Department of Agriculture, Western Australia

Issues in remnant vegetation protection in Western Australia

A report of the

Remnant Vegetation Steering Committee

June, 1991

Acknowledgement

The contributions made by all members of the Committee to discussions and the preparation of this report are acknowledged with appreciation. The issues concerned with remnant vegetation protection are quite complex, and sometimes the interests of individual Committee members were substantially different. Without their goodwill and preparedness to focus on the best interests of the whole community many of the issues would not have been adequately resolved.

G.A. Robertson
Chairman
Remnant Vegetation Steering Committee

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Summary of recommendations

In 1988, the Government established the Remnant Vegetation Steering Committee to review the issue of remnant vegetation protection and provide recommendations on policy direction. The Committee is broadly representative of groups, organizations and Departments involved in using or managing remnant vegetation. The membership of this Committee is listed in Appendix 3.

The terms of reference for the Committee are:

(i) to review the area, location, condition and role of remnant vegetation in farming environments in the South-West Province of Western Australia;

(ii) to identify priorities and mechanisms for the protection and management of remnant native vegetation;

(iii) to recommend policies for the future use and management of land occupied by remnant native vegetation.

After several meetings, the Committee has identified the issues worthy of consideration in the general area of remnant vegetation protection and resolved the directions required for future actions. The recommendations in each of these areas follow, together with nominations of the agency(ies) responsible for lead action.

Key to agency abbreviations

DAWA	Department of Agriculture, Western Australia
CALM	Department of Conservation and Land Management
WAWA	Water Authority of Western Australian
DPUD	Department of Planning and Urban Development
DMR	Department of Main Roads
DLG	Department of Local Government
DVG	Department of Valuer General
APB	Agriculture Protection Board
DOT	Department of Transport
CSCA	Country Shire Councils' Association
GA(WA)	Greening Australia (WA)

Recommendations (numbers correspond to report sections)

2. Existing remnant vegetation

- Completion of the mapping of remnant vegetation should be a priority.

Responsible agency: DAWA

- Surveys defining the types of vegetation represented within remnants on both private and Crown land should be completed quickly, and methods for recording their condition and monitoring changes in condition need to be developed and regularly applied.

Responsible agency: CALM

- Increased resources should be provided to improve the management of remnant vegetation on Crown land.

Responsible agency: CALM

3. Roles of remnant vegetation

Land conservation

- Remnant vegetation should be retained and protected wherever its removal and the future management of the land is likely to result in or exacerbate degradation of land, groundwater or stream resources, unless the vegetation itself is severely degraded, in which case it should be supplemented with additional vegetation or replaced with more effective, better located deep-rooted perennial vegetation.

Responsible agency: DAWA

Water resource conservation

- Remnant vegetation within the five catchments protected by the Western Australian Water Authority should be classified according to its conservation and water resource protection values, and guidelines prepared to encourage land users to protect and manage it to maximize these values.

Responsible agencies: WAWA, CALM, DAWA

- Remnant vegetation should be retained wherever it contributes to the protection of local fresh water resources, unless being replaced with more effective, better located deep-rooted perennial vegetation.

Responsible agencies: WAWA, DOLA, DLG

Nature conservation

- Remnant vegetation should be protected where:
    - it provides habitat for significant, or rare and endangered species of flora and fauna;
    - it has a diversity of species which is inadequately represented in the area;
    - it has heritage value as a remnant of a vegetation association existing before clearing;
    - it provides a corridor between larger areas of remnant vegetation.

Responsible agency: CALM

- The highest priority areas for action to protect remnant vegetation for the purpose of nature conservation should be the more extensively cleared areas of the wheatbelt and such other areas specifically identified as sensitive.

Responsible agencies: CALM, DAWA

- Increased research should be undertaken into the ecology of remnants and the management required to ensure their conservation.

Responsible agency: CALM

- Guidelines should be developed for the management of remnants to optimize nature conservation. These should include advice on the use of remnants for sheltering stock and what actions are needed for adequate fire, weed and feral animal control.

Responsible agencies: CALM, DAWA, APB

Land productivity

- Advice to landholders on the benefits of diversifying farm incomes through the protection and productive use of remnant vegetation should be improved.

Responsible agencies: DAWA, CALM

- Further research should be undertaken to establish the contribution remnant vegetation can make to total land productivity, to develop appropriate management techniques and to analyse the on-farm economic benefits of such use.

Responsible agencies: DAWA, CALM

Amenity, tourism and recreation

- The importance of retaining remnant vegetation for amenity, tourism and recreation values should be emphasized in the regional and local planning framework, including Local Government's development of rural planning strategies.

Responsible agency DPUD

- Responsible Government Departments should continue to promote the importance and increase the public profile of remnant vegetation.

Responsible agencies: DAWA, CALM (with assistance of LGD, EPA, DPUD, WAWA, DOT)

4. Use of remnants

- A system of classifying remnant vegetation should be developed to indicate its capability of withstanding preferred or compatible uses, including both active and passive uses.

Responsible agencies: CALM, DAWA

- A set of guidelines, which pays regard to controlling the spread of dieback, should be developed for managing remnant vegetation for preferred or compatible uses.

Responsible agencies: CALM, DAWA

5. Protection need and resource allocation

- Guidelines should be developed as to the minimum area of various types of remnant vegetation that would warrant the investment of resources for their protection.

Responsible agencies: CALM, DAWA

- Public resources and promotional activities devoted to the retention of vegetation should be focussed on remnants (including Crown reserves) that have inherent

robustness, as well as those which are important for species or ecosystem preservation or land conservation.

Responsible agencies: CALM, DAWA, EPA

- Relevant Government agencies should devise means of minimizing the impact of man's activities on Crown reserve remnants, particularly those which are unvested.

Responsible agencies: CALM, DOLA

- Land users should be encouraged to limit the impact of their operations on remnant vegetation (e.g. by carefully controlling the drift of herbicide spray or fertilizer dust).

Responsible agencies: DAWA, CALM

6. Considerations in planning protection

Regional differences

- A state-wide zoning of remnant vegetation should be established that includes priorities for its protection and guidelines for its management in each zone.

Responsible agencies: EPA, CLAM, DAWA

Wildlife corridors and strategic revegetation

- Programmes to protect remnant vegetation should place importance on the conservation and re-establishment of corridors and regional networks of native vegetation.

Responsible agencies: CALM, DAWA, DPUD, DLG

- Resources should be directed to increasing the width of rail and road reserves to re-establish them as priority native vegetation and wildlife corridors.

Responsible agencies: MRD, DOT

District planning

- Shires and Land Conservation District Committees should be encouraged to survey remnant vegetation and develop remnant vegetation protection programmes in their rural strategies and catchment or farm plans.

Responsible agencies: DLG, CSCA, DAWA

7. Incentives for remnant protection

Preferred approach

- The emphasis of remnant vegetation protection policies should be a range of voluntary programmes.

Responsible agencies: DAWA, CALM

Voluntary covenants

- Facilities for voluntary protection of remnant vegetation should be established in relevant Acts to encourage landowners to set aside and protect areas of remnant vegetation in perpetuity.

Responsible agencies: CALM, DAWA

Fencing subsidies

- The Remnant Vegetation Protection Scheme should be retained for the duration of the Decade of Landcare and if possible expanded through increased funding. On-going monitoring should be established, in collaboration with the land owners, on all sites where remnant vegetation has been fenced under the scheme.

Responsible agencies: DAWA, CALM

Low interest loans

- A loan scheme with a subsidized interest rate should be established for land users to purchase fencing and other management requisites for the protection of remnant vegetation. This would best be included as part of a broader loan scheme covering land and water conservation activities.

Responsible agency: DAWA

Local Government rates

- The effect on the capital value of land voluntarily set aside for protecting remnant vegetation on farmlands should be considered when assessing rates and taxes.

Responsible agencies: DLG, DVG, CSCA

Taxation

- Circumstances justifying additional taxation deductions or credits or rebates should be explored and promoted to the Commonwealth Government as additional incentives to land users to protect remnant vegetation.

Responsible agency: DAWA

8. Control and guarantees over management

Existing mechanisms

- The administration of programmes involving protection of remnant vegetation through the control of clearing needs to be co-ordinated across agencies.

Responsible agencies: DAWA, EPA, CALM, WAWA

- Procedures should be developed to ensure regulations in various Acts relating to the clearing of native vegetation are uniformly operated in such a way that ensures community standards and objectives are met in respect of the:

- conservation of soil and land resources;
- maintenance of bio-diversity (i.e. nature conservation);
- protection of water resources;
- maintenance of amenity values;
- protection of individual landowner rights and responsibilities.

Responsible agencies: DAWA, EPA, CALM, WAWA

Future options

- Compensation provisions under relevant Acts, including an examination of the need for the creation of such provisions under the Soil and Land Conservation Act, should be reviewed and made consistent.

Responsible agencies: DAWA, CALM, WAWA, EPA

- Relevant Government Departments, in consultation with other organizations, should recommend procedures to determine whether and under what circumstances compensation is appropriate and how it should be provided.

Responsible agencies: DAWA, CALM, WAWA, EPA

- Areas protected under a compensation agreement should be monitored to ensure accountability.

Responsible agencies: DAWA, CALM, WAWA

9. Community acceptance

- Community awareness should be increased through continuing support by Federal and State Governments for projects and incentives to protect remnant vegetation.

Responsible agencies: CALM, DAWA

- Government and community organizations involved in the protection and management of vegetation should be encouraged to promulgate a land care ethic that includes remnant vegetation protection and assists in raising the community understanding of the values of such vegetation.

Responsible agencies: DAWA, CALM, WAWA, EPA

10. Minimum cover levels of deep-rooted vegetation

- Until better information is available the current estimates of the minimum amounts of deep-rooted perennial vegetation required to achieve land and water conservation (i.e. between 60% and 20% cover) should be used as a guide for clearing control, which should include an assessment of whether the native vegetation could be replaced or supplemented with other more effective, better located deep-rooted perennial vegetation.

Responsible agencies: DAWA, CALM, WAWA, EPA

- Further research should be undertaken to more precisely specify the area, type and distribution of deep-rooted perennial vegetation required on the landscape to achieve land and nature conservation objectives.

Responsible agencies: DAWA, CALM, WAWA

- A community participation programme should be undertaken to demonstrate existing native vegetation regeneration and establishment techniques.

Responsible agencies: DAWA, CALM

- Further research should be initiated into techniques of regeneration and establishment of native vegetation in the wheatbelt.

