

UNITED STATES
DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE
Washington, D. C. 20240

POLICIES AFFECTING INTERPRETATION

Wildlife, Fish, Vegetation, Land, and Water;
Recreational Angling

A portfolio of Policy Statements, Discussion
Outlines and Papers Concerning National Park
Service Policies and Procedures Relating to
the Management and Research of Fish, Wildlife,
Vegetation, Land, and Water and Recreational
Angling.

Assembled for Training Session
National Park Service Academy
Stephen T. Mather Interpretive
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UNITED STATES
DEPARTMENT OF THE INTERIOR
National Park Service

Wildlife Policies and Problems
in Relation to
"Wildlife Management in the National Parks,"
A Report of the Secretary's
Advisory Board on Wildlife Management
(The Leopold Report)

1. The Overall Objective

A basic, long-established objective of the National Park Service is to perpetuate, or restore as completely as possible, the original-natural conditions and relationships of the land--including the normal ecological successional trends and stages--for the benefit and enjoyment of mankind. The Leopold Report (pp. 2-4) strongly supports this objective with its concept that "a national park should represent a vignette of primitive America."

The resulting benefit and enjoyment of mankind has been shown to extend not only to the millions of visitors who come to the parks to enjoy natural conditions no longer present at home, but to a wide and growing domain of Science.

The importance of basic ecological research to national welfare is becoming ever more widely recognized. Already the units of our National Park System are looked to and sought out by research workers of many countries as unique outdoor laboratories or classrooms where man can obtain a more complete understanding of the natural laws that may govern his future--and possibly his ultimate survival--in lands and environments everywhere.

In 1961 a conference of ecologists from 12 countries concluded that the National Parks of the world offer the principal future hope of preserving some scattered fragments of primeval nature for fundamental scientific research. The large primeval parks of the U. S. National Park System were declared to be preeminent in this respect, and of international significance and value. This idea has been reiterated at other international forums. Our National Parks also have been declared by some Europeans to be one of America's most outstanding cultural contributions to the world.

Other public land management agencies usually seek to remove an annual crop, such as timber, game animals, fur, or beef. They artificially increase this crop by eliminating competing species and predators. Often the land is radically altered for these purposes.

Presented November 15 at the 1963 Fall Session of the Stephen T. Mather Interpretive Training and Research Center, Harpers Ferry, West Virginia, by Lowell Sumner, Research Biologist.

The primary "crop" that is harvested from National Park Service lands is the unfolding story of the land itself, with its native flora and fauna present in their "normal" but everchanging, interacting variety and numbers.

Under ideal conditions this self-perpetuating crop would require virtually no management because there would be no unbalancing, man-caused disturbances that had to be compensated for. This situation is illustrated best at Katmai and Glacier Bay, but hardly anywhere else in the National Park System, although Isle Royale comes close to it.

Most other parks require varying degrees of compensatory management because they are ecologically vulnerable to man-caused disturbances from the outside--or from the inside. Everglades, at the other end of the vulnerability scale from Katmai, at present is so dependent on management assistance for its survival as to be in a class by itself.

Recognition of the central importance of the unfolding natural story, and the obligation of management to counteract man-caused disturbances which interrupt or distort this story, is a major premise of the Leopold Report (see The concept of park management, pp. 2 and 3).

2. The Policies

The Service's wildlife policies, first published in 1932 (Fauna No. 1 of the National Park Service, pp. 147-148) were formulated in accordance with the basic objective just described; actually these basic policies apply equally to native plants, and in practice have been so considered. The entire Leopold Report is based on the concept of habitat maintenance or restoration and thus further emphasizes the necessity of including native plants in the policies.

In furtherance of the overall objective, of maintaining or restoring the primitive scene, each native species is allowed to carry on its struggle for existence unaided unless there is real danger that it may perish if unassisted. In special cases where a species is unable to cope with civilization's changes, assistance is directed toward restoring that species to a self-sustaining basis as soon as possible.

Rare species, including predators, are considered special wards of the NPS in proportion as they are endangered elsewhere. No native predator is destroyed on account of its normal utilization of any other park animal unless the latter is in immediate danger of extermination, and then only if the predator is not itself a vanishing form.

Hoofed animals are not permitted to exceed the carrying capacity of their ranges. However, removal of surplus native animals by public hunting inside the parks is not permissible (except at Teton under

special conditions whose effectiveness awaits further trial). Removal of surplus animals must be accomplished by officially designated park personnel. The effective removal of these surplus mammals creates many of our most difficult and widespread problems.

Nonnative species are to be eradicated, or held to a minimum if complete eradication is impossible. These present less common but often very severe problems. Plants and animals which are inimical to public health and welfare, or destructive to special historic or archeological features, are controlled or neutralized where necessary.

Where the original environment has been upset, emphasis is on restoration measures, and after these have been accomplished, native species which have been exterminated shall be brought back--as soon as feasible.

Boundary adjustments shall take into consideration that
(a) each park should include a sufficient amount of each type of habitat to maintain at least minimum populations of all native species;
(b) boundaries should conform to natural biological barriers insofar as possible. Many of the most difficult problems to solve are habitat and boundary problems.

Park wildlife is not to be caged, artificially concentrated, or lured to special feeding areas. Its presentation to the public shall be as natural as possible. Our bear problem falls here.

Fishing is a partial deviation from the above policies because angling is specifically permitted by law. The removal of limited numbers of fish affects "the balance of nature" relatively little on adjacent land areas. However, the same fundamental restoration and management objectives apply. Fishing for naturally produced wild fish is considered the most appropriate type of angling in the National Park System; consequently, the planting of catchable size fish is discouraged.

Although deterioration of natural habitats from heavy human use was not made the subject of a separate statement in the original policy summary, the destructive effects on plants and animals was clearly recognized, and described in detail.

The solution of the overuse problem appears to lie in a determination of and adherence to the ecological carrying capacities of all such problem areas, for humans as well as for animals. This concept is clearly supported by the Leopold Report (p. 9).

Accomplishment of the Service's wildlife program currently is the joint responsibility of two divisions: The Division of Natural History

is responsible for the basic research which must underlie and precede management programs. The Division of Ranger Services is responsible for testing and carrying out management recommendations resulting from research.

Some park deterioration problems are so severe that the general nature of required corrective action is obvious and cannot be postponed until confirmation is obtained through research. But emergency action is never acceptable as a permanent substitute for research.

To illustrate from the field of medicine, there are very important treatments for patients who have contracted polio or cancer. Having such a disease represents an emergency situation. But the polio problem was not solved until research brought knowledge of how to prevent polio, and this is the route that cancer research also must take before that problem can be considered solved.

National Park Service biologists have functions and responsibilities comparable to those of the medical profession. For many years to come, some biologists will have to administer curative treatments to parks that already have contracted serious ecological diseases. Other biologists will have to conduct, or organize, the basic research on which the entire Service ultimately depends, as in the medical profession, for detection of trouble in the earliest stages, or for elimination of the "disease" altogether.

It may be instructive to make this comparison between the recommendations of 1932 and 1963 on wildlife management -

Fauna No. 1 (1932), p. 148 - a four-step investigation should be made for each park at the earliest possible date, as follows:

1. Determine the original faunal picture.
2. Determine the (ecological) effects of subsequent human influences.
3. Make a thorough zoological (ecological) survey of the existing plants and animals.
4. Develop (and apply) a wildlife management plan for restoring, insofar as possible, original conditions.

The Leopold Report (1963), p. 12 - a four-step habitat management plan for each park as follows:

1. Ascertain the original ecological picture.
2. Determine current plant-animal ecological relationships (includes human influences, and thus covers both steps 2 and 3 of Fauna No. 1) leading to formulation of tentative management plans.
3. Conduct small-scale management experiments to test tentative management plans formulated under step 2 (this important step was not separately given, though not precluded, in Fauna No. 1).
4. Apply tested management methods and plans for restoring, insofar as possible, original conditions.

March 4, 1963

The Honorable Stewart Udall
Secretary of the Interior
Washington 25, D.C.

Dear Mr. Secretary:

Your Advisory Board on Wildlife Management transmits herewith a report entitled "Wildlife Management in the National Parks."

In formulating the conclusions presented in this report, the Board made a major effort to familiarize itself with actual conditions in the parks and monuments. The full Board visited Yellowstone and Grand Teton National Parks where the elk situation has been acute. Individual Board members inspected a number of other parks which in the judgment of the National Park Service have current wildlife problems. Between us in the last few years we have seen nearly all of the major parks and monuments, including those in Hawaii and Alaska. Our recommendations are based principally upon our own knowledge of the parks and their problems.

Additionally, we have endeavored to understand and to evaluate the full spectrum of opinions and viewpoints on park management. In September at Jackson Hole the Board met with five directors of state game departments. In December in Washington we met with five executive officers of conservation organizations. Many other individuals and groups have offered advice and information. All of this was informative and helpful, but we want to make clear to you that our conclusions were not reached by weighing opinions and counter-opinions. The conclusions represent our own collective thinking.

The report as here presented is conceptual rather than statistical in approach. We read thousands of pages of reports, documents, and statistical tables, but used these data only sparingly to illustrate specific points. Emphasis is placed on the philosophy of park management and the ecologic principles involved. Our suggestions are intended to enhance the esthetic, historical, and scientific values of the parks to the American public, vis a vis the mass recreational values. We sincerely hope that you will find it feasible and appropriate to accept this concept of park values.

Respectfully submitted,

Stanley A. Cain

Clarence M. Cottam

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WILDLIFE MANAGEMENT IN THE NATIONAL PARKS

Advisory Board on Wildlife Management,
appointed by Secretary of the Interior Udall

A. S. Leopold (Chairman), S.A. Cain, C. M. Cottam, I. N. Gabrielson, T. L. Kimball

March 4, 1963

Historical

In the Congressional Act of 1916 which created the National Park Service, preservation of native animal life was clearly specified as one of the purposes of the parks. A frequently quoted passage of the Act states "...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."

In implementing this Act, the newly formed Park Service developed a philosophy of wildlife protection, which in that era was indeed the most obvious and immediate need in wildlife conservation. Thus the parks were established as refuges, the animal populations were protected from hunting and their habitats were protected from wildfire. For a time predators were controlled to protect the "good" animals from the "bad" ones, but this endeavor mercifully ceased in the 1930's. On the whole, there was little major change in the Park Service practice of wildlife management during the first 40 years of its existence.

During the same era, the concept of wildlife management evolved rapidly among other agencies and groups concerned with the production of wildlife for recreational hunting. It is now an accepted truism that maintenance of suitable habitat is the key to sustaining animal populations,

and that protection, though it is important, is not of itself a substitute for habitat. Moreover, habitat is not a fixed or stable entity that can be set aside and preserved behind a fence, like a cliff dwelling or a petrified tree. Biotic communities change through natural stages of succession. They can be changed deliberately through manipulation of plant and animal populations. In recent years the National Park Service has broadened its concept of wildlife conservation to provide for purposeful management of plant and animal communities as an essential step in preserving wildlife resources "...unimpaired for the enjoyment of future generations." In a few parks active manipulation of habitat is being tested, as for example in the Everglades where controlled burning is now used experimentally to maintain the open glades and piney woods with their interesting animal and plant life. Excess populations of grazing ungulates are being controlled in a number of parks to preserve the forage plants on which the animals depend. The question already has been posed -- how far should the National Park Service go in utilizing the tools of management to maintain wildlife populations?

The concept of park management

The present report proposes to discuss wildlife management in the national parks in terms of three questions which shift emphasis progressively from the general to the specific:

- 1) What should be the goals of wildlife management in the national parks?
- 2) What general policies of management are best adapted to achieve the pre-determined goals?

3) What are some of the methods suitable for on-the-ground implementation of policies?

It is acknowledged that this Advisory Board was requested by the Secretary of the Interior to consider particularly one of the methods of management, namely, the procedure of removing excess ungulates from some of the parks. We feel that this specific question can only be viewed objectively in the light of goals and operational policies, and our report is framed accordingly. In speaking of national parks we refer to the whole system of parks and monuments; national recreation areas are discussed briefly near the end of the report.

As a prelude to presenting our thoughts on the goals, policies, and methods of managing wildlife in the parks of the United States we wish to quote in full a brief report on "Management of National Parks and Equivalent Areas" which was formulated by a committee of the First World Conference on National Parks that convened in Seattle in July, 1962. The committee consisted of 15 members of the Conference, representing eight nations; the chairman was Francois Bourliere of France. In our judgment this report suggests a firm basis for park management. The statement of the committee follows:

"1. Management is defined as any activity directed toward achieving or maintaining a given condition in plant and/or animal populations and/or habitats in accordance with the conservation plan for the area. A prior definition of the purposes and objectives of each park is assumed.

Management may involve active manipulation of the plant and animal communities, or protection from modification or external influences.

2. Few of the world's parks are large enough to be in fact self-regulatory ecological units; rather, most are ecological islands subject to direct or indirect modification by activities and conditions in the surrounding areas. These influences may involve such factors as immigration and/or emigration of animal and plant life, changes in the fire regime, and alterations in the surface or subsurface water.

3. There is no need for active modification to maintain large examples of the relatively stable "climax" communities which under protection perpetuate themselves indefinitely. Examples of such communities include large tracts of undisturbed rain-forest, tropical mountain paramos, and arctic tundra.

4. However, most biotic communities are in a constant state of change due to natural or man-caused processes of ecological succession. In these "successional" communities it is necessary to manage the habitat to achieve or stabilize it at a desired stage. For example, fire is an essential management tool to maintain East African open savanna or American prairie.

5. Where animal populations get out of balance with their habitat and threaten the continued existence of a desired environment; population control becomes essential. This principle applies, for example, in situations where ungulate populations have exceeded the carrying capacity of their habitat through loss of predators, immigration from surrounding areas, or compression of normal migratory patterns. Specific examples include excess populations of elephants in some African parks and of ungulates in some mountain parks.

6. The need for management, the feasibility of management methods, and evaluation of results must be based upon current and continuing scientific research. Both the research and management itself should be undertaken only by qualified personnel. Research, management planning, and execution must take into account, and if necessary regulate, the human uses for which the park is intended.

7. Management based on scientific research is, therefore, not only desirable but often essential to maintain some biotic communities in accordance with the conservation plan of a national park or equivalent area."

The goal of park management in the United States

Item 1 in the report just quoted specifies that "a prior definition of the purposes and objectives of each park is assumed." In other words, the goal must first be defined.

As a primary goal, we would recommend that the biotic associations within each park be maintained, or where necessary recreated, as nearly as possible in the condition that prevailed when the area was first visited by the white man. A national park should represent a vignette of primitive America.

