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NATIONAL PARK SERVICE

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Memorandum

To: General Superintendents, Alaska and Klamath Falls Groups,
and Superintendents, Coulee Dam, Craters of the Moon,
Mount Rainier, Nez Perce, North Cascades, and Olympic

From: Chief Scientist, Pacific Northwest Region

Subject: Paper on special regulations, sport fishing

Enclosed is a copy of the paper "Management of Aquatic Resources
and Sport Fishing in National Parks by Special Regulations," which
Mr. Wallis presented recently at the Western Division meeting of the
American Fisheries Society. This document contains many ideas which
will be of interest and value to you.

Garrett A. Smathers

Enclosure

MANAGEMENT OF AQUATIC RESOURCES
AND SPORT FISHING IN NATIONAL PARKS
BY SPECIAL REGULATIONS

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MANAGEMENT OF AQUATIC RESOURCES AND SPORT FISHING
IN NATIONAL PARKS BY SPECIAL REGULATIONS

ABSTRACT

Management of aquatic resources within national parks is directed toward the protection, perpetuation, and restoration of the natural environments, native fish fauna, and the associated fauna and flora. Where recreational fishing is encouraged, it is governed by the conservative and controlled use of native and nonnative fishes, designated as sport species, and by regular and special regulations and measures that are designed to encourage high quality fishing as a part of the park experience without endangering the basic fish supplies or impairing the wildlife, scenic, scientific, ecological, and historical values of the park and the enjoyment of these features by other park visitors.

Special regulations to achieve specific resource management objectives are used in current aquatic resources management and use programs in national parks. To illustrate the application of special regulations in more detail, programs in Yellowstone, Great Smoky Mountains, and Shenandoah National Parks are described and analyzed.



MANAGEMENT OF AQUATIC RESOURCES AND SPORT FISHING
IN NATIONAL PARKS BY SPECIAL REGULATIONS

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Management of aquatic resources within national parks is directed toward the protection, perpetuation, and restoration of the natural environments, native fish fauna, and the associated fauna and flora. Where recreational fishing is encouraged, it is governed by the conservative and controlled use of native and nonnative fishes, designated as sport species, and by general and special regulations and measures that are designed to encourage high quality fishing as part of the park experience without endangering the basic fish supplies or impairing the wildlife, scenic, scientific, ecological, and historical values of the park and the enjoyment of these features by other park visitors.

National parks, since Yellowstone National Park was created on March 1, 1872, have been set aside as unique natural areas. Natural terrestrial and aquatic ecosystems within them are protected and perpetuated, and restored, where feasible, under conditions as undisturbed as possible. Full protection is afforded by law to all plants and animals, except fishes.

Congress directed the Secretary of the Interior in 1872 to establish regulations that would provide against the wanton destruction of fish and against their capture or destruction for the purposes of merchandise or profit. Subsequently, the Act of May 7, 1894 (28 STAT 73) that related to the protection of birds and animals in Yellowstone National Park dictated:

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" . . . nor shall any fish be taken out of the waters of the park by means of seines, nets, traps, or by the use of drugs or any explosive substances or compounds, or in any other way than by hook and line, and then only at such seasons and in such times and manner as may be directed by the Secretary of the Interior . . . he shall make rules and regulations governing the taking of fish from the streams or lakes in the park . . ."

Thus the initial special regulations for fishing in Yellowstone National Park were established. Subsequently, these or similar provisions were incorporated in legislation that authorized additional national parks. Eventually, with the creation of the National Park Service in 1916, the general Servicewide regulations that were enacted contained provisions of these earlier laws.

Recreational fishing within a national park is governed by: (1) laws and regulations of the State in which the individual park is located; (2) general Federal regulations that apply, with some exceptions, to all national parks; and (3) special Federal regulations that relate to the specific park.

With a few exceptions, all fishing laws and regulations for the State in which a national park is located are adopted and made a part of the general Federal regulations for that park. General and special Federal regulations may be more restrictive than those of the State. However, as a general principle, fishing regulations within a national park are not more liberal than those of the State in which the park is situated.

Majority of fishermen in most national parks are residents of the State in which the park is found. Therefore, from the fisherman's point-of-view, it is desirable and much less confusing if there is a degree of consistency between fishing laws and regulations that apply within and outside the park.

