The challenge of protecting Western Australia's biodiversity

Thank you for the opportunity to speak. It means that I have to go through the discipline of thinking about the subject.

There are 2 parts:
A. Introduction to Biodiversity, and
B. Leading through to the Practical Applications.

1. What do we mean by biodiversity?
The term is a shortened version of the biological diversity of all living things: the different plants and animals including micro-organisms, the genetic information they contain and the ecosystems they form.

So biodiversity is more than a consideration of rare and endangered plants & animals, it is a consideration of communities and the functions they perform.

2. How do we measure biodiversity?
There are a number of measures which are combined to understand the broad aspect of biodiversity:
(a) number of species per unit area; [high biodiversity 80+ plant species per $100m^2$ quadrant]
(b) number of species unique to an area;

(c) change in species composition from one area to a close-by area.

We also need to measure biodiversity in terms of its ecological functions. For instance the function of the plant communities in the agricultural areas in relation to hydrological balance and the function of seagrass in relation to production of food stuff for the fish we like to eat.

3. What do experts say about the biodiversity of WA?

Extract from Tim Flannery's "The Future Eaters", pp 92-93.

> "The heathlands of south-western Western Australia support some of the most diverse and spectacular plant communities on Earth. Western Australia supports some 10 000-12 000 species of plants, with the numbers of species per square kilometre in the extraordinary heathlands of the south-west rivalling those found in the richest rain-forests of Australia's north-east.

> Most of the world's banksias, sundews (*Drosera*) and all of its dryandras, to mention only a few, are found in this small region of Australia. Yet it is remarkable that the bulk of these species come from relatively few families, such as the Proteaceae, the family containing species of *Banksia, Dryandra, Grevillia* and others. Thus many species of rather similar plants coexist. This is all the more surprising as the landscape of the south-west is, superficially at least, rather monotonous. Most of the area is covered by highly infertile sand sheets and there are few mountain ranges or sharp topographic features to provide microhabitats that might speed the evolution of new species. Subtly different soil types do, however, support different plant communities.
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> Many species in the region possess unusual adaptations to extreme soil infertility. The Western Australian Christmas tree (*Nuytsia floribunda*) is a tree-sized mistletoe that gains nutrients by parasitising the roots of grasses and other plants. The carnivorous plants are particularly abundant. Endemism is high, with two of Australia's seven genera, as well as the majority of species of two others, being found only in the south-west of Western Australia. More than half the world's species of sundews (*Drosera*) are found only there, as is the Western Australian pitcher plant (*Cephalotus follicularis*), which is placed in its own family."

4. Why is there such a high biodiversity in WA?
The reason is to do with our geological history over the past 40-60 million years.

Australia drifted northwards from the Antarctic [and is still drifting]. Australia did not experience some of the soil changing activities to the same extent as other parts of the world, e.g. creation of mountains and volcanoes.

Extract from Tim Flannery's "The Future Eaters, p 100.

> "Australia's extraordinary long-term climatic and geological stability, brought about by continental drift and its thick continental crust, are responsible for the persistence of low-nutrient conditions over tens of millions of years."

> "... floods, fires and climatic changes have disturbed the south-western heathlands for aeons, but no single shock has been large enough to remove them altogether, for fossil floras indicate that Western Australian heathland plants have been in existence for over 40 million years."

5. Why is the EPA interested in biodiversity?
There are a number of reasons:

(a) Almost every proposal which comes before the EPA involves the removal of plants and also animal habitat. The question which then has to be asked is "How much biodiversity is enough?" or alternatively "How much biodiversity is it safe to remove?"

Biodiversity is not only about plants and animals but also about the ecological functions it performs.

The removal of biodiversity in the agricultural area is a very good example of the removal of too much biodiversity. The function of keeping the salt (120kg of salt under each square metre of soil) below the impact line has been removed in large areas.

(b) There is now a "National Strategy" of the Conservation of Australia's Biological Diversity" signed by all of the Premiers, Chief Ministers and the Prime Minister.

