Management of native vegetation on farmland in the wheatbelt of Western Australia

A M. Coates

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Management of Native Vegetation on Farmland in the Wheatbelt of Western Australia

Compiled by:
A.M. Coates

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Management of native vegetation on farmland in the wheatbelt of Western Australia

Department of Agriculture
Western Australia
Resource Management

Technical Report No. 145

MANAGEMENT OF NATIVE VEGETATION ON FARM LAND
IN THE WHEATBELT OF WESTERN AUSTRALIA

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CONTENTS

Summary and recommendations ................................................................. 1

Chapter 1. Introduction .............................................................................. 5
  1.1 Introduction and project objectives .................................................... 5
    1.1.1 Project objectives ........................................................................ 6
  1.2 Causes for concern ............................................................................ 7
    1.2.1 Land degradation ........................................................................ 7
    1.2.2 Loss of flora and fauna .............................................................. 8
    1.2.3 Vegetation decline ...................................................................... 8
    1.2.4 Impact of climatic change .......................................................... 9
  1.3 Benefits of remnant vegetation on farmland in the wheatbelt of Western Australia ................................................................. 9
    1.3.1 Shade and shelter ........................................................................ 9
    1.3.2 Control of land degradation ....................................................... 10
    1.3.3 Conservation of flora and fauna .................................................. 10
    1.3.4 Aesthetic, educational and recreational values .............................. 11
    1.3.5 Conservation of genetic resources ............................................. 11
    1.3.6 Commercial uses ....................................................................... 11

Chapter 2. Incentives for the retention of native vegetation ....................... 13
  2.1 Procedures for native vegetation retention and replanting in Australia and overseas ................................................................. 13
    2.1.1 Australian Capital Territory ....................................................... 13
    2.1.2 New South Wales ..................................................................... 13
    2.1.3 Northern Territory .................................................................... 14
    2.1.4 Queensland .............................................................................. 14
    2.1.5 South Australia ....................................................................... 15
    2.1.6 Tasmania .................................................................................. 16
    2.1.7 Victoria .................................................................................... 17
    2.1.8 Western Australia ..................................................................... 18
    2.1.9 Federal government ................................................................... 20
    2.1.10 Overseas .................................................................................. 20
  2.2 Possible elements of an 'Incentive package' ......................................... 21
    2.2.1 Taxation rebates and concessions ............................................. 21
    2.2.2 Local government rate rebates .................................................. 22
    2.2.3 Grants and subsidies .................................................................. 23
    2.2.4 Low interest finance ................................................................. 24
    2.2.5 Schemes to provide employment ................................................ 24
    2.2.6 Management agreements .......................................................... 24
    2.2.7 Demonstration farms and extension work ................................... 25
    2.2.8 Compensation and land purchase ............................................. 26

Chapter 3. The extent of remnant vegetation in the study area ..................... 28
  3.1 Method of mapping and analysis ....................................................... 28
  3.2 The extent of remnant vegetation in four shires of the wheatbelt region ................................................................. 28
  3.3 Landholder estimates for remnant vegetation on privately owned land in the Central South Region of the wheatbelt ................................................................. 37
SUMMARY AND RECOMMENDATIONS

Clearing in the wheatbelt region of Western Australia has been rapid and extensive. The mapping of remnant vegetation in the shires of Dumbleyung, Lake Grace, Pingelly and Tammin with the use of the most recent aerial photography (1984) demonstrates the extent of clearing especially in the old established farming areas. Only 7 per cent of the Tammin shire had been retained under native vegetation, 10 per cent of the Dumbleyung shire and 14 per cent of the Pingelly shire. In the Lake Grace shire where large areas have only recently been developed for agriculture, approximately 31 per cent had been retained under native vegetation. Most of the ‘blocks’ of remnant vegetation in the older farming areas were small and scattered and therefore prone to deterioration and in need of active management.

Causes for concern in the wheatbelt include loss of flora and fauna, vegetation decline, wind and water erosion, increased salinity and the impact of climatic change. Better management of native vegetation is needed for nature conservation and to help alleviate land degradation. This management will need to include maintenance and regeneration of remaining areas, limiting the extent of further clearing and strategic replanting of indigenous species.

