"What We're Talking about Here are Dynamic Processes that Don't Stop":

A Speech to the National Park Service Western Region Superintendents' Resource Management Seminar, April 28, 1975

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I CAME HERE TO TALK ABOUT MANAGEMENT; PARK MANAGEMENT. I got involved in this thing in the Yellowstone situation of the early 1960s, which is really an outgrowth of mismanagement policies in the past of that park. Namely, the predator control that's been referred to by Howard[1] already, that permitted the unusual and abnormal growth of [the] elk population which was destroying some of the resources of the park, particularly the carrying capacity for other species within the park: mule deer, white-tailed deer, and others. Biologists pointed this out to park management several times and finally Lon Garrison,[2] recognizing that a problem did arise, took the bull by the horns and sent his own boys out there and shot 4,500 elk.

This created a tremendous political rhubarb, as you can readily imagine. The principal pressure being that people with the states of Montana and Wyoming, they wanted to get in and do the elk shooting. If there are too many elk, why, let us shoot them, we got a lot of good shots. Two governors, four senators, and God knows how many congressmen got involved in this thing and brought tremendous pressure on President Kennedy, who called Udall[3] in and said, do something about this. Udall, being an excellent administrator, appointed a committee.[4]

The committee, then, had the thing on its hands, and that was our gain. As we look[ed] this situation over, it was perfectly clear that the particular step that Garrison took, an attempt to rectify a management error by management on his part, was sound in our view, but in order to put this in the context of the whole park problem, the board [i.e., the committee] felt that we couldn't just give back a report on the elk situation in Yellowstone, but rather try and paint a broader picture of what we consider good park management, and then relate the elk

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situation to this. It was an opportunity, in other words, for us to depict some of the broader goals of park management, and so we did so and you have all read this report.

Just a few humorous details about that report, when it was to be given publicly at the North American Wildlife Conference in Detroit in March 1963, and Udall was to be there to receive it, and respond to it. I got a copy of the report to him about a week or so before the conference and he read this thing over and (inaudible) read it over and here we were talking about letting fires burn in national parks and it scared the devil out of him. The night before the presentation he phoned me and said he was awfully sorry he couldn't come because Kennedy had given him some kind of an errand to do. And we laughed about this later. He knew and I knew that this wasn't the case at all. Politically, this looked like dynamite to him. So he sent one of his henchmen out who responded to this report.

It caught a lot of conservation organizations a little bit flat-footed and there was an awful lot of talk in the cocktail hours the next day or two. Tony Smith of the National Parks Association[5] and Dave Brower of the Sierra Club[6] and many others were pinning us down as to the scope of management that we envisioned, which is of course quite a departure from the basic idea of park preservation, which had been the guiding philosophy.

Finally, however, it was obvious there was going to be no strong political adverse reaction, so Sec[retary] Udall accepted this thing graciously and not only that, but implemented it. George Hartzog came in then as the new director [of the National Park Service] and he said, "This is it, take it and do something with it." Now ten years later, I can reconsider this whole sequence and the report itself, and give you my evaluation of it with the advantage of some more mature judgment.

By and large, I think the basic concept is still pretty sound. I would change, however, one very important key sentence in that report, and this had to do with the basic goal of park management which read, "As a primary goal we would recommend that the biotic associations within each park be maintained or where necessary recreated as nearly as possible in the condition that prevailed when the area was first visited by the white man…." Now that was too narrow and too restrictive, and the phraseology was bad. In other words, it implied stopping the clock. And what we're talking about here are dynamic processes that don't stop. Biotic associations change, constantly, naturally. You can't just reverse the clock and set a given pattern, of vegetation we'll say, which may have been existing at the time that the first mountain man visited the park area.

I would change that wording in this way—this is very rough, but, "As a primary goal, we would recommend that the natural biological and geologic processes under which the area evolved, be permitted to function in a manner to perpetuate the ecosystem as first observed by the white man." The important thing is not a static fixed pattern of plants, animals, canyons, and so on; it is a series of natural processes that go on constantly—erosion, plant succession, fire which sets back succession, these are the things that really must be perpetuated if an area is to retain some semblance of naturalness.

