The role of the protected area manager

Uriel N. Safriel

Abstract

Safriel, U.N.: The role of the protected area manager. — Bocconea 7: 249-259. 1997. — ISSN 1120-4060.

The traditional role of managers has been to restore or maintain a certain state of the protected ecosystem, implying that the conservation goal of all protected areas is to secure the 'balance of nature'. It is now recognized that ecosystems undergo non-equilibrium dynamics. Rather than strive to restore 'balance', conservation goals should be attainable, and specifically moulded for each protected area. Often areas are not allocated for attaining predetermined conservation goals, but goals are 'fitted' to already selected areas. The first role of the manager is to set attainable goals to the protected area. To do this, it is necessary to survey the current and the 'potential' inventory of species and processes, and to evaluate the findings by checking them against existing conservation programmes and their state of implementation. Natural 'assets' of the protected area are then identified, and become the objects of the conservation goals. The subsequent role is to prepare a management programme, that by executing it, conservation goals will be attained. Preparation includes tapping current relevant scientific knowledge, formulating a management hypothesis, outlining an action plan that comprises conservation activities optimized to accommodate a public relations component, a monitoring protocol for periodically evaluating the success of the programme, a management-oriented research programme, a timetable, and a budget. The third role of the manager is to execute the management programme in a dynamic and iterative manner, whereby 'clocks' are 'set' to update and revise the programme, using scientific progress, trends in public opinion, changes in funding and resources, research results and the reaction of the protected area to the management activities. A prospective manager should be trained through a formal academic programme that equips the manager with research experience, evolutionary thinking and quantitative approach to management. Protected areas should be hierarchically networked, and the promotion track of managers should include the formulation and execution of management programmes for these networks.

Protection and management

What is protected in a 'protected area', and why should there be a manager? In other words, why is management necessary, on top of protection? 'Protected areas' are areas allocated for nature conservation. What should they be protected from? For conserving

nature, is protection required? Traditional dangers used to be hunting or logging for example, and protected areas have been traditionally protected against such dangers. But dangers of this kind have become less and less of a problem, especially where the conservation of wild relatives of cultivated plants are concerned. For the latter, and many other types of natural assets, the essence of protection in a protected area is protection against habitat loss, loss to development. Once the habitat is protected against loss, either by law and its enforcement, or by education and public awareness, why is it necessary to manage in order to protect?

The 'traditional' objective of management of protected areas used to be to maintain, or more often, to restore, the 'balance of nature' in the protected area.

However, the concept of 'balance' implies stable ecosystems. But ecosystems are made of biotic communities, which are assemblages of populations. And populations are very unlikely to be in 'balance'. The size of a population fluctuates due to 'internal' processes, such as chaotic behaviour, demographic stochasticity, and stochasticity in genetic structure. It also fluctuates in response to the dynamics of other populations –competitors, predators and mutualists. And it fluctuates due to environmental fluctuations –climatic stochasticity, fluctuations and trends, and anthropogenic effects. It is therefore very unlikely that the concept of 'balance of nature' is valid (De Angelis & Waterhouse 1987, Pimm 1991). When an area becomes protected, it is likely to be at a certain state, characterized by some degree of stability. It is futile to attempt and manage it for maintaining that state, for restoring a previously occurring state, or for bringing it to a novel state, as if any of these alternatives is the desired 'balance of nature'.

To conclude, since it is impossible to manage for 'balance', the goal of protection can not be the maintenance or the restoration of 'balance'. Instead, it is necessary to set more specific, tangible and attainable conservation goals. Management can therefore be defined as an activity for achieving these specific conservation goals. It follows that the role of the manager is to execute the rnanagement, following a 'conservation algorithm'.

The conservation algorithm

An ideal procedure of nature conservation is: (a) set goals; (b) allocate an area suitable for attaining the goal – the protected area; and (c) manage the protected area, such that the goal is attained. Thus, the managers enter only in the third phase (Fig. 1).

But, this algorithm is rarely achieved. More often an area comes under protection first, and then goals are set for it. This is because oftentimetablethe areas allocated to conservation are those allocated by default, rather than by choice; they are the least valuable for anything else, hence relatively easy given away for conservation. Now, if the allocated area is one that has been given away, rather than chosen, it is necessary to determine, not which area suits which goals, but which goals are appropriate for the allocated area.

