BLACK BASS MANAGEMENT PLAN

DEPARTMENT OF INLAND FISHERIES AND WILDLIFE
DIVISION OF FISHERIES AND HATCHERIES

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REGION C

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BLACK BASS LIFE HISTORY

The term “black bass” is a common name applied to several species of centrarchids (sunfishes), of which Maine’s smallmouth bass (*Micropterus dolomieu*) and largemouth bass (*Micropterus salmoides)* are members. This plan deals only with smallmouth and largemouth bass, which will be collectively referred to in this plan as black bass or, simply, as bass.

As their names imply, the two species can be distinguished on the basis of mouth size. The maxillary bone of the upper jaw of the largemouth bass extends beyond the eye, whereas the maxillary of the smallmouth does not extend beyond its eye. Other external physical differences exist between the two species, such as coloration and the separation between the spiny and soft dorsal fin, but these are less reliable identifying features than jaw size. Smallmouth and largemouth bass also differ in behavioral and physiological characteristics of importance to their management; these will be discussed later.

Smallmouth Bass

Smallmouth bass thrive in many of Maine’s lakes and ponds, as well as in many larger rivers and streams, except in extreme northern Maine. The northern limit of their range in Maine is based on whether first-year bass achieve adequate body size and weight to survive the approximately 200+ day starvation period encountered during the first winter, when water temperatures cooler than 50° F result in cessation of feeding and growth.

Stable water levels during spawning and suitable shoreline spawning gravel, usually interspersed with cover, are important to the reproductive success of smallmouth bass. Male smallmouth bass mature at 3 to 4 years of age, while female bass mature by age 4 or 5. Size at maturity ranges from 8 to 12 inches. Male bass usually mature at a smaller average length than females.

The effective fecundity of female smallmouth bass has been estimated to be from 2,000 to 3,000 eggs per pound. Although total eggs in females may approximate 7000 – 8000 per pound of body weight, female bass do not release all the eggs in the ovaries during each spring’s spawning, as evidenced by angler observations of many eggs remaining after spawning is concluded. In Maine, most smallmouths spawn between mid-May through mid-June, depending on location and water temperatures. Nest construction, done by males, generally occurs as water temperatures rise above 55° F, with egg deposition occurring at water temperatures between 60-66° F. Nests are usually constructed in shallow water near cover from rocks, logs, stumps, or sharp drop-offs.

Parental care is highly developed, with protection of the eggs and fry being practiced by the male only. Females leave the nest after egg deposition, while males remain to guard the eggs and fry for a few weeks. The fin movements of the male bass serve to prevent silt deposition on the eggs and also keep the eggs oxygenated. Hatching occurs within about 5-8 days at water temperatures common to most Maine waters.

Male bass are very sensitive to water level changes during the spawning period, and a relatively small drawdown may cause abandonment of many nests and certain loss of eggs or fry. Similarly, cooling water temperatures during the spawning period may produce nest desertion by

the male, with mortality of eggs or fry. Although re-nesting may occur later as water temperatures warm or as water levels are restored, the progeny of later spawning bass may not experience an adequate growing season for suitable growth to survive the first winter. In most Maine waters where spawning occurs at the normal time, populations of young smallmouth bass typically reach average lengths of 2.2 - 2.9 inches by the end of their first growing season, although some fast-growing individuals may reach lengths of 4 inches. There is a direct relationship between size and overwinter survival in first-year smallmouth bass, with larger bass experiencing a higher survival rate.

The male's aggressiveness in protecting the nest makes him especially vulnerable to being hooked by anglers during the reproduction period. Removal of the male by angling can result in predation or other forms or mortality to the unprotected eggs or fry.

The combination of the high number of eggs spawned by females, coupled with a high degree of protection of the eggs and fry by the male, results in a high reproductive potential for smallmouth bass. Because of this, stocking of smallmouth bass is rarely necessary to maintain healthy populations after they are initially established.

Largemouth Bass

Although largemouth bass occur in a variety of habitats in Maine, they thrive in shallow, weedy areas of eutrophic and mesotrophic lakes, and slow-moving rivers and streams. This species grows best in waters with average summer temperatures in the high seventies.

Largemouth bass spawning behavior is initiated in the late spring and early summer as water temperatures exceed 60°F. Shallow weedy areas and areas adjacent to stumps are commonly selected for spawning, and nests are often less elaborate than those of smallmouths. Male largemouths fan superficial silt from the bottom, creating a shallow depression, or "bed", in which the eggs are deposited. Egg deposition occurs at water temperatures around 63° F. Eggs sink to the bottom of the nest and adhere to substrate. Females spawn some of their eggs, then they depart. They may return to spawn again with the same male or may spawn in other nests with additional males.

The fecundity of largemouth bass is high; mature females may produce 2,000 to 20,000 eggs per pound of body weight. The female bass leaves the nest shortly after the eggs have been deposited and fertilized, while the male remains near the nest for several weeks, guarding the eggs and fry. Hatching occurs within a few days to a week, depending on water temperatures. Large fluctuations in water temperatures during incubation may result in nest desertion by the male largemouth and in heavy egg mortality. Re-nesting usually occurs once water temperatures have warmed to suitable levels.

Both smallmouth and largemouth bass in Maine may become infected with the bass tapeworm, *Proteocephalus ambloplites*. Extreme caution should be exercised to prevent the introduction and spread of this parasite into new waters. Bass tapeworm can be spread by fish species other than bass.

The high fecundity of female black bass (both smallmouth and largemouth) and the protective behavior of the male toward his progeny, plus the low fertility of most Maine waters and our short growing season, combine to produce bass, which generally are slower growing than their counterparts in southern states. This fact may be crucial to Maine bass management

because anglers who fish for bass in Maine are commonly attracted to the prospect of capturing “trophy size”, hence, old bass. In short, the attraction of older, larger fish may result in their being more easily exploited by anglers than faster-growing, younger bass from southern United States waters.

SPECIES MANAGEMENT HISTORY

Smallmouth Bass

Smallmouth bass are not native to Maine; they were first introduced in 1868. Cochnewagon Pond, Phillips Lake, Sebasticook Lake and Cobbosseecontee Lake were among Maine's first waters to receive smallmouth bass. The bass for these introductions were obtained from New York waters. Smallmouth bass have since been introduced, either legally or illegally, throughout much of the State. They now occur in 471 Maine lakes and ponds. In 240 of these 471 waters, smallmouths are the only species of bass; in 231 waters, smallmouths coexist with largemouth bass.

Smallmouth bass waters are located primarily in the lower 2/3 of Maine, as shown in Figure 1. They are not found in the upper sections of Somerset, Piscataquis, or Aroostook Counties.

Smallmouth bass populations in Maine sustain themselves by natural reproduction, and stocking is unnecessary, except occasionally in rare situations. Some Maine waters, especially those in eastern Maine, have an abundance of spawning habitat, and smallmouth bass populations are maintained at high levels. Other waters may need a higher minimum length limit on bass to sustain the desired population abundance, such as lakes where harvest levels need to be restricted, or where spawning habitat is limited, and bass populations are less abundant.

Largemouth Bass

Largemouth bass are not indigenous to New England. Due to widespread introductions they are currently found in all New England states, in many waters throughout the United States, and in other countries.

The first largemouth bass introduction in Maine probably occurred incidentally with planned introductions of smallmouth bass during the late-1800's. The first recorded largemouth introduction in this state was in Forbes Pond, Gouldsboro in 1897. Some of the other large lakes where largemouths were first successfully established were Great Pond and Messalonskee Lake, both in the Belgrade Lakes Region.

Most introductions of largemouth bass during the early 20th Century were made by the Maine Department of Inland Fisheries & Wildlife using bass reared at a federal hatchery. Over half of Maine's total largemouth bass introductions have been made since 1954. The fish for more recent authorized stockings have been obtained from Maine's lake and pond bass populations.

Largemouth bass have since been introduced, either legally or illegally, throughout much of the southern half of Maine. Their distribution is shown in Figure 2. They are not found in Piscataquis or Aroostook Counties, or in the upper sections of Somerset, Franklin, and Penobscot Counties.

Largemouth bass now occur in a total of 372 Maine lakes and ponds. In 141 of these waters, largemouths are the only species of bass; in 231 waters, they coexist with smallmouth bass.

Largemouth bass populations in Maine sustain themselves by natural reproduction, and stocking is unnecessary. Some waters may need a higher minimum length limit to sustain the desired population abundance, such as lakes where spawning habitat is limited, and bass populations are less abundant.

Bass – Both Species

Early fishery managers were highly enthusiastic about bass because they are easily caught, are excellent fighters, and are very palatable. Bass are highly important in terms of their high value as a popular sportfish. Many states regard bass as the number one sportfish, in terms of popularity with anglers.

In Maine bass are considered to be one of our most important sportfishes, along with brook trout and landlocked salmon. According to an angler questionnaire survey conducted by the Department in 1983, angler effort expended annually on black bass, was exceeded only by brook trout and landlocked salmon. More recent data from the Department's summer 1999 Open Water Fishing Survey (Paterson, et al, 2001) found that bass ranked highest of all Maine sportfish in three important areas:

1. largest number of anglers,
2. most angler-days of use,
3. most frequently caught species.

Table 1 compares angler use from 1983 to 1999.

