United States Department of the Interior

NATIONAL PARK SERVICE
WASHINGTON, D.C. 20240

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Memorandum

To: Directors, Midwest, Northeast, Pacific Northwest, Southeast, Southwest and Western Regions

From: Director

Subject: Backcountry Use and Operations Plan

The preparation of such a Backcountry Plan is necessary for each unit of the National Park System having significant backcountry resources. The "backcountry resources" referred to are all Class V lands and those Class III, IV, and VI lands which are not accessible by road and are managed primarily for trail and camping use. This would include lands designated as wilderness together with adjacent Class III lands which comprise the area used by visitors for backcountry recreation. This Backcountry Plan would be separate, and entirely different from the Natural Resource Plan which deals with biological problems and programs for all park lands. The Backcountry Plan would have the following functions:

1. Serve as an "action plan" for the park staff in their day-to-day management of backcountry visitor use with the objective of providing the opportunity for a quality experience with minimal impact on the resources.

2. Assure effective compliance with administrative policies including wilderness management policies. For example, the plan would provide for the accomplishment of essential operations in ways which avoid inappropriate use of motorized or mechanical equipment.

3. Serve as an "action plan" which would identify and justify appropriate and needed items or programs which should be incorporated in budgetary programs.

The Backcountry Plan is needed because sheer popularity threatens parks resources in many areas, including backcountry resources and

the public's enjoyment of them. The threat is widely recognized and concern has been expressed in recent issues of the "Federal Register," conservation organization magazines and in a number of other publications. The Backcountry Plan could strengthen and make more effective our protection and management of these resources. The resources are irreplaceable, their value staggers the imagination, their benefits to mankind are not fully known, but are known to be of the highest order. Moreover, the backcountry - wilderness areas that remain today include many extremely fragile resources. Many of the natural ecosystems are in a state of delicate balance and the future of a number of animal species depends upon the preservation of these environments. Each backcountry area has its own resource requirements, its own pattern of use and a particular set of management objectives. To plan intelligently for the use of these areas demands a sound knowledge of resource requirements and a highly sophisticated understanding of the ways in which use can be accommodated, directed, and guided. The total effect and the quality of the visitor's experience will be the sum of many sometimes subtle, manipulations.

For a number of years the staff at Sequoia and Kings Canyon National Parks has prepared an annual report on backcountry management which contains some elements of a Backcountry Plan, but it is primarily an accounting of actions taken and results achieved. Recently a "Wilderness Management Plan" was developed for the Petrified Forest Wilderness. This document is essentially a restatement of the Wilderness Management Policy section of the, "Administrative Policies For Natural Areas of The National Park System," with some specific references to resources within the designated wilderness area. What we are suggesting is a plan for visitor use and management activities and programs necessary to provide for optimum use based on carrying capacity and, therefore, with the least impairment of the backcountry-wilderness values. Also, the plan would not be limited to the designated wilderness, but would focus upon the total area which provides the visitor with his "backcountry experience." Therefore, this would include the adjacent wilderness threshold (Class III areas) with their backcountry camps and other backcountry facilities and recreational opportunities.

The Backcountry Plan would describe the total plan for visitor use and would define regulations and programs related to such use. It

would contain a plan for the management of backcountry camping. It could and probably should include procedures relative to such things as" Information and interpretation, density of use, recreational stock use, signing, trail standards, reservation systems, registration, fire permits, procedures for routine and emergency management activities including the use of motorized or mechanical equipment, and any special procedures such as seasonal considerations, special uses or activities involving other agencies, organizations, etc. This plan would provide a sound basis for the institution of systems to limit and direct visitation to selected areas. Where there is legislatively designated wilderness, the plan would clearly identify the area and, as needed, would state the specific ways by which wilderness use and management policies are implemented. Since Class V or wilderness areas may contain only the minimum facilities necessary for the health and safety of the wilderness traveler or the protection of wilderness resources, this plan would provide the sound reasons for providing any such facilities in wilderness. The Backcountry Plan would consist of narratives, graphics and maps as needed. To develop such a plan requires a comprehensive analysis of the backcountry resources; the objectives related to their preservation and use; existing visitor use patterns; identification of adverse conditions; the formulation of a plan to alleviate problems and provide optimum use based on carrying capacity; and a good method of translating needs into budgetary programs. The plan would also provide support data for budgetary items and would provide a means to assure that objectives for backcountry use and operations are achieved. The plan could be prepared by the park staff with assistance from specialists on any major planning problems.

Most of the data and knowledge needed to develop such plans is already available in most areas with such backcountry use. It requires only time effort and thought to prepare a usable plan.

We are sure you have already noted the reference to carrying capacity and the first question we can anticipate is "who is going to develop these carrying capacity figures?" We will let you in on a little secret, you are. Who is in a better position to at least establish some general capacity figures than those people onsite in the individual areas with the greatest knowledge of the problems.

You should, of course, rely on any outside expertise you may be aware of or former area employees now assigned elsewhere. Dr. Linn's resource group has prepared a paper dealing with the subject of carrying capacity and a copy is attached for your perusal. While it appears rather formidable, we urge you to read it carefully for it contains much helpful information to assist you in your decision-making process. You should determine all areas within your respective Regions where such plans need to be prepared and have draft plans completed for discussion purposes by the end of February 1973. We will schedule a meeting in early March to finalize these plans in order to implement them by the beginning of the 1973 summer season at least to whatever extent funding and manpower will allow. This is going to be difficult, but the alternatives are unacceptable. We must get on with the job of developing plans for control of the greatly increasing numbers of visitors if we are to fulfill our obligations in resource protection. We recognize and accept the fact that we will get criticism, some of which will undoubtedly be justified, but it is incumbent upon us to accept this criticism for our actions rather than the more justifiable criticism for inaction.

We suggest that you appoint someone in your regional offices with the specific responsibility of assuring that such plans are prepared, someone in park operations involved in resource management and visitor use would seem ideal. We also believe it would be wise to have the Superintendent of each area, where plans are necessary, to appoint a specific individual to prepare the plan.

It would be helpful to us to have a list of those areas which you decide should have plans together with the names of individuals responsible for plan preparation both in the areas and the Regions. We stand ready to assist you in whatever way possible, if we can help let us know.

Enclosure

June 7, 1972

RECREATIONAL CARRYING CAPACITY OF THE NATIONAL PARKS

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and

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Recreational Carrying Capacity of the National Parks

The increasing congestion and overuse in parks and recreation areas in the United States and the concomitant deterioration of natural features and of developments has brought management agencies and visitors to the realization that it may ultimately be necessary to schedule park use. A more equitable distribution and some restriction of visitors at peak periods must be seriously considered as alternatives if we are to halt the adverse effects of overuse and to restore the ecological balance in our parks.

The problem is widely discussed as the "carrying capacity" for recreational lands, i.e. the number of persons for which an area can provide recreation while maintaining the conditions that originally made it desirable for that purpose. This definition implies that the natural characteristics of the area are of primary importance and form the basis for its management. The objectives and the policies of the managing agency are to determine the type of use appropriate to the area, the proper intensity of use, the degree of impact which can be considered reasonable, and the seasonal distribution of visitors. These factors are also important in assessing the maintenance effort required to improve conditions or to increase capacity without risk of loss of natural and aesthetic values. Thus, many of the major factors that determine the use of a park are contained

within its enabling legislation and within the mandate of the agency's administration.

But the concept of carrying capacity for the National Park System implies to many persons an a priori decision process that takes into account the size, the character, and the significant natural features of an area, and allows the judgment to be made as to the number of people that can see or interact with it on the basis of the natural features alone. There is a desire to discover something inherent within each type of area that would allow this judgment to be made, such as a true "park" experience, or large crowds of people enjoying themselves, or some other aesthetic criteria of the people-park interation that does not significantly damage the resource.

How many people can be accommodated in a park before the park begins to deteriorate? This question is invariably preceded by descriptions of overcrowding in Yosemite, automobile traffic in Yellowstone and the Great Smokies, and campground congestion in Grand Teton. And the speaker might add that roads are crumbling under continuous use, campsites are wearing out, and larger areas of wilderness are showing the depredations of frequent trampling; that back-country lakes are increasingly polluted and the impact of garbage and trash in remote areas is reaching the acute

stage. Sewage disposal is critical in highly developed areas and a worsening problem in wilderness. "Will success spoil the National Parks?" is a significant question that induces emotional overtones and the not-so-subtle suggestion that visitations to parks must be limited or the parks will be destroyed.

The problem of carrying capacity is significant to the future of the parks. It applies to the present use of the parks, the repair of damage already done, and the development of areas as yet undeveloped and in most cases untrammeled. In the face of increasing pressure, how can the commitment to public use be honored without further jeopardizing the resource that the Park Service is charged with maintaining for the use of all people for all time? Above all, how can use be made of the parks by the greatest number of people without detriment to the environmental qualities of the parks? Can the experience still be translated into environmental awareness and appreciation of our American heritage and be a satisfying aesthetic experience as well, replete with safe and exhilerating adventure?