The implications of this seemingly simple aspiration are stupendous. Many of our national parks--in fact most of them--went through periods of indiscriminate logging, burning, livestock grazing, hunting and predator control. Then they entered the park system and shifted abruptly to a regime of equally unnatural protection from lightning fires, from insect outbreaks, absence of natural controls of ungulates, and in some areas elimination of normal fluctuations in water levels. Exotic vertebrates, insects, plants, and plant diseases have inadvertently been introduced. And of course lastly there is the factor of human use--of roads and trampling and camp grounds and pack stock. The resultant biotic associations in many of our parks are artifacts, pure and simple. They represent a complex ecologic history but they do not necessarily represent primitive America.

Restoring the primitive scene is not done easily nor can it be done completely. Some species are extinct. Given time, an eastern hardwood forest can be regrown to maturity but the chestnut will be missing and so will the roar of pigeon wings. The colorful drapanid finches are not to be heard again in the lowland forests of Hawaii, nor will the jack-hammer of the ivory-bill ring in southern swamps. The wolf and grizzly bear cannot readily be reintroduced into ranching communities, and the factor of human use of the parks is subject only to regulation, not elimination. Exotic plants, animals, and diseases are here to stay. All these limitations we fully realize. Yet, if the goal cannot be fully achieved it can be approached. A reasonable illusion of primitive America could be recreated, using the utmost in skill, judgment, and ecologic sensitivity. This in our opinion should be the objective of every national park and monument.

To illustrate the goal more specifically, let us cite some cases. A visitor entering Grand Teton National Park from the south drives across Antelope Flats. But there are no antelope. No one seems to be asking the question--why aren't there? If the mountain men who gathered here in rendezvous fed their squaws on antelope, a 20th century tourist at least should be able to see a band of these animals. Finding out what aspect of the range needs rectifying, and doing so, would appear to be a primary function of park management.

When the forty-niners poured over the Sierra Nevada into California, those that kept diaries spoke almost to a man of the wide-spaced columns of mature trees that grew on the lower western slope in gigantic magnificence. The ground was a grass parkland, in springtime carpeted with wildflowers. Deer and bears were abundant. Today much of the west slope is a dog-hair thicket of young pines, white fir, incense cedar, and mature brush--a direct function of overprotection from natural ground fires. Within the four national parks--Lassen, Yosemite, Sequoia, and Kings Canyon--the thickets are even more impenetrable than elsewhere. Not only is this accumulation of fuel dangerous to the giant sequoias and other mature trees but the animal life is meager, wildflowers are sparse, and to some at least the vegetative tangle is depressing, not uplifting. Is it possible that the primitive open forest could be restored, at least on a local scale? And if so, how? We cannot offer an answer. But we are posing a question to which there should be an answer of immense concern to the National Park Service.

The scarcity of bighorn sheep in the Sierra Nevada represents another type of management problem. Though they have been effectively protected for nearly half a century, there are fewer than 400 bighorns in the Sierra. Two-thirds of them are found in summer along the crest which lies within the eastern border of Sequoia and Kings Canyon National Parks. Obviously, there is some shortcoming of habitat that precludes further increase in the population. The high country is still recovering slowly from the devastation of early domestic sheep grazing so graphically described by John Muir. But the present limitation may not be in the high summer range at all but rather along the eastern slope of the Sierra where the bighorns winter on lands in the jurisdiction of the Forest Service. These areas are grazed in summer by domestic livestock and large numbers of mule deer, and it is possible that such competitive use is adversely affecting the bighorns. It would seem to us that the National Park Service might well take the lead in studying this problem and in formulating cooperative management plans with other agencies even though the management problem lies outside the park boundary. The goal, after all, is to restore the Sierra bighorn. If restoration is achieved in the Sequoia-Kings Canyon region, there might follow a program of re-introduction and restoration of bighorns in Yosemite and Lassen National Parks, and Lava Beds National Monument, within which areas this magnificent native animal is presently extinct.

We hope that these examples clarify what we mean by the goal of park management.

Policies of park management

The major policy change which we would recommend to the National Park Service is that it recognize the enormous complexity of ecologic communities and the diversity of management procedures required to preserve them. The traditional, simple formula of protection may be exactly what is needed to maintain such climax associations as arctic-alpine heath, the rain forests of Olympic peninsula, or the Joshua trees and saguaros of southwestern deserts. On the other hand, grasslands, savannas, aspen, and other successional shrub and tree associations may call for very different treatment. Reluctance to undertake biotic management can never lead to a realistic presentation of primitive America, much of which supported successional communities that were maintained by fires, floods, hurricanes, and other natural forces.

A second statement of policy that we would reiterate--and this one conforms with present Park Service standards--is that management be limited to native plants and animals. Exotics have intruded into nearly all of the parks but they need not be encouraged, even those that have interest or ecologic values of their own. Restoration of antelope in Jackson Hole, for example, should be done by managing native forage plants, not by planting crested wheat grass or plots of irrigated alfalfa. Gambel quail in a desert wash should be observed in the shade of a mesquite, not a tamarisk. A visitor who climbs a volcano in Hawaii ought to see mamane trees and silver-swords, not goats.

Carrying this point further, observable artificiality in any form must be minimized and obscured in every possible way. Wildlife should not

be displayed in fenced enclosures; this is the function of a zoo, not a national park. In the same category is artificial feeding of wildlife. Fed bears become bums, and dangerous. Fed elk deplete natural ranges. Forage relationships in wild animals should be natural. Management may at times call for the use of the tractor, chain-saw, rifle, or flame-thrower but the signs and sounds of such activity should be hidden from visitors insofar as possible. In this regard, perhaps the most dangerous tool of all is the roadgrader. Although the American public demands automotive access to the parks, road systems must be rigidly prescribed as to extent and design. Roadless wilderness areas should be permanently zoned. The goal, we repeat, is to maintain or create the mood of wild America. We are speaking here of restoring wildlife to enhance this mood, but the whole effect can be lost if the parks are overdeveloped for motorized travel. If too many tourists crowd the roadways, then we should ration the tourists rather than expand the roadways.

Additionally in this connection, it seems incongruous that there should exist in the national parks mass recreation facilities such as golf courses, ski lifts, motorboat marinas, and other extraneous developments which completely contradict the management goal. We urge the National Park Service to reverse its policy of permitting these non-conforming uses, and to liquidate them as expeditiously as possible (painful as this will be to concessionaires). Above all other policies, the maintenance of naturalness should prevail.

Another major policy matter concerns the research which must form the basis for all management programs. The agency best fitted to study

park management problems is the National Park Service itself. Much help and guidance can be obtained from ecologic research conducted by other agencies, but the objectives of park management are so different from those of state fish and game departments, the Forest Service, etc., as to demand highly skilled studies of a very specialized nature. Management without knowledge would be a dangerous policy indeed. Most of the research now conducted by the National Park Service is oriented largely to interpretive functions rather than to management. We urge the expansion of the research activity in the Service to prepare for future management and restoration programs. As models of the type of investigation that should be greatly accelerated we cite some of the recent studies of elk in Yellowstone and of bighorn sheep in Death Valley. Additionally, however, there are needed equally critical appraisals of ecologic relationships in various plant associations and of many lesser organisms such as azaleas, lupines, chipmunks, towhees, and other non-economic species.

In consonance with the above policy statements, it follows logically that every phase of management itself be under the full jurisdiction of biologically trained personnel of the Park Service. This applies not only to habitat manipulation but to all facets of regulating animal populations. Reducing the numbers of elk in Yellowstone or of goats on Haleakala Crater is part of an overall scheme to preserve or restore a natural biotic scene. The purpose is single-minded. We cannot endorse the view that responsibility for removing excess game animals be shared with state fish and game departments whose primary interest would be to capitalize on the recreational value of the public hunting that could

thus be supplied. Such a proposal imputes a multiple use concept of park management which was never intended, which is not legally permitted, nor for which can we find any impelling justification today.

Purely from the standpoint of how best to achieve the goal of park management, as here defined, unilateral administration directed to a single objective is obviously superior to divided responsibility in which secondary goals, such as recreational hunting, are introduced. Additionally, uncontrolled public hunting might well operate in opposition to the goal, by removing roadside animals and frightening the survivors, to the end that public viewing of wildlife would be materially impaired. In one national park, namely Grand Teton, public hunting was specified by Congress as the method to be used in controlling elk. Extended trial suggests this to be an awkward administrative tool at best.

Since this whole matter is of particular current interest it will be elaborated in a subsequent section on methods.

Methods of habitat management

It is obviously impossible to mention in this brief report all the possible techniques that might be used by the National Park Service in manipulating plant and animal populations. We can, however, single out a few examples. In so doing, it should be kept in mind that the total area of any one park, or of the parks collectively, that may be managed intensively is a very modest part indeed. This is so for two reasons. First, critical areas which may determine animal abundance are often a small fraction of total range. One deer study on the west slope of the Sierra Nevada, for example, showed that important winter range, which could

be manipulated to support the deer, constituted less than two per cent of the year-long herd range. Roadside areas that might be managed to display a more varied and natural flora and fauna can be rather narrow strips. Intensive management, in short, need not be extensive to be effective. Secondly, manipulation of vegetation is often exorbitantly expensive. Especially will this be true when the objective is to manage "Invisibly" -- that is, to conceal the signs of management. Controlled burning is the only method that may have extensive application.

The first step in park management is historical research, to ascertain as accurately as possible what plants and animals and biotic associations existed originally in each locality. Much of this has been done already.

A second step should be ecologic research on plant-animal relationships leading to formulation of a management hypothesis.

Next should come small scale experimentation to test the hypothesis in practice. Experimental plots can be situated out of sight of roads and visitor centers.

Lastly, application of tested management methods can be undertaken on critical areas.

By this process of study and pre-testing, mistakes can be minimized. Likewise, public groups vitally interested in park management can be shown the results of research and testing before general application, thereby eliminating possible misunderstanding and friction.

Some management methods now in use by the National Park Service seem to us potentially dangerous. For example, we wish to raise a serious question about the mass application of insecticides in the control of forest

insects. Such application may (or may not) be justified in commercial timber stands, but in a national park the ecologic impact can have unanticipated effects on the biotic community that might defeat the overall management objective. It would seem wise to curtail this activity, at least until research and small scale testing have been conducted.

Of the various methods of manipulating vegetation, the controlled use of fire is the most "natural" and much the cheapest and easiest to apply. Unfortunately, however, forest and chaparral areas that have been completely protected from fire for long periods may require careful advance treatment before even the first experimental blaze is set. Trees and mature brush may have to be cut, piled, and burned before a creeping ground fire can be risked. Once fuel is reduced, periodic burning can be conducted safely and at low expense. On the other hand, some situations may call for a hot burn. On Isle Royale, moose range is created by periodic holocausts that open the forest canopy. Maintenance of the moose population is surely one goal of management on Isle Royale.

Other situations may call for the use of the bulldozer, the disc harrow, or the spring-tooth harrow to initiate desirable changes in plant succession. Buffalo wallows on the American prairie were the propagation sites of a host of native flowers and forbs that fed the antelope and the prairie chicken. In the absence of the great herds, wallows can be simulated.

Artificial reintroduction of rare native plants is often feasible. Overgrazing in years past led to local extermination of many delicate perennials such as some of the orchids. Where these are not reappearing naturally they can be transplanted or cultured in a nursery. A native plant, however

small and inconspicuous, is as much a part of the biota as a redwood tree or a forage species for elk.

In essence, we are calling for a set of ecologic skills unknown in this country today. Americans have shown a great capacity for degrading and fragmenting native biotas. So far we have not exercised much imagination or ingenuity in rebuilding damaged biotas. It will not be done by passive protection alone.

Control of animal populations

Good park management requires that ungulate populations be reduced to the level that the range will carry in good health and without impairment to the soil, the vegetation, or to habitats of other animals. This problem is world-wide in scope, and includes non-park as well as park lands. Balance may be achieved in several ways.

(a) Natural predation. - Insofar as possible, control through natural predation should be encouraged. Predators are now protected in the parks of the United States, although unfortunately they were not in the early years and the wolf, grizzly bear, and mountain lion became extinct in many of the national parks. Even today populations of large predators, where they still occur in the parks, are kept below optimal level by programs of predator control applied outside the park boundaries. Although the National Park Service has attempted to negotiate with control agencies of federal and local governments for the maintenance of buffer zones around the parks where predators are not subject to systematic control, these negotiations have been only partially successful. The effort to protect large predators in and around the parks should be greatly intensified. At the same time, it must be recognized that predation alone can seldom be

relied upon to control ungulate numbers, particularly the larger species such as bison, moose, elk, and deer; additional artificial controls frequently are called for.

(b) Trapping and transplanting. - Traditionally in the past the National Park Service has attempted to dispose of excess ungulates by trapping and transplanting. Since 1892, for example, Yellowstone National Park alone has supplied 10,478 elk for restocking purposes. Many of the elk ranges in the western United States have been restocked from this source. Thousands of deer and lesser numbers of antelope, bighorns, mountain goats, and bison also have been moved from the parks. This program is fully justified so long as breeding stocks are needed. However, most big game ranges of the United States are essentially filled to carrying capacity, and the cost of a continuing program of trapping and transplanting cannot be sustained solely on the basis of controlling populations within the parks. Trapping and handling of a big game animal usually costs from \$50 to \$150 and in some situations much more. Since annual surpluses will be produced indefinitely into the future, it is patently impossible to look upon trapping as a practical plan of disposal.

(c) Shooting excess animals that migrate outside the parks. - Many park herds are migratory and can be controlled by public hunting outside the park boundaries. Especially is this true in mountain parks which usually consist largely of summer game range with relatively little winter range. Effective application of this form of control frequently calls for special regulations, since migration usually occurs after normal hunting dates.

Most of the western states have cooperated with the National Park Service in scheduling late hunts for the specific purpose of reducing park game herds, and in fact most excess game produced in the parks is so utilized. This is by far the best and the most widely applied method of controlling park populations of ungulates. The only danger is that migratory habits may be eliminated from a herd by differential removal, which would favor survival of non-migratory individuals. With care to preserve, not eliminate, migratory traditions, this plan of control will continue to be the major form of herd regulation in national parks.

(d) Control by shooting within the parks. - Where other methods of control are inapplicable or impractical, excess park ungulates must be removed by killing. As stated above in the discussion of park policy, it is the unanimous recommendation of this Board that such shooting be conducted by competent personnel, under the sole jurisdiction of the National Park Service, and for the sole purpose of animal removal, not recreational hunting. If the magnitude of a given removal program requires the services of additional shooters beyond regular Park Service personnel, the selection, employment, training, deputization, and supervision of such additional personnel should be entirely the responsibility of the National Park Service. Only in this manner can the primary goal of wildlife management in the parks be realized. A limited number of expert riflemen, properly equipped and working under centralized direction, can selectively cull a herd with a minimum of disturbance to the surviving animals or to the environment. General public hunting by comparison is often non-selective and grossly disturbing.

