Nature Conservation Strategy

A submission by the Environmental Protection Authority on the draft document released for review by the Department of Conservation and Land Management

Environmental Protection Authority
Perth, Western Australia
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THE PURPOSE OF THIS REPORT

This report is the Environmental Protection Authority's submission to the review of the document released by the Department of Conservation and Land Management entitled "A Nature Conservation Strategy for Western Australia".

This submission is not a report under Part IV of the Environmental Protection Act, and there are no provisions for appeals against the Authority's views expressed in the submission, though the Authority would welcome comments and suggestions.

ACKNOWLEDGEMENT

The Environmental Protection Authority acknowledges the valuable contribution to this submission by Dr Barry Wilson who prepared background advice on scientific aspects of nature conservation in Western Australia.

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Contents

1. Introduction

The Department of Conservation and Land Management (CALM) has produced for public review a draft document entitled "A Nature Conservation Strategy for Western Australia". The summary explains that the Strategy "is an attempt to draw together CALM's existing nature conservation policies, and to introduce new ones where gaps exist, into a comprehensive strategy for nature conservation in Western Australia".

The preparation of the draft Nature Conservation Strategy by CALM is a major achievement and the Environmental Protection Authority commends CALM on its initiative and the extensive public consultation which was part of the preparation of the document.

This submission seeks to point out areas of deficiency in the document, but they should not be seen as detracting from the positive contribution of the draft Strategy. Rather they are intended to place the draft Strategy in context, clarify its role and offer suggestions for its improvement.

2. The Role of the Strategy - CALM or State?

The draft document is entitled "A Nature Conservation Strategy for Western Australia" and it clearly seeks to look beyond CALM's direct sphere of influence.

However, the approach of drawing together CALM's existing policies and adding new ones has limited the scope somewhat. The EPA considers that the coverage of matters relating to the State in general and agencies other than CALM is inadequate for this to be a State Nature Conservation Strategy.

Nevertheless the Authority agrees that there is a need for a State Strategy and that CALM should have a key role in its formulation. The Authority therefore considers that the present document, as amended following the review process, should be regarded as a (Statewide) Nature Conservation Strategy for CALM and as the first stage in the development of a State Nature Conservation Strategy.

Some of the matters which need to be more fully covered in the State Nature Conservation Strategy include:

- nature conservation functions of other agencies such as the Agriculture Protection Board, the Department of Agriculture, the Water Authority and of course the Environmental Protection Authority. With regard to the EPA the assessment of specific proposals (in consultation with CALM) under the Environmental Protection Act and the contribution this can make to conservation objectives should be mentioned as should the potential for pursuing nature conservation objectives through the development of Environmental Protection Policies;
- the roles of the Museum, CALM, tertiary institutions and the Agriculture Protection Board in respect to nature conservation research, and the need for coordination of research between these organisations;
- a greater emphasis on off-reserve conservation measures (this implies a greater involvement with and commitment by the public and by other agencies such as the Department of Agriculture, the Fisheries Department, the Museum and the Department of Planning and Urban Development);
- more specific proposals for the interaction between agencies. The present references to "liaison with" agencies are too imprecise and reflect that this is CALM's strategy. A State strategy should indicate the role, commitment and planned actions for all involved agencies (CALM's own strategy also needs to be more specific in this regard - see Auditing and Feedback below);
- an examination of the adequacy and appropriateness of the existing legislative and bureaucratic framework and recommendations for amendments where desirable, and

- a stronger link to the other existing programmes and State and National Councils (e.g. Decade of Land Care, Ecologically Sustainable Development, Greenhouse Council, National Strategy on Biodiversity).

The EPA lists these points not so much in criticism of the present draft document (though some points need addressing there) as in an attempt to clarify the scope of that document and to encourage the subsequent development of a State Strategy. CALM would be the appropriate agency to coordinate its preparation, but other agencies would also need to be involved at a senior level so that the appropriate commitments could be made.

Recommendation 1

The document should be retitled to indicate that it is strategy for CALM. The title could also indicate that it is part one of a wider state strategy.

Recommendation 2

CALM should initiate an interactive process with the other relevant agencies to jointly develop a State Nature Conservation Strategy.

3. General comments on the draft Strategy

3.1 Overall objective

The stated "overall objective" is commendable in itself but it is narrower than the scope of the Strategy. It relates to the preservation component of nature conservation but does not provide for the conservation (= sustainable management) of native plant and animal species for legitimate use.

CALM's Strategic Plan (1988 version) contains:

* the *mission statement* : "To conserve Western Australia's wildlife and manage lands ... for the benefit of present and future generations", and

* the *primary aims*: "CONSERVATION - To conserve the indigenous plant and animal species and environmental processes in natural habitats throughout the State"; and "PRODUCTION - To provide and regulate the supply of those renewable resources that Government decides should be used, on a sustainable yield basis for the satisfaction of long term social and economic needs, and in a manner that minimises impact on other values."

Whether the Nature Conservation Strategy pertains to the policies and programmes of CALM alone or purports to be a State strategy, the overall objective must encompass the whole scope of protection, management and sustainable utilisation of "landscapes, ecosystems and species". Consideration could be given to amending the wording of the objective accordingly.