Responsible agencies: CALM, DAWA

- A Statewide programme of integrated remnant vegetation protection and revegetation, based on catchments or landscapes, should be developed and implemented as a matter of urgency.

Responsible agencies: DAWA, CALM, GA(WA), EPA

Issues in remnant vegetation protection in Western Australia

1. Introduction

Vegetation, particularly native trees and shrubs, plays a crucial role in maintaining a stable landscape and a diverse genetic pool of fauna and flora species.

Australia's short land use history has been dominated by developments that have lacked an understanding of the need to retain a proportion of the native vegetation. The consequences have resulted in considerable damage to the natural environment. In the 200-odd years since Australia's settlement by Europeans, 70 per cent of its pre-1788 plant communities have been degraded in some way; 65 per cent of its original tree cover has been removed; and up to 75 per cent of its rain forest has been cleared for grazing and agriculture. In addition, 55 per cent of the continent's arid lands and 45 per cent of the non-arid lands require treatment for land degradation; and 78 species of plants and 17 species of mammals are believed to be extinct (Saunders et al. 1990 p. v).

The impact of clearing native vegetation in this State is most noticeable in the agricultural area. This area's great diversity in native flora and fauna and its particularly fragile landscape have suffered significant degradation. For example, in the wheatbelt the number of rare and endangered flora (35) is greater than in any other Western Australian area, and 13 of the original 46 species of mammals native to the wheatbelt have disappeared (House, 1990 pp. 92-93). Also, the area of salinity resulting from over-clearing has grown from 80,000 ha of cleared lands to 443,000 ha during the period 1955-1989 (House 1990 p. 16).

There is now reasonable community acceptance of the need to protect and manage remnant vegetation[1] in the agricultural areas of Western Australia. Reports such as the 'Conservation of native vegetation in farming areas' (Mulcahy: 1986) and the 'Management of native vegetation on farmland in the wheatbelt of Western Australia', (Coates: 1987) indicated areas of the State where there is very little remnant vegetation left. Recommendations made in these papers ranged from education and research into areas of remnant vegetation through to incentives for the protection of these areas by way of tax rebates and subsidies (Appendix 2A and 2B). Some of the recommendations have been implemented, such as the Remnant Vegetation Protection Scheme, which assists farmers to fence areas of remnant native vegetation, and the mapping of remnant vegetation in the South-West Province of Western Australia (Figure 1).

However, it is evident from continuing conflict over the clearing of land for agriculture that the issue is not well managed. Expressed public concern relates to the loss of native vegetation in agricultural areas and reflects increasing recognition of the role such vegetation plays in maintaining sustainable agriculture, groundwater levels and the diversity

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Footnote (1) Remnant vegetation is regarded as that native vegetation remaining after the major land use developments in an area. The actual percentage remaining after such developments varies widely with the rainfall, topography, type of land use practised, government policies applying at the time of clearing. Unless actively protected and managed, the changed environment is likely to cause ongoing degradation of this vegetation and its wildlife.

of flora and fauna. The community as a whole needs to recognize that the issues are complex and that the role of remnant vegetation will vary depending on its extent and location. Hence, remnant protection, clearing and re-planting of vegetation all need to be considered in the context of local land and nature conservation needs.

During 1988, the issue of remnant vegetation protection achieved a high public profile in association with the renewal of the woodchip export licence for Western Australian Chip and Pulp (WACAP). An Environmental Protection Authority Assessment Report (Environmental Protection Authority Bulletin No. 329: 1988) highlighted the conflicts and difficulties then existing in remnant vegetation protection and management. Accordingly, the Government established the Remnant Vegetation Steering Committee in 1988 to review the issues and provide recommendations on policy direction, as the beginning of a concerted effort to conserve the remaining species of native flora and fauna in the State.

The Committee broadly represents groups, organizations and Departments interested in protecting, managing or using areas of remnant vegetation (Appendix 3).

The terms of reference of the Remnant Vegetation Steering Committee are:

(i) to review the area, location, condition and role of remnant vegetation in farming environments in the South-West Province of Western Australia;

(ii) to identify priorities and mechanisms for the protection and management of remnant native vegetation;

(iii) to recommend policies for the future use and management of land occupied by remnant native vegetation.

The major concern of this Committee relates to the need to protect the small areas of threatened vegetation on private property in the more highly cleared agricultural areas. Also, of considerable concern to the Committee is the need to improve the quality of protection for the many Crown reserves in the agricultural areas. Many of these are inappropriately used (e.g. mined for gravel and sand) and their contribution to land and nature conservation is being degraded.

The Committee is of the view that the protection of remnant native vegetation is most likely to be achieved by policies and programmes which place an emphasis on encouragement, co-operation and education, rather than regulation. The basis for this view lies in the perception of the community's recognition of the important roles remnant vegetation and revegetation play in achieving sustainable land use and effective nature conservation.

Notwithstanding this recognition, it is clear that, unless there is in place a range of incentives, backed by regulation as a last resort mechanism, investments by farmers in protecting remnant vegetation are unlikely to improve until the agricultural economy becomes more bouyant.

2. Existing remnant vegetation

Knowledge of the extent and location of remnant vegetation is critical to the development of sound policies and programmes for its protection. A project to map the extent of native vegetation in the south-west of Western Australia is now largely complete (Figure 1). Some of these data have been extracted to illustrate the considerable differences that exist in the amount of native vegetation remaining in various areas of the South-West Province. These

are presented on a Shire basis in Table 1. Commonly, much of the wheatbelt vegetation is found on private land and is not in good condition. Tammin Shire is an extreme example. After several decades of agriculture, only 7 per cent of the Shire area remains under native vegetation, and three-quarters of this is on private land (Coates 1987: p. 58). Of the wheatbelt data presented in Table 1 only Lake Grace Shire has more native vegetation on public land than on private land.

It follows that all areas of remnant vegetation in the wheatbelt, whether on private or public land, are worthy of considerable effort to ensure their preservation.

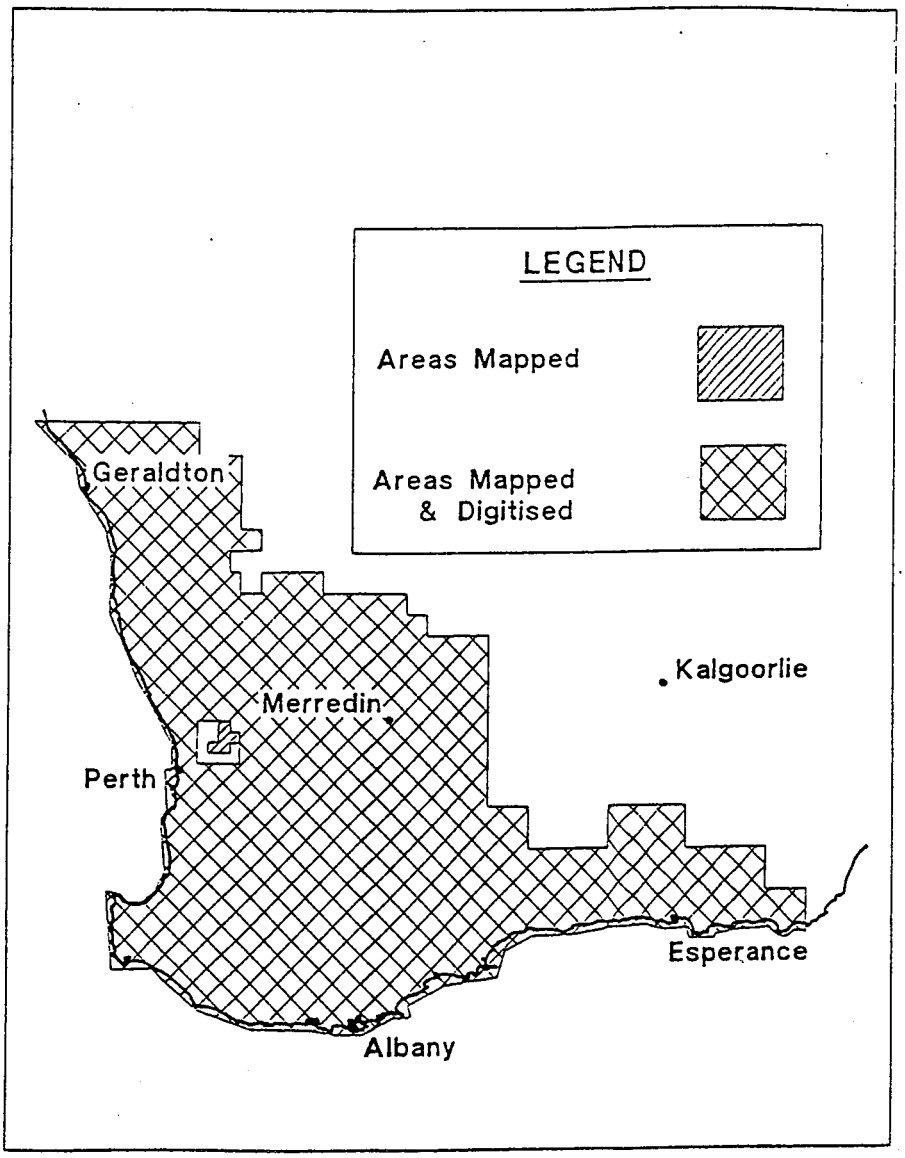

Figure 1. Map showing the extent of the South-West Province from which the area and location of remnant vegetation has been captured into the Department of Agriculture Geographic Information System.

Table 1. Extent of remnant vegetation in the forest and south coastal areas and the wheatbelt areas of Western Australia (collated from DAWA Geographic Information System data base)

Regions/shires	Shire area (ha)	Remnant vegetation area (ha) [% shire]	Remnant vegetation on private land (ha) [% shire]	Remnant vegetation on public land (ha) [% shire]
(a) Forest and south coast[1]				
Albany	445,800	199,272 [44.7]	26,748 [6.0]	172,524 [38.7]
Plantagenet	482,700	174,736 [36.2]	16,411 [3.4]	158,325 [32.8]
Denmark	184,300	140,436 [76.2]	8,293 [4.4]	132,143 [71.7]
Manjimup	689,400	603,241 [87.5]	19,320 [2.8]	583,921 [84.7]
(b) Wheatbelt[2]				
Dumbleyung	255,200	26,578 [10.4]	16,050 [6.3]	10,528 [4.1]
Lake Grace	925,000	282,990 [30.6]	109,132 [11.8]	173,857 [18.8]
Pingelly	123,300	7,026 [13.8]	8,934 [7.2]	8,092 [6.6]
Tammin	108,700	7,642 [7.0]	5,812 [5.3]	1,830 [1.7]

(1) Source: Schofield *et al.* (1989). Vegetation strategies to reduce stream salinities of water resource catchments in south-west Western Australia. WAWA, Rep. WS 33, July 1989 p. 61.