For example, you could find that when such-and-such a park was first visited, there was a stand of aspen on some hillside. The implication wasn't that that stand of aspen be replaced on that hillside; rather that somewhere in the park the processes that produced aspen be permitted to function, and with the aspen comes certain birds and mammals and so on. With

this basic change, however, which is not a change in our thinking but an improvement in our wording, I would say that the concept, the idea of active management of a park to achieve these goals and to maintain this goal is still pretty sound.

Let me give you an example of what I mean by "processes." This one came to my attention only last Friday. We had a seminar in our little wildlife group over at the University,[7] and as a guest Michael Norton-Griffiths, who's been working in the Serengeti and Tanzania for the last five years or so.[8] I had worked with Michael in the Serengeti [National Park] when he was laying out a plan, a study of the whole park and some attempt to understand the ecosystem and the biomass of animals and the plants on which they depend. And he has now completed a phase of this study and this was the subject of his seminar. Basically it was this: When [the] study began in the Serengeti, which is less than ten years ago—the park had been set up earlier but actual biological investigation really began fairly recently—there were about a quarter of a million wildebeest, and the usual assortment of predators that preyed on them. This was considered normal. There were relatively few elephants; the park was not surrounded by a lot of intensive farmland at that time, it was sitting out pretty much in a wild country that had been that had been maintained that way by the Masai. And so the concept of protection was applied to this ecosystem, as it existed.

One of the things that bothered the administration then, and still does, is the frequency of fires that occurred in the park, set, some of them by lightning, but many by the neighboring herdsmen who burn to improve their grazing. And fires were definitely changing the ecology of this park. That is to say, the sequence of burning was so frequent and so intense that the bush areas, the forest areas, were giving way to more and more grassland. Now the original Serengeti was made up of a big central plain in the center of the park with a bush or forest area in the north and a rather dry strip of bush to the south. And the forest was retreating as a result of these fires, [it was] absolutely physically impossible to stop the fires, [there was] too big an area with that tall grass, [so] that no way could the administration stop this. Here was a process going on induced in part by people, I admit; to that extent it was not completely natural.

But in monitoring this situation over a period of years, going back to scattered data that were available earlier, Dr. [Norton-]Griffiths came up with this idea: that the park was certainly expanding in grassland, decreasing in forest, and if this process continued indefinitely, you would lose a tremendously important part of the park, namely the forest itself, and those species dependent upon it. What actually was happening was that the sequence of fire was decreasing because, under protection, the wildebeest and zebra population had gone up from a quarter of a million to a million and the impact of these grazers upon the grass was consuming the fuel that carried the fires—the fires were smaller, and less intense than they had been. The tendency then of this growing mass of herbivores was to have a counter effect on the fires and to permit the development of scrub, that is to say, woody plants, in areas where for a sequence of years they had been essentially burned out.

But working conversely to this trend of increasing scrub was an increasing elephant population, forced into the park by harassment on the outside. Elephants push down the trees, eat the brush during the dry season; every time they push a tree down, it opens that area up to grass which then accelerated the fire situation. Here you have two sets of native animals,

one tending to, by virtue of its grazing, decrease the intensity of fire; the other one tending to increase the spread and intensity of the fire.

Now, once you understand this complex system—oh, I hasten to say he looked carefully at the weather records as far back as they go, and none of this could be attributed to change in rainfall, this had something to do with animals in relation to plants in relation to fire. As a manager, then, what issues might you have to face up to? The conclusion that Norton-Griffiths came to was, leave the ungulates alone. These are migratory herds, they swing out a hundred miles over the park seasonally following rainfall, following green grass; the predators never catch up with them. The predators are unable to control the herd of big ungulates on the Serengeti. But sooner or later, that herd—which is now a million of the two principal species plus goodness knows how many of the lesser ones, gazelles and so on—sooner or later a severe drought is going to come. There is going to be a massive die-off. This could be next year; it could be 15 years from now. This probably is what's gone on for thousands of years in the past, a long steady build-up of these ungulates and then periodic crashes induced by climate. The ungulate herd then will be controlled by a climatic catastrophe, and there is nothing that a manager need do or can do about regulating this process.