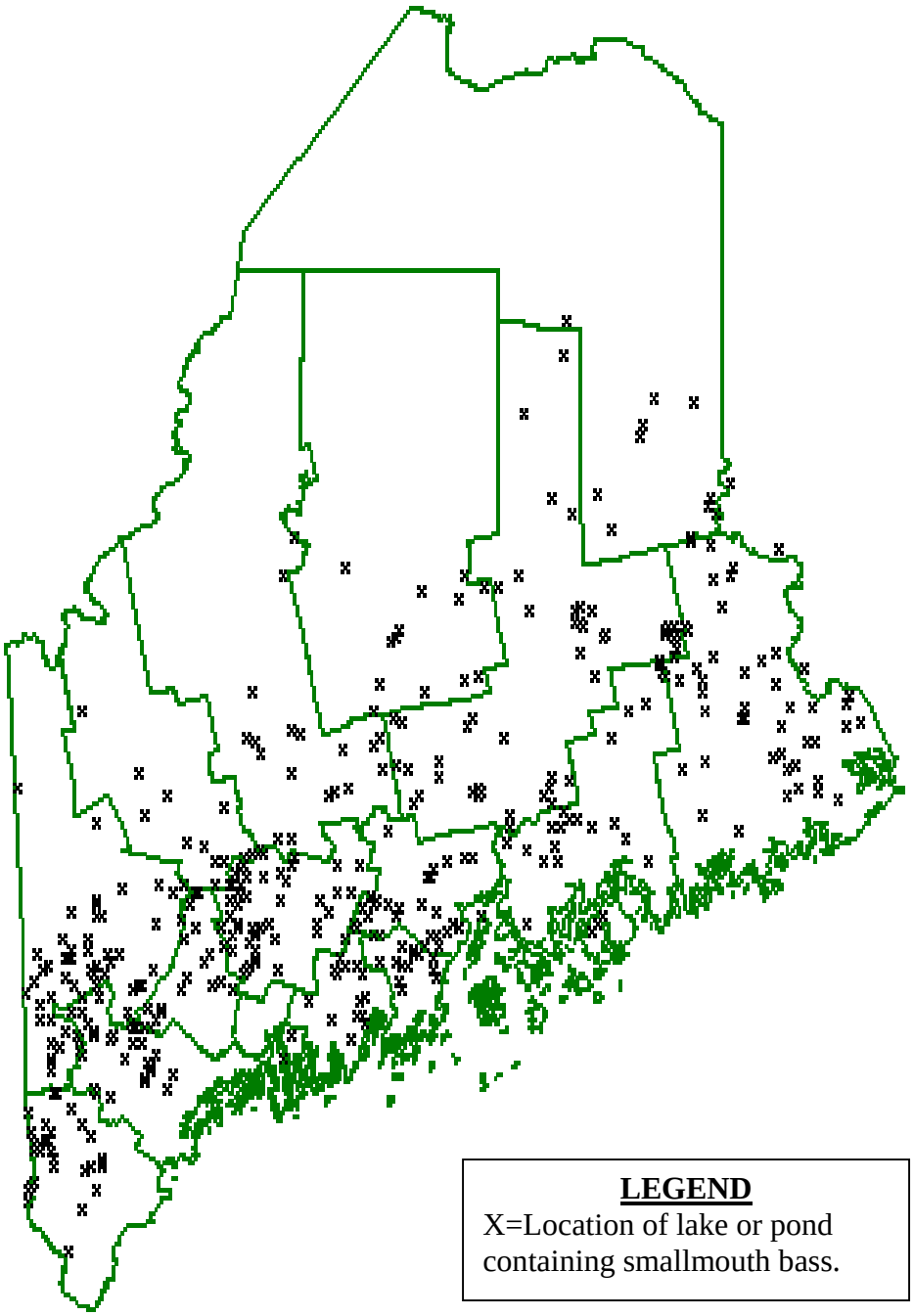

FIGURE 1: DISTRIBUTION OF SMALLMOUTH BASS IN THE LAKES AND PONDS OF MAINE, YEAR 2000 UPDATE

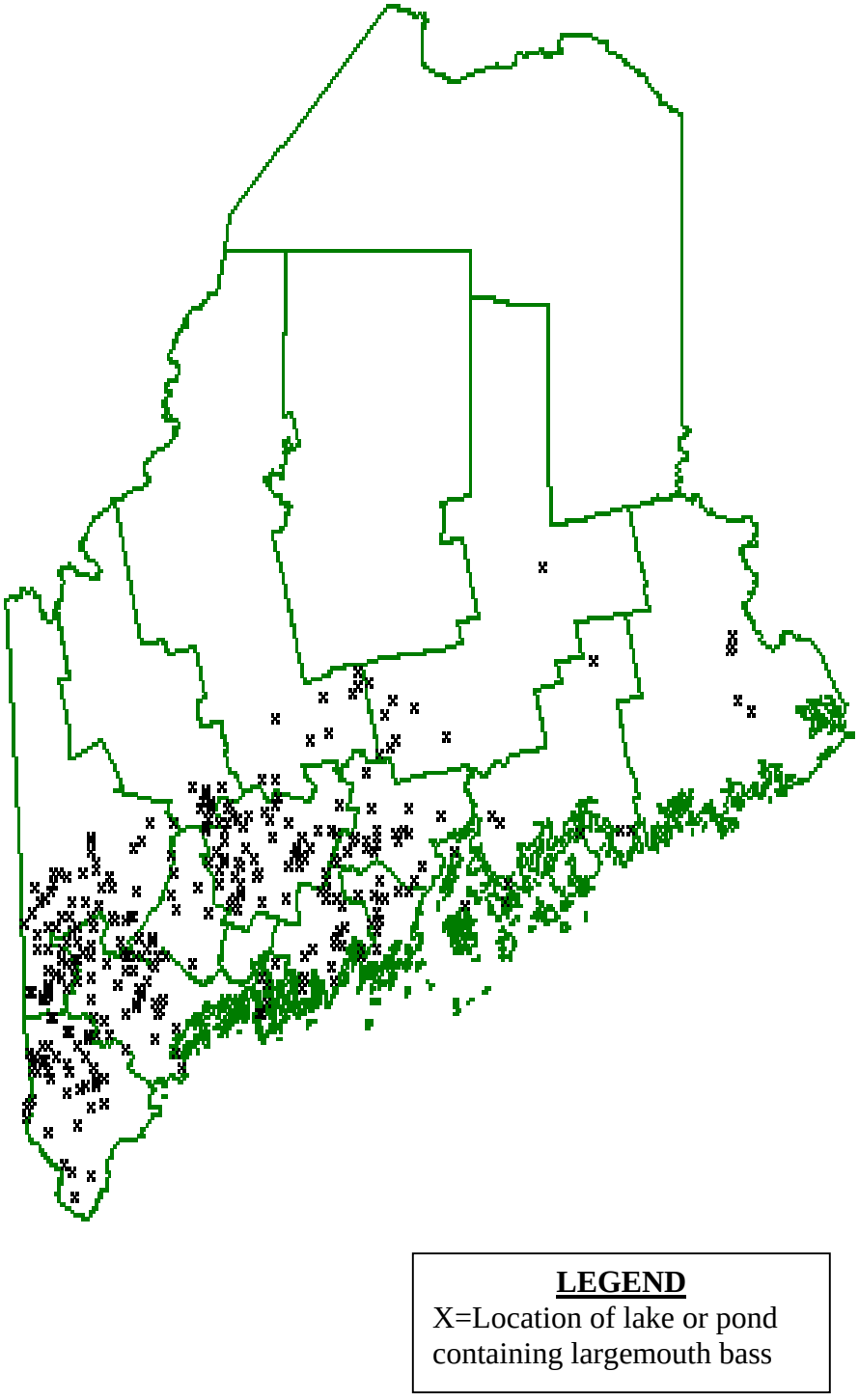

FIGURE 2: DISTRIBUTION OF LARGEMOUTH BASS IN THE LAKES AND PONDS OF MAINE, YEAR 2000 UPDATE

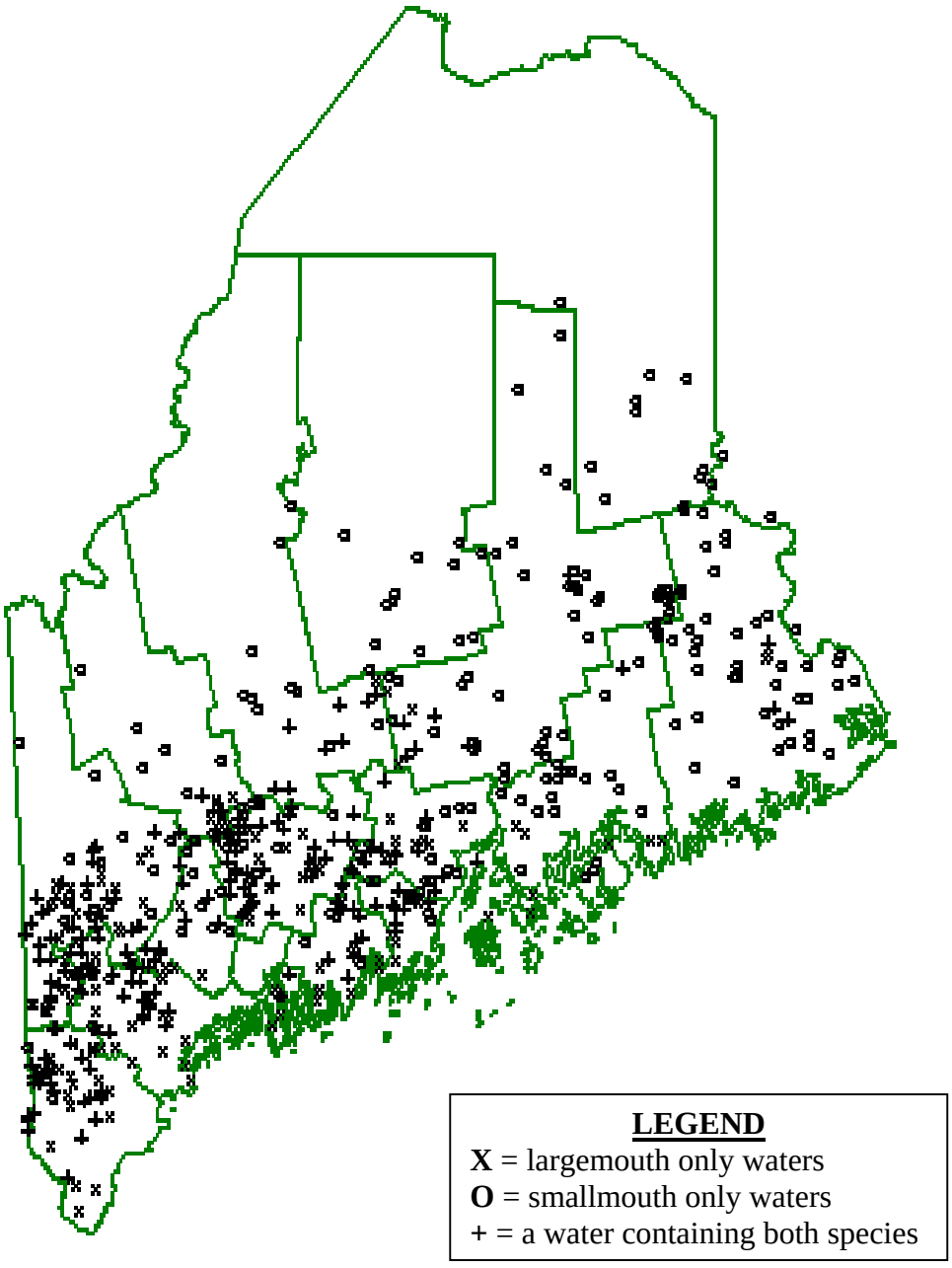

FIGURE 3 : DISTRIBUTION OF PRINCIPAL FISHERIES FOR BLACK BASS IN THE YEAR 2000

Table 1: Angler Use Comparison, 1983-1999

SPECIES	1983 EFFORT (ANGLER – DAYS)	1999 EFFORT (ANGLER – DAYS)
Bass (smallmouth and largemouth)	1,200,000	2,173,000
Brook trout	1,470,000	1,633,000
Landlocked salmon	1,250,000	1,505,000

Due to the increased popularity of bass in recent decades, numerous unauthorized, illegal introductions of bass by anglers have occurred. This activity has altered fish populations and ecosystems in some Maine waters and watersheds, sometimes with deleterious effects. To prevent potential problems all requests for introduction of new species should be initiated through the regional fisheries biologists.

