



Position Statement by
The Ecological Society of Australia

Protected Areas

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The Ecological Society of Australia and Position Statements

Occasionally there are broad issues of public interest in relation to which most ESA members have formed a similar view, based on their professional expertise. In these cases the Society may formulate and endorse a Position Statement which is intended to inform public debate and policy action. While there may be minor variation of members' opinion in relation to technical details encompassed within a Position Statement, there is widespread general agreement concerning both the importance of the issue and the major points raised within the Statement.

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Protected areas

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Executive Summary

The ESA considers that protected areas are the primary mechanism for biodiversity conservation in Australia and that the primary function of protected areas is to promote the persistence of biodiversity. The ESA commends governments, non-government organisations and private groups for their efforts in extending and managing the Australian protected area system over many decades. At the same time, the ESA recognises that the system is far from adequate for protecting the country's biodiversity. Improvement of the system is urgent because Australian biodiversity continues to decline irretrievably in the face of threatening processes, many of which can be prevented or mitigated within properly planned and managed protected areas. The ESA has identified nine broad issues that must be addressed by science, policy and funding to improve the effectiveness of the protected area system.

1. Improving information on biodiversity. The ESA considers that planning and management of Australia's protected areas are limited by lack of information on habitats, species, populations and natural processes. The ESA recommends increased research effort to rectify these deficiencies.

2. Improving information on threatening processes. Major threats to Australia's biodiversity include land clearing, grazing, logging, harvesting of marine species, climate change, introduced species and altered fire regimes. The ESA recognises an urgent need for more information on the current distribution, expected rates of expansion, and future patterns of these threats.

3. Formulating protection targets for biodiversity. The ESA considers that quantitative targets for retention and restoration of biodiversity pattern and process should be the subject of ongoing research, debate and improvement. When unconstrained by political or economic considerations, targets can promote meaningful tradeoffs between nature conservation and competing land uses.

4. Reconciling multiple goals for nature conservation. The ESA considers that the conservation of biodiversity should not be regarded as a by-product of achieving other goals such as salinity mitigation or carbon sequestration. There is an urgent need in all regions to identify areas important to biodiversity that do not coincide with priority areas for other management goals.

5. Extending protection of biodiversity at all scales. The ESA considers that Australian governments must accelerate progress toward Comprehensive, Adequate and Representative (CAR) systems of protected areas for all terrestrial and marine regions. The costs of doing this, and the economic and other benefits of CAR protected area systems, should be estimated and described.

6. Correcting deficiencies in the design of protected areas. The ESA considers that the design of many existing and proposed protected areas can be improved and that this will reduce management costs and enhance the persistence of biodiversity. At the same time, isolated fragments of depleted habitats should be protected and regarded as nuclei for restoration efforts.

7. Improving the management of protected areas. The ESA considers that management of each protected area should be regularly reviewed to enhance its effectiveness and to assess requirements for additional resources. Management of all protected areas should be based on explicit site-based objectives that recognise the importance of individual areas in regional contexts.

8. Co-ordinating management of land and sea outside protected areas. The ESA considers that off-reserve management should be better co-ordinated with protected areas in local and regional contexts.

9. Improving reporting on protected areas and off-reserve management. The ESA considers that accurate reporting is critical for the accountability of government and non-government organisations. Reporting should indicate expected times to “completion” (achievement of targets) of CAR systems of protected areas and should distinguish between habitats and species in different categories of exposure to important threatening processes.

Statement on protected areas

Terrestrial protected areas cover more than 77 million hectaresⁱ or about 10% of the Australian landmass, distributed unevenly within and between states, territories and biogeographic regions. Of this total estate, about 70% falls in IUCN categories I-IV, where management is for intrinsic natural values. The remaining 30% is in IUCN categories V and VI which allow for limited commercial or subsistence extractive uses, including mining or mineral exploration, but retaining biodiversity conservation as an important goal. Marine protected areas total more than 64 million hectaresⁱⁱ, mostly in Commonwealth waters beyond the three nautical mile limit, but occurring in all state and territory waters.

