ENVIRONMENTAL PROTECTION OF NATIVE VEGETATION IN WESTERN AUSTRALIA

CLEARING OF NATIVE VEGETATION, WITH PARTICULAR REFERENCE TO THE AGRICULTURAL AREA

Position Statement No. 2

December 2000

Environmental Protection Authority

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FOREWORD

The protection of Western Australia's native vegetation is important, not only because of its biological diversity and uniqueness, but also because of the part it plays in ecosystem processes. The importance of native vegetation has been brought into sharp focus in recent times through the issue of salinity in the agricultural area.

Much of the native vegetation in the agricultural area has been cleared, and the loss of these deep-rooted plants has allowed the water level to rise bringing with it large quantities of salt. The resulting salinisation is the State's most pressing environmental problem. About 2 million hectares of the State's 18 million hectares of prime agricultural land are already salt affected and a further 4 million hectares are at risk.

Clearing and consequential salinity are having a devastating effect on biodiversity through the direct loss of plant species, and the associated loss of mammals, birds and other animals which depend upon sufficiently large areas of healthy bush for food and shelter. Many of the remaining areas of native vegetation in the wheatbelt are small islands surrounded by farmland, and the fauna are unable to move to other areas of native vegetation when they are too far apart and not linked by "stepping stones" or corridors.

The Environmental Protection Authority has long been concerned about the environmental consequences of clearing in the agricultural area and, whilst it appreciates that there are matters of equity to be considered, it holds strongly to the view that from an environmental perspective it is unreasonable to allow further clearing to be undertaken in the agricultural area for agricultural purposes.

Through the publication of this Position Statement, the Authority is setting down its view on land clearing in agricultural areas. However, the matter of land clearing also needs to be given attention in relation to other areas of the State. Western Australia is a signatory to the National Strategy for the Conservation of Australia's Biological Diversity. The principles embodied in that Strategy have to be followed whenever clearing of native vegetation is being considered by the signatory governments.

Western Australia's native vegetation is unique on a world scale. Some areas, such as Mount Lesueur, have very high species diversity levels, reaching over 100 species per 100 square metres. This compares with other parts of the world where 30 species per 100 square metres is regarded as high. The challenge is to ensure that as our State grows we take the appropriate action to protect our unique native vegetation which is recognised by the thousands of people who tour Western Australia admiring our wildflowers.

This Position Statement has been finalised by the Environmental Protection Authority, following its consideration of an array of inputs from conservation groups, government agencies and individual members of the public, as a result of the release of the EPA's Preliminary Statement. The EPA greatly appreciates those inputs.

I commend this Position Statement to you for reading.

Bernard Bowen

Bernard Bowen

Chairman
Environmental Protection Authority

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1.   INTRODUCTION

Australia is unique in both the environmental processes acting at the landscape level and in its biodiversity.

The EPA is mindful of the geo-evolutionary history of the Western Australian environment which has given rise to extreme age of most of the landscape, a long period of erosion and removal of nutrients from the landscape, relative lack of soil-generating processes such as volcanism and glaciation, and a climate with high evaporation and sufficient time to concentrate large amounts of salt in the soil profile which are then readily freed when land is cleared of the native deep-rooted vegetation and the water table rises.

The particular geological and climatic history and naturally nutrient depauperate status of the soils has provided the somewhat extreme conditions to which WA's native plants have become adapted. This, combined with a long period of isolation from other land masses, has provided an extended period of time in which subtle adaptations to the extreme conditions could take place, resulting in the very high level of biodiversity of plant species in Western Australia, especially in wetland and heath communities in the South West region. The South West is frequently referred to as a mega-biodiverse region on a world scale. Much of the region has species numbers in the order of 80-100 species per hundred square metres. This compares with values commonly regarded as high in other parts of the world in the order of 30 species per hundred square metres. Furthermore, although the number of species per hundred square metres may remain the same over distance, the change in actual species represented occurring over quite short distances in upland and wetland areas with high biodiversity, such as Mt Lesueur, the Stirling Ranges and the Western Wheatbelt, can also be quite high.