The only thing that is within the realm of management here is the element [of] population, which is indeed compressed in the sense that the elephants used to wander in and out freely all over this country, now by virtue of the developing farms and grazing interests around it, forcing the elephants to concentrate in the park. It may be that some elephant control will be necessary to maintain the balance of these forces. Now this is a more complicated system, I admit, than most of us have to face, and has long-term implications which are different than the year-to-year implications. I give this example, however, [because] sometimes it's perhaps a little easier to be objective about somebody else's park than it is about your own, but here is a case of somebody else's park in which, once the good solid research is done on the processes, then the management suggestions become fairly clear.

Looking at our own system here, what are some of these processes—natural or man-induced—that we face in our own parks to perpetuate what we might call a "natural system"? I won't try and go through all of them, but let me go through a few with examples.

First of all, one of these processes is of course predation, [the] development of large predators that to some extent help us control populations of the ungulates, and this in turn has ramifications in the flora. In terms of what we know now about predation on big animals, large ungulates, in our own country as well as the experience from Africa and other places, we realize that predation is only truly effective in regulating big herbivores when those herbivores are resident in local areas. Large migratory herds are never actually regulated by predation. The example that falls within our own sphere here is of course the caribou and the wolf in Mount McKinley [National Park][9] and any of the parks that are going to be developed by the Service in the future. Those migratory herds of caribou are preyed on indeed by wolves. But it isn't going to be the wolf that regulates the caribou number. On the other hand, when you have non-migratory prey such as deer, or moose, animals that may move very locally, that don't make these big swinging, vagrant types of migrations, predation can be an effective tool to encourage the regulation of herbivores, and the regulation of herbivores is certainly one of the responsibilities that we have in maintaining a natural situation in the park.

In the case of areas where the large predators have been eliminated or reduced so low that they can't seem to take off again, get going, it may necessary for us as administrators to reintroduce some of the large predators. Actually, some of you may be aware that Jack Anderson[10] was exploring around and considering the possibilities of reintroducing the wolf in Yellowstone, as a help in handling some of the excess elk. He actually sent out a letter to several of the wolf authorities—Durward Allen,[11] Pruitt in Canada,[12] and several others—asking the question, how do you reintroduce wolves? No one has any idea really how to do this successfully. And right when this was being considered and all of us were slapping [out] an awful lot of letters about how to do it, suddenly the wolf showed up in Yellowstone Park. A very small number, we have no idea, and there is no assurance of how they got there; some people—Glen Cole, the chief biologist there, believes they were there all the time; another possibility is that they just wandered across Montana and settled in there. But it's a long way across Montana from existing wolf range. We just don't know.

But the wolves so far are not numerous enough to be of any particular help in handling the elk, but hopefully they will increase and become so. For reasons that we don't understand, the mountain lion, which was never completely exterminated in Yellowstone, is not increasing adequately. Mountain lions are still darn scarce in that park. Yet they have been protected now since the policy of the Park Service was changed back in the mid-1930s. Some people, including Maurice Hornocker at the University of Idaho, [who] is certainly one of the authorities on mountain lions, proposed that we capture and reintroduce enough lions [to] get a viable population going in the park. I myself am dubious about this; I'd rather give the native lions a chance to get started, and they are increasing slightly.

But the manipulation of predators in order to achieve this balance of ungulates to their range is a possibility in many areas. Now I'm talking about native predators, obviously—not exotic.

Oh, one other point on predation: within the Yellowstone there are a lot of different herds of elk, some of them are migratory; the big northern herd, the one that was bugging Garrison, comes out of the Lamar [Valley] and the whole northern part of the park and goes down across to the north of the Gardner River; the only effective regulation of that big herd now is hunting, public hunting outside the park, when the herd moves far enough across the Gardner so that hunting is possible. Within the park, however, there are little resident populations of elk, one of them on the Gibbon River, a small herd that doesn't migrate, it just stays there. The current thinking of Anderson and his biologists is that that herd could be effectively regulated by predators—that there is no need to artificially attempt to control that herd; in actuality in the springtime, when the snow melts and the herd has been through a tough winter, many of those elk are so slow, so weak that the grizzly bears emerging from their winter hibernation, or sleep, can actually catch them, and this goes on every year. You get a certain amount of effective predation from grizzlies. Goodness knows it would be far more effective if additionally we had some wolves and some mountain lions. There is a difference, in other words, between the relationships between predators and elk depending on which herd you're talking about: are they migratory, or are they resident? And this differentiation has to be worked out and applied to many other populations of ungulates, including deer, on some of our own part.