In all areas administered by the National Park Service, except 10 national parks, a fisherman must satisfy State fishing license requirements before wetting a line in park waters. No license is required in Yellowstone, Glacier, Olympic, Mount Rainier, Crater Lake, Big Bend, Wind Cave, Isle Royale, Mammoth Cave and Platt National Parks. This requirement is governed by the legislation under which the park was established or by commitments that were made at that time.

Management of aquatic ecosystems and fishing activities within a national park involves many considerations. The park manager is concerned with the impact of the fishermen upon the fragile aquatic and

shoreline environments, upon the wilderness aspects of the park, upon the wildlife, and upon the enjoyment of the park by other groups of visitors. He is concerned with the traffic, parking, littering, and other problems associated with this or any other group of park visitors. Special regulations are developed to cope with these concerns associated with fishing as well as the protection of the fishery resources.

On waters, located outside a national park, where the management objectives are geared to provide for maximum utilization of a fishery resource and for maximum opportunities for fishing, many basic methods may be employed to enhance the resource. These include: 1. fish planting to introduce new species, to extend the range of endangered species, and to maintain an adequate stock of fish in waters in which natural reproduction is limited or lacking; 2. lake and stream improvements to enhance the environments; 3. manipulation of the populations of sport fishes by the removal of nongame species, even endemic forms, that are considered to be undesirable for the maintenance of game species; 4. construction of new waters by making impoundments; and 5. regulations to control the catch and protect the basic fishery resources.

Resource management objectives within a national park generally preclude the use of those methods that artificially manipulate the natural aquatic environments and aquatic populations. Congress, in the Act of 1916, that established the National Park Service, provided some specific directives that relate to the management of park resources. In part, the Act stated that:

"The Service thus established shall promote and regulate the use of the Federal areas known as national parks, monuments, and reservations, hereinafter specified, by such means and measures as conform to the fundamental purpose of the said parks, monuments, and reservations, which purpose is to conserve the scenery, and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations."

From early years, fish planting has been widely conducted in national parks. With a general lack of full understanding and appreciation of the significance of natural and unmodified aquatic ecosystems, both native and exotic fishes have been planted and transplanted into waters that were originally barren of fish life and into waters containing endemic species. As a consequence, few waters and fish populations remain in national parks that have not been altered by stocking.

With the era of fish culture, stocking was sanctioned for the purposes of replenishing fish stocks that had been reduced or depleted by fishing; maintaining fish populations in waters in which conditions for natural reproduction were limited or absent; and creating new fishing waters by stocking waters that did not naturally contain sport fishes. Stocking of trout into isolated backcountry lakes and streams was used to entice visitors into remote areas of the park. Although none are located in national parks today, fish hatcheries operated in several parks in the past to provide an adequate supply of trout for stocking.

Fishes, mostly trouts, are still stocked in limited numbers in some national park waters to maintain fishing at desired levels and to restore native species. This practice, however, is now carefully regulated and conducted in accordance with approved management plans in which the management objectives for each water are defined. At the present time, trout are not stocked in the waters of Yellowstone, Glacier, Crater Lake, Shenandoah and Rocky Mountain National Parks.

Prime consideration is directed toward species that are native to the individual water or drainage. Barren waters are not stocked. Numbers of fishes planted are regulated within the carrying capacity of the water and the anticipated fishing pressure.

Investigations have revealed that stocking is not required in many waters to perpetuate natural conditions and to maintain high quality fishing. It is recognized that past introductions have severely altered natural aquatic environments and, in many cases, have impaired the native fish fauna.

Increasing emphasis is being placed upon the objective of protecting and maintaining wild populations of native and introduced fishes solely by natural reproduction. Special regulations are created that will implement this objective by restricting the total catch so that wild populations of trout may be maintained without artificial replenishment by the use of hatchery fishes.

Special regulations, also, are used extensively in national parks to implement management programs designed to accomplish management objectives of perpetuating and restoring where feasible the natural aquatic environments and natural aquatic life and providing for fishing for wild trout. Such special programs have been established in several parks to enhance the quality of fishing. Programs, such as Fishing-For-Fun or catch-and-release fishing and fly-fishing-only and children-only, have met with mixed success. Some have achieved the desired objectives and have resulted in an increase in the quality of the fishing opportunities. Others have been less successful. The Fishing-For-Fun program in Yosemite National Park was discontinued,

for example, because of the lack of wide public acceptance, lack of adequate personnel for law enforcement and for monitoring the program, and poor selection of water.