The ESA considers that protected areas are the primary mechanism for biodiversity conservation in Australia. The ESA also considers that the primary function of protected areas is to promote the persistence of biodiversity. Protected areas contain a substantial portion of Australia's biodiversity, including examples of rare and threatened species and ecosystems. They provide essential ecological services, regionally and globally. They are also enormously important for their scenic, recreational, cultural, wilderness, scientific and educational values and, in some cases, contribute to the sustainable management of natural resources. Many protected areas are an integral part of Australian life and identity. Some are national and international icons.

The ESA commends Australian governments, non-government organisations and private groups for their efforts in extending and managing the Australian protected area system over many decades. At the same time, the ESA recognises that the system is far from adequate for protecting the country's biodiversity. Improvement of the system is urgent because Australian biodiversity continues to decline irretrievably in the face of various threatening processes, many of which can be prevented or mitigated within properly planned and managed protected areas. The ESA has identified nine broad issues that must be addressed by science, policy and funding to improve the effectiveness of the protected area system. Specific considerations of the ESA on each of these issues are appended.

1. Improving information on biodiversity

A fundamental requirement for effective location, design and management of protected areas is information on the patterns and processes of biodiversity. The main purpose of any one protected area is "to maintain, hopefully in perpetuity, a highly complex set of ecological, genetic, behavioural, evolutionary and physical processes and the coevolved, compatible populations which participate in those processes."ⁱⁱⁱ This complexity is magnified many times within a system of protected areas, each part of which should be placed so that biophysical variation within and between regions is adequately sampled and maintained. Knowledge of the complexity of biodiversity in Australia and elsewhere is very incomplete. Surrogate measures, such as vegetation types, localities of well-surveyed species, and the extent and connectivity of remnant habitats ("natural" parts of land types, freshwater types and marine habitats) are poorly tested but apparently only approximate representations.

The ESA considers that planning and management of Australia's protected areas are limited by lack of information on habitats, species, infra-specific variation, and natural processes. Much further work is required on surveying and mapping biodiversity, understanding its response to management and disturbance, developing informative spatial surrogates for biodiversity pattern and process, and incorporating uncertainty about biodiversity into decisions about planning and management.

2. Improving information on threatening processes

A basic role of protected areas is to separate elements and dynamics of biodiversity from processes that threaten their persistence in the wild. Accordingly, information on the current patterns and rates of spread of threatening processes is essential in formulating quantitative targets for biodiversity protection, locating and designing protected areas, scheduling their implementation, and managing them to retain their values. This information is unavailable for most Australian terrestrial and marine regions.

The ESA considers that major threats to Australia's biodiversity include land clearing, grazing, logging, harvesting of marine species, climate change, introduced plants and animals, and altered fire regimes. Information is urgently needed on the current distribution, expected rates of expansion, and future patterns of important threatening processes, especially land clearing, trawling

and selected introduced species. Further information is needed on the distributions and effects on biodiversity of logging, grazing, altered fire regimes, climate change and ways of mitigating their adverse effects.

3. Formulating protection targets for biodiversity

Australian governments have produced and endorsed numerous policies and conventions relating to the conservation of biodiversity. These documents promote broad goals such as comprehensiveness, adequacy, representativeness, persistence and sustainability. Planning and management of protected areas require these goals to be translated into quantitative targets for conservation action on the ground. Targets developed for the Regional Forest Agreements remain controversial scientifically and, in any case, have questionable relevance to agricultural and pastoral regions or marine environments. The more recent retention target of 30% of the pre-1750 extent of ecological communities^{iv}, even where achieved, will result in further loss of biodiversity in many regions.

The ESA considers that quantitative targets for retention and restoration of biodiversity pattern and process should be the subject of ongoing research, debate and improvement. Targets framed as percentages of regions, subregions or jurisdictions, because of their broad scale, are not useful for planning new protected areas or reviewing established ones. Targets are necessary for land types and species at finer scales. Targets should not be constrained by political or economic considerations because meaningful tradeoffs between nature conservation and competing land uses require areas important for both to be identified and compared.

4. Reconciling multiple goals for nature conservation

The motivation for nature conservation has long been multifaceted, incorporating goals related to scenery, wilderness, ecosystem services, cultural resources and socio-economic values as well as biodiversity. To varying extents, these goals conflict by placing priorities for additional protected areas in different parts of the landscape. Conflicts between goals may also arise in management of protected areas. The resolution of these conflicts is seldom explicit and often determined by lobbying and political pragmatism. Goals that

are not sufficiently compelling at a particular time and place are marginalised, often with unknown consequences.

