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PHILOSOPHY, SCIENCE AND MANAGEMENT:
THE FUNDAMENTALS OF NATURAL AREA CONSERVATION

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INTRODUCTION

The tone and thrust of this paper have been chosen purposively to be somewhat in contrast with the other papers presented at this workshop. In the following papers, we will discuss pragmatic difficulties facing the managers of natural areas, including such issues as walking tracks, fire management, monitoring procedures, and administrative systems. These are all important matters, often made so by the immediacy that surrounds them and it is hoped that the papers and ensuing discussion will shed some helpful insight on with how they might be resolved.

In this paper, I argue that a successful programme of natural area preservation must rest on three components. First, it is necessary to build a logical and defensible philosophical framework that provides a clear statement of the rationale underlying preservation. Basically, this provides a statement of the purpose, function, and role of natural areas in society. Second, a solid data base regarding the resource and its use is needed. The best thoughtout philosophy is of little value if the information base is inadequate. And third, there must be an effective delivery system - a management system - to propose, implement, and monitor, actions to achieve the goals and objectives set up for such areas. The combination of these three elements provides the essential features of any successful programme of natural area conservation.

A PHILOSOPHICAL BASIS FOR MANAGEMENT

In my experience, much of the difficulty in determining what course of action to take with regard to vegetation management, fire management, visitor management, etc. has its roots in the fact that a solid philosophical basis or rationale concerning the purpose and function of such reserves has not been established. Simply put, the 'why' of conservation is unanswered beyond some vague notion that it's a good thing. However, it is the contention of this paper that until the philosophical foundations are well-planted, pragmatic day-to-day management has little chance of being much other than a series of ad hoc actions taken to stamp out recurring problems. Moreover, the accumulative effects of such an approach are likely to be wholly inconsistent with what was originally conceived of as being the purpose of the natural areas conservation programme. Thus, proceeding with lengthy debate regarding the appropriate gradient for tracks or the merits of permits for overnight camping is roughly analogous to devoting one's energy to polishing the ship's brass while sailing uncharted waters.

While it's easy to criticise the lack of attention to the question of 'why conserve natural areas', its not hard to understand why such attention is generally lacking. It is an admittedly murky area, seen much more as the realm of philosophers than resource managers. Debates about the purpose and value of natural areas have a distressing tendency to lack any sense of closure; frequently, the arguments become metaphysical or even mystical in nature.

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There is also the simple reality that natural areas are with us, established through legal actions that impose responsibilities and obligations on managers that cannot be put aside while the philosophers get their affairs in order. The difficulty, of course, is that the legislation establishing such areas often carries with it exhortations of logical inconsistency (e.g. areas will be preserved for all the people to use) as well as scientific impossibility (e.g. no unnatural impacts will be permitted). Thus, managers are placed in the unenviable position of getting on with a job, yet lacking any clear notion of exactly what the job is.

The typical avoidance of the needed philosophical deliberation is also fed by the fact that it is a much more tidy and comfortable task to dwell on questions of whether tracks should average five or eight percent gradient or whether signs should be of native material or synthetic composites than it is to confront an issue such as 'what is natural'.

Yet until we do grapple with such issues, I foresee the task of natural areas management remaining a frustrating pursuit, with the possibilities of counter-productive or even self-defeating activity great. Perhaps most importantly, the ability to justify and rationalise a programme of natural area conservation will remain continually on the defensive in the political arena.

Numerous authors have dealt with the issue of justifying the conservation of natural areas. For example, Godfrey-Smith (1980) discusses four themes: the cathedral view, where such areas provide spiritual renewal, moral regeneration, and aesthetic pleasure; the laboratory argument in which such areas provide material for scientific inquiry; the silos argument which sees such areas as the reservoirs of genetic diversity; and the gymnasium argument which supports such areas for the recreational pursuits they offer. Ehrenfeld (1976) elaborates further on these themes, presenting nine broad categories of values:

1. Recreational and aesthetic values
2. Undiscovered or undeveloped values
3. Ecosystem stabilisation values
4. Examples of survival
5. Environmental baseline and monitoring values
6. Scientific research values
7. Teaching values
8. Habitat reconstruction values
9. Conservative value (avoidance of irreversible change)

Both authors stress that these values, and indeed, the very process of defining the values of natural area conservation, reflect an instrumental conception of natural areas in that such areas are a means to an end rather than an end in themselves.