Recommendation 3

The objective should be expanded to cover the scope of the document.

3.2 Nature conservation ethic

The State Conservation Strategy and the Nature Conservation Strategy share a commitment to promoting an "environmental ethic" encompassing a "nature conservation ethic". Neither strategy attempts to define what such an ethic is.

Ethics is a system of moral principles governing behaviour. Traditionally, ethics have pertained to the behaviour of humans towards each other. During the past few decades the concept of "environmental ethics" has arisen, pertaining to human behaviour towards environment.

There are two streams of thought in this concept. The first is strictly anthropocentric — ethical behaviour towards environment is seen as necessary because of immediate or long-term effects on other people or their property and rights. This is the basis of the principle of "inter-generational rights" being espoused in the current ecologically sustainable development debate, and the current "land care" programs. It encompasses the ecosystem concept whereby accountability for the impacts of human action needs to take account of indirect environmental consequences, and recognises the ultimate dependence of human populations on continuance of biodiversity and natural processes such as nutrient cycling and energy transfer.

The second stream goes further in recognising "rights of nature". This is the concept which leads to the view that species have a right to exist independent of any human interest in the matter, and that humans have an ethical responsibility to behave in ways which do not put any species of plant or animal at risk of extinction. The Animal Liberationists take the concept even further and argue that it is ethically wrong to kill an animal for human purposes.

There seems to be a fair measure of public acceptance of an environmental ethic of the anthropocentric kind and recognition that the human species depends on it for the long-term. The "rights of nature" concept is more controversial.

Chapter 11 of the document is inadequate here in that it does not clearly state the nature conservation ethic which is to be enhanced and promoted. The overall objective (p. 1) is too narrow for the purpose. The "land care ethic" of CALM Policy Statement No. 27 quoted on page 106 is of the narrowest kind of anthropocentric ethic and does not take account of the rights of species espoused elsewhere in the document (see discussion on ethics and biodiversity on page 8).

This is one of the most important sections in the Strategy and it needs a clearer statement of the "vision" being promoted. Perhaps consideration could be given to including a definition of "nature conservation ethic" along the following lines:

A nature conservation ethic should:

- respect the right of other species to continued existence — humanity should not bring them to extinction by our own activities;
- acknowledge that the maintenance of species, ecosystems and natural processes is beneficial to humanity for many reasons, including aesthetic appreciation of the environment in which we live, a range of direct and indirect economic benefits, and ultimately the maintenance of our own species' life-support systems, and acknowledge the rights of other people of this and future generations to enjoy those benefits to no lesser degree than we do;
- accept that the utilisation of plants and animals for human purposes is only consonant with nature conservation principles if there is adequate management to ensure that the utilised species, and any other species indirectly affected, are not threatened by the utilisation activities;
- adopt the principle of ecological sustainability in all activities which utilise or otherwise impact upon living and other renewable resources, and
- accept responsibility as temporary custodians for management of the land and it's natural resources in a manner which will ensure the persistence of all it's species and natural processes.

Recommendation 3

A definition of "nature conservation ethic" along the above lines should be included in the document.

3.3 Role of the NPNCA

The draft document makes very little mention of the National Parks and Nature Conservation Authority. It should outline its role and proposed actions in context. If the lack of mention is an indication that the role of the NPNCA is being questioned, this questioning should be addressed in the document.

At times it has been claimed that the effectiveness of the NPNCA has been constrained by its dependence on CALM for resources for day-to-day operations. If the strategy indicates a significant role for the NPNCA then the question of resourcing should also be addressed. If the NPNCA were found to have no significant role its existence should be questioned.

Recommendation 4

The role of the NPNCA should be clearly enunciated in the document (with the involvement of the NPNCA) and actions for the NPNCA spelled out.

3.4 Auditing and feedback

The draft document is inadequate in terms of its requirement of auditing and feedback. Some of the recommended actions are not expressed in terms of actions which can be audited but rather in general terms expressing the intention of the action. It will not be possible to subsequently report on the extent to which these actions have been achieved, whether or not they were the appropriate actions to take to achieve the objective, or whether they need to be modified.

Also no mechanism is specified for reporting the results of auditing the implementation of the actions and responding to any issues the audit highlights. Some programme of audit, reporting and review needs to be developed. It should involve some public accountability and preferably some scope for public input to the review.

Recommendation 5

All actions in the document should be expressed in terms which enable CALM subsequently to audit them to determine the extent to which they have been carried through and the extent to which they have achieved their objectives. The auditing process should be delineated in the document and it should include public reporting on the results of auditing. The document should also contain proposals for the review of the Strategy after an appropriate period (e.g. seven years).

3.5 Integration of research - the knowledge base

The document discusses research in Chapter 12, separately from its discussion in other chapters of the significant conservation issues. While this separation of research reflects the present structure of CALM it weakens both the document and any case it mounts for increased research by failing to make clear, strong links between the present state of knowledge as described in the other chapters and the proposed research.

Recommendation 6

The case for research should be strengthened by being integrated into the discussion of the issues rather than dealt with separately in its own chapter.

The four principles espoused in Chapter 12 are all apt and the discussion of them relevant. The objective and action steps (pp. 112-114), with emphasis on both species and community research, are also apt and comprehensive although several aspects warrant comment.