The ESA considers that the persistence of biodiversity is a primary goal of local and regional planning, not a by-product of achieving other goals such as sustainable development. There is an urgent need in all regions to identify areas important to biodiversity that do not coincide with priority areas for other goals, such as salinity mitigation and carbon sequestration which are currently receiving attention and funding. These biodiversity areas should be highlighted for protection in their own right.

5. Extending protection of biodiversity at all scales

A comprehensive, adequate and representative (CAR)^v system of protected areas for Australian terrestrial and marine regions has been slow to develop and is still far from complete. Clearing of some habitats has pre-empted the achievement of realistic targets in many regions, indicating the need for extensive restoration. Many of the 85 Australian terrestrial biogeographic regions and most of the 60 marine bioregions are poorly represented in protected areas. At finer spatial scales, many habitats and species are still represented poorly or not at all by protected areas, even in regions with large percentages of their total areas protected. In most regions, protected areas are not representative of biological variation related to geographical and environmental gradients within habitats. Much of the unprotected biodiversity across Australia is vulnerable to commercial uses and other threatening processes and continues to decline. The ESA considers that Australian governments must accelerate progress toward CAR systems for all terrestrial and marine regions. Protection is urgently required for habitats that have been extensively modified and remain vulnerable to commercial uses. The cost of CAR protected area systems, complemented by appropriate off-reserve management, should be estimated for a sample of regions so that governments, scientists and the public can form realistic expectations about the resources required. To balance costings, economic and other benefits of CAR protected area systems should also be estimated and described.

6. Correcting deficiencies in the design of protected areas

Many established and proposed protected areas will lose some of the species they currently support because of deficiencies in their design. Limitations on design also increase the cost of managing many protected areas. Design limitations include small size, boundaries that are not aligned with catchments, and lack of connectivity with surrounding protected areas and other extant habitats. In the agricultural zone and some intensively harvested marine areas, loss of habitat has imposed design limitations on established protected areas and has limited the design options for new protected areas.

The ESA considers that the design of many existing and proposed protected areas can be improved with information from population models, including analyses of population viability and metapopulation persistence, and models of future patterns of land use. Notwithstanding the importance of good design for management and the persistence of biodiversity, protection of isolated fragments can be important to secure examples of depleted habitats and to provide nuclei for restoration.

7. Improving the management of protected areas

The protection afforded to biodiversity by many protected areas is reduced by limitations on effective management. Many reserves are affected adversely by the permeability of their boundaries to disturbances from outside. Some have sources of management problems and threats to biodiversity within their boundaries, including visitor pressure, altered disturbance regimes, harvesting in multiple-use zones of marine parks, and commercial extraction from some terrestrial protected areas. Solutions to these problems are constrained by lack of resources and the failure of governments to recognise and deal with inappropriate activities.

The ESA considers that all Australian protected areas should be reviewed for effectiveness of management and assessed for additional management resources required. Management of all protected areas should be based on explicit site-based objectives but should also acknowledge the biodiversity values of each area in its regional context.

8. Co-ordinating management of the land and sea outside protected areas

Extensive areas of habitats do not qualify for listing as protected areas under the Commonwealth's National Reserve System Program, due either to inappropriate

management objectives or lack of secure arrangements for protection. These areas are partly covered by diverse zonings and classifications that vary widely in their security and effectiveness in protecting biodiversity. Effective off-reserve management is essential for that portion of biodiversity that will remain difficult to include in protected areas. Off-reserve management is also important to maintain ecosystem services and to strengthen protected areas by improving their design and mitigating threats from outside. Importantly, off-reserve management can provide the flexibility to shift protective management in response to movements of animals or the dynamics of post-disturbance states. The ESA considers that off-reserve management should be better coordinated with protected areas in local and regional contexts. Aspects of this coordination should include consideration of limitations in the location, design and management of protected areas, identifying priority areas for biodiversity that are difficult to include in protected areas, and developing explicit protocols for recommending appropriate and feasible off-reserve mechanisms.