(2) Source: Coates A.M. (1987). Management of native vegetation on farmland in the wheatbelt of Western Australia, Conservation Council WA 1987 pp. 58.

In contrast, the area of native vegetation in the forest and south coast areas is considerable (from about 40 to 90 per cent of Shire areas) and is overwhelmingly situated on public land. Furthermore, a large proportion of this native vegetation is reserved in State Forest and National Parks or nature reserves, and a significant amount of land remains uncleared on farms in these areas.

On the land released for agriculture since 1960, a better representation of native vegetation has been retained, particularly along the south coast between Albany and Esperance and on sections of the northern sandplains. In these areas a more comprehensive programme of establishing reserves was used, specifically for the protection of native flora. The road reserves in these areas, for example, were set significantly wider (200 metres) than previous reserves (often as little as 20 metres).

In contrast to the data available on the area of native vegetation, there are few data on the type and condition of the vegetation in the remnants, and few attempts are being made to monitor trends in its condition. This includes the remnant vegetation in Crown reserves, which arguably makes the greater contribution to nature conservation because it is mostly larger in area and in better condition than that on privately owned land. Many of these reserves are being degraded by activities such as gravel and sand mining, poorly controlled recreation activities, illegal timber cutting and frequent bushfires.

Consequently, there is an urgent need to survey in a regional context, all remnant vegetation on private and Crown land to properly assess its value to land and nature conservation. Such information is a pre-requisite to improving the level of management and protection it receives.

Recommendations

- Completion of the mapping of remnant vegetation should be a priority.
- Surveys defining the types of vegetation represented within remnants on both private and Crown land should be completed quickly, and methods for recording their condition and monitoring changes in condition need to be developed and regularly applied.
- Increased resources should be provided to improve the management of remnant vegetation on private and Crown land.

3. Roles of remnant vegetation

Depending on its nature, size and location, remnant vegetation almost always serves a number of inter-related purposes. These include land conservation, water conservation, nature conservation, amenity, total farm productivity and, in certain special circumstances, production in its own right.

In planning the future protection of remnant vegetation an analysis of the dominant role it serves is helpful in developing appropriate management plans to ensure its conservation. In addition, this type of analysis also serves to identify opportunities for conservation action by government agencies with lead responsibilities in the relevant areas of natural resource management(2).

Footnote (2) The partitioning of the roles of remnant vegetation is artificial. In reality, there will always be a number of roles served by remnant vegetation. The development of specific recommendations for action has consequently been done carefully toavoid overlap and duplication. All the recommendations here should be regarded as a complementary set.

Land conservation

Remnant vegetation is very important in protecting land resources. In particular, areas of steep slope, areas prone to waterlogging or wind erosion, and areas that might be specific recharge or discharge sites for salinity, may be protected from land degradation by retaining remnant vegetation in strategic areas.

These strategic areas can be protected by the Clearing Regulation under the *Soil and Land Conservation Act*, which requires notification by landowners who intend clearing land. Where such clearing or the subsequent land use represents a land degradation hazard, these areas can be protected with management conditions that require future owners to continue the specified management of the remnant.

Although qualitative information is available regarding the preferred location of remnant vegetation in the landscape to meet various land conservation purposes, site specific quantitative information is quite deficient. Nevertheless, recent technical information, such as that presented in the 'Vegetation strategies to reduce stream salinity of water resource catchments in south-west Western Australia' (Schofield et al. 1989), and in reports on the effects of different clearing strategies (Ruprecht and Schofield 1991 a, b) provides increasing definition of the preferred location of remnant vegetation to manage salinity in the greater than 450 mm p.a. rainfall zone.

This research indicates the importance of retaining or re-planting substantial areas of native vegetation on the valley floor and lower to middle side slopes in the lower reaches of catchments. Deep-rooted perennial vegetation in these positions prevents groundwater levels rising into the stream zone and causing waterlogging and salinization. Retaining vegetation in these landscape positions makes a substantial contribution to land conservation as well as protecting stream-zone ecology and faunal corridors. In upper reaches of catchments, the retention of native vegetation on the hilltops, particularly where the soils are poor, is also an important component of salinity control.

In addition, the above reports improve our understanding of the proportion of catchments that should remain under or be replanted to deep-rooted perennial vegetation to minimize waterlogging and salinization. This proportion is sensitive to the amount of annual rainfall. For instance, in the 700-800 mm p.a. rainfall zone, Schofield *et al.* (1989) estimate that 58 per cent of cleared land would need to be re-planted, in the valley floor and lower midslope positions, to maintain groundwater levels. Similar proportions to these are probably required to prevent eutrophication of estuaries.

Equivalent data are not available for the drier agricultural areas (i.e. < 450 mm p.a. rainfall). However, experienced land and nature conservation professionals estimate that, on average, 20 per cent of land in these areas needs to be covered with deep-rooted perennial vegetation to achieve land (and nature) conservation.

These data on the tree and shrub cover needed to control and prevent waterlogging and salinity should, however, be treated with care. They are based on a small number of catchment studies covering a limited range of conditions and may not apply in all circumstances. The issue of minimum amounts of deep-rooted perennial vegetation is discussed in greater detail in Section 10.

Recommendation

- Remnant vegetation should be retained and protected wherever its removal and the future management of the land is likely to result in or exacerbate degradation of land, groundwater, or stream resources, unless the vegetation itself is severely degraded, in which case it should be supplemented with additional vegetation or replaced with more effective, better located deep-rooted perennial vegetation.

Water resource conservation

Remnant vegetation plays an important role in protecting water resources. Schofield *et al.* (1989) show strategically located and managed reforestation is able to lower saline groundwater and control stream salinity. Reforestation can thus simultaneously exert control over land and water salinization, by reducing groundwater recharge or discharge. Its management, however, must be aimed at maximizing evapotranspiration, by maintaining a healthy, vigorous, regenerating stand of vegetation. Thus, every effort should be made to encourage land users to retain and manage remnant vegetation for water resource protection purposes, in addition to those of land conservation.

Recommendation

- Remnant vegetation within the five catchments protected by the Western Australian Water Authority should be classified according to its conservation and water resource protection values, and guidelines prepared to encourage land users to protect and manage it to maximize these values.

- Remnant vegetation should be retained wherever it contributes to the protection of local fresh water resources, unless being replaced with more effective, better located deep-rooted perennial vegetation.

Nature conservation

The need for active conservation programmes for native flora and fauna species is directly related to the extensiveness and completeness of the clearing of native vegetation for land development. Western Australia, with its flat topography, has cleared most of the native vegetation from the agricultural areas in particular. In consequence, it has lost more species of native flora and fauna than any other State; 70 species out of a total of 97 species lost from the Australian continent (House 1990 p. 93).

A major concern for future nature conservation strategies in this State is the fact that more than half (55 per cent) of the rare and endangered species of flora and fauna are not represented within conservation reserves (House 1990 p. 93). Remnant vegetation is thus an increasingly important element for the conservation of native flora and fauna. Over large tracts of land such remnants represent the only source of habitat, food, genetic diversity for the evolution of future generations of flora and fauna, and prey-predator relationships that help maintain a stable ecosystem.

The ability of and need for privately owned native vegetation to contribute to nature conservation varies across the South-West Province. For example, nature conservation objectives are reasonably well satisfied in the high rainfall forest zone, because a significant amount of the landscape is reserved in State Forest, national parks and controlled catchment

areas of the Water Authority of Western Australia[3] . Some 33 per cent of rare and endangered species of flora lies outside conservation reserves in this area (House 1990 p. 92). Similarly, nature conservation objectives are well served along the south coast where there are substantial flora and fauna reserves (18 per cent of rare and endangered species of flora lies outside reserves in this area (House 1990 p. 92)).

In the wheatbelt environment the protection of flora and fauna provided by remnant vegetation is quite inadequate. In this area, 45 per cent of rare and endangered species of flora lies outside conservation reserves and less than half of the fauna species originally present are still regarded as common (House 1990 p. 92).

Together with the need to protect the many small areas of native vegetation remaining in the wheatbelt, the general community also needs to give priority to protecting the few remaining large areas of native vegetation. In addition, wherever possible, priority should be given to the protection and establishment of bush corridors to link small remnants and thus ensure the protection of certain migratory species of fauna (Saunders and Curry, 1991).

The current priorities for remnant vegetation protection in the wheatbelt are those applied by the Remnant Vegetation Protection Scheme, viz:

- woodlands, such as banksia or salmon gums;
- shrublands on sandy soil;
- fresh-water wetlands;
- brackish wetlands with undegraded fringe vegetation;
- vegetation on greenstone or quartzite outcrops.

These priorities have been subjectively developed and need to be reviewed and refined over time.

There can be no doubt that existing remnant vegetation in the wheatbelt should command the highest priority for future protection and management. However, in allocating resources for nature conservation activities, careful consideration needs to be given to maximizing the return from limited resources. This may mean, for example, that funds to provide bush corridors to link reserves in the Dumbleyung Shire may prove to be a more effective investment in nature conservation than the provision of funds for the fencing of isolated remnants in the Tammin Shire (see Table 1).

As discussed in Section 5., 'Protection need and resource allocation', the management of native vegetation is crucial to its protection and long term survival and, hence, the achievement of nature conservation objectives. However, despite the availability of some information (e.g. Saunders et al. 1987) there is a significant lack of knowledge on the ecological interactions of various fauna species and remnant vegetation, as well as the appropriate forms and intensities of management required to maintain viable populations of plant and animal species.

Footnote (3) The conservation movement does not accept the view that nature conservation objectives are reasonably well satisfied in the high rainfall forest zone. They assert that less than 22 per cent of jarrah forest is reserved in the conservation estate and that dieback is a significant threat to this resource.

Recommendations

- Remnant vegetation should be protected where:
    - it provides habitat for significant, or rare and endangered species of flora and fauna;
    - it has a diversity of species which is inadequately represented in the area;
    - it has heritage value as a remnant of a vegetation association existing before clearing;
    - it provides a corridor between larger areas of remnant vegetation.
- The highest priority areas for action to protect remnant vegetation for the purpose of nature conservation should be the more extensively cleared areas of the wheatbelt and such other areas specifically identified as sensitive.
- Increased research should be undertaken into the ecology of remnants and the management required to ensure their conservation.
- Guidelines should be developed for the management of remnants to optimize nature conservation. These should include advice on the use of remnants for sheltering stock and what actions are needed for adequate fire, weed and feral animal control.