Although the concept that every park has carrying capacity is generally accepted, there is some question whether the limit can be quantified in terms of number of visitors per hour or per day or whether the same formula can be applied to more than one area. Objective guidelines are needed so that a park manager will know that his area has reached its

full capacity and that additional visitors will result in unacceptable deterioration. Such a guideline would be a valuable tool for any land-managing agency responsible for maintaining a resource and providing for its use, whether that resource is a wilderness preserve, a multiple-use recreation area, or a historic site or building in an urban setting.

Throughout the world there are myriad examples of the results of excessive use of preserves and natural areas in developed countries. Wherever shorter working hours, increased incomes, and improved roads and access have become available to the majority of citizens, the subsequent increase in tourism has taken its toll of the most precious of that nation's scenic and historic resources.

Widespread park deterioration has led to extensive research into carrying capacities but only now are we making progress in accumulating quantitative data. Many studies describe a complex array of biological, physical, social, and aesthetic factors interacting to influence the source and nature of impact and its effect on the resource, while others cite the lack of standards by which to measure biological alterations as an obstacle to quantitative guidelines. Moreover, the aesthetic qualities in nature are not amenable to quantitative measurement by resource economists and equally intangible are the complex relationships and the vagaries of human behavior that further effect the natural biota, the developed facilities, and the enjoyment of other visitors.

Although the study of total park impact is formidable, many clues have long been available in the journals of agriculture, forestry, and ecology. Bates (1935) documented the effects of human use on the vegetation of "footpaths, sidewalks, cart-tracks, and gateways" and earlier Meinecke (1926, 1929) studied the impact of tourist travel in Sequioa National Park and California redwood parks. Subsequent studies have described the effects of touring, boating, camping, picnicking, hiking, skiing, or snowmobiling on coasts, lakes, back country, landscapes, ski-slopes, watersheds, caves, or tundra. Considerable data is available on the effects of trampling and other compaction on meadows, pastures, and woodlots (Steinbrenner, 1951: Lull, 1959; Free et al., 1940).

Detailed information provided by soil scientists has aided in documenting that the impact of continual campsite use extends far beyond the immediate evidence of exposed tree roots and reduced canopy. Knowledge of infiltration moisture regimes, organic decomposition, and nutrient take-up demonstrates the physical and chemical changes brought about by soil compaction. Soil condition effects the reproduction, growth, and vitality of vegetation at the site, which in turn effects the campsite's appearance, susceptibility to further impact, and its response to rehabilitation (Paparnichos, 1966; Jolliff, 1969).

Corresponding to the wide range of factors influencing park use, information from many non-biological fields is cited in the literature dealing with impact and capacities. Resource economics, land use planning, and landscape architecture are related disciplines that have provided data relating to problems of special concern to the park manager. The determination of visitor preferences and satisfaction relies heavily on the contributions of social scientists, and some recreational surveys have provided pertinent data in that area. Smith et al., (1969) conducted a survey of recreational boating populations aimed at learning the preferred activities of that group and Brewer and Gillespie (1967) compared indices useful for estimating satisfaction levels of recreationists for their preferred vis-a-vis actual activities. Willard and Marr (1962) examined effects on tundra in Rocky Mountain National Park and recommended that carrying capacities be established for the major ecosystems in the National Park System.

Wilcox et al., (1969) considered the sociological factors as determinents of impact and outlined areas where further work would be required, but failed to define the parameters by which such determinations could be made. Other park studies have examined specific instances of visitor impact. Hartesveldt (1963) reported that the effects of visitors on Sequoia dendron giganteum included significant changes in organic matter, nitrogen content, saturation percentage

and potash in severely trampled soils. Witson (1970) studied the impact of human use on the Chisos Basin in Big Bend National Park, examining in particular the effects of horses and stock on trailside vegetation and on areas surrounding buildings and concessions. He found significant alterations in plant distribution and succession. Studies aimed at determining what controls are needed on the more popular lakes in the back country of Sequioa - Kings Canyon National Park, are uncovering useful evidence related to human impact. Limitations have been imposed on river floats in Grand Canyon and remote campsite use is held to a fixed number in those areas in the inner canyon that have been damaged by too many hike-in campers (Arron 1971). These restrictions are similar to those imposed by the U.S. Forest Service in New Hampshire's White Mountain Forest, where increased camper impact at trail shelters has required special regulations and limits on users.

The variety of needs and objectives of different environmental agencies and the broad range of interests motivating individual and groups of conservationists are reflected in the diversity of research now being conducted in land use planning and environmental impact. Significantly, much of the accumulating data is basically useful to all natural resources management. Recent advances in biological simulation and modeling; computer mapping; remote sensing; technical

information systems; and improved monitoring methods in air and water quality and other environmental parameters are particularly helpful.

Continuing efforts are producing quantitative criteria with which to measure even some of the less tangible factors such as the individual's personal satisfaction with natural values. The difficult problem is to apply these accumulating data to the objectives of the agencies that administer public lands. The problem is compounded by what may be called a "floating baseline." The personal satisfaction an individual derives from a "park experience" will depend to a great extent on his first experience. Each generation "rediscovers" the parks, wilderness, and natural areas, and the condition in which they are found will influence their appreciation or lack of it. Thus it is important for park managers to retain the continuity of experience and skills to preserve and maintain areas, and to regulate use in order to provide the authentic environmental circumstance in which a satisfactory park experience can occur.

In view of the significant implications of carrying capacities, the diversity of present thinking and research, and the complexity of man's activities in our parks there is need to institute practical means to minimize the impact. The concern of the National Park Service relates to national parks, monuments, and historic sites but

the principles are applicable to other agencies and to any park situation. Some of the national parks already have areas suffering from overuse, and these are appropriate places to develop the necessary controls. Secretary of the Interior Morton took the first step on March 1, 1972, when he announced a temporary, experimental program aimed at dispersing visitors over a wider region and limiting their numbers in remote areas of Great Smokey Mountain, Yosemite, and Sequoia-Canyon National Parks.

The concept of carrying capacity as it is sometimes used gives the false impression that there is an a priori method of determining the capacity for any given parcel of land or natural resource. However, carrying capacity is not a primary factor in the interaction of people and a resource, but is a derived or dependent factor which is subject to precise definition after the parameters of park development have been determined. The primary factors or parameters of carrying capacity are those elements of park planning and development that determine how people are to be accommodated and contained within the park.

To illustrate carrying capacity at its two extremes, first consider a true wilderness -- in reality a trackless forest, desert, mountain fastness, or prairie -- where the only trails are animal trails. The carrying capacity of a true wilderness is zero or a very low number.

By definition, it is the number of human beings that could occupy the land, either temporarily or permanently, without disturbing the ecosystem in any way. They would take little or nothing into the wilderness, remove nothing from it, and nothing would be rearranged. If the wilderness is to be preserved, man must function in it as an intimate part of the ecosystem and without benefit of technology. His actions would not be discernable from the ecological events of the area so that he would, in effect, be integrated into the natural system.

At the other extreme, Times Square in New York City represents the ultimate in development for human use; hundreds of thousands of people use Times Square every day. It is the epitome in urbanization with its concrete, steel, and glass-hardened surface; quite the opposite from the wilderness. But as soon as the first improvement is made in the wilderness -- the first trail cut or the first stream bridged -- the urbanization of the wilderness begins. From trails to roads and from campsites to motels is only a matter of degree of urbanization that progresses from the primitive to the highly technical.

When man makes improvements in the environment he is usually accommodating the environment to himself. The cutting of a trail in the

wilderness is an accommodation to man; roads are a further accommodation to man and his animals and machines. This is the beginning of total urbanization of the environment that only ends when the entire complex is given over to man and his machines and activities, as exemplified by Times Square or the downtown of any city. If we are to understand carrying capacity, we must first understand that when man shapes the environment to his own purpose he is fashioning containers or compartments for his activities, and it is the capacity of these containers or compartments that are the ultimate parameters of carrying capacity.

Carrying capacity is the ability of the developed landscape or park to contain people in compartments. The simplest compartment is a trail. How many people can use a trail? The answer depends upon a number of factors. If the trail is long and broad the number is quite large, but its capacity also will be influenced by the rate of travel of the individuals using it, whether they are on foot, bicycles, or horseback; the number of places people will wish to stop; and whether the trail is circular or whether the return must be made in the opposite direction on the same trail. If the trail is hazardous, its limit will depend upon the number of people that can travel it under supervision. From trails to roads with pullouts and overlooks, and from campgrounds to hotels, visitors centers, golf courses, and museums

is merely a matter of degree, with each new development increasing the capacity for visitation and creating its own limitation parameters. Each facility in a national park has a certain size, potential filling and emptying rate, and a certain population restriction when maintenance is in progress. If maintenance is not possible during use, the facility will degrade faster than it can be maintained and a reduction in capacity will result.