9. Improving reporting on protected areas and off-reserve management

Reporting on protected areas is critical for the accountability of government and non-government organisations in addressing endorsed policy directions such as CAR. Reporting on off-reserve protection is also necessary because of its influence on protected areas and its importance for biodiversity outside protected areas. Much reporting uses inappropriate indicators and geographic scales.

The ESA considers that it is inappropriate to report on protected areas and off-reserve management at the scales of regions, subregions or jurisdictions unless information is also provided on protection of habitats and species relative to their conservation targets. Reporting should indicate expected times to “completion” (achievement of targets) of CAR systems of protected areas at current rates of establishment and should distinguish between habitats and species in different categories of exposure to important threatening processes. Reporting should also distinguish between strict protected areas (IUCN categories I-IV) and others or between zonings within marine protected areas and, for off-reserve mechanisms, should indicate categories of security and effectiveness in mitigating threats to biodiversity.

Appendix

1. Improving information on biodiversity – specific considerations

The ESA considers that:

- * Much further work is needed on the taxonomy, distribution, abundance, and dynamics of Australian flora and fauna, particularly marine organisms and terrestrial invertebrates and non-vascular plants, as a basis for improved planning and management of protected areas. This biological information will directly inform decisions about protected areas and, indirectly, will provide better data for testing biodiversity surrogates, on which there will be a continuing reliance.
- * Much further work is also needed to classify and map habitats consistently within and between regions.
- * Active fields of research are now established in testing taxonomic surrogates (one taxon for another) and environmental surrogates (habitats for species) for biodiversity pattern, and testing spatial surrogates for biodiversity processes. Both areas of research need much further development and support.
- * The approximate nature of surrogates should be recognised in planning and managing protected areas by constructing datasets with as much biological information as possible, formulating conservation targets for surrogates that account for their heterogeneity and inaccuracy, and acknowledging upper and lower bounds of reliability when making decisions.

2. Improving information on threatening processes – specific considerations

The ESA considers that:

- * Information is urgently needed on the current distributions and expected rates and patterns of vegetation clearing in regions within and bordering the Australian agricultural zone as a basis for planning additional protected areas. This information should indicate the relative inherent susceptibility of habitats to expansion of agriculture and other developments and should also model future clearing in relation to infrastructure and other socio-economic factors.
- * Further broad-scale assessments are required of the biodiversity impacts of grazing and logging in relation to suitability for (or intensity of) these uses and the susceptibility to these activities of selected species. This work is important for planning new protected areas and for gauging the effectiveness of off-reserve mechanisms that combine nature conservation with commercial extraction.
- * Further assessments of threats to unprotected marine environments are necessary for planning additional protected areas. More knowledge of current and future threats to marine protected areas themselves is needed to integrate terrestrial and marine protection, identify management needs, and establish whether zonings that allow harvesting are consistent with the persistence and restoration of biodiversity.

* Anthropogenic climate change also represents a major threat to many Australian species, in combination with loss and fragmentation of habitats. More information is needed on the likely effects of climate change on the distributions of species, in combination with other important factors such as soil type, so that adjustment to climate change can be considered when designing new protected areas and habitat restoration.

* Introduced (alien) plants and animals are major threats to Australia's biodiversity. Much further research on alien species is needed to document their current distributions, potential future distributions, effects on native species, and response to control mechanisms. This research is essential to understand the effectiveness of protected areas and off-reserve management in mitigating the impacts of alien species, the susceptibility of protected areas to invasion by aliens, and the cost of controlling alien species in protected areas.

* Altered fire regimes also adversely affect Australia's biodiversity over extensive areas. Support for continued research on fire is essential so that it can be managed to promote the persistence of biodiversity within and outside protected areas.

3. Formulating protection targets for biodiversity – specific considerations

The ESA considers that:

* Explicit, quantitative targets are essential for planning and managing protected areas and off-reserve protection mechanisms.

* Quantitative targets should be the subject of ongoing debate and refinement. The primary concern of this debate should be the scientific interpretation of broad goals stated in policy, not the political and economic constraints on targets. New data and new understanding will require continuing refinement of targets.

* Targets should concern not only elements of biodiversity pattern but the spatial and temporal aspects of natural processes, including population sizes, movements, metapopulation dynamics, disturbance regimes, ecological refugia, adjustments to climate change, and diversification.