To effectively and successfully implement management objectives or programs, special regulations in national parks and elsewhere must adhere to certain criteria. Such criteria include the following principles: Special regulations should be:

1. Established to serve a specific purpose or objective;
2. Limited in number to those actually required;
3. Based upon sound biological principles and derived from adequate investigations or research;
4. So clearly written that their true meaning and intent is understood by the fishermen;
5. Acceptable to the fishermen;
6. Available to the fishermen either by printed notices or booklets or visibly posted;
7. Enforceable and enforced; and
8. Periodically reviewed and evaluated to determine if they are effectively achieving the objectives for which they were established; if not, they should be abolished or revised.

Special regulations, by their very limited nature, can create additional administrative responsibilities such as increased law enforcement; the need for expanded public relations to explain the special provisions and their purposes; and added posting and signing. When criteria such as these are not given proper consideration, problems of enforcement and application frequently develop and the special regulations fail to accomplish the intended purposes.

The National Park Service has the responsibility for the management of the aquatic resources and the regulation of fishing activities within national parks. In fulfilling this obligation, the Service receives the cooperative assistance from the appropriate State fish and game departments and the U. S. Fish and Wildlife Service. Such assistance includes lake and stream surveys and management services, advice, fishes for stocking when required, and aid in fish planting especially when stocking is done by airplane.

Fishery management programs within national parks are designed to complement activities directed by the State fish and game departments and the Bureau of Sport Fisheries and Wildlife in waters located outside park boundaries.

In addition to national parks and other natural areas, the Service administers recreational areas including the large reservoir areas such as the Lake Mead National Recreation Area, Nevada-Arizona, with Lakes Mead and Mohave; and Glen Canyon National Recreation Area, Arizona-Utah, with Lake Powell. In these recreational areas, maximum development and management of the fishery resources are encouraged for the purposes of increasing fishing opportunities and regulations are designed to achieve these objectives. Fishery management programs in these areas are conducted primarily by the States in cooperation with the National Park Service and the U. S. Fish and Wildlife Service.

Some special fishery programs operating in Great Smoky Mountains, Shenandoah, and Yellowstone National Parks are discussed below to illustrate how special regulations are effectively employed to implement these programs.

Examples of Special Aquatic Resources Management Programs

Shenandoah National Park.

Shenandoah National Park, located in the northern section of the Blue Ridge Mountains in Virginia, has more than 108 miles of trout streams. Size of the trout populations in these waters is controlled by droughts, storms, and other climatic conditions.

In the autumn of 1951, a series of severe droughts started that continued into 1955. Seasonally, water in the streams was reduced to isolated pools. Flash floods on March 1, 1954 and the torrential rains released by Hurricane Hazel on October 15, 1954 scoured the stream courses. Additional downpours associated with Hurricanes Connie and Dianne in August 1955 resulted in further destruction. Investigations conducted by Fish and Wildlife Service biologists, reported Lennon (1961), revealed that the trout resources had been severely depleted by the combination of climatic events.

The National Park Service faced two alternatives for the management of the trout streams of the park. One, the surviving brook trout could be protected and assisted in restoring the trout populations by natural reproduction or, two, attempts could be made to reestablish and maintain stream trout populations by the stocking of hatchery trout. Initially, the Service employed both methods.

In 1955, fingerling trout were stocked in 13 of the park's 46 streams. Subsequent hurricane-created floods nearly eliminated all of the hatchery trout but young-of-the-year wild brook trout survived relatively well. Since that failure of stocking effort in 1955, no additional trout have been planted in the park.

With the endorsement of sportsmen's organizations, the Service embarked upon a program directed toward the natural recovery of the trout populations. Special regulations were established to implement the program. All park streams were closed to fishing during the 1954 and 1955 seasons to allow the remaining trout an opportunity to replenish the streams. During these years, the small numbers of surviving brook trout spawned successfully.