The EPA regards biological diversity as being a key environmental factor in the State. In 1996, the Commonwealth Government, with all State and Territory Governments, signed the National Strategy for the Conservation of Australia's Biological Diversity. Conservation of biological diversity is a foundation stone of ecologically sustainable development. In this regard, one of the objectives of the National Strategy for Ecologically Sustainable Development is to protect biological diversity at the ecosystem, species and genetic levels and to maintain essential ecological processes and life support systems. The National Strategy for the Conservation of Australia's Biological Diversity adopted the following principles as the basis for the Strategy's objectives and actions:

1.   Biological diversity is best preserved in-situ.

2.   Although all levels of government have clear responsibility, the cooperation of conservation groups, resource users, indigenous peoples, and the community in general is critical to the conservation of biological diversity.

3.   It is vital to anticipate, prevent and attack at source the causes of significant reduction or loss of biological diversity.

4.   Processes for and decisions about the allocation and use of Australia's resources should be efficient, equitable and transparent.

5.   Lack of full knowledge should not be an excuse for postponing action to conserve biological diversity.

6.   The conservation of Australia's biological diversity is affected by international activities and requires actions extending beyond Australia's national jurisdiction.

7. Australians operating beyond our national jurisdiction should respect the principles of conservation and ecologically sustainable use of biological diversity and act in accordance with any relevant national or international laws.

8. Central to the conservation of Australia's biological diversity is the establishment of a comprehensive, representative and adequate system of ecologically viable protected areas integrated with the sympathetic management of all other areas, including agricultural and other resource production systems.

9. The close, traditional association of Australia's indigenous peoples with components of biological diversity should be recognised, as should the desirability of sharing equitably the benefits arising from the innovative use of traditional knowledge of biological diversity.

The EPA is aware that there may be equity issues that may need to be addressed by government and that the challenge now is to find the means of doing so.

However, from an environmental perspective the EPA is of the view that it is unreasonable to expect to be able to continue to clear native vegetation from land within the agricultural area (see Figure 1) other than relatively small areas and where alternative mechanisms for protecting biodiversity are addressed. Furthermore, removal of remnant native vegetation from elsewhere in the State should be in accord with the principles and objectives of the National Strategy for the Conservation of Australia's Biological Diversity. The EPA notes that in relation to land clearing Objective 7.1 of the National Strategy, signed by all Premiers, Chief Ministers and the Prime Minister, commits State, Commonwealth and Territory Governments by the year 2000 to, among other things:

"(l) arresting and reversing the decline of remnant native vegetation; and

"(m) avoiding or limiting any further broad-scale clearance of native vegetation, consistent with ecologically sustainable management and bio-regional planning, to those instances in which regional biological diversity objectives are not compromised" (Commonwealth of Australia, 1996, p.42).

2. WHAT BIODIVERSITY IS AND WHY IT IS IMPORTANT

The National State of the Environment Report made the following statements in defining biodiversity:

"Biodiversity is the variety of all forms of life - the different plants, animals and micro-organisms, the genes they contain and the ecosystems of which they form a part. Consequently, biodiversity is considered at three levels: ecosystem diversity, species diversity and genetic diversity.

"The species in a given area interact with each other and with their environment to form complex networks known as ecosystems. These differ from place to place, thus creating ecosystem diversity. Each ecosystem differs from all others because it contains a unique combination of species (and therefore genes) and because these species interact with each other and with each environment in distinctive ways.

"Species diversity is the number of species and their relative abundance in a defined area.

"Genetic diversity is the variety of genes contained in all the species in a given area. There are so many genes and different possible combinations of genes that, for most types of organisms, every individual, population and species is genetically distinct." (Saunders et al, 1996, p.4-4).

There are four main reasons for preserving biodiversity: maintaining ecosystem processes, ethics, aesthetics and culture, and economics.

Biodiversity has two key aspects:

- its functional value at the ecosystem level; and

- its intrinsic value at the individual species, species assemblages and genetic levels.

The functional value is derived from the parts played by the species assemblages in supporting ecosystem processes and is expressed through the kinds of plant and animal assemblages occurring in various parts of the landscape on different soil types. In addressing this, matters requiring consideration include:

- soils;

- landscape;

- species richness;

- species composition;

- differences in composition pre and post disturbance; and

- the ecosystem processes, linkages and how they are supported.

The intrinsic values relate to the actual species and species associations.

Two species assemblages may have different *intrinsic* values but may still have the same *functional* value in terms of the part they play in maintaining ecosystem/ecological processes.