Another process, of course, is fire in relation to plant succession, and I won't dwell on that one. I think we've pushed that one pretty hard. The concept of letting some natural fires burn, or in other places where necessary or desirable, actually prescribing and setting fires to attempt to re-establish these natural processes is by this time well known to you and I won't dwell on it. It is the one area of management in which I think the parks are making the most progress right now in relation to all of these other things that I am talking about.

This isn't always easy, of course; take the 1974 fire in Grand Teton, and Gary's[13] concern with that one. He let it burn because that was the policy that they had developed. It laid a pall of smoke down on the lake, obscuring the Tetons all summer long. Needless to say, Gary got an awful lot of static on that one and you all have heard of it; and he was beginning to get pretty uneasy by September. He took a couple of us up in an airplane, Nathaniel Reed[14] and myself, we flew that fire, turned out to be just about a week before the snowfall that put it out. And Gary was wondering if he could hang tough, and really stick with it because the pressure was beginning to ricochet through the halls of Congress by that time, but bless his heart he did it. He didn't put that fire out. It was put out naturally.

This, however, created enough stir in Congress that there may be repercussions which are going to have effects on all of you in your own problems of "let burn." One of these days a big one is going to take off. Jack Anderson in Yellowstone has set aside three very large areas and said, any natural fire that starts there, we'll let burn. Last year there were six of them going and when we flew the Teton fire we went and had a look at all of these; they were all just poking along, a few acres, none of them took off. A big one will take off some day. Then again I imagine the Park Service will suddenly come under intense criticism by preservationists, or possibly by the Forest Service if they feel that the fire may be endangering adjoining forest. It's easy enough for us to sit here and talk of these principles of management; when it comes to the politics of actually doing them I don't mean to imply that it's going to be easy. But I do think that, in this particular regard, a natural fire is part of a natural system of a park, [and] we are going to have to hang tough, and not yield to political pressure and go backwards to the policy of protection that we've had in the past.

Natural erosion and deposition is another process. We're all familiar with examples—you'll have a really classic one from Paul Godfrey[15] later this morning—concerning the process of the beach erosion and deposition in [Cape] Hatteras [National Seashore]. To attempt to counteract these natural processes, to attempt to stabilize beaches that are basically, fundamentally unstable, is a policy that we have been following in the past that obviously leads to nothing but more expense and more trouble and ultimate defeat.

There are other types of problems though, for example, flash floods that we know from past history have come down in certain types of terrain, particularly in the arid Southwest; and, to attempt to build buildings, to permit campgrounds, otherwise to utilize areas subject to flash flooding leads only to danger and ultimate tragedy, as for example happened this last year in Lake Mead [National Recreation Area].[16] We had a classic case a few years ago when a flash flood came down Bright Angel [Creek] on the north side of Grand Canyon. Apparently it was a 300–400-year flood because it took out some Indian dwellings that were high on the side of the hill and had been there an awful long time. And Lyle McDowell[17] and I and [a] couple of others were sent down by Hartzog to take a look at this thing. Well, there

was some building along Bright Angel and they knew the trail and the water line exposed to this flood (inaudible) torn out by it. The question is, what do you do about it. Contrary to the general policy that I'm enunciating perhaps, we agreed that on the basis of a 500-year flood you could rebuild that trail, and rebuild that water line and figure that some time in the next 500 years you're gonna lose her again. It was the only logical place for people to walk across Grand Canyon and the only logical place to bring water needed on the other side. The trail and the pipe line did not basically affect the natural scene very much. It was simply an artificial area, a development that permitted some people to get in there. This technique in planning has to take into account that whenever you put anything, any type of structure of development or road in an area subject to flash flooding, you're going to lose it someday. In many cases it's far better not to put it there at all; sometimes you have to.