The goals must be such, that they can be attainable, that is, that the management necessary to attain the goals is feasible. And the management is feasible, if the manager can do it.

Hence, the role of the manager is not just to manage; it is the manager that should first and foremost, set the goals.

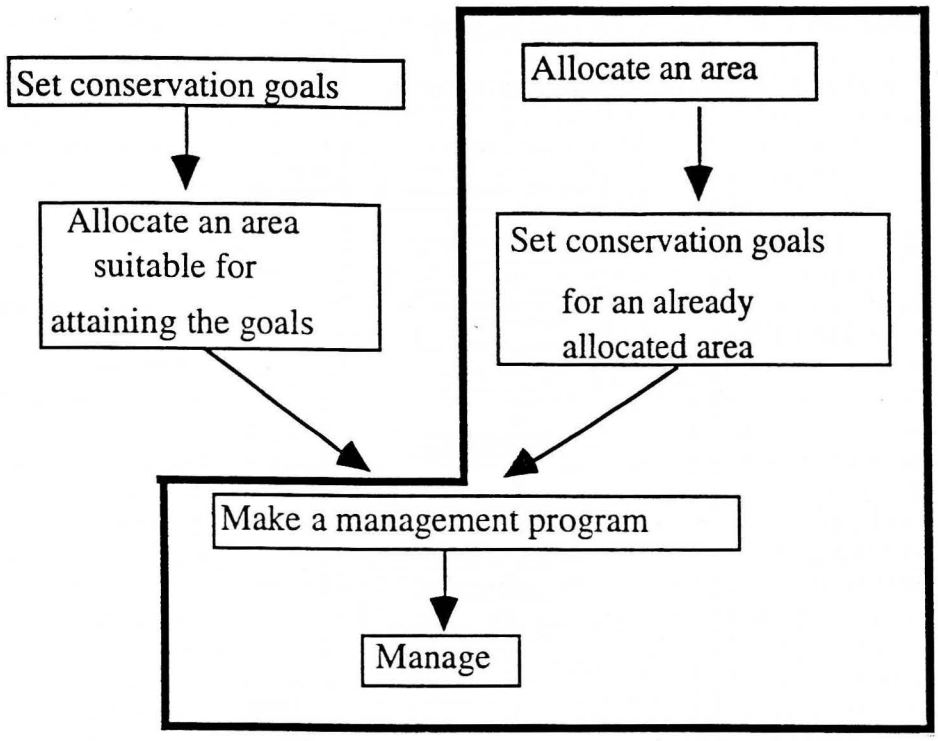

Fig. 1. The two alternative conservation algorithms. Thick frame — the role of managers.

The management algorithm

Assuming that setting conservation goals is the task of the manager, then 'management' includes also setting the goals. The management algorithm thus includes three major phases: (a) setting the goals; (b) preparing the management programme; (c) executing the programme; and (d) revising and updating the programme. These phases and their sequential steps will be now elaborated (Fig. 2).

Phase I. Setting the goals

Four steps should precede the actual setting of the goals, which comprises the fifth step of this phase.

Step 1. Current inventory. It is impossible to define goals for a protected area, if its contents are not known. The first stage is therefore making an inventoryi of what is currently there – species, and their abundance. But a protected area may have hundreds of species, some very rare, some common but hard to detect, some identifiable only by specialists. Furthermore, their abundance may change between seasons and years. Even within a given year, estimating abundance reliably is often not a simple task.