From each developed facility within a park, there flows a transition of disturbance from the center of the facility to some place in the natural environment. The simplest example is a road. The center of disturbance is the center of the road and the transition occurs through the berm, the roadside, and into the surrounding vegetation. In all park development it is desirable to minimize the transition of disturbance from the developed facility to the natural vegetation, and to a large extent this will depend upon the design of the facility itself.

A campground located behind an amphitheater demonstrates the problem. Let us assume that access to the campground is on roads parallel to the sweep of the amphitheater. The main foot traffic flow from the campground will not be along the roads, for that is the long way, but through the wooded area between the campground and the roads. If

regular pathways had led to the amphitheater, the zone of disturbance would have been minimized by being channeled and absorbed within fixed corridors that can be hardened to resist wear and be easily maintained.

Each developed facility in a park will have a potential maximum capacity. For a motel it depends upon the number of rooms; for a parking lot it is the number of parking spaces. We do not usually think of a road or highway as a container but, nonetheless, there is a maximum capacity for any road. For trails, the concept is even more elusive but it exists. The crowds at the C&O Canal National Historical Park at Great Falls, Maryland, are an indication of the capacity of the canal towpath for it is bounded by a high wall on one side and the canal on the other. A wilderness trail in the high country may have other features that define its limits.

In addition to the maximum capacity for each developed facility there is an optimum capacity. The optimum capacity is reached when the degradation of the facility does not outpace its maintenance. If the facility is a road or path or trail, its optimum capacity keeps the zone of disturbance to a minimum and hazards to life at a minimum. If the facility is a wilderness campsite, the optimum capacity may be that level of use that does not cause the pollution of streams or lakes in

the area; or that does not significantly alter the appearance of the wilderness site by trash disposal, use of firewood or bathing or washing clothes; or does not cause the deterioration of vegetation in the vicinity.

It is safe to predict that as visitors to national parks increase, the frequency of maximum capacity for the developed facilities in the park will increase at a similar ratio. This will make maintenance difficult and facilities will deteriorate. It is the degradation of the developed facilities, as much as the disturbance of the surrounding area, that leads to degraded visitation.

Although the view in Glacier National Park along Going-to-the-Sun Road will never wear out, the condition of the road, the congestion at the pullouts, and the inconvenience created by large numbers of visitors at the Logan Pass Visitor Center may lessen the enjoyment of the trip. How many road repair crews, stalled cars, and full turnouts are required to significantly reduce the capacity of the road to handle cars and to diminish the enjoyment of an otherwise magnificent mountain drive? How can the interaction of people and tundra be manipulated to reduce to an absolute minimum the zone of disturbance between the developed facility and the tundra itself? Tundra is no more fragile than a grass lawn -- the rate of growth of grass and its rapid recovery from abuse are what make it different from tundra. Tundra sod strips placed on the upslope

side of road cuts at Trail Ridge in Rocky Mountain National Park have not grown appreciably since their placement in the 1930's.

The construction of a path, instead of permitting visitors to roam at will is a start to containing the crowds at Logan Pass. The erection of walls, some attractive fences and other devices will also work. An elevated boardwalk is a nearly perfect container because it completely separates the people from the resource without inhibiting their enjoyment of it, and is in sharp contrast to the multiplicity of trails and paths that form when people traverse the tundra at will. Only a boardwalk through Anhinga in the Everglades makes it possible to traverse an otherwise impassable swamp and the boardwalks at Logan Pass and Anhinga provide "windows on the wilderness." A boardwalk in Bird Park at Hawaii Volcanoes National Park would prevent the destruction of undergrowth and of the magnificent Koa trees.

Before additional facilities are introduced into the parks, care must be taken in assessing their impact upon the area. At the general development concept of planning stage it should be possible to predict within certain limits what the capacity of any given area will be. We know from experience that areas that are developed only to the extent of a trail are little used unless the area is a lawn or lawn-like,

such as tundra and that areas that are highly developed such as the village at Grand Canyon attract high visitor use. It is or should be obvious that planners are in part estimating use when they design facilities.

Moreover, in considering the alteration to the vegetation it is equally important to consider the response of the animals, especially if they are large and potentially dangerous. The carrying capacity of certain areas -- Canyon Campground in Yellowstone, for example -- is reduced during those times of the year when grizzly bear activity is a potential hazard to human occupancy. Multiple use of such areas is possible, but in order to maintain the natural fauna the carrying capacity is reduced because the seasons for visitors must begin later and end earlier and the circumstances require a closed vehicle for camping. The Camus Creek Road in Glacier National Park poses similar problems because the road sides are seeded to timothy and clover and the early spring green-up of these plants attracts grizzly bears. The potential hazard to visitors along this road may have repercussions similar to those of campgrounds built in prime bear habitat.

The optimum capacity for any developed facility in a park is related to its maintenance. If the rate of degradation exceeds the rate of

maintenance, only two alternatives are available: maintenance must be increased or visitors must be decreased. The first alternative is only a temporary solution because usually the number of visitors increases at the same rate as the size and convenience of the facility. Optimum use is not a single-factored phenomenon, nor is any ecological relationship, and carrying capacity is an ecological relationship of people to facilities and resources.

Best judgment decisions have to be made regarding the optimum capacity for each facility and these decisions must be soundly based on reasonable maintenance of developed facilities and of the related natural resource. A bear attack on a visitor using the Camus Creek Road in Glacier must be attributed to road maintenance because the practice of seeding the road-slopes with timothy and clover attracted the bear to that location. Similarly, bear attacks in the vicinity of garbage dumps must be attributed to the efficiency of garbage disposal, another maintenance cost.

Based on developed facilities of known capacity, known rates of movement into and out of these developed facilities (roads, trails, buildings, etc.), and established optimum use levels the actual numerical carrying capacity of any park can be determined. The

carrying capacity will not relate to the number of acres of natural area within the park boundaries, but will relate to the population capacity of the developed areas of the park. The determination of the carrying capacity of a park, however, requires some qualification. For example, if the 800,000 acres of Yosemite were developed like Disneyland, the carrying capacity would be very large indeed and conversely, Yosemite with no development at all, not even roads or trails, would have very little capacity. When Stephen Mather prepared his road plan for Yosemite he did not visualize it being gridironed with a road syste, that would make every part accessible; Mather's plan included large portions that would be accessible only on foot or on horseback (National Park Service Road Folder). This decision limited the overall carrying capacity for Yosemite, and rightly so since only through limited access can the wilderness aspect be maintained.

The carrying capacity of a park, then, is determined by the capacity of the developments and facilities, and whether occupation will be maximum or optimum is determined by the extent to which occupancy affects maintenance, including maintenance of the natural resource. The decision to limit occupancy, while soundly based vis-a-vis maintenance

costs, will nevertheless be a best judgment decision. Good maintenance is not compatible with a stream of cars and campers entering a park when an entrance sign says, "All campgrounds full." Placed in this context, we can recognize that carrying capacity is largely a systems analysis problem. There may be many variables, with a consequently large number of equations, necessary to solve the problem, but it remains a straightforward analysis problem. Maintenance and engineering personnel can supply maintenance estimates for roads, trails, and structures and these, together with noticeable effects on the natural vegetation will form the basis for establishing optimum usage. The role of the ecologist in determining the equation will focus on the unacceptable degradation of the natural environment. There is no magic formula for determining the carrying capacity of a natural area and for a park the determination can be made only after the developments are incorporated into it, for without them the concept of carrying capacity has no practical meaning.

Finally, then, carrying capacity is dependent upon master planning, which must in turn, be based on fundamental ecological principles. Assurance of this consideration has been stated in two of the criteria for an adequate park master plan (NPS Service and Planning Standards) which:

1) describes the overall concept for the preservation and use of the area, including the role and degree

of development; and

2) identifies and describes ecological and developmental limitations of visitor use which provide the framework for park capacity.

One of the most costly mistakes in master planning is failing to realize that most developments are merely downpayments. Over the long haul, maintenance of the facility and restraining the degradation of the concomitant natural areas will be far costlier. Poor judgment left uncorrected will cost not only the initial investment, but also will require excessive maintenance upkeep and perhaps corrective measures at a later date. The failure to abandon a campground that is plagued by problems with bears or the subsequent necessity for a floating breakwater for a marina that could have been built in a lee cove are examples of a poor understanding of all the environmental costs associated with development.

