Source: *The George Wright Forum*, Volume 1, No. 2 (Autumn 1981)
Published by: George Wright Society
ISSN: 0732-4715 (print), 3064-8564 (online)

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Report To

Secretary of the Interior James G. Watt

A REVIEW AND RECOMMENDATIONS ON ANIMAL PROBLEMS AND RELATED MANAGEMENT NEEDS IN UNITS OF THE NATIONAL PARK SYSTEM

Durward L. Allen
Larry Erickson
E. Raymond Hall
Walter M. Schirra

1981

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7 October 1981

Report to Secretary of the Interior James G. Watt.

From: Special task force of the National Park System Advisory Board and its Council: Larry Erickson, E. Raymond Hall, Walter M. Schirra, Durward L. Allen, Chairman.

Re: A review and recommendations on animal problems and related management needs in units of the National Park System.

This investigation largely represents an updating of information on subjects that have sometimes been under lengthy study, often involving public controversy, and where a new departure in management action appears appropriate. Our effort has been limited by constraints on time and travel, but it draws upon a history of work by this board and other public service committees; it utilizes a fairly extensive published and unpublished record; and it profited substantially from "mail order" help and telephone communications with personnel in regional offices and the parks.

On a basis of obvious urgency or the conclusion that experimental management is timely, we offer recommendations on five specific problems or resource protection opportunities. Past errors are waiting to be rectified, and these are issues where it appears that high-level guidance and policy support would be helpful. The National Park Service needs fortifying through unquestioned solidarity of purpose at all levels and reassurance of its commitment to the historic aims of resource protection and public service.

Legal authority exists for all that resource managers in the parks must do, but the committee perceives a hazard peculiar to the past decade: In an era of idle tort claims, suits, and domineering activist pressures, a mode of temporizing and expedience may be taking the place of forthright action. A too-cautious approach to many problems can be self defeating. In communities of living things, maladjustments (and, indeed, their social ramifications) often grow irreparably while we delay. Provident fact-finding and early remedial action are called for.

For convenience in use, this report is divided into the following sections:

Animal problems in the parks—an overview
More notes on exotics
Overpopulations
Restorations pending
Wildlife futures

SUMMARY AND RECOMMENDATIONS ON FIVE SELECTED ANIMAL MANAGEMENT PROBLEMS

1. *WILD BOARS IN GREAT SMOKY MOUNTAINS NATIONAL PARK*

European wild boars have been a nuisance in the park for about 30 years. In their rooting and feeding these animals extensively damage vegetation and are directly destructive of nesting birds and small animal life. Total eradication would be desirable, but studies indicate that this is unlikely by any known methods.

A hunting season could crop a minor portion of the annual increase of boars each year, but it would not reduce the basic population. This expedient should not be considered in a national park that is one of our great natural areas. Parks in this category are distinguished by the highest standard of resource preservation and protection from disturbance—a major criterion setting them apart from monuments, recreation areas, historic sites, etc. In the national wilderness system, the only fully protected plant-animal communities available for scientific study are in the national parks.

Recommendations:

- The unwelcome status of wild boars in this national park will have to be "lived with" while being intensively studied. Shooting and trapping by authorized personnel should continue as appropriate with major consideration for cost and biological effectiveness.

2. *PROTECTION OF GRIZZLY BEARS IN THE YELLOWSTONE ECOSYSTEM*

Estimates on the basis of inadequate data indicate that some 300 wild grizzly bears use Yellowstone Park and adjacent areas of five national forests. Public agencies are required by law to protect this threatened species, which is in rapidly increasing jeopardy from pressures for resource development in its diminishing wilderness habitats. The growth of back-country visitor use in Yellowstone (also true in Glacier National Park) poses the problem of more frequent visitor contacts. Sheep grazing on two or more allotments on the Targhee National Forest adjoining the southwest corner of the park is an obviously incompatible human use of what was historically a high-use unit of the grizzly bear range. Sheep losses will inevitably continue, and the illegal killing of bears is taking place.

Recommendations:

- In the interest of visitor safety and bear protection, certain limited areas of the Yellowstone back country should be closed seasonally to public entry.

- Where the regularly used range of Yellowstone grizzly bears extends into national forests surrounding the park, such lands should be delineated as critical habitat.

- On allotments contiguous with the south border of Yellowstone Park on the Targhee National Forest—range consistently used by bears and where bear-killing has continued over the years—the grazing of sheep should be discontinued.

- Research on bears of the entire Yellowstone ecosystem should continue on at least the present level of intensity.

- With burgeoning pressures of the present and future in view and with growing indications that grizzlies are being poached for the commercial market, we recommend that the status of this species south of Canada be changed from threatened to endangered.

3. *FERAL BURROS IN THREE AREAS OF THE NATIONAL PARK SYSTEM*

Historically, wild ranging domestic burros have been present in several parks and monuments. They were held to small and largely inconsequential numbers by routine shooting. In the past 15 years this practice came to the attention of horse-protective organizations, who brought court actions against any kind of control that involved killing. Burros have thereby increased to destructive levels. They are versatile feeders, having heavy impacts on vegetation. They induce erosion and damage prehistoric sites. They compete directly for forage and water with the desert bighorn and muledeer and degrade the habitats of other native wildlife. Experience has shown that any control short of total eradication is only temporarily effective and fosters a continuing problem.

Recommendations:

- As the result of a highly expensive roundup by a private organization, burros in Grand Canyon National Park have been reduced to perhaps a dozen. We recommend (1) total elimination of the remaining individuals, (2) whatever fencing may be helpful in preventing reentry, and (3) the quick destruction of any burros found in the park in the future.