Moreover, the numbers of game animals that must be removed annually from the parks by shooting is so small in relation to normally hunted populations outside the parks as to constitute a minor contribution to the public bag, even if it were so utilized. All of these points can be illustrated in the example of the north Yellowstone elk population which has been a focal point of argument about possible public hunting in national parks.

(e) The case of Yellowstone. - Elk summer in all parts of Yellowstone Park and migrate out in nearly all directions, where they are subject to hunting on adjoining public and private lands. One herd, the so-called Northern Elk Herd, moves only to the vicinity of the park border where it may winter largely inside or outside the park, depending on the severity of the winter. This herd was estimated to number 35,000 animals in 1914 which was far in excess of the carrying capacity of the range. Following a massive die-off in 1919-20 the herd has steadily decreased. Over a period of 27 years, the National Park Service removed 8,825 animals by shooting and 5,765 by live-trapping; concurrently, hunters took 40,745 elk from this herd outside the park. Yet the range continued to deteriorate. In the winter of 1961-62 there were approximately 10,000 elk in the herd and carrying capacity of the winter range was estimated at 5,000. So the National Park Service at last undertook a definitive reduction program, killing 4,283 elk by shooting, which along with 850 animals removed in other ways (hunting outside the park, trapping, winter kill) brought the herd down to 5,725 as censused from helicopter. The carcasses of the elk were carefully processed and distributed to Indian communities throughout

Montana and Wyoming; so they were well used. The point at issue is whether this same reduction could or should have been accomplished by public hunting.

In autumn during normal hunting season the elk are widely scattered through rough inaccessible mountains in the park. Comparable areas, well stocked with elk, are heavily hunted in adjoining national forests. Applying the kill statistics from the forests to the park, a kill of 200-400 elk might be achieved if most of the available pack stock in the area were used to transport hunters within the park. Autumn hunting could not have accomplished the necessary reduction.

In mid-winter when deep snow and bitter cold forced the elk into lower country along the north border of the park, the National Park Service undertook its reduction program. With snow vehicles, trucks, and helicopters they accomplished the unpleasant job in temperatures that went as low as -40° F. Public hunting was out of the question. Thus, in the case most bitterly argued in the press and in legislative halls, reduction of the herd by recreational hunting would have been a practical impossibility, even if it had been in full conformance with park management objectives.

From now on, the annual removal from this herd may be in the neighborhood of 1,000 to 1,800 head. By January 31, 1963, removals had totalled 1,300 (300 shot outside the park by hunters, 600 trapped and shipped, and 406 killed by park rangers). Continued special hunts in Montana and other forms of removal will yield the desired reduction by spring. The required yearly maintenance kill is not a large operation when one considers that approximately 100,000 head of big game are taken annually by hunters in Wyoming and Montana.

(f) Game control in other parks. - In 1961-62, excluding Yellowstone elk, there were approximately 870 native animals transplanted and 827 killed on 18 national parks and monuments. Additionally, about 2,500 feral goats, pigs and burros were removed from three areas. Animal control in the park system as a whole is still a small operation. It should be emphasized, however, that removal programs have not in the past been adequate to control ungulates in many of the parks. Future removals will have to be larger and in many cases repeated annually. Better management of wildlife habitat will naturally produce larger annual surpluses. But the scope of this phase of park operation will never be such as to constitute a large facet of management. On the whole, reductions will be small in relation to game harvests outside the parks. For example, from 50 to 200 deer a year are removed from a problem area in Sequoia National Park; the deer kill in California is 75,000 and should be much larger. In Rocky Mountain National Park 59 elk were removed in 1961-62 and the trim should perhaps be 100 per year in the future; Colorado kills over 10,000 elk per year on open hunting ranges. In part, this relates to the small area of the national park system, which constitutes only 3.9 per cent of the public domain; hunting ranges under the jurisdiction of the Forest Service and Bureau of Land Management make up approximately 70 per cent.

In summary, control of animal populations in the national parks would appear to us to be an integral part of park management, best handled by the National Park Service itself. In this manner excess ungulates have been controlled in the national parks of Canada since 1943, and the same principle is being applied in the parks of many African countries. Selection

of personnel to do the shooting likewise is a function of the Park Service. In most small operations this would logically mean skilled rangers. In larger removal programs, there might be included additional personnel, selected from the general public, hired and deputized by the Service or otherwise engaged, but with a view to accomplishing a task, under strict supervision and solely for the protection of park values. Examples of some potentially large removal programs where expanded crews may be needed are mule deer populations on plateaus fringing Dinosaur National Monument and Zion National Park (west side), and white-tailed deer in Acadia National Park.

Wildlife Management on National Recreation Areas

By precedent and logic, the management of wildlife resources on the national recreation areas can be viewed in a very different light than in the park system proper. National recreation areas are by definition multiple use in character as regards allowable types of recreation. Wildlife management can be incorporated into the operational plans of these areas with public hunting as one objective. Obviously, hunting must be regulated in time and place to minimize conflict with other uses, but it would be a mistake for the National Park Service to be unduly restrictive of legitimate hunting in these areas. Most of the existing national recreation areas are federal holdings surrounding large water impoundments; there is little potentiality for hunting. Three national seashore recreational areas on the East Coast (Hatteras, Cape Cod, and Padre Island) offer limited waterfowl shooting. But some of the new areas being acquired or proposed for acquisition will offer substantial hunting opportunity for a variety

of game species. This opportunity should be developed with skill, imagination, and (we would hopefully suggest) with enthusiasm.

On these areas as elsewhere, the key to wildlife abundance is a favorable habitat. The skills and techniques of habitat manipulation applicable to parks are equally applicable on the recreation areas. The regulation of hunting, on such areas as are deemed appropriate to open for such use, should be in accord with prevailing state regulations.

New National Parks

A number of new national parks are under consideration. One of the critical issues in the establishment of new parks will be the manner in which the wildlife resources are to be handled. It is our recommendation that the basic objectives and operating procedures of new parks be identical with those of established parks. It would seem awkward indeed to operate a national park system under two sets of ground rules. On the other hand, portions of several proposed parks are so firmly established as traditional hunting grounds that impending closure of hunting may preclude public acceptance of park status. In such cases it may be necessary to designate core areas as national parks in every sense of the word, establishing protective buffer zones in the form of national recreation areas where hunting is permitted. Perhaps only through compromises of this sort will the park system be rounded out.

Summary

The goal of managing the national parks and monuments should be to preserve, or where necessary to recreate, the ecologic scene as viewed by the first European visitors. As part of this scene, native species of wild

animals should be present in maximum variety and reasonable abundance. Protection alone, which has been the core of Park Service wildlife policy, is not adequate to achieve this goal. Habitat manipulation is helpful and often essential to restore or maintain animal numbers. Likewise, populations of the animals themselves must sometimes be regulated to prevent habitat damage; this is especially true of ungulates.

Active management aimed at restoration of natural communities of plants and animals demands skills and knowledge not now in existence. A greatly expanded research program, oriented to management needs, must be developed within the National Park Service itself. Both research and the application of management methods should be in the hands of skilled park personnel.

Insofar as possible, animal populations should be regulated by predation and other natural means. However, predation cannot be relied upon to control the populations of larger ungulates, which sometimes must be reduced artificially.

Most ungulate populations within the parks migrate seasonally outside the park boundaries where excess numbers can be removed by public hunting. In such circumstances the National Park Service should work closely with state fish and game departments and other interested agencies in conducting the research required for management and in devising cooperative management programs.

Excess game that does not leave a park must be removed. Trapping and transplanting has not proven to be a practical method of control, though it is an appropriate source of breeding stock as needed elsewhere.

Direct removal by killing is the most economical and effective way of regulating ungulates within a park. Game removal by shooting should be conducted under the complete jurisdiction of qualified park personnel and solely for the purpose of reducing animals to preserve park values. Recreational hunting is an inappropriate and non-conforming use of the national parks and monuments.

Most game reduction programs can best be accomplished by regular park employees. But as removal programs increase in size and scope, as well may happen under better wildlife management, the National Park Service may find it advantageous to employ or otherwise engage additional shooters from the general public. No objection to this procedure is foreseen so long as the selection, training, and supervision of shooting crews is under rigid control of the Service and the culling operation is made to conform to primary park goals.

Recreational hunting is a valid and potentially important use of national recreation areas, which are also under jurisdiction of the National Park Service. Full development of hunting opportunities on these areas should be provided by the Service.

UNITED STATES
DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE
Washington, D. C. 20240

Policies and Procedures for the Protection and
Management of Fish and Wildlife Resources

The following policies and procedures have been established to provide uniform guidance in matters relating to fish and wildlife protection and management. They were revised and issued in August 1959 in the Division of Ranger Activities Administrative Manual, Volume VI, Part 2, Chapter 5, pages 1 through 8. They supersede statements previously published.

November 1963.

Protection and Management of Wildlife and Fish

General

Conserving the wildlife is one of the significant purposes mentioned in the Organic Act of 1916, and plans for protection and management shall leave it and its habitat unimpaired for the enjoyment of future generations. The needs for protection of specific forms of animal life have been among the important reasons for the establishment of a number of parks and monuments. Wildlife in its natural environment is a primary visitor attraction. Associated with management and protection is the pressing responsibility for the perpetuation of endangered and vanishing species. Such forms must be preserved and encouraged for the enjoyment of generations yet to follow.

The animal life in areas administered by the National Park Service is varied in kinds and numbers and the complexity of management mounts as variety and competitions increase. Each species is an integral part of a living community and situations arising from its proper handling are often complicated. See the Organization Volume, Part 5 for certain broad policies established for their protection. More specific policies follow in this chapter.

Policies--Wildlife

Wildlife. The animals indigenous to the parks shall be protected, restored, if practicable, and their welfare in a natural wild state perpetuated. Their management shall consist only of measures conforming with the basic laws and which are essential to the maintenance of populations and their natural environments in a healthy condition.

Hunting. Hunting in areas of the National Park System is incompatible with their preservation in the manner contemplated by the authorizations for their establishment and will not be permitted, except as specifically provided by law.

Wildlife problems, especially those in relation to overpopulation, are to be solved effectively, but use of public hunting as a method of wildlife management aimed at readjusting

animal populations to approximate natural biotic conditions is definitely not to be a solution.

Predatory Animals. No native predator shall be destroyed because of its normal utilization of any other park animal or plant, unless such animal or plant is in immediate danger of extermination, and then only if the predator is not itself a vanishing form. When control is necessary, it shall be accomplished by transplanting, or if necessary, by killing offending individuals and not by campaigns to reduce the general population of a species.

Species predatory upon fish shall be allowed to continue in normal numbers and to share normally in the benefits of fish culture.

Exotics. Nonnative forms shall not be introduced into parks. Any exotic species which has already become established in a park shall be either eliminated or held to a minimum provided complete eradication is not feasible, and the possible invasion of the parks by other exotics shall be anticipated and steps taken to guard against the same.

Native Forms. Every native species in the areas of the National Park System shall be left to carry on its struggle for existence unaided as being to its greatest ultimate good, unless there is real cause to believe that it will perish if unassisted.

Where artificial feeding, control of natural enemies, or other protective measures are necessary to save a native species that is unable to cope with civilization's influences, every effort shall be made to place that species on a self-sustaining basis once more. The artificial aids, which themselves have unfortunate consequences, will then no longer be used.

Reintroduction. Any native species or subspecies which has been exterminated from a park shall be brought back if this can be done, but if a species has become extinct, no related species shall be considered a candidate for reintroduction in its place. If a subspecific variant of a species has become extinct, substitution of a closely related subspecies may be considered.

Adverse Biological Forces. Plants and animals which are inimical to the public health or welfare or which are destructive to historic, archeological or scientific structures, sites, features or records of primary importance shall be subject to neutralization or control.

Hoofed Animals. The numbers of native hoofed animals occupying a deteriorated range shall not be permitted to exceed its reduced carrying capacity and, preferably, shall be kept below the carrying capacity at every step until the range can be brought back to its original productiveness.

Artificial Feeding. No animal shall be encouraged to become dependent wholly or in part upon man for its support.

Captive Animals. Artificiality shall be avoided in the presentation of the animal life of the parks to the public. The preferred presentation shall be through wholly natural situations.

Management. Management measures or other interference with plant and animal relationships should be undertaken after a properly conducted investigation. Approval of programs for the destruction and disposition of wild animals which are damaging the land, or its vegetative cover and of permits to collect rare or endangered species has not been delegated. (See Organization Volume, Part 6, Chapter 2, Order 14, Section 1 (k).)

Endangered and Vanishing Species. The issuance of a scientific collector's permit must be based upon the abundance of the species in the park which the permit applies. Every request must be considered carefully, and the collection of endangered or vanishing species is restricted or prohibited. Full information on scientific collecting and the appointment of collaborators may be found in the Natural History Section of the Manual, Volume IV, Part 2, and the Organization Volume, Part 6, Chapter 3.

Policies--Fishing

General Statement. Recreational fishing within National Parks and Monuments shall be permitted under management programs directed toward the perpetuation, restoration and protection of

native species and wild populations of fishes and the protection of the natural aquatic environments and the ecological relationships of the associated fauna and flora. This activity shall be directed so as to not decrease the wildlife, scenic, scientific or historic values of the park.

Where Fishing is Excluded. Fishing may be excluded from specific waters when necessary to preserve aquatic or terrestrial species or habitats which are limited in distribution or when such activity materially decreases the enjoyment of the area by the general public.

Native Species. The perpetuation, protection and restoration of native species in safe numbers in waters where they originally were found shall be given primary consideration in any management plan whenever possible.

Native Nonsport Fishes. All species of fishes are fully protected, except those designated for recreational angling.

Native nonsport fishes shall not be reduced or eliminated except as may be unavoidable and incidental to the primary objective of extirpating an exotic unwanted population of fishes.

In any restoration plan, native nonsport fishes should be reintroduced as well as the sport fishes.

Hybrid Trout. Hybrid trout shall not be stocked in waters of National Parks and Monuments.

Stocking. Artificial replenishment or stocking may be employed:

1. To reintroduce native species into waters where they have become eliminated or seriously depleted by natural or man-made causes.

2. To maintain fish populations in selected and approved lakes which are capable of supporting fish life, but which lack sufficient natural spawning facilities to maintain an adequate fish population to meet the need of recreational angling.

Size of Fish to Stock.

1. Fingerling trout may be planted in lakes where competent study had determined a need for supplementary stocking.

2. The stocking of eyed-eggs, fry or fingerlings in streams shall not be practiced except to restore a depleted population of native trout. (Numerous qualified studies on streams of varying sizes throughout the country have demonstrated that where conditions are suitable for trout, natural populations are maintained at maximum carrying capacity by natural reproduction. Planting of eyed-eggs, fry or fingerling trout in streams to supplement this natural reproduction has proven to be of negligible or no benefit.)