Land productivity

Remnant vegetation, depending on its location, shape and vegetation type, may contribute to farm productivity in a variety of ways. These include windbreak shelter for stock, crops and pastures, and habitat for predators of some agricultural pests. In addition, some remnant vegetation may be used as a resource for fire wood, fence posts, craft wood, honey and wildflowers, provided it is carefully managed.

Currently (1991) there is a dearth of readily available information concerning the potential uses and appropriate management of remnants for productive purposes. While most farmers use remnants for the protection of stock during severe weather events (e.g. newly shorn sheep threatened by cold, wet conditions), they remain largely unaware of the much wider production potential of remnant vegetation.

If remnant vegetation conservation is to be widely adopted, then it is very important that the full range of potential benefits to farmers is emphasized and promulgated. The important issue of just how remnants should be managed is covered under Section 4. 'Use of remnants'.

Recommendations

- Advice to landholders on the benefits of diversifying farm income through the protection and productive use of remnant vegetation should be improved.
- Further research should be undertaken to establish the contribution remnant vegetation can make to total land productivity, to develop appropriate management techniques and to analyse the on-farm economic benefits and costs of such use.

Amenity, tourism and recreation

State Forests, National Parks, nature reserves and other areas of remnant vegetation all provide significant amenity value by way of shade and shelter, as well as scenic character and landscape variety. Some are directly used for shade and shelter, but all add to the tourism and recreation attractions of a State which calls itself the 'Wildflower State'.

Regional and district planning should take account of these values in raising community awareness of remnant vegetation.

Recommendations

- The importance of retaining remnant vegetation for amenity, tourism and recreation values should be emphasized in the regional and local planning framework, including Local Government's development of rural planning strategies.
- Responsible Government Departments should continue to promote the importance and increase the public profile of remnant vegetation.

4. Use of remnants

The use of remnants is a complex and controversial issue. There is a view that too little of our native vegetation and wildlife remains and therefore all remnants ought to be preserved and not used at all by man. Alternatively, there is a pragmatic view which recognizes that some remnants may be more capable of withstanding certain forms of usage than others. This view extends to the proposition that, overall, efforts to conserve remnant vegetation will be better served if some practical or economic benefits can be shown to derive from conservation efforts(4).

As mentioned in Section 3 there is a wide range of production uses to which remnant vegetation may be put. The key questions to be answered to ensure the conservation of productively used remnants are: firstly, to which use(s), if any, is a remnant suited(5) ?; and, secondly, what intensity of use can a remnant withstand, assuming good quality management is applied? This second question raises a further one; is there enough knowledge on the management of remnants to allow some form of use and still achieve the objective of its conservation?

Clearly, the ability of a remnant to withstand some form of usage depends on whether the main purpose(s) it serves can still be met whilst it is being used. These purposes will be one or a combination of land and nature conservation or aesthetics. Several examples follow of

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Footnote (4) In reality the options for potential use of remnants will be quite different, depending on the amount of vegetation remaining, the climate, soils and wildlife. For example, the options at Dwellingup will be very different from those at Tammin.

(5) A very important consideration of potential use of a remnant is the evaluation of the risk of introducing dieback disease. This disease is considered to be the greatest problem confronting nature conservation in south-west Western Australia (House, 1990 p.96).

how the use, the intensity of use and the conservation purpose of remnant vegetation can lead to different assessments as to the impact of such usage.

The use of remnant vegetation for stock protection can have a varying impact on the vegetation. Where it is used to protect stock only during severe weather alerts, long term damage to the vegetation may not occur. However, in some parts of the State such usage would include daily protection of cattle from cold during winter and from the heat during summer, and clearly would damage the vegetation. In other areas, paddocks with trees providing windbreaks and shade are set aside for protecting lambing and off shear sheep. The understorey vegetation is unlikely to survive in these circumstances, but the survival rate and productivity of the stock is much higher than in paddocks without trees (Breckwoldt 1986: p. 67). In these circumstances trees indirectly contribute to the productivity of the farm. However, this use is incompatible with long-term flora and fauna protection and is also often incompatible with maximizing land conservation.

The use of remnant vegetation for the production of timber is another complex and controversial example. The taking of timber from remnants on farmland may range from an occasional fence post through to clear felling and regeneration for timber products. Such uses may contribute to farm income and also assist in the management of the remnant. However, the long term effects on the conservation of the remnant will depend on the scale of use and the amount and quality of rehabilitation, and these are not well understood.

Wildflower harvesting can provide additional income for land owners with large areas of remnant vegetation. The annual bloom of wildflowers in Western Australia is particularly attractive because of the diversity of the flora. However, as in the case of timber production, the long term effects on flora and fauna conservation depend on the scale of operation and the care with which it is managed, and these are not fully understood.

The newly created wildflower export industry may well increase the demand for wildflowers and could provide an incentive to keep remnants. However, it could also result in adverse pressure on remnants. The impact of the industry on the integrity of remnants should be monitored and assessed to develop appropriate guidelines for management.

Remnants need to be classified according to the uses to which they may be put, and management guidelines established so that conservation values are maintained or enhanced. One distinction that certainly needs to be made is between remnants whose purpose is controlled stock protection, or flora and fauna protection.

Recommendations

- A system of classifying remnant vegetation should be developed to indicate its capability of withstanding preferred or compatible uses, including both active and passive uses.

- A set of guidelines, which pays regard to controlling the spread of dieback, should be developed for managing remnant vegetation for preferred or compatible uses.

5. Protection need and resource allocation

In considering whether an investment to protect remnant vegetation is likely to be cost effective, a number of factors need to be taken into account. These relate to the need to protect the flora and fauna species in a remnant and the long-term survival of the ecosystem once it is protected.

The need to protect a remnant arises from a consideration of the relative scarcity of the flora and fauna species and communities contained in it and the value these have in contributing to biogenetic diversity, land conservation, agricultural production and landscape aesthetics. As individual remnants become fewer and smaller, the need to protect them for reasons of species preservation and aesthetics increases. However, as remnant size and number decrease, the cost per unit area of protecting them increases, and this raises the issue of whether and at what cost long-term survival can be achieved.

The robustness of remnant vegetation is either inherent or imposed by sound management practices. The inherent factors include size, shape, condition (i.e. the number and vigour of flora and fauna species) and the isolation or distance from other remnants. The larger a remnant, the more likely its condition will be good and the less influential will be the factors of shape and distance from other remnants.

There is documented evidence that a remnant's ability to sustain populations of flora and fauna decreases as the size becomes smaller and the distance from other remnants increases (Saunders et al. 1987). Accompanying such characteristics is a heightened risk of degradation caused by man's use of surrounding land (edge effects) or land within the remnant. Edge effects include weed invasion and the drift of fertilizer, herbicide and insecticide; detrimental land use within remnants includes sand and gravel mining, rubbish dumping, uncontrolled timber cutting and grazing.

Management practices that enhance the survival of small and isolated remnants include linking remnants with bush corridors, the re-introduction of indigenous species, fencing to exclude domestic stock, controlling vermin and moderating the impact of land management practices on adjoining land or land within the remnant. Where possible, linkages between remnants can be easily made by conserving vegetation within road and rail reserves or by encouraging natural regeneration and/or the establishment of replanted vegetation within fenced areas.

Despite the availability of some knowledge on the factors affecting the survival of remnants, insufficient is known to confidently specify the minimum requirements for the protection of each and every piece of remnant vegetation. Some early attempts at protecting vegetation failed to recognize minimum size and use constraints, and these are now recognized as ineffective in some circumstances. An example is the controlled catchments of the Water Authority of Western Australia, in which individual trees were protected and grazing of understorey vegetation was allowed.

A more informed, but still subjective attempt to guarantee long-term survival was made when introducing the Remnant Vegetation Protection Scheme. This scheme endeavours to maximize survival of funded areas by only accepting nominations of areas that are greater than 5 ha and which have vegetation in good condition. Such subjective conditions need to be more soundly based.

In the extensively cleared agricultural areas of the State native vegetation is often so rare that the need to protect and preserve it for heritage as much as land and nature conservation reasons will generally outweigh the fencing and vermin control costs required to ensure its long-term survival. Such small, isolated areas of remnant vegetation have considerable heritage value as the last remaining examples of original ecosystems.

Overall, the allocation of either public or private sector resources to protect remnants should reflect the inherent robustness of the remnant, its importance, the likelihood of success in preserving species or ecosystems, and its contribution to land conservation.

Recommendations

- Guidelines should be developed as to the minimum area of various types of remnant vegetation that would warrant the investment of resources for their protection.

- Public resources and promotional activities devoted to the retention of vegetation should be focussed on remnants (including Crown reserves) that have inherent robustness, as well as those which are important for species or ecosystem preservation or land conservation.

- Relevant government agencies should devise means of minimizing the impact of man's activities on Crown reserve remnants, particularly those which are unvested.

- Landusers should be encouraged to limit the impact of their operations on remnant vegetation (e.g. by carefully controlling the drift of herbicide spray or fertilizer dust).

6. Considerations in planning protection

The important elements to consider in setting objectives and allocating resources for the protection of remnant vegetation are the number, size, total area, bio-diversity, condition, representativeness and viability of remnants within a given area, plus the level of management needed to ensure protection is effective. Proper planning based on data that provide an overview of the extent and distribution of remnant vegetation in an area will greatly enhance the prospects of cost effective remnant vegetation protection.

Regional differences

The importance of remnant vegetation on private and public lands varies in different areas of the State. For example, in the older settled and more extensively cleared Shires of the central and eastern wheatbelt, remnant vegetation areas are vitally important for land and nature conservation because of the scarcity and poor condition of many of the original ecosystems (refer Table 1). The small amount and poor condition of this vegetation restricts the number of habitats for flora and fauna species. Hence the presence of remnants on both farms and public lands in these areas is of paramount importance in the total context of protection of flora and fauna. In contrast, in the south-west forest area, there are ecosystems, such as jarrah/karri systems which are reasonably well represented in reserves, National Parks or State forests, and their importance for protection on other land titles is comparatively less.