The benefits to society of native vegetation on farmland include aesthetics, the conservation of flora and fauna and the conservation of genetic resources. Benefits to farms include those provided by windbreaks, shade and shelter for stock, the control of soil and water erosion and salinity and wildlife habitats for pest predators (Breckwoldt, 1986).

This report proposes that the willing cooperation of the farm sector is essential for the successful management of native vegetation in the wheatbelt for nature and soil conservation. The map work presented in the report and research carried out by CSIRO indicates that the greatest proportion of native vegetation remaining in the wheatbelt is found on private land and little crown land is available in the old established farming areas for reservation. The nature reserve system does not sample the landscape adequately and land degradation needs to be dealt with on a regional or catchment basis.

Private landholders, however, may not have the financial resources or motivation necessary for the retention, maintenance, regeneration and replanting of native vegetation in the region and therefore support and encouragement is needed from government and community groups. Incentives offer the opportunity of encouraging the willing cooperation of the farm sector in land management for nature and soil conservation and reduces the possibility of harmful confrontation which could arise through government regulation. The report reviews procedures for native vegetation retention and replanting in Australia and overseas and outlines alternatives for a package of incentives.

The results of the farmer survey provide a guideline for the setting of objectives for schemes to effectively encourage the voluntary retention and re-establishment of native vegetation on privately owned land in the wheatbelt. These objectives are as follows:

1. To discourage the continued clearing of native vegetation in old established farming areas and regulate clearing in new land situations.
2. To encourage the maintenance and regeneration of the remaining native vegetation.
3. To promote the benefits of remnant vegetation on farmland especially for the conservation of flora and fauna.
Management of native vegetation on farmland in the wheatbelt of Western Australia

4. To convert interest in replanting to practice, with emphasis on the use of indigenous species wherever possible.

Incentives in order of landholder preference, were fencing subsidies, the supply of low cost trees, tax concessions, extension work by government departments, relief from local government rates, worker schemes and low interest loans. The management agreement outlined to respondents and based on the Heritage Agreements in South Australia was accepted by 70 per cent of landholders interviewed.

To achieve a high level of landholder involvement in the planning and management of native vegetation in the region an education program introduced through extension work by government and community groups is needed.

**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 program which increases community awareness of the value of native vegetation on farmland and demonstrates appropriate procedures for maintenance, regeneration and replanting.

For effective decision making regarding the management of native vegetation information on existing biological and physical resources is needed including the extent, composition and condition of remnant vegetation.

**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 region of Western Australia to determine its extent, condition and composition.

Research is also needed to develop effective procedures for the maintenance, regeneration and replanting of native vegetation in the wheatbelt. Leading research agencies include the Department of Agriculture, the Department of Conservation and Land Management and CSIRO, but community support is also needed.

**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.

For the effective management of native vegetation individual nature reserves need to be looked at in the context of a whole system or network of remnant vegetation on public and privately owned land and land degradation needs to be tackled on a regional or catchment basis. This can be accomplished by overall planning.
Recommendation 4

That the need for overall planning in the wheatbelt be recognised 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.

Whole farm planning provides assistance to the individual landholder by helping him/her to develop good farming practices that take into consideration the short and long term viability of the property. Soil and nature conservation can both be taken into consideration and financial incentives provided.

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.

Landholders interviewed in the farmer survey suggested, on average, that 14 per cent of their properties should now be retained under native vegetation. In the wheatbelt it has been estimated that 3 per cent of the region has been set aside for nature conservation with further crown reserves in existence for other purposes. This report therefore assumes that an objective to retain or re-establish native vegetation on a minimum of 15 per cent of the land has general farmer support in this region if the retention or re-establishment on privately owned land is on a voluntary basis encouraged through incentives schemes. Fifteen per cent has recently been suggested by the Land Resource Policy Council report (LRPC 1986). Shires where only 10 per cent or less of privately owned land have been retained under native vegetation need special attention.

Recommendation 6

That shires within the wheatbelt region 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.

In the formulation of policies and objectives by government and community groups the importance of the retention and re-establishment of native vegetation in the wheatbelt needs to be recognised. These policies and objectives influence the direction of extension work, research, planning and the allocation of sometimes limited finances. For the effective use of resources in the promotion of the retention and re-establishment of native vegetation in the wheatbelt the following role for government and community groups has been recommended:

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.

