

By E. C. von Geldern, Jr.

black bass

what does the future hold in store for these fine game fish in California?

BLACK BASS constitute one of California's most highly prized and sought after game fishes. While they do not have as large a following as trout in the Golden State, they are actively pursued by an ever-increasing number of devoted anglers.

There can be no question but that interest in black bass angling in California has reached unprecedented levels. During the last two years alone, from 12,000 to 15,000 avid California anglers have organized themselves into fishing clubs that actively promote and support both black bass angling and programs to enhance black bass fisheries throughout the state.

The increased interest in black bass angling is reflected by Department of Fish and Game postal card surveys designed to establish trends in use and catch among the various segments of California's inland fisheries. These surveys show that the annual black bass catch in California during the 1970s is about double what it was in the 1950s, while the number of successful bass anglers has increased by about 65 percent. We have every reason to expect that interest in these fine sport fish will continue to increase in the years ahead.

What impact has increased fishing pressure had on California's black bass resources? How well prepared is the Department of Fish and Game to handle the ever greater increases which are projected for the future? These are important questions of real and genuine concern to all devoted bass anglers. Before describing some of the prob-

lems associated with the management of California's black bass fisheries, it might first be desirable to define the general status of these fisheries as they exist today.

The discussions that follow, both from the standpoint of the present black bass fishery and the Department of Fish and Game's management programs, apply primarily to largemouth bass in artificial impoundments. We fully recognize the importance of other black bass species such as smallmouth bass and spotted bass, and we also recognize that significant bass populations exist in many streams and natural lakes. We believe, however, that largemouth bass fisheries are of greatest concern to the majority of sport fishermen and that reservoirs provide most of the habitat for this species in California.

The DFG postal card surveys provide some important clues concerning the status of black bass fisheries in California today. For example, these surveys show that the total annual black bass catch, after reaching a record high in 1969, declined by over 12 percent in 1970 and an additional 9 percent in 1971. The total number of successful bass anglers (those who actually catch bass) reached a peak in 1970 and declined by 8 percent in 1971.

A declining catch coupled with increasing pressure generally serves as a signal that troublesome times may lie ahead. In the case of bass fisheries, the situation on individual waters may be even more acute since habitat potentially capable of supporting bass populations has steadily increased because of the construction of new reservoirs.

12-pound, 14-ounce Florida-strain largemouth bass from El Estero Reservoir, San Diego County. Large specimens such as this have become increasingly common in southern California in recent years.

These observations indicate that the art of bass management will need to be refined if we are to maintain and enhance California's bass fisheries in the future. We recognize the great importance of this objective and are committed to the development of bass management programs which will maintain these fisheries at attractive levels for future generations.

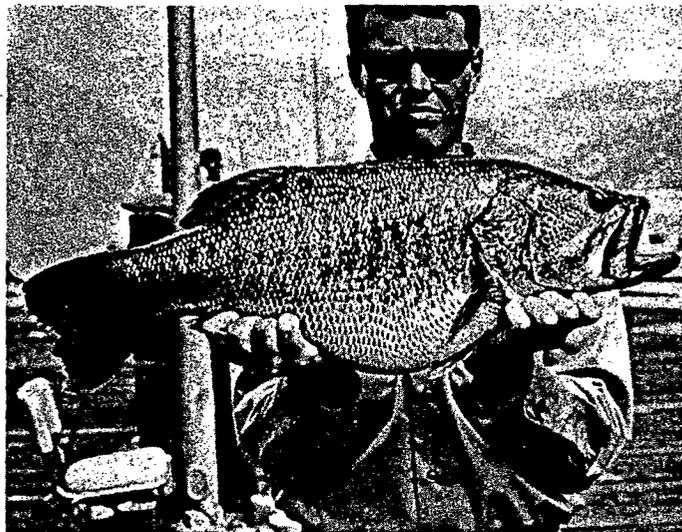
It's turn now to some of the specific problem areas associated with the management of bass fisheries. In this regard, California began to intensively study warmwater reservoirs in 1960. While this timely research effort was directed at increasing our general knowledge of reservoir fisheries as a whole, much of the information obtained applies directly to the largemouth bass segment of these fisheries.