3.5.1 Inter-agency collaboration

The chapter is written very much from the CALM point of view. There is no suggestion here that the Strategy is taking a State-wide view. In fact, the document errs in the other direction. Research is an area where there are many opportunities for collaboration with other agencies (and with industry). Although this is acknowledged there are no action steps to put it into effect.

The Strategy could be much strengthened by some specific proposals for collaborative research with other State and Commonwealth Government agencies and Tertiary institutions in particular.

A particular case of this relates to taxonomy and a reference collection/information facility for fauna. Because the Herbarium is a part of CALM, taxonomic research and curatorial programmes on plants is encompassed within the Department; but, for historical reasons, taxonomic research and the State reference collections on fauna are based at the WA Museum. An effective taxonomic programme and collection/reference facility for both flora and fauna is required but it needs a mechanism for collaboration and integration of effort.

Recommendation 7

The opportunities for collaborative research with other agencies and with industry should receive greater attention.

3.5.2 Research linked to strategies

Discussion of "improvement of the knowledge base" separately, with its own action steps, is valid but should be linked back tightly to the principal strategies. The principles espoused in Chapter 12 make the point that research must be oriented to the conservation and management objectives yet there is some weakness in the document in this respect. There is little cross-reference to the other objectives and action steps of the Strategy which tend to be much more specific than those in the research section.

Examples are:

(i) Objective 3 and action steps (i) and (ii) on pp. 49-50 specifically refer to inventories of significant habitats and their flora and fauna but in Chapter 12 discussion of the need for inventory and the research action steps (pp. 112-114) are only generalised.

(ii) In the excellent section on identifying threatened plant communities (pp. 50-53) reference is made to certain plant communities which have "the highest priority for research ..."; Objective 6 is to "identify ... threatened and inadequately reserved plant communities ... "; action step (ii) proposes to "undertake detailed studies in poorly reserved Botanical Districts". None of these specifics are referred to in the Chapter 12 action steps.

(iii) In the section dealing with management of reserves for nature conservation much is made of the need "to manage conservation reserves to maintain biological diversity and ecological processes" (Objective 1, p. 64). This is not followed up strongly in Chapter 12. Ecological principles and the need for community ecology are referred to in the principles (p.110) and as an issue (p. 111) but the relevant action step (v b) is weak. In fact the discussion on p. 112 and the action steps suggest that the research program is strongly biased in favour of species studies.

(iv) The section on management of utilised species (pp. 81-84) has an action step (ii) proposing to "undertake or promote research on the biology of utilised species" but this is not referred to at all in Chapter 12.

(v) The issues identified on p. 111 as subject areas where there is an inadequate knowledge base include "the ecology of weeds, marine ecology, and the conservation of invertebrates, which have as yet received little attention". None of these is addressed in the action steps and there is no commitment to resourcing them.

Recommendation 8

The proposals for research should be more specific and more clearly linked to strategies for nature conservation.

3.6 State forests

There are ambiguities in the document in respect of management of State forest for nature conservation.

Table 5 of the document includes State forest and some minor land categories as well as national parks and nature reserves as "lands and waters managed by CALM" and lumps them together in a context of the conservation reserve system. On page 37 State forest is specifically included in the conservation reserve system.

But on page 53 we find use of the term "primary reserve system" and reference to other "areas managed by CALM outside national parks and nature reserves, which are managed for nature conservation in conjunction with other purposes".

And then on pp. 68-69, in the Chapter on management for nature conservation on areas managed by CALM we find a section on State forest which contains as a principle (in part) " .. setting aside a representative system of conservation reserves and managing other parts of the forest in a manner consistent with the protection of biological diversity and other nature conservation values across the whole forest ecosystem".

There is no reference to State forest in the sections dealing with reserve selection except that on page 40 reference is made to surveys of reserve adequacy *in* State forest in the Darling District - which implies that the forest itself is not part of the reserve system.

The document is thus internally contradictory as to whether State forest can be counted as part of the conservation reserve system.

Recommendation 9

The document should clearly state that while State forest serves most important conservation functions (notably in the context of the sustainable utilisation of species and ecosystems) it is not regarded by CALM as part of the reserve system.

Notwithstanding this, it is obvious that State forest has important nature conservation values and reference to the Forest Strategy document considered elsewhere shows that CALM is putting in place management strategies which will greatly enhance those values. In the section of this Nature Conservation Strategy dealing with management for nature conservation in State forest (p. 68-69) there is a summary of those strategies.

While those strategies are in themselves admirable, there is much left unsaid in this section. A major contemporary issue in respect of forest management relates to its impact on forest ecosystems.

Emphasis is clearly on the vertebrate fauna in this document. Proper attention is devoted to "maintaining special components of the habitat of wildlife where timber harvesting occurs". Maintaining hollow logs, patches of undisturbed vegetation and riparian strips is undoubtedly desirable. So too are the strategies for reducing the area and frequency of severe disturbance

insofar as mobile animals such as vertebrates are concerned. However, as discussed elsewhere, many invertebrates are not so highly mobile and appear to be incapable of recolonising areas where they have become locally extinct.