- In Bandelier National Monument about 75 burros remain from a population reduced by shooting, which was done previous to a legal suit in the summer of 1980. Court findings were

in favor of the park, but the decision was appealed, and a year later it has not been handled by the Court of Appeals. We recommend the immediate eradication of burros by shooting—the only feasible method amid the prehistoric ruins the monument was established to protect.

- Wild burros in Death Valley National Monument are involved in an untenable ecological situation. Burro control was included in a general management plan on which an environmental impact statement is being prepared. Action on urgently needed reduction of burros must await the hearings and other legal process consequent to publication of the statement.

- As of August 1980, at least 2500 burros were in the monument—up from 1426 in 1978. This committee recommends formulation of an administrative plan for the earliest possible removal of all burros from Death Valley National Monument by the most efficient and cost-effective methods.

4. *INTERPRETATION OF THE NATIONAL ENVIRONMENTAL POLICY ACT*

Guidelines established by the Council on Environmental Quality to implement the National Environmental Policy Act of 1969 require an impact statement when the proposed action of a federal agency is expected to be "highly controversial." Since any management operation involving the killing of animals—such as the control of feral burros—will be opposed by someone, an overly conscientious interpretation of the CEQ regulation can delay essential control operations almost indefinitely. The National Park Service is mandated by the founding law of 1916 to protect natural resources, including the flora and fauna, of the areas under its custody. In the subjective judgment of what is controversial, the protection of native wildlife and its habitats should be a prior obligation.

Recommendations:

- The National Park Service should proceed with protective management operations, such as the control of feral burros and other destructive animals, until ordered by a court to do otherwise.

5. *PROTECTION AND RESTORATION OF THE GRAY WOLF*

Isle Royale National Park is unmanned from early November to late April, except for a small research crew during a period in midwinter. Access to the Lake Superior island is only by skiplane or helicopter. Staffing of the park to monitor winter camping would serve few people at high cost. Such uses would be hazardous to those involved and serve to encourage harassment of wolves and moose.

Wolves have an intrinsic value to the public as an attribute of wilderness, and they once served as a natural control of large animal populations. Two parks in the "lower 48" now support wolves, Isle Royale and Voyageurs (questionable for the future), and the spread of wolves from Canada into North Cascades is a possibility. In two other large parks the food base is adequate and the restoration of wolves is biologically feasible.

Recommendations:

- We reiterate a recommendation made by this board in a memorandum to the Secretary on 8 October 1975. A regulation should be published in the Federal Register officially closing Isle Royale National Park to public entry from November through April.

- Active planning and public information programs should be initiated with the prospect of early experimental reintroductions of wolves to Yellowstone National Park and Olympic National Park.

UPDATE ON FIVE SELECTED PROBLEMS

Relative to the five animal management issues we have selected as meriting high-level attention at this time, we present in the following discussions additional pertinent information and viewpoints not included in the summaries.

Control of Wild Boars in the Smokies

As an escapee from a fenced range in North Carolina in 1912, the European wild boar was invading Great Smoky Mountains National Park by 1950. From the west end of the park the animals spread eastward and have now occupied about three quarters of the federal lands, as well as adjacent state areas. It is a matter of time until they will be affecting plant-animal communities in all parts of the half-million-acre park, which supports the most intensive public use of any unit in the national system (visitation 8 million annually).

A highly adaptable ancestor of the domestic pig (averaging about 80 pounds), the boar roots extensively and feeds on a wide variety of ground vegetation, mast, and small animal life. It has adverse effects on many of the rare plants and animals (including amphibians) that should be protected by this wilderness park. It causes streambank erosion and disrupts nutrient cycling in forest habitats. The ecology of the species has been studied intensively, especially with the objective of effective control measures. None has been found, and research will continue.

Shooting by park personnel and live-trapping have been used to eliminate a minor percentage of the annual increase of boars.

Live animals are made available to the states of North Carolina and Tennessee—the state boundary bisects the park. However, trapping has not been a cost-effective method. Transporting live hogs through roadless forest is expensive; the states are not always in a position to accept the animals; and benefits to the park are minimal. Stocking hunting areas by this method is done at high cost, and if the states feel it is justified they should provide personnel to catch and remove boars under the supervision of park managers.

The boars are a major public relations liability. Especially in North Carolina on the south border of the park, local residents regard the wild boar as a game animal, and they are adamant in opposing any control within the park. This antagonism is expressed in many acts of vandalism, trap theft, forest burning, and threats of violence against park personnel.

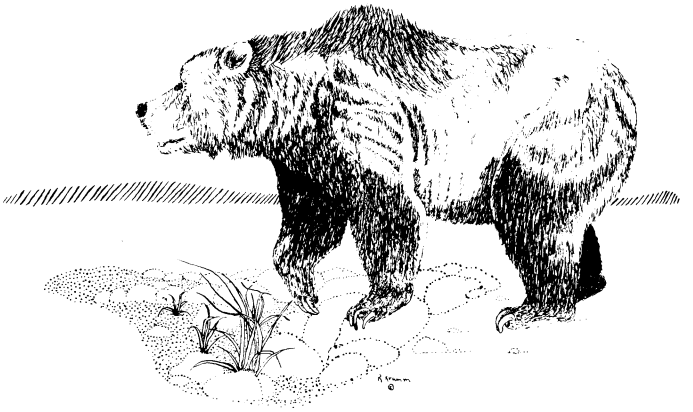
These people would welcome the opening of the park to hunting, but this is not feasible, even if it were legal—which it is not. It would be hazardous in terms of the high visitation level of the park and disrupting to people who expect a great natural park to be a place of quiet and undisturbed nature. Experience with public hunting in Hawaii (goats and pigs) and Grand Teton National Park (elk) indicates that the public simply comes to regard the park as a hunting area. Few hunters get far from a road, and the number of animals taken does not justify administrative and management costs. In its large natural parks, the NPS has custody of the only fully protected lands and waters in the National Wilderness Preservation System. Thereby these areas serve a unique function for research on natural communities. The Great Smoky Mountains National Park is a unit of the United Nations system of biosphere reserves, and its integrity as a relatively undisturbed area should be maintained.