Clearly, across the South-West Province a number of areas exist for which specific remnant protection policies should be developed. As indicated, the central wheatbelt is an area of particular concern. The east Darling Range area between the forest and the wheatbelt areas is also an older settled area that needs attention. The south-west forest area has well

represented ecosystems, but policies should be developed to ensure their conservation for water resource protection purposes. Finally, the coastal areas, although somewhat different in their needs for vegetation protection, are of sufficient concern to require specific policies.

Recommendation

- A State-wide zoning of remnant vegetation should be established that includes priorities for its protection and guidelines for its management in each zone.

Wildlife corridors and strategic revegetation

Planning for the protection of remnant vegetation and its management needs to be undertaken on a regional, or broad scale basis, in addition to that on a farm scale. Such planning provides an overview of the remnant vegetation resources of particular areas. Of special importance for land and nature conservation is the identification and protection of vegetation networks. These serve as corridors for the movement of flora and fauna and greatly enhance their survival (Saunders 1982). In addition, when located along water courses (discharge areas) they provide an important contribution to controlling waterlogging and salinity, in particular. The protection of such networks prevents remnants from becoming 'islands in a sea of agriculture', which if allowed to develop, result in decreased diversity of flora and fauna species in particular areas (Breckwoldt 1986; p. 67).

Networks and corridors of vegetation, which are often located along road-sides, rail reserves, property boundaries and watercourses, also create a visual awareness of our heritage and the need for its protection. In fact, ready opportunities exist to improve the value and viability of native vegetation on rail and road reserves by setting back their fence lines. Actions like this can significantly improve the nature conservation and aesthetic value of rail and road-side vegetation.

The mapping of remnant vegetation on a landscape scale is thus a valuable means of identifying vegetation networks or corridors that need to be protected if conservation programmes are to be effective.

Recommendations

- Programmes to protect remnant vegetation should place importance on the conservation and re-establishment of corridors and regional networks of native vegetation.

- Resources should be directed to increasing the width of rail and road reserves to re-establish them as priority native vegetation and wildlife corridors.

District planning

The planning focus for implementing remnant vegetation protection programmes should be at the shire or district catchment level. This would allow the integration of shire planning and Land Conservation District Committee activities. The shire planning framework and Rural Planning Strategies provide significant opportunities for remnant vegetation protection (see Section 8, p. 19). Also, Land Conservation Districts currently (1991) play a significant role in assessing both clearing notifications and nominations for the Remnant Vegetation Protection Scheme. In addition, they are actively involved in catchment and farm planning which frequently seeks to serve both land and nature conservation objectives.

Recommendation

- Shires and Land Conservation District Committees should be encouraged to survey remnant vegetation and develop remnant vegetation protection programmes in their rural strategies and catchment or farm plans.

7. Incentives for remnant protection

The mood of the community towards remnant vegetation protection is altering significantly. There is a very real acceptance developing that remnant vegetation is a resource worth protecting. The basis for this change in attitude is the increasing recognition of the important contributions both remnant and replanted vegetation make towards achieving sustainable land use, nature conservation and an aesthetically pleasing landscape. The continued development of this attitude should be fostered and used. Ultimately, land and nature conservation will only be achieved through community action.

There is general agreement that effective and efficient protection of remnant native vegetation is more likely to be achieved with an emphasis placed on encouragement and co-operation, rather than regulation(6) . One way of encouraging remnant protection is to ensure that its contribution to farm productivity is recognized and an appropriate value placed on it (Campbell, 1989). To achieve both this recognition and a community commitment to protecting remnant vegetation, government needs to put in place a range of protective measures and incentives. The following options for encouraging community participation are worthy of serious consideration.

Preferred approach

The preferred position of most people involved in this issue is to encourage voluntary commitments by land users to protect remnant vegetation. The preparedness of land users to act in this way became apparent when the Remnant Vegetation Protection Scheme was introduced. Many of the early enquiries originated from land users who had voluntarily fenced remnant vegetation some years earlier.

The use of regulation alone to protect remnant vegetation would not be wise. Regulation can discourage members of the community from accepting responsibility for remnant protection actions by distracting attention from the need for and benefits of remnant vegetation protection.

Recommendation

- The emphasis of remnant vegetation protection policies should be a range of voluntary programmes.

Footnote (6) This is not meant to imply legislative regulations are unnecessary. They are necessary as a last resort mechanism to ensure protection of community standards and expectations for remnant protection are met.

Voluntary covenants

There are many land users who have and would voluntarily reserve areas of remnant vegetation to ensure the indefinite protection of the remnant. This could be formalized by recording the reserved remnant on a voluntary register and citing the details as a special notice on the land title. Such a facility is included in recent amendments to the *Soil and Land Conservation Act*. Similar facilities need to be considered in the *CALM Act* or those in the *Soil and Land Conservation Act* broadened.

Recommendation

- Facilities for voluntary protection of remnant vegetation should be established in the relevant Act(s) to encourage land owners to set aside and protect areas of vegetation in perpetuity.

Fencing subsidies

The Government now provides a 50 per cent subsidy per kilometre on the cost of fencing areas of remnant vegetation through the Remnant Vegetation Protection Scheme. This scheme has been enthusiastically adopted by land users and is an appropriate focus for community input. The land owner agrees to protect the fenced areas for 30 years and the agreement is recorded on the land title. The condition of these remnants is surveyed in the first year, but needs to be monitored over time.

Recommendation

- The Remnant Vegetation Protection Scheme should be retained for the Decade of Landcare and, if possible, expanded through increased funding. On-going monitoring should also be established, in collaboration with the land owners, on all sites where remnant vegetation has been fenced under the scheme.

Low-interest loans

The cost of protecting and managing remnant vegetation is substantial. In particular, the cost of fencing can be significant when labour charges for erection and maintenance of the fence are included. Given that grazing causes substantial damage to the understorey and, eventually to the trees, fencing is perhaps the single most effective practice that enhances protection. Furthermore, if bush corridors are to be encouraged, the cost of fencing per unit area of protected vegetation will be very high. The availability of finance at concessional rates for fencing and other management operations would be a significant encouragement to voluntary protection of remnant vegetation.

Recommendation

- A loan scheme with a subsidized interest rate should be established for land users to purchase fencing and other management requisites for the protection of remnant vegetation. This would best be included as part of a broader loan scheme covering land and water conservation activities.

Local government rates

Any remnant vegetation voluntarily reserved under an official scheme should be duly recognized when assessing the valuation of land for land council rates and State Government taxes. Such recognition would encourage further protection of remnant vegetation. In the long term, when community attitudes change, protected areas of remnant vegetation are likely to enhance the value of a property. This option is not straightforward, however, and other issues need to be considered, such as the impact of altering the rateable value on Grants Commission disbursements.

Recommendation

- The effect on the capital value of land voluntarily set aside for protecting remnant vegetation on farmlands should be considered when assessing rates and taxes.

Taxation

A recent (1990) decision by the Australian Taxation Office is of importance to remnant vegetation protection. The Deputy Commissioner of Taxation approved expenditure on the following activities related to vegetation protection as eligible deductions in the year of expenditure under Section 75D of the Income Tax Assessment Act. These activities have to be shown to be principally and primarily concerned with treating land degradation. Relevant activities include:

- fencing to exclude stock from saline, degraded or fragile areas;
- fencing to exclude stock from recharge areas where tree planting or special practices are to be implemented to reduce salinity;
- re-aligning fences to overcome or avoid land degradation where exclusion of stock is required;
- regeneration of native vegetation, including costs on the management of native vegetation.

Given that in many cases vegetation protection for flora and fauna conservation and/or land conservation will preclude the generation of direct income from the land in question, incentives such as larger taxation deductions, and credits and rebates should be seriously considered as a means of enhancing such protection.

Recommendation

- Circumstances justifying additional taxation deductions or credits or rebates should be explored and promoted to the Commonwealth Government as additional incentives to land users to protect remnant vegetation.

8. Control and guarantees over management

If Government policies and programmes are to reflect community needs and aspirations for remnant vegetation protection, the Government must have some safeguard that its objectives are being achieved. Implicit in such a requirement is the necessity to be able to:

- control actions that may cause remnant vegetation to be removed or to deteriorate; and

- guarantee that voluntary actions to protect remnant vegetation (taken on the basis of either personal initiative or stimulated by Government incentives) are effective.

In developing and applying mechanisms to control and guarantee the protection of remnant vegetation, every effort must be made to protect the rights of all the individuals and parties concerned. In seeking to apply this principle, however, difficult problems may arise, particularly where the rights of the individual have the possibility of clashing with the objectives of the Government and broader community. For example, many land users would like to conserve native flora and fauna and have no intention of clearing areas of remnant vegetation. At the same time though, they may not wish to give away their options of some future use or management of that land (e.g. stock protection during a severe weather event). Another example may be where Government has provided resources to protect remnant vegetation for the purpose of, or purposes which include, flora and fauna protection. In such circumstances, leaving the land user the option of grazing would be unacceptable. Clearly then, the development of acceptable degrees and methods of safeguarding the objectives of all parties is very important.

Existing mechanisms

The objective of maintaining the extent of existing native vegetation is presently addressed through controls on land clearing over a range of specific purpose legislation.

For the purpose of minimizing or reversing the salinization of the State's major water resources, clearing is controlled within declared catchments by the *Country Areas Water Supply Act.* This control extends to protecting individual trees, but pays no attention to management, most notably grazing. Uncontrolled grazing of uncleared forest and of paddocks with scattered trees will damage any native understorey vegetation and prevent regeneration of trees. In the long term, neither water nor nature conservation objectives will be well served without some accompanying control over management.

The *Soil and Land Conservation Act,* which is administered by the Department of Agriculture, can control clearing to prevent or minimize the occurrence of various forms of land degradation, e.g. wind and water erosion, salinity and vegetation decline. The Commissioner of Soil and Land Conservation requires 90 days notice from landowners of their intent to clear land. The present procedure for the assessment of Notices of Intent to Clear involves the identification of any soil and land degradation hazards, and clearing is prevented where they exist. Landowners often voluntarily accept clearing and management restrictions placed on them and retain areas of vegetation in perpetuity. However, use of a Soil Conservation Notice is sometimes required to ensure these conservation objectives are satisfied.

The *Wildlife Conservation Act,* administered by the Department of Conservation and Land Management, prohibits the 'taking' (i.e. the destruction by any means) of gazetted

endangered flora, unless a permit has been granted by the Minister. Prohibition notices remain in force for a maximum of five years. In effect, this mechanism is a form of clearing control. (Note: There are no equivalent clauses for gazetted rare fauna.)