Very little research has been done on the long-term effects of disturbance to forest ecosystems by timber production management practises, apart from that on vertebrates.Whether the full suite of plants and animals return and the ecosystem processes they construct are re-established after severe or regular disturbance has not been investigated thoroughly. Little attention has been given to the all important invertebrate component of forest ecosystems and the ecological processes they drive such as nutrient recycling.

In particular, two important forest management practises which are ignored in this Strategy are the impacts on forest ecosystems of clear-felling and regular prescribed burning. Because the ecosystem impacts of these practices are not well known, particularly in regard to invertebrates, aquatic systems and lower plants, they should be discussed in the document and strategies proposed to provide the information to ensure that the practices are or can be made sustainable.

Recommendation 10

The document should give more emphasis to the impacts of forest management techniques (especially clear-felling or 'gap' creation and regular prescribed burning) on forest ecosystems, including actions for research, monitoring and reporting.

3.7 Principles

An interesting and useful approach to presentation in the document is the insertion of boxed "principles", which seek to stand alone within the text as beacons to which the discussion and strategies relate. However, there are problems in that some principles are more like objectives, and vice versa, and some principles are simply statements of history or fact.

An example is the principle on page 32 which is actually a statement of historical fact. The first paragraph which follows is more like a principle.

Recommendation 11

The concept of boxed principles is effective, but some of the present principles should be reworded to ensure that they are expressed as principles rather than as strategies, actions or historical observations.

3.8 Environmental costs - who pays?

3.8.1 Economic analysis is inadequate

Chapter 13 dealing with funding for nature conservation is a crucial section of the Strategy. However, it places an inappropriate reliance on decision-making based on quantifying the values of nature conservation.

The EPA considers that it is inappropriate for important value judgements about the environment to be made by those with no mandate (economic modellers), under the guise of techniques which place highly questionable monetary values on conservation assets in the interests of "integrated economic decision-making".

The document recognises this when it states on page 12 that "market forces are ineffective for those parts of ecosystems to which human society does not allocate an economic value" and cites the development of the Wheatbelt as a failure of the market forces to protect conservation interests in that area. While this market failure may have been partly due to government intervention to promote agricultural development it was also symptomatic of the lack of information and lack of market power that have consistently led to the environment losing when market forces are relied upon.

On page 8 the document states that "Many biological resources, including species considered "useless" today, will be found to have new values in the future." This makes it clear that the basis of conservation is not a short term, present value economic decision. Rather it has to be an extremely long term value judgement since there are far too many unknowns for the limited view of economic analysis to provide any real illumination.

Despite these acknowledgments of the inadequacies of economic analysis for informing decisions about conservation the equivocal conclusion is reached on page 12 that "Market processes will only work effectively to protect natural factors such as biological diversity if the inadvertent use or degradation of such factors is included in the financial planning of any development."

The missing clarification is that these factors are only included in financial planning as a result of environmental impact assessment and the setting of binding conditions ensuring the protection of the environment. This assessment is the result of decisions based on value judgements, not on market processes which have shown themselves to be incapable of adequate environmental protection.

Recommendation 12

To be consistent with the findings in the text the document should conclude that economic analysis is an inadequate tool for decision-making in relation to nature conservation issues.

Recommendation 13

The document should note that the "user pays" principle is inappropriate for nature conservation. It is more appropriate to apply the "polluter pays" principle, under which the agent of the environmental degradation pays for its amelioration. In the case of nature conservation expenditure we have all, through developmental pressures placed the natural environment under stress to the extent that this expenditure is now needed, so we all (the taxpayers) should pay.

4. Specific comments on the text

4.1 Marine nature conservation

The State's conservation legislation is ambiguous, most notably in the overlap of definition of "fauna" and "fish" in the CALM and Fisheries legislation. This duality has resulted in a degree of confusion of roles between the two departments which has not been fully resolved by operational arrangements, and led to no responsibility being taken by either agency for the conservation of some marine species.

For its purposes the Fisheries Act (1905; Section 3) defines fish as "any form of marine life" while the Wildlife Conservation Act (1950) defines fauna as "any animal indigenous to any State or Territory of the Commonwealth or the Territorial waters of the Commonwealth". Under these definitions all indigenous aquatic animals in State waters are both "fish" and "fauna".

The departments have sought to resolve the resulting confusion as to which Act and Regulations apply to aquatic animals, and which department is responsible for protecting and managing utilization of them by operational agreements between the departments in respect of marine park management and agreement that amendments will be introduced to remove mammals, birds, reptiles and amphibians from the meaning of "fish" in the Fisheries Act.

Difficulty remains, however, in applying the concepts of nature conservation to aquatic invertebrate fauna and those (the majority of) fish (in the strict sense) for which there is no commercial or recreational fishing. Whale sharks in the vicinity of Ningaloo Reef Marine Park, which are attracting increasing tourism interest, are a case in point.

Commercial and recreational fishing is still primarily a "hunting and gathering" type of activity. (Although the current trend toward aquaculture is acknowledged.) Fishery management for "sustainable yield" depends to a large extent on statistics obtained indirectly from harvest data and focuses primarily on target species population management.

Recently, attention has been given to the need for the impacts of incidental catch and the effects of fishing activities on other elements of aquatic communities to be taken into account. (See the Fisheries volume of the "Ecologically Sustainable Development" reports.) Nevertheless, attitudes towards marine biota do not fully embrace the conservation concepts applied to terrestrial flora and fauna.