The key to establishing carrying capacity lies in recognizing its relation to environmental degradation and in limiting the use of a facility when an imbalance between degradation and maintenance is reached. Maintenance costs include repair of physical damage to the facility or to the surrounding natural area, e.g. bear attacks or law

enforcement problems; highway accidents or the pollution of back country lakes. The maintenance of any ecological situation implies the ability to regenerate, restore, rehabilitate, or reequilibrate the community. When this ability is lost, the vigor and vitality of the community are lost with it and degradation and destruction follow.

To maintain the parks unimpaired for future generations, the interrelated concepts of park development, carrying capacity, and cost of maintenance must be thoroughly understood. Sound planning based on ecological principles, determination of optimum use, and the techniques of systems analysis should speedily produce the needed answers for any present or contemplated development. Since carrying capacity is so obviously a systems analysis function, it should be no problem to construct mathematical models of park developments and apply systems analysis to the master plan prior to construction. Such a system should do much to enlarge the horizons of planners, ecologists, and engineers alike, and should ultimately lead to the most efficient patterns for park usage.

While many factors interact to affect the capacity of a natural area for recreational use, one of the most critical problems facing the National Park System is determining when the number of visitors exceeds the point

where developments are no longer adequate or efficient or desirable.

The mandate to provide for public use and preserve our parks has continually tested the training and dedication of men and women of the National Park Service who are responsible for the traditionally high standards of the parks, and resolution of the dilemma has long relied on the soundness of their personal judgments. Many park managers know approximately how many persons their park can accommodate, and as visitation increases at a linear rate the attendant problems can be solved by adding seasonal personnel or by intensifying maintenance. But at some point the problems and incidents associated with visitors increase at a rate disproportionate with the number of persons or cars, and may even approach logarithmic proportions. Experience shows that enlarging picnic grounds or designating overflow camping areas does not solve the problem. When by-pass roads are built in the parks, traffic increases and still is unable to move freely. As with an ungulate range, a campground may resist moderate use and be able to renew its vegetation for the next season, but if perpetually "overbrowsed" the reproductive base is killed and may require years to repopulate and regenerate. When the cost of maintenance outweighs its effectiveness acceptable capacity has been exceeded and the decision to limit visitation or to institute other controls must be made in time to forestall damage to the park. It is essential therefore, to adopt a realistic capacity for use; one that provides the necessary

margin for carrying out maintenance without shutdowns or impairment of service and that can adapt to feedback from any of the physical, biological, or aesthetic indicators of overuse.

The primary elements of carrying capacity center on a few important concepts, the most essential of which is that carrying capacity is a function of development. Minimum capacity is an economic concept, i.e. if the cost-benefit ratio is such that the development is precisely justified by its use, it is operating at MINIMUM capacity; if fewer than the minimum capacity use the facility there is reason to question the merit of its inception.

The design capacity reflects the master planner's concept of "best use" of the area in question. The initial considerations of master planning must take into account the character of the resource and its natural properties and the best manner in which the resource can be enjoyed. Design capacity must be based upon engineering considerations for construction, utilities placement, access, circulation of vehicles and people and adequate water supplies and garbage and sewage disposal. The design capacity is the absolute number of spaces allotted for people in the master plan. It includes the total number of campsites, trailer and camper sites, parking spaces, motel rooms, etc. The

design capacity will determine to a large extent the actual use but will not be congruent with actual use.

The maximum capacity is the upper limit of people who can be accommodated in the developed areas of the park if the threat to the development or to the surrounding natural resource is ignored. Maximum capacity under some circumstances can exceed the design capacity, as when rooms designed for double occupancy are occupied by more than two persons. When people spill out of the developed areas of the park and spontaneous development occurs in unplanned areas, the park is over capacity. Parking, camping, viewing and other activities conducted at unauthorized locations are all symptoms of over capacity, as are excessive traffic accidents or law enforcement problems that are beyond the ability of the regular staff to handle.

The optimal capacity for park areas centers on two concepts: (1) that under conditions of optimal capacity the natural resource adjacent to developed facilities does not degenerate faster than it can regenerate itself or be regenerated (by planting, seeding, fertilizing slope stabilization, etc.); and (2) that the development is not deteriorating faster than it can be maintained given the economic resources available.

Acceptable cost is a necessary modifying condition. Optimal carrying capacity is the use level of a park area at which the natural resource does not deteriorate faster than it can be regenerated and where maintenance of the development is at a reasonable level and for which the dollar value is either remaining constant or diminishing.

The use of a facility sometimes contributes to its maintenance and, conversely, nonuse of an area, particularly a building, may quickly cause the deterioration of the facility. Adequate maintenance will halt the deterioration of a facility but it may not be economically justified if use is deficient.

The arbitrariness of the establishment of optimal carrying capacity focuses on several factors. One is the judgment of the park planning and design staff in the initial concept for development. It is here that the binding decisions of the circumstance of the "park experience" are made and they must be based on enlightened ecological, environmental, and engineering judgment. The second point of arbitrary judgment is the determination of what constitutes acceptable change in the natural environment. The definition of change as deterioration will automatically evoke the concept of overuse. The extent to which change is detrimental is a well-informed ecological and environmental opinion based upon adequate baseline data for the area. Thirdly, the park manager must

judge which human behavioral attributes fall within the prescribed uses of the park or recreation area, and his sound judgment can prevent law enforcement problems from getting out of hand.

Each of these factors are warning indicators that tell the park manager that optimal capacity is being exceeded. Of course, part of the concept of development is related to park staff, which, in turn, is related to the number of visitors, the services expected and the nature of the area involved. When the demands for service exceed the capabilities of the park staff, optimal capacity is being exceeded regardless of other factors.

The available evidence is subtle and elusive. but there are indications that deterioration of facilities and resources may be a geometric function of the number of people. The same may be true also of the deterioration of visitor safety and protection. At a certain point the incidents of auto accidents, lost or strayed children, thieving, etc., increase disproportionately to the increase of people. This seems to preclude the notion that to increase either the development or the staff is an easy solution to carrying capacity problems, and also reinforces the view that scheduling for optimal use, with perhaps an increase in the total recreational park system, is a valid concept.

The systems analysis approach augmented by defining and delineating arbitrary parameters based upon sound judgment is the answer to the carrying capacity problem. Finally, it must be added that when the park is operating at optimal capacity it will also be operating at standard, for these concepts represent two manifestations of the same phenomenon.

The fear that the establishment of a carrying capacity for a park or recreation area will lead to its reduced use is not supported by the evidence. The increased efficiency of park use through scheduling will, in most instances, bring about increased use. It is optimization of use that is the criterion and this means the seasonal distribution of use and the reduction of peak loads that are the cause of most damage and present the greatest management problems. By supplying the information necessary to allow people to schedule their park visits during times when they can efficiently be accommodated we will increase the carrying capacity of the parks and enhance the park experience. Under these conditions the parks can be maintained unimpaired for the enjoyment of future generations.

CF LETTER a report on environmental issues

September 1972 9-72

In this issue: The adverse impacts of people on national park environments continue to increase . . . Some options for dealing with the problems.

NATIONAL PARKS AT THE CROSSROADS: DRAWING THE LINE WHERE PROTECTION ENDS AND OVERUSE BEGINS

From Cape Cod to Point Reyes, choice areas to live and vacation in are subjected to increasing debasement from overcrowding and overdevelopment. At the same time, countervailing efforts to protect prized environments are being made by many communities and by the federal and some state governments (see August 1971 and August 1972 CF Letters).

Also confronting difficult growth problems is the National Park Service, custodian of 285 areas, including 38 national parks and a variety of national recreation areas, seashores, lakeshores, scenic rivers, trails, parkways, monuments and historic sites. This CF Letter deals with options for managing major natural parks in the public interest.

Some see threats to the parks as early warning signals. Said the Council on Environmental Quality's third annual report last month: "Encroachments on the parks and what the nation does about them are a test of its resolve to improve the quality of all sectors of our environment." Actually, park problems exist in tandem with those of cities and other areas. Just as the Park Service is moving to prohibit private autos in some park areas, so are some cities starting to ban cars from certain blocks. Both parks and cities are beginning to show signs of capitalizing on the potential of bus and rail service. Similarly, just as the Park Service is starting to regulate the flow of visitors and development in some park areas, and is expected to resort to reservation systems, so are some communities contemplating or taking the first steps to control population growth and development.

Present zoning restrictions and temporary denials of building permits or sewer hook-ups are likely to evolve into stiffer regulatory measures. Rand Corp. demographer Peter Morrison, according to an article in the August 21 issue of Time, "believes that the federal government may have to adopt population-distribution policies; if not, localities may resort to residency permits and migrant entry fees to prevent being 'loved to death'."

Carrying Capacity

It is axiomatic that for any given park or section of a park -- at some point and at some time -- a line must be drawn between use and preservation.

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Sydney Howe, President Rice Odell, Editor

At some threshold, the development of facilities and accommodation of visitors must give way to protection. Otherwise the natural resource loses its original appeal and its value to every user is diminished. Quality is displaced by quantity.