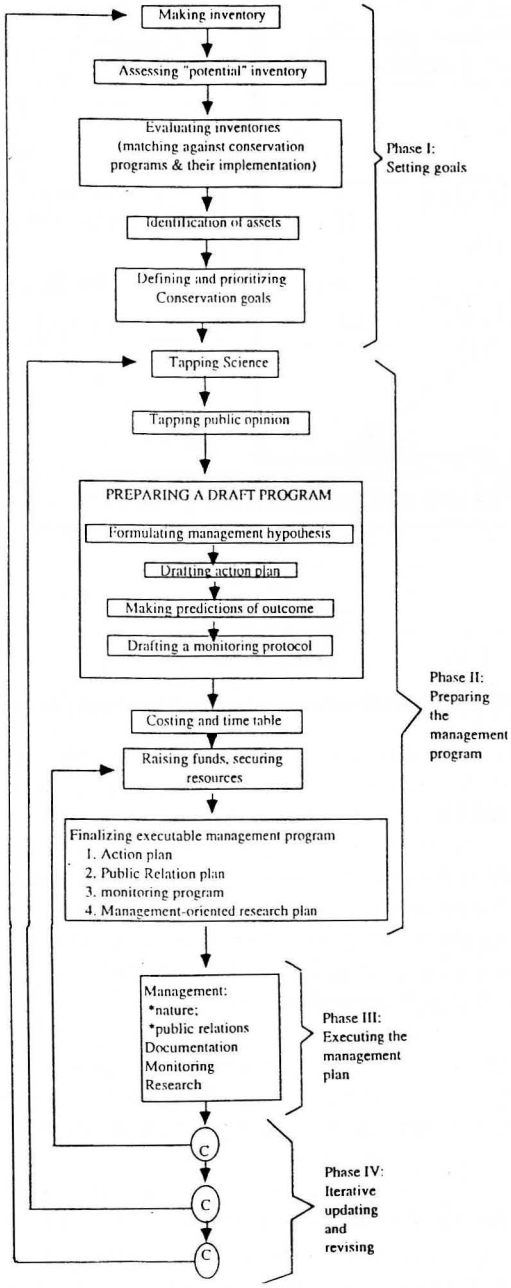

Fig. 2. The management algorithm. C = clock. For further details, see text.

It is therefore necessary to set a time limit for the phase of making the current inventory, otherwise management will never proceed. Within the management algorithm a 'clock' is set, which pre-determines when, with whatever information about the inventoryi is to hand, the manager should move to the next phase of the management algorithm. There are, however, two different 'settings' of the clock. One is for moving to the next phase, the other is for determining when the current phase is to be revisited. Thus, abandoning the first phase at a time when the current inventory is far from being completed, does not mean that the management will forever be based on incomplete knowledge. It only means that lack of complete knowledge is not an excuse for delaying management. Once management proceeds, there will come the time to revisit the inventory phase, and attempt to promote it, in order to improve the management.

Step 2. Potential inventory. As evident from the discussion of the 'balance of nature' concept, the inventory reported in Step 1 is not necessarily the one that has existed there earlier, or will exist there in the future. The term 'potential'should not be confused with 'climax' or 'equilibrium'. Rather, the manager should attempt to identify states of the protected area which are 'feasible', though quite different from the current state. To obtain the potential inventory, it is necessary to assess relevant environmental characteristics and variables of the protected area, such as the prospects of immigration of species from other areas, the applicability of the concepts and notions of local succession, the assessment of community interactions and the identification of key or keystone species within the existing community. It is also useful to evaluate ecosystem functions, which involve the interactions between the nonliving environment and the community, and assess how they can be modified, given that the community attains a state different than the current one. Needless to say, compared with the description of the current inventory, the assessment of the potential inventory is a daunting undertaking. A clock should therefore be set for moving to the third step. It is advisable, however, to revisit step 1 before going to step 3; the attempt to assess the potential inventory may reveal that a critical piece of information about the current inventory is missing, and a special effort to obtain this is invaluable for a fair, initial notion of the conservation value of the protected area.

Step 3. Evaluation. The value of the protected area is assessed by matching its inventory, current and potential, against already existing conservation programmes. There may be national, subregional or regional conservation programs for the region within which the protected area under question is located. Global programmes, such as the Global Biodiversity Strategy Strategy (WRI/IUCN/UNEP 1992)). and even international documents such as the Convention on Biological Diversity (UNEP 1994)), should be consulted. The state of implementation and execution of available programmes, should be also explored. This step enables the manager to obtain a perspective of the protected area under his consideration, and examine it in a wider, relevant context. The evaluation step too, should have its timetable, determined by a pre-set clock. Some documents may be hard to obtain, and the information on implementation of programmes in the region may not be forthcoming. These need not delay the transition to the next step.

Step 4. Identification of assets. By matching the inventory against existing programmes and their state of implementation, the manager can identify the natural assets of the protected area. Thus those species, populations, processes, and ecosystem services that constitute the assets of the protected area.can be singled out from the inventory – by virtue of them being already recognized as worthy and requiring protection, because they are

exclusive to that protected area, or because their protection fits in nicely to already existing conservation programmes.