The major difficulty concerning the efficient management of largemouth bass in reservoirs centers on the simple fact that bass invariably must compete with a variety of game and nongame fish species in these waters. Bass are efficient competitors and we all know that they can sustain large populations in suitable environments. When numbers are reduced by angling, however, other fish species may successfully compete for the "ecological niche" left vacant by the removal of the bass.

Tagging studies very clearly show that bass are removed from reservoirs by anglers at far greater rates than those of game and nongame fish species which compete most directly with them. Tagging studies conducted on a variety of reservoirs throughout California show that anglers harvest about 50 percent of the catchable-sized bass population each year. By comparison, such species as bluegill, crappie and catfish are harvested at much lower rates. This phenomenon tends to favor competing species at the expense of bass and is very definitely responsible for bass fishery declines in many waters.

Another problem associated with bass fisheries involves the interaction of black bass and threadfin shad. We know that threadfin shad are an extremely important forage fish for a variety of game fish in many of our larger reservoirs. Bass growth rates have improved in reservoirs where shad are stocked and, to that extent, the introduction of shad has been desirable.

We must remember, however, that forage fish are of



value only to game fish which are large enough to consume them. In some reservoirs we have found that shad have reduced the survival of young bass. We are not certain why this occurs, but it most probably relates to competition between very young bass and shad for the same food items. This phenomenon is observed most often in the San Joaquin and Salinas valleys, and we find the problem to be particularly acute in years when rainfall is low and winters are relatively mild. Such conditions permit large numbers of shad to survive the winter, which adversely affects young bass survival the following spring.

A third major problem centers on environmental changes which occur as a reservoir ages. New reservoirs often have considerable shelter along the shoreline, which is highly conducive to successful bass spawning. The primary virtue of shelter is that it helps protect bass nests from the destructive effects of wind and wave action. As reservoirs age, much of this shelter washes out, the shoreline is left exposed and bass reproduction declines. We consider this phenomenon to be an important contributing factor to the decline of bass populations in many of our older impoundments.

Water level fluctuation patterns in some reservoirs are often not conducive to successful largemouth bass reproduction. DFG studies clearly show that bass reproduction is greatest when water levels are stable or slowly rising during the spring spawning period. Rapidly rising water levels are detrimental because they often result in decreasing water temperatures at the nest site, which may adversely affect the development of bass eggs.

Conversely, declining water levels expose bass nests more fully to the destructive effects of wind and wave action. These conditions occur with varying intensity throughout California and they definitely add to the many problems associated with the management of black bass fisheries.

The problems of excessive bass harvest, the adverse effects of threadfin shad on bass reproduction, habitat deterioration and water level fluctuation patterns clearly constitute the major threats to California's black bass re-

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sources. Let us look now at how the DFG is attempting to find solutions to these problems.

The DFG has long recognized that anglers harvest bass at far greater rates than competing species, and we have attempted to counteract this by liberalizing or removing bag limits from competing species. More recently we have broadened our approach by stocking the Florida largemouth and also by evaluating the general effectiveness of size limits as a means of reducing exploitation.

The Florida largemouth was first introduced into California in 1959. Extensive tagging studies have been conducted at El Capitan Reservoir in San Diego County which compared the angler harvest rate or "catchability" of Florida bass and the regular northern form that is prevalent throughout California. In virtually every instance, Florida bass proved to be about twice as difficult for anglers to catch as northern bass.

