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RESEARCH: A BASIS FOR MANAGEMENT

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JUSTIFICATION FOR RESEARCH

Currently more than 34 million acres have been set aside specifically for conservation purposes in Australia and it seems likely this area will increase significantly within the next decade. The acquisition and declaration of conservation reserves is only a beginning: once acquired a reserve must be managed to ensure it is kept in an appropriate ecological condition. The management and maintenance of these areas largely depends on public funds and, clearly, there is a need to introduce planned management to ensure these funds are used wisely.

Research is fundamental to sound management of any business, organisation or natural resource, and a well designed and controlled research programme can be a wise economic investment in ensuring the prescribed management aims are attained at minimum cost. Conservation management is no exception to this need for supporting research.

Research in conservation has specific features and, whilst research in the related fields of forestry, agriculture, fisheries, watershed and rangeland management can provide information relevant to conservation areas, seldom are the results completely satisfactory for conservation purposes. This is partly because the aims of conservation are more comprehensive, usually being concerned with more than one species and involving whole ecosystems rather than emphasising single products. For example, in forests managed primarily for timber, hazard reduction by prescribed burning is an established practice, with large areas burnt each year. Whilst the principle of prescribed burning has application in conservation management, the methods and scale of operations adopted in commercial forests cannot be applied uncritically to conservation areas. Similarly, the results of nutrition studies on domesticated animals for wool or meat production might assist in formulating management policies for the indigenous fauna but cannot be applied indiscriminately.

Productivity in agriculture, forestry and water catchment may be measured in pounds of wool, tons of logs, or gallons of water and emphasis is generally placed on one or, at best, a few main products. In conservation management, features such as diversity are desirable and the component parts of the ecosystem assume individual importance. Productivity in conservation reserves is difficult to measure; surprisingly little research has been done in formulating management aims and in developing techniques to assess the success of conservation management. Declaration is only the beginning in reserve management and research.

NATURE OF RESEARCH

If the term conservation reserve is considered in the broad sense to include national parks as well as strict nature reserves, conservation research can be grouped into two major categories. First, studies of such natural resources as animals, plants, rocks, soils and their interaction and, second, study of the people who use the areas—their numbers, behaviour patterns, interests and, particularly, benefits derived from the reserve.

[a] Natural Resource Research

Ideally, detailed study of the natural resources of a conservation area should be carried out as a basis for selecting sites. In practice detailed study generally begins only after a reserve is established and tenure secure.

Initially, research in a particular reserve usually centres on the survey and assessment of the resources using techniques such as the establishment of permanent plots to record changes with time and evaluate the success or otherwise of management.

Later, research may concentrate more on individual features of the reserve, for example, interactions between characteristic organisms, bird breeding cycles, litter fauna composition, or tree regeneration patterns. This latter type of interpretive research is often carried out by specialist scientists or short-term post-graduate students but the results add to the accumulating knowledge of the reserve and often provide valuable management information.

Another important type of research can be "problem solving" where management may persuade, invite, or commission research workers to investigate problems affecting management. Examples of this type of study include methods to control invading exotic plants and animals without adversely affecting indigenous ones, disease outbreaks in fauna, the effect of visitor numbers on soils and vegetation, or the design of a suitable road, track and nature trail network.

The primary application of this research should be in the preparation of management plans to achieve the conservation aims for which the reserve was established, and in checking the effectiveness of management. Such research results are also of fundamental value in the preparation of interpretive material for displays, films, booklets, and notice boards at points of interest in the reserve. If public and student use cannot be encouraged on the reserve, there are often areas of similar characteristics nearby which can be used in nature interpretation.

[b] User Research

The second major kind of research in some conservation areas is "user research". Many reserves are established with public enjoyment and education as aims, but little study is done to determine if these objectives are being achieved. Some managers of conservation areas may feel that, while ever visitors come to the reserve, it must be fulfilling its aims, but there is need to know if the same visitors keep returning and, if not, why. It is well

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established that the measure of enjoyment of music, theatre and sport is related to the level of understanding of the art, and it is likely that visitor reaction to a conservation reserve is related to his background knowledge. "All gum trees look the same" is a common remark.

A recent visitor study at Tidbinbilla Nature Reserve in the A.C.T. found many people expressing disappointment at the apparent absence of animals during the middle of the day. Biologists know that many native animals are nocturnal but many of the public do not until, by various means, this fact is interpreted for them and it is pointed out that evening visits to the bush can be much more rewarding. Similarly, many visitors expect to see large numbers of animals and birds, partly because they are only familiar with high density populations in zoological gardens. They are unaware of the intense supplementary feeding to support such numbers and the small carrying capacity of the native bushland.

When visitors to a reserve claim they "did not see much" it is often because what is there was not interpreted for them at all or was described in terms they could not understand.

