

# Are we keeping the best in reserve?

Australia's most productive and accessible land has been taken up by agriculture. National parks tend to contain the rugged remains. The scenery may be breathtaking, but the parks do not necessarily represent Australia's diverse natural habitats. A new system developed by the NSW National Parks and Wildlife Service has opened the way for a more sophisticated approach to the selection of land for conservation reserves. The system also has the potential to aid land use planning in agricultural regions.

A haphazard approach to the selection of land for nature conservation has shaped a national reserve system that may not adequately protect Australia's biological diversity.

Chapter 4 of *Australia: State of the Environment 1996* reports that several decades of *ad hoc* protection have led to two serious limitations of the national reserve system. The first is that reserves often do not represent the natural features (such as ecosystems or species) within regions. Some features are represented many times and others not at all. This means that the total area needed to represent all the features in a region, starting with the existing reserve system, is greater than if a whole new reserve system were designed from scratch.

The second limitation is that reserves tend to be 'residual' land use, with more extensive protection given to areas least useful for intensive commercial purposes. In many areas, this means that reserves do not occur where threatening processes are greatest. For example, ecosystems most in danger of outright replacement by crops and pastures often receive zero or minimum protection.

Major conservation battles tend to be fought in a small subset of the environments in need of protection, such as areas of Crown land where the main alternatives are forestry or reservation. But Crown land itself is usually the residual tenure after freehold land has been released for intensive land use. It is therefore a poor starting point for regional-based planning, which requires a mix of protection measures with the strictest protection applied to those areas least able to persist under any form of extractive uses, particularly agriculture. A residual reserve system provides the opposite starting point.

The report's appraisal of Australia's reserve system is based on the work of Dr Bob Pressey, a senior research scientist with the New South Wales National Parks and Wildlife Service who leads a research program on systematic approaches to conservation planning. Pressey's conviction that scientists should contribute to the shaping of conservation policy

motivated him to join the committee that prepared the biodiversity chapter. 'If you're in research, you've got to influence policy, otherwise it's a waste of time,' he says. 'I wanted to get a few messages through.'

Pressey says that *ad hoc* reservation often gives the appearance of conservation progress (for example, increasing area of reserves) without genuinely contributing to the protection of biodiversity. 'The public is easily fooled,' he says. 'The government can show television footage of a newly-proclaimed national park, but if new parks aren't chosen carefully, it can bugger the whole system up.'

Pressey's own contribution to the policy of reserve selection has involved developing a sophisticated yet practical computer program for guiding the selection of conservation reserves. The software analyses the environmental condition of a region to determine which combination of reserved areas could best achieve specific conservation targets.

Individual land units in the region are rated from zero to 100, according to their irreplaceability, or, the extent to which the options for a representative reserve system are diminished if that area is lost. Some units are totally irreplaceable, either because they contain unique features, or contain so much of one or more features that the reservation goal can no longer be achieved if the unit is not reserved. Other units are replaceable to varying degrees. A map of irreplaceability in a region is a map of options for developing a representative reserve system.

When the options are laid out, choices can be made between units that are not totally irreplaceable on the basis of condition, location, cost and other factors. As choices are made to reserve some planning units, the irreplaceability of units that have not been notionally reserved will change because some of the features they contain have already been represented.

Earlier this year, Pressey's system was used to guide negotiations relating to 5 000 000 hectares of public forests in 11 regions throughout eastern NSW. The software laid out options for achieving predetermined reservation targets in each region by displaying the irreplaceability of each forestry compartment. It also



provided background information to the users to guide choices, and redisplayed the altered picture of irreplaceability. The process continued for each region until key targets relating to forest types had been met.

The approach was judged a great success, particularly as it facilitated cooperative decision-making between a range of parties including government authorities, conservation groups and the forestry industry. It is now seen as a model for further regional planning in NSW and is being considered in other states.

Pressey says that forestry is not the only area in which the software can be used. It could also be applied in extensively-cleared agricultural regions where the amount, location and condition of remnant vegetation influences the viability of rural industries. In fragmented landscapes, the software could outline planning options for:

- protecting remaining pockets of fragmented vegetation;
- allocating various forms of protection, from strict reservation to conservation management agreements;
- nominating areas of mandatory conservation such as vegetation remnants in groundwater recharge zones, areas with potential for dryland salinity, streambank erosion or serious soil degradation; and
- identifying key unvegetated areas for habitat reconstruction by identifying potential connections between important remnants or by mapping areas of groundwater recharge, erodible soils or steep slopes.

## Forest facts

THE past 200 years have seen widespread destruction of Australia's forests. The national goal is to ensure that there is an adequate reserve system to protect at least 15% of each of forest type that existed before 1750. Stronger controls are being introduced to manage the uses of remaining forests, such as timber, water catchment and recreation. However, old growth forests continue to be harvested despite several findings that this practice violates sustainability principles.

Old growth forest is that which is ecologically mature and subjected to negligible unnatural disturbance such as logging, road building and clearing, in contrast to regrowth forests that re-establish themselves after logging. They are often rare and scattered throughout the forest estate and their rich understoreys, numerous epiphytes, hollow limbs and fallen logs harbour high biological diversity.



Malcolm Paterson, CSIRO

## Land resources: key threats to sustainability

Issue	Detail	Comment
<i>Land clearing</i>	Land clearing has important implications for land degradation processes, especially salinity, biodiversity loss and greenhouse gas emissions.	Substantial areas are still being cleared for cropping, grazing and urban development. Programs to retain remnant vegetation and improve on-farm conservation are active, but the rate of replanting is much less than clearing. Deteriorating.
<i>Agriculture</i>	Many areas are subject to slow cumulative threats such as soil acidification, salinity and structural decline.	Substantial damage has been done. Practices are improving in some areas.
<i>Rangelands</i>	Only a small proportion of rangelands is in formal reserves. Some important conservation sites (e.g. waterholes) are threatened because they are the focus of domestic herbivore activity.	There are areas of severely degraded rangelands, but condition and trend vary between regions and are very sensitive to management practices.
<i>Cropping lands</i>	There is particular concern about rates of erosion in marginal cropping areas with shallow soils and variable climate.	Severe degradation will increase if current practices continue. The long term sustainability of cropping on sloping lands is threatened by soil erosion.
<i>Forests</i>	There is inadequate conservation of old growth forests and some other forest types. Logging competes with other uses in native forest areas.	Management methods are improving but monitoring is not yet adequate and primary data are limited.
<i>Data</i>	Compared with other developed nations, Australia has only rudimentary information on the condition and productive capacity of its land resources.	This lack of information limits our ability to use land in accordance with its capabilities and to monitor trends in its condition.

Chapters 4 to 9 of *Australia: State of the Environment 1996* conclude with summaries of the key issues affecting Australia's human settlements, biodiversity atmosphere, land resources, inland waters, estuaries and the sea, and cultural heritage. The level of knowledge in relation to these issues, and the effectiveness of society's responses to them, are also assessed. This simplified version of issues affecting the sustainability of Australia's land resources was prepared for the report's executive summary.