3. Stocking of catchable size trout to provide "put and take fishing" is not compatible with the fundamental concept of the National Park Service, therefore, the planting of fish for immediate recovery by the angler shall not be made in waters of national parks and monuments.

4. Adult wild trout may be transplanted to re-establish native species or depleted populations.

Stocking National Parkways. Recreational fishing within National Parkways is permitted under management programs and stocking procedures normally practiced by the State or States in which the Parkways are located. This activity shall be regulated by the National Park Service.

Each Parkway Superintendent shall designate Parkway fishing waters. When the impact of fishing pressure would create damage to Parkway, features and facilities, would produce hazardous traffic congestion or would result in unusual enforcement problems, individual waters may be closed to fishing and to stocking.

Stocking Exotic Species. Exotic species of fishes or other exotic animals, or any exotic species of aquatic plants may not be introduced or stocked in waters of the National Parks and Monuments except:

1. In waters where exotic fishes are established and the restoration of native species is impracticable.

2. Where adequate investigations have demonstrated that additional planting is desirable and necessary to supplement limited or nonexistent natural reproduction.

Management of Exotic Sport Fishes. In waters where exotic sport species of fishes are established, and they are valuable for angling and are ecologically compatible with the existing environment, and their replacement by native species is impracticable, the fishery for the exotic species will be managed in a manner similar to that for native forms.

When replacement of the exotic by the native species is practicable, the latter shall be encouraged to take over its former place.

Removal of Exotic Species--Eradication or Control. Where exotic species have become dominantly established to the detriment of the native species, restoration of the original fish composition may be brought about by the removal of the undesirable exotics. Standard eradication methods; such as, chemical treatment or electric shocking may be employed. Also, these methods may be employed to control exotic species where complete elimination is not feasible.

The need for and techniques to be used for an eradication or control program shall be based upon adequate investigations by aquatic biologists.

Egg Taking. The taking of eggs from fishes for the purpose of artificial propagation within waters in national parks and monuments is rarely justified and should not be permitted until a thorough review has been made.

Protection of Virgin Waters. Lakes and streams which are barren of fish life shall remain in this virgin condition and shall not be stocked.

Artificial Improvement of Lakes and Streams. All forms of artificial improvement of streams or lakes for fishery management purposes which would change the natural habitat and the surrounding landscape are prohibited, except that, when the aquatic

environment has been so altered by man that restoration by natural means is improbable, measures may be taken to return the streams and lakes to a more natural condition.

Management by Regulations. To preserve the populations of native species and yet allow angling, sport fishing shall be controlled by regulations which provide for the conservation of native species of fishes and compatible management of introduced, established species. Limits shall be established so that the total catch will not exceed the natural productive capacity of the waters. Creel limits shall not be considered as "goals".

Fishery Investigations. The conservation and proper management of the fishery resources and angling as a recreational activity is dependent upon a complete knowledge of the status of the fish fauna and the angling pressures being exerted. Adequate and continuing investigations are vital to the successful preservation and management of this resource.

Commercial Fishing. Commercial fishing is generally non-compatible with National Park Service objective and shall be permitted only within national parks and monuments where this activity is specified by law. It will be conducted under restrictions which are designed to conserve and perpetuate the resource.

Publicity. Publicity regarding fishing within the areas of the National Park System shall be directed toward the recreational and esthetic values, and the appreciation of the unspoiled environment as a whole rather than emphasis on the catch. Information regarding angling will be factual and realistic with respect to fishing conditions.

Promotional types of publicity are discouraged but this does not apply to release of information on subjects of conservation of aquatic resources, fish regulations, care of fish by anglers, or the place of angling in the national park experience.

Agreements

Memoranda of Agreement with Fish and Wildlife Service. The need for consultation, and agreement on certain phases of fish

and wildlife investigations and management has been established through Memoranda of Agreement with the Fish and Wildlife Service.

The Secretary of the Interior approved one such agreement on March 5, 1956, that pertained to fish stocking procedure, operation of fish traps and taking of spawn, the assignment of fish from Federal hatcheries, and wildlife research and management procedures.

There is an agreement between the National Park Service, the Fish and Wildlife Service, the Clark County (Nevada) Commissioners, the Nevada Fish and Game Commission, and the Arizona Game and Fish Commission relating to the management of the fishery resources of the Colorado River below Hoover Dam.

An agreement with the Fish and Wildlife Service was made on July 12, 1951, which is a supplement to the agreement of March 5, 1946, pertaining to predator and rodent control work adjacent to areas under the jurisdiction of the National Park Service. Predator and rodent control is to be done after consultation between the two agencies. Specifically, 1080 Stations (sodium fluoracetate) are not to be placed within three miles of the boundary of areas administered by the National Park Service except by joint agreement.

The Secretary of the Interior approved an agreement between the Service and the Fish and Wildlife Service on June 19, 1952, whereby the Fish and Wildlife Service can grow hay in Grand Teton National Park for the purpose of feeding the Jackson Hole elk herd.

The full text of these agreements can be found under Cooperative Agreements, Part 10, of the Organization Volume, Administrative Manual.

UNITED STATES
DEPARTMENT OF THE INTERIOR
National Park Service

THE ROLE OF AQUATIC LIFE INTERPRETATION AND PRESERVATION
AND RECREATIONAL ANGLING IN NATIONAL PARKS

Recreational angling for certain species of fishes has become established as a traditional use of a natural resource within areas administered by the National Park Service. In fact, in this respect protection of the fishes stands in a unique position. With the exception of a few other natural features such as pine cones, berries, downed wood, seashells, etc., the park visitor cannot legally carry away any other park features. The taking of natural baits for fishing such as aquatic insects, grasshoppers, wood grubs or angle worms theoretically is prohibited in National Parks.

Early laws relating to Yellowstone National Park provided for fishing for sport. This intent has not been seriously questioned in the creation of subsequent areas.

To provide sport fishing, exotic species have been introduced by transplanting and stocking into waters barren of fish life and in others supporting native fishes. Today relatively few waters exist in National Parks which have escaped this intentional and, all too often, indiscriminate practice. Natural conditions and native fishes have thus been sacrificed in many waters for the recreational benefit of a relatively small minority of park visitors who fish.

Recreational fishing thus has been provided for by law and is now firmly established by tradition. Management activities are being conducted to perpetuate this form of visitor-use.

This is the situation which prevails in National Parks today. The challenges which face the National Park Service concern:

1. The perpetuation of recreational angling for wild, colorful, vigorous trout in a visitor-use activity role which creates minimum interference with wildlife or features of scenic, scientific, or historic significance or with the enjoyment of these features by other park visitors.
2. The protection and perpetuation of the waters and native populations which remain under relatively unmodified conditions.
3. The restoration of at least representative lakes and streams and the associated aquatic life they contained to an original state.

To achieve these objectives, it is necessary for the National Park Service to complete a program which will include:

1. Research on the aquatic environments to determine the original and existing situations with respect to the composition of the fish faunas, the biological and physical conditions and ecological relationships.

2. An evaluation of angler-use activities in relation to other park-use activities and the protection of park features and their enjoyment by other park visitors.
3. The development and implementation of research, interpretation, and management plans for each park which possess significant aquatic life resources. These plans should be based upon adequate scientific investigations and should provide for:
 - (1) The perpetuation of unmodified waters and fish populations. (Barren waters which now exist, whether or not fish were ever introduced into them, for example, should be preserved in this fishless condition for the scientific value they incorporate. Deviation from this policy should be permitted only when it is clearly established that the scientific significance to be achieved by the introduction of fishes justifies such action.)
 - (2) The restoration of native species, natural aquatic conditions, and associated plants and animals in representative waters.
 - (3) The protection of wild fish populations.
 - (4) The perpetuation of angling experiences which emphasizes the recreational and esthetic aspects of the activity rather than catch alone.
 - (5) The management of present resources through methods such as limited stocking, fishing regulations and law enforcement and through the facts secured from research and scientific investigations. (Primary reliance for fish for the angler will be placed upon the natural reproductive capacities of wild fish populations rather than upon planting of artificially reared fish.)
 - (6) The creation of greater appreciation and understanding of the aquatic resources through the interpretation of these features to park visitors.

O. L. Wallis
April 1963

INTERPRETING MARINE AND FRESH-WATER LIFE IN NATIONAL PARKS

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Scenic beauty found in National Parks is created by a combination of many natural features -- the forests, the eroded canyons or the towering peaks. The attractiveness of these scenes is enhanced by the gurgling, tumbling streams; the clear mountain lakes enclosed in cirques; the crashing of the sea upon a rock-bound coast, or the gentling surf rolling over sandy shores. The grandeur of the Great Smoky Mountains, the Virgin Islands, or Glacier National Park, to name a few, would be lessened if these aquatic features were missing.

These waters are significant also for the biological treasures they possess. The natural aquatic environments and their inhabitants found within National Parks and Monuments, even in the desert of Death Valley National Monument, are among the country's cherished possessions entrusted to the National Park Service to perpetuate for all time and to interpret for the enjoyment and appreciation of park visitors. Certainly National Parks are vast outdoor laboratories for the study of aquatic life under natural conditions.

Isolated and hidden beneath the water's surface film, plant and animal inhabitants of the seas, lakes, ponds, streams, swamps and marshes have been frequently overlooked in an out-of-sight and out-of-mind manner. Their significance has not been fully recognized nor represented in park interpretive programs.

The philosophy has developed that the value of a body of water is best measured by the number of fishes which an angler could catch and that other forms of aquatic life are of consequence primarily as they support sport species. Therefore, often in the past, interpretive attention was directed primarily toward aquatic resources as they related to the angler. Now we recognize that the story can not stop here!

Presented as part of the symposium on Outdoor Laboratories at a joint session of the Annual Meetings of the American Nature Study Society and the National Association of Biology Teachers, New York, New York, December 27, 1960 in connection with 127th Meeting of the American Association for the Advancement of Science.

The National Park Service is taking a fresh look at many things. Among these is the role of the marine and fresh water life in the overall pattern of park interpretation and protection. A program to provide for adequate interpretation of these aquatic features is being developed and encouraged.

In these interpretive endeavors, some very definite principles are being applied.

The significance of aquatic life forms and habitats within a park are initially identified. The broad aspects of the term "aquatic life" is considered to include all plants and animals which are part of an aquatic environment as illustrated at Royal Palm in Everglades.

Their relationship to other park features of geological, historical, archeological, or biological interest are evaluated.

Marine and fresh water life interpretation is then incorporated into an individual park's program in proportion to the significance of these resources and as they relate to the other primary park features.

Wherever possible the aquatic story is molded into the interpretation of other principle park features.

In scenic-scientific parks, where the relationship is frequently more distinct, this integration is easier to achieve than in historical and archeological areas where the association is more remote. In the parks of great biological importance, emphasis is placed upon the ecological relationships of the whole environment rather than upon individual forms. In parks where geology is important, for example, the approach is directed toward telling how geologic processes created the aquatic habitats and influenced the distribution of aquatic life. In historical and archeological parks, attempts are made to illustrate the role which aquatic life forms played in the welfare of the earlier cultures.

The type of park visitation, also determines the treatment the subject can receive. In areas where a visitor's stay is brief, a general approach to a wider scope of natural history is employed; in other parks where a visitor's visit is more prolonged, a more specialized presentation may be enjoyed.

Aquatic interpretation is directed toward creating a fuller understanding and appreciation of the ecology of aquatic life. The observation of aquatic life through self-guiding devices and through participation in conducted trips is encouraged. Local field situations, climatic

considerations, available facilities and visitor-use patterns govern the application and effectiveness of each technique within a park.

A variety of interpretive methods are being utilized to do the job. To develop those most suited to fully utilize unique local conditions requires considerable experimentation. Let's take a look at some techniques which are currently being used.

The beach walk is among the unusual and fascinating interpretive methods employed as part of the regular program along the Atlantic shores of Cape Hatteras, beside the rock-bound coast of Acadia in Maine, next to the tropical blue seas of the Virgin Islands, upon the Pacific Ocean strip of Olympic in Washington, and among the tide pools at Cabrillo National Monument in California. Each walk affords a similar but still a vastly different type of experience. Tidal pools, common to Cabrillo and Acadia, present different ecological associations from those to be discovered along the sandy beaches of Olympic, Cape Hatteras or Virgin Islands.

Such a beach experience frequently starts after a brief "get-acquainted" chat in the shelter of a building or overhanging rock. This is the opportunity for the naturalist to identify and to explain various creatures which may be encountered along the shore. Then after a short walk, the group pauses briefly within sight and sound of the ocean to orient themselves with the expanse of sea and sand before them. As they move out onto the beach or scramble over the rocky pools, the visitors observe the things identified earlier, discover new features and all of the forms of life begin to fall into the pattern of the overall picture. Occasionally, the naturalist may dash out into the water and bring forth various objects of interest which are explained to the group. One can never tell what the sea may cast up upon the shore; therefore, every beach walk is different.

And now a word about the size of beach parties. The experience can be a most rewarding adventure when the number of those participating is small. Everyone is able to participate, to ask questions, to see what has been discovered and to hear what is being discussed. When larger groups show up, the method of presentation must be altered. As it takes more time to "compact" a larger group, fewer stops can be made and each must be longer in duration. With a sizable group, the naturalist loses the opportunity to chat as casually about individual features as are found.

Guided walks are made beside fresh water lakes and streams in several parks including Crater Lake and Rocky Mountain. In Everglades, an

elevated trail, called the Anhinga Trail, has been constructed over Taylor Slough. Naturalists regularly lead visitors over this exciting wildlife trail.

Another type of conducted trip is the guided boat cruise. The main theme of a boat trip may not be aquatic interpretation but aquatic life will be incorporated as it relates to other important park features. On Crater Lake, geology and origin of the lake is the basic story and the interpretation of aquatic life is subordinate to the main topic. Although the mule-drawn barge trip along the C. & O. Canal in National Capital Parks is principally a historic experience, aquatic life is woven in. Naturalist guided boat trips are programmed, also, at Acadia, Glacier, and Lake Mead. The interpreter presents the message either with or without an amplifying system. Boat trips conducted underground on Echo River, deep within Mammoth Cave, are of unique interest.

Some of the trips at Lake Mead, Glacier and Everglades, and upon the Green River at Mammoth Cave are unaccompanied by naturalists. The interpretive messages are presented by the concessioners' boatmen or guides who have been briefed on the correct story by the park naturalists.