Unless more efficient trapping methods are developed, shooting by authorized personnel—done judiciously with the public interest in view—is the best method of control. Qualified volunteers, or perhaps YCC help could be used if supervisory personnel were available. The small ranger staff of the park has not been adequate to perform these functions effectively for the large area involved.

Grizzlies in Yellowstone

With closing of the Rabbit Creek and Trout Creek garbage dumps in 1970 and 1971, the park administration embarked on a program to return Yellowstone's grizzlies to the wild. Decades of dependence on man-supplied foods had adversely conditioned a substantial portion of this remnant population of the continent's largest carnivore. With the rapid build-up of park visitation in the 60s, "bum" bears were becoming an obvious hazard around campgrounds and other developed areas. From 1968 through the season of 1972, intensive monitoring and frequent control actions —

which included transplanting and the destruction of "incorrigibles" —were necessary. In this 5-year period, a total of 48 grizzlies were destroyed, or sent to zoos, all of these in developed areas of the park. By 1973 it was evident that most "problem" individuals had been eliminated from the now-scattered population. That year control mortalities were zero, and through 1980 only seven additional bears had to be removed.



In 1973 an Interagency Grizzly Bear Study Team was appointed to provide research data on the numbers and habits of bears in the Yellowstone ecosystem, which includes adjacent areas of Idaho and Montana and five national forests. There is no certainty how many bears inhabit this area, but the team guesses 300-odd. Summaries of bear sightings over the years indicate relative stability. However, a more intensive level of research is needed in the interest of both public safety and better protection of a threatened species.

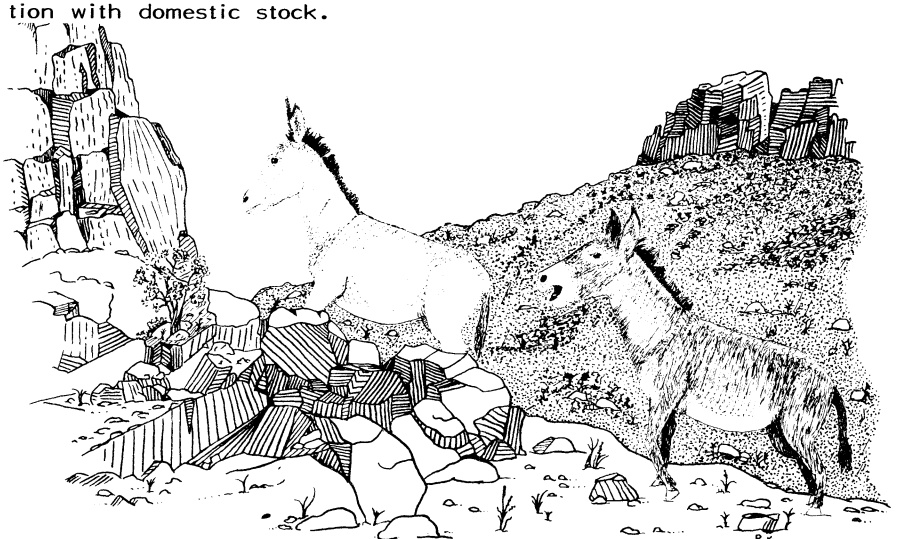
It is evident that home ranges and intensively used habitat of Yellowstone bears do not stop at park boundaries. Surveys have delineated several high use areas on adjacent forests. Since there are grazing allotments on such lands, stock losses have occurred, and certain sheep herders have obviously made their own rules relative to tolerance of the grizzly. Voluntary reports of bear killings ceased in 1975, when this animal was declared a threatened species. Investigations by several agencies from 1976 through 1979 indicate that illegal control has continued. The shooting of two radio-instrumented bears was documented, although no court case has resulted. The money spent in following activities on sheep ranges (used for about three months each summer) has been grossly disproportionate to the values involved. Removal of the

sheep from at least two allotments—which should be included in a designation of critical habitat outside the park—is overdue.

The appearance of bear claws in curio shops and reports of more expensive items for sale suggest that the poaching of grizzlies (in addition to elk, bighorn sheep, and bison), is one of the problems of an inadequate ranger staff. In and around Yellowstone we seem to be in the position that killing bears is right until proved wrong, and the wrongs are slow to be exposed. With the total population of grizzlies south of Canada estimated at perhaps 1000 animals, and with steadily increasing demands for incompatible uses of the wilderness habitat, it is inevitable that in the contiguous states this species must be declared endangered. We suggest that there would be law-enforcement and other advantages in doing so now.

Burros in Three Parks

The domestic burro used by early prospectors in western states was a descendent (6000 years removed) of three races of the African wild ass, which once inhabited desert areas from Somalia on the east to Algeria on the west. American burros turned loose to fend for themselves found no hardship in going wild; they spread and multiplied in arid habitats. Historically, their numbers were kept in check by ranchers who objected to their competition with domestic stock.



In 1971, under pressure from horse-oriented organizations, Congress passed the Wild Free-roaming Horse and Burro Act, which gave nearly complete protection to wild horses and burros on public lands. The National Park Service and the Fish and Wildlife Service were exempted from the Act, but letter writing campaigns, injunctions, and court suits were brought against the Service when

several citizen groups learned that burro numbers were being held down by shooting in certain areas of the National Park System. With the cessation of effective control, burros built up rapidly to objectionable levels in Grand Canyon National Park, Bandelier National Monument, and Death Valley National Monument (all visited in field trips of the National Parks Advisory Board). Intensive studies of the burro have been carried out, and its ecological status is now well documented. Under favorable conditions these animals are capable of doubling their numbers in three years. They degrade the vegetation, compete with wild sheep and deer for food and water, destroy the habitats of other wildlife, and cause extensive erosion through their trekking and wallowing.