Bass Regulations History

Maine's first open season for bass fishing was July 1, 1877 to March 31, 1878. There were no restrictions on length, bag, or weight limit.

During the period 1898-1906, there was a closed season while bass were "on the spawning beds", but no dates were given. Although there was no statewide general law bag limit, a 12-inch minimum length was established on 15 waters, mostly in the Belgrade Lakes region. From 1907 to 1913, the minimum length was changed to 10 inches.

An ice-fishing season was established for bass in 1914 from February 1 to March 31.Open water season dates were July 1 to September 30 for lakes, rivers, and streams. A 15-pound weight limit and a 25-fish bag limit (in the aggregate with 4 other species) were established. The minimum length limit remained unchanged until 1988. The 25-fish bag limit (aggregate) remained in effect from 1914 to 1950. The limit dropped to 15 fish in 1951, to 12 fish from 1963 to 1966, and to 8 fish until 1979, with an exception allowing only 5 fish in the winter of 1978.

Between the mid-1920's and 1975, the open water season for bass in Maine lakes was from June 1 to September 30. From June 1-20, representing the bass spawning season, fishing was by artificial lures or fly fishing only with a bag limit of 3 bass per day.

Between the 1940's and 1987 the general law fishing season ended on August 15 on brooks and on September 15 in rivers and on September 30 in lakes and ponds. From 1967 to 1977, bass could be taken in the winter only in waters legally open to ice fishing.

From 1979-1991, a 5-bass limit was established, except that no more than 3 bass could be taken during the period April 1-June 20, by artificial lures only. Between 1979-81, bass were not included in the aggregate bag limit but were included in the aggregate weight limit. From 1982 to 1996, bass had a separate weight limit. In 1997, the weight limit was abolished.

In 1992, Maine promulgated its present statewide general law bag and length limits. From January 1 – June 20, the bag limit is 1 per day. From June 21 –September 30, the bag limit is 3 bass, with only 1 bass over 14 inches.

The general law length limit on bass was increased to 12 inches in 1988, but later reduced to 10 inches in Washington, Hancock, Aroostook, and Piscataquis Counties.

PAST MANAGEMENT GOALS

The long-range **goal** for black bass management established in the **1981 plan** was:

To maintain supply at 1980 levels and promote increased use.

Specific management **objectives** of the 1981 plan were as follows:

- Maintain bass populations within their present range.
    - In 1980 smallmouth bass occurred in 417 lakes (487,181 acres); largemouth bass occurred in 226 lakes (145,140 acres). A total of 502 lakes and ponds (495,794 acres) had populations either smallmouth or largemouth bass.
- Provide for 805,000 angler-days of use and an annual harvest of 161,000 fish by 1985.
- Maintain average fish size in the creel at 14.2 inches in length and 1.5 pounds in weight.

The **goal of the 1996** update were nearly identical:

To maintain bass numbers at current levels, maintain harvest and fishing quality within acceptable levels, and increase angler effort on underutilized waters.

The **1996 objectives**, by which progress toward the goal is measured, were as follows:

- **Abundance:** Maintain bass populations in 489 lakes (397,639 acres) presently providing principal fisheries. Standing stocks of bass ≥ 10 inches to be maintained at 2.0 fish/acre and 2.3 pounds/acre.
- **Harvest:** Maintain harvest at no greater than 0.4 fish and 0.47 pounds/acre/year.
- **Fishing quality:** Maintain an average catch rate (bass kept plus released) of 1.0 bass ≥12 inches per angler day (all anglers) in southern and central Maine and 1.0 bass ≥ 10 inches per angler day (all anglers) in northern and eastern Maine. Maintain average size of bass caught at 14.2 inches and 1.5 pounds in southern and central Maine and 11 inches and 0.6 pounds in eastern and northern Maine. Manage some selected waters for large bass in excess of 3 pounds.

The trend shows that at least one species of bass occurred in 417 waters (487,181 acres) in 1980. By the 1991 mini-update of the plan's goals and objectives, Maine had 549 bass waters totaling 498,694 acres. The 1996 update listed 583 bass waters totaling 512,645 acres. Based on Maine's 2000 update of the statewide lake inventory file, at least one species of bass now occurs in 613 Maine lakes, totaling 523,319 acres. Comparing the number of known bass waters in 1980 to the number in 2000, there has been an increase of 47% (196 additional waters) where bass occurred in the year 2000.

Clearly, our objective of maintaining bass within their 1980 range has failed, primarily due to unauthorized introductions by anglers, although a small number of the new bass waters are due to a few planned introductions by the Department or to better reporting, resulting from recent lake surveys of previously unsurveyed waters. The purpose of this objective was to limit new bass introductions as a means of controlling potential adverse impacts on other fish populations through competition and predation. The potential adverse effects of failure to achieve this objective do not occur to the species of bass that was newly introduced. Rather, they occur to other established fish populations in that body of water, perhaps even the other species of bass, which must now live with more potential competition and predation. Unauthorized, illegal

introductions of bass represent a problem to Maine fisheries management that is being addressed by the Department.

The second part of the abundance objective was to maintain standing stocks (the total number of fish or biomass in a population at a given time of year) of bass $\geq$ 10 inches at 2.0 fish/acre and 2.3 pounds/acre over the suitable bass habitat. Not all of a lake's surface acreage represents bass habitat. Some large, deep, coldwater lakes contain many acres of habitat of negligible value to bass, because it is too deep and too cold. Thus, when assessing how much of a bass lake's acreage represents usable habitat, the acreage of unusable habitat must be excluded. Generally, unusable habitat would include habitat deeper than 30 feet in most lakes, although some bass may occasionally use deeper water at certain times of the year. On a statewide basis, this abundance objective was met, although on a lake-by-lake basis, a few waters with populations of low abundance did not meet the objective due to either low production or high exploitation.

The harvest objective to maintain harvest at no greater than 0.4 fish and 0.47 pounds/acre/year was met. Based on the 1999 Maine Open Water Fishing Survey, bass anglers fished an average of 14 times each summer and kept 0.05 bass/day of fishing, for a total individual harvest during the open water season of 0.7 bass/year. As long as these anglers fished more than 2 acres during the entire season, they would not have exceeded the harvest objective. Maine's fishing surveys also report that Maine ice anglers harvested an estimated 24,605 bass, and open water anglers harvested an estimated 105,444 bass, for a total annual harvest of 130,049 bass or 0.25 bass/acre/year. This harvest rate was 38% less than the maximum harvest in the objective, so the harvest objective for a maximum harvest of 0.4 fish/acre/year was met. A total of 130,049 bass weighing an average of 1.5 pounds were harvested. Based on Maine's 523,530 acres, the above harvest represented 0.37 pounds/acre/year, slightly below the harvest objective for weight of 0.47 pounds/acre/year.

The fishing quality objectives were to maintain an average catch rate (bass kept plus released) of 1.0 bass $\geq$12 inches per angler day (all anglers) in southern and central Maine and 1.0 bass $\geq$ 10 inches per angler day (all anglers) in northern and eastern Maine. On a statewide basis, this objective was achieved. Based on catch records from angler diaries, creel surveys, and experimental angling by biologists, this objective was exceeded on a large number of Maine's bass waters. Present catch rates on many eastern Maine bass waters range from 20-60 bass/angler-day, with approximately 20-33% exceeding 12 inches in length. The fishing quality objective of maintaining average size of bass caught at 14.2 inches and 1.5 pounds in southern and central Maine and 11 inches and 0.6 pounds in eastern and northern Maine was met for eastern and northern Maine, but probably not for southern and central Maine. The objective for southern and central Maine may have been unrealistically high. The objective of managing some selected waters for large bass in excess of 3 pounds was met on a statewide basis with regulations such as 18 inch minimum length, 18" maximum length, 18-23" protected slot limits, and catch and release angling. In addition to the objectives listed above, the 1986 bass plan had an objective to provide for 805,000 angler-days of use and an annual harvest of 161,000 fish. Based on the 1999 Maine Open Water Fishing Survey, 156,000 bass anglers fished a total of 2,173,560 days, caught a total of more than 4 million bass, but kept only 105,444 of them. Thus, by 1999, the number of days spent bass fishing had grown to 2.7 times the objective rate, but the purpose of the objective was to increase use of bass populations. However, even with this high amount of use, anglers harvested only an estimated 105,444 bass in 1999. These facts substantiate the high degree of voluntary catch and release ethic practiced by Maine's bass anglers, undoubtedly maintaining a higher quality fishery than would otherwise exist. These factors indicate that the objective of the 1986 plan was met and exceeded in terms of angler-days

of use, but the level of use did not result in an over-harvest because anglers harvest very few bass. Monitoring of Maine's bass lakes by the Department has shown no adverse effects at present fishing levels, even in heavily fished lakes where bass are caught and released many times.

The size class structure of some Maine bass populations shows evidence of potential for depletion of larger size classes through angler exploitation. It will be important to determine which Maine bass waters are most susceptible to high exploitation and depletion of larger individuals and to protect them with proper regulations.

OPPORTUNITY

In this plan, information will be presented on the basis of Fisheries Management Regions, each of which comprises 92-184 towns and townships.