The *Environmental Protection Act,* though not specifically addressing clearing controls, provides lead powers that enable it to be used to assess clearing proposals. This Act could be used to require environmental impact assessment of clearing proposals, or to develop an Environmental Protection Policy that would establish co-ordinated procedures and guidelines for the assessment of clearing proposals. The detail involved in the environmental impact assessment approach, which requires considerable time, is not suited to the routine assessment of large numbers of clearing proposals. Alternatively, the Environmental Protection Policy mechanism could be used as the basis for a co-ordinated framework for assessing clearing proposals. Its application enables the development of statutory policies through an extensive public review process. If regulation is viewed as having a role in protecting remnant vegetation, its application could prove to be quite effective.

The *Town Planning and Development Act* allows for the implementation of clearing controls through provisions within Town Planning Schemes. Clearing controls in such schemes may be achieved by zoning provisions, general policy statements, or means associated with development approval procedures. The Shire of Albany, for example, includes the felling of timber in its definition of development, and requires Council approval for such activity.

Protection of remnant vegetation may also be achieved by planning mechanisms, such as Rural Planning Strategies. In recent years the Department of Planning and Urban Development through the Rural Land use Planning Policy has co-ordinated the preparation of regional and local rural strategies. These provide a basis for planning and land management where changes in the land use and development occur.

A Rural Planning Strategy can also provide for policies to be prepared for land management over areas not affected by changes in land use, although this is generally not practised.

Although policies in Rural Planning Strategies are largely directed towards local government's planning and management functions, they can and should reflect the land management functions of other government agencies and associated legislation.

At the present (1991), the processes to achieve the various objectives of all these Acts are largely independent. Increasingly, there is a need for effective co-ordination and consistency in the administration of the various Acts that control the clearing of vegetation.

Recommendations

- The administration of programmes involving the protection of remnant vegetation through the control of clearing should be co-ordinated across agencies.

- Procedures should be developed to ensure regulations in various Acts relating to the clearing of native vegetation are uniformly operated in such a way that ensures community standards and objectives are met in respect of the:
    - conservation of soil and land resources;
    - maintenance of bio-diversity (i.e. nature conservation);
    - protection of water resources;
    - maintenance of amenity values;
    - protection of individual landowner rights and responsibilities.

Note: The issue of the control of clearing is examined in greater detail in a separate report by the Soil and Land Conservation Council (previously the Soil Conservation Advisory Committee).

Future options

For remnant vegetation protection policies to be effective they must be sustainable in the long term. Amongst other things, this means that they must deal fairly with the issue of who benefits from and who pays for remnant vegetation protection. There is a wide range of views on this matter. One is that the land owners have responsibility for their actions and their effect on other landowners and the wider community. The other is that the Government has some responsibility of reparation where actions taken for the good of the broader community adversely affect the earning capacity of individuals. Clearly, neither view alone will appropriately and justly accommodate all circumstances, and some means of combining both should be available.

The owner responsibility view is consistent with the principles expressed in the State Conservation Strategy (Anon. 1983). These principles are used as the basis for both voluntary regulation and legislative regulation. In its voluntary connotation it is implicit in the now commonly espoused 'land care ethic'. In its legislative expression it is used as the basis for planning and pollution controls. Applied to the matter of remnant vegetation protection, it would mean that a landowner may either voluntarily decide not to clear native vegetation from his land or he may be compelled not to do so by legislative regulations. Either way, any costs incurred through foregone income (i.e. no productive use of the land) or in the conservation management of the land are borne by the land user.

The complexity of the natural environment sometimes makes the identification of owner responsibility difficult, notably in a small proportion of Notices of Intent to clear under the existing Clearing Regulations of the *Soil and Land Conservation Act.* These difficulties arise because, unlike the point-source pollution typical of urban environmental problems, cause and effect relationships to environmental problems in the rural areas are diffuse and complex in their origin and expression. In the case of vegetation clearing, most (these days) takes place on a scale (paddock) much smaller than that involved in land or nature degradation processes (catchment or landscape), at a time many years before any deleterious effects become noticeable, and at sites often well removed from those where the deleterious effects are manifested. Examples of such broad-scale, diffuse-source, long-time-scale degradation processes are salinization and eutrophication. Thus, whilst clearing

undoubtedly contributes to land and nature degradation, the magnitude, form, location and timing of the expression of that degradation cannot always be adequately predicted.

Indeed, such difficulties point to the advisability of complementing government regulations with government responsibility provisions, particularly where government's requirements restrict the equity and earning capacity of the individual. Such provisions already exist in some pieces of legislation, where they are expressed in various forms of compensation, e.g. the *Country Areas Water Supply Act* and the *Wildlife Conservation Act.* No compensation provisions exist in the *Soil and Land Conservation Act.*

As awareness of the need to conserve the State's reserves of remnant vegetation increases, the issue of compensation being provided to landowners who are prevented from clearing or directed to incur management costs to protect vegetation (e.g. fencing via a Soil Conservation Notice) is likely to become quite important. It will certainly arise where land was purchased with the expectation (or conditions, in the case of conditional purchase lease holdings) that the whole area would produce commercial returns from agriculture and/or forestry. It could also arise where clearing is prevented because of resultant off-site land degradation hazards or where a farm is largely in an undeveloped state (i.e. where well in excess of an arbitrary retention figure of, say, 20 per cent is uncleared). In these circumstances both an individual's equity and potential earning capacity would be diminished by Government action to prevent clearing, and a case for compensation could be justified.

Ultimately, a decision to offer compensation is a matter for judgement after weighing all the issues involved. In addition to those already mentioned, the following are relevant and should also be considered:

- any adverse consequences of broad-scale clearing compared with any beneficial effects of remnant protection;
- the level of community awareness of the need to retain and protect remnant vegetation compared with expectations of clearing all land;
- what forms of compensation, if any, may be appropriate (e.g. finance, land swap, land purchase, fencing assistance);
- the effectiveness of off-setting incentives to encourage remnant vegetation protection;
- the relationship with existing compensation provisions in relevant Acts, including the legal obligations that accompany the granting of compensation.

Given the pattern of farm development and clearing in this State, the option of compensation, as outlined above, would only apply to a small proportion of uncleared land (i.e. land with the highest capability, Class I or II) on a small number of farms.

At the very least, compensation arrangements in all relevant Acts, including the possible inclusion of some in the *Soil and Land Conservation Act,* should be reviewed and made consistent.

Recommendations

- Compensation provisions under relevant Acts, including an examination of the need for creating such provisions under the *Soil and Land Conservation Act,* should be reviewed and made consistent.

- Relevant Government Departments, in consultation with other organizations, should recommend procedures to determine whether and under what circumstances compensation is appropriate and if so how it should be provided.

- Areas protected under a compensation agreement should be monitored to ensure accountability.

Management

Where clearing is prevented by regulation, the issue of ongoing management of the protected area is of concern. As of 1991, Soil Conservation Notices, issued under the *Soil and Land Conservation Act,* require the land owner to protect remnant vegetation that is not to be cleared.

The issues of concern relating to appropriate management of remnant vegetation have been covered in Section 4. The recommendations made in that Section will, if adopted, result in actions that will provide appropriate advice on the preferred usage and management of remnants to ensure their conservation.

9. Community acceptance

Considerable change has occurred in community attitudes over the last few years in Western Australia and there is now reasonable support across the rural community for protecting remnant vegetation. This change is reflected by the introduction and success of the Remnant Vegetation Protection Scheme (RVPS). For example, in 1988/89 there were about 350 nominations received, of which 54 per cent came from the central wheatbelt area where most clearing has occurred. Strong support for the Scheme has continued; 220 nominations were received in 1989/90 and 218 in 1990/91, which, again, were dominated by nominations from the wheatbelt.

Programmes such as the RVPS and the Commonwealth 'Save the Bush Program' create awareness and provide some experience with and education of the need to protect remnant vegetation. The result is that attitudes change towards conservation orientated agricultural activities and practices, both in rural and urban communities.

As successful as the RVPS has been, continuing efforts to change community attitudes are required. These should include better training of departmental officers, so they understand both the benefits deriving from remnant vegetation protection and the management requirements to ensure its conservation. It should also include the encouragement of tree planting community organizations to include with their efforts the protection and enhancement of remnant vegetation.

Recommendations

- Community awareness should be increased through continuing support by Federal and State Governments for projects and incentives to protect remnant vegetation.

- Government and community organizations involved in the protection and management of vegetation should be encouraged to promulgate a land care ethic that includes remnant vegetation protection and assists in raising the community understanding of the values of such vegetation.

10. Minimum cover levels of deep-rooted vegetation

In concluding an examination of the issues concerned with remnant vegetation protection, a discussion is warranted on where remnant vegetation protection measures fit in relation to other government and community activities aimed at achieving land and nature conservation objectives. There can be no doubt that, over most of the land used for agriculture, clearing has been too extensive and that substantial revegetation is needed. In the context of revegetation programmes, the need for and value of remnant vegetation protection will be viewed with a different set of perspectives.

There is increasing acceptance that considerable replanting of deep-rooted perennial vegetation is required in agricultural and certain other areas of the State if land, water and nature conservation objectives are to be met. However, the amount of revegetation needed is not yet adequately known. Consequently, there is a need to objectively establish the minimum amounts of deep-rooted perennial vegetation required on a catchment or landscape basis in the various areas of the State. In addition, this knowledge needs to be supplemented by information on which types of vegetation at what landscape locations best achieves these objectives.

Only when this knowledge is assembled will rational assessments be possible regarding where on the landscape it is best to retain certain types of vegetation and where it is best to establish others. Situations could well arise, for example, where remnant native vegetation is degraded, poorly positioned and less well suited than other types of vegetation to contribute to land and water conservation. In such circumstances, providing the native vegetation does not have high nature conservation value, its clearing could be justified on the proviso that a strategic tree and shrub revegetation programme be implemented several years before the clearing is undertaken. Alternatively, remnant vegetation and wildlife could have their conservation enhanced by bush corridors of strategically replanted trees and shrubs, which would also contribute to land conservation requirements.

Ideally, estimates of the minimum necessary cover of deep-rooted perennial vegetation should be based on quantitative research evidence. The available evidence of this type (Schofield *et al.* 1989, Ruprecht and Schofield 1991 a, b) indicates that the minimum amount of such vegetation varies with annual average rainfall. In the high rainfall zone (i.e. > 700 mm rainfall p.a.) as much as 60 per cent of a catchment needs to be covered with deep-rooted perennial vegetation located on the valley floor and lower to midslope positions. In the lower rainfall zone (i.e. < 450 mm rainfall p.a.) the data (one site) indicate the required amount of such vegetation is much less. This is consistent with what one would expect. In the drier areas the required amount of vegetation should be less because the amount of evapotranspiration required to maintain the water balance is less.