The conception of natural areas as valuable in and of themselves - as intrinsically valuable - is a formidable philosophical leap for most of us living in industrialised Western society. Nevertheless, there does appear to be increasing recognition that it is important to set some areas aside from the normal kinds of developmental actions, even where it may be difficult to specify or define the values that might accrue to society. I would submit that the recent debate over the future of the magnificent Southwest Wilderness of Tasmania epitomises this situation. Arguments have been marshalled that the area contains significant archaeological remains and that it possesses important ecological values. The plans for hydro-electric development have been

criticised on the grounds that future demand estimates for power consumption rest on faulty assumptions and that cheaper thermal-generated power alternatives exist.

All these arguments are sound and need to be debated in a suitable public forum. Yet, I believe they miss one of the fundamental arguments that underlies society's decision to reserve natural areas. And that is that such actions are symbolic gestures of a moral responsibility on the part of society to preserve as wide a range of environmental diversity as possible. It also reflects a measure of a society's confidence in itself, that it does not need to extend its influence to the last remaining remnants of the natural world in order to survive.

We are indeed an impoverished species, with little hope of survival, if all that stands between us and oblivion is the damming of the last free-flowing stream or the cutting of the last vestiges of native forests.

Such an approach to rationalising natural area conservation is unabashedly moral or religious in its nature. Elton (1958) has indicated that the basic reason for conservation is '... really religious'. Ehrenfeld (1976) remarks that this 'non-economic value of communities and species is the simplest of all to state: they should be conserved because they exist and have existed for a long time ... Existence is the only criterion of value, and diminution of the number of existing things is the best measure of decrease of value'. This diminution in value is reflected in the remarks of Stegner, 'Something will have gone out of us as a people if we ever let the remaining wilderness be destroyed'. Wilderness and natural areas are needed, he wrote, because they are 'a means of reassuring ourselves of our sanity as creatures, a part of the geography of hope'. (Outdoor Recreation Resources Review Commission 1962).

In summary then, I see a need for managers of natural areas to operate with a sense of understanding of the philosophical origins and meanings underlying the conservation of areas under their administration. Without such an understanding, they risk performing as mere mechanics, tinkering with bits and pieces of the environment, but with no clear appreciation of the whole. With an understanding of the 'why and what for' of natural area conservation, they take on much more the role of architect or design engineer, with their actions related to a purpose and desired end.

A SCIENTIFIC BASIS FOR MANAGEMENT

However, just as a management programme without an adequate philosophical underpinning can lead to purposeless action, a programme lacking empirical knowledge is similarly a danger. Thus, the second important element in any successful natural areas management programme is the development of a scientific basis for decision making. I use the term 'scientific' to reflect the systematic acquisition of information, according to accepted principles of scientific inquiry. A major, but not sole, function of such activity is to help insure that actions taken to achieve the kinds of goals identified at the philosophical level can, in fact, be met.

Natural areas pose a set of interesting problems because they represent a precarious point of contact between nature and society. Their very establishment is founded typically on the presence of substantially unaltered natural conditions, but much of their justification and rationale is founded upon their utility to society. It is the old 'use and preserve' dichotomy that has plagued national park and other nature reserve areas for many years (e.g. Forster 1973). With the introduction of human use into such areas, significant alterations of environmental conditions can occur, often very quickly. Thus, it is possible

that in striving to realise some of the values of natural areas that relate to such things as recreation (the 'gymnasium' values of Godfrey-Smith), other values may be depreciated, such as naturalness.

I will, for the moment, avoid the debate as to whether it is appropriate to talk about 'managing' natural areas. It is an unavoidable reality in my estimation and I will elaborate on this further shortly.

Managing natural areas is an inherently difficult task. It is made so by the fact that we often have very little understanding or knowledge about the systems with which we are dealing and about the consequences which stem from actions which we undertake. Lack of adequate knowledge is a pervasive problem in any field of resource management, but it takes on an added significance in natural areas management because of the potential of committing irreversible mistakes (e.g., the inadvertent eradication of a species) and because the assets we define as valuable might very well be irreplaceable. Given that uncertainty is typically high and the costs of making mistakes is great, managing authorities need to be fairly conservative in their actions.

There are several kinds of information that scientific inquiry can provide managers which will enable them to do a better job. First, it can provide an accurate profile of historical conditions that prevailed in the area and the kinds of cycles and perturbations that have occurred. It can also provide an understanding of the factors that influenced these historical patterns. Such data are absolutely crucial when we undertake management programmes that are intended to maintain or restore 'natural' conditions. Before we can attempt to do so, we must have an accurate notion of what historical regimes persisted and the environmental and/or cultural forces that gave shape to these regimes. For instance, understanding the role of aboriginal peoples in firing the Australian landscape, is fundamental knowledge to any programme that purports to restore fire to its 'natural historical role'.