Although smallmouth bass are more widely distributed than the largemouth, both species

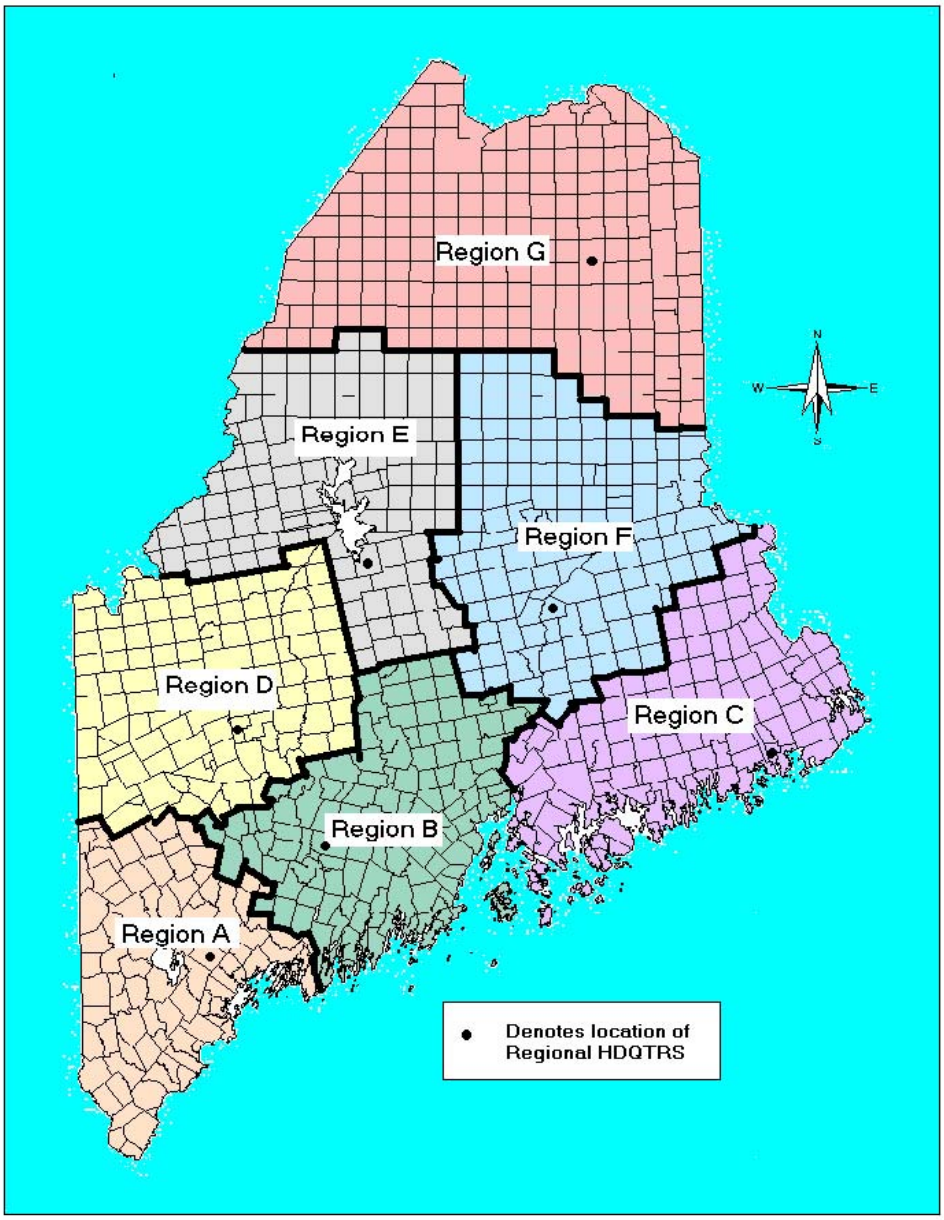

FIGURE 4. THE FISHERY ADMINISTRATIVE REGIONS, MAINE DEPARTMENT OF INLAND FISHERIES AND WILDLIFE

are largely confined to the southern and eastern portions of the state (Figures 1, 2, 3). A total of 613 (30%) of the state's 2076 surveyed lakes and ponds and 523,530 acres (55%) of the state's 945,347 acres of lakes contain populations of one or both species of black bass.

Smallmouth bass occur in 471 lakes (512,263 acres) representing 23% of Maine's surveyed waters; they support principal fisheries in a total of 551 waters totaling 426,194 acres in Maine, 93% of which are found in Regions A, B, C, and F.

An additional 373 lakes, representing 18% of all Maine waters and totaling 196,947 acres, have populations of largemouth bass. A total of 347 lakes (195,288 acres) support principal fisheries for largemouths. More than 90% of the waters that provide principal fisheries for largemouth bass are found in Regions A and B.

Table 2 shows the number and acreage of Maine lakes containing black bass populations. Approximately 37% of Maine lakes containing bass have populations of both species; 39% contain only smallmouth bass; 24% contain only largemouth bass.

Table 2. Number and Acres of Maine Lakes Containing Black Bass Populations

MANAGEMENT REGION	SMALLMOUTH ONLY		LARGEMOUTH ONLY		BOTH SPECIES		TOTAL	
	NUMBER	ACRES	NUMBER	ACRES	NUMBER	ACRES	NUMBER	ACRES
A	26	5,457	75	5,184	100	77,924	201	88,565
B	49	8,976	54	4,576	107	84,589	210	98,141
C	72	95,250	8	1,044	12	11,542	92	107,836
D	14	10,732	5	463	8	10,045	27	21,240
E	8	86,736	0	0	2	595	10	87,331
F	68	119,018	0	0	2	985	70	120,003
G	3	414	0	0	0	0	3	414
STATE	**240**	**326,583**	**142**	**11,267**	**231**	**185,680**	**613**	**523,530**

Table 3 shows the number and acreage of Maine lakes by region that support principal fisheries for black bass. A total of 551 waters representing 426,194 acres support a principal fishery for at least one species of bass. Principal fisheries are those waters where the species is abundant, is purposefully fished for, and contributes significantly to the angler's catch. Regions A, B, C and F contain over 97% of Maine lakes in which bass are a principal fishery.

Table 3. Number and Acres of Maine Lakes Containing Principal Fisheries for Black Bass

MANAGEMENT REGION	SMALLMOUTH ONLY		LARGEMOUTH ONLY		BOTH SPECIES		TOTAL	
	NUMBER	ACRES	NUMBER	ACRES	NUMBER	ACRES	NUMBER	ACRES
A	26	5,457	67	4,886	100	77,924	193	88,267
B	43	8,628	42	4,024	104	84,410	189	97,062
C	54	88,854	6	520	12	11,542	72	100,916
D	13	10,205	5	463	7	9,939	25	20,607
E	7	11,846	0	0	2	595	9	12,441
F	59	105,557	0	0	2	985	61	106,542
G	2	359	0	0	0	0	2	359
STATE	**204**	**230,906**	**120**	**9,893**	**227**	**185,395**	**551**	**426,194**

Fish and Wildlife Department records, shown in Table 4, indicate that since the 1986 species plan, unauthorized and illegal introductions of at least one species of bass have occurred in at least 57 waters. In southern Maine's regions A and B, most introductions (92%) were of largemouth bass. However, in the northern regions smallmouth bass were the principal species, occurring in 73% of all illegal introductions.

Table 4: Unauthorized Bass Introductions in Maine Since 1986

REGION	SPECIES		
	LMB	SMB	TOTAL
A	11	2	13
B	11	0	11
C	1	11	12
D	1	8	9
E	3	0	3
F	4	4	8
G	0	1	1
STATE	31	26	57

When bass fishing opportunity in Maine's 613 bass waters is categorized by lake type (Table 5), a total of 49 lakes (8%) can be characterized as being oligotrophic. Oligotrophic lakes display low productivity, are generally deep and clear, show deep secchi disk readings, have low phosphorus and chlorophyll levels, have very little aquatic plant growth, and usually have high oxygen levels in the hypolimnion. Although oligotrophic lakes are commonly managed for coldwater sportfish such as salmon, lake trout, and brook trout, many of Maine's bass populations in oligotrophic lakes produce highly important fisheries. An additional 264 Maine bass waters (43%) are characterized as eutrophic lakes. Eutrophic lakes have high productivity, shallow secchi disk readings, high phosphorus and chlorophyll levels, and abundant aquatic plant life. If a eutrophic lake stratifies, the hypolimnion is often low in dissolved oxygen. Eutrophic lakes are generally managed only for warmwater sportfish species. The final 300 bass waters (49%) are mesotrophic. Mesotrophic lakes are characterized as being moderate in productivity, with characteristics that are intermediate between typical eutrophic and oligotrophic conditions.

Table 5: Bass Fishing Opportunity by Lake Type

REGION	LAKE TYPE			*TOTAL WATERS*
	OLIGOTROPHIC	EUTROPHIC	MESOTROPHIC	
A	8	114	79	**201**
B	7	91	112	**210**
C	15	2	75	**92**
D	7	12	8	**27**
E	4	3	3	**10**
F	7	41	22	**70**
G	1	1	1	**3**
TOTAL	**49**	**264**	**300**	**613**

Table 6 presents bass fishing opportunity by the type of fishery management occurring in Maine lakes. Of 613 bass waters, a total of 29 (5%) are being managed for coldwater sportfish, 354 (58%) are being managed for warmwater sportfish species only, and 216 (35%) are being managed for a combination of coldwater and warmwater sportfish species. The remaining 14 waters (2%) where bass occur are under no management.

Table 6: Bass Fishing Opportunity by Fishery Management Type

REGION	MANAGEMENT TYPE				TOTAL WATERS
	COLDWATER	WARMWATER	COMBINATION	NONE	
A	1	101	91	8	**201**
B	8	142	55	5	**210**
C	4	50	37	1	**92**
D	5	12	10	0	**27**
E	4	3	3	0	**10**
F	6	44	20	0	**70**
G	1	2	0	0	**3**
TOTAL	**29**	**354**	**216**	**14**	**613**

In the 5% of Maine bass lakes being managed solely for coldwater sportfish species, biologists have decided not to undertake any active management for bass, generally because bass in these waters represented an unauthorized, illegal introduction into a lake where one or more coldwater sportfish species constitute the priority management. In these situations the presence of bass may result in adverse impacts on the coldwater fish species. Brook trout generally suffer more adverse impacts from competition and predation from bass than Maine's other coldwater sportfish species. In general, bass do not exert adverse impacts on populations of landlocked salmon or lake trout in Maine lakes due to differences in both habitat and prey items.

A total of 35% (216) of Maine's bass waters are managed for a combination of management for both coldwater and warmwater species. These are more likely to be waters where bass coexist with lake trout, landlocked salmon, or brown trout and adverse impacts from the combination of species are less likely to occur. Thus, the combination of regulations used to manage bass populations does not pose an adverse impact on coldwater fisheries management techniques involving regulations and stockings.

Finally, 354 (58%) Maine bass waters are managed solely for warmwater fisheries. In some cases bass may be the only warmwater sportfish occurring in that lake, while in other cases, bass may coexist with one or more other warmwater sportfish species, such as chain pickerel, white perch, yellow perch, black crappie, or northern pike.

The opportunity to fish for black bass is limited by geographical distribution, restrictions on public access (legal or physical), and restrictions imposed by fishing regulations.

Black bass are readily available to anglers throughout Regions A, B, C, and F. However, opportunity is limited in Regions D, E, and G by the low number of bass waters in those Regions.