The section of the Strategy dealing with "utilised species" (pp. 81-84) discusses the range of public attitudes towards the commercial and recreational utilisation of native wildlife, including fish, but studiously avoids the issue of overlap of legislation and departmental regulatory function.

The issues involved here are fresh, complex and highly controversial, but they need to be resolved. Marine conservation is an area of increasing public interest and concern. Any attempt to develop a Nature Conservation Strategy which applies equally to marine environments will require much more public discussion and must involve the Fisheries Department and the fishing industry.

Recommendation 14

The document should directly address the need for a resolution of the present confusion and propose a solution which will adequately ensure the achievement of CALM's marine nature conservation objectives.

Recommendation 15

The document may not be able to spell out a comprehensive marine nature conservation strategy because of the difficulties referred to above. It should, however, spell out a process for the development of such a strategy once the issue of responsibility is resolved.

Recommendation 16

The document should acknowledge and incorporate the Government's recently announced "Marine Parks Policy for Western Australia".

4.2 Dual responsibilities

The above discussion raises the more general problem of areas where CALM shares the responsibility for nature conservation with other agencies. A vital area where the Strategy is clearly confined to CALM responsibilities is found in Chapter 9 dealing with managing endangering processes across the State. What is presented here is very relevant but it does not cover the whole ground. The EPA in particular has an important role in this area, as does the Agriculture Protection Board. Passing reference is made to these roles but they are not followed through into the Objectives and action steps. As stated in 2 above, although this should clearly be CALM's strategy, the document needs to be more specific and less insular in its references to other agencies.

Recommendation 17

The document should make specific references to CALM's objectives and actions with regard to other agencies and its expectations of those agencies (with some indication from those agencies that the expectations are not unrealistic).

4.3 Invertebrates

A serious deficiency of the Strategy lies in its treatment of invertebrate conservation. The numerical dominance of invertebrates in the Western Australian fauna, as elsewhere, is

acknowledged in the discussion on biodiversity (p. 6 and Table 1). The critical importance of these organisms in ecosystems, for example in nutrient recycling, is mentioned in the discussion of life-support systems and in the boxed "Principle" on page 10. The statement is made that "maintenance of Western Australia's biological diversity will largely depend upon maintaining the diversity of invertebrates and lower plants".

The critical importance of invertebrates is now widely recognised by ecologists and has been formally acknowledged in several important conservation policy documents internationally. For example, in 1986 the Council of Europe's Committee of Ministers adopted a "Charter on Invertebrates". That charter was used as a model for the "Australian Statement on Invertebrates" adopted by CONCOM in 1988. The Western Australian Minister was a signatory to that statement and yet only passing reference is made to it (p. 77) in the present Strategy which contains no action proposals aimed specifically at conserving invertebrates.

The only reference in the document to protection of invertebrates occurs within the text on page 77, viz.: "While the key to the protection of invertebrates is the sustainable management of ecosystems and processes, invertebrates can also be gazetted as threatened fauna ..". Both components of this statement are true but it leaves much unsaid.

Recommendation 18

The document should make more reference to invertebrate conservation issues, objectives and actions.

4.3.1 Management of ecosystems and processes

A characteristic of many native invertebrate species is that they have very restricted habitats and geographical distributions. No reserve system is possible which will encompass habitat and populations of even the majority of invertebrate species. This is discussed elsewhere in this critique. Another common characteristic of invertebrates is a very limited capacity for dispersal (i.e. for emigration and re-establishing populations in areas where they have become locally extinct). For these reasons, "sustainable management of ecosystems and processes" outside (as well as inside) the reserve system is critical to invertebrate conservation.

Obviously the large scale clearing of native vegetation for agriculture has totally removed habitat for very many native invertebrate species. Because of the "taxonomic impediment" (i.e. poor taxonomic knowledge which inhibits research) we have little idea what the invertebrate fauna of the wheatbelt, for example, was like and what may have been lost. We do know that there is continuing progressive loss of relict species on the remaining relict vegetation (reserves) as a result of restricted distributions and a variety of ecological circumstances.

Less obvious than clearing are the effects of changed land management practices since the arrival of Europeans, for example on pastoral lands and in forests. Very few studies have been done on the impacts on invertebrate communities and species of continuing grazing, regular prescribed burning and periodic clear-felling. Those which have been done have been relatively short-term and inconclusive. This type of research is very labour-intensive and must be done over long time periods to be useful. The desperate lack of taxonomic knowledge of the most important elements (in terms of ecological processes) in the invertebrate fauna such as helminth worms, beetles and mites, continues to inhibit research.

Given the importance promoted in this Nature Conservation Strategy to ecosystem management and maintenance of life-support systems, these are critical issues which should be addressed. Research in these fields should be given the highest priority. Strategies for invertebrate taxonomic and synecological research, involving the museum and other agencies and leading to improved management strategies, should feature strongly in this document but they are lacking.

Recommendation 19

The document should give greater emphasis to the conservation and off-reserve management of ecosystems including the necessary research.