In the absence of adequate quantitative data for the drier agricultural areas, an estimate for these areas of the minimum cover of deep-rooted vegetation has been based on the collective experiences of many land and nature conservation professionals. This estimate is 20 per cent of a catchment area (Department of Agriculture Clearing Assessment Guidelines).

For areas with average rainfall between 450 and 700 mm p.a. the required minimum cover of deep-rooted perennial vegetation should lie between 20 and 60 per cent of a catchment area.

Although helpful, such estimates should be used with caution. They have been generated from a comparatively small number of research sites and accumulated experience. Their generality has not been tested and they will vary from catchment to catchment and with vegetation type and condition. For example, the Denmark River catchment has salinity problems despite being 85 per cent covered with native vegetation. In this case, rather than overclearing, the salinity has been caused by inappropriate clearing and land management. The clearing was done on high salt storage areas of the catchment, including side slopes and valley floors, and land management practices have allowed grazing of the remaining native vegetation on the hilltops and drainage lines.

Nevertheless, used wisely, these estimates provide a guide as to whether clearing should proceed, or perhaps more importantly, whether a strategic revegetation programme is advisable. Indeed, opportunities arise through the insight that such estimates provide, to devise vegetation management programmes that combine remnant protection and regeneration with strategic revegetation. Programmes of this sort would simultaneously improve land and nature conservation, farm productivity and landscape amenity.

As desirable as combined revegetation and regeneration programmes are, there are some areas of the State where the knowledge necessary to guarantee their success needs to be improved. This is particularly so in the wheatbelt. Here issues such as viable remnant size and shape, remnant management, the interaction of native vegetation and fauna with agriculture and the effectiveness of tree and shrub corridors are not well understood (Section 3). Research should be initiated to overcome these deficiencies in our knowledge.

In the meantime, landholders should be encouraged to implement, wherever necessary, joint remnant protection and revegetation projects using the best available knowledge. The urgency of the need to improve land and nature conservation efforts in the drier agricultural areas makes this imperative.

Recommendations

- Until better information is available the current estimates of the minimum amounts of deep-rooted perennial vegetation required to achieve land and water conservation (i.e. between 60 per cent and 20 per cent cover) should be used as a guide for clearing control, which should include an assessment of whether the native vegetation could be replaced or supplemented with other more effective, better located deep-rooted perennial vegetation.
- Further research should be undertaken to more precisely specify the area, type and distribution of deep-rooted perennial vegetation required on the landscape to achieve land and nature conservation objectives.
- A community participation programme should be undertaken to demonstrate existing native vegetation regeneration and establishment techniques.
- Further research should be initiated into techniques of regeneration and re-establishment of native vegetation in the wheatbelt.
- A Statewide programme of integrated remnant vegetation protection and revegetation, based on catchments or landscapes, should be developed and implemented as a matter of urgency.

References

Anonymous (1983). *A Conservation Strategy for Western Australian - Living Resource Conservation for Sustainable Development.* Conservation and Environment Council. July 1983 Dept. Cons. & Environment Report No. 12.

Anonymous (1988). *The Western Australian Woodchip Industry - WA Chip and Pulp Co Pty Ltd Report and Recommendations.* Environmental Protection Authority. Bulletin 329. Perth, Western Australia, July 1988.

Anonymous (1990). *Clearing Assessment Guidelines.* Western Australian Department of Agriculture (unpublished).

Breckwoldt R. (1986). *The Last Stand.* Aust. Govt. Pub. Serv. Canberra, ACT 1986.

Campbell A. (1989). *Role of Remnant Vegetation - The Farmer Perspective.* Paper to Remnant Vegetation Steering Committee (August 1989).

Coates A.M. (1987). *Management of Native Vegetation on Farmland in the Wheatbelt of Western Australia.* Report of Voluntary Native Vegetation Retention Project. Conservation Council WA pp. 58.

House M.G. (1990). *Select Committee into Land Conservation. Discussion Paper No. 2. Agricultural Region of Western Australia.* Pt II. 16 Management of the Conservation Estate, pp. 92-94.

Mulcahy M.J. (1986). *Conservation of Native Vegetation in Farming Areas: A Discussion Paper.* Land Resource Policy Council (Dept. Premier and Cabinet, WA) June 1986.

Ruprecht J.K.and Schofield N.J. (1991a). *The Effect of Partial Clearing on the Hydrology and Salinity of Lemon Catchment.* Water Authority of Western Australia. Rep. WS74, Jan 1991.

Ruprecht J.K.and Schofield N.J. (1991b). *The Effect of Partial Clearing Treatments on the Hydrology and Salinity of Dons Catchment.* Water Authority of Western Australia. Rep. WS75, Jan 1991.

Saunders D.A. (1982). The breeding behaviour and biology of the white-tailed black cockatoo. Ibis 24, 422-455.

Saunders D.A., Arnold G.W., Burbridge A.A. and Hopkins A.J.M. (eds.) (1987). *Nature Conservation: the role of remnants of native vegetation.* Surrey Beatty and Sons. Chipping Norton.

Saunders D.A. and Curry P.J. (1990). The impact of agricultural and pastoral industries on birds in the southern half of Western Australia: past, present and future, pp. 303-321. *In: Australian Ecosystems: 200 years of Utilization, Degradation and Reconstruction.* Saunders D.A., Hopkins A.J.M. and How R.H. (eds.) Surrey Beatty and Sons. Chipping Norton.

Saunders D.A., Hopkins A.J.M. and How R.A. (1990). *Australian Ecosystems: 200 years of Utilization, Degradation and Reconstruction.* p (v). Surrey Beatty and Sons. Chipping Norton.

Schofield N.J., Loh I.C., Scott P.R., Bartle J.R., Ritson P., Bell R.W., Borg H., Anson B. and Moore R. (1989). *Vegetation Strategies to Reduce Stream Salinities of Water Resource Catchments in South-West Western Australia.* Water Authority of Western Australia. Rep. WS 33. July 1989.

Appendix 1

Current and required actions on recommendations (Numbered sections refer to report sections)

Recommendation and lead* agency(ies)	Status (OK/STA/ LTA)**	Required action	
		Short term action (STA)	Long term action (LTA)
2. Existing remnant vegetation			
• Mapping - (DAWA)	OK,STA,LTA	- complete mapping	- undertake research to specify vegetation types
• Surveys - (CALM)	STA,LTA	- set up mechanism for monitoring changes in area	- implement surveys to monitor condition
• Resources - (CALM)	LTA		- attract extra resources for management of remnant vegetation of Crown Land
3. Roles of remnant vegetation			
Land conservation			
• Clearing - (DAWA)	OK,STA	- clearing assessments to include consider-ation of replacing native vegetation with better placed vegetation for land and nature conservation purposes	
Water resource conservation			
• Protected vegetation- (WAWA, CALM, DAWA)	LTA		- undertake survey of conservation value of protected vegetation - develop classification of vegetation water use - develop guidelines for optimizing conseration and water use
• Local water supplies - (WAWA, DOLA, DLG)	STA,LTA	- identify and protect vegetation on local town water supply catchments	- identify and protect native vegetation necessary to conserve all local fresh water resources

Appendix 1 continued ...

Recommendation and lead* agency(ies)	Status (OK/STA/ LTA)**	Required action	
		Short term action (STA)	Long term action (LTA)
Nature conservation			
• Nature conservation - (CALM)	STA,LTA	- identify and protect vegetation of significant value to nature conservation	- identify and protect vegetation of significant value to nature conservation
• Priority areas - (CALM)	STA	- identify priority areas for remnant vegetation protection in wheatbelt and other areas	
• Management guidelines - (CALM, DAWA, APB)	OK,STA	- prepare guidelines to manage remnants for nature conservation and, if possible, production	
• Ecology of remnants - (CALM)	LTA		- research interaction between fauna, flora and management in native vegetation
Land productivity			
• Extension - (DAWA, CALM)	STA	- extend benefits of remnant productivity to farmers	
• Research - (DAWA, CALM)	LTA		- research productive management of remnants on farms
Amenity, tourism and recreation			
• Planning - (DAWA, CALM, DPUD, DLG)	STA,LTA	- include use of remnants for amenity in regional and local planning	- include remnant vegetation protection in rural planning strategies
• Promotion - (DAWA, CALM, DPUD, DLG)	STA	- promote protection of remnant vegetation in a co-ordinated way	

Appendix 1 continued ...

Recommendation and lead* agency(ies)	Status (OK/STA/ LTA)**	Required action: Short term action (STA)	Required action: Long term action (LTA)
4. Use of remnants			
• Identifying uses - (CALM, DAWA)	STA	- classify remnants for potential uses	
• Managing various uses - (CALM, DAWA)		- compile management guidelines for various uses	
5. Protection need and resource allocation			
• Viable size - (CALM, DAWA)	OK,STA,	- develop guidelines on minimum viable size of remnants	
• Focus for action - (CALM, DAWA, EPA)	OK,STA	- focus resources and promotion on important remnants	
• Crown reserves - (CALM, DOLA)	STA	- control use of unvested reserves	
• Land use impact - (DAWA, CALM)	STA	- extend advice to minimize impact of agriculture on remnants	
6. Considerations in planning protection			
Regional differences			
• Zones and priorities - (EPA, CALM, DAWA)	STA	- develop statewide zones and priorities for remnant protection	

Appendix 1 continued ...

Recommendation and lead* agency(ies)	Status (OK/STA/ LTA)**	Required action	
		Short term action (STA)	Long term action (LTA)
Wildlife corridors and strategic revegetation			
• Corridors and networks - (CALM, MRD, DPUD, DLG)	STA	- implement a planning programme to protect corridors and networks of vegetation	
• Rail and road reserves (CALM, MRD, DOT)	STA	- implement a programme to widen and protect vegetation on rail and road reserves	
District planning			
• Shires and LCDC's - (DOLA, CSCA, DAWA)	STA,LTA	- include remnant protection in rural strategies and catchment and farm plans	- include remnant protection in rural strategies and catchment and farm plans
7. Incentives for remnant protection			
Preferred approach			
• Voluntary programmes - (DAWA, CALM)	OK,STA,LTA	- develop and implement voluntary protection programme	- monitor progress of remnant protection programme
Voluntary covenants			
• Amendment to Acts (CALM, WAWA)	STA	- include voluntary convenants in relevant Acts	
Fencing subsidies			
• Protection Scheme - (DAWA, CALM)	OK,STA	- increase funding for RVPS and its monitoring programme	
Low interest loans			
• Fencing and management - (DAWA, CALM WAWA)	STA	- establish provisions for low interest loans for remnant fencing and management	

Appendix 1 continued ...