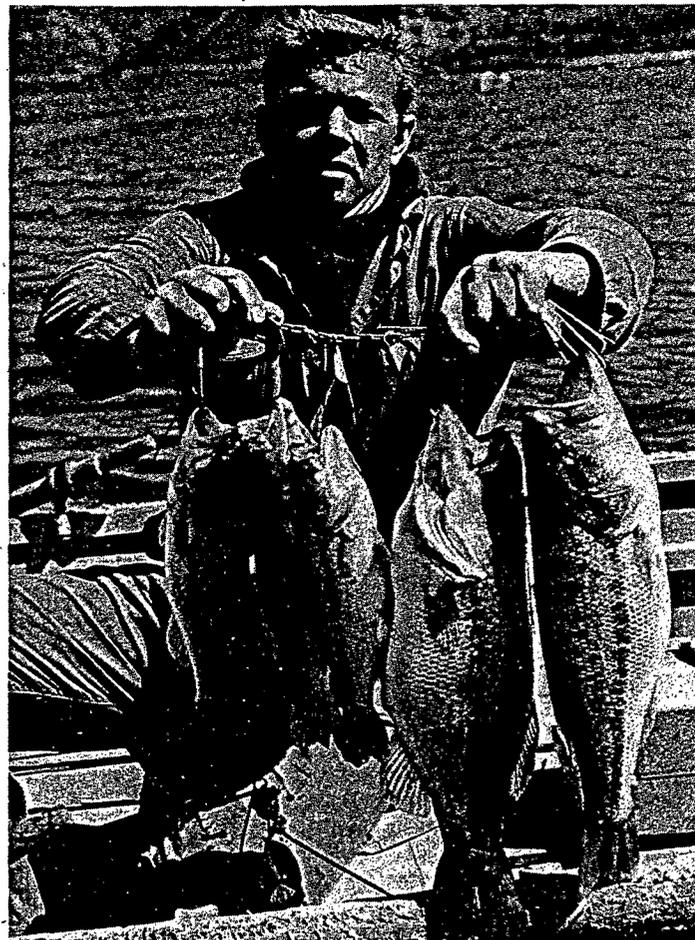
Florida bass hybridize readily with the northern form, and bass populations with Florida-strain characteristics rapidly develop in reservoirs where they are stocked. Bass angling in southern California has substantially improved since Florida bass were introduced and large numbers of bass in excess of 10 pounds are regularly taken. In effect, because of their lower vulnerability to anglers, Florida bass have reduced or alleviated the general problem of bass overharvest in many southern California reservoirs.

Despite the success of Florida bass in southern California, their introduction into northern waters will be very carefully controlled. We have found that some game fish species such as bluegill decrease in abundance after Florida bass become established and, for that reason, their introduction into waters containing attractive bluegill fisheries may be unwise. Folsom Lake, near Sacramento, was stocked with Florida bass in 1972 and 1973 in an effort to determine the ability of Florida bass to solve management problems associated with the differential harvests of bass and competitors in northern waters.

Adoption of a size limit on black bass in California is a management tool which has potential for reducing the exploitation rate of bass populations. Extensive creel checks conducted on a multitude of waters throughout northern and central California indicate that about 50 percent of all bass caught and kept by anglers in these areas are 12 inches or less in length. In the south, however, the average length of bass in the angler's catch is probably closer to 14 inches.

We are presently evaluating the impact of a 12-inch size limit on the largemouth bass fishery at Merle Collins Reservoir near Marysville. The program is designed to determine the hooking mortality suffered by undersized fish released by anglers. When this information is obtained, we can then decide whether to extend this regulation to additional waters.

Anglers themselves can play an important role in helping to lessen the problem of bass overharvest. They can do this by carefully releasing all fish they don't really need and by encouraging their fellow anglers to do the same. The Department of Fish and Game is much impressed with the increasing emphasis that responsible bass fishing organizations are placing on releasing bass alive, and we



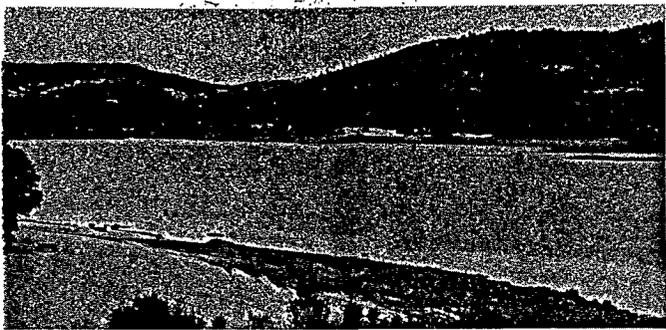
A skillful angler shows off a fine string of northern largemouth bass from Lake Piru in Ventura County.

hope this concept of the sport of bass angling will grow in the years ahead.

Many California anglers are aware of the DFG's program of stocking trout and striped bass in certain large impoundments containing abundant populations of threadfin shad. The fisheries these programs provide are attractive to a great many anglers and they help reduce angler pressure on the black bass segment of reservoir fisheries.

We also believe that these programs may help alleviate some of the adverse effects excessive shad populations have on the survival of young bass. The DFG has conducted extensive studies on the food habits of both striped bass and trout in reservoirs containing threadfin shad. These studies clearly reveal that threadfin shad are the staple food item consumed, and there is no evidence that these species feed on black bass.