4.3.2 Threatened invertebrates

We turn now to the second part of the sentence quoted above from page 77: it is true that invertebrates may be gazetted as threatened under State legislation, thereby providing them with protection. What is not said is that this has not yet been done, even though the threatened status of several invertebrate species has been documented.

It must be acknowledged that there are practical difficulties in providing some invertebrates with statutory protection, and that in many cases it is obviously unnecessary. However, that argument does not diminish the need to provide special protection to threatened invertebrates.

There is reference in the document to the lack of knowledge about the degree to which invertebrates are threatened (p. 76). This leaves no room for any complacent assumption that invertebrate species are not threatened. In fact, invertebrate zoologists believe that a significant element of the invertebrate fauna is threatened, and that many species have already been lost. The extinction problem here may well be as severe as in the much quoted mammals.

As is the case with the flora, especially in the South-West, the habitat heterogeneity and complex climatological and geological history has left us today with a diverse invertebrate fauna, many genera and species being relict from ancient Gondwanaland. These relict animals have extreme scientific importance. Many of them, like many threatened plant species, have very restricted geographical distributions and narrow habitat requirements. Many of them also have little or no capacity to migrate and re-establish populations when they have become locally extinct.

Examples of this are legion. For example, the megalomorph spiders include several such species, some of which are known to be fire sensitive. The snail *Austrosimmnaea* is a Gondwanaland relict now inhabiting only a handful of damp sites along the coastal zone of the Leeuwin-Naturaliste Ridge. The spiders are vulnerable to changes in fire management while the snails are vulnerable to climate change and utilisation of water resources adjacent to their tiny habitats. These matters are discussed further in the section on the adequacy of the reserve system.

The plight of the Western Australian invertebrate fauna needs urgent study but receives little attention in this Strategy. The section in Chapter 8 dealing with threatened species has no reference in either the objectives or the action steps to the problem of invertebrates.

In United States and Victorian conservation legislation special provision is made for invertebrate conservation. The Western Australian provision referred to above is curious, or rather its implementation is curious. By definition under the Wildlife Conservation Act, invertebrates are "fauna" and would be subject to the same measure of protection as vertebrates. But under the provisions of Section 14 (2) (a) the Minister has declared by gazettal notice that, with a couple of exceptions, invertebrates are **not** fauna for the purposes of the Act. In other words they have no protection (outside nature reserves and national parks where other provisions apply).

Further, the Act prescribes that only protected fauna may be declared "threatened". Therefore, before any invertebrate species may be declared threatened and given special protection its status as protected must first be re-instated.

Nevertheless, the Western Australian legislation contains sufficient provisions for the declaration of threatened invertebrates. The Strategy should include a discussion of the issue and propose action steps for the application of the provisions. The lack of such proposals leaves the impression that the Department does not give proper consideration to invertebrate conservation, even though it was a party to the development of the Australian Statement on Invertebrate Conservation and acknowledges their critical importance in ecosystems.

In terms of public perception, the use of Section 14 (2) (a) to un-protect invertebrates must seem counter to the spirit of the national statement and those parts of the discussion in this document which refer to the critical role of invertebrates in nature conservation. Perhaps an amendment could be considered which avoids this appearance.

Recommendation 20

The document should give address the inadequacy of the protection of invertebrate fauna and propose actions (including legislative amendments if appropriate) to correct this.

4.4 Relict species

The discussions of the existing reserve system (Chapter 4) and planning for a more representative one (Chapter 5), hardly refer to the very difficult issue of relict species. Southern WA is peculiarly rich in such species, many of which are relicts of ancient Gondwanaland now confined to very small populations and with very restricted distributions. These plants and animals have extreme scientific interest. (See also comments on threatened invertebrates.)

Many vertebrate species, notably mammals and birds, have recently become relict (i.e. restricted to few populations in only a part of the former geographical range since European colonisation). Although data are scanty, this is certainly true also of many native plants and invertebrates. But in addition, many plants and invertebrates are "naturally" relict, i.e. they are survivors of ancient floras and faunas now confined to very restricted locations by quirks of evolutionary, geological and climatological history. They form a very notable element in the flora and fauna, especially in the South West Land Division.

Some of the relict species are also relictual in the sense that they are the last remaining living representatives of genera and families which were once much more widespread and speciose, i.e. they can be said to be "living fossils". In any conservation strategy giving regard to maintaining biodiversity such species warrant high priority for they preserve genotypes distant to that of other living forms. With their restricted habitats and distribution and small populations they are especially vulnerable to disturbance by human activity.

There is a practical difficulty, however. How can a reserve system be designed and managed in a region like the South West where relict species are scattered over the heterogenous landscape like pepper by seemingly random historic circumstance?

Fortunately many of the relict species of the south coast are within reserves but even these require special management rather that broadscale rule-of-thumb management strategies. Also, the occurrence of relict species is not actually altogether random. Highland gullies, high rock outcrops and wetlands provide refugia for a large proportion of them. This issue is touched on in the section on "Uplands ..." (p. 46) although the historical significance of many of the relict species is not addressed and the special difficulties in "designing" a reserve system to deal with relictual species is not discussed.

There is no mention of the fact that the majority of the animals concerned are invertebrates. There is an urgent need for taxonomic research to identify the species as well as their habitats, and ecological research to determine their special habitat requirements. (See comments on the Research section.)