Exotic animals and plants constitute a process which is not natural but man-induced, but nevertheless, the implications in the management of natural areas are tremendous. Some of the most severe repercussions of exotics are from the herbivorous animals, including the ungulates, the hoofed animals, such as goats, sheep, particularly in Hawaii and some of the Channel Islands; the burro; and wild horse and cattle where they still exist. The elimination of these large ungulates is within the realm of possibility. It's tough. I recognize the problems that are faced in Hawaii, for example, keeping the goats and sheep out of those national park areas, [the] political as well as biological difficulties of eliminating them, they're feasible. There are some problems that are going to be even more difficult, such as the rabbits on some of the Channel Islands that [Channel Islands National Monument] Super[intendent] Ehorn[18] has got to face up to. It's easy to kill 99.5% of the rabbits but, by golly, it's awful hard to get that last one. And this may be a perennial, a never-ending problem. To save the flora and some of the native beauty and interest, the rabbit has to be taken out. Yet there are many, many exotics in our parks that don't have that much of an adverse effect. And it would be impossible to eliminate [them all,] such as some of the Mediterranean grasses; we're not out to try and eliminate *Bromus tectorum* from all the western parks, that would be utterly impossible. You do the best you can. You certainly try hard on those exotics that can be eliminated, even at great expense and difficulty. And I'm speaking mostly here of ungulates.

Howard has already brought up the question of trout and this is a tough one. We have willy-nilly spread non-native species of trout all over the West, in lakes and streams. Now what are we going to do about it? Where you have a native trout population and can protect it from exotics, such as there are [in] areas that we have that are still stocked with pure golden trout in the southern Sierra Nevada; in Yellowstone, Jack Anderson has part of his system that is pure cutthroats, the lake itself and the river down as far as the falls. The obvious thing to do there is to do everything possible to protect these native populations of fish [and] absolutely preclude any introductions that would complicate this system. That's easy enough. But when it comes to established exotics such as the rainbow trout, which is spread in every park throughout the West now, although it was native only on the Pacific slope of the Sierra, or the brown trout brought from Europe, I don't think it's feasible nor within the realm of managerial wisdom to set out and try to exterminate these things merely because they weren't there [originally]. In the first place, you couldn't do it, and secondly you'd create an insurmountable set of public relations problems. When it comes to high-country lakes, where fish

can only be maintained by constant restocking, and this is the situation Howard referred to, I think there we could make a very good case for simply saying, there will be no further restocking in national park waters. Where fish have become established and can maintain themselves, we're not going to attempt to destroy that, and as I say you probably couldn't do it anyway. But we don't need to compound the problem by continuing to restock.

The question of feeding wild animals—this is again a disruptive process in many ways. Bears are our most troublesome ones of course, and as many of you are aware, you get bears that become bums, they hang around, begin to rip up cars, tear up camps, damage not only property but people. When you try to [do] something about it you offend the public. In Yellowstone today, all garbage feeding of the grizzlies has been terminated despite a big ruckus about it, [and] the fact is, it's done and very successfully. The black bears that used to line the roads and beg are invisible; they're gone, they have been eliminated systematically. But you sure have to ask yourself some questions about this; people now drive all the way out from Des Moines, arrive at Yellowstone, [and ask,] "Where are all those bears that I've seen in all the posters?" and they aren't there. There's just as many black bears in Yellowstone as there ever were, but they're wandering up there on the hill, they're not lining the road. It is a hard public relations problem but nevertheless an essential sound step in resource management, in my opinion. And any feeding of any type of wildlife, including water fowl in national parks, bears are the worst, but any other type, I think, is a mistake and we should back away from it ourselves and enforce this regulation of non-feeding on the public in order to try to preserve that natural scene.

There are many other forces that I could mention. Volcanism, and avalanches: obviously you aren't going to manage volcanism, it's gonna manage itself. Avalanches are going to occur, the question is what do you do with them after they've happened. [Do] [y]ou clean it up and make it look tidy, or do you use this as an educational tool for the public, a bunch of flattened trees? I've seen this on Rainier and I know it occurs in many other parks. My inclination is that these should be interpreted to the public as perfectly normal natural phenomena that always have occurred and always will.