A first basic step is to adopt a master plan premised on a judgment of the appropriate "carrying capacity" of a park. This judgment should be a political one, grounded in both expert evaluation of the resource and in the interests of the people who use or could use the park.

The Park Service's proposed master plan for Grand Teton National Park says that there are two "paramount considerations" which limit a resource's carrying capacity: (1) "the mandate to perpetuate the park's ecosystems in their most natural state," and (2) "the assurance of a quality visitor experience in each of the park's principal use zones."

The Conservation Foundation this month published a new study, "National Parks for the Future" (see box on page 3), in which a task force report listed three components of carrying capacity:

"1. Physical Carrying Capacity: This relates to the effect of visitation on the non-living aspects of the habitat. The ability of a particular terrain to resist trail erosion is one factor. So is its ability to "absorb" trails, roads, and other man-made objects. Conversely, when man-made features dominate the scene, the physical carrying capacity is exceeded. Space also determines carrying capacity . . . Only a few visitors can stand in a ruin at a time.

"2. Ecological Carrying Capacity: This concerns the effect of visitors on park ecosystems. When the natural plant and animal features are substantially altered, ecological carrying capacity is exceeded and the preservation function aborted . . . The 'fishing-out' of a lake or stream is another illustration, as is the effect on flora of pasturing a horse on a mountain meadow. The ability to dispose of visitor wastes without damage to park ecosystems may prove to be the ultimate measure of ecological carrying capacity.

"3. Psychological Carrying Capacity: The most subtle and difficult, but in many ways the most important, component of carrying capacity concerns the effect of other visitors on the mind of the individual visitor . . . Levels of tolerance for other people vary, of course. At one extreme is the person for whom the sight (and even the knowledge) of one other camper or camping party in the vicinity detracts from the quality of the experience. At the other extreme are those whose chief delight in a park experience comes from association with fellow visitors. For them an empty campground would not only be a disappointment but a positively frightening prospect."

Dr. Rowan Rowntree, of Syracuse University, speaking at a symposium conducted as part of the CF study, noted another important dimension of carrying capacity: "Obviously, it cannot be a question of only how many people use a park, but of the way in which they use it. And the notion of visitor management suggests that there are ways of using parks so that park values are not diminished."

The CF study noted the paucity of solid information on carrying capacities. It called for an accelerated research effort -- with specially designated appro-

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AN OUTSIDE APPRAISAL

The Conservation Foundation's report "National Parks for the Future" was commissioned by the National Parks Centennial Commission as part of its plans to commemorate the 100th birthday of the National Park System. It was funded under a $170,000 Park Service contract. The Commission asked CF to arrange a citizens' appraisal of the parks, "identifying the basic problems and issues confronting the National Park System today and those anticipated in the future . . . (and to develop) a statement of philosophy and long-range objectives and goals with implementation recommendations."

Among those participating in the one-year study, in addition to project coordinator Robert T. Dennis and other CF staff members, were 34 advisors, some 200 participants at a symposium, and 30 individuals who made up five task forces. In addition to environmentalists, task force members included those who traditionally have had little involvement with park policies -- urban planners, labor spokesmen, college students and minority representatives. (The final 254-page report contains CF's own concluding recommendations, five task force reports, and 11 selected talks and project papers. The report is available from CF, $3.50 prepaid.)

priations -- in both natural and behavioral sciences. "National park managers must be able to determine carrying capacity limits, based on both ecosystem science and new insights into human needs, expectations and preferences," it said. Meantime, one of the CF task forces recommended that the Park Service follow a policy of visitor limitation based on "conservative best judgment" criteria.

Preservation vs. Use

The Conservation Foundation's study has come down hard in favor of preserving natural park values -- and against the kind of intensive use, development and auto traffic that is incompatible with those values. "We recommend that the National Park System reassert its traditional role as conservator of the timeless natural assets of the United States," it said.

This, of course, has often been the traditional conservationist posture, which is frequently branded "elitist" for appearing to cater only to those few with a special affinity for wilderness communion. Indeed, Interior Secretary Rogers C. B. Morton, whose domain includes the National Park Service, was himself quick to challenge the CF recommendations on banning auto traffic and various kinds of development:

"The concern I have about the report is . . . (that) we're going to begin to discriminate against the elderly, the traveling families who have only a very limited time and modest budgets to visit the parks, and probably narrow the constituency of the parks to only those such as back packers and others who are able to spend the time and have the inclination to camp in the wilderness." (UPI, September 17, 1972.)

Yet the CF study implies criticism of the Park Service itself for failing to provide for low-income, elderly and other restricted groups. There is no mass

transportation to the parks and little within it, it is argued, so people are forced to come in cars; many accommodations are expensive; many campsites are designed for fancy trailers. "As it is now, they're subsidizing the middle and upper-class park users," said one critic. "Morton can't have it both ways."

In conducting its study, the Conservation Foundation also tried to recognize the dangers of slipping into undue emphasis on the natural environment. Thus, its symposium and task forces included people who, it was hoped, would represent the interests of the young, the urban poor and others not traditionally consulted on park issues. Even so, the result was heavy emphasis on limiting use so as to preserve the natural environments which make the parks worth coming to in the first place.

Most observers would agree that the typical confrontation between preservation and use in a park area should be resolved on the merits and in open forum. But the arguments can be thrown askew by the strong and pervasive influence of commercial interests -- such as the construction, automobile, gasoline, trailer and concession industries. Edward Abbey, in his book "Desert Solitaire" (Ballantine, New York, 1971), asked: "Why is the Park Service generally so anxious to accommodate that other crowd, the indolent millions born on wheels and suckled on gasoline, who expect and demand paved highways to lead them in comfort, ease and safety into every nook and corner of the national parks?"

The answer, he says, lies with the nature of "Industrial Tourism," or all the financial interests which are "well organized, command more wealth than most modern nations, and are represented in Congress with a strength far greater than is justified in any constitutional or democratic sense . . . Through Congress the tourism industry can bring enormous pressure to bear upon such a slender reed in the Executive Branch as the poor old Park Service, a pressure which is also exerted on every other possible level -- local, state, regional -- and through advertising and the well-established habits of a wasteful nation.

"When a new national park . . . is set up, the various forces of Industrial Tourism, on all levels, immediately expect action -- meaning specifically a road-building program . . . 'Parks are for people' is the public-relations slogan, which decoded means that the parks are for people-in-automobiles."

When the Park Service shows an interest in restricting auto traffic to alleviate crowding -- as it has begun to do of late -- it may run into a crossfire from pro-development forces. Master plans proposed for Grand Teton and Yellowstone National Parks would clamp down on road building and cars, but at recent hearings on the plans, state government and business representatives strongly urged expansion instead. So the Park Service is caught in the middle.

Alternatives to cars can also stir up the wrath of environmentalists. When Congress established the North Cascades National Park in 1968, it forbade construction of roads in several areas. It is proposed instead to haul visitors to key scenic peaks by building two tramways. But many conservationists view this as simply an alternate desecration.

Every unit of the National Park System is unique and, the Foundation's study concluded, should be planned and managed according to its own merits and characteristics -- its natural values, its carrying capacity, visitor demand and public preferences. Yet Congress and the large administrative bureaucracy impose policies which tend to excessive rigidity rather than flexibility.

For example, it is disturbing to many environmentalists that a number of large,

new, essentially natural areas, instead of being designated National Parks, are being proclaimed National Recreation Areas, Seashores, Lakeshores and the like. What these latter have in common is a management policy under which recreation -- rather than protection of natural or historic features -- "shall be recognized as the dominant or primary resource objective . . . Primary emphasis shall be placed on active participation in outdoor recreation in a pleasing environment." ("Administrative Policies for Recreation Areas," National Park Service, revised August 1968.)

The results of this and other policies are roads, buildings, developed campgrounds, marinas, hotels, recreation facilities, and other accommodations. Hunting and fishing are encouraged, and in some areas timber harvesting and grazing as well. But the Foundation suggests that classification of such areas as Assateague Island and Point Reyes National Seashores as recreation rather than natural areas does not mean that their impressive natural qualities should be more expendable than those of national parks.