* Refinement of conservation targets will largely depend on research into spatial surrogates for biodiversity pattern and process and the effects of alteration of habitats outside protected areas.

* Appropriate scales for formulating targets will vary, but targets expressed as percentages of regions or subregions are essentially meaningless unless they are tied to, and preceded by, targets for habitats at the finest available scale of mapping. Targets for regions, subregions or jurisdictions should emerge from targets at finer scales.

* Targets for protected areas should be complemented by ceilings for loss of habitat with the balance comprising multiple-use under appropriate forms of off-reserve management.

* Protection targets should not be constrained by areas of extant habitats but should, where necessary, indicate the need for restoration to extend and link fragments of habitat and improve their condition.

* Constraints on the rates of expansion of protected areas within regions require individual targets to be prioritised so that early protection is given to those biodiversity features that are most irreplaceable and most vulnerable to threatening processes.

4. Reconciling multiple goals for nature conservation – specific considerations

The ESA considers that:

* Protection and restoration for biodiversity goals warrant substantial funding in their own right because the persistence of biodiversity is a primary goal of local and regional planning, not a by-product of management for other goals.

* There is an urgent need for integrated planning across regions to identify priority areas for retention and restoration of habitats to achieve different goals (e.g. representation targets for habitats, connectivity for selected faunal species, wilderness, carbon sequestration, salinity mitigation).

* An important outcome of these regional plans should be information on the extent to which priority areas for different goals coincide or fail to coincide. In particular, the plans should identify areas important for biodiversity that do not coincide with priority areas for salinity mitigation and carbon sequestration, goals that are currently receiving much attention and funding.

* Priority areas for biodiversity that are unlikely to be protected for other goals should be highlighted for specific funding and conservation action.

* Within protected areas that are managed wholly or partly for multiple-use, conflicts between biodiversity conservation and resource extraction should be investigated and resolved.

5. Extending protection of biodiversity at all scales – specific considerations

The ESA considers that:

* A CAR system of protected areas is a valid and essential land use.

* Adherence to national and international policy on biodiversity requires Australian governments to increase funding and accelerate progress toward CAR reserve systems for all terrestrial and marine regions.

* IUCN categories for specific protected areas are interpreted inconsistently by the states and territories. A consistent system for finalising IUCN categories is necessary. The system should be capable of re-categorising or delisting protected areas that do not meet IUCN standards for purpose of management and security of tenure.

* At present, the overlap between protected areas and value for commercial activities is generally slight. The development of CAR reserve systems for terrestrial and marine

regions will require effective protection and restoration of biodiversity in commercially valuable habitats, many of which are under freehold or leasehold tenure in terrestrial regions. Restoration is required where the elimination of habitats through clearing, trawling and other impacts has made realistic protection targets unachievable and where habitats have been extensively modified.

* As a guide to the additional funding required, governments should use a representative sample of regions to cost the achievement of regional CAR systems of protected areas, using scientifically defensible targets for biodiversity pattern and process. These estimates will promote informed debate and clarify expectations about the resources required.

* To balance estimates of the cost of implementing CAR principles, it will be necessary to estimate the economic and other benefits of CAR protected areas for the same sample of regions.

* Explicit criteria are necessary for deciding whether new protected areas or complementary off-reserve, co-operatively managed areas are the most appropriate and feasible mechanisms for specific parts of commercially valuable habitats.

* Recognising that Australian scientists are at the forefront of research and development in conservation planning, governments should accelerate development in this area of excellence to guide progress toward CAR protected areas and assist other countries with expertise and technology.

6. Correcting deficiencies in the design of protected areas – specific considerations

The ESA considers that:

* Population models, including analyses of population viability and metapopulation persistence, and models of future patterns of land use should be applied more extensively to established protected areas to estimate the likelihood of persistence of selected species. The models should also be used to identify improvements in design that could be achieved by extending protected areas or by off-reserve protection and restoration outside protected areas.

* Population and land use models should be used to develop criteria for adequate design of new protected areas in different regions or different parts of regions.

* Where there are no alternatives for achieving targets for habitats or species, smallness and isolation of habitat fragments should not prevent their inclusion in the protected area system or the application of off-reserve measures. Many fragments represent the last opportunities to retain vestiges of once widespread habitats and can serve as nuclei for restoration activities. Many fragments are also likely to retain many of the species they presently support for some time, particularly plants and invertebrates.