Angler access to black bass waters is not a serious problem (Table 7). In fact, public access is restricted on less than 3,200 (0.6%) of the 523,530 acres of bass lakes in the State. However, continued shoreline development in southern Maine may pose a potential threat to public access to bass waters in Region A and B by increased posting of land to trespass in the future.

Table 7. Access to Black Bass Lakes Expressed as a Percentage of Total Lake Acres

REGION	OPEN TO FISHING		SUMMER ACCESS BY AUTO[1]	BOAT LANDING PRESENT[2]	PUBLIC RIGHT-OF-WAY PRESENT[3]	SUMMER ACCESS FEE CHARGED[4]	PUBLIC ACCESS RESTRICTED[5]
	SUMMER	WINTER					
A	100.0	96.9	99.6	83.5	80.8	5.5	1.4
B	99.8	96.6	100.0	95.7	82.9	1.1	0.5
C	100.0	99.7	99.6	95.2	68.4	0.1	1.4
D	100.0	96.4	99.8	90.7	81.5	10.2	0.0
E	100.0	99.8	99.5	99.1	94.5	0.0	0.0
F	100.0	99.9	99.2	85.6	73.5	0.6	0.0
G	100.0	100.0	100.0	86.7	86.7	0.0	0.0
STATE	100.0	98.7	99.6	91.6	79.3	1.7	0.6

Fishing regulations impose little restriction on bass fishing opportunity in Maine. Virtually all Maine lakes are open to fishing for bass from April 1 to September 30 and from January 1 to March 31. In addition many bass waters are open to catch and release angling with artificial lures only during October and November, then reopen to fishing as soon as ice forms in the early winter. The general law daily bag limit on bass is 1 during the winter and from April 1 through June 20. Bass fishing is restricted to artificial lures only from April 1 to June 20. From June 21 through September 30 there is a 3 fish limit, except that only one bass larger than 14 inches may be kept. The general law legal length limit for bass during both seasons is 12 inches, except for a 10-inch minimum length in Aroostook, Hancock, Piscataquis, and Washington Counties in extreme northern and eastern Maine.

Various special regulations have been applied to many bass waters. Some regulations remove the size and bag limit on bass in certain waters where bass populations are so abundant that they compete strongly with each other and limit growth. Some lakes are regulated with 12-16 inch protected slot limits designed to increase the number of bass larger than 16 inches, while others have 18-23 inch protected slot limits to increase the number of large bass in the population. A few lakes have an 18 inch minimum length limit, others have an 18 inch maximum size limits, and a few are restricted to catch and release angling. Bass anglers have demonstrated a strong willingness to support and accept restrictive regulations where necessary for improving or maintaining size quality and abundance. Most Maine anglers clearly seem more interested in catching bass than in harvesting them.

In the future additional restrictive regulations may need to be adopted on selected waters to maintain bass fishing quality in the presence of continued increases in angler effort and harvest.

[1] Access to within ½ mile by either 2-wheel or 4-wheel drive vehicle
[2] Includes lakes where it is "reasonably possible to back a boat trailer into the water".
[3] Rights-of-way may include those established by tradition as well as by legal, public deed.
[4] Fee charged by landowners at landing points or as general land-use fees charged at road gates.
[5] Primarily exercise of trespass rights by private landowners.

Some increases in fishing opportunity could be realized as physical and legal access to bass waters in isolated areas is improved. Additional expansion of fishing opportunity may be produced through deliberate introductions of these species, either done by the Department or done illegally by anglers, in areas currently lacking bass populations. The extent of future expansion of the range of black bass through illegal stockings, such as has occurred in the Moosehead Lake area and throughout the state of Maine, cannot be predicted. Increased fishing opportunity gained through any of these techniques will be small in relation to existing statewide use opportunity for bass.

Losses in opportunity are possible if shoreline development parallels projected increases in Maine's human population and if shoreline development is accompanied by restrictions on physical and legal access to the resource.

Federal funds available for boat launching facilities are expected to continue to result in improved fishing opportunity through the procurement of lakeshore land by the Department and by establishment of new launching facilities as well as the improvement of older launch sites.

Many of Maine's rivers and streams contain fishable populations of black bass; however, most of these populations have not been inventoried and will not be considered in this update.

Data are lacking to permit accurate estimates of the population numbers of bass in Maine because they are not normally vulnerable to capture by trapnets in most lakes. Also, the tendency of many bass to have a relatively small home range in relation to total lake size is a drawback to obtaining reliable lake-wide population estimates. While lack of data does not permit an accurate estimate of the statewide supply of harvestable size bass (bass which equal or exceed the legal length of 10 or 12 inches, depending on location in Maine), the infertility of most Maine waters, plus our short growing seasons are the limiting factors on bass growth and production, keeping them lower than those produced in the southern United States. It is instructive to note, however, that studies in the southern United States indicate that the biomass of black bass averages about 10 pounds per acre in unmanaged waters.

In many Maine waters the combination of highly abundant spawning habitat and lack of significant predators on juvenile bass combines to produce highly abundant bass populations comprised primarily of fish from 8-13 inches in length, producing an opportunity for high catch rates that distinguishes Maine's bass fishing in comparison to other states. Our data from experimental angling samples of smallmouth bass during early June indicates that in many eastern Maine waters, individual angler catch rates for bass of all sizes may range from 6-14 bass per angler per hour. These catch rates represent an increase of 2-3 times when compared to catch rates of the early 1990's, and are the result of increased recruitment of bass following 5 summers of above-average temperatures in a 6-year period.

Department policy is to introduce bass only where such introductions will not jeopardize existing coldwater fisheries. Angler demand for bass and whether they occur elsewhere in the watershed are major considerations. Under present management plans, only minor increases in black bass abundance by planned introductions can be expected during this planning period.

DEMAND

Based on Maine's angler questionnaire surveys, the number of angler-days of annual effort expended in pursuit of bass has doubled from 1.2 million angler-days in 1982 to 2.4 million angler-days in 1999. During the same period summer angling for bass increased by 73%, from 1,133,000 to 1,968,000 angler-days. Winter fishing pressure represented only 17% of the total annual effort. Table 8 shows the estimated fishing effort on black bass by regions of the state and compares 1982-83 and 1999 data. Angler-days of effort expended in each Region parallel the distribution of the human population in Maine, shown in Table 9.

Table 8: Comparison of Estimated Angler-Days of Effort Expended on Black Bass in Maine Lakes, Based on Angler Questionnaires

	ANGLER DAYS					
MANAGEMENT REGION	SUMMER 1982-83	SUMMER 1999	WINTER 1982-83	WINTER 1998-99	TOTAL ANNUAL 1982-83	TOTAL ANNUAL 1999
A	381,000	813,600	27,000	115,200	408,000	928,800
B	356,000	719,000	28,000	170,100	384,000	889,100
C	175,000	157,500	*	52,400	175,000	209,900
D	29,000	49,200	*	15,100	29,000	64,300
E	16,000	49,500	*	12,300	16,000	61,800
F	176,000	173,100	*	44,300	176,000	217,400
G	*	6,100	*	1,200	*	7,300
STATE	**1,133,000**	**1,968,000**	**55,000**	**410,600**	**1,188,000**	**2,378,600**

* insufficient data for estimate

Table 9: Fishing Pressure and Harvest for Black Bass in Maine Lakes

MANAGEMENT REGION	ANGLER-DAYS/LAKE ACRE			HARVEST LBS/LAKE ACRE		
	SUMMER	WINTER	ANNUAL	SUMMER	WINTER	ANNUAL
A	9.2	1.3	10.5	0.50	0.17	0.67
B	7.3	1.7	9.0	0.73	0.21	0.94
C	1.5	0.5	2.0	0.12	0.02	0.14
D	2.3	0.7	3.0	0.21	0.02	0.23
E	0.6	0.1	0.7	0.05	0.01	0.06
F	1.4	0.4	1.8	0.12	0.01	0.13
G	14.7	2.9	17.6	0.56	0.00	0.56
STATE	**3.8**	**0.8**	**4.6**	**0.28**	**0.07**	**0.35**

The goal of the 1981 plan was to promote increased use of Maine's black bass resources, and this has clearly been accomplished. Increases in fishing effort show that demand for bass fishing from all users has grown during the past planning period. On a nationwide level there has been a clear growth in demand for bass fishing. Also, the past 15 years in Maine represent a period of great increase in the popularity of bass clubs and bass tournaments. Maine has

developed a legal regulatory procedure for bass tournaments including a lottery system of assigning tournaments to applicants, limitations on lake size and the number of tournaments allowed per lake, and restriction of tournaments during the spawning period to catch-measure-and release.

In 1992, Maine adopted more conservative general law regulations on bass, decreasing the daily limit to one fish prior to June 21, decreasing the daily limit to 3 fish with no more than one exceeding 14 inches after June 20, and increasing the minimum length limit in most counties to 12 inches. Also, many waters capable of producing high-quality bass populations had more restrictive length and bag limits applied as special regulations. These regulation changes were enthusiastically supported by most anglers, and are expected to adequately protect bass populations in a majority of Maine's lakes in the future.

Table 10: Comparison of Estimated Catch of Black Bass in Maine Lakes, Based on Angler Questionnaires (Note: Not all bass caught were harvested – most were released)

MANAGEMENT REGION	NUMBER CAUGHT					
	SUMMER 1982-83	SUMMER 1999	WINTER 1982-83	WINTER 1989-99	TOTAL ANNUAL 1982-83	TOTAL ANNUAL 1999
A	70,600	1,235,000	6,600	61,000	77,200	1,296,000
B	71,800	1,385,500	9,000	98,900	80,800	1,484,400
C	70,000	225,000	*	17,700	70,000	242,700
D	10,000	79,600	*	3,200	10,000	82,800
E	5,100	102,500	*	2,000	5,100	104,500
F	79,000	234,000	*	6,300	79,000	240,300
G	*	5,400	*	35	*	5,435
STATE	**306,500**	**3,266,500**	**15,600**	**189,135**	**322,100**	**3,456,135**

*Insufficient data for estimate

Table 11: Comparison of Estimated Catch and Harvest of Black Bass in Maine Lakes, Based on 1998-99 Angler questionnaires

FISHERY REGION	FISH/ANGLER DAY		SUMMER		WINTER		ANNUAL		PERCENT KEPT	
	SUMMER CATCH RATE	WINTER CATCH RATE	CATCH	HARVEST	CATCH	HARVEST	CATCH	HARVEST	SUMMER	WINTER
A	1.52	0.53	1,235,000	25,900	61,000	8,600	1,296,000	34,500	2.1	14.1
B	1.93	0.58	1,385,500	42,000	98,900	12,200	1,484,400	54,200	3.0	12.3
C	1.43	0.34	225,000	12,600	17,700	1,800	242,700	14,400	5.6	10.2
D	1.62	0.21	79,600	3,200	3,200	300	82,800	3,500	4.0	9.4
E	2.07	0.16	102,500	3,600	2,000	300	104,500	3,900	3.5	15.0
F	1.35	0.14	234,000	11,600	6,300	1,300	240,300	12,900	5.0	20.1
G	0.88	0.03	5,400	400	35	0	5435	400	7.4	0
STATE	1.66	0.46	3,267,000	99,300	189,135	24,500	3,456,135	123,800	3.0	13.0

Tables 10 and 11 above show the estimated catch, catch rates, harvest, and the percent of bass caught that were harvested for both summer and winter seasons. The estimated summer catch of 3,267,000 bass in 1999 was nearly 11 times as high as the estimated catch of 306,500 bass in 1982. Estimated winter catch of 322,100 bass in 1999 was much lower than the summer catch, but showed a similar rate of increase (12 times) in 1999 compared to 1982. The total estimated annual catch of 3,456,135 bass in 1999 increased by nearly 11 times when compared to the 1982 catch. Most of this increase was in fishery regions A,B, and E, where 1999 catch estimates were 17-20 times greater than those of 1982. Regions C,D, and F showed smaller increases, from 3-8 times that of the 1982 survey.