In the spring of 1980, an estimated 350 burros were present in the Grand Canyon. In July the Park implemented its "public live removal program." During the following year, in three major efforts, the Fund for Animals was successful in removing and putting up for "adoption" 565 burros. The operation involved a roundup, roping, and the use of a sling-equipped helicopter. Published figures indicate that the cost was more than $1000 per animal. In July 1981 it appeared that about a dozen burros remained in the park. If these are not taken alive in a further roundup effort, they will be eliminated by shooting. The management plan includes a fence across the lower end of the canyon, and a policy of keeping the park entirely free of burros in the future.

While taking satisfaction that the vegetation and native animal life of the canyon are now free from a destructive influence, we see objectionable features in the program as it was carried out. The much publicized catching and live removal of animals—burros in Grand Canyon and Death Valley, wild boars in the Smokies, introduced Rocky Mountain goats in Olympic National Park—is conditioning the public to believe that these expensive methods are the proper way to control nuisance animals. The National Park Service will never have money to handle most jobs in this manner. We wonder also about the priorities of a society in which contributions can be raised to rescue feral domestic burros at $1000 each, while nearly all the wild horses of the Earth (with the exception of plains zebras) are declining to extinction. The World Wildlife Fund is much in need of contributions.

In Bandelier National Monument the unfavorable habitat effects of too many burros were evident (and detailed by research), but another aspect of the problem was of major significance: Burros were damaging the ancient Indian ruins that were the main interest in establishing the monument. Shooting was the only practical method of removing the animals, and this kept the population under some degree of control until 1980. At that time it was estimated that some 75 burros were left.

A court suit, demanding the cessation of burro killing, was ajudicated in the summer of 1980, pending which, no control was practiced. Findings of the court were in favor of the park on all

23 counts, but the case was appealed and a year later has not been handled by the appeals court. In the meantime, it may be assumed that burros are recovering their numbers under a policy of no control until a final action is taken on the suit. This policy, which we consider to be overly scrupulous, has been followed in the absence of any legal requirement to do so. In fact, the judge who ruled in the case encouraged the superintendent to go ahead with his burro reduction program. We address this situation in our recommendations and in our discussion of the interpretation of the National Environmental Policy Act.

Periodic routine reductions by shooting held the long-established burros in Death Valley to what might be considered tolerable levels—a program confused by disagreements among researchers over the details of relationships between the burro and the desert bighorn. That there is substantial overlap in food preferences and in seasonal ranges seems now to be well established, and the heavy impacts on soil, water, and vegetation are the same as elsewhere.

In the past decade, public controversy intervened on behalf of the Death Valley burros, and with an unprecedented degree of protection the population built up. Counts from the air indicated minimum populations of 1426 in 1978, 2300 in 1980, and 2500 in August of 1981. With numbers at this level, the potential for heavy habitat impacts in a short period of time is great.

No court has ordered the Park to desist from controlling burros, and we question the strategy of including this urgently needed operation in a general management plan for the park on which an environmental impact statement is being prepared. Protective custody of this park was mandated by the Law of 1916, which established the National Park Service. As we have pointed out, it is a question of subjective judgment whether an impact statement is needed on a protective operation. In the case of burro reduction by the most effective and least costly method, shooting, a commitment of the Service to await the public hearings and other processing of an impact statement only plays the game of those who would like to stall indefinitely a long-overdue reduction of burros.

We submit that a separate plan for the early eradication of burros from Death Valley is an administrative imperative.

Interpreting NEPA

The National Environmental Policy Act of 1969 was designed to be a landmark safeguard against the progressive, piecemeal degradation of human environments, including natural habitats and scenery. That it was not intended to supersede or negate the protective commitments embodied in existing laws is indicated by the wording of Section 104: "Nothing in section 102 or 103 shall in any way affect the specific statutory obligations of any Federal Agency...to comply with criteria or standards of environmental

quality..." Section 105 states that "The policies and goals s forth in this Act are supplementary to those set forth in existir authorizations of Federal Agencies."

In its guidelines for the preparation of environmental impa statements (36 Fed. Reg., 7724-7729, 23 April 1971) the Council c Environmental Quality recognized the statutory clause requirir such a statement in the case of "major Federal actions significan ly affecting the quality of the human environment" and state further that "Proposed actions, the environmental impact of whic is likely to be highly controversial, should be covered in a cases." These directives were not affected by the publication additional regulations in 1978.

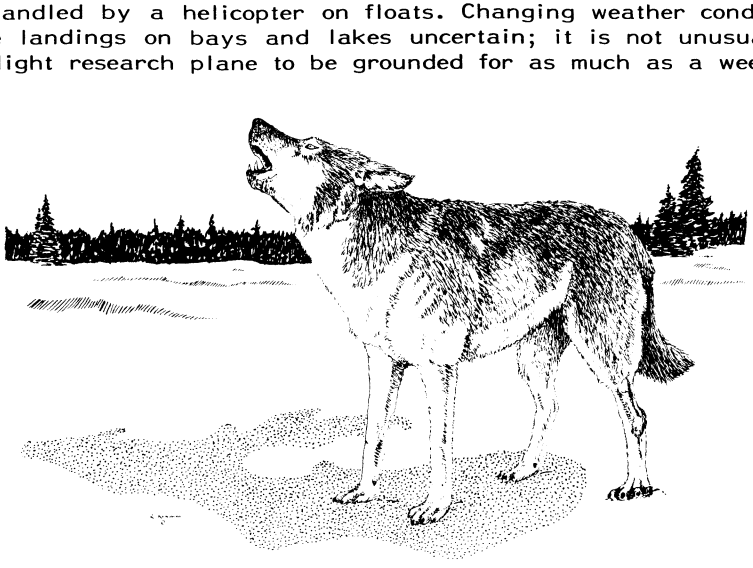
For more than half a century the National Park Service ha operated under its historic charge in Public Law 235 of 1916 " conserve the scenery and the natural and historic objects and wi life therein..." This custodial mandate was not changed, bu rather fortified, by NEPA.