The report also included the statements:

"Biodiversity provides the critical processes that make life possible, and that are often taken for granted. Healthy, functioning ecosystems are necessary to maintain the quality of the atmosphere, and to maintain and regulate the climate, fresh water, soil formation, cycling of nutrients and disposal of wastes (often referred to as ecosystem services). Biodiversity is essential for controlling pest plants, animals and diseases, for pollinating crops and for providing food, clothing and many kinds of raw materials." (Saunders et al, 1996, p.4-5); and

"While primary ecological processes are well understood we know little about the ecological role of individual species. The maintenance of soil structure and fertility, for example, depends largely on the activity of groups of poorly understood organisms that constitute soil biodiversity. Loss of these organisms results in the disruption of processes essential to agriculture, such as water intake, nitrogen fixation and other types of nutrient cycling. Thus, by failing to take appropriate action to conserve biodiversity, Australia could be losing species vital to the sustainability of its rural industries." (Saunders et al, 1996, p.4-6).

The report points out that the main pressures on plant biodiversity come from agriculture, grazing, roadworks and weed competition (see Table 1). In Western Australia, *Phytophthora cinnamomi* dieback disease is also a major threat to plant diversity in the South West.

Saunders et al (1996) also says that cascading effects are common. For example clearing, such as for agriculture and forestry, is often so rapid and extensive that natural systems cannot recover. The loss of plants results in the loss of food for animals (herbivores and in consequence carnivores). In addition "the removal of plant cover leads to the loss of soils through erosion, or of soil nutrients through leaching. Both processes reduce the vast complexes of minute species that comprise soil biodiversity. Urbanisation and pastoral and agricultural programs that suppress the regeneration of native vegetation make these changes and losses long-term, perhaps permanent." (Saunders et al, 1996, p.4-7).

Furthermore, clearing in agricultural areas tends to leave remnants of vegetation as isolated islands and this process of fragmentation tends to mask the cascading effects that can be subtle and hard to see, such as lack of pollination of plants, or lack of regeneration of saplings. Cascading effects commonly follow the introduction of exotic plants, animals or micro-organisms. Introduced weeds have effects that start at the base of the food chain, displacing native species and even entire communities of native plants. These effects flow on to animals that depend on the native plants for food and shelter.

Biodiversity is important not only because of the plants and animals as species but because of the ecological functions they perform. Reduction of biodiversity or removal of species therefore can lead to significant effects at the level of how ecological systems function.

The key questions to ask always in relation to making changes which might reduce biodiversity are "How much biodiversity is enough", "How much breeding stock is enough" or alternatively "How much biodiversity is it safe to remove?"

Finally, biodiversity is important in both "quality" (or condition) and "extent". This Statement relates only to "extent", but the EPA is very mindful that "quality" is an essential element, and that many land use activities throughout the State can reduce the quality of the biodiversity. This issue also needs to be addressed.

Table 1. Pressures on plant bio-diversity: Major causes of extinction and past and present threats to endangered plant species in Australia (Source: Leigh and Briggs (1992) and Leigh and Briggs (1994) *in* Saunders et al, 1996, p.4-7.).

Threat/cause	Number of species presumed extinct	Endangered species	
		Past threat	**Present and future threat**
Agriculture	44	112	50
Grazing	34	51	55
Weed competition	4	12	57
Roadworks	1	8	57
Low Numbers	-	10	85
Industrial and urban development	3	20	21
Fire frequency	-	10	17
Forestry	-	10	10
Collecting	-	6	17
Mining	1	3	11

Note: Many species are affected by more than one threat. In some cases the past threat may have ceased and new ones arisen. Other threats include recreation, dieback, clearing, railway maintenance, salinity, insect attack, quarrying, trampling by pigs and buffalo, drainage and flooding.

3. CLEARING IN THE BROADER CONTEXT

This Position Statement provides an overview of the EPA's position on the clearing of native vegetation in Western Australia with particular reference to clearing within the agricultural area. However, there is an array of additional information at both the National and State levels which is relevant to the position adopted by the EPA. Some of the more important documents are (see Section 5, Additional Reading):

• National Strategy for the Conservation of Australia's Biological Diversity 1996.

• Natural Heritage Trust Partnership Agreement 1997.

• ANZECC National Framework for the Management and Monitoring of Australia's Native Vegetation 1999.

• Memorandum of Understanding for the Protection of Remnant Vegetation on Private Land in the Agricultural Region of Western Australia 1997.

• EPA Bulletin 966 on Clearing of Native Vegetation 1999.

• Native Vegetation Working Group Final Report 2000.