In the Everglades another form of boat tour, known as a "boat-a-cade" may be experienced. After a brief orientation talk, the park ranger in the lead boat guides the visitors following in their boats through some of the waterways. After the tour starts he is able to communicate with the participants only at designated stops, and continuous interpretive contact is impossible.

Audubon bird observation boat tours are conducted within Everglades in addition to the other trips.

During the cruise of the Ranger III across Lake Superior, to Isle Royale, passengers learn the aquatic story, through an illustrated program, which is presented in the lounge.

Direct observation of aquatic life is encouraged. An old gun emplacement at Cabrillo has been glassed-in to serve as a lookout station from which park visitors assist in counting the gray whales as they migrate southward to their mid-winter breeding grounds. Here the visitors hear the story of this gigantic marine mammal and display panels provide additional interpretive information.

Several lakes, such as Emerald Lake in Lassen Volcanic National Park, and Shadow Lake in Mount Rainier National Park, are closed to angling and are reserved for the observation of trout. Out-of-doors living

fishes are displayed in ponds at Happy Isles Nature Center in Yosemite and in several other parks. Aquariums are occasionally used, such as the small one at Mammoth Cave, in which blind fishes are exhibited. However, their use is restricted to the display of specially unique forms.

The most elaborate indoor living exhibit is located within the Happy Isles Nature Center where the life history of the trout is demonstrated through the use of display troughs containing trout in various stages of development. Panels which form a backdrop combine to make the exhibit very effective.

The Pa-hay-okee or "river of grass" self-guiding nature trail in Everglades presents the aquatic story of the sawgrass and the creatures which dwell here. This elevated trail terminates at an observation platform where visitors look over the "river of grass" and where an exhibit panel explains this unusual habitat.

A cross section diagram of Taylor Slough which will be erected (soon) on the Anhinga Trail and a lift-lid exhibit here illustrate other devices.

Recently established on an experimental basis at Trunk Bay in the Virgin Islands is a most unique self-guiding device -- the world's first underwater self-guiding trail!

A panel on the beach identifies various marine features and invites the experienced swimmer to follow the underwater route. Equipped with a face plate and a snorkel, he then enters the water and views the scenic beauties beneath the sea. Submerged labels painted on glass describe the outstanding attractions along the trail. Eventually, it is hoped that we shall be able to program guided underwater trips at which time necessary safety precautions, such as having a lifeguard in a boat above, and adequate means of underwater communications will be developed. This certainly provides exciting possibilities.

Museum displays play an important part in interpreting marine and freshwater life. These consist of identification and interpretive panels, such as this one at Great Smoky Mountains, or this exhibit at Natchez Trace Parkway. Identification panels are limited in favor of exhibits which also interpret. A diorama of the life in Florida Bay, here still in the studio, add dimension to the scene.

Interest in aquatic life has been kindled in recent years through movies, television programs, featured magazine articles and some excellent books. This is reflected in the multitude of commercial attractions offered the traveler. Although our objectives are more than mere entertainment,

some of these devices offer possibilities which are being reviewed. At Silver Springs, Florida, as elsewhere, glass-bottomed boats afford a look under the sea -- a look which is similar to looking down into a forest from an airplane. At Rainbow Springs, in a different form of boat, the passengers descend into a submerged viewing cabin from which they look out through ports into the aquatic world. At Disneyland, submarines which run along a submerged railway, permits viewers to see beneath the surface. Visitors to the Nature's Fish Bowl at Homasassa Springs, Florida, observe fish life from elevated platforms or take a walk under the water in a viewing gallery incorporated into the boardwalk.

The underwater theater built into the side of Weeki Wachee Spring in Florida allows visitors to look into the water from a submerged room.

The possibility of utilizing underwater closed circuit television with stations on the comfort of the land is being investigated.

The main objective in underwater interpretive observation in National Parks is to provide a natural experience by means which will not alter, or damage the marine environments. The construction of some of the devices just shown probably will have to be ruled out because of these considerations. Although some forms of underwater viewing methods are desirable so that more visitors can participate in an underwater experience, they are but a supplement to actually going under and getting wet and observing first hand.

Booklets, self-guiding trail leaflets and other printed materials are being developed to further interpret aquatic life.

Aquatic interpretation is incorporated in scheduled talks in parks where these resources are important. These talks are frequently illustrated by slides and movies..

The discovery that grunion spawn in the sands of Cabrillo National Monument resulted in the establishment of a unique aquatic demonstration in which visitors were encouraged to participate. The naturalist collected some of the sand in which the grunion had spawned and by keeping it moist was able to permit the eggs to survive. While talking about the grunion, he handed out small paper drinking cups. Into each was placed a small quantity of sand and to this fresh sea water was added. Then the participants were instructed to gently agitate the water. After a few moments of such movements, tiny fish appeared suddenly from the apparently barren sand. Such an experience leaves an indelible impression upon the visitor!

To vitalize interpretive presentations, the recent findings of research are incorporated in the programs. The National Park Service encourages cooperative research which will provide just this type of information. Outstanding cooperative aquatic research projects are being conducted in Virgin Islands, Everglades, Yellowstone, Great Smoky Mountains, Olympic and Mammoth Cave National Parks, in Cape Hatteras National Seashore, and in other parks.

Marine and fresh-water interpretation in the National Parks is a challenging venture. It is one which requires an inquisitive spirit, imaginative thinking, creative planning and bold appreciation of new ideas and concepts. The opportunities to create greater understanding, appreciation and enjoyment of the aquatic environments make all of this worthwhile and rewarding.

Management of Sport Fishing in National Parks¹

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ABSTRACT

The National Park Service, entrusted with the perpetuation of natural aquatic conditions in areas it administers, manages recreational fishing so as to create minimum disturbances to these resources. In national parks and monuments angling cannot be managed independently of other park uses and features of significance. The objectives of the conservation of park fishery resources differ in some respects from those which govern programs in waters located outside park areas. The policy and program for the management of sport fishing are outlined.

Fishery resources of the national parks and monuments of the United States are part of the great heritage entrusted to the National Park Service to preserve and perpetuate for present and future generations. Management entails the safeguarding of these resources while providing recreational angling for limited numbers of park visitors who fish.

Recreational angling is a recognized use of these natural resources. This use may appear to be a deviation from the fundamental conservation concept that all forms of wildlife within the national parks and monuments shall receive full protection. In reality, angling is provided for by law in some parks, by rules and regulations in others, and by tradition throughout the Service. Commercial fishing is permitted in a few parks, also.

Birds and mammals of Yellowstone National Park receive full protection by the law of 1894 which specifically prohibits the killing of these animals while providing for the catching of fish by the use of hook and line only. In addition, it directs ". . . that the Secretary of the Interior . . . shall make rules and regulations governing the taking of fish from the streams and lakes in the park." Similar provisions are contained in legislative actions which relate to the establishment of many other national parks. Consequently, fishing is a park-visitor use which dates from the creation of the first national park in 1872.

The law which established the National Park Service in 1916 endowed it with this responsibility: ". . . to conserve the scenery and the natural and historic objects and the wildlife

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." The Service has developed a policy and program which provides for recreational fishing consistent with these primary objectives.

In areas such as Lake Mead and Shadow Mountain National Recreation Areas, where recreational activities are administered by the National Park Service, we cooperate with state agencies and the Bureau of Sport Fisheries and Wildlife in the management of the fishery resources. In national parks and monuments the National Park Service assumes the primary responsibility for the management of sport fishing.

A critical evaluation of fishery resources to determine needs for research, investigations, interpretation, and management is now being conducted. The place of recreational angling in the scope of visitor activities also is being reviewed.

The program is directed toward:

1. The determination of original and present aquatic conditions.
2. The perpetuation and restoration of native fishes, natural aquatic conditions, and associated plants and animals.
3. The protection of wild fish populations. (Wild fish are defined as native or exotic fish which have been naturally produced or which have been stocked during previous seasons as fingerlings. In contrast, put-and-take fish are recognized as hatchery fish introduced for the purpose of being caught immediately or during the current season.)
4. The provision of an opportunity to fish for wild, colorful, vigorous trout amid surroundings which remain as nearly natural as possible. This activity is to be conducted in a manner that shall create minimum interference with wildlife

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or features of scenic, scientific, or historic importance or with the enjoyment of these features by other park visitors.

5. The management of present resources through methods such as limited stocking, fishing regulations, and law enforcement and by the use of information secured through investigations and records of angler-use activities. Primary reliance for fish for the angler will be placed upon the natural reproductive capacities of wild fish populations rather than upon planting of artificially reared fish.

6. The creation of greater appreciation of the aquatic resources through the interpretation of these features to the park visitors.

The history of management of fishery resources in many lakes and streams now within national parks is similar to that for other waters throughout the nation. The significance and importance of preserving native fish faunas and original conditions have not always been appreciated in the past.

Exotic fishes have been introduced into waters which were originally barren and into waters containing only indigenous fishes. Such introductions were made by intentional stocking, invasion of exotics from waters outside park boundaries, and unauthorized releases of bait fishes. Although the exotics failed to take hold in some waters, they became established in other locations. As a result of predation by and the competition and hybridization with the introduced forms, the endemic fish faunas have become greatly altered. Initial and subsequent stocking operations have left relatively few waters untouched. Into other park waters, the free movement of native migratory species has been restricted or completely cut off by the construction of dams. Further changes in aquatic environments and alterations in the distribution and composition of fish populations have resulted from the creation of artificial impoundments adjacent to some parks.

Acute and drastic modifications of many original habitats and fish faunas have thus occurred within the parks. Fortunately, some very significant waters and fish faunas still exist under relatively undisturbed conditions. Because relatively few natural unaltered aquatic environments are found throughout the country, the Service recognizes a special opportunity to preserve the natural habitats and native fishes found in park areas.

Fresh-water lakes and streams found in national parks and monuments are classified in two groups. The first group consists of

waters which originally contained native fishes. In some the fish populations still exist in a virtually natural state; in others, exotics have been introduced and both the alien and native fishes are present; in still others, the exotics have completely replaced the native fish faunas and exist by natural reproduction. The second group concerns waters which were originally barren. Some are still without fish life; many are maintained by self-supporting populations of exotic fishes; and others support fish only by periodic stocking.

The eventual objective of the Service is to restore native fishes to their natural waters wherever and whenever feasible. Such a restoration program entails studies of specific waters to evaluate the current fish populations. In most cases, exotic fishes must be eliminated before native forms may be returned. Sport and non-sport fishes will be given equal consideration in any re-establishment plan. Restoration may be achieved by natural or artificial methods.

In Great Smoky Mountains National Park, for example, the introduced rainbow trout (*Salmo gairdneri*) in Indian Creek were eradicated by chemical treatment and the Appalachian strain of brook trout (*Salvelinus fontinalis*) restored. A few other waters in the National Park System have also been reclaimed by this method. The future of this procedure shows promise on a selected basis, but wholesale elimination of exotics and restoration of indigenous species probably is not feasible.

Natural rehabilitation of a native population is encouraged. An example of this is taking place in Shenandoah National Park where a series of climatic events reduced the populations of native brook trout. Severe droughts in 1953 and 1954 caused the streams to diminish in size, and the dry seasons were followed by the hurricane torrents which scoured the stream courses. In order to preserve and restore the remnant native fish populations, the streams were closed to fishing. During this period of closure the surviving brook trout began to replenish the waters. When the streams were reopened, the size limit was set at 9 inches and fishing was allowed only with single-hooked lures. Now the streams abound with wild and brilliantly colored native brook trout. Adjust-

ments of the size and creel limits in future years will be based on known population characteristics.

It is recognized that reclamation of all streams and lakes is impractical by the use of current techniques. Where restoration is deemed infeasible, therefore, the existing native and introduced fishes are managed as wild populations. Maximum reliance upon natural reproduction is stressed. In lakes and streams which originally were barren and in which natural reproduction is limited or lacking, stocking may be employed to supplement current fish populations. Lakes which are now barren are preserved in this original condition.

Many animals utilize fish in their normal diets. To limit or restrict this natural use of the fishery resources is not undertaken even in the interest of protecting sport fishes unless the fish species are in danger of extinction. Under such a program angling within national parks and monuments cannot be managed independently of other park uses and values. This sport is recognized as an incidental park recreational activity. The primary purpose of a visit to a park is the enjoyment of all natural features for which that individual park was created. Often procedures used to preserve park fisheries are different from methods employed to manage the resources outside park areas. The objectives of each program must be considered before each type of management is understood and appreciated.

Following the national trend, numbers of anglers have increased within the national parks and monuments. Specific natural characteristics of any lake or stream limits the number of fish which can be naturally supported. The catch, therefore, must be regulated within the bounds of this natural productivity. Measures being used to protect wild fishes on specific waters are: lower creel limits, higher size limits, and fishing-for-fun-only and fly-fishing-only regulations. They are providing the desired results.

A creel limit often is interpreted as a goal which an angler must achieve to be considered successful. This objective often results in the taking of excess fish and consequent waste. In keeping with its special objectives, the Service discourages the consideration of creel limits as goals to be achieved and has experi-

mented with low creel limits, the return of uninjured fish, and the taking of only enough fish for camp use.

Park officials in Great Smoky Mountains National Park are experimenting with fishing-for-fun-only regulations on four streams as part of a research program conducted in cooperation with the U. S. Fish and Wildlife Service. The angler may fish the year around, catch all the trout he can on single-hooked artificial lures, but he is required to release all fish under 16 inches. He may keep the larger trout as trophy fish. On these waters recreation is the primary objective and the enjoyment of angling comes from the luring of wild trout and not from retaining the catch. Under this system anglers can catch more fish per hour without damage to the basic resources. It is a means of limiting the kill rather than the catch and of coping with high fishing pressure without resorting to measures that would lower the quality of the fishing experience. In other park waters, where the carrying capacity is low, such as the Ohanapecosh River in Mount Rainier National Park, angling is restricted to fly-fishing-only. The use of live or natural baits often is prohibited to limit the harvest and to prevent the introduction of non-native animal life.

On Yellowstone Lake in Yellowstone National Park, where the future of the cutthroat trout (*Salmo clarki*) must be insured, the creel limit is three fish per day. Under such restrictions the population is withstanding the strain of ever-mounting pressure.

Hatchery trout are released into some park waters to supplement natural reproduction and to help sustain angling for wild fish. It is not our policy to provide put-and-take fishing. The stocking of catchable trout for immediate return to the anglers is not compatible with the fundamental objectives of the National Park Service fishery management program. Plantings of this nature tend to attract fishermen who are primarily interested in fishing rather than in the overall enjoyment of basic park features. First priority in stocking programs is given to native fishes. In waters where exotic species have become established and where the restoration of native species is impracticable, these waters are managed by methods comparable with those employed for native species.