Step 5. Setting conservation goals. It is now possible to set conservation goals, that will of course address the assets identified in the preceding step. Given the list of assets, it is likely that there,will be more than one goal. Some of the goals may even be in conflict It is therefore imperative not just to define the goals, but to prioritize them. This prioritization should be assisted by the evaluation phase, namely, by looking again. at the broader perspective, of existing programs and their state of implementation..

Phase II. Preparing the management programme

Step 1. Tapping science. A goal-oriented literature survey is required as a first stage. This should be followed by a field survey. The survey differs from the inventoryi stage; its objective is to survey management options, given the defined conservation goals, and the state of the art of management and conservation, as revealed by the literature survey. Following the field survey, it is advisable to revisit the literature, as this second scanning is likely to be better focused, given the initial field experience.

Step 2. Preparing the management programme draft. The draft includes the following componente: (a) hypothesis. It is essential that the management programme is directed by a testable hypothesis; (b) the plan of action. This is the core of the management programme. It should be structured as a well-designed experiment, aimed at testing the hypothesis. This should become feasible by formulating predictions generated by the hypothesis, which forecast the outcome of the execution of the plan of action. The predictions should be structured in a quantitative terms, such that the validation or rejection of the hypothesis can be based on measurable evidence; (c) the monitoring protocol. The management programme should include a monitoring protocol, and the evaluation of the monitoring data will constitute the hypothesis-testing.

Step 3. Costing and timetable. Step 2 above generates the 'ideal'programme. This is only a draft, because the execution of a programme depends on the availability of resources, both human and financial. The last step of the draft management programme is therefore its costing. This is a conventional budgeting exercise, hence should include a detailed timetable.

Step 4. Securing funds and resources. This may be the most critical and effort-consuming step of the management algorithm. With no security of resources, it is impossible to initiate management. However, it is unlikely that all resources required for the execution of the draft will become available. Here again it is necessary to set a clock. Even with a minimal amount of funds, it is feasible to execute some management that will be of a certain value. But this requires a redrafting of the draft programme. Thus, the amount of resources secured determines the transition from the draft programme to the final, execution-ready programme.

Phase III. Execution of the management programme

The execution entails three simultaneous activities, managing, documenting and monitoring. Take for example a management activity such as fencing against livestock intrusion. Together with the actual putting in place of the fence, the necessary

arrangements for executing the monitoring protocol should be made, so that the monitoring starts when the fence is set up, to enable an assessment of the effect of the fence, compared to state of affairs prior to its placement. It is also important to document the management activity – time of setting up, the specification of the fence, and its route. The neglect to document the management activity in time and with utmost detail and precision, results in failure to interpret correctly the monitoring data, and in assessing the success of the management programme.

Phase IV. Iterative revision and updating

Three clocks are set to give signals for additional activities during the execution of the management programme. The first sets the time for the first and subsequent evaluations of the monitoring data. The second sets the time for renewed fund raising efforts, to enable an upgrading of the programme. The third is set for longer time steps, and it sends the manager again to the literature, so that he can follow scientific progress. Each of these three activities may bring about a revision of the management programme, and as a result, a new implementation plan. Thus, management is a dynamic process, driven by lessons learned from its results, by scientific advances, and by the availability of resources. This availability depends greatly on the management programe itself.

The public relations role of the manager

Management for nature and management for public relations. Since no management can be executed without resources, securing resources should become an indispensable component of the management programme. For convincing the public and decision-makers of the need to allocate resources, the protected area should be accessible, its assets displayed and the means to protect them demonstrated. These public relations activities may conflict with the activities aimed at attaining conservation goals. The preparation of the management plan may therefore have three steps: (a) constructing an action plan 'for nature', as if no public relations were required; (b) planning management for public relations, and (c) making the necessari optimization, that may constitute a compromise between the two objectives. For example, a trail leading to site of interest may risk the assets, but will increase public awareness and facilitate fund raising. Designing this trail and setting the rules of its use, such that damage will be minimized and the benefit maximized, is a formidable task, yet it should become a part of the preparatory phase of the management programme. Also, its execution should be documented, and its use and effects monitored.