Secondly, scientific investigations provide accurate profiles of existing conditions, which in turn, are the baselines for future analyses of trends. Monitoring is an increasingly important activity in natural area management (see the paper by Brown in these proceedings), but the feedback gained through monitoring is useful only when there is a basis against which it can be compared. Both social and ecological information needs to be collected.

The formal identification of existing conditions and the permanent storage of these data are also important given that manager turnover can be great; thus, subtle environmental changes can occur without being noticed until such times that the changes might be irreversible.

Thirdly, scientific study provides important understanding on how basic ecological processes function. A traditional conception of natural areas is that they serve an important purpose as an educational resource, or in Leopold's (1941) terminology, as a 'land laboratory'. Such understanding can have important implications for basic scientific study, but also is necessary for the implementation of any successful management programme.

Fourth, studies are needed that provide information on the likely consequences and implications of proposed management actions. As noted earlier, uncertainty typically is high in natural area management as is concern with regard to the potential irreversibility of any management decision. Thus, one of the major functions of scientific inquiry is to provide managers with reasonable estimates of the likely effects stemming from their decisions.

However, it is important that managers (and scientists) appreciate the limitation of research for decision making purposes. Research is seldom the source of answers as to what ought to be done (Stankey 1979). It is the source of information, but often that information will be ambiguous with regard to what is the 'correct' solution. Well-conducted research studies can give managers a better understanding of the likely consequences of their actions, but only rarely will they unequivocally point to what should be done.

Finally, research can help identify areas of needed action. This would include questions relating to closures or reductions in use as well as programmes of use regulation, information dispersal, or camping regulations. In particular, research can help identify actions that will produce the most benefit, both from an environmental as well as a social perspective, for a given level of investment.

Of course, scientific investigations of natural areas can become a major management problem in and of themselves. It is important for those engaged in scientific work in natural areas to be aware of their potentially deleterious effects on the environment as well as other users and to take steps to minimise those effects. Some excellent guidelines can be found in the recent Australian Academy of Science report 'Scientific Research in National Parks and Nature Reserves' (1980).

DELIVERY OF MANAGEMENT IN NATURAL AREAS

The final element in the three-part foundation I have identified is the management system itself - the procedures, the actions, and the people. The overall objective is to recommend and implement specific actions, based upon the best knowledge available, necessary to insure that natural areas achieve the kinds of role identified for them within the philosophical framework.

Many of the papers scheduled for presentation at this workshop focus upon management. Again, I have chosen not to elaborate on the specific, but to offer some more general remarks about the function of management. It seems particularly important to me that some thought be given to this matter, as management of areas set aside as some form of natural area or reserve always raises the question as to whether it is appropriate or even logical to link such notions. The debate on this matter is extensive (e.g. Lucas 1973) but the essential reality seems to be that the relative scarcity of areas retaining significantly natural conditions coupled with their popularity, makes the issue of management one of how rather than whether.

Broadly speaking, it seems to me that management has three principal roles to play. First, management has a role in identifying the values associated with the preservation of natural areas and in developing programmes to ensure their establishment. Second, it has a major responsibility to work toward the implementations of programmes that protect the values that underlaid the act of establishment. In natural areas management, where the emphasis is on the protection of natural qualities, the task becomes one of striving to make the area appear unmanaged. Finally, management has responsibility to provide society with information about the values offered by such areas so that enlightened public judgements regarding the need for natural areas can be made. This latter responsibility reflects a highly instrumentalist view of such areas; it is also an area where management has performed least well.

Managing natural areas is, as noted earlier, a complex task. There are many reasons for this, not the least of which is the fact that natural systems are often precariously balanced and that even minor perturbations can lead to significant disturbance. But other factors contribute as well. Most natural areas protected today are only remnants of original systems. Although the analogy of 'islands' can be overstressed, most reserves, even the very large ones still comprise only a small percentage of their original extent. Moreover, reserve status may give the impression of protection, but not uncommonly such areas have within them competing land uses, such as agriculture, forestry or mining, that detract from many of the natural area values. Even where protection is stringent, pre-existing impacts occur whose effects are often long-lived. Burning by Aborigines and early settlers have likely produced alternatives in long-term ecological conditions that we are only beginning to fathom (Nicholson 1981). As I noted earlier, conditions we now presume to be 'natural', might, in fact, represent the cumulative effect of extensive periods of burning by Aborigines. Is this the naturalness we seek to preserve in our natural areas?