The distinction was dramatically illustrated last March when it was suddenly revealed that the Park Service, back in 1968, had granted the Corps of Engineers permission to thrust a wave research pier from unspoiled Assateague Island more than 500 yards into the Atlantic Ocean. In the midst of the resulting uproar, Assateague's superintendent was quoted as pointing out that Congress, in legis-

"NOT SCATTERED OASES"

"Let us accept the conceit of a green world in which different emotional and intellectual responses are available -- as fundamental to the human condition, a requirement of a civilized being; and ask that these availabilities be extended to an ever growing number of citizens . . . National, regional and local parks together must form so massive an area of open space that no man is deprived of its advantages. One might consider an ideal series of parks as you might a great water system, using the metaphor of green water in massive lakes emptying into larger rivers and small creeks, rushing narrowly over waterfalls and flowing placidly and broadly through the flat countryside in a continuous sequence of parklands. Then it curls around and through cities in man-determined forms, held back by reservoirs, channeled over aqueducts and finally rising -- as in Rome, in fountains, small ones in dusty corners and large, baroque ones in mighty plazas. Thus, the fields and trees of parks should be, as water, not scattered oases such as Yosemite, but a weaving, interconnected green mass that changes in size and purpose, but always inter-penetrates forcibly but gently the urban, suburban, and rural scene. A dialectical relationship between parkland and urban area is created that might be said, in Marvell's terms, to parallel a dialogue within each of us between knowing and changing, on the one hand, and feeling and accepting, on the other. Or to put it in social terms, a dialectic between a growth economy, on the one hand, and a balanced organic state, on the other."

-- William M. Roth, past chairman, San Francisco Planning and Urban Renewal Association, at CF Symposium.

lating the Seashore, "did not create a national park. It created a national recreation area."

The plan for the pier was quickly put to rest, but the basic problem remains. Conservationists have suggested that Park Service policy be adjusted to give top priority to protecting natural values wherever they exist. Also a planning system could be used in which parks are less categorized, and in which the complex trade-offs between preservation and use can be assessed more on a park-by-park basis. This leads, in turn, to the question of whether park planning and management decisions are to be made chiefly by bureaucrats who are far from the scenery, and upon whom commercial interests may be pressing, or whether they should be shaped by direct input from members of the public most concerned.

Citizen Participation

The most logical way to provide broad public participation in park affairs, CF found, is to set up citizens' advisory committees for the parks -- and then take their recommendations to heart. In its report, the Foundation recommended that "the full range of National Park Service policy-making, planning and management processes be opened to public view and that greatly expanded opportunities for citizen participation be provided . . . What is basically at issue here is whether or not the parks are, or can be, truly responsive to the needs of all Americans, not just those who are economically or politically involved in policy decisions, and not just the suburban, white, middle-class visitors who currently fit the 'average visitor' profile."

CF recommended that the development of master plans, and all later major planning documents, include citizen participation throughout the planning process, and that plans be available to the public in draft form prior to adoption. Five-year development schedules should be public documents, it added. The Foundation further recommended:

"A citizens' advisory committee should be established for each sizeable unit of the park system . . . In every case, three kinds of people should be represented on these commissions and each group should participate in the selection of its own representatives: (1) persons with professional, scientific and technical skills or special knowledge relevant to the unit; (2) representatives of the local, state and regional governments involved; and (3) representative park users and potential users from both near and far. These commissions should be consulted by park superintendents on policy-making and management matters, as well as on planning, and should have broad charters to speak out on their own initiative."

What is the current situation with respect to citizen participation? The Park Service generally does not hold public hearings on its master plans for newly authorized areas; and there is often little or no follow-up participation by the public. In any case, the master plan process embodies other problems, as discussed by Robert Twiss, professor of landscape architecture at the University of California, Berkeley. Speaking for a group at the CF symposium, he said:

"We feel that master plans are highly conceptual, and that it's very difficult to perform environmental impact review on such conceptual plans. It is also difficult to get public involvement, other than purely philosophical agreement or disagreement with concepts. We need more exacting land-use and environmental plans for the parks, which make sense to people . . . so that several realistic alternatives might be compared . . . Rather than sweeping conflicts 'under the

rug' in a conceptual master plan, perhaps several plan maps ought to be prepared, showing land-use needs versus environmental capabilities . . ."

Neither the Park Service nor the Administration has ever asked Congress to set up an advisory committee for a particular park, and in fact the latter has opposed such committees (in connection with pending legislation to create a Golden Gate National Recreation Area and Cumberland Island National Seashore). Congress itself, however, has set up advisory commissions in recent years for 15 units of the park system. The problem is that they are not necessarily representative of broad public interests.

In August 1970, Congress also authorized the Secretary of Interior to establish other advisory groups as he may wish, and instead of committees for individual parks, the Administration prefers one regional advisory committee for each of the Park Service's six regions. At present, members have been appointed by Secretary Morton to only three of these committees. It does not seem likely, in any case, that these will reflect a very wide diversity of opinion. Among the nine members of the Western Regional Advisory Committee announced on September 10, for example, there is evidently considerable interest in the outdoors; but five of the members are associated with industry.

The Secretary of Interior also has an overall Advisory Board on National Parks, Historic Sites, Buildings and Monuments. CF, in its report, said this Board should be reorganized, and expanded if necessary, to make it representative of the broad range of social and economic groups that comprise our national community."

PROBLEMS AND SOLUTIONS

The park problem largest in many minds -- the deterioration of environmental quality from the impact of too many people, too many cars and other vehicles, and too much development to accommodate people's needs -- has many facets, and many suggestions have been put forth to solve it. Some major options are discussed below.

Dealing With the Automobile

The major villain, in the eyes of many, is the automobile. "Let the people walk," exhorted Abbey in "Desert Solitaire." "Or ride horses, bicycles, mules, wild pigs -- anything -- but keep the automobiles and the motorcycles and all their motorized relatives out. We have agreed not to drive our automobiles into cathedrals, concert halls, art museums, legislative assemblies, private bedrooms and other sanctums of our culture; we should treat our national parks with the same deference, for they, too, are holy places."

The CF study had these comments and recommendations:

"Automobiles can destroy our national park heritage just as surely as they have made our cities inhumane and dangerous to limb and lung and have desecrated much of the metropolitan countryside. We believe that automobiles are inconsistent with the preservation mission, with what is called the 'park experience,' and with even the most rudimentary ethic. It is not now feasible to recommend that private automobiles be banned from every unit of the National Park System, but that would be our choice. We do recommend this: first, an immediate moratorium on road building, parking lots, and other auto-oriented improvement; second, appointment by the Secretary of the Interior of a special commission to study the entire question of private automobiles in the parks and alternative methods of intra-park transportation.

"We suggest that this commission be charged not with identifying a few areas

MEETING URBAN NEEDS

Recognizing the dearth of major park areas within easy access of big cities, the Conservation Foundation study of national parks recommended a "specific and urgent" acquisition program. It urged that a special task force "prepare an inventory and evaluation of sizeable natural areas within striking distance of large cities for addition to the National Park System." Point Reyes, Indiana Dunes and Fire Island were cited as existing models of such parks, and new opportunities are suggested in the Chesapeake Bay region and the Pine Barrens of New Jersey. Proposals for two "Gateway" parks in San Francisco and New York are pending in Congress, and CF recommended that the Gateways and other parks near metropolitan areas be heavily supported financially by the federal government, but be managed and operated by state, regional or local agencies rather than the National Park Service. "For parks are at the center of a community's character; they reflect and strengthen the sense of place and identity that make cities fit places for people."

"Near-city parks should be brought close to urban residents by imaginative transportation planning," the CF study said. It suggested that the Park Service cooperate with the Department of Transportation and other agencies on demonstration projects for public transit to Cape Cod, Point Reyes and Indiana Dunes.

The study also proposed a nationwide Federal Recreation Information System which would include walk-in offices in urban centers, and would make a special effort to attract minority groups and other non-users of parks. "While the city dweller cannot be expected to make a blind leap directly from sidewalk to alpine trail," CF said, "he can be encouraged to experience the parks on their own terms." (For a more extensive discussion of urban park and recreation problems and opportunities, see the March 1972 CF Letter.)

where automobiles should be proscribed, but with the reverse. The commission should assume that paved roads and the autos that use them essentially compromise park management policy. Its determinations should focus on exceptions to a general policy of automobile prohibition . . .

"Within the parks, every rational effort should be made to separate the visitor from his car and encourage him to travel on foot, by horse, by bus, by park train, by tramway, or other means. Visitors should be asked to leave automobiles and automobile homes alike at the park's edge, there to transfer to an intra-park public system, such as the Yosemite propane-powered buses . . ."

"In regard to transportation to and from parks, concessioners could be specially franchised to offer 'package' services including access transportation from nearby railheads or airports and from nearby tourist accommodations. Perhaps Amtrak could provide special park access services, with a European-type railroad pass for those who plan trips to several parks."

As noted, some beginning steps have been taken in these directions. Cars have been banned from the intolerably congested eastern end of Yosemite Valley, and people now use free and frequent sightseeing buses and trams which they can climb off and on at frequent stops. This system has received much favorable

comment, and the Park Service is beginning to use or develop similar alternatives to cars in such parks as the Everglades, Grand Canyon and Mount McKinley. At the latter, for example, people with a campground reserved will be allowed to drive to it, but they must leave their vehicle and use a shuttle service.