7. Improving the management of protected areas – specific considerations

The ESA considers that:

- * Management of all protected areas should be based on explicit goals and targets for their biodiversity and other values, acknowledging the particular biodiversity values of each area in its regional context.
- * An essential basis for informed management of protected areas is ecological research, including issues such as the dynamics of natural systems, requirements for persistence of species in protected areas, and responses of species to visitor use and management activities.
- * Reviews of management effectiveness in achieving biodiversity and other goals are needed for all Australian protected areas, with clear statements of the activities and resources necessary to reduce or eliminate management limitations. The review process should involve independent scientists and other stakeholders as well as agency representatives.
- * Reviews of zonings within marine protected areas and IUCN categories for marine and terrestrial protected areas should address their appropriateness for achieving biodiversity goals and targets.

8. Co-ordinating management of the land and sea outside protected areas – specific considerations

The ESA considers that:

- * Off-reserve management is typified by fragmentation of responsibility between jurisdictions, agencies and non-government organisations. Much better co-ordination is needed between protected area authorities and those responsible for off-reserve management. Appropriate geographical contexts for this co-ordination will vary but include local government areas, biogeographic regions and major catchments.
- * Some approaches to off-reserve management are ineffective in preventing the loss and degradation of habitats important for biodiversity and ecosystem services. Reasons include inadequate protection for biodiversity and lack of security of management arrangements, some of them being removable without proper scientific and public consultation.
- * Effective off-reserve management requires the same systematic planning approaches that have been developed for protected areas. In particular, off-reserve management should be based on scientifically defensible targets for biodiversity, quantitative targets for other conservation values, and explicit protocols for identifying feasible and appropriate mechanisms for protection.

9. Improving reporting on protected areas and off-reserve management – specific considerations

The ESA considers that:

- * Reporting on protected areas in terms of gross areas or proportions of regions or subregions is meaningful only if tied to, and preceded by, data on progress towards scientifically defensible targets for biodiversity pattern and process at spatial scales much finer than regions or subregions.
- * Regular reporting on rates of progress towards regional CAR targets is necessary for all terrestrial and marine regions, with estimates of time to “completion” (achievement of targets) of CAR systems at current levels of funding. This reporting should specifically indicate progress in protecting habitats and species that are highly vulnerable to commercial uses and other threatening processes and where targets are likely to be compromised if threats continue.
- * Reporting should distinguish between protected areas in IUCN categories I-IV and those in categories V and VI.
- * Reporting on marine protected areas and the habitats and species they contain should include statistics on internal zonings so that the contribution of no-take zones can be distinguished from that of multiple-use zones.
- * Reporting on off-reserve management should provide information on the effectiveness of specific mechanisms in mitigating threatening processes, the security of those mechanisms, their contribution to the design and defensibility of protected areas, and their contribution to ecosystem services and other conservation goals.
- * Well managed protected areas can provide benchmarks for comparative reporting of the effectiveness of off-reserve management for protecting biodiversity.
- * As a counterbalance to arguments about the opportunity costs for resource extraction of establishing protected areas, it is important that governments and non-government organisations promote research and reporting on the ecosystem services and socioeconomic values of protected areas.

ⁱ Unpublished data from Environment Australia (11.02.03) pending finalising of terrestrial figures in the Collaborative Australian Protected Areas Database (CAPAD 2002) in February 2003. For earlier figures, see CAPAD 2000 – www.ea.gov.au/parks/nrs/protarea).

ⁱⁱ Unpublished data from Environment Australia (11.02.03) pending finalising of marine figures in the Collaborative Australian Protected Areas Database (CAPAD 2002) in March 2003.

ⁱⁱⁱ Frankel, O.H. & Soulé, M.E. 1981. Conservation and evolution. Cambridge University Press, Cambridge.

^{iv} Anon. 2001. National objectives and targets for biodiversity conservation, 2001-2005. Environment Australia, Canberra.

^v For definitions, see the National Forest Policy Statement (Commonwealth Government, 1992) or the National Reserve System Program web site (www.ea.gov.au/parks/nrs)