The report joins with the LRPC Report and the House of Representatives Standing Committee on Environment and Conservation in recommending:

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 programs involving education, extension, research, direct grants and volunteer workers.

The results of the farmer survey indicate that in general landholders in the wheatbelt see a value for remnant vegetation on their properties with regard to sustaining and increasing production through soil conservation and shade and shelter for stock. They are less likely to value these areas for flora and fauna conservation emphasising the need for promotion in this area and the importance of cooperation between those involved in flora and fauna conservation and those involved in farm management. Coordination of the many government departments, community groups and individuals involved in the retention and re-establishment of native vegetation is needed.

Recommendation 12
That an executive officer be appointed and based at the Department of Conservation and Land Management to coordinate and promote the activities of the many organisations and individuals involved in the voluntary retention and re-establishment of native vegetation on privately owned land in the wheatbelt.
CHAPTER 1. INTRODUCTION

1.1 INTRODUCTION AND PROJECT OBJECTIVES

In the Western Australian wheatbelt (roughly 300-600 mm average annual rainfall) large areas of land have been cleared for agriculture at a rate and scale seldom seen elsewhere in the world (Ralph, 1986/87). In the Shire of Tammin, for example, 93% of the total area has been cleared leaving only small remnants of the original vegetation. In view of the limited nature reserve system in the wheatbelt this is of concern to those interested in the conservation of flora and fauna. It also has implications for soil conservation, a major problem facing farmers today. The problem of conserving native vegetation in farming areas has recently been addressed by a Land Resource Policy Council report (1986). The report recognises the need for Commonwealth, State and Local Government involvement in the retention and replanting of native vegetation.

The present study is an attempt to determine the needs and attitudes of those most vitally concerned, the farmers themselves. Recommendations are put forward, taking into consideration farmer preferences, for a package of incentives to encourage the retention, maintenance, regeneration and replanting of native vegetation in the wheatbelt of WA.

The benefits to society of native vegetation on farmland include aesthetics, the conservation of flora and fauna and the conservation of genetic resources. Benefits to farms include those provided by windbreaks, shade and shelter for stock, the control of soil and water erosion and salinity and wildlife habitats for pest predators (Breckwoldt, 1986).

Reliance must be placed on privately owned land for the conservation of flora and fauna in the wheatbelt with the realisation that publicly owned conservation lands inadequately sample the landscape (Hopkins and Saunders, 1987).

In preliminary estimates the Department of Agriculture has suggested that farmers in the low and medium rainfall areas are losing annually $94 million to land degradation including wind and water erosion, soil structure decline and salinity (Dept. of Agriculture Annual Report 1985/86). The expected climatic change to the south-west of WA with reduced total rainfall (Chittleborough, 1985) is likely to exacerbate wind and water erosion problems experienced under the present cropping regime.

With increasing concern over the conservation of flora and fauna and land degradation in the wheatbelt has come the acknowledgment of the need for Government intervention. Increasing economic pressure on the farm economy in recent years has placed increasing pressure on the landholders to expand cropping operations to service debts at the expense of the remaining native vegetation. The cost/price squeeze has also limited available finance for the maintenance and replanting of native vegetation. Private decisions may be made for short-term survival rather than taking into consideration long term implications and the general benefits to society.

Government intervention can be in the form of regulation or incentives. Regulation in the form of ‘clearing bans’ has been seen as counter-productive with examples given of farmers deliberately clearing land which they may otherwise have retained because of anger at what they consider an overbearing approach by government.
Other reactions may include the deliberate degradation of areas of native vegetation on farmland by the spreading of fertiliser, ringbarking of trees by stock and ‘accidents’ with burning off. Without farmer cooperation the effective implementation of a policy to manage native vegetation in the wheatbelt with regard to retention, maintenance, regeneration and revegetation could be very difficult.

Incentives offer the opportunity of encouraging the willing cooperation of the farm sector in land management, both for soil conservation and for the conservation of native fauna and flora. This approach reduces the possibility of harmful confrontation and works towards a satisfactory balance between conservation and agricultural development (Edwards and Thomson, 1985).

In the words