Public relations target populations, and tactics

The importance of public relations as one of the major tasks of the manager is often overlooked or underestimated, and hence this issue deserves some more elaboration. The manager should be trained in both interpretation and education; exposing to the public what is there in their protected area, and explaining why, why it is there and why it requires protection. The target audience is the general public, both adults and schoolchildren, government, industry, and members of academic institutions. Industry is

very important because its public image is increasingly enhanced by supporting conservation, and its potential is greater than that of governments. The PR directed to academic institutions should be aimed at exposing the scientists to the urgent needs for specific conservation-oriented research. The manager should not just utilize nature for interpretation and education, but should also exploit the management programme, both its conception and implementation processes, for the end of rallying support. For this, the management programme should be both transparent and accessible, open for study, comments and criticism, both by the general public and government and by the scientific community.

The role of the manager in commissioning research

The fourth phase of the management algorithm calls for setting clocks for monitoring results, for making renewed fund-raising efforts, and for tapping scientific progress in order to revise and update the management programme and thus improve protection. But sooner or later, these efforts in tapping science would reveal that much of science is not directly relevant to the manager's problems. The following two quotations from a recent paper reviewing the literature on correlates of endangerment of plant species (Schemske & al. 1994) echo this shortcoming: 'In spite of theoretical relationships between genetic diversity and species' persistence, no empirical evidence exists that directly links the genetic composition of- plant populations to their growth rate or survival', and 'Much of our understanding of dispersal is based on theory, and it has not been shown whether either demographic or genetic componente of dispersal have a significant impact on plant population survival'. A critical role of managers is therefore also to commission conservation-oriented research, tapping the human resources of the scientific community, and directing its efforts in the direction dictated by the needs of the protected area. Thus, a management programme, when it develops, adds a third component to the management and monitoring component – a management-oriented research programme.

Public opinion as a resource for tapping

It should be recognized that the science of conservation biology is still an emerging discipline: much of what it recommends to managers is a matter of fashion rather than based on robust evidence. Therefore, the periodically updated actual management component of the nature management programme reflects current scientific dogma. Similarly, there are fashions and dogmas in public opinion and attitudes towards the environment and nature conservation. Periodically, the manager has to monitor and tap current trends in public opinion and learn to use them, both in fund raising efforts, and in the public relations component of the management programme.

Who is a manager?

The role of the manager of protected areas is to follow the conservation and the management algorithms, as structured above. What qualifications are necessary for accomplishing these feats?

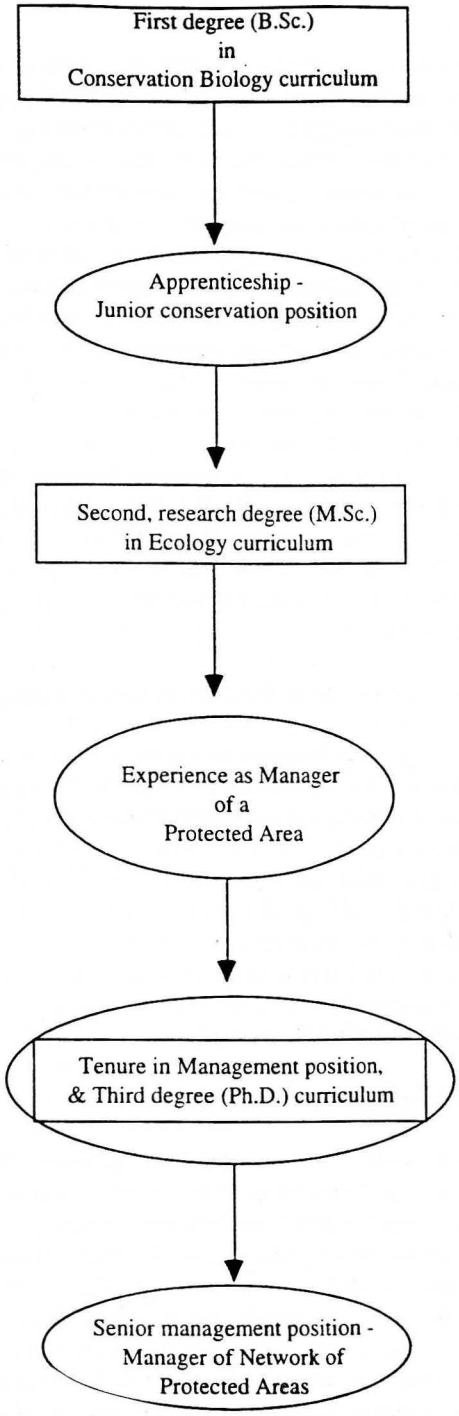

Fig. 3. The manager's professional track. Rectangular frames = studies; elliptical frames = experience.