As adverse conditions subsided, wild trout repopulated the streams. With improved survival and growth of trout, the park streams were reopened to fishing on May 1, 1956, under special regulations that provided for the use of artificial flies or lures only; for the return of all trout that measured less than 9 inches; and for a creel limit of 8 trout. Subsequently, the size limit was reduced to 8 inches and the limit to 5 trout.

Although the number of trout that are available for fishermen in the park streams is limited, the fish that are caught are wild, colorful native brook trout. These waters remain among the few in Virginia that are managed entirely for wild native brook trout without replenishment by the use of stocked fish.

Size of the streams, coupled with the fluctuating climatic conditions are not conducive to the maintenance of large trout populations nor many large trout. Therefore, fishing in Shenandoah National Park is managed essentially as a catch-and-release program in which the rewards of fishing are the wild native trout rather than a full creel.

Along the Rapidan and Staunton Rivers that flow in and out of the park, a Fishing-For-Fun program has operated cooperatively by the Virginia Game and Inland Fisheries Commission and the National Park Service since 1961. Special regulations provide that anglers must use barbless single-hooked flies or lures and must return all trout they catch to the water unharmed. This year, the program was expanded; under special regulations, the streams are now open to fish for fun on a year around basis.

Great Smoky Mountains National Park.

A Fishing-For-Fun program was inaugurated in Great Smoky Mountains National Park, North Carolina and Tennessee, in 1954. It was a

pioneering experiment in trout fishery management implemented by special regulations.

The plan, evoked by the revolutionary concept proposed by Dr. Albert Hazzard in 1952 (Hazzard, 1952), was also known as the "Hazzard Plan." It was predicated upon the premise that sport fishing for wild trout can be preserved, improved in quality, and made available to increasing numbers of anglers by prohibiting the kill of trout (Lennon and Parker, 1960).

Special park regulations permitted fishermen to catch an unlimited number of trout provided they fished only with artificial flies or lures and returned all the trout caught to the water unharmed.

Initially, in 1954, stretches of Bradley Fork and the West Prong Little Pigeon River were placed under the Fishing-For-Fun regulations during the regular fishing season, May 16 through August 31. Waters involved amounted to 42 miles--a small percent of the 700 miles of fishable streams in the park.

Subsequently, in September 1958, the program was enlarged and modified. Sections of two additional streams, Little River and Oconaluftee River, were added to the catch-and-release program during the off-season, September 1 to May 15. General park regulations applied on these waters during the regular fishing season. The Bradley Fork and the West Prong Little Pigeon River were opened on an all year basis. Under these new special regulations, an angler was permitted to retain trout he caught that measured more than 16 inches.

In the Bradley Fork, populations of wild brook and rainbow trouts are maintained by natural reproduction; no fish have been stocked in this stream since 1953. In the other streams, wild populations of trout are supplemented by the selective use of hatchery trout.

The Fishing-For-Fun season was shortened by 46 days on Little River and Oconaluftee River in 1966 when the general season was extended from April 15 to September 15.

Over the years, anglers have been able to catch more trout per hour on the Fishing-For-Fun streams than on the waters managed entirely under general regulations. For example, the average catch per hour was 5 on the Fishing-For-Fun streams as compared to 3 trout per hour on the other waters during a 4-year period, 1964-1967.

In 1967, Richardson (1968) observed that since 1963, pressure on the Fishing-For-Fun streams increased nearly three fold as compared to an 80 percent increase in the overall park fishing program during this period. Even during the winter months, November through February,

he reported that it was not unusual to see up to 20 fishermen on the Oconaluftee and Little Rivers on a sunny weekend. Climatic conditions during the winter months governed to a large extent the numbers of fishermen who utilized the Fishing-For-Fun streams.

After the first 6 years, Lennon and Parker (1960) concluded that the Fishing-For-Fun program was a success. It had demonstrated that the quality of fishing could be increased without resorting to measures that would lower the quality of the fishing experience. Principle objectives of the program, namely the improvement of trout populations and the acceptance of the Fishing-For-Fun concept by fishermen, were achieved.

Prior to the initiation of the Fishing-For-Fun program, regular park regulations allowed for a creel limit of 5 trout and permitted only the use of flies or lures. The success of the Fishing-For-Fun special regulations was due in part to the fact that anglers were accustomed to low limits and the use of flies or lures.