Providing Services Outside the Parks

Closely related are suggestions that inappropriate facilities -- which act as magnets to people in cars -- be removed from parks to areas outside their boundaries. The CF study stated:

"If the parks are to be meaningful to all Americans, everyone must feel welcome. For many visitors, this requires a somewhat civilized base of operations: a dry room, a bed with sheets, a recognizable kitchen or public eating place. At the same time, resort accommodations and shopping centers do not belong in national parks . . . (nor do) souvenir and trinket shops, swimming pools, bars, barber shops, golf courses and tennis courts.

"Nor do camping and picnic areas which are so designed and congested as to bring urban scenes and urban problems . . . We do not believe the Park Service is obliged to provide camp sites equipped with electric outlets, running water, or toilet hook-ups. Moreover, completely modern homes on wheels are contrary to the park ethic."

One of the task forces said that "all visitor facilities which can be provided outside of park boundaries should be built there rather than inside the parks. Present facilities, such as lodging, curio shops and parking lots, now located inside, should be phased out wherever practicable." It added that relocation should take place in conjunction with development of public transportation between the parks and facilities outside them.

In the same vein, the CF study recommended that non-profit, quasi-public corporations -- rather than private concessioners -- operate facilities needed within parks. "The concessioner has a disproportionate influence on planning and policy-making for the national parks," CF found. "His objective is to generate as much demand for the services he provides as is possible. This is thoroughly understandable, but it too often brings the people to the parks for the wrong reasons. The predictable result is that the concessioner makes a case for further facilities to accommodate a market that he -- not the parks -- has created. In some cases, these new facilities are utterly inappropriate."

A contrary view was expressed at the CF symposium in Yosemite National Park by Park Service Director George B. Hartzog, Jr: "Some of the innovations in park management that have contributed so much to the quality of our park experience here bespeaks eloquently the effectiveness of the government-private-enterprise partnership that exists here in providing for the visitors to Yosemite. As one example . . . perhaps the shuttle system that operates in this valley would not be in operation today had the Yosemite Park and Curry Co. not advanced $125,000 of its private money to test its feasibility long in advance of its approval by the Administration and the Congress."

The movement of facilities outside park boundaries, and the existence of unattractive, honky-tonk, "gateway" communities which can be seen from some parks, suggested to one task force the need for each park master plan to "reflect an understanding of the dynamic relationship between the park and the 'park-influence zone,'" and in fact to embody proposals for this zone as well as the park itself.

CF recommended that the federal government cooperate with state and local

governments in regional planning for parks and their influence zones. "The small gateway communities around national parks, in the absence of a carefully drawn and enforced land-use plan, typically become sprawling, billboarded and neon-lighted tourist-exploitation centers . . . The Park Service should not plan the future of the parks independently" of surrounding lands and resources. The Service's lack of authority to engage in comprehensive, regional planning results in "an unfortunate tendency for the Park Service to plan each park to be unnecessarily self-sufficient . . ."

Zoning and Use Controls

Sections within a park can be limited to particular uses, under a sort of zoning. Indeed, in the master plan process, lands within each park are assigned to one of six land-use classifications designed to channel environmental impacts. The six are: high density areas, general outdoor recreation areas, natural environment areas, unique natural areas, historic sites and cultural sites. But classifications are by no means a cure-all. It remains necessary to decide such thorny questions as what future demand for an area will be, and to what extent it should be accommodated.

Another important "zoning" technique is to protect roadless areas within national parks and recreation areas by designating them as wilderness areas under the Wilderness Act of 1964. The first phase of this continuing process calls for designation by 1974 of such areas within 60 National Park System

"BUY BACK AMERICA"

"Major new sources of federal funds must be developed to meet pressing needs for parks in the neighborhoods and communities of urban areas that are home to four out of five Americans," said the Conservation Foundation study. "We recommend two such sources as both practical prospects and appropriate policy initiatives." One is a capital gains tax on revenues from sales of undeveloped lands. "Much, if not most, of this revenue is derived from speculative land sales in and around metropolitan areas. There is a kind of poetic justice in dedicating (such) tax revenues . . . to the acquisition and development of public park and open spaces."

CF also suggested a 5% excise tax on recreational vehicles and equipment: "This would produce new sources of revenue from sales of such items as trailers, campers, trail bikes, boats, camping equipment, sporting goods, and related equipment and supplies. Such a tax is now imposed on sporting arms and ammunition (11%) and on fishing gear (10%) . . .

One of the CF study's task forces made a separate recommendation for a $100 billion national bond issue to "Buy Back America" -- for land acquisition, capital development, and improvement of the national, state, city and county park systems. The task force said: "A rough estimate indicates that $100 billion would provide funds sufficient for the acquisition of nearly 52 million acres of land, including 8,608 acres for vest-pocket parks, with a residual of $32 billion for development and improvement."

units. There has been constant pressure from those who seek more generous reservations of land for wilderness protection and wilderness-type usage.

There are, in addition, management techniques for diversion of visitors away from the most impacted places in a park to other areas. Examples include information programs, changed circulation systems and relocation of facilities.

Many types of use restrictions are available, such as limiting duration of visits, and requiring permits for particular recreation activities. The CF study noted further that, through interpretive and education programs, natural and ecological values can be communicated to the public, thereby decreasing its often callous disregard for park environments.

Limiting the Number of Visitors

A much-discussed technique for protecting natural park values is restricting the number of visitors allowed to enter a park, or visit a special feature or facility within the park. A CF task force discussed six methods of limiting visitor use to carrying capacity:

1. Market rationing by means of raised fees: "It is wildly inappropriate that one should qualify for a wilderness experience according to how successful one is in the antithetical world of the marketplace." (Others have simply said that charging high fees is totally out of character for our society, and would discriminate against the poor, the young, etc.) "Market rationing is also impractical in that fees would have to be set very high to have a significant effect . . ."

2. A first-come-first-served system: "This would so discriminate against the millions of Americans taking long vacation trips as to be politically infeasible."

3. A reservation system: "Wilderness was seen to be open, free, spontaneous and unconstrained, and reservations the opposite . . . (We had a) profound fear of the psychological erosion of the wilderness experience . . . A reservation system is well-suited to the style of vacationing and park use of the traditional middle-class park visitors, people who are accustomed to making advance arrangements, who know in the spring when they will take their summer vacation, and where and with whom they will go. However, a reservation system is extremely ill-suited to the styles of life and park use of the young, styles long on spontaneity and woefully short on planning."

4. A lottery system: "Seems unwieldy, unlikely, and raises the specter of both a vast administrative apparatus and an inevitable black market. Yet it is undeniably the most egalitarian device possible."

5. Limitations on length of stay: "Useful, but this device seems to be entirely inadequate to cope with the magnitude of the problem in the future."

6. Built-in frictions: "These are largely a matter of failing to provide paved roads, lodging, stores, or training for the convenience of visitors."

Of the six options, the task force proposed that built-in frictions "be considered the first line of defense and relied upon where and whenever possible." It further suggested that, when formal limitations on access are necessary, "a combined system of X percent reservations and Y percent spaces on a first-come-first-served basis should be employed, providing for both those who plan ahead and those who do not."

The future, of course, is already upon us. This past summer, for example, the

Park Service experimented with a permit system to limit the number of overnight backpackers in certain wilderness trail areas of three parks -- Great Smoky Mountains, Rocky Mountain and Sequoia-Kings Canyon -- where trails and facilities have been overcrowded and abused.

Most California state parks and several private parks are on a Ticketron computer reservation system for campsites. Reservations can be made up to 90 days ahead, and alternative choices are provided. Southern beach areas turn people away every day in the summer, while many inland parks are never filled to capacity, state officials say.

Increasing the Supply

Acquisition of new parks is another obvious and important way to reduce visitor pressures on existing areas. Emphasis in the CF study was on the need for parks near urban areas. (See box on page 8.) One of the task forces also noted that certain types of terrain are "grossly under-represented" in the National Park System. They include the northern Great Plains, short-grass prairies and the Arctic tundra. It added that there is an "urgent need for a focused national program to protect the nation's diminishing island, marine and estuarine resources which have significant scientific, natural and recreational values." The task force noted that since the Bureau of Outdoor Recreation's three-year study of threatened islands was completed in 1970, "little has been done."

An expansion of private recreation areas would also help. As the Council on Environmental Quality's 1972 annual report put it:

"The need is greatest for quality recreation opportunities that can begin to draw away from the overloaded national and state parks those people who would be satisfied at private parks or campgrounds but who now resist going to private sites that are often only crowded trailer parks."

Finally, the CF study noted that, through information programs and promotion of alternative parks, the public can be encouraged to visit those that are less crowded. A nationwide information system, CF said, could "help the citizen determine how and where to spend his leisure time -- at federal, state or local facilities -- to best satisfy his own needs in ways compatible with various recreation resources."

CF LETTER

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September 1972

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~~A pinch hitter course for emergency co-pilot action (landings) will will be taken by those personnel who may be frequent passengers on the plane~~.

