., panfish, rusty crayfish, etc.); OR 3) Majority local public interest and support for memorable bass fishing in the specified water**.</p>	1 in total	69 (1.6%)

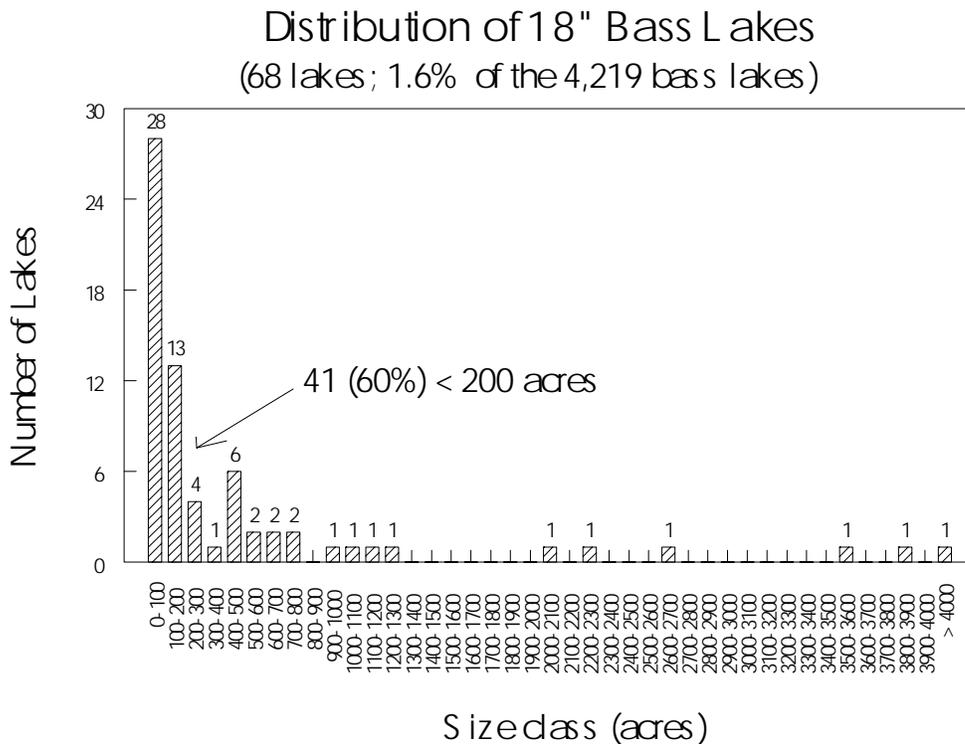
*17 waters (0.4%) having rules promulgated prior to the implementation of this system do not currently fall within any of these categories.

**See additional criteria in Appendix C.

Appendix C. Use of high minimum length limits and low daily bag limits for black bass in Wisconsin.

Background - The 18" minimum length limit can be an important management tool for bass populations that are in need of rehabilitation or restoration. The high size limit can also be effective at providing memorable bass fishing (with fewer bass being kept). It can virtually eliminate tournament activity, unless a "paper" contest is conducted. It can also protect bass populations in small lakes that would otherwise be fished down early in the season. However, with a daily bag limit of 0 through May and most of June in the north, fishing is spread out longer in that area of the state. The 18" minimum length limit can be effective at maintaining existing good quality bass populations that are threatened with increased fishing pressure. In short, the 18" minimum length limit greatly reduces opportunities to harvest bass, which results in more bass, and generally, better catch rates in waters where harvest has impacted population size.

There are many issues and options for including the 18" minimum length limit in our management options for bass populations. There are approximately 4,219 bass lakes in the state, of which, currently 68 (1.6%) have the 18" minimum length-limit. Of the 68 lakes, 60% (41) are less than 200 acres in size and 13% (9) are over 1000 acres in size; 18 (26%) are between 200 and 1000 acres in size; 87% are less



than 1000 acres.

A Department Advisory question on the 1999 Spring Hearings sought public input on the use of "trophy" bass regulations by asking if anglers would favor an increase in the number of trophy bass waters (up to 5% of all bass waters, versus the current 1% (at that time)). The answer was nearly 2:1 against; 1,263 (36%) supported the increase while 2,294 (64%) did not. Twenty-two counties scattered throughout the

state supported the concept - 43 did not. Many of the supporting counties turned in close votes (Bayfield, Dunn, Chippewa, Eau Claire, Lacrosse, Pepin, Richland, Iowa, Lafayette, and Green). However, many of those with strong support are located in the heart of the bass range: Brown (nearly 5:1), Buffalo (4:1), Columbia (16:1), Dodge (3:1), Door (over 2:1), Douglas (over 5:1), Iron (3:1), Sawyer (over 10:1), St. Croix (over 2:1), Vernon (over 3:1), Vilas (over 13:1), Waupaca (4:1).

Because of the nature of the issues and effectiveness of the regulation at addressing these problems, Fisheries Biologists will continue to pursue the use of higher minimum length limits. It's clear we need more specific criteria and guidelines for the use of the 18" minimum length limit.

With that in mind, the Bass Management Team has developed the following criteria for determining whether to approve rule proposals on the Spring Hearing questionnaire. Rule proposals fitting these criteria should be approved for public hearings. The application of these criteria do not necessarily endorse any specific rules, just that the question should be asked at the hearings.

1) **Restoration/rehabilitation.** Authorize proposed rules that use the 18" minimum length limit on lakes with documented declines in bass populations (e.g., chemical spills, fish kills, etc.), as part of a restoration/rehabilitation plan, on a temporary basis until a specified population objective is reached.

2) **Ecological Applications.** Authorize proposed rules that use the 18" minimum length limit to increase bass populations and thus predation on panfish, crawfish, rough fish, or other species in order to attain better balance in the fish and aquatic community. Protecting predators can be an effective way of affecting the entire aquatic community. Bass are excellent candidates for ecological manipulations because they are generally self-sustained (don't require stocking) and they are very effective predators. For example, we have used the 18" minimum length limit to increase predation on panfish, thus improving their growth and size-structure (e.g., research project on Round Lake, Waushara County). We have also used the 18" minimum length limit to increase predation on crayfish in lakes with abundant rusty crayfish with some success.

3) **Protection of existing size-structure.** Authorize rule proposals that use the 18" minimum length limit to protect existing good quality bass populations that are threatened by increased fishing pressure where a pending change threatens to impact the number of large fish. For example, this approach was used on Chequamegon Bay, where they had good smallmouth bass fishing and the public wanted to maintain it. It is now considered by many to be a world class smallmouth bass fishery. We have also used this approach on small lakes with poor public access when new access development is anticipated to increase fishing pressure.

4) **Memorable fishing opportunities.** Authorize proposed rules that use the 18" minimum length limit to provide "memorable" fishing opportunities (any size of lake), provided local support is expressed at public hearings. The impacts of the regulation on tournament fishing activity should be duly considered and documented. The 18" minimum length limit provides protection to bass and can provide great fishing, however, little harvest will occur. In the past, we have typically advanced these rules changes if they were initiated by the public and supported at local hearings. One option would be to focus these efforts on smaller (<1000 acre) lakes, which would reduce impacts on tournaments and focuses on lakes where the regulation would likely have a more dramatic affect and may better protect small bass populations.