In more recent years, Richardson (1968, 1969) and Jones (1971) report that the programs continue to be successful and popular. On all park waters in 1970, it was calculated that park anglers expended over 232,000 angler-use days during which they caught more than two million trout. Of this number, they voluntarily released 70 percent of the fishes caught. The bulk of these trout were wild trout as the total number of fish planted in 1970 in park waters was about 55,000.

Yellowstone National Park

Objectives for the management of aquatic resources and visitor enjoyment of these park features within Yellowstone National Park are to perpetuate and restore aquatic ecosystems for their scientific, aesthetic, and cultural values and to provide a quality angling experience for park visitors with wild trout in natural surroundings.

To achieve these objectives, investigations are being made of all park lakes and streams. Special attention is directed toward Yellowstone Lake and the Yellowstone River system, Madison and Fire-hole Rivers and other heavily used waters; surveys are being conducted on the backcountry lakes and streams as well.

Selected aquatic environments and native fish populations are to be maintained or restored as representative of conditions that existed when the park was discovered. In other waters in which introduced fishes have become established, and restoration of the native fauna is not feasible, the wild populations of the introduced species will

be protected. Special regulations are developed to implement these objectives.

Regulations for nearly a century have been directed toward the protection of the fishery resources. The earliest regulations controlled the methods by which fishes could be taken; subsequent regulations established seasons, creel limits, size limits, and bait restrictions and provided for catch-and-release fishing for rare native fishes.

Period of fishery management in Yellowstone has been divided into three eras by Sharpe (1970). They are:

1. Period of exploitation (from the first discovery to the early 1900's).
2. Era of stocking and protection (from the early 1900's to the end of World War II).
3. Era of habitat maintenance, regulation, and preservation of trout stocks (from the late 1940's).

During the era of exploitation, Yellowstone was remote and the impact of the few visitors was minor as compared with that which would follow. However, in 1901, concern for the welfare of the native cutthroat trout of Yellowstone Lake was expressed when the Army established the first hatchery at West Thumb to compensate for the trout that were being taken by fishermen. Later in 1903, the Bureau of Fisheries constructed a hatchery on Yellowstone Lake. Hatchery operations and egg-taking stations continued until 1953. Additional egg-taking stations operated at Grebe Lake for the collection of grayling eggs and at Trout Lake for rainbow trout.

Increased numbers of visitors after World War II exerted heavy pressures upon the park fishery resources. Concerned for the welfare of these resources, the National Park Service requested the U. S. Fish and Wildlife Service to conduct investigations to provide a basis for the management of the trout fisheries.

In 1949, a project directed by a team of fishery research biologists was started at Yellowstone Lake. Its purposes were to conduct investigations of the trout populations, fishing pressures, and the impact of egg-taking operations upon the basic stocks of cutthroat trout in Yellowstone Lake and to make recommendations for the management of the resources.

The studies determined that egg-taking and restocking were not necessary to maintain the fishery and that these practices were

actually detrimental to the natural resource. As a result, in 1953 the hatchery program that had existed since 1901 was terminated and trout planting in park waters ceased. Trout populations in all park waters were returned to an entirely self-supporting basis. Emphasis of the research program was directed toward determining the carrying capacity of Yellowstone Lake and the impact that fishing pressures were having upon the trout populations.

With the acquisition of a fund of research data about the lake and its cutthroat trout populations, the Bureau of Sport Fisheries and Wildlife of the U. S. Fish and Wildlife Service replaced the research team with a crew of fishery management biologists in 1961. These biologists have continued to conduct fishery investigations with the application of management practices based upon research findings. These studies resulted in recommendations for special regulations tailored to implement the park's management objectives.

Special regulations have undergone many changes over the years to cope with the increasing fishing pressures. Catch limits that were 30 fish per day prior to and during the 1920's were reduced to 10 until 1948. Then between 1949 and 1952, the creel limit on Yellowstone Lake was 5 fish per day and since 1953, it has been 3 trout per day.