The goal of the Bushcare Program of the Natural Heritage Trust Partnership Agreements is to reverse the long-term decline in the quality and extent of Australia's native vegetation cover. Important aspects of this goal are:

• no clearing of endangered ecological communities;

• no clearing that would change the conservation status of a community; and

• limit further broadscale clearing to those instances which do not compromise regional biodiversity objectives.

These are being pursued bilaterally with each jurisdiction in the context of the Partnership Agreements, as well as multilaterally through the development of the Australian and New Zealand Environment and Conservation Council's (ANZECC) *National Framework for the Management and Monitoring of Australia's Native Vegetation.*

From a purely biodiversity perspective and taking no account of any other land degradation issues, there are several key criteria now being applied in States where clearing is still occurring:

i)   the "threshold level" below which species loss appears to accelerate exponentially at an ecosystem level is regarded as being at a level of 30% of the pre-clearing extent of the vegetation type;

ii)   a level of 10% of the original extent is regarded as being a level representing "endangered";

iii)   clearing which would put the threat level into the class below should be avoided; and

iv)   from a biodiversity perspective, stream reserves should generally be in the order of at least 200m wide.

The Commonwealth has also indicated that for a State such as WA with known and predictable salinity problems occurring within a very short time following clearing, it is difficult to see how any further clearing in areas known to be susceptible to salinisation could be defended.

4. EPA'S POSITION ON CLEARING

The previously stated EPA policy in relation to remnant native vegetation is:

"Now all existing remnant native vegetation is important, and it should be managed to ensure its retention." (EPA, 1988).

The EPA's published objective for remnant native vegetation at that time was "To retain and manage remnant native vegetation." (EPA, 1988).

EPA's current position on clearing follows:

4.1 Clearing in the agricultural area for agricultural purposes

In the agricultural areas the removal of biodiversity has already been too much and agricultural practices have not been able to mimic the ecological function performed by the former native plant communities. Only 13 per cent of vegetation remains in the Avon Wheatbelt Interim Biogeographic Regionalisation for Australia region, and in that region there is also only 2 per cent of vegetation in secure conservation reserves. The EPA recognises that, by comparison with the remainder of the Wheatbelt area, the West Midlands has a higher percentage of remaining native vegetation. However, the West Midlands is the only portion of the agricultural area that preserves a reasonable proportion of the intricate soil landscape that once characterised much of this agricultural area. This landscape over time, with climate change, has given rise to the rapid replacement of species over very short distances which now characterises the flora of West Midlands and underlies its high species diversity and mosaic of vegetation communities. This is now the only area where the full range of the soil landscape and its mega diverse vascular flora can be observed and retained.

Starting again with the wisdom of hindsight we would need a very cautious approach to such mass clearing and removal of biodiversity. In terms of maintaining hydrological function alone, most of the agricultural area would need to retain deep-rooted vegetation at a level in the order of 60 to 70 percent cover. Recent information from Tom Hatton at CSIRO Land and Water (pers. comm) suggests that to have a chance of restoring hydrological function in some catchments the figure for planting deep-rooted vegetation would need to be in the order of 85% catchment cover, because of the hysteresis effect (when you push a natural system too far then you have to go even further to bring about a rebound and return it to close to the previous position, if this is possible at all).

The "agricultural area" to which this statement applies is shown in Figure 1. The eastern boundary of the agricultural area is the agricultural clearing line; the western boundary follows the System 6 boundary from the Moore River (north of Perth) southward, until the point where the System 6 boundary heads westward – then the Shire of Boyup Brook boundary is followed eastward to intersect with the RFA boundary, with the RFA boundary followed southwestward to the ocean.