Relative to what is "highly controversial," it is predictab that someone will appear to oppose any killing of animals irre spective of the need to protect habitats of native wildlife. Whethe an action is HIGHLY controversial is a subjective judgment, ar this committee concludes that such judgments should favor the cor tinued carrying out of the Service's legal missions. It appear that relatively small, single-interest organizations have intim dated the National Park Service to a point of abdicating its re sponsibilities. A great many more citizens, including members large national conservation organizations, expect the traditiona program of resource protection to be carried out. We do not thin they should have to sue in getting this done. Such logic is th basis of our recommendation that control of wild burros shoul proceed in all units of the National Park System where these ani mals are present. To avoid future costs and troubles, tota removal is needed.

Wolf Protection and Restoration

Eight subspecies of the gray wolf once occupied about thre quarters of the area now encompassing the 48 conterminou states. All of these races are now gone except for a few strag glers of questionable identity and except for two populations the eastern timber wolf. Of the latter, some hundreds persist i northern Minnesota. The only discrete, fully protected populatio subsists on moose and beavers on 210-square-mile Isle Royale i upper Lake Superior. Intensive studies now in the 24th year hav recorded a range of midwinter numbers from 16 to 50, most recent ly 30. The roadless wilderness island is the most important wol research area in the world, recognized in July 1981 as a unit i the United Nations system of biosphere reserves.

A major amenity of the island as a wolf range is its relati freedom from human disturbance during winter months, when it isolated by water and ice. From November through April Is Royale is uninhabited except for the research team (usually fou during a period in midwinter. Access is by ski-equipped plan Any emergency—there never has been one—probably would need be handled by a helicopter on floats. Changing weather conditio make landings on bays and lakes uncertain; it is not unusual f the light research plane to be grounded for as much as a week.



Despite such difficulties, the superintendent of Isle Roya National Park often receives insistent requests for camping permi in winter. These have had to be denied for safety reasons— would be disproportionately expensive to man the island and se vice a few people in this way. As another factor, wolves a moose travel the lakes, bays, and shoreline ice. They are high vulnerable to harassment, which has been observed on the part unauthorized planes during the winter study period.

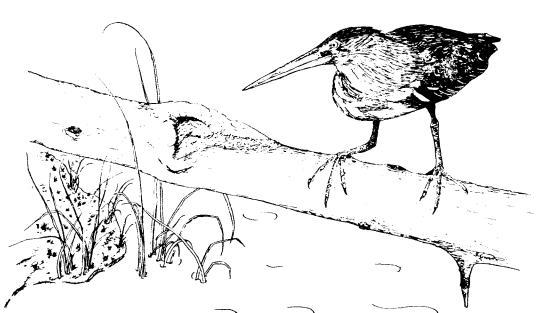
It would fortify the position of the superintendent in deali with requests for winter camping, and also strengthen the leg status of the Service in case of illegal entry (which has happene and an emergency if an official regulation closing the park fr November through April were published in the Federal Regist We urge that this be done before the coming winter.

Of other parks in the eastern half of the country, on Voyageurs has wolves—a part of the Minnesota population. T future of the species in this park is uncertain because of fore maturation and the decline of deer, which are the main dependen of wolves in that area. The land area of the park is so divid that it is much subject to surrounding influences.

A century ago, nearly all western parks (leaving out California) —or areas that were to become parks—supported wolves, and there were substantial populations in ranges having an adequate big-game food base. Today two parks are clearly eligible for restoration efforts that could correct the ill-advised wolf extermination programs that were carried out half a century ago.

Scattered records of what is presumed to be the Northern Rocky Mountain wolf have accumulated in the regions around Glacier and Yellowstone National Parks and the country between. No packs have been reported, and it is evident the animals have been subjected to illegal attrition. For more than a decade, there was some expectation that a breeding stock of these wild wolves would be attracted by the abundant elk and would reestablish themselves in Yellowstone, but this has not happened. This park appears to have resources to support a fairly discrete population of wolves. The animal belongs there for its ecological effect on big-game species and also as an essential part of the primitive wilderness that the public expects in Yellowstone. If the northern Rocky Mountain subspecies is unavailable, then a race from an adjacent range in Canada will need to be used. Wolf restoration is an experimental undertaking, and there appears to be no advantage in delaying it. We recommend an active effort to prepare public opinion and to make other arrangements for an early restoration effort.

Olympic National Park represents what appears to be an adequate and fairly isolated range that supports elk, deer, and an overpopulation of introduced mountain goats. The wolf that once inhabited the northwest coastal region (*Canis lupus crassodon*) is now extinct. The subspecies most nearly related probably is one of the northern wolves, *C. l. columbianus*, *C. l. occidentalis*, or *C. l. pambasileus*. We recommend a further study of this matter and that preparations be made for a restoration experiment (see note on follow-up studies discussed under "Restorations Pending" section).



ANIMAL PROBLEMS IN THE PARKS--AN OVERVIEW

Each area of the National Park System is unique in its own way, and its complement of plants and animals is dissimilar in many respects from any other. Thus biological problems develop in great variety, vastly complicated by the effects of regional land-use activities, by the almost universal invasion of non-native species, and by the increasingly demonstrative attitudes of an idealogically diverse public.