The natural history scientist needs the assistance of the social scientist to conduct research to determine the effectiveness of educational programmes. Interpretation is often the first to suffer in budgetary cuts, largely because at present there is no measure of its effectiveness. Also the benefits from it are often not reflected in the reserve itself but elsewhere in the community.

Visitor surveys can be an aid to management by recording use of different areas. In the A.C.T. study referred to, 77% of groups visited the kangaroo enclosure but only 33% the visitor centre; thus, if management is relying on displays in the visitor centre as its main educational tool, ways must be found of attracting more visitors to it.

Users surveys can also be of value in obtaining basic information on patterns of attendance throughout the year and within each day to assist management in staff allocation. They may be vital in providing data which enables conservationists to convince politicians of the need for supporting finance for management and reserve acquisition.

CONTROL OF RESEARCH PROJECTS

The long term protected status of conservation reserves combined with their high degree of naturalness and often the availability of trained wardening staff makes them increasingly attractive areas for research. The attractiveness will tend to increase as a body of scientific knowledge relevant to the reserve accumulates, as facilities such as laboratories, observation huts, museums and living quarters are constructed, and as more and more scientists develop research programmes in the reserve. As alienation of native bushland for agriculture, factory and urban development continues, conservation reserves will become the major source of material for research into indigenous species and ecosystems.

Even though scientific data from which to formulate sound management policies are very limited and much needed in Australia, some restrictions may still have to be placed, even at an early stage, on the number of research workers, the types of research and the timing of research lest they adversely affect the conservation quality of a particular reserve.

For example, in a coastal reserve having an important colony of ground nesting sea birds, it may be necessary during the breeding season to prohibit all visitors to the breeding area except for a small number of responsible ornithologists carrying out relevant research on the breeding colony. At other times of the year, the uninhabited breeding areas would not be banned to others, e.g. botanists and geomorphologists, provided their research is unlikely to change significantly the ecological nature of the area.

A variety of other reasons may justify control of research activities on conservation areas. Typical examples are in small reserves where a particular project is on such a scale it interferes with other research projects: in cases where research creates health hazards, for instance through the introduction of radio active elements into an ecosystem; where the research may require an undesirable massive introduction of equipment into a reserve; destructive sampling, or where a research worker is unwilling to release the results of his research to aid management decisions.

The control and direction of research activities in conservation areas, particularly where scientific knowledge is limited, can present serious problems to anyone responsible for managing the area to attain prescribed management aims. This is especially so if restrictions have to be placed on unco-operative scientists, or people occupying senior positions and who may have been active in having the area declared a conservation reserve.

Nevertheless, responsible control must be exercised over research in conservation reserves and it is important to set down acceptable guidelines within which research may be carried out whilst ensuring they are not unreasonably restrictive and unimaginative in operation.

RESEARCH PRIORITIES AND CRITERIA

Clearly, high priority should be given to monitoring-type studies which provide successional records of the organisms present and ecological conditions. Such studies can be invaluable in judging the success of past management, but care must be taken to ensure sampling is not on such a scale as to adversely affect the reserve. Repetitive photography from fixed positions can provide valuable records of change with little impact on the reserve.

High priority should also be given to research orientated to solving practical management problems of current concern, indeed initially, management itself may be organised so as to be of an experimental exploratory nature leading to research opportunities in the critical evaluation of the effects of different kinds and intensities of management.

For example, whilst many Australian ecological communities have been influenced by fire, the use of fire as a management tool to maintain characteristic communities on Australian reserves is a matter of debate. The management plan for a conservation reserve where fire is an important ecological factor might initially require the general continuance of the existing management whilst introducing to selected subdivisions of the reserve different fire regimes ranging from complete protection to regular prescribed burns of different intensities. The replication, location and size of each treatment should be sufficient to permit research scientists to make statically sound evaluations of the effects of different treatments on the flora, fauna and soil.

It then becomes possible to formulate a programme of reserve management incorporating the most appropriate fire regime or combination of regimes, to enhance the conservation value of the reserve.

Another important consideration in allocating research priorities is related to the uniqueness of a reserve. If the reserve is truly unique then obviously management research has to be done largely on the reserve itself. In many cases neighbouring areas are ecologically sufficiently similar to the reserve that research there can meaningfully be applied to the reserve. Under these conditions, there can be little justification for allocating high priority to research on the reserve, particularly where it may involve destructive sampling or large scale intrusion into the landscape.

DISCUSSION

Whilst research has an important contribution to make to the management of conservation reserves, its success will depend upon co-operation: co-operation between research scientists, and between research scientists and and the managers of reserves. Research scientists, like the general public, must accept the need for some control. In particular it is important that they concentrate research on the more critical problems of management. Acceptance of this immense challenge can provide satisfaction and achievement in seeing the research successfully applied and in serving as a demonstration of sound conservation management.

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