1. Significant clearing of native vegetation has already occurred on agricultural land, and this has led to a reduction in biodiversity and increase in land salinisation. Accordingly, from an environmental perspective any further reduction in native vegetation through clearing for agriculture cannot be supported.
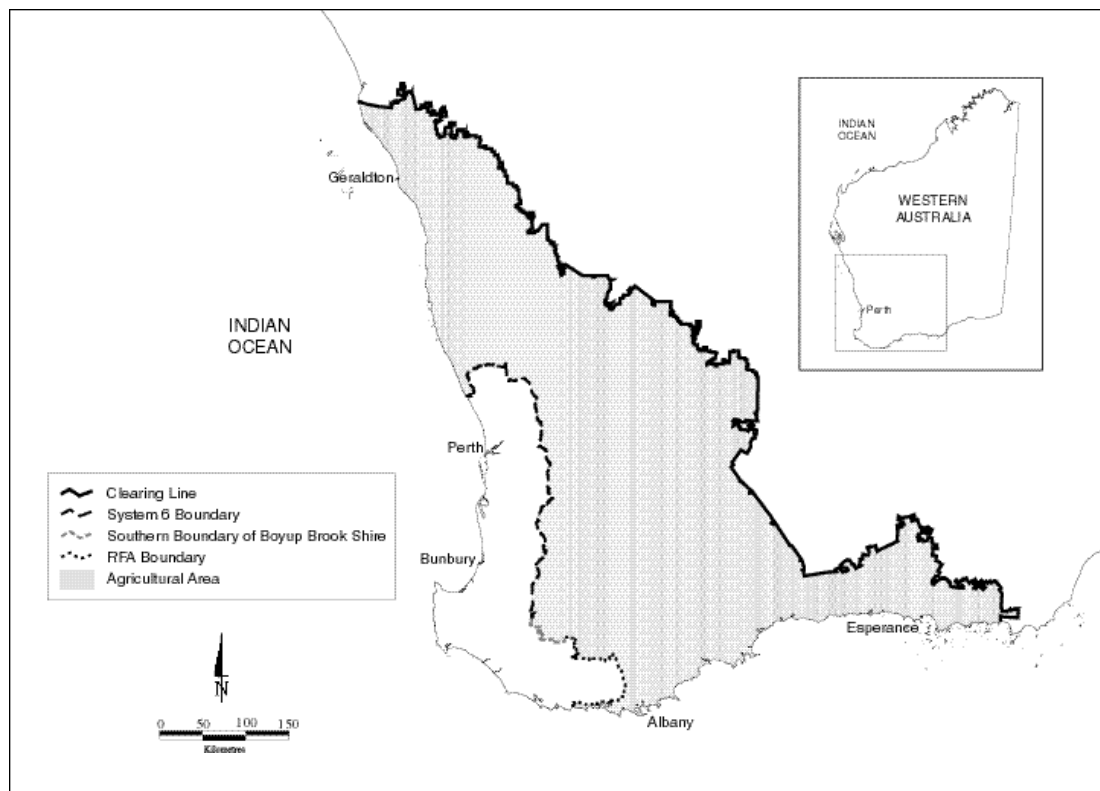
Figure 1. Agricultural area for purposes of this Position Statement.

2. All existing remnant native vegetation should be protected from passive clearing through, for example, grazing by stock or clearing by other means such as use of chemicals including fertilisers.

3. All existing remnant native vegetation should be actively managed by landholders and managers so as to maintain environmental values.

4. Because of the extent of over-clearing in the agricultural area, development of re-vegetation strategies at a landscape level, including provision of stepping stones, linkages and corridors of native vegetation, should be a priority.

5. Clearing of deep-rooted native vegetation for replacement with non native deep-rooted crops (eg *Tagasaste* or blue gums) is generally not regarded as acceptable environmentally and these alternative deep-rooted crops should be planted on already cleared land.

4.2 Clearing in the agricultural area where alternative mechanisms address biodiversity values

In exceptional circumstances the EPA could consider supporting clearing in the agricultural area if:

1. The proposed land use addresses alternative mechanisms for protecting biodiversity. Opportunities for addressing biodiversity could include rehabilitation of disturbed areas and/or acquisition of areas containing remnant native vegetation. The EPA would like to see an overall environmental benefit as a result of the proposal, such as

ensuring protection and management of higher quality remnant native vegetation in the general area (not necessarily on the same property).

2. The area proposed for clearing is relatively small, depending on the scale over which significant biodiversity changes occur in the particular area, including the extent of vegetation in the surrounding area, and recognising that the values will vary for different ecosystems.

3. The proponent demonstrates that the elements set out in Section 4.3 are being met. This will require extensive local and regional biodiversity work.

4. Land degradation, including aquatic environments and threatening processes, such as dieback, salinisation or disruption of catchment processes, on-site and off-site would not be exacerbated.

4.3   Clearing in other areas of Western Australia

In its consideration of the consequences of proposals for biological diversity, the EPA will focus on the principles and the related objectives and actions of the National Strategy outlined in the Introduction to this paper. The EPA would expect that the government will take account of these principles prior to making any decisions in relation to proposals. The EPA will ensure that the principles are addressed in any environmental documentation relating to proposals.