Lakes within national parks and monuments are managed according to their specific characteristics. When stocking is needed in trout lakes, fingerlings are planted. Such releases are made according to demonstrated requirements. To prevent indiscriminate planting, definite management programs are established. Where natural reproduction is limited, such evaluations frequently are difficult. In lakes where natural reproduction is absent, the success of previous plantings is used as a guide for future stocking. In Yosemite National Park, for example, there are over 200 high-country lakes which contain trout. They are now managed according to a 10-year plan. Lakes which contain adequate supplies of trout are not restocked. The other lakes are managed on a maintenance basis. Those which receive heavy fishing are stocked annually or biennially, according to their individual requirements.

Back-country lakes receive lighter fishing pressures. Plantings of rainbow trout are made on a rotation system. Under this system the lakes are restocked every 5 to 7 years. This practice provides for maximum growth of planted fish because the factor of competition between age groups is reduced or eliminated. Where several lakes occur in an individual basin, not all are planted in a single season. Good fishing can thereby be had in one or more of these lakes each year. Formerly, when pack stock was used to transport the fish, it was necessary to plant all lakes within a given basin at one time. The cooperation of the California Department of Fish and Game in planting these trout by airplane makes the present program possible. By stocking smaller numbers of trout the individual fish make faster growth. Past overstocking resulted in slower growth and smaller trout — a condition which could not be corrected until the population became drastically reduced. This process usually takes several years. Information on the relative success of each planting is now obtained through follow-up investigations and angler creel census. By having a definite plan for fishery management of the lakes of Yosemite, the National Park Service is perpetuating wild trout fishing. Similar programs are being developed in other national parks.

State fishing licenses are required in a number of parks and all monuments, but they are not necessary in some parks where exclu-

sive jurisdiction is exercised. This requirement generally is governed by the type of legal authority by which a specific area was established.

In the management of its fishery resources the National Park Service enjoys the cooperation of the U. S. Fish and Wildlife Service and state fish and game departments. Although final determinations of stocking requirements are made by the National Park Service, fish planted in park waters are provided by the U. S. Bureau of Sport Fisheries and Wildlife or by the states. The actual planting operations usually are cooperative undertakings. The Service receives assistance and advice in fishery research and management investigations from the Fish and Wildlife Service, state agencies, educational institutions, and private organizations. Cooperative research is welcomed and encouraged in both marine and fresh-water biology. Most parks afford ideal conditions for such study, and we believe the value of these park waters for research will continue to increase.

The interest of the National Park Service in its fishery resources extends beyond the utilization of sport fishes by anglers. The fish fauna is a vital part of the natural history of an individual area, and its proper interpretation to the park visitor is an important function of the Service. Species which are of little interest to the angler may be of greater significance ecologically and biologically than sport fishes. The isolated Cyprinodon fishes of Death Valley National Monument, for example, provide living evidence of past geological happenings. A unique mosquito fish of Big Bend National Park, Texas, is near extinction, and this has caused concern in recent years. A highly specialized chub initially discovered in Grand Canyon National Park may become extinct as water conditions in the Colorado River are modified by the construction of Glen Canyon Dam. The blind fishes of Mammoth Cave National Park, Kentucky, are of special interest to visitors and scientists alike.

Information on the native fish faunas of most parks is meager. Significant studies have been conducted in some of the areas; but, as in other waters throughout the country, additional research is required to complete knowledge necessary for intelligent management.

Sport angling of national significance for wild fishes can be perpetuated and native

fishes and natural aquatic conditions can be preserved in national parks through proper management. Through interpretive programs, appreciation and interest in the aquatic life will extend to all park visitors. The Service is looking forward to developing closer cooperation with the states and other federal agencies to provide a well-balanced recreational, interpretive, and scientific conservation program for the fishery resources.

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UNITED STATES
DEPARTMENT OF THE INTERIOR
National Park Service

April 9, 1963

Discussion

POLICY REGARDING PUBLICITY ABOUT RECREATIONAL FISHING

Policy Statement:

"Publicity regarding fishing within areas of the National Park System shall be directed toward the recreational and esthetic values, and the appreciation of the unspoiled environment as a whole rather than emphasis on the catch. Information regarding angling will be factual and realistic with respect to fishing conditions.

"Promotional types of publicity are discouraged but this does not apply to release of information on subjects of conservation of aquatic resources, fish regulations, care of fish by anglers, or the place of angling in the National Park experience."

--NPS Admin. Man. VI (Ranger Services), Part 2,
Chapter 5, p. 7 (August 1959)

The intent of this section of the policies for the protection and management of fishery resources is that publicity relating to angling in areas of the National Park System shall be essentially nonpromotional in nature. It is not the Service's objective to "sell fish" but rather the recreational and esthetic aspects of angling as it blends into the broad scope of a park visit. This policy does not exclude the release of information relating to the conservation of aquatic life resources, angling regulations, and the role of fishing in the park experience.

A preliminary set of guidelines has been prepared to assist in developing a uniform interpretation and application of the intent and word of this policy in various forms of public contact. For several years they have informally served in the preparation of the free park informational booklets. It is now proposed that they be applied to all other forms of visitor contact through various informational and interpretive media.

Guidelines for the Use of Information of Fishes and Fishing in the Various Forms of Public Contact in Areas of the National Park System.

1. Recreational and esthetic aspects of the angling experience rather than the catch, alone, shall be emphasized.
2. In areas where angling is a significant recreational activity, a statement regarding it will normally be included under the "What to Do and See" section of the informational booklet.
3. A brief statement on rules and regulations relating to this activity and the license requirements may be included in the "What to Do and See" or the "Regulation" section of the booklet.
4. The National Park Service policy and philosophy about recreational angling and the preservation of native fishes should receive appropriate emphasis.
5. Consideration should be given to the inclusion of catch phrases to emphasize this philosophy: Fish-For-Fun! Keep only the fish you will use in camp! Waste of fish may decrease your future recreational opportunities! Limit your kill not your catch! There's more to fishing than catching fish!
6. A brief discussion of special regulations, such as Fishing-For-Fun or Fly-Fishing-Only, will help to explain the objectives of these programs in the park's pattern of recreational angling and fish conservation.
7. Reference to stocking and hatchery fish should not be incorporated into park informational booklets and should receive a subdued position in press releases and informational and interpretive presentations. Undue emphasis upon this aspect of fishery management frequently tends to attract those solely interested in fishing.
8. An interpretive statement about the fishes and aquatic environments should be considered for inclusion in the "Natural History" section of the informational booklet in parks where the fishes are significant or where fishes can be readily observed by park visitors.
9. In parks where a unique fish is especially significant consideration should be given to illustrating it in the informational booklet.

10. A photograph of angling activity adds interest to an informational booklet but should be used only when the figure of the angler is subordinate to the scenic background. Such a picture may well illustrate the Service's theme of "recreational angling amid highly scenic surroundings in an unspoiled wilderness." An illustration which merely pictures anglers and fishing activity is considered to be of a promotional nature and should be discouraged. (In folders for recreational areas where fishing is considered as a primary use, a picture of anglers and fishing would be considered correct, although a photograph of an angler fishing amid scenic surroundings would be more appropriate.)

11. Catch pictures should not be used. The angler and his catch may make an excellent promotional picture for a sporting goods catalogue or chamber of commerce release but is inappropriate for National Park Service publications and presentations.

O. L. Wallis

extinction by overfishing and also the introduction of exotic species to national park waters.

Fishing requirements within the national parks are regulated to meet local conditions. Season and catch limits frequently coincide with regulations established by the State in which the unit is located. Fishing licenses are required in most areas. This requirement is governed by the conditions under which the park was established. The Department advises anglers to contact the park superintendent for special regulations.

With the exception of those units located in California, a salt-water license is not required.

Boats are allowed on some roadside park waters. Again, the park superintendent can provide information regarding special regulations which govern boating use within a specific park.

For the angler who plans to include camping in his itinerary, campgrounds are located within most of the parks. These campgrounds generally have well-drained campsites, fireplaces, picnic tables, water, restrooms, and occasionally concession-operated laundry facilities. The angler must provide only his equipment--and his day's catch.

Overnight accommodations and trailer spaces also are located in most of the parks, the Department said.

Conrad L. Wirth, Director of the National Park Service, noted that the Service's management of recreational fishing has been furthered through the close cooperation of the U. S. Bureau of Sport Fisheries and Wildlife, and the various State fish and game departments.

The following is a park-by-park description of fishing opportunities.

ACADIA NATIONAL PARK, MAINE: License required.

Brook trout are found in the streams, and trout, land-locked Atlantic salmon, pickerel, perch, and bass in the various lakes on Mount Desert Island. Shore fishing produces a variety of salt-water species.

Superintendent - Box 338, Bar Harbor, Maine.

BANDELIER NATIONAL MONUMENT, NEW MEXICO: License required.

Wild brook and rainbow trout are plentiful in Frijoles Creek, near the park headquarters. Brown trout are found in remote Capulin Creek.

Superintendent - Santa Fe, New Mexico.

BIG BEND NATIONAL PARK, TEXAS: No license required.

Channel catfish are found in the Rio Grande River, which serves as the international boundary between the United States and Mexico.

Superintendent - Big Bend National Park, Texas.

BLACK CANYON OF THE GUNNISON NATIONAL MONUMENT, COLORADO: License required.

Various species of trout are found in the isolated section of the Gunnison River at the bottom of the Black Canyon.

Superintendent - Box 438, Fruita, Colo.

BLUE RIDGE PARKWAY, VIRGINIA-NORTH CAROLINA: License required.

Placid streams provide fishing for brook, rainbow, and brown trout; some waters are managed as "native trout" streams and reduced limits are enforced. Price and Trout Lakes contain rainbows, while bass and bluegills are found in Cone Lake.

Superintendent - P. O. Box 1710, Roanoke, Va.

CAPE HATTERAS NATIONAL SEASHORE, NORTH CAROLINA: No salt-water license required.

Charter boats, surf, and piers provide access to a variety of salt-water fishes. A few ponds contain bass and bluegills. Inshore marine species include channel bass, mullet, striped bass, bluefish, and spot; deep-sea forms are marlin, sailfish, dolphin, and amberjack.

Superintendent - P. O. Box 457, Manteo, N. C.

CHANNEL ISLANDS NATIONAL MONUMENT, CALIFORNIA: Salt-water license required.

The Pacific waters surrounding the various islands of this magnificent national monument contain sea bass, barracuda, bonito, yellowtail, and other marine species.

Superintendent - P. O. Box 6175, San Diego 6, Calif.

C & O CANAL NATIONAL MONUMENT, MARYLAND: License required.

Bass, sunfish, and a number of other warm-water sport fishes are caught in areas situated along the Canal: Big Pool, near Fort Frederick; Little Pool, at Hancock; and Battie Mixon Pond, near Oldtown.

Superintendent - 479 No. Potomac Street, Hagerstown, Md.

CATOCTIN MOUNTAIN PARK, MARYLAND: License required.

Big Hunting Creek offers trout on a "fly-fishing-only" basis. Wild Brook and brown trout are caught in Little Owens Creek.

Superintendent - Thurmont, Md.

COULEE DAM NATIONAL RECREATION AREA, WASHINGTON: License required.

The kamloop strain of rainbow trout and kokanee salmon are the principal sport fishes found in Roosevelt Lake, which was created by gigantic Grand Coulee Dam.

Superintendent - Box 37, Coulee Dam, Wash.

CRATER LAKE NATIONAL PARK, OREGON: No license required.

Rainbow trout and kokanee, introduced here several years ago, are sufficiently plentiful to provide the angler with an unique fishing experience deep within the rims which surround Crater Lake. The lake is accessible by the one-mile-long Cleetwood Trail. Rainbow and brook trout are found in the small streams.

Superintendent - Box 672, Medford, Oreg.

DESOTO NATIONAL MEMORIAL, FLORIDA: License required.

Fishermen cast from boats and the shore to catch a variety of salt-water fishes in Tampa Bay.

Superintendent - Box 1377, Bradenton, Fla.

DEVILS POSTPILE NATIONAL MONUMENT, CALIFORNIA: License required.

Rainbow, brook, and brown trout are plentiful in the Middle Fork of the San Joaquin River.

c/o Superintendent - Box 577, Yosemite National Park, Calif.

DINOSAUR NATIONAL MONUMENT, UTAH-COLORADO: License required.

Jones Hole Creek contains rainbow and brook trout, while channel catfish provide a challenge in the Green and Yampa Rivers.

Superintendent - Vernal, Utah.

EVERGLADES NATIONAL PARK, FLORIDA: License required only for fresh water.

Although tarpon, snook, and bonefish are the principal fishes, the spotted sea trout, mangrove snapper, and redfish command the attention of salt-water fishermen in the bays and estuarine waters. Largemouth bass, bluegill, and an assortment of other fresh-water fishes are found in the streams, ponds, and pools.

Superintendent - P. O. Box 279, Homestead, Fla.

FORT PULASKI NATIONAL MONUMENT, GEORGIA: No salt-water license required.

There is fishing from the bridges over the south channel of the Savannah River and in the moat which surrounds the historic fort.

Superintendent - Box 98, Savannah Beach, Ga.

GLACIER BAY NATIONAL MONUMENT, ALASKA: License required.

Here the fishery resources consist of salmon, rainbow, grayling, and Dolly Varden. Anglers are cautioned that Glacier Bay is rather inaccessible and remote at this time.

Superintendent - Box 1781, Juneau, Alaska.

GLACIER NATIONAL PARK, MONTANA: No license required.

Cutthroat, brook, rainbow, and Dolly Varden trout and kokanee salmon are plentiful in the lakes and streams of this scenic park. Grayling are present in a few waters in the Belly River country. Lake St. Mary, Crossley, and Waterton Lakes also afford fishing for lake trout.

Superintendent - West Glacier, Mont.

GRAND CANYON NATIONAL PARK, ARIZONA: License required.

Brown and rainbow trout are found at the bottom of the canyon in Bright Angel Creek, near Phantom Ranch. Channel catfish are taken from the nearby Colorado River. Rainbow swim the Thunder River and Tapeats Creek, both of which are located in remote canyons.

Superintendent - P. O. Box 129, Grand Canyon, Arizona.

GRAND TETON NATIONAL PARK, WYOMING: License required.

Lake trout are taken in greatest numbers in Jackson Lake, located at the base of the picturesque Grand Tetons. Jackson lake, open all year except for a short period during the fall spawning season, affords unusual ice fishing during the winter. A number of other lakes and many streams contain cutthroat, brook, and rainbow trout and whitefish.

Superintendent - P. O. Box 67, Moose, Wyo.

GREAT SMOKY MOUNTAINS NATIONAL PARK, NORTH CAROLINA-TENNESSEE: License required.