When considering the above estimates of annual bass catch, it is important to remember that many bass are caught and released multiple times in the open water season. Maine bass anglers display a very strong catch and release ethic; on a statewide basis, only 3% of bass caught in the summer are harvested and 97% are released. During the winter, 13% of bass caught are harvested and 87% are released. The tendency for winter anglers to keep a higher percentage of the bass they catch than do summer anglers is partially due to the fact that winter-caught bass tend to be of a greater average size than those caught during the summer.

Studies by the Maine Department of Inland Fisheries and Wildlife in eastern Maine show that bass marked with temporary marks may be caught multiple times in a season. Also, these bass and other tagged bass have been caught by our staff multiple times over multiple years, indicating good survival.

Despite an estimated total annual catch of 3,456,135 bass, Maine anglers only harvested an estimated 123,800 fish. Considering that 2,378,600 angler-days of bass fishing occurred in Maine in 1999, the above harvest results in a very low harvest rate of only 0.05 bass/angler-day. In other words, Maine bass anglers harvested an average of 1 bass for every 20 days spent fishing annually and in the summer season and 1 bass for every 17 days of winter fishing. This low rate of harvest, combined with Maine's general law and special fishing regulations on bass, represent the reasons why a high percentage of bass populations in Maine are healthy and produce excellent fisheries of national attention. Unlike fisheries for many species, demand for bass fishing in Maine is primarily directed on bass to catch and release, rather than on bass to harvest.

Table 12. Average Catch Rate and Fish Size of Black Bass in Maine Lakes[1]

MANAGEMENT REGION	NUMBER HARVESTED/ANGLER DAY			AVERAGE SIZE	
	SUMMER	WINTER	ANNUAL	LENGTH (INCHES)	WEIGHT (POUNDS)
A	0.03	0.07	0.04	14.5	1.7
B	0.06	0.07	0.06	15.4	1.7
C	0.08	0.03	0.07	12.4	1.0
D	0.07	0.02	0.05	13.0	1.4
E	0.07	0.02	0.06	13.5	1.1
F	0.07	0.03	0.06	12.0	1.2
G	0.07	0.00	0.05	10.5	0.6
STATE	0.05	0.06	0.05	14.2	1.5

Bass harvested in Maine average 14.2 inches and 1.5 pounds. Some variation in average size is noted between Regions, with fish of a smaller average size reported in Regions C, D, E, and F (Table 12). Bass populations in these Regions consist mostly of smallmouths, although more than 20% of Region C bass waters have largemouth bass.

The supply of legal bass is unlikely to change significantly over the next five years, although summer water temperatures exert a strong effect on survival of first-year bass. As previously mentioned, warm summers in 5 years between 1994-99 have greatly improved growth and survival of first-year smallmouth bass, resulting in much higher levels of recruitment. It is doubtful that above-average summer temperatures will consistently occur to continue this trend. We have observed large reductions in cohorts of Maine smallmouth bass following a year of below-average summer temperatures. This environmentally caused phenomenon occurred in 1986, 1992, and 1996, resulting in large-scale reductions of those cohorts. These natural reductions of bass populations are sometimes beneficial in waters having abundant populations, because competition is temporarily reduced, usually resulting in improved growth for individual bass.

Introductions of bass into waters which are now outside the range of bass in Maine and the effects of high fishing pressure on certain waters will likely produce some changes in local supply, but are not expected to impact the statewide supply.

[1] Harvest rates based on 1998/99 angler questionnaire. Average fish sizes obtained from creel surveys.

FISHING QUALITY

Catch rates for bass in Maine are difficult to obtain in a systematic basis. An accurate creel survey for bass would require clerks to be on the lake or at the boat landing throughout the entire day until dark. Because the length of the season for bass lasts at least 4.5 months, a great deal of clerk time and expense would be required. The survey is further complicated by the fact that anglers generally catch numerous fish, sometimes exceeding 50 fish/angler-day, but no accurate counts are kept and most fish are released. Because the statewide release rate for bass is 97% in the summer, and 87% in the winter, clerks would collect only a few lengths and weights. Creel surveys in Maine have more commonly been conducted on salmonid waters and for shorter lengths of time, as for winter ice fishing surveys or for open water surveys done for 4-6 weeks immediately after ice-out. Surveys have not been done specifically for bass.

When biologists sample bass by rod and reel, catch rate data are recorded. Catch rates for biologists sampling bass by experimental angling in late May and June generally range from 1-5 bass/angler-hour of fishing. During the period 1999-2000 these catch rates have risen to 6-14 bass/angler-hour in many eastern Maine lakes because of notably higher bass populations following very warm summers in 5 of 6 years from 1994-99. It has not been uncommon for individual biologists to catch from 25-60 bass in a 5-hour fishing day in 1999-2000. Reports from other anglers indicate similar excellent catch rates. Unfortunately, catch rates from experimental angling are only available for a small fraction of Maine's 613 bass waters, coming mostly from eastern Maine.

Our most systematic and consistent data on bass catch and harvest rates come from Maine's Open Water and Ice Fishing Surveys, conducted periodically since the 1970's. Although anglers are asked to report their fishing trips and catches after the conclusion of the season, leading to a degree of recall bias which sacrifices some accuracy, the bias is assumed to be consistent throughout Maine's geographical regions and probably does not differ from one survey to another. Thus, the trends that emerge from the results are assumed to accurately reflect differences in fishing throughout Maine's 7 fishery regions. This plan will use data from these surveys as measures of catch and harvest components of fishing quality.

In Maine's season-long 1999 Open Water Fishing Survey, black bass catch rates range from 0.88-2.07 fish/angler-day in the summer for Maine's fisheries regions, with a statewide average of 1.7 bass/angler-day throughout the season. Harvest rates were substantially lower, ranging from 0.03-0.08 bass harvested/'angler-day in Maine's fishery regions, with a statewide average of 0.05. These harvest rates reflect that Maine anglers practice a very high rate of catch and release angling for bass, a key factor in maintaining the high quality bass fishing that commonly occurs in Maine.

Maine's 1999 Ice Fishing Survey showed ice fishing catch rates in the regions ranged from 0.03-0.58 bass/angler-day, with a statewide average of 0.46 bass/angler-day. Harvest rates were also low during the winter season, ranging from 0.00-0.08 bass harvested/angler-day throughout the fishery regions, with a statewide average of 0.06 bass/angler-day. Table 13 presents regional and statewide catch and harvest rates. In many of Maine's bass waters, especially in Washington and Hancock counties, bass are almost never caught by winter anglers, despite the occurrence of very abundant populations in those waters. This factor serves to protect and preserve high fishing quality in many Maine waters.

The regulations adopted by Maine in 1992, combined with special regulations on selected waters, have been proactive and are expected to adequately protect bass stocks in most Maine waters in the future.

Table 13: Bass Catch and Harvest Rates by Season, 1998-99

FISHERY REGION	FISH/ANGLER DAY			
	SUMMER CATCH RATE	WINTER CATCH RATE	SUMMER HARVEST RATE	WINTER HARVEST RATE
A	1.52	0.53	0.03	0.08
B	1.93	0.58	0.06	0.07
C	1.43	0.34	0.08	0.04
D	1.62	0.21	0.06	0.02
E	2.07	0.16	0.07	0.03
F	1.35	0.14	0.07	0.03
G	0.88	0.03	0.07	0.00
STATE	**1.66**	**0.46**	**0.05**	**0.06**

BLACK BASS MANAGEMENT GOALS AND OBJECTIVES FOR THE YEAR 2015

GOAL: Maintain black bass populations and fishing opportunities in 613 lakes and ponds, in existing rivers and streams, and provide for limited introductions in appropriate waters. Maintain, acquire, and improve angler access sites as necessary**.**

OBJECTIVES: Maintain the following fishing quality objectives, and improve size quality as appropriate.

1. Fishing Quality Objectives for Lakes and Ponds Having *Principal Fisheries* for Bass:

MANAGEMENT EMPHASIS	CATCH/ ANGLER -DAY *	LENGTHS OF FISH COMMONLY CAUGHT	LENGTHS OF LARGEST FISH CAUGHT	SMALLMOUTH BASS LAKES			LARGEMOUTH BASS LAKES		
				NO. OF LAKES	LAKES IN THIS CATEGORY	ACRES OF LAKES	NO. OF LAKES	LAKES IN THIS CATEGORY	ACRES OF LAKES
Fast Action	>20	6-12”	--	14	3%	23,977	5	2%	556
General	6-20	6-16”	--	100	24%	134,280	29	9%	11,249
Quality Size									
Regions A&B	>3	--	14-18”	59		84,045	93		107,489
Regions C-G	>3	--	12-18”	32		65,854	3		333
Statewide total				91	22%		96	29%	
Trophy	0-3	--	≥18” SMB ≥20” LMB	15	4%	49,543	12	4%	16,170
Unclassified:				196	47%	52,483	189	56%	40,205

*Catch rates will be lower in Regions E & G where environmental conditions limit population size due to reduced survival of first-year bass.