In assessing a proposal, the EPA's consideration of biological diversity will include the following basic elements:

1. A comparison of development scenarios, or options, to evaluate protection of biodiversity at the species and ecosystem levels, and demonstration that all reasonable steps have been taken to avoid disturbing native vegetation.

2. No known species of plant or animal is caused to become extinct as a consequence of the development and the risks to threatened species are considered to be acceptable.

3. No association or community of indigenous plants or animals ceases to exist as a result of the project.

4. There would be an expectation that a proposal would demonstrate that the vegetation removal would not compromise any vegetation type by taking it below the "threshold level" of 30% of the pre-clearing extent of the vegetation type (see Section 3).

5. Where a proposal would result in a reduction below the 30% level, the EPA would expect alternative mechanisms to be put forward to address the protection of biodiversity.

6. There is comprehensive, adequate and secure representation of scarce or endangered habitats within the project area and/or in areas which are biologically comparable to the project area, protected in secure reserves.

7. If the project area is large (and what is meant by large will vary depending on where in the State) the project area itself should include a comprehensive and adequate network of conservation areas and linking corridors whose integrity and biodiversity is secure and protected.

8. The on-site and off-site impacts of the project are identified and the proponent demonstrates that these impacts can be managed.

Clearing in these other areas of the State may be environmentally acceptable if the proponent demonstrates clearly that the proposal meets the above elements and that actions to meet the two key objectives of the National Strategy for the Conservation of Australia's Biological Diversity are being met, namely:

by the year 2000 Australia will be:

"(l) arresting and reversing the decline of remnant native vegetation; and

"(m) avoiding or limiting any further broad-scale clearance of native vegetation, consistent with ecologically sustainable management and bio-regional planning, to those instances in which regional biological diversity objectives are not compromised" (Commonwealth of Australia, 1996, p.42).

The EPA is also mindful that it is not always possible for a proponent alone to be able to ensure that biological diversity is adequately protected and that to do so may require the participation of the State Government to ensure that adequate areas are reserved.

4.4 The matter of equity

The EPA is aware that matters of equity arise in relation to land clearing decisions. The challenge now is for Government to address these equity issues rather than to compromise in land clearing. This matter has been considered in the Native Vegetation Working Group Report 2000, which includes a number of recommendations. The Minister for Primary Industry released a Media Statement on 12 October 2000 in response to the report which, *inter alia*, listed as an action to be progressed, "establishing a revolving fund which is able to purchase bushland of high conservation value, protect this with covenants and sell to interested buyers".

5. ADDITIONAL READING

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GLOSSARY

Assemblage – A collection of co-occurring populations, therefore equivalent to community (Allaby 1992).

Biodiversity – The variety of life forms: the different plants, animals and microorganisms, the genes they contain, and the ecosystems they form. It is usually considered at three levels: genetic diversity, species diversity and ecosystem diversity (NSCABD 1996). Also referred to as *biological diversity*.

Community – A general term applied to any grouping of populations of different organisms found living together in a particular environment. Beard defines a plant community as an assemblage of plants at any given locality (Lewis 1977).

Comprehensive, Adequate and Representative (C.A.R.) Reserve System – The development of a C.A.R. reserve system is guided by nationally agreed criteria developed by JANIS (see Appendix 1):

1. **Comprehensiveness**: includes the full range of ecological communities recognised by an agreed scientific classification at appropriate hierarchical levels.

2. **Adequacy**: the maintenance of ecological viability and integrity of populations, species and communities.

3. **Representativeness**: those sample areas that are selected for inclusion in reserves should reasonably reflect the biotic diversity of the ecological communities.

Cumulative Effects – This refers to the consideration of the cumulative impact on the environment of developments at the regional scale, as in a strategic environmental impact assessment, versus the site-specific assessment of one proposal.

Degradation – Any activity which reduces the quality, nature or usefulness of land. Degradation can be caused by salinity, soil acidification, soil compaction, waterlogging, siltation, soil erosion, eutrophication, flooding, and/or the removal or deterioration of natural or introduced vegetation (Clement and Bennett 1998).

Ecological Community – Naturally occurring biological assemblage that occurs in a particular type of habitat. Note: The scale at which ecological communities are defined will often depend on the level of detail in the information source, therefore no particular scale is specified (English and Blyth 1999).