Brook and rainbow trout are found in the 600 miles of fishing streams in the park. At lower elevations bass also are taken. Sections of some streams are managed as "Fishing-For-Fun" waters. Here, only artificial flies may be used and all fish, except those measuring more than 16 inches, must be returned to the stream unharmed.

Superintendent - Gatlinburg, Tenn.

ISLE ROYALE NATIONAL PARK, MICHIGAN: No license required.

Northern pike are found in 28 inland lakes and in the waters of Lake Superior surrounding the park. The lake trout is found in both Lake Superior and Siskiwit Lake. Other waters contain rainbow and brook trout, perch, walleye, and whitefish.

Superintendent - 87 No. Ripley St., Houghton, Mich.

KATMAI NATIONAL MONUMENT, ALASKA: License required.

Anglers who are seeking rainbow trout, lake trout, Dolly Varden, grayling, whitefish, northern pike, and Pacific salmon can reach this isolated national monument by airplane.

Superintendent - Mt. McKinley National Park, Alaska

LAKE MEAD NATIONAL RECREATION AREA, ARIZONA-NEVADA: License required.

Two huge lakes--Mead and Mohave--created by Hoover and Davis dams provide the main fishing waters of this recreation area. Lake Mead is noted for its largemouth bass and channel catfish. Lake Mohave contains rainbow trout in the upper end and largemouth bass farther down. Sunfish and crappie also are taken in these lakes.

Superintendent - 601 Nevada Highway, Boulder City, Nev.

LASSEN VOLCANIC NATIONAL PARK, CALIFORNIA: License required.

A number of roadside waters and back-country lakes and streams furnish fishing for rainbow, brook, and brown trout.

Superintendent - Mineral, California.

MAMMOTH CAVE NATIONAL PARK, KENTUCKY: No license required.

Sauger, walleye, catfish, and bass are found in the Green and Nolin Rivers and in several small ponds.

Superintendent - Mammoth Cave, Ky.

MOUNT MCKINLEY NATIONAL PARK, ALASKA: No license required.

The magnificent Wonder Lake contains lake trout, while the small ponds and streams provide grayling and Dolly Varden.

Superintendent - McKinley Park, Alaska.

MOUNT RAINIER NATIONAL PARK, WASHINGTON: No license required.

High alpine lakes contain a variety of trout. The streams provide fishing for cutthroat, rainbow, brown, and brook trout.

Superintendent - Longmire, Wash.

OLYMPIC NATIONAL PARK, WASHINGTON: No license required.

Olympic's streams and lakes contain cutthroat, rainbow, and brook trout, Dolly Varden, and Pacific salmon of several species. Larger rivers are noted for steelhead (sea-run rainbow trout) fishing.

Superintendent - 600 E. Park Ave., Port Angeles, Wash.

PLATT NATIONAL PARK, OKLAHOMA: No license required.

The park streams contain largemouth bass, sunfish, crappie, warmouth, and white bass.

Superintendent - Box 379, Sulphur, Okla.

PRINCE WILLIAM FOREST PARK, VIRGINIA: License required.

Three small lakes support bass and bluegill populations.

Superintendent - Triangle, Va.

ROCKY MOUNTAIN NATIONAL PARK, COLORADO: License required.

Cutthroat, rainbow, brown, and brook trout are found in Rocky Mountain's lakes and streams.

Superintendent - Box 1080, Estes Park, Colo.

SEQUOIA-KINGS CANYON NATIONAL PARKS, CALIFORNIA: License required.

The areas many wilderness lakes and streams contain California golden, rainbow, brook, and brown trout. Many of the park waters are very remote and require extensive hike-in and pack-in trips. Sections of two streams are managed as "Fishing-For-Fun" waters and anglers return all fish they catch.

Superintendent - Three Rivers, Calif.

SHADOW MOUNTAIN NATIONAL RECREATION AREA, COLORADO: License required.

Year-round fishing is provided on two man-made waters: Shadow Mountain Lake and Lake Granby. Main fishes are rainbow trout and kokanee. Also present are lake, brown, and cutthroat trout. Ice fishing is offered during the winter.

Superintendent - Box 1080, Estes Park, Colo.

SHENANDOAH NATIONAL PARK, VIRGINIA: License required.

More than 100 miles of streams contain wild and colorful native brook trout. High quality fishing has developed on the Rapidan and Staunton Rivers, both of which have been set aside as "Fishing-For-Fun" waters, requiring anglers to return all fish caught on artificial flies and lures.

Superintendent - Luray, Va.

THEODORE ROOSEVELT NATIONAL MEMORIAL PARK, NORTH DAKOTA: License required.

The Little Missouri River contains sauger, channel catfish, goldeye, and bullheads, which are taken on stretches of the river accessible by road.

Superintendent - Medora, N. Dak.

YELLOWSTONE NATIONAL PARK, WYOMING-IDAHO-MONTANA: No license required.

Yellowstone Lake is well known for its extensive population of native Yellowstone cutthroat trout. Other park streams and lakes contain rainbow, brook, brown, cutthroat, and lake trout. Also found here are grayling and whitefish.

Superintendent - Yellowstone National Park, Wyo.

VIRGIN ISLANDS NATIONAL PARK, VIRGIN ISLANDS: No salt-water license required.

The marine waters surrounding St. John Island, upon which the park is located, contain a variety of salt-water sport fishes, including: tarpon, barracuda, jacks, bonito and bonefish. Fishing includes deep-sea trolling and angling in shallow reef and inshore waters.

Superintendent - Box 1707, Charlotte Amalie, St. Thomas, V. I.

YOSEMITE NATIONAL PARK, CALIFORNIA: License required.

Rainbow, golden, brook, and brown trout are found in the park's more than 200 lakes and 550 miles of streams. Most waters are located off the roadside and require hiking or horseback riding. "Fishing-For-Fun" programs operated on the Dana Fork of the Tuolumne River.

Superintendent - Box 577, Yosemite National Park, Calif.

ZION NATIONAL PARK, UTAH: License required.

A short section of the Virgin River, which flows through Zion Canyon, supports a limited rainbow trout population.

Superintendent - Springdale, Utah.

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OPPORTUNITIES FOR ICHTHYOLOGICAL RESEARCH IN NATIONAL PARKS

Orthello L. Wallis, Aquatic Biologist
National Park Service
U. S. Department of the Interior

Native fish faunas of the national parks provide unique opportunities for research. Outstanding contributions to the knowledge of the systematics, distribution, ecology and zoogeographic relationships of the fishes have been made in several parks. In other park waters, little is known about the composition and identity of the aboriginal fish fauna and the status of current populations. Some of these faunas fortunately remain in a relatively natural state, neither contaminated by non-native forms nor altered by adverse environmental conditions.

The National Park Service recognizes its obligations to perpetuate native fishes, to preserve examples of the endemic fish faunas and, where feasible, to restore native forms which have become extirpated (Wallis, 1958, 1959). Its responsibilities extend beyond protection alone. The average visitor to a park knows little about the fishes and the significance of the aquatic environments. So that an appreciative understanding of the marine and fresh-water life may be fostered, increased emphasis is being directed toward these subjects in the interpretive programs in the parks. The Service encourages research which will aid in fulfilling these fundamental and challenging obligations in the most effective manner possible.

The same early laws which furnished absolute protection for other forms of wildlife made provisions for the taking of fishes for sporting purposes. With this incentive, active programs of fish stocking and transplanting were initiated to expand and improve fishing conditions. Frequently this objective was achieved at the expense of the native fish faunas and natural aquatic conditions (Cahalane, 1947 a, b; Hubbs, 1937, 1940, 1949; Hubbs & Lagler, 1949; Hubbs & Wallis, 1948; King, 1937, 1939, 1940, 1942; Madsen, 1937; Wallis, 1960).

Paper presented at the 40th Annual Meeting of the American Society of Ichthyologists and Herpetologists, Chicago, Illinois. June 19, 1960.

Today, angling is governed by the following general policy as stated in the National Park Service Administrative Manual (N.P.S., 1959):

"Recreational fishing within National Parks and Monuments shall be permitted under management programs directed toward the perpetuation, restoration and protection of native species and wild populations of fishes and the protection of the natural aquatic environments and the ecological relationships of the associated fauna and flora. This activity shall be directed so as the wildlife, scenic, scientific or historic values of the park shall not be decreased."

Fishing is recognized as an incidental visitor-use activity rather than the primary purpose for a visit to a National Park. Natural angling is primarily dependent upon wild populations of fishes rather than upon stock replenished by artificial means.

Attempting to perpetuate native fishes while permitting wild type recreational angling presents a complex task. Only through sufficient research to determine more about the fish faunas can this challenge be met.

The significance and importance of fishes in some parks has been established by ichthyological research. For Example:

Intensive studies by Miller (1948) revealed the uniqueness of the Cyprinodonts of Death Valley National Monument. As a direct result of these findings, The Presidential Proclamation of January 17, 1952, set aside the Devil's Hole and its entire population of Cyprinodon diabolus for Federal protection as part of the monument.

An opportunity to protect and preserve certain fish species threatened with extinction in this country came with the establishment of Big Bend National Park. Carl Hubbs (1940) reported on the distinctiveness of the fish fauna of this region. In recent years Clark Hubbs has assisted Park officials in their efforts to perpetuate the mosquitofish, Gambusia gaigei, which is greatly endangered.

Fishes of various lakes and streams of Isle Royale National Park constitute unaltered examples of endemic fish faunas which the National Park Service is perpetuating. Hubbs and Lagler (1949) and Lagler and Goldman (1959) have focused attention upon the important character of these fishes.

General accounts of the native fish faunas in several other parks have been published. Among these are: Yellowstone (Jordan, 1889; Kendall, 1915; Smith & Kendall, 1921; Simon, 1953), Yosemite (Evermann, 1921; Hubbs & Wallis, 1948; Evans, Wallis & Gallison, 1958), Sequoia (Evermann, 1905), Glacier (Hazzard, 1939; Schultz, 1941), Grand Teton (Hagen, 1954), Lassen Volcanic (Potts and Schulz, 1953), Mammoth Cave (Bailey, 1933), Grand Canyon (Miller, 1946), Lake Mead National Recreation Area (Wallis, 1951), and Zion (Woodbury, 1933; Tanner, 1932).

Research on specific ichthyological problems currently is being undertaken in Great Smoky Mountains, Mammoth Cave, Rocky Mountain, Everglades and Virgin Islands National Parks; Katmai National Monument; and Cape Hatteras National Seashore.

In most parks, investigations concerned primarily with the management of sport fishes have been undertaken. Fertile fields for research on taxonomic and distributional studies of the native fish faunas remain virtually unworked. For example, in the following parks, to name a few, surveys of the native fish faunas are lacking or incomplete: Olympic, Mt. McKinley, Mount Rainier, Crater Lake, Lassen Volcanic, Sequoia, Kings Canyon, Zion, Grand Canyon, Everglades, Mammoth Cave, Great Smoky Mountains, Shenandoah, Acadia, and Rocky Mountain National Parks; and Katmai, Glacier Bay, Great Sand Dunes, Bandelier and Dinosaur National Monuments. Surveys in Yellowstone, Glacier and Grand Teton and Yosemite National Parks would reveal changes which have occurred since initial studies were conducted.

More needs to be learned about the life histories, the ecology or the zoogeographic relationships of specific fishes in each park fauna.

Other fields of natural history, such as herpetology, mammalogy and ornithology, afford additional research possibilities.

Qualified scientists with well-defined research objectives are welcomed to conduct investigations within National Parks. The following steps outline the manner for initiating a research project.

1. Submission of Proposal: A plan which briefly outlines the scope and objectives of the investigations, its duration, anticipated collecting requirements, financial support, and institutional sponsorship should be submitted to the Superintendent of the park in which the work is proposed.

2. Review and Approval of Proposal: The Superintendent, usually in consultation with members of his staff and frequently with personnel in the Washington and Regional Offices, reviews the proposal. After this review he has the authority to approve or disapprove any proposal.

3. Issuance of Collecting Permits: When the need to collect scientific specimens in connection with the research project has been demonstrated, the Superintendent may issue a permit. A separate permit must be secured from the Superintendent of each park in which collecting is to be conducted.

Two classes of collecting permits are available.

Class A: Allows for the collecting of insects, spiders, plants, rocks and minerals, for public exhibits and for research by qualified individuals who can establish their connection with public museums or other scientific institutions but who are not Federal employees.

Class B: Provides for the collection of specimens covered in Class A plus other forms of animal life by Federal employees.

4. Collaboratorship Appointments: An individual, otherwise qualified, may receive Federal employment status through an appointment as a Collaborator, WOC, (without compensation) with the National Park Service.

To receive such an appointment, an applicant must fill out two copies of Form 57, Application for Federal Employment; one appointment affidavit, and three copies of a waiver of claims against the Government for compensation. All three copies of the waiver must be signed by two witnesses. The applicant must answer all questions on the appointment affidavit, and have his signature subscribed and sworn to before a Notary Public or other person designated to administer such oaths.

Appointments are limited to the shortest period needed to accomplish the collecting project. This term can be as long as three years with the privilege of having the appointment renewed for an added period if a continuing research program requires it. Appointments for Federal employment for more than six months require a loyalty investigation and fingerprinting.

The Superintendent may make the Collaborator appointment if the work is to be confined to the park he administers. However, if collecting is proposed in two or more parks within one National Park Service Region, the appointment usually is made by the Office of the Regional Director. If two or more areas are located in separate National Park Service Regions, the appointment is made by the Director's Office in Washington.

A Collaborator, WOC, thus has status comparable to that of an employee of the National Park Service. As such he is qualified to receive certain benefits not available to non-employees such as waiver of entrance fees, the use of government housing, vehicles and other facilities and services when available.

5. Financing Research: Currently, the National Park Service has few finances at its disposal to assist in cooperative research projects. However, it is possible for Superintendents to make services and facilities available to qualified investigators. Cooperating Associations in some National Parks occasionally financially support such research and many are in a position to publish popular and semi-scientific findings resulting from the investigations. Such considerations frequently make the National Parks attractive sites for research undertakings.

Most of the cooperative research projects now being undertaken in National Parks are being supported wholly or in part by institutional grants or by funds the institutions have secured from the National Science Foundation or from other sources.