The special issue of relict species conservation needs more emphasis in this Strategy.

Specific strategies are needed to identify and include as many of these areas as possible in the reserve system with appropriate management. Objective 3 (p. 49) and action steps (i) and (ii) (p. 50) are aimed at this problem but they are inadequate. Preparation of inventories of "significant habitats" (action i) and of "flora and fauna of significant habitats" (action ii) are proposed but they are not carried through to the research objectives and action steps (pp.112-114).

Recommendation 21

The protection of relict species, both on and off reserves should be given greater emphasis and specific actions proposed.

4.5 Fire

The Strategy correctly identifies fire as potentially a threatening process if the fire regime is "inappropriate" (p.1; p. 87). This is one of the hottest subjects in the conservation debate but the pros and cons of the arguments are not discussed. What is appropriate and inappropriate is not explored. Obviously the appropriate fire regime will vary from one type of habitat to another, and from one species to another.

The likelihood of long-term ecosystem effects of regular prescribed burning in place of episodic wildfires is a major conservation issue which remains unresolved. The respective consequences of prescribed autumn burning versus spring burning is another major issue. CALM has taken a vigorous part in public debates and has a great deal of technical information on these matters.

In the section on endangering processes (Chapter 9, p. 87) under the heading "Habitat Modification", the statement is made that "probably the issue most requiring further attention is the management of fire regimes". This is undoubtedly true and relates to most terrestrial habitats throughout the State including coastal heathlands, pastoral lands and forests. Yet the position is taken that it is important "especially in the huge expanses of the arid zone" and the only discussion of the importance of fire is in that context.

In view of the significance of fire as a habitat modifying force, the omission of an adequate discussion of the role of fire is a major deficiency in the document which should be corrected.

Recommendation 22

The document should include a more detailed discussion of the significance of fire as a habitiat modifying force, including details of the impacts of CALM's current fire management practices and proposals for research/amendment.

4.6 Ducking the issues

In several places the document fails to lay out clear policies but falls back on the fact that CALM carries out the directions of Government, whatever its policies might be. That does not seem a very helpful "vision for nature conservation in Western Australia". The issue is most evident in the sections dealing with commercial and recreational utilisation of wildlife resources and mining on reserves policy.

Recommendation 23

The document should not be constrained by existing policy, but should provide advice for new olic initiatives, includin ad ustments to existin olicies where a ro riate.

4.7 Nature reserves

4.7.1 The history of their establishment

A quotation from the book "Reflections on 20 years" published recently by the EPA:

> "Systematic conservation through reserves had its genesis in 1958 when the Australian Academy of Science appointed a Committee for National Parks and Nature Reserves to provide information that might lead to the establishment of a comprehensive system of reserves across Australia. The Committee, in turn established state sub-committees to determine what already had been done, what was being done and what should be done to have adequate land set aside for national parks and nature reserves. The West Australian sub-committee made its land mark report to the Academy in 1962, selecting new areas to meet the need for a set of reserves to be representative of the major communities of wildlife and scenery types. The CTRC wrote in 1974 that although a number of the

Academy sub-committee's recommendations were acted on by the Minister for Lands, conflicting interests impeded the implementation of others.

Efforts continued in 1969 with the formation by the WA State Government of the Reserves Advisory Council. It was to consider ways of protecting natural scenery in WA and to recommend legislative means of achieving the State's goals and, again, while some of its recommendations were implemented — namely, the Victoria Desert Wildlife Sanctuary and the Chichester Range National Park — others were not achieved.

In 1971, its first year, the Environmental Protection Authority directed its own Conservation Through Reserves Committee, which first met on February 17, 1972, to recommend the best areas for conservation. And so began the major study to set aside special areas for conservation and recreation. The State was divided into 12 regions or systems, each based on geography and human activities. To make the task manageable, the State was examined system by system to define areas which should be set aside as reserves because of their particular value for plants, animals, landscape, geology or for recreation. In the following years, recommendations were made to the EPA, reviewed in the public arena and reported to Government, and endorsed by Cabinet, setting in train a complex process to set aside forever a wide-ranging suite of parks and reserves."

Recommendation 24

The document should give more acknowledgment to the role of the Conservation Through Reserves Committee in reviewing the basis of the State's reserves system.

4.7.2 Representativeness

A critical issue in biodiversity policy and programmes is the "representativeness" of the reserve system in terms of species. Statistical methods have been developed (by CALM researchers and others) for the design of representative reserve systems which maximise habitat and species representation.

However, the fact is that the Western Australian reserve system was not established by application of such technical methods. Some of the early reserves were selected for scenic or other values. The more recent CTRC review of the reserve system, which resulted in substantial additions, was based mainly on subjective analysis of regions and vegetation systems and the information available was often limited. Many of the additions were of land which happened to be still available rather than land which best increased the representativeness of the reserve system.

The more recent approach to reserve selection seeks to redress the lack of representativeness in the existing reserve system. A detailed survey and statistical approach to reserve design is still appropriate in the arid and semi-arid parts of the State but elsewhere, especially in the South West Land Division, the opportunity to include some major habitat types, with their characteristic biota, has long since passed. This needs to be acknowledged. Nevertheless, improvements to the representativeness of the reserve system can and must continue.