2. Fishing Quality Objectives for Rivers and Large Streams Having *Principal Fisheries* for Bass:

MANAGEMENT EMPHASIS	CATCH/ ANGLER-DAY	LENGTHS OF FISH COMMONLY CAUGHT	LENGTHS OF LARGEST FISH CAUGHT	SMALLMOUTH BASS, NUMBER OF RIVERS AND STREAMS	LARGEMOUTH BASS, NUMBER OF RIVERS AND STREAMS
Fast Action	>20	6-12”	--	3	0
General	6-20	6-16”	--	10	2
Quality Size					
Regions A&B	>3	--	14-18”	1	1
Regions C-G	>3	--	12-18”	2	0
Trophy	0-3	--	≥18” SMB	0	0
			≥20” LMB	0	1
Unclassified:	Lack of data	Lack of data		4	1

Capability of Habitat: Studies in Maine during the past 15 years indicate clearly that Maine's black bass habitat is capable of supporting the fisheries described in the goals and objectives. Maine's bass populations were originally introduced with relatively small numbers of fish that have produced the self-sustaining populations existing in Maine today. Maine's lakes generally contain abundant habitat for spawning, nursery, and adult rearing needs. Water quality and forage abundance combine with the habitat to produce thriving bass populations in Maine waters, except in northern Maine where growing season is a limiting factor. In some cases, special restrictive fishing regulations on selected Maine bass waters have been combined with existing habitat to improve the quality of the population and associated fishery.

Feasibility: This goal should be feasible provided that (1) an effective regulatory system controlling the sizes and numbers of bass harvested is implemented in a timely manner early in the planning period, and (2) the assessment of habitat capability is accurate. In many cases, existing bass regulations may need to be made more restrictive to produce the types of fisheries stated in the objectives, and to prevent over-harvest.

Desirability: Maintaining present population numbers and fishing quality while implementing additional management for quality and trophy size bass where possible will achieve angler expectations. Maintaining bass within their present distribution combined with biological oversight of all new introductions would assist in the implementation of certain of the salmonid management plans as well as implementation of the Black Bass Plan by preventing competition in single-species bass waters by the introduction of the other bass species.

Possible Consequences: Successful implementation of this management program is dependent upon accurate estimates of standing stocks, harvest, and production capability of the habitat. Over-exploitation, leading to a substantial decline in fishing quality, could occur if stock densities have been significantly over estimated or harvest underestimated. Recovery of the bass population would be slow. A substantial degree of public dissatisfaction is likely if over-exploitation occurs and prevents the goals and objectives from being met.

A slight degree of public dissatisfaction may occur regarding implementation of more restrictive regulations designed to improve size quality of bass fisheries.

In some cases illegal introductions of black bass species could create competition with salmonid species, resulting in failure to achieve the goals and objectives for salmonid species management in those waters.

BLACK BASS MANAGEMENT PROBLEMS AND STRATEGIES

FINANCIAL ISSUES:

PROBLEM 1. Because of the numerous responsibilities and duties of fisheries biologists, staffing levels and resources are inadequate to conduct necessary bass studies, analyze data, and write reports.

Strategy a. Increase staff and resources available for bass studies. Hire additional biologist(s) and a technician to press scales as part of their duties. Obtain additional electrofishing boat for use in sampling bass.

Strategy b. Solicit cooperation from bass clubs in systematically furnishing fish size data from catch and release tournaments.

HABITAT ISSUES:

PROBLEM 1. Habitat improvement as a means of enhancing bass fisheries has not been adequately explored in Maine.

Strategy a. Devise and implement various types of bass habitat improvement projects on one or more bass waters where the project(s) has/have the ability to improve population levels. Follow-up studies should be adequate to determine the degree of success.

POPULATION AND MANAGEMENT INFORMATION ISSUES:

PROBLEM 1. Habitat potential, population dynamics, and fishery dynamics of the Maine bass resource are not yet completely inventoried and understood. A total of 196 smallmouth bass waters (52,483 acres) and 189 largemouth bass waters (40,205 acres) in Maine have not been sufficiently inventoried to permit determination of the most appropriate management emphasis for that population.

Strategy a. Obtain population and fishery data from Maine bass waters, and determine the relationship between these statistics and commonly used indices of productivity.

Strategy b. Perform basic bass inventory studies on waters whose management emphasis is presently listed as “unclassified”. Determine best bass management emphasis category for each newly sampled water. Assign high priority for inventory and management to waters having the ability to grow quality-size and trophy bass.

PROBLEM 2. The effectiveness of regulatory schemes, particularly length limits, in protecting and/or enhancing bass fisheries has not been fully evaluated in Maine.

Strategy a. Implement length limit changes on a variety of bass waters and study the response of their fisheries.

PROBLEM 3. Present levels of fishing effort/harvest or the catch and release ethic of many anglers may be producing significant changes in the size-class structure of some bass populations, causing declines in size quality.

Strategy a. Categorize Maine bass lakes on the basis of size-class structure, fishing effort and exploitation rates; identify affected waters.

Strategy b. Educate anglers regarding bass populations where harvest will be helpful in achieving desired size quality objective. Publish list of waters where harvest is desired.

Strategy c. Identify present or potential Maine bass waters having the capacity to provide a quality fishery on the basis of size. Devise and implement a management program to protect and/or enhance these fisheries.

Strategy d. Identify present or potential trophy bass waters on the basis of their capacity to provide a reasonable chance to capture a trophy fish (>18" for smallmouth bass. >20" for a largemouth bass). Devise and implement a management program to protect and/or enhance the "trophy" character of these fisheries.

PROBLEM 4. Maine's riverine bass populations have not been well studied.

Strategy a. Prepare a complete inventory of the state's riverine bass fisheries.

Strategy b. Estimate statewide angler effort and harvest for bass rivers and streams via the angler questionnaire.

Strategy c. Conduct an intensive study of at least one riverine bass fishery in each region during each 5-year planning period.

PROBLEM 5. Illegal introductions of smallmouth and largemouth bass create adverse impacts on management of other species.

Strategy a. Conduct statewide public relations, educational, and law enforcement program designed to curtail unauthorized bass transfers, route requests for new introductions through biologists, and apprehend violators.

PROBLEM 6. Environmentally caused variations in year-class abundance can limit first-year growth of Maine's smallmouth bass, resulting in heavy mortalities of cohorts produced during cool summers.

Strategy a. Study year-class abundance in relation to water temperatures from May through late October. Study populations of catchable bass to document impact on cohort reduction on fishing success and population levels in years when affected cohorts are in the fishery.

PROBLEM 7. The relationship of forage species to growth of bass in Maine is unknown.

Strategy a. Prepare a complete inventory of presence of selected forage items in Maine bass waters using Maine's lake inventory file.

Strategy b. Determine the bass/forage relationship in representative Maine waters.

PROBLEM 8 Delayed mortalities and potential adverse impacts on bass populations from live-released tournament-caught bass at certain times of the year and at differing release locations have not been fully investigated and/or publicized in Maine.

Strategy a. Based on past studies of Maine bass tournaments, devise an educational program to disseminate information regarding best methods to decrease mortalities.

Strategy b. Spot-check live-wells at bass tournaments with dissolved oxygen meter. Discuss results with anglers about whether live-well contained adequate dissolved oxygen to sustain bass without adverse effects.

Strategy c. Conduct additional studies on impacts of bass tournaments as necessary to minimize adverse impacts on populations.

PROBLEM 9. Bass regulations in Maine do not reflect the different management needs of smallmouth and largemouth bass.

Strategy a. Devise, implement, and follow-up on statewide and special regulations based on the biological differences between smallmouth and largemouth bass.

ACCESS ISSUES:

PROBLEM 1. Public access to some bass waters is inadequate.

Strategy a. Develop list of access needs; devise and implement a program to correct deficiencies. The type of access should fit with size of lake and amount of expected use by anglers.

PUBLIC AND PROFESSIONAL INFORMATION ISSUES:

PROBLEM 1. There is a perceived need from anglers for more bass waters in northern Maine.

Strategy a. Although anglers have suggested that Maine should introduce bass into more waters in northern Maine, the spread of bass populations and potential adverse impacts on established populations and fisheries for coldwater sportfish precludes this as a wise fisheries management option. Educate anglers regarding need to confine bass to areas where they will not create adverse impacts on other important fisheries.

PROBLEM 2. Additional unauthorized expansion of the range of largemouth bass into existing smallmouth bass waters may adversely affect smallmouth bass production and quality of the fishery.

Strategy a. Educate anglers regarding the potential impacts of unauthorized introductions of largemouth bass, regarding the proper procedure for requesting the Department to consider introducing largemouth bass, and regarding enforcement of laws prohibiting unauthorized introductions.

Strategy b. Continue to work with Warden Service for highest levels of law enforcement regarding illegal introduction of new fish species. Request the maximum penalty from courts for successful prosecution of violators.

Strategy c. Prohibit tournaments in waters where bass are illegally introduced in the future.

APPENDIX A

WARMWATER WORKING GROUP INPUT

WARMWATER WORKING GROUP
BLACK BASS MEETING SUMMARY
MAY 24, 2001

Issues:

- ✓ *Tournaments: what are the effects, if any, of releasing fish away from the capture point?*
- ✓ *What are the effects of a largemouth bass introduction on a resident population of smallmouths, i.e. are the former expanding at the expense of the latter?*
- ✓ *Does the bass tapeworm occur in Maine? What is its impact, if any, on bass?*
- ✓ *Staff increase needed to do justice to the size and importance of this resource.*
- ✓ *Habitat restoration/improvement program: DIFW should have "Habitat Engineers" to supervise this type of work.*
- ✓ *Need for more **FFO**/ALO opportunities for bass anglers, re the "setting" provided on such waters. Small waters are the most likely candidates.*
- ✓ *Proposal made to consider expanding bass angling opportunity into appropriate waters in Aroostook County.*
- ✓ *Suggestion was made that fishing rules/regulations have not kept pace with advances in technology. Re made to GPS units, sonar, even lures.*
- ✓ *Need to place increased emphasis on educational efforts – particularly as regards the illegal introduction of exotics. It was suggested that we use the fishing rulebook as part of this effort.*
- ✓ *It was proposed that the DIFW consider a "Bass License" for those who have no interest in other fisheries. A system of "stamps" was also suggested.*
- ✓ *It was suggested that DIFW utilize the DeLorme Gazetteer to provide sport fishing information as per the NH Gazetteer model.*
- ✓ ***What is a "trophy"?****
- ✓ *C.M.R. tourneys are a potential source of fishery information since each fish is measured and verified. DIFW should look at these tourneys as a possible source of data.*
- ✓ *Fall fishing is restricted because of concerns about the effect of angling on fall spawners, shouldn't spring spawners be similarly protected?*
- ✓ *Others suggest that spring fishing should be liberalized.*
- ✓ *Inappropriate operation of watercraft – PWC's took the brunt of the criticism. Common courtesy is the key word in proper operation of any watercraft.*
- ✓ *Rivers will be the next major area of interest for bass anglers. Additional work is needed on rivers.*
- ✓ *DIFW should consider LMB introductions into some large waters to expand opportunities for weigh-in tourneys thereby taking some of the pressure off the more popular tourney waters.*

The following goals and objectives were arrived at through group discussion:

Goals

I. Maintain the present fishery (Lakes and Ponds and Rivers and Streams).
II. Increase fishing opportunity for bass.
III. Expand/improve access.