This report can do no justice to many of the dilemmas faced by superintendents and their staffs. Here, without detail, we discuss some basic and general difficulties, often with no good solution in sight.

More Notes on Exotics

All ecological systems of the Earth are being altered as human activities open up avenues of interchange and bring about an inexorable homogenizing of fauna and flora. Thus, what we preserve as "natural conditions" in the parks are inevitably next best to what might be desired.

Many of the more influential exotics cause problems, a few of which are manageable. Many more are not manageable at the present state of the art. Given a favorable political climate, invasions by burros and wild horses can be handled. For the present, wild boars outnumber and survive what reduction efforts we can bring to bear. Research should go on, and it might find a way to reduce the nuisance to a reasonable level or even to get rid of it.

The pig problem in parks of Hawaii antedates Captain Cook and all his meddlesome successors. It arrived with Polynesian colonists of the islands more than a thousand years ago. Goats were introduced in the late 1700s. These and other exotic competitors have had far-reaching destructive effects on vegetation and the native bird life; bats are the only indigenous land mammals. The staffs at Hawaii Volcanos and Haleakala must be committed to a war of attrition. Fortunately, there appears to be little public objection to shooting; both pigs and goats are hunted as game. A fencing project has been proposed for Haleakala that could be a key to eventual elimination of the goats.

State introductions of new species for hunting purposes have helped add to the roster of exotics in parks. Barbary sheep have spread into Carlsbad Caverns and Guadalupe Mountains National Parks after escaping from a stocked hunting range about 80 miles north of Carlsbad. In the parks and elsewhere they are competing for range with the native desert bighorn, a factor of concern to state authorities. In New Mexico each deer license is accompanied by a free permit to kill a Barbary sheep. Inside the parks a program of control by shooting has been carried out to protect the

native sheep range—an effort this committee commends. The protection of mountain lions in these parks should be a recognized objective.

Of course, native American species can function as "exotics" when outside their original ranges. Early in the century the state of Washington moved Rocky Mountain elk into forested areas on three sides of Mountain Rainier. These animals are now becoming plentiful in the park and making summer use of high alpine meadows—one of the park's major public attractions—that evidently developed in the absence of browsing and grazing animals. Clear cuts in forests outside the park provided winter range that allowed the elk herds to build up. Through appropriate studies, the numbers of elk in the park and their impacts on the vegetation were assessed. Through inter-agency cooperation, arrangements were made with the state for late hunting seasons outside the boundaries, and these are reducing the migrating herds to some extent. This kind of control will not remove elk from the park, but it provides the means of mitigating damage to the unique alpine meadow vegetation. The management plan includes a continued monitoring program.

As another case in point, on the Olympic Peninsula a small initial stocking by local hunters of perhaps a dozen Rocky Mountain goats was outstandingly "successful." Fifty years later, goats are present in some 700 square miles, including all of the alpine and subalpine habitats of Olympic National Park. The population continued to increase, and the slow-growing high-altitude plant communities—a treasure house of endemic species—are showing heavy damage from grazing, trampling, and wallowing. An area for study and experimentation (Khahhane Ridge, with about 180 goats) has been selected and herd reduction by netting and transplanting is being carried out, with systematic studies of the results. Such work is a proper means of developing cost-effective control measures. The problem may diminish in some degree if the recommended restoration of wolves is successful. Olympic National Park is a United Nations biosphere reserve and one of the outstanding wilderness areas of the country. Preservation of its indigenous plants and animals is a national issue.

The competitive relationship between introduced animals and native species of similar habits has been evident in many areas, burros and bighorns being a notable example. Two species of game birds also appear to illustrate this. As elsewhere in the West, the Eurasian chukar partridge was introduced to semi-arid benchlands of Utah, and after these birds became established in Capitol Reef National Park the plentiful Gambel quail declined. Ten years after the appearance of chukars, these birds were abundant and the quail were scarce. The trapping program on chukars is unlikely to restore this species. It appears the change is here to stay.

The status and management of urban wildlife are in the initial stages of study and experimentation. Problems involve a mix of

native and exotic species exemplified impressively in the National Capital Parks. Contiguous with the front lawn of the White House, Lafayette Park is a side show of biotic maladjustments. A study indicated that six of the many habitual visitors distributed at least 3000 pounds of peanuts in a year—a portion of the constantly renewed food supply that supports an almost unheard-of density of gray squirrels. This nutritional bounty is shared by a heavy infestation of Norway rats and innumerable pigeons. As a result of continuing damage, trees, shrubs, and flower beds of the park required expensive upkeep, and public opinion effectively limits the types of control that can be practiced. The defacement of buildings and parks of the Capital area by pigeons and starling roosts—a special problem at Wolf Trap Farm—has called for structural baffles and modifications of ingenious design. Environmental management of various kinds appears to be the most practicable approach to the manipulation of wildlife and humans in such areas.

We should not leave the subject of non-native species without recognizing that there are many questions of fish management policy that fall in this category. Over the decades, changes in philosophy have been marked by the abandonment of early stocking programs for recreational fishing and the favoring of native species wherever possible. Obviously the great shuffling of fish fauna that has taken place is largely irrevocable. It has not been possible to undertake a treatment of this important field in the present report.

Overpopulations

Even the most superficial review of animal problems in the parks reveals that overpopulations are at the root of many difficulties. We take for granted that the word "overpopulation" implies arbitrary judgment and ad-hoc standards. When the activities of man-produced habitat changes or other influences that cause a species to build up to a level destructive of its own food supply or damaging to pristine plant and animal communities—then in terms of park preservation objectives we are dealing with an overpopulation.