This situation is well described in the Strategy (Chapter 4, p. 37) and the objectives and action steps in Chapter 5 deal with the issue.

Although scientific methods are available for designing reserve systems to *maximise* representativeness, there is evidence that even if those methods were applied to large pristine regions, the area of land which would need to be reserved to provide secure refuge for *all* native plant and animal species would vastly exceed the 10% of the total often quoted as the ideal proportion. For example, in a study of wetland flora in the Macleay Valley floodplain of NSW, Margules & Nicholls (1988, *Biological Conservation*, **43**: 63-76) showed that 44.9% of the wetland area would need to be reserved in order to represent every species at least once in a reserve.

In areas of high habitat and biotic homogeneity, such as the desert areas of Western Australia, the necessary proportion of land to be reserved would be relatively low. But conversely, in

areas of high habitat and biotic heterogeneity it is probably quite impossible to reserve sufficient secure habitat for even the majority of species. Regrettably, it is the latter circumstance which prevails in the South West Land Division where it has been further compounded by extensive clearing. Some soil types and associated vegetation types have been virtually completely alienated by clearing for agriculture and their biota has been lost because of the association between fertile soils and the dependent flora.

Action step (i) on page 41 which seeks to establish and manage a "State-wide" reserve system that contains "all" species is clearly unrealistic - an impossible aim - in respect of the extremely species rich south-west.

Although the Strategy in places implicitly acknowledges this situation, for example in the discussion on "How to conserve biological diversity" (pp. 10-13), the proposed action steps give it insufficient emphasis. On page 11 the statement is made that "the conservation reserve system is currently the primary tool for achieving this aim [management for nature conservation]". Elsewhere the document acknowledges that many species do not occur within reserves and that conservation strategies must take account of the need to conserve a significant number of native flora and fauna species off reserves (pp. 53-56).

The reserve system, while certainly the "front line" of species conservation, cannot now be "designed" to adequately represent our flora and fauna. There is a danger that the community may become complacent, if it is led to imagine that the reserve system will solve the problem. In reality a very large proportion of our species must be conserved off-reserves - it is a community problem not to be solved solely by Government reserving and managing land for conservation.

Recommendation 25

The document should not imply that a fully representative reserve system is an attainable aim, but should place more emphasis on off-reserve conservation strategies to supplement the function of the reserve system.

4.7.3 Status of nature reserves

It might be assumed that Class A nature reserves would be the category of conservation reserve given the highest level of protection since that is virtually their sole purpose. That the Government has decided to give them a lesser level of protection than national parks (in respect to mining) indicates that there is a poor level of public understanding of the State's conservation reserve categories. The section describing these categories needs strengthening.

Recommendation 26

The document should list strategies and actions for promoting understanding of the categories of reserves and their v tions.

4.8 Conservation planning

Chapter 5 of the document repeats some of the theme of Chapter 4 and does not differentiate adequately between planning for a conservation reserve system and planning for reserve management. This is an editorial detail but important.

Recommendation 27

The document should differentiate adequately between planning for a conservation reserve system and planning for reserve management.

4.9 Land clearing

In the Summary (p.1, para. 4) the statement is made that "development of land has almost ceased". This statement is misleading. The release of new blocks of crown land for clearing for farming has been discontinued but clearing of remnant native vegetation on existing farms continues on a large scale.

Recommendation 28

The document should acknowledge that while the release of land for agriculture has virtually ceased, the ongoing clearing of land for agriculture can be detrimental to the objectives of off-reserve conservation and that assessments of the biological values of areas proposed for clearing and the possible prevention of some clearing on conservation grounds are required if the interests of conservation are to be adequately addressed.

4.10 Habitat modification

Disturbance of natural ecosystems is discussed at length in the Strategy in the context of endangering processes. One aspect which is not discussed is the disturbance which may be caused when native species change their population status.

The classic examples in the marine field are the so-called plagues of Crown of Thorns Starfish *Acanthaster* and coral-eating snail *Drupella*, which severely damage coral reef ecosystems. Another in the terrestrial environment is the damage done to native vegetation, and presumably other native fauna, by population growth of kangaroos, including on nature reserves established to protect native flora.

There is much debate about whether these events are "natural" or human induced. The kangaroo problem at least appears to be human induced. The ecosystem damage such animals may cause can equal that done by introduced species which are discussed at length. The culling of native species for ecosystem management is a difficult subject raising several philosophical and technical issues and it is worthy of discussion in this Strategy.

Recommendation 29

The document should more adequately address the difficult subject of the management of increases in the populations of some native species (i.e. how to ensure that they do not increase to a level which adversely affects other nature conservation objectives).

5. Conclusion

The Department of Conservation and Land Management has taken a major step towards better nature conservation in Western Australia with the production of this Nature Conservation Strategy. As a long-term strategy for CALM's nature conservation effort and as the first step towards a State Nature Conservation Strategy it is to be applauded. The suggestions in this submission are intended to increase its effectiveness in achieving its objectives. The Environmental Protection Authority would be pleased to respond directly to any questions CALM may have in relation to these suggestions and to work co-operatively with CALM and other appropriate agencies on the development of a State Strategy.