Many members of the group expressed interest in concentrating management efforts on maintaining and/or enhancing size quality where possible. Subsequent to the discussion of goals and objectives, the WW Group asked DIFW staff what they "wanted" for Goals and Objectives.

The following Goals and Objectives, interestingly similar to those developed by the WW Group, were offered by Rick Jordan and seemed to find general acceptance by the WW Group present at the meeting. The number of lakes and their acreages were filled in later based on Fisheries Division knowledge of appropriate categories for each lake; the completed table is found on page 38 of this plan.

Black Bass Management Goal and Objectives, 2001

- ✓ Maintain black bass populations and fishing opportunities in 613 lakes and ponds, in existing rivers and streams, and provide for limited new introductions in appropriate waters.
- ✓ Provide the following potential fishing quality in lakes and ponds:

MANAGEMENT EMPHASIS	CATCH/ANGLER-DAY	LENGTH IN INCHES (RANGE)	NUMBER OF LAKES	ACRES OF LAKES
General	6-20	8-16”		
Size Quality*	3-5	14-23”		
Fast Action	>20	6-12”		
Unclassified	---	---		

***There was considerable discussion on the definition of what constitutes a trophy fish. It was suggested that the Size Quality Category might be to broad and that it should be split into 2 groups: Size Quality and Trophy. There seemed to be some general agreement that the criteria for size quality and trophy fish should differ between species of bass (SMB and LMB), habitat types (lakes versus rivers), and regions of the state, i.e. Fishery Regions A and B versus C and others.*

PRIORITIZED BLACK BASS MANAGEMENT OBJECTIVES

DESCRIPTION OF STATEWIDE OBJECTIVES	RANKINGS Warmwater Group
Maintain, acquire and improve **angler access sites,** as necessary.	1
Maintain present fishing opportunities for black bass in 613 lakes and ponds and in existing rivers and streams.	2
Maintain the present diversity of black bass fishing opportunities in lakes and ponds and rivers and streams to include **"**Fast Action Fishing Quality", "General Fishing Quality", "Quality Size Fishing Quality" and "Trophy Size Fishing Quality".	3
Provide for limited introductions of black bass in waters to satisfy angler demands only when such introductions do not threaten existing sport fisheries.	4
Improve black bass size quality in lakes and ponds and rivers and streams, as appropriate.	4

PRIORITIZED BLACK BASS MANAGEMENT PROBLEMS

DESCRIPTION OF MANAGEMENT PROBLEMS	FINAL RANKING
The unauthorized expansion of the range of either species of black bass remains a serious and growing threat to coldwater gamefish species.	1
Changes in water temperature regimens can severely limit first-year growth of Maine's smallmouth bass, resulting in heavy over-winter mortalities of bass fry produced during cool summers with the potential for complete year-class failures.	1
The Fisheries Division lacks sufficient staff and financial resources to implement the strategies necessary to achieve the plan's objectives.	2
The unauthorized expansion of the range of largemouth bass may adversely affect pre-existing smallmouth bass fisheries.	3
Bass regulations in Maine do not reflect the different management needs of our two black bass species: smallmouth bass and largemouth bass.	4
Public access to some bass waters is inadequate.	5
The effectiveness of existing regulatory strategies, particularly length limits, has not been fully evaluated in Maine.	6
The Fisheries Division lacks sufficient staff and financial resources to implement the strategies necessary to achieve the plan's objectives.	7
There is insufficient information on angler use, catch and harvest from black bass principal fisheries.	8
The potential adverse impacts of live-release bass tournaments on Maine bass populations are not fully understood.	9
Present levels of fishing effort and harvest as well as the strong catch and release ethic of Maine bass anglers may be producing significant changes inn the size class structure of Maine bass populations.	10
Maine's river and stream bass populations and bass fisheries have not been well studied.	11
The relationship of the type and abundance of forage species to growth of bass in Maine is unknown.	12
Habitat improvement as a means of enhancing bass fisheries has not been adequately explored in Maine.	13
Maine's black bass habitat and black bass populations have not been fully inventoried.	14

CONCEPT PLAN FOR THE IMPLEMENTATION OF BLACK BASS MANAGEMENT OBJECTIVES (2001-2016)

PRIORITIZED BLACK BASS MANAGEMENT OBJECTIVES		Region A Contribution			Region B Contribution			Region C Contribution			Region D Contribution			Region E Contribution			Region F Contribution			Region G Contribution			Statewide Totals		
DESCRIPTION OF STATEWIDE MANAGEMENT OBJECTIVES	**Rank**	**Exst**	**Prop**	**Dfct**	**Exst**	**Prop**	**Dfct**	**Exst**	**Prop**	**Dfct**	**Exst**	**Prop**	**Dfct**	**Exst**	**Prop**	**Dfct**	**Exst**	**Prop**	**Dfct**	**Exst**	**Prop**	**Dfct**	**Exst**	**Prop**	**Dfct**
Maintain, acquire and improve **angler access sites,** as necessary.	1																								
Maintain present fishing opportunities for black bass in 613 lakes and ponds.	2a																								
Maintain present black bass fishing opportunities for existing river and stream populations.	2b																								
Maintain the present diversity of black bass fishing opportunities in lakes and ponds to include **"**Fast Action Fishing Quality", "General Fishing Quality", "Quality Size Fishing Quality" and "Trophy Size Fishing Quality".	3a	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Maintain the present diversity of black bass fishing opportunities in rivers and streams to include **"**Fast Action Fishing Quality", "General Fishing Quality", "Quality Size Fishing Quality" and "Trophy Size Fishing Quality".	3b	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Provide for limited introductions of black bass in waters to satisfy angler demands only when such introductions do not threaten existing sport fisheries.	4a																								
Improve black bass size quality in lakes and ponds, as appropriate.	4b																								
Improve black bass size quality in rivers and streams, as appropriate.	4c																								

*****See tables 1 and 2 on the following pages for fishing quality concept plans.

Fishing Quality Objectives for Lakes and Ponds Having *Principal Fisheries* for Bass and the EXISTING SUPPLY of These Waters

MANAGEMENT EMPHASIS	CATCH/ANGLER DAY*	LENGTHS OF FISH COMMONLY CAUGHT	LENGTHS OF LARGEST FISH CAUGHT	SMALLMOUTH BASS			LARGEMOUTH BASS		
				NUMBER OF LAKES	% OF LAKES IN THIS CATEGORY	ACRES OF LAKES	NUMBER OF LAKES	% OF LAKES IN THIS CATEGORY	ACRES OF LAKES
Fast Action	>20	6-12”	--	14	3%	23,977	5	2%	556
General	6-20	6-16”	--	100	24%	134,280	29	9%	11,249
Quality Size **Regions A&B** **Regions C-G** **Statewide total**	 >3 >3	 -- --	 14-18” 12-18”	 59 32 91	 22%	 84,045 65,854	 93 3 96	 29%	 107,489 333
Trophy	0-3	--	≥18” SMB ≥20” LMB	15	4%	49,543	12	4%	16,170
Unclassified:	Lack of data	Lack of data		196	47%	52,483	189	56%	40,205

* Catch rates will be lower in Regions E & G where environmental conditions limit population size due to reduced survival of first-year bass**.**

CONCEPT PLAN FOR THE IMPLEMENTATION OF BLACK BASS FISHING QUALITY OBJECTIVES FOR LAKES AND PONDS (2001-2016)

PRIORITIZED BLACK BASS MANAGEMENT OBJECTIVES		Region A Contribution			Region B Contribution			Region C Contribution			Region D Contribution			Region E Contribution			Region F Contribution			Region G Contribution			Statewide Contribution		
DESCRIPTION OF BLACK BASS FISHING QUALITY MANAGEMENT OBJECTIVES FOR LAKES AND PONDS	Rank	Exst	Prop	Dfct	Exst	Prop	Dfct	Exst	Prop	Dfct	Exst	Prop	Dfct	Exst	Prop	Dfct	Exst	Prop	Dfct	Exst	Prop	Dfct	Exst	Prop	Dfct
Fast Action	3a																						14		
General	3a																						100		
Quality Size	3a																						91		
Trophy	3a																						15		
Unclassified	3a																						196		

Exst = existing supply; Prop = proposed supply by 2016; Dfct = need for change in the number of waters in this category and region by 2016.

Fishing Quality Objectives for Rivers and Large Streams Having *Principal Fisheries* for Bass and the KNOWN EXISTING SUPPLY of These Waters:

MANAGEMENT EMPHASIS	CATCH/ANGLER-DAY	LENGTHS OF FISH COMMONLY CAUGHT	LENGTHS OF LARGEST FISH CAUGHT	SMALLMOUTH BASS NUMBER OF RIVERS AND STREAM	LARGEMOUTH BASS NUMBER OF RIVERS AND STREAMS
Fast Action	>20	6-12”	--	3	0
General	6-20	6-16”	--	10	2
Quality Size					
Regions A&B	>3	--	14-18”	1	1
Regions C-G	>3	--	12-18”	2	0
Trophy	0-3	--	≥18” SMB	0	0
			≥20” LMB	0	1
Unclassified:	Lack of data	Lack of data		4	1

CONCEPT PLAN FOR THE IMPLEMENTATION OF BLACK BASS FISHING QUALITY OBJECTIVES FOR RIVERS AND STREAMS (2001-2016)

PRIORITIZED BLACK BASS MANAGEMENT OBJECTIVES		Region A Contribution			Region B Contribution			Region C Contribution			Region D Contribution			Region E Contribution			Region F Contribution			Region G Contribution			Statewide Contribution		
DESCRIPTION OF BLACK BASS FISHING QUALITY MANAGEMENT OBJECTIVES FOR RIVERS AND STREAMS	**Rank**	**Exst**	**Prop**	**Dfct**	**Exst**	**Prop**	**Dfct**	**Exst**	**Prop**	**Dfct**	**Exst**	**Prop**	**Dfct**	**Exst**	**Prop**	**Dfct**	**Exst**	**Prop**	**Dfct**	**Exst**	**Prop**	**Dfct**	**Exst**	**Prop**	**Dfct**
Fast Action	3a																						3		
General	3a																						10		
Quality Size	3a																						3		
Trophy	3a																						0		
Unclassified	3a																						4		

Exst = existing supply; Prop = proposed supply by 2016; Dfct = need for change in the number of waters in this category and region by 2016.