In achieving all these managerial objectives, you have compromises to make every foot of the way. You do the best you can to restore the original fauna and flora knowing that in some cases it is never going to be possible to achieve it in whole. But we certainly can be criticized if we don't attempt to achieve this in part. I'm fully aware of the day-to-day pressures that are on you as superintendents and the sort of things I'm talking about by and large are not the daily pressures. The things you have to cope with are people, and all the problems concerning the facilities, the arrangements made for your visitors. In dealing with this problem, however, for goodness' sake constantly keep in mind that the park itself and the natural value that you are trying to preserve is going to be far more important 10 or 20 years from now than how well you handled your tourist traffic in 1975. As we look back on the administration of these areas, the important thing is going to be the preservation of the values in the park and not the development and preservation of the facilities for people to see them. That is going to follow naturally. Parks are not going to be sealed off from people, but it [is] awfully easy, I believe, to let yourself get trapped into the situation where you are so busy with day-to-day affairs that some of these more general responsibilities, that I view as yours, are easily lost track of. Our

National Park Service, as Howard said, should be a pace setter for park management for the whole world—other countries and state parks as well—and the philosophy and policies that apply to management of the natural values in the park are in the long run going to be things that I think will be viewed by the world as achievement in the administration of our national park system. Thank you very much.

Endnotes

1. Howard Chapman, the director of the Western Region at the time.
2. Career NPS employee Lemuel A. "Lon" Garrison was superintendent of Yellowstone National Park from 1956 to 1964.
3. Secretary of the Interior Stewart Udall.
4. The committee was officially known as the Special Advisory Board on Wildlife Management. Chairing the board was A. Starker Leopold, the eldest son of noted conservationist Aldo Leopold. A respected zoologist, professor of wildlife management, and assistant to the chancellor at the University of California–Berkeley, Leopold was joined on the board by other prominent scientists and conservationists: Professor Stanley A. Cain of the Department of Conservation at the University of Michigan; Ira N. Gabrielson, formerly of the US Fish and Wildlife Service (USFWS) and president of the Wildlife Management Institute; Thomas L. Kimball, executive director of the National Wildlife Federation; and Clarence Cottam, former assistant director of USFWS and director of the Welder Wildlife Foundation. The board soon became known as the "Leopold Committee," and its final report, the "Leopold Report" (http://en.wikipedia.org/wiki/Leopold_Report)
5. Anthony Wayne Smith, president of the National Parks and Conservation Association (now known simply as the National Parks Conservation Association).
6. Actually, in 1975 David Brower was the executive director of Friends of the Earth, which he had founded in 1969 after resigning as Sierra Club executive director following a disagreement with the board of directors (http://en.wikipedia.org/wiki/David_Brower)
7. The University of California–Berkeley.
8. Norton-Griffiths spent five years in Serengeti National Park, Tanzania, where he designed and implemented the Serengeti Ecological Monitoring Program (http://www.mng5.com/what.htm). He went on to become an environmental consultant in Kenya.
9. Now called "Denali National Park and Preserve."
10. Superintendent of Yellowstone National Park from 1967 to 1975.
11. Professor at Purdue University and one of the originators of the long-running study of moose and wolves at Isle Royale National Park.
12. Probably William O. Pruitt, Jr., authority on boreal ecology. In 1975 he was on the faculty at the University of Manitoba (http://passages.winnipegfreepress.com/passage-details/id-158565/).
13. Gary Everhardt, superintendent of Grand Teton National Park from 1972 to early 1975, at which time he was elevated to the NPS directorship (http://www.cr.nps.gov/history/hisnps/NPSHistory/directors.htm).
14. Assistant secretary of the interior for fish, wildlife, and parks from 1971 to 1977 (http://www.aapra.org/Pugsley/ReedNathaniel.html).

15. Paul Jeffrey Godfrey, associate professor of botany at the University of Massachusetts–Amherst and NPS research biologist. See his paper "Barrier Beaches: Special Management Problems," given at the 1982 George Wright Society conference and published later that year in *The George Wright Forum* (vol. 2, no 4, pp. 12–16); online at http://www.georgewright.org/024godfrey.pdf.
16. Nine people were killed in a flash flood that struck Eldorado Canyon in Lake Mead National Recreation Area on September 14, 1974.
17. Head of operations for NPS, and an advocate for wildland fire (http://sportsillustrated.cnn.com/vault/article/magazine/MAG1086197/3/index.htm).
18. William H. Ehorn became superintendent of Channel Islands National Monument in June 1974 and served in that position into the 1980s (http://www.nps.gov/chis/planyourvisit/upload/CHIS-25th-booklet-website2.pdf). Channel Islands was redesignated as a National Park in 1980.