Carrying Capacity — Dr. Robert Linn

Reference was made to the two recently published National Park System Plan booklets--Part One is History and Part Two is Natural History. These are the result of task force action from Point #8 of former Secretary Hickel's 11 point program.

The discussion concerned back country management and more particularly the determination of carrying capacity for such portions of a park. Special reference was made to Joe Rumburg's recent memorandum on this together with Theodore Sudia's report on carrying capacity. The crux of the problem now is that we must take action which we can expect will result in criticism that will only be more severe by doing nothing.

While there is a correlation of carrying capacity to the design capacity of a park the realities of master plan preparation are such that we can't wait for all the master plans to be completed. Further compounding the problem is the absence of any real science that can be used to determine carrying capacity. The result is that we are dependent upon "planned judgment" to determine carrying capacity.

This "planned judgment" is based on following the procedures presented in several outlines (see Appendix) designed to evaluate factors relating to the capability of the resource to withstand use. The first such planned evaluation is to look at the type of resource--historic, archeological, paleontological, geological, biological, and ecological.

The resource is then rated 0 to 9, assuming that 0 is common, easily repaired, extremely capable of recuperating to 9 which is extremely rare, difficult to repair, cannot recuperate. This rating for the resource is applied to: (1) rarity and uniqueness, (2) vulnerability, (3) recuperative, (4) repairability, (5) replicability. The rating 0 to 9 on the chart can best be done by those most familiar with the circumstances in the area. In the form in the appendix where figures are already given the values are fairly well established universally.

The second form deals with backcountry wilderness areas. This form covers two kinds of situations, namely those with trails, campsites, pit toilets, no electric power or permanent utility and those areas with no trails, campsite, pit toilets, etc. Three evaluations are made, namely "(1) maximum number persons per lineal mile of trail (or per unit of area), = _____, (2) maximum percent of park area involved at this level = _____, and (3) maximum percent of park area permissible at this level = _____." Again the completion of this data is dependent upon the most knowledgeable person about the areas' resources. Obviously it is a value judgment by such a person. In these figures we are looking for the maximum figure at the peak period. It can be seen that past use in figures and what has resulted from that use bear importantly on the decision made. It should be borne in mind that these are Technology Levels 5 and 6 which are part of the Technological Level of Facilities which has Levels 1, 2, 3 and 4 for Developed Areas. (Referring to these forms in the Appendix).

Questions were raised in this discussion about man's natural role in the scene. There are some indications that man is considered unnatural yet he is a part of the scene and he and his use cannot be simply denied and evaluated as unnatural.

The third form deals with 5 specific limiting factor areas and a final one as a catch all for other limiting factors. Again it is the best judgment of the people in the park who can make this estimate on (1) "park roads are overcrowded when—cars are in the park". The relevancy here of going farther and including the number of people was questioned. Capacities for sewer systems, area accommodations, maintenance costs at the highest attainable and desirable for building and utilites and trail maintenance can be determined generally without difficulty.

The above data is then put together in a formula to determine the factor to reduce the capacity calculation. This formula is put together as A= Technology level; B= Fragility factor; C= Limiting factors and D= Special factors unique to specific areas. The formula is

$$cc \text{ (carrying capacity)} = A - \left(B \times \frac{A}{100}\right)$$

then cc = C or cc = D whichever is lowest.

We must remember that these are subjective evaluations designed through the formula to reduce the average figure determined for trail use to take into account fragility, etc.

All of this is designed to relate to a Natural Park Resources Management Objective. This objective was altered after discussion to be: "As nearly as possible maintain, or when necessary recreate, those ecological conditions that would prevail within the park consistent with appropriate human use."

Reference was made to Joe Rumburg's getting the three parks together that have been involved in backcountry use controls this year. It is the design of things now to have additional areas involved in backcountry control programs in 1973. Backcountry management plans for all appropriate areas are to be finished by the end of February 1973.

It should be remembered that sociologists can have a distinct roll to play. These are factors to be considered such as what makes some people seek isolation on trails as opposed to those who cling to groups when on backcountry trails.

Joe Rumburg will be coordinating our study and area conferences in the months ahead.

~~Communications between officials~~

~~When verbal or telephone communication takes place between the Director and Field Superintendents and decisions or commitments are made, a written record is to be made by the Superintendent and forwarded immediately to the Field Director, with copy to the Director. Similarly when field or central office personnel are in communication with Departmental officials and decisions or directives are passed on this information is to be forwarded by memorandum to the Director.~~

~~Cooperative Activities - State Park operations~~

~~The Director is hereby directed to coordinate a cooperative agreement with a State, particularly California, to undertake cooperative and exchange training along with mutual involvement in other park operational matters. This could include, if dealing with California, to have the Yosemite Institute do all the training for State Park interpretives.~~

RESOURCE	FACTOR INDICES				
	Rarity and Uniqueness	Vulnerability	Recuperative	Repairability	Replicability
Historic			9		
Archeological			9		
Paleontological			9		9
Geological			9		9
Biological (organisms)				9	9
Ecological (communities)					8

Rate each resource present on a 0-9 scale for each factor index, assuming that:

0 = extremely common; extremely well protected (or not damageable); extremely capable of recuperating; extremely easily repaired; and extremely easily replicated.

9 = extreme rarity; extremely vulnerable; cannot recuperate; cannot be repaired or replicated.

BACKCOUNTRY WILDERNESS AREAS

5. Lowest Facility Level

Trails only, into and out of area; campsites with pit toilets or other natural self-contained biodegradable system ("Clivus", etc.); hand water pumps or less; no services; no electric power or other permanent utility.

Maximum number persons per lineal mile of trail = _____

Maximum percent of park area involved at this level = _____

Maximum percent of park area permissible at this level = _____

6. No Facility Level

No trails; no campsites; no pit or other toilets; spring or stream natural water-flow water only; no services; no utilities of any kind.

Maximum number of persons per unit of area = _____

Maximum percent of park area involved at this level = _____

Maximum percent of park area permissible at this level = 100%

LIMITING FACTORS

1. Park roads are overcrowded when _____ cars are in the park representing _____ people. Carrying capacity of the park is below this figure. This can (and, for sizeable parks, should) be computed for each district, subdistrict or other reasonable subdivision such as a "management unit".

2. Developed area sewage system is at peak capacity when _____ people reside overnight and when _____ people day visit the area.

3. Developed area accommodations are at capacity when _____ people reside overnight at lodges and campsites (may be considered separately) and when _____ people day visit.

4. Developed area is at capacity when maintenance costs for buildings and utilities is at highest attainable, obtainable, or desirable. In terms of people, this capacity is judged to be _____ people.

5. Trail is at capacity when maintenance costs for upkeep of tread is at highest obtainable or reasonable. In terms of people, this capacity is judged to be _____ people.

6. Other limiting factors as appropriate.

FACTOR CONSIDERATIONS

A. Technology Level

B. Fragility Factors

C. Limiting Factors

D. Special factors unique to specific area.

(1) $CC = A - (B \times \frac{A}{100})$

(2) or $CC = C$

(3) or $CC = D$

whichever is lowest

TECHNOLOGICAL LEVEL OF FACILITIES

"Developed" Areas
= max. of 3% of park area
(L.R. equiv. = 6.3 sq. miles)

1. Complete facility level (Max. # people/acre = _____ (Max. % park area involved = _____

Paved roads to and from; paved parking lots; or complete rail, tram, boat, etc., services; complete tertiary sewage treatment; services (food, lodging, etc.) have little or no impact--i.e., waste product taken care of externally or by highly sophisticated internal facilities (such as tertiary treatment).

2. Nearby complete facility level (Max. # people/acre = _____ (Max. % park area involved = _____

Same as 1, except secondary sewage treatment instead of tertiary.

3. Moderate facility level (Max. # people/acre = _____ (Max. % of park area involved = _____

Paved or graded roads and parking; at least secondary sewage treatment for all facilities.

4. Low facility level (Max. # people/acre= _____ (Max. % of park area involved = _____

Graded roads or equiv.; road parking only, or mostly so; secondary treatment and/or natural self-contained biodegradable (pit toilets, "Clivus", etc.)

5. Lowest facility level (Max. # people/acre = _____ (Max. % of park area allowed = _____

Trails only into and out of; campsites with pit toilets or other natural self-contained biodegradable system; hand water pumps or less; no services; no electric power or other permanent utilities.

6. No facility level (Max. # people/acre = _____ (Max. % of park area allowed = 100%

Trailless; campsiteless; taoiletless; spring or stream natural flow water only; no services; no utilities.

NATURAL PARK RESOURCES MANAGEMENT OBJECTIVE

To as nearly as possible maintain, or when necessary recreate, those ecological conditions that would prevail within the park consistent with appropriate human use.