Finally, because our remaining natural areas are remnants, scattered 'islands' amidst developed lands, external effects can have profound impacts on even the best managed natural areas. Administrative boundaries are scant protection against acid rain, soil erosion from clear-fells, or pesticides drifting in the wind.

The implication of these realities for managers of natural areas, it seems to me, is that it is necessary that we retain a sense of realistic proportion with regard to the management actions we undertake. For example, there is great concern about the undesirable effects on natural area ecosystems associated with recreation use (e.g. Ittner et al. 1979). There seems to be little question that the increasing numbers of recreationists who visit such areas can bring with them the makings of a 'mini'ecocatastrophes'. The notion that many natural areas are in danger of being 'loved to death' is not without at least some basis in fact. Yet, the impacts associated with recreation use typically are concentrated along a few routes of travel, at desirable camping locations, and at sites of attractive features such as scenic views, waterfalls, etc. The extent to which such concentration occurs probably is not fully appreciated; in one large wilderness area in the United States, Cole (1981) found recreational impacts along trails accounted for only 0.3 percent of the total area and impacts at campsites, only 0.2 percent. However, in the same area, there was a history of extensive livestock grazing and forest fire suppression, activities that from an ecological point of view had a much more profound effect on naturalness than did recreation use. Yet invariably, the focus of workshops and seminars on natural or wildland management is on the need to control the 'damages' associated with recreation use.

There are, of course, good reasons for this focus. Recreation impacts are a problem because of the very fact that they are where the people are. Thus, they are at least potentially noticeable to the user, detracting from the aesthetic value of the experience in addition to their ecological consequences. Moreover, even though these impacts might comprise only a tiny percentage of the total area, they might represent a fairly significant share of area that visitors directly experience.

A management focus on recreation impacts is also important because they do represent an area of concern upon which management can have some positive effect. While the undesirable effects of a history of livestock grazing or fire suppression are extremely difficult to offset, particularly in the short run, recreation impacts are more susceptible to correction. Prevention can be encouraged through better decisions regarding track location or through educational programmes designed to eliminate innocent but environmentally-damaging

behaviour by visitors. Existing impacts can be corrected through programmes of rest-and-rotation or through restoration efforts.

Clearly, then, management of recreation impacts is a legitimate and useful activity. But it needs to be undertaken, as I suggested earlier, with a realistic sense of proportion. In times of limited financial and personnel resources, it makes little sense to devote larger shares of these scarce resources to correcting, for example, problems of track erosion, on the grounds that it represents a significant deterioration of ecological values when at the same time, pervasive problems of environmental alteration persist to which virtually no attention is given. Such a situation seems to be driven by a notion that 'we have to be seen to be doing something'.

Instead, programmes of management need to be given direction by a careful consideration of the relationship between specific actions (and their likely outcomes) and specific management objectives. The management of impacts in natural areas seems, however, frequently to be the product of the particular value set that natural area managers have had inculcated in to them through their educational backgrounds, professional peers, etc. As a result, we are often all-to-ready to spring into action to correct an evil, less willing to thoughtfully reflect on the need and purpose of our actions. As Kennedy (1979) notes, reflecting upon field tours with fellow foresters throughout the world:

We usually take these tours on full-benched forest roads with ... erosion on cut and fill banks; we travel past gravel pits and unimaginative fire ponds, by log landings with bare soil and old diesel cans, through a clear cut ... and eventually arrive at a camp ground ... to agonise over several square yards of exposed roots and compacted soil

The lesson to be understood here is that management frequently involves implementation of professional values and perspectives as much as it does scientific principles and guidelines. There is nothing inherently wrong with this; we all organise and shape the world as we see it. The problem is that natural area managers have conceptions that users of natural areas do not necessarily share - it is a problem of perception (Hendee and Pyle 1971). This is not an argument that managers should simply adopt the current popular will of the people. Such views can be short-sighted, selfish, and fickle in the extreme. But management does have a responsibility to provide accurate information to the citizenry, to take the lead in identifying needed programmes and of providing accurate notions of the various alternatives and their associated consequences and implications. And managers need to constantly be aware of the personal values that influence them and that these values are not necessarily widely shared. Without such sensitivity, it is likely we will find an increasing disparity between the objectives of natural area preservation programmes and public perception and use of them.

CONCLUSION

The task of natural area management is complex and formidable. Successful performance requires a curious mix of skills on the part of managers, ranging from that of philosopher to scientist to administrator. It is further confounded by the fact that natural area preservation is still an activity that is an anomaly in western society. Decisions to set such areas aside are assuaged by efforts to document the values such areas will yield to society. Yet in the final analysis, natural area preservation is a basically religious or moral action by society.

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