(c) The community expects the EPA to consider "significant effect" of any proposal and in this regard biodiversity is an important factor. "Significant effect" is a matter of judgement and is associated with the term "environmental significance".
[The EPA document on Environmental Impact Assessment has set out how environmental significance will be considered - see 3.1].

Where a proposal appears likely to have a significant effect on the environment, a Decision-making Authority must refer it to the EPA, any person can refer a proposal to the EPA, the Minister can refer a proposal to the EPA and the EPA can call in a proposal.

(d) The Cabinet has included "natural conservation values" in a statement issued in 1995 about clearing.

Clearing of native vegetation and the animal habitat it provides leads directly to biodiversity considerations.

(I will come back to this subject of land clearing later.)

So, for a variety of reasons the EPA is involved in a consideration of biodiversity.

6. How much biodiversity is enough?
There can be no precise answer, but I will provide some comments.

(a) In the agricultural areas the reduction in biodiversity was too much and agricultural practices have not been able to mimic the ecological function performed by the plant communities. It is easy in hindsight to say that, but if starting again there would need to be a very cautious approach to removing biodiversity. The figure for the retention of ecological function may have been in the order of 30-40% of the original vegetation required. However, in reality we will never know what the correct approach might have been.

(b) In the marine environment the answer to the question of how much biodiversity of mangroves, seagrass and corals is enough is certainly higher than 30-40%. It is more of the order of 80-90% because its ecological function is that of a primary producer providing basic food stuff for the assemblage of animals leading to crustaceans, molluscs and fish which most Western Australians want to either just eat or catch and eat.

(c) In the forest debate there is a figure for old growth of 15% of the original area of old growth forest (in broad terms).

7. How is biodiversity maintained in today's world of community expectations?
There are a number of aspects:

(a) We all have a responsibility as good corporate citizens to protect the environment, and community consciousness is growing. This applies to both conservation reserves and areas outside the conservation estate.

(b) There is the reserve system.
This has grown from the Conservation Through Reserves system of reports in the 1970's to a gradual addition to the conservation estate.

Now there is the CAR reserve concept.
Need for Comprehensive, Adequate and Representative reserve system (CAR) in Western Australia. In some areas this is difficult to achieve because of the actions already taken. However, in Perth the manifestation is the Perth Bush Plan and in the Forest area there has been an enormous effort to establish such reserves as part of the Regional Forest Agreement process.

I will return to this in terms of the rangelands of WA.

(c) Maintenance of ecological functions is also an aspect of biodiversity as a driver of ecological processes.

There has been a considerable loss of ecological function in the agricultural areas, but in the forest debate now under way the challenge is now to allow resource utilisation under the principles of Ecologically Sustainable Forest Management. One of the principles is "conservation of biological diversity" or biodiversity.

So whatever part of Western Australia is considered, the matter of biodiversity is on the agenda. For instance, how do we consider the Ord Stage 2 with the proposed opening up of some 50 000 ha of land

8. What are the practical applications of the maintenance of biodiversity for the pastoral and agricultural areas?

A. Pastoral
Introduce here the importance of the Department of Conservation and Land Management.

The Department has a central role in the maintenance of biodiversity through the establishment and management of the conservation estate through the Reserve System of National Parks and Nature Reserves.

There have been environmental changes in the rangelands over 150 years through grazing stock, increased numbers of herbivores, changes in fire regimes and the introduction of feral animals and weeds.

Attention is now being given to the need for conservation areas in the pastoral area as well as the broader rangelands. The EPA is preparing an overarching position statement on Environmental Protection of Rangelands which includes the statement:
"Of primary importance to the conservation of biological diversity is the establishment of a system of protected areas or reserves".

CALM is the operating department in this regard, and I am indebted to that Department for providing the following information. Mr Batini, who is in the audience, would be able to clarify or comment on any information which I provide.