6. Obligations of Researchers: A collecting permit is issued under the following conditions:

a) The collections shall be used for scientific or educational purposes only, shall be dedicated to public benefit, and shall not be used for commercial profit.

b) All collecting must be done away from roads, trails, and developed areas, unless such localities are specified in the permit. The collecting shall be conducted in such a manner as not to attract attention or to cause damage to the environment. Because of the scarcity or importance of some specimens, Service officials may designate and limit the kinds, numbers, and sizes of specimens which may be collected, and may make other restrictions necessary to the preservation of the natural features of the area.

c) The National Park Service reserves the right, in the interest of science, to designate the depository of all specimens removed from a National Park or Monument and to approve or restrict transfers of specimens between depositories. The National Park Service also reserves the right to designate the U. S. National Museum as the depository of any type specimen removed from a National Park or Monument, after the collector has made necessary studies and published the results of his research thereon.

d) The Superintendent may require the permittee to furnish an inventory and locality description of any or all specimens proposed to be collected before they are removed and, after the collection is assembled, to submit it for examination.

e) Use or Disposition of Preserved Specimens:
The collected specimens shall be deposited in a permanent public museum or in the exhibit, study or type collections of scientific or educational institutions. They must be suitably recorded in a permanent file and must be available to the public.

f) Copies of reports, reprints and other published materials deriving from the research shall be given to the Superintendent for use in the protection, preservation and interpretation of the features studied.

The National Park Service intends to further scientific research of all natural features found within areas which it administers. It desires to cooperate with technical workers to the fullest extent compatible with its charge to preserve the flora and fauna and all geological materials in a natural state insofar as is possible.

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TROUT SPECIES ESTABLISHED IN LAKES AND STREAMS IN NATIONAL PARKS
AS NATIVE OR AS INTRODUCED FORMS

National Parks	Rainbow	Golden	Cutthroat	Brown	Brook	Lake	Dolly Varden
Acadia * (Maine)				I	N I	N I	
Bryce Canyon * (Utah)	I				I		
Crater Lake (Oregon)	I				I		N
Glacier (Montana)	I		N I		I	N I	N
Grand Canyon * (Arizona)	I			I	I		
Grand Teton * (Wyoming)	I		N I	I	I	I	
Great Smoky Mtns.* (Tenn.-No. Car.)	I			I	N I		
Isle Royale (Michigan)	I				N I	N	
Kings Canyon * (California)	N I	I		I	I		
Lassen Volcanic * (California)	N? I			I	I		
Mount McKinley (Alaska)						N	N
Mount Rainier (Washington)	N? I		N? I	I	I		N
Olympic ** (Washington)	N I		N I		I		N
Rocky Mountain * (Colorado)	I		N I	I	I		
Sequoia * (California)	N I	N I		I	I		
Shenandoah * (Virginia)	I				N I		
Yellowstone (Ida.-Mont.-Wyo.)	I		N I	I	I	I	
Yosemite * (California)	N I	I	I	I	I		
Zion * (Utah)	I		N?		I		

* State Angling License Required.

** State License required on a few waters.

N - Native to some park waters.

N? - Native status in question.

I - Introduced into some park waters.

No trout found in: Big Bend (Texas); Carlsbad Caverns (New Mexico); Everglades (Florida); Hot Springs (Arkansas); Hawaii (Hawaii); Mammoth Cave (Kentucky); Mesa Verde (Colorado); Platt (Okla.); Wind Cave (North Dakota); Virgin Islands (Virgin Islands).

UNITED STATES
DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

May 24, 1963

NATURAL HISTORY RESEARCH IN NATIONAL PARKS AND INSTRUCTIONS
FOR SECURING PERMITS TO COLLECT SCIENTIFIC SPECIMENS

The National Park Service encourages biological and geological research which increases the knowledge of the natural features phenomena perpetuated within areas which it administers. The protection of ecological processes and the natural environments for research purposes is recognized as one of the highest values of these areas. Research can prove to be mutually beneficial to qualified scientists, the institutions they represent, and the National Park Service.

Qualified scientists with well-defined research objectives are welcomed to conduct investigations within National Parks. The following steps outline the manner for initiating a research project.

1. Submission of Proposal: A plan which briefly outlines the scope and objectives of the investigations, its duration, anticipated collecting requirements, financial support, and institutional sponsorship should be submitted to the Superintendent of the park in which the work is proposed.
2. Review and Approval of Proposal: Upon professional and administrative review and recommendation, the Superintendent approves or disapproves the proposal.
3. Collection of Scientific Specimens. The collection of scientific specimens is governed by Federal Regulations (C.F.R., Title 36, Chapter 1, paragraph 1.15) which read:

"Collection of natural objects for scientific or educational purposes shall be permitted only in accordance with written permits first had and obtained from the Superintendent.

"No permits will be issued to individuals or associations to collect specimens for personal use, but only to persons officially representing reputable scientific or educational institutions in procuring specimens for research, group study, or museum display.

"Permits will be issued only on condition that the specimens taken will become part of a permanent public museum or herbarium collection, or will in some suitable way be made permanently available to the public.

"No permits may be granted for the collection of specimens the removal of which would disturb the remaining natural features or mar their appearance.

"Permits to secure rare natural objects will be granted by the Director only upon proof of special need for scientific use and of the fact that such objects cannot be secured elsewhere."

4. Collecting permits: The Superintendent may issue the necessary permit when the need for the collecting of scientific specimens in connection with a well defined research project has been clearly demonstrated. The applicant must fill out and submit Form 10-741, Rev. 3/57, Application for Permission to Collect Specimens of Plants, Rocks, Minerals and Animals, directly to the Superintendent of the park in which he desires to collect.

A separate permit must be secured from the Superintendent of each park in which collecting is to be conducted.

Two classes of collecting permits are available.

Class A: Allows for the collecting of insects, spiders, plants, rocks and minerals, for public exhibits and for research by qualified individuals who can establish their connection with public museums or other scientific institutions but who are not Federal employees.

Class B: Provides for the collection of specimens covered in Class A plus other forms of animal life. It may only be granted to Federal employees; such status may be secured through an appointment as Collaborator, Without Compensation. (See below)

5. Other Federal and State Permits Required: Before an applicant can be granted a National Park Service permit to collect migratory birds, he must have in his possession a valid Migratory Bird Permit, issued by the U. S. Fish and Wildlife Service. In certain parks, depending upon the type of jurisdiction which prevails, an individual must have permits and licenses as required by the State for the collecting and transporting of birds, mammals, fishes and other animal life within the specific State.

6. Collaboratorship Appointment: Federal employment status may be received by an individual, otherwise qualified, through an appointment as a Collaborator, WOC, (without compensation) with the National Park Service.

To apply for an appointment as a Collaborator, WOC, an applicant must fill out and submit the following forms, which may be secured from the office of the Director (Washington, D.C.), Regional Directors or Park Superintendents:

Form 57, Application for Federal Employment	2 copies
Appointment Affidavit	1 copy
Waiver of Claims against the Government for Compensation	1 copy <i>3 copies</i>

The applicant must answer all questions on the Appointment Affidavit and must have his signature subscribed and sworn to before a Notary Public or other person designated to administer such oaths. He must have all three copies of the Waiver of Claims signed by two witnesses. An applicant will find it beneficial to make out three copies of Form 57, submit two and retain one for his files.

Appointments are limited to the shortest period needed to accomplish the collecting project. This term may be as long as three years with the privilege of having the appointment extended for an additional period if a continuing research program requires.

If the appointment extends beyond six months, an applicant is required to complete and submit the additional forms:

Form 85, Security Investigation	1 copy <i>set</i>
Form 87, Fingerprint Chart	1 copy

A Superintendent may make the Collaborator appointment if the work is to be confined to the park he administers. Application is made directly to his Office.

If collecting is proposed in two or more parks within a single National Park Service Region, the appointment usually is made by the Office of the Regional Director. The accompanying map illustrates the areas included within each region and the list shows the addresses of the Regional Offices. Application is made directly to the Regional Director concerned.

When the work is proposed for two or more areas which are located in more than one National Park Service Region, the appointment is made in the Director's Office in Washington, D. C. Application should be submitted directly to: Chief, Division of Natural History, National Park Service, Washington 25, D. C. for necessary action.

A Collaborator, WOC, thus has status comparable to that of an employee of the National Park Service. As such he is qualified to receive certain benefits not available to non-employees such as waiver of entrance fees, the use of government housing, vehicles and other facilities and services when available.

7. Financing Research: Currently, the National Park Service has few finances at its disposal to assist in cooperative research projects. However, it is possible for Superintendents to make services and facilities available to qualified investigators. Cooperating Associations in some National Parks occasionally financially support such research and many are in a position to publish popular and semi-popular findings resulting from the investigations. Such considerations frequently make the National Parks attractive sites for research undertakings.

Most of the cooperative research projects now being undertaken in National Parks are being supported wholly or in part by institutional grants or by funds the institutions have secured from the National Science Foundation or from other sources.

8. Obligations of Researchers: A collecting permit is issued under the following conditions:

(a) The collections shall be used for scientific or educational purposes only, shall be dedicated to public benefit, and shall not be used for private nor commercial profit.

(b) All collecting must be done away from roads, trails, and developed areas, unless such localities are specified in the permit. The collecting shall be conducted in such a manner as not to attract attention or to cause damage to the environment. Because of the scarcity or importance of some specimens, Service officials may designate and limit the kinds, numbers, and sizes of specimens which may be collected, and may make other restrictions necessary to the preservation of the natural features of the area.

(c) The National Park Service reserves the right, in the interest of science, to designate the depository of all specimens removed from a National Park or Monument and to approve or restrict transfers of specimens between depositories. The National Park Service also reserves the right to designate the U. S. National Museum as the depository of any type specimen removed from a National Park or Monument, after the collector has made necessary studies and published the results of his research thereon.

(d) The Superintendent may require the permittee to furnish an inventory and locality description of any or all specimens proposed to be collected before they are removed and, after the collection is assembled, to submit it for examination.

(e) Use or Disposition of Preserved Specimens: The collected specimens shall be deposited in a permanent public museum or in the exhibit, study or type collections of scientific or educational institutions. They must be suitably recorded in a permanent file and must be available to the public.

(f) Copies of reports, reprints and other published materials deriving from the research shall be given to the Superintendent for use in the protection, preservation and interpretation of the features studied.

The National Park Service intends to further scientific research of all natural features found within areas which it administers. It desires to cooperate with technical workers to the fullest extent compatible with its charge to preserve the flora and fauna and all geological materials in a natural state insofar as is possible.

Addresses of Regional Offices

Regional Director, Northeast Region, National Park Service
143 South Third Street
Philadelphia 6, Pennsylvania

Regional Director, Southeast Region, National Park Service
Federal Building
P. O. Box 10008
Richmond, Virginia

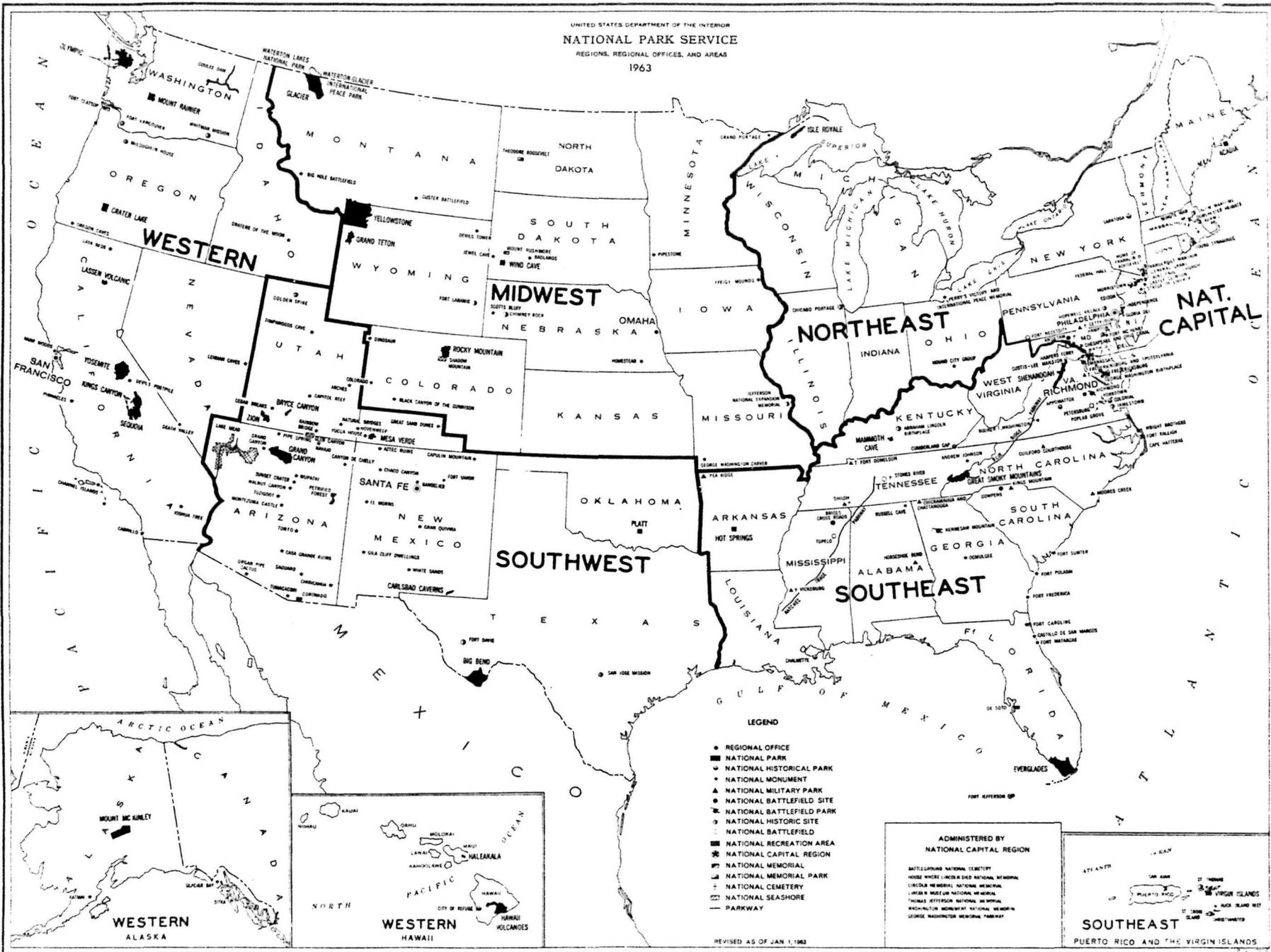
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UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE
 REGIONS, REGIONAL OFFICES, AND AREAS
 1963



UNITED STATES
DEPARTMENT OF THE INTERIOR
National Park Service

April 1963

Policy Statement

UNIFORM USE OF COMMON AND SCIENTIFIC NAMES OF FLOWERING
PLANTS AND VERTEBRATE ANIMALS

"Uniform common and scientific names of flowering plants and vertebrate animals shall be used throughout the National Park Service in all phases of park protection, management, interpretation, and public contact in accordance with standards approved by the Director."

A detailed discussion of the objectives of this policy, the standards approved by the Director, and guidelines for the implementation of this policy is contained in full in the Handbook, It's to be Published, Appendix A, pages 33-40, January 1960 with Amendment No. 1 (April 1960) for page 38.