Problems associated with the deterioration of shoreline habitat are potentially quite difficult to solve. Direct physical manipulation of the environment would be extremely costly if conducted at a level which would materially enhance California's bass fisheries on a statewide basis. As an interim measure, we have chosen to import the Alabama



Erle Collins Reservoir, Yuba County, is the site of a DFG special program designed to evaluate the impact of a 12-inch size limit on black bass fisheries. DFG photo by Ken Wigglesworth.

Spotted bass, which has demonstrated the ability to reproduce and provide attractive fisheries in older impoundments in Alabama and Georgia.

The spotted bass is reportedly an outstanding game fish and is extremely active on hook and line. They build deeper nests than largemouth bass, resulting in more protection from the detrimental effects of wind and wave action. Spotted bass fry are more developed and more active when they hatch than the fry of other black bass species. They also tend to feed on fish at an earlier age than either largemouth or smallmouth bass.

For these reasons, spotted bass may be able to reproduce successfully in older impoundments where water level fluctuations and surplus threadfin shad populations limit the reproductive success of other black bass species.

We wish to emphasize that it is not our intent to substitute spotted bass fisheries for largemouth bass fisheries in California waters. Their importation will be made solely to provide more variety for California's bass anglers. We plan to initially introduce spotted bass into Perris Reservoir in southern California and Millerton Lake near Fresno. Their performance in these waters will be carefully evaluated before they are stocked in additional impoundments.

One rather traditional approach to fisheries management has been to stock fish on some sort of a regular basis in situations where natural reproduction is limited. This approach to bass management has, historically, been difficult to implement because of high costs and other problems associated with rearing large numbers of bass in hatcheries. Bass generally require minnows for food and have a distinct tendency to feed on each other—factors which greatly add to the costs of rearing bass. Recently, however, the Alabama Department of Fish and Game developed an economical technique for rearing bass which involves "pre-training" young fish to accept prepared food.

The DFG attempted to duplicate Alabama's program at the Central Valleys Hatchery in 1973. While the results of a series of experiments were mixed, we are now reasonably certain that we can rapidly develop the technology required to economically rear bass to yearling size in hatcheries. Moreover, we expect to have a small crop of

yearling bass in 1974 which can be used for experimental stocking purposes.

Facilities for rearing bass at Central Valleys Hatchery will be expanded this year, and the economic feasibility of stocking both fingerling and yearling bass in large impoundments can then be thoroughly evaluated. If successful, this program could add an entirely new dimension to the art and science of bass management.

Opportunities for controlling water level fluctuation patterns are usually quite limited since water agencies normally have firm commitments to supply downstream users and to maintain adequate flood control storage. In some cases, it may be possible to control water levels at certain key impoundments in situations where several reservoirs are located on the same water course.

We believe that our black bass management program is moving ahead—that some of the major problems have been identified and that we are implementing experimental management programs which have a solid potential for solving these problems.

Our job has been made easier by the establishment of new reservoir biologist positions in each of our five regional management units. This additional manpower will be used to help solve the complex problems associated with reservoir management. We have every reason to believe that orderly progress in this field will be made in the years ahead. #

New Chief of Operations . . . James S. Leiby, administrative officer of the Department of Fish and Game since 1960 and the man chiefly responsible for the DFG's \$4 million program to screen major water diversions, has been named the department's chief of operations. He will supervise all field operations of the DFG—regional activities, engineering and communications—and will be directly or indirectly responsible for the work of more than 800 persons, about two-thirds of the entire DFG staff. #

DFG Employees Honored . . . For their key roles in the re-establishment of a saltwater marsh in Bolsa Chica Bay—an action unprecedented anywhere in the world—two employees of the Department of Fish and Game won the coveted Wildlife Officer of the Year Award of the Shikar-Safari Club International, an organization of sportsmen-conservationists. The award went jointly to James B. McCormick, chief of the DFG's Planning Unit, and John Speth, associate wildlife manager-biologist. #

Sport Fishing Regulations . . . The California Fish and Game Commission has adopted 1974 sport fishing regulations designed to make it easier for the state's 2.3 million anglers to follow rules that fill a 32-page booklet. Under the new format, the state is divided into eight districts, each with its own fisheries and rules. Districts are the Southern, Colorado River, Central Coast, Sierra, Valley, North Coast and Delta inland fisheries districts and the Ocean and San Francisco Bay Ocean Fishing District. #