Recommendation and lead* agency(ies)	Status (OK/STA/ LTA)**	Required action	
		Short term action (STA)	Long term action (LTA)
Local government rates			
• Assessments - (DLA, DVG, CSCA)	STA	- examine impact of capital value on remnants in rate assessments	
Taxation			
• Concessions - DAWA	STA	- explore possibility of additional deductions, credits or rebates for fencing and other remnant management	
8. Control and guarantees over management			
Existing mechanisms			
• Clearing - (DAWA, EPA CALM, WAWA)	STA	- develop co-ordinated administration of clearing regulations relating to land, water, nature, and amenity conservation	
• Common standards - (DAWA, CALM WAWA, EPA)	STA	- develop common procedures and standards for clearing controls	
- Compensation - (DAWA, CALM DAWA, EPA)	STA	- review the need and make consistent the inclusion and operation of compensation provisions in Acts which control clearing	
• Compensation criteria - (DAWA, CALM WAWA, EPA)	STA	- institute criteria for assessing claims and types of compensation to be provided	
• Monitoring - (DAWA, CALM, WAWA, EPA)	STA	- monitor the condition and management of remnants on compensated areas	

Appendix 1 continued ...

Recommendation and lead* agency(ies)	Status (OK/STA/ LTA)**	Required action	
		Short term action (STA)	Long term action (LTA)
9. Community acceptance			
• Government programmes - (CALM, DAWA)	STA	- seek support for continued State and Federal Government programmes for remnant protection	
• Land care ethic - (DAWA, CALM)	STA	- promote a land care ethic which includes remnant vegetation protection	
10. Minimum cover levels of deep-rooted vegetation			
• Clearing/ revegetation guidelines - (DAWA, WAWA, CALM, EPA)	STA	- use best available estimates of required area of vegetation when assessing clearing and revegetation proposals	
• Required area of vegetation - (DAWA, CALM, WAWA)	OK,LTA		- undertake further research into the area of vegetation required for land and nature conservation in different areas of the South-West Province
• Demonstrations - (CALM, DAWA)	STA	- set up programme to demonstrate existing regen-eration and establishment techniques	
• Regeneration of native vegetation - (CALM, DAWA)	LTA		- undertake research into regeneration and establishment techniques for native vegetation

Appendix 1 continued ...

Recommendation and lead* agency(ies)	Status (OK/STA/ LTA)**	Required action	
		Short term action (STA)	Long term action (LTA)
• Integrated remnant protection and revegetation (DAWA, CALM, GA(WA), EPA)	STA, LTA	- develop regional targets and catalyse planned protection and revegetation projects	- monitor progress and attract extra resources necessary to further stimulate on-the-ground actions

* Lead agency signifies the Government agencies responsible for initiating and overseeing the completion of the required action(s). A Lead agency may or may not undertake the action with its own resources. The first mentioned agency should coordinate the programme.

** OK signifies that action is current, or completed and the necessary requirements are in place.

Appendix 2

Recommendations from previous reports on native vegetation in Western Australia

2A. Conservation of native vegetation in farming areas (Mulcahy 1986)

Recommendation 1

That the Government should provide, through the Department of Agriculture, an advice and extension service to farmers and landholders which includes the preparation of development plans for the land which allow for native vegetation retention and strategic replanting.

Recommendation 2

(a) That the lead agency for implementation of Soil Conservation District projects should continue to be the Division of Resource Management of the Department of Agriculture; and

(b) that the activities of the District Committees should be carefully co-ordinated with local rural planning schemes developed by local authorities.

Recommendation 3

That the rating powers under the *Soil and Land Conservation Act* be examined and if necessary revised by the Department of Agriculture with a view to their equitable use as an incentive for vegetation retention and maintenance.

Recommendation 4

That the Western Australian Government seek the support of farmer organizations in approaching the Commonwealth with a view to seeking assessable income deductions for tax purposes, and tax rebates for expenditure on capital and maintenance costs incurred in the retention or re-establishment of native vegetation.

Recommendation 5

That the State Planning Commission develop plans and policies for rural areas which recognize the benefits of retention and maintenance of native vegetation for conservation, protection of land and water resources and private and public amenity.

Recommendation 6

That the State Planning Commission, in consultation with other agencies, give priority to establishing the minimum desirable amount of native vegetation to be retained in different regions. In the interim, the objective should be to retain or re-establish native vegetation on a minimum of 15 per cent of the land.

Recommendation 7

That the State Planning Commission give consideration to the establishment of additional regional parks as a means of promoting the retention of native vegetation in scenic areas.

Recommendation 8

That local planning schemes be prepared or amended to provide for retention or replanting of native vegetation where required for the protection of water and land resources, and for the protection of conservation and amenity values.

Recommendation 9

That the Department of Local Government be the lead agency in preparing a report to Government on means to offset or modify provisions in the rating system which encourage undesirable clearing of native vegetation. Other Government agencies directly involved should contribute, namely the State Planning Commission, the Department of Agriculture, Valuer-General's Office and the Western Australian Tourism Commission.

Recommendation 10

That the following objectives and priorities be adopted for retention of native vegetation in established farming areas:

- protection of existing reserves and natural areas on public land;
- maintenance of natural areas and replanting of native and other species on farmland, in accordance with farm development plans and local and regional land use planning objectives.

Recommendation 11

That the following objectives and priorities be adopted for retention of native vegetation in new farming areas:

- land release for agriculture should be subject to the same environmental impact assessment procedures as other forms of development;
- provision of adequate and representative reserves;
- improved design of farm blocks before allocation;
- further assistance to farmers in developing farm plans, allowing for retention of native vegetation for soil and water conservation and amenity, and for planting programmes.

Recommendation 12

That the following objectives and priorities be adopted for retention of native vegetation in the south-western high rainfall areas:

- protection of existing and proposed reserves and natural areas on public land;
- management plans for State Forest, National Parks and Nature Reserves to be developed in accordance with local and regional planning schemes and policies;
- maintenance of scenic and amenity values through conservation of natural areas on private land in accordance with regional and local policies and plans;

- consolidation of clearing controls for soil conservation and catchment protection according to regional and local policies and plans.

2B. Management of native vegetation on farmland in the wheatbelt of Western Australia (Coates 1987)

Recommendation 1

That all levels of government and community groups promote the retention of native vegetation on private land in the wheatbelt by the introduction of an education programme which increases community awareness of the value of native vegetation on farmland and demonstrates appropriate procedures for maintenance, regeneration and replanting.

Recommendation 2

That the Department of Agriculture and the Department of Conservation and Land Management undertake the mapping and field survey of the remnant vegetation in the wheatbelt area of Western Australia to determine its extent, condition and composition.

Recommendation 3

That priority be given by government and community groups to research work involved in the development of effective procedures for the retention, maintenance, regeneration and replanting of native vegetation for soil and nature conservation in the wheatbelt of Western Australia.

Recommendation 4

That the need for overall planning in the wheatbelt be recognized and that future regional and local planning policies and objectives include provisions for encouraging the voluntary retention, regeneration and replanting of native vegetation on privately owned land.

Recommendation 5

That the importance of the retention, maintenance, regeneration and strategic replanting of native vegetation in farm management for shade and shelter, soil and flora and fauna conservation be promoted through whole farm planning.

Recommendation 6

That shires within the wheatbelt area of the State with 10 per cent or less of privately owned land retained under native vegetation be targeted as priority areas for discouraging further clearing.

Recommendation 7

That the importance of the retention, maintenance, regeneration and replanting of native vegetation be promoted by the Department of Agriculture as an integral part of its agricultural advice, soil conservation and farm management responsibilities. This can be achieved through research and extension of farm planning and cost effective fencing, management agreements and implementation of projects through the Soil Conservation Districts.

Recommendation 8

That the importance of the retention, maintenance, regeneration and replanting of native vegetation on privately owned land in the wheatbelt be promoted by the Department of Conservation and Land Management for the purposes of wheatbelt flora and fauna conservation, as well as for other purposes such as soil conservation and farm production. This can be achieved through a specialist advisory service, research into all aspects of maintenance and re-establishment of native species, and financial incentives including management agreements, fencing subsidies for rare and endangered plants and the supply of subsidised plants and seed.

Recommendation 9

That taxation provisions be introduced for expenditure on capital and maintenance costs incurred in the retention or re-establishment of native vegetation for nature as well as for soil conservation purposes.

Recommendation 10

That local government bodies promote the retention, maintenance, regeneration and re-planting of native vegetation in the wheatbelt through the promotion of incentive schemes and involvement in the Soil Conservation Districts and local planning schemes.

Recommendation 11

That Greening Australia and other community groups promote the retention, maintenance, regeneration and replanting of native vegetation on privately owned land in the wheatbelt through programmes involving education, extension, research, direct grants and volunteer workers.

Recommendation 12

That an executive officer be appointed and based at the Department of Conservation and Land Management to co-ordinate and promote the activities of the many organizations and individuals involved in the voluntary retention and re-establishment of native vegetation on privately owned land in the wheatbelt.

Appendix 3

Remnant vegetation steering committee - members and nominating organizations

Department of Agriculture

- Dr Graeme Robertson
- Mr Greg Hamilton
- Mr Greg Beeston

Department of Conservation and Land Management

- Dr Barry Wilson
- Mr John Blyth

Water Authority of Western Australia

- Mr George Kikiros

Environment Protection Authority

- Mr Gary Whisson (Deputy: Ms Helen Allinson)

Department of Planning and Urban Development

- Mr Brett Flugge (Deputy: Mr Gary Taylor)

Western Australian Farmers' Federation

- Mr Alex Campbell

Pastoralists' and Graziers' Association

- Mr Chris Evans

Country Shire Councils' Association

- Mr Ian Purse

Conservation Council of Western Australia

- Mrs Rachel Siewert
- Mrs Jill Reading

Greening Australia (Western Australia) Inc.

- Mr Brett Loney (Deputy: Ms Martine Scheltema)

Australian Forest Development Institute

- Mr John Sanders (Deputy: Mr Graham McKenzie-Smith)