(a) CALM has acquired 9 pastoral leases for inclusion in the conservation estate.

(b) 3 more leases are likely to be purchased.
(c) CALM has commissioned a consultant to report on opportunities for CALM to enlarge the conservation estate.

(d) CALM is also giving attention to off reserve management through voluntary agreements with pastoral lessees. One has been signed and another is likely to be signed.

(e) CALM has MOU's with 3 mining companies holding pastoral leases.

(f) The National Heritage Trust (NHT) is providing funds to assist with the development of the conservation initiatives.

(g) CALM will continue to identify land with high conservation values for inclusion in the formal reserve system.

B. Agricultural

Land has been cleared, and the State is concerned about further clearing.

You will be aware of the Cabinet announcement of a broad policy on the "Protection & Management of Remnant Vegetation on Private Land in the Agricultural Region".

The policy set out broad views on land clearing and added conservation values to that of land degradation.

The policy resulted in an MOU and an explanatory booklet (September 1997) on the protection of remnant vegetation.

So there is now consideration of the protection of biodiversity as a driver of the ecosystem as well as the maintenance of the plant communities and animal habitats.

Extract from the Introduction of "The Protection of Remnant Vegetation on Private Land in the Agricultural Region of Western Australia", Agriculture Western Australia, September 1997.

> "In response to this evolving public concern, in April 1995, State Cabinet endorsed a proposal to:
> - provide better support for remnant vegetation protection and management;
> - include nature conservation values in the assessment of clearing proposals; and
> - remove the presumed right to clear native vegetation in landscapes containing less than 20% of the original vegetation."

The State Cabinet policy has been given practical application through the information provided in the MOU and the Ag Document.

The clearing of remnant vegetation in the agricultural areas is a complicated business.

(a) In broad terms there has been much clearing, and much of the community puts the proposition that there should be no more.

(b) The areas where clearing applications are mostly coming from are areas of high biodiversity on a world scale - over 80 species per $100m^2$ quadrant is extremely high.

(c) In areas of high biodiversity, such as the west Midlands area, there is also considerable plant species variation from one location to another.

(d) The concept of [CAR] comprehensive, adequate and representative reserve system for this area really means that the reserve system should be larger.

Extract from "Clearing of native vegetation on Victoria Location 10598 Cockleshell Gully Road, Shire of Dandaragan - Reassessment under Section 43 of the Environmental Protection Act. Mr Craig Underwood. EPA Bulletin No. 894, May 1998.

> "'... in relation to the three nodes of 'extraordinary species richness and endemism in the south-west of the State' ... i.e. Fitzgerald River National Park, Stirling Range National Park and Lesueur National Park, it is pertinent to compare the respective sizes of the parks. Fitzgerald River National Park covers an area of 242,800 ha, Stirling Range National Park 115,700 ha and Lesueur National Park 27,500 ha. Clearly the Lesueur National Park is significantly smaller."
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> "At 27,500 ha, the Lesueur National Park is not large for an important conservation reserve; desirably it should be larger. If a conservation reserve for the Lesueur Area was to be designed without any consideration for existing land tenure, it would include most of the area between Nambung National Park, Badgingarra National Park, Alexander Morrison National Park and South Eneabba Reserve. However, much of this area is now freehold and cleared for farming. This does not mean that the Lesueur National Park is not extremely valuable, it reinforces the need to retain as much as possible of this larger area in nature conservation reserves.' (p.111, Bulletin 424)."

(e) It is within this context that the EPA is required to consider some of the applications to clear.

The EPA is involved because clearing in this area is regarded as a "significant environmental effect" which triggers the operation of the Environmental Protection Act. This is a matter of judgement, of course, and is associated with the term "environmental significance".

The C/W also has an interest in land clearing from both a biodiversity perspective as well as contributing to the bushland carbon sink. The C/W controls NHT money which is of high order importance.

Consideration of the maintenance of biodiversity in the Agricultural areas is a complex business and will challenge us well into the next century.