Various hoofed species—grazers and browsers—respond most clearly to conditions that create an embarrassment of numbers. Today we do not have the extensive mature forests that once formed barriers to the spread and increase of elk and deer. Instead we have cutovers producing great quantities of food, which nurture herds that will move seasonally into parks. Few parks are self-contained ecological units, so we have migratory elk herds in competition with livestock, or winter ranges being built up as residential sites. Such development usurps the range directly (east side of Olympic), or it creates a public opposition to hunting that might otherwise be helpful in reducing the animal population (Rocky Mountain National Park).

Hunting outside parks should be relied upon to the greatest possible extent to control big-game overpopulations. However, it has not been outstandingly successful on the north Yellowstone elk or in Jackson Hole, where hunting is permitted by law in Grand Teton National Park and the National Elk Refuge. It may be that deputizing hunters to take surplus big game within parks will need to have greater consideration in the future.

The history of deer on Mount Desert Island, Maine, is a classic case of an ungulate involved with all the biological influences and man-created constraints that make normal environmental relationships an impossibility. Roughly a third of the island is included in Acadia National Park, and much of the remainder is residential. The deer population has not been hunted since establishment of the park in 1929. For about 20 years no problem appeared because the herd evidently was being held in check by such factors as poaching, road kills, dog predation, and malnutrition. After a major fire in 1947, a brush-stage forest on about half of the park (16,000 acres) produced a new supply of browse, and the deer rapidly increased from approximately 400 to an estimated 3,000 as of 1960. Winter range in the cedar swamps was largely destroyed and has not recovered since. A major die-off occurred, and in recent years the population of 200 to 400 has varied with the severity of winters that concentrate deer into the swamps.

Residential neighbors of the park, whose gardens and shrubbery suffer from inroads by the deer, tend to hold the park responsible for managing the island herd. Unfortunately, the same park has an overpopulation of beavers for what is basically the same reason —no effective predators. In this case research has suggested experimental management such as neutering old resident breeders, or artificially scent marking the vicinity of unoccupied pond sites. Work of this kind should be encouraged.

Overpopulations of small animals, such as pocket gophers and prairie dogs, sometimes become obvious in our protected parks. It is logical to suspect that these are a secondary result of changing range conditions. For example, the prairie dog population of Wind Cave National Park has increased 430 percent in 26 years since reduction programs (poisoning?) were terminated. The build-up may well be related to heavy use of the range by too-numerous buffalo. Since prairie dogs perpetuate heavy damage to vegetation by their own kind of feeding and digging, prospects for the Wind Cave Range are not good. While the golden eagle and coyote are still active in the park, the kit fox, prairie falcon, and black-footed ferret are not part of the present community. And, indeed, it is questionable whether all these small predators together could head off today's expansion of dog towns in the presence of continued range "improvement" by the buffalo. The dynamics of range rodent populations is an extremely complex field of ecology. The need to preserve prairie dogs in proper relationship to other components of the plant-animal communities of parks is an evident objective. However, achieving "natural" conditions often is confused

by past uses of the land and influences that are poorly understood at best. We recommend continuing studies of prairie dog biology and the development of control measures acceptable for use, when occasion demands, in a national park.

The buffalo is an attractive exhibit animal, and it has been introduced to most of the western parks within its original range. Wherever this is done, the increasing animals overstock their grazing area unless a regime of frequent herd reduction is established. As numbers grow, a problem of strays onto adjoining lands may develop, Badlands being an example. The Theodore Roosevelt National Park needs a million dollars worth of fencing to contain the two herds of buffalo, which are indeed a magnificent spectacle for the visiting public.

As another administrative challenge, brucellosis appears to be a relatively harmless endemic disease in the bison; untreated herds show about 50 percent reactors. Elk also harbor the disease, and states are concerned that park animals may communicate brucellosis (contagious abortion) to cattle on adjacent lands—a relationship that has never been demonstrated. Thus, all parks except Yellowstone (which has a wild bison herd on its native range) have had to build facilities and manage their buffalo like domestic stock. This means an annual roundup (not always a total success), the culling of reactors, and the vaccination of calves. Although this is a patently incompatible activity in a national park, it has greatly reduced the incidence of brucellosis, and it also provides a means of removing any appropriate number of animals from a too-numerous herd. Needless to point out, our native bison is being converted into a domestic animal. Only the wolf can "cull" such a population and preserve the genes that made the buffalo wild and capable of surviving on its original grassland. Today, outside Alaska, only the Yellowstone herd has the potential (in expectation of wolf restoration) for retaining its wild character.

Although the following suggestion would not be an important means of reducing large overpopulations, in some parks the disposal of annual surpluses of buffalo, and possibly elk, might be used to enhance the visitor experience. Annual roundups of buffalo at Wind Cave have involved the sale of butchered animals as meat. In Custer State Park, immediately to the north, bison have long been held in check by live sales and slaughtering for the market. We have not investigated this subject, but some years ago one of the concessioners at Wind Cave was selling "buffalo burgers," which seemed to be fairly popular at the time. It might be appropriate for the Service to study the question of making the meat resulting from necessary herd reductions available to the public in restaurants of certain parks where population surpluses exist. It should be recognized that the culling of a population must include old and decrepit animals—the ones that would be first choice for the wolf.

In the past it has been a practice that when animals had to be removed from parks they could sometimes be used for research

purposes or they were contributed to responsible institutions as museum specimens or zoo exhibits. In some cases states have utilized surplus game animals for introduction to areas where a species has been extirpated. It can be assumed that this kind of cooperation is expected of a public agency. However, where nuisance animals are routinely live-trapped from a park for stocking on state hunting lands—as opposed to more economical methods of control in the park—state funding of the operation should be expected. The existence of such a program should not restrain the park management from using other permissible means to reduce an overpopulation.