Before 1952, the fishing season extended from May 30 to October 15; in 1953, the opening date was changed to June 15 on Yellowstone Lake and to June 1 on Yellowstone River. Investigations revealed that many cutthroat trout were being taken during the spawning runs. To provide protection for the trout during this period, the season on the rivers was changed to July 15 and to June 15 on Yellowstone Lake.

It was not until 1970 that the initial length limits were imposed upon the trout caught from Yellowstone Lake; a length limit of 14 inches was established.

As the result of increasing fishing pressures, the trout of Yellowstone Lake began to show signs of heavy exploitation. It was suggested that special regulations be enacted to limit the catch. (Benson and Buckley, 1963). Numbers of trout being taken were rapidly approaching the maximum numbers that could be caught before the populations would be adversely affected. It was recommended that the fishing season be shortened to protect the spawning trout and that a length limit would effectively reduce the numbers of fishes that were killed.

At this time, when the number of trout being taken from the Lake began to appear critical, the National Park Service became concerned by the numbers of trout that fishermen were wasting. In July 1959, more than 7,500 trout discarded by fishermen were counted in the trash receptacles in the Fishing Bridge area alone. It was estimated that during that season, more than 20,000 trout were discarded. Many fishermen apparently did not value the trout once they had been caught.

In an attempt to combat this situation, the National Park Service, in January 1960, announced its plans to initiate a Fishing-For-Fun program in Yellowstone. Fishermen were to be encouraged to release all or most of the trout they caught as a means of perpetuating the native trout resources of Yellowstone Lake without the need for artificial replenishment. Emphasis was placed upon the recreational aspects of the fishing experience and the value of releasing the trout rather than in depleting the resource by catching and discarding the fish. The proposed program was to be voluntary and was not to be supported by new special regulations. To gain acceptance for the concept, an intensive public relations campaign was waged during the following months.

The program was officially inaugurated with the opening of the 1961 season on June 15. Through press releases, posters, and talks, park fishermen were encouraged to participate and to release the trout they caught. It was not intended that a fisherman would continue to catch-and-release trout after he had retained his legal limit of 3 fish (McIntyre, 1960). The program had hardly begun, however, before questions were raised about the merits and effectiveness of the voluntary program. There were reports that trout that had been hooked and released were being found dead along the shores.

A preliminary assessment of Fishing-For-Fun at Yellowstone was made by the Fish and Wildlife Service biologists in 1961 to determine angler acceptance of the program and to evaluate the hooking mortality (Benson and Bulkley, 1963). Interviews with 2,661 anglers indicated that: 1) 82 percent of the anglers caught at least one trout; 2) 80 percent of the anglers who were successful kept all fish they caught; 3) 65 percent of those who returned trout still kept their legal limit; and 4) only 3.9 percent of the successful anglers returned all fish captured. These findings Benson and Bulkley (1963) interpreted to indicate that anglers were using the program as an excuse to continue fishing after catching the legal limit.

Studies in 1962 showed that 10 percent of the anglers released trout before they retained a limit of 3 fish and that 14.5 percent caught the limit of 3 before releasing any.

General Federal regulations for the National Park Service now require an angler to stop all fishing, even on a catch-and-release basis, once he has retained his legal limit.

Hooking mortality investigations were conducted over a 5-year period, 1964-1968, to determine the survival of trout after being caught and released. Results of these studies are reported by Marnell (1966, 1969); Marnell and Hunsaker (1968); Marnell and Sharpe (1966); and Hunsaker and Marnell and Sharpe (1970).

These studies revealed that cutthroat trout that were caught on flies, lures, and bait suffered mortality rates of 4, 5, and 48 percent, respectively, after being released. No significant increase in survival of trout taken on barbless hooks on lures or flies was demonstrated.

Trolling of a single hook and worm was a popular method for catching trout on Yellowstone Lake. Therefore, a mortality of over 40 percent of the worm caught trout that were released accounted for a significant loss of trout. Between 1963 and 1965, it was calculated that more than 62,700 trout were released annually. With an overall mortality rate for released trout taken, by all methods, of 18 percent, the annual loss of returned trout amounted to 11,300 fish. It was estimated that if fishing had been restricted to artificial lures or flies, the loss would have been about 2,500 trout as the mortality for trout released by being hooked with lure or fly was 4 to 5 percent.