Ecosystem – A dynamic complex of plant, animal, fungal, and microorganism communities and the associated non-living environment interacting as an ecological unit (NSCABD 1996)

Floristic Community Type – Florisitc assembage defined by all the vascular plant taxa present in standard areas (a site proscribed by a plot of some form); several standard areas may have the same floristic type if they share a majority of taxa**.**

Habitat – The place or type of site in which an organism naturally occurs (NSCABD 1996).

Native Vegetation – Any local indigenous plant community containing throughout its growth the complement of native species and habitats normally associated with that vegetation type or having the potential to develop these characteristics. It includes vegetation with these characteristics that has been regenerated with human assistance

following disturbance. It excludes plantations and vegetation that has been established for commercial purposes (NSCABD 1996).

Rehabilitation – The re-establishment of ecological attributes in a damaged community although it will remain modified (English and Blyth 1999).

Restoration – The return of a community to its pre-disturbance or natural state in terms of abiotic conditions, community structure and species composition (English and Blyth 1999).

Social Surroundings – This does not involve a full social impact assessment, but in practice is restricted to the impacts of a proposal on aspects such as Aboriginal culture and heritage, visual amenity and the activities of people not associated with but impacted by the proposal. This can include the impact of a project on the economic viability of existing operations, and the environmental assets regarded by the community as having icon status.

Species – A group of organisms capable of interbreeding freely with each other but not with members of other species (NSCABD 1996).

Taxon (plural **taxa)** – The named classification unit to which individuals or sets of species are assigned, such as species, genus and order (NSCABD 1996).

Threatened – A species or community that is vulnerable, endangered or presumed extinct (NSCABD 1996).

Threatened Ecological Community – As defined by English and Blyth (1999) are those ecological communities that have been assessed through a procedure (co-ordinated by CALM) and assigned to one of the following categories related to the status of the threat to the community. One of the criteria used to determine the categories of threatened ecological community is an estimate of the geographic range and/or the total area occupied and/or the number of discrete occurrences reduced since European settlement. The categories are:

1. **Presumed Totally Destroyed**

2. **Critically Endangered**: < 10% of pre-European extent remains in an intact condition in the bioregion.

3. **Endangered**: 10 to 30% of pre-European extent remains.

4. **Vulnerable**: declining and/or has declined in distribution and/or condition, and whose ultimate security is not yet assured (it could move into a category of higher threat in the near future if threatening processes continue).

5. **Data Deficient**

6. **Lower Risk**: > 30% of pre-European extent remains, and does not qualify for one of the above categories of threat.

Threatening Processes – Any process or activity that threatens to destroy or significantly modify the ecological community and/or effect the continuing evolutionary processes within any ecological community (English and Blyth 1999).

Vegetation Condition – The condition as defined by Keighery (1994):

1. **Pristine**: no obvious signs of disturbance.

2. **Excellent**: vegetation structure intact; disturbance affecting individual species and weeds are non-aggressive.

3. **Very Good**: vegetation structure altered; obvious signs of disturbance.

4. **Good**: Vegetation structure significantly altered by obvious signs of multiple disturbance. Retains basic vegetation structure or ability to regenerate it.

5. **Degraded**: Basic vegetation structure severely impacted by disturbance. Scope for regeneration of vegetation structure, but not to a state approaching good condition without intensive management.

6. **Completely Degraded**: The structure of the vegetation is no longer intact and the area is completely or almost completely without native species.

Vegetation Type – Vegetation types as defined by Beard (1990) are based on three principle characteristics of vegetation:

1. **Floristic Composition**: the species of plants which comprise vegetation.

2. **Vegetation Structure**: the height of plants in layers, their shape and their spacing

3. **Growth-form**: the morphological characteristics of the component plants, such as woody or herbaceous, annual or perennial, thorny or succulent, evergreen or deciduous, and leaves of a certain texture, size and shape.

   Beard mapped Western Australia's vegetation types, principally at the level of plant formation and most often at the 1 : 250,000 scale, doing this at the level of *plant formation*, with minor attention to *plant associations* where they could be readily distinguished.

4. **Plant Association**: the component species, with particular dominants, of a given area. If the vegetation of another area has the same dominants it is in the same association. The association is the basic unit of vegetation.

5. **Plant Formation**: a vegetation unit that considers plant associations that have a similar physiognomy (a combination of vegetation structure and growth-form), independent of specific floristic composition.