The following is a recommended curriculum for managers (Fig. 3): (a) First degree in Nature Conservation (university conservation-oriented teaching programmes at the B.Sc. level already exist in some institutions, and should be encouraged); (b) apprenticeship and experience in a junior conservation position (e.g. a ranger, etc.); (c) second, research degree (e.g. an M.Sc.) in ecology (assuming that a good ecology curriculum provides the necessary insights into all advanced aspects of conservation biology, and that any basic research in ecology has conservation applications); (d) experience as a manager (in any kind of conservation organization); (e) Optional third (Ph.D.) degree, as a prerequisite for promotion to a position of managing a network of protected areas. Reading for this third degree can be done while the person functions as a manager. Thus, this curriculum provides for a balanced blend of studies and experience. Whatever the curriculum of the manager is, it should produce a person who recognizes that ecosystems are dynamic and still poorly understood, and that their populations constantly evolve. Therefore management of a protected area too, is a dynamic processi and management plans should benefit from an evolutionary thinking (Erwin 1991). Also, the manager should recognize that management is a quantitative rather than qualitative issue, and cannot be conceived and evaluated without a quantitative orientation. The curriculum should therefore produce a manager who is proficient in experimental design, data storage, retrieval, reduction, analysis, and statistical inference.

The role of research experienee in the curriculum of managers

A prospective manager needs research experience gained during his training, not for preparing him to carry out his own research while on the job. It need not, or even should not be required that the manager investigates the protected area he manages. This is because management of a protected area is nearly always an overwhelmingly complicated and absorbing task, that does not leave much time and mental resources for scientific research, which requires full attention, concentration and dedication. But research experience, gained during the training stages, is necessary (a) to strengthen the manager's confidence in his communications and dealings with scientists; (b) to motivate the scientists and to commission the necessary research; and (c) to exercise criticism and make judgment on the research produced.

Incentives and promotion prospects

A manager of a protected area should be provided with a constant incentive, and therefore a promotion track has to be considered. Fortunately, a protected area never stands isolated and its management programme depends on and should be linked with adjacent, and even distant other protected areas. Management programs should interact, and protected areas should be networked. Much theoretical and also some phenomenological and even experimental research already exists to emphasise the significance of area, corridors, assembly and spatial configuration of protected areas (e.g. Fiedler & Jain 1992). Management should therefore be network-oriented, and it is the role of senior managers to generate and implement networks' management programs. These can be structured into a hierarchy of local, national, subregional and regional management

programmes, that provide for an appropriate and challenging promotion track for managers.

Acknowledgements

I would like to thank Professors Zohary, Valdés and Raimondo who, as members of the Organizing Committee of the Symposium, have encouraged me to produce this paper.

References

DeAngelis, D. L. & Waterhouse, J. C. 1987: Equilibrium and nonequilibrium concepts in ecological models. — Ecological Monographs **57:** 1-21.

Erwin, T. L. 1991: An evolutionary basis for conservation strategies. — Science **2539:** 750-752.

Fiedler, P. L. & Jain, S. K. 1992: Conservation Biology: The Theory and Practice of Nature Conservation, Preservation and Management. — Chapman & Hall, London.

Pimm, S. L. 1991: The Balance of Nature? — The University of Chicago Press, Chicago.

Schemske, D. W., Husband, B. C., Ruckelshuas, M. H., Goodwillie, C., Parker, I. M. & Bishop, J. G. 1994: Evaluating approaches to the conservation of rare and endangered plants. — Ecology **75:** 584-606.

United Nations Environment Programme 1994: Convention on Biological Diversity. Text and annexes. — UNEP/CBD, Châtelaine, Switzerland.

WRI/IUCN/UNEP 1992: Global biodiversity strategy. — WRI, Washington DC.

Address of the author:
Dr. U. N. Safriel, Department of Evolution, Ecology & Systematics, the Hebrew University of Jerusalem, Jerusalem 91904, Israel.