The Fishing-For-Fun program ran through 1965. During this period, about 18 percent of the trout were caught and released. The following year, 1966, when the program was deemphasized by the removal of information encouraging Fishing-For-Fun, trout released amounted to 9.7 percent of the total catch.

It was concluded that a voluntary Fishing-For-Fun or catch-and-release program that is not implemented by special regulations that prohibit the use of bait can result in heavy mortality to the trout that are released. This loss plus the trout retained by anglers within their legal limits could prove detrimental to the fish populations. The program apparently accomplished one goal which was to discourage fishermen from discarding trout, as fewer fishes were found in the trash containers during this program.

Special regulations that prohibited the use of bait for all fishermen over the age of 12 years, in 1969, and for all fishermen, in 1970, made the application of the catch-and-release concept effective and feasible as a means of perpetuating native and wild fish populations while providing for high quality fishing. In addition, special regulations of 1970 required the return of all cutthroat trout under 14 inches; this further encouraged catch-and-release fishing.

Dean and Mills (1970) predicted that the 14 inch limit would reduce the numbers of trout taken from the lake by 66 percent and the removal of approximately 50,000 cutthroat trout. Their studies (Dean and Mills, 1971) during 1970 revealed that 177,334 anglers returned 58 percent of the 251,440 cutthroat trout they caught. The number of trout retained was 106,570 which was the lowest number of trout that had been removed from the lake in a single season for 35 years. The overall catch rate of 0.66 trout per hour was slightly above the 20-year average of 0.65.

Current emphasis on catch-and-release fishing in Yellowstone was initiated about 1968. To achieve a degree of understanding and appreciation of the catch-and-release idea and the new special regulations that were established to implement it, park personnel embarked upon an intensive educational campaign, similar in many aspects to that staged with the initial Fishing-For-Fun program in 1960.

Talks were given before professional, civic, and sportsmen's groups; personal contacts were made with fishermen, park and concessioner employees; news items were released to the press media; an information sheet describing the program was issued to park employees; and a packet of informational materials was given to the fisherman. The packet contained a copy of the park fishing regulations, a map that identified the waters and the specific regulations which apply to each; and color plates of the park fishes. In addition, the Yellowstone Library and Museum Association released the colorful booklet, "Yellowstone Fish and Fishing," by F. Phillip Sharpe (1970). It further described the park fishes and the significance of the unique aquatic ecosystems of the park.

This advance public relations paid off in the general acceptance of the program by most fishermen, although in 1970 some violations of the 14 inch limit were observed. Dean and Mills (1971) conclude that most anglers accept catch-and-release fishing if fishing is good, but when the catching becomes difficult there may be a tendency to keep a trout whether it is legal or not. A continued educational program and increased law enforcement will be required to have this program and the special regulations be effective in achieving park management objectives.

The catch-and-release approach to fishing on Yellowstone Lake, implemented by special regulations, will result in the restoration and perpetuation of the cutthroat trout by reducing the numbers of trout that are removed from the lake and in enhancing the quality of the fishing experience for park visitors as the numbers and size of trout increase.

Elsewhere in Yellowstone, special regulations on the Madison and Firehole and Lower Gibbon Rivers require the use of artificial flies and the return of all trout that measure less than 16 inches, and provide for a creel limit of two trout on these rivers. Introduced rainbow and brown trouts are maintained in these waters by natural reproduction. It was reported that these regulations that encourage quality fishing were enthusiastically accepted by the fly fishermen. Previously, anglers on these streams had been noted for the practice of voluntarily releasing many of the trout caught. Dean and Mills (1970) found that in 1969 anglers on the Madison River voluntarily returned 57.9 percent of the trout caught; and on the Firehole, they released 63.5 percent of the catch.

The grayling, once an endemic species to certain park waters, is now largely limited in distribution to waters where it was introduced. To protect this species, fishermen are required to return all they catch.

Bait fishing generally is prohibited in the park although children 12 years of age and under may fish with worms on the Gardner River, Obsidian Creek, Indian Creek, and Panther Creek.

Other special regulations provide for a creel limit of 5 trout, of which no more than 3 may be cutthroat trout, on waters other than those of the Yellowstone System above the Upper Falls, and the Lower Gibbon, Madison and Firehole Rivers.



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