Restorations Pending

Nearly every biologist who investigates an overpopulation of animals speculates on what the situation would be if the primitive complement of "natural enemies" were present. However, this is no field for cook-book assumptions. It has long been evident that the numbers of herbivores, small and large, are more commonly influenced by food supply and weather than they are by ordinary densities of predators. This does not mean that predators play no part in determining population levels of their prey. In response to plentiful food, the carnivores too are prone to build up, and they operate in conjunction with other factors affecting the plant-feeding species. In some situations, they undoubtedly help contain a build-up of numbers that would reach catastrophic proportions if unchecked. Among large browsing and grazing animals, this would mean a population level at which the usable vegetation would be exhausted, with a resulting die-off.

Studies of wolves, moose, and beavers in Isle Royale National Park have helped to elucidate these relationships. There is little question that the absence of wolves is a contributing factor in problems of too many elk, deer, or other large animals in some of the parks. Hence, our recommendation for the return of wolves to the faunas of Yellowstone and Olympic. This same recommendation would be made for Rocky Mountain, Smoky Mountains, and other parks, except that we are aware of size limitations and the conflicting interests wolves would encounter in their travels beyond the boundaries.

Not all desirable restorations are "pending," we are pleased to note. Personnel in the parks have been alert to such opportunities, which are site-specific and best known to local investigators. In Hawaii the Service is cooperating in restoration of the native upland goose, the nene, an effort impeded by the introduced mongoose and other, less evident, factors. A restoration of the white-tailed prairie dog in Bryce Canyon was outstandingly successful, and now the population may need a judicious pruning. In Theodore Roosevelt the California bighorn was brought in to replace the extinct Audubon bighorn; the animals seem plagued by diseases common among wild sheep of the West. A plan is afoot to reestablish the peregrine falcon to Yellowstone and perhaps to other parks with the proper terrain.

The possibility of rescuing an endangered species enlists willing workers, and is exemplified by the manner in which the administration of Padre Island National Seashore is cooperating in an international effort to preserve the Atlantic ridley turtle. Eggs are collected at the principal remaining breeding area, the beach at Rancho Nuevo in Mexico, where egg gathering by local residents is wiping out the last of the turtles. Eggs are hatched at Padre Island, and the young are allowed to enter the surf as an "imprinting" device. They are then caught up and reared for the first year—a period of high mortality in the natural system—at Galveston Island. Substantially increased in size, and presumably safe from gulls and other small predators, the turtles are liberated on the Padre Island beach, and they take to the sea from there. It is hoped they will return to the Padre Island National Seashore to lay their eggs after attaining breeding age in the ocean.

The introduction of breeding stocks of animals to areas where a species does not now exist will not usually be expensive as compared, for example, with "maintenance" transplanting of excess populations. It needs to be done only once, if successful. However, in undertaking such a project, the National Park Service must necessarily be committed to follow-up monitoring for whatever period of years is appropriate to assess results of the operation. This, in fact, is true of nearly any kind of biological experimentation. In the absence of adequate studies, we would be repeating the hit or miss methods of the past.

Wildlife Futures in the Parks

We must conclude that there are three principal reasons for animal problems in the parks: (1) The parks were not set up as ecological entities. The dynamics of their life communities are much involved with what is happening on contiguous lands and waters. (2) The loss of species from original communities has produced maladjustments for which a best-possible compensation must be made. (3) Man has added species (exotics) to the park biota whose influence is disruptive.

The preservation or restoration of conditions that are a facsimile of pre-Columbian America requires management. Since we hope to hold this to a minimum, there is a tendency to delay action; but often enough, the problem grows instead of going away. Curative measures commonly require habitat changes to make possible the reproduction and survival of a diminishing species. Or meeting the problem head-on may necessitate eliminating an unwanted species or surplus numbers of one that is out of hand.

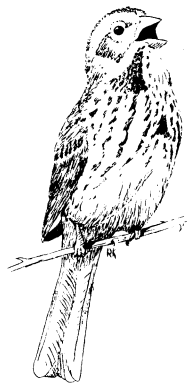
However effective the National Park Service is to be in its custody of living things will depend much on public understanding of problems and the acceptance of methods that must be used. Increasingly, clients of the agency are urban dwellers with little exposure to the natural scene. Many of them have acquired no working concept of Earth relationships, of carrying capacity, of

annual surpluses and the consequent "expendability" of individuals that is in reality the flow of nutrients through living systems. People have little opportunity to see the high turnover rate in animal populations. In fact, few think of populations at all. Instead, they are preoccupied with the fate of individual animals, Bambis of the wild, who must be cared for and handled like house pets, and for whom death is a tragedy to be avoided at any cost. Many children from this background of parental influence have never seen a cow milked or viewed the inside of a chicken. College wildlife students may refuse to trap a mouse or to dissect a frog.

This is no accusation against society, but a reality to be understood. People with no original knowledge of wild communities can be led into pressure groups who see only one side of an issue and who help to make policy for government. In the pushing and shoving, a vast amount of personnel time is wasted, funds are misappropriated, morale is destroyed, the reason for being is neglected.

We suggest that the National Park Service and citizens who support the agency cannot afford this syndrome. For whatever reasons, the public information job is not getting done. Nor will it get done by anyone who tells less than the whole story or covers up unsightly realities. It will not get done unless the Service, with a sensitivity it has failed to show, promotes policy in its public relations and accepts the help of those who understand the mission and the process. Fortunately, there is a responsible, well-informed side of citizen concern—local, state, and national organizations who study issues, help spread the facts of life, and devote their resources to the socially important functions to which the National Park Service has been assigned by law.

This task force proposes that when enough people are told often enough what the objectives and benefits of a park system are and how they can be attained with the means available, we will see less lost motion and more progress toward solid, achievable goals. Perhaps what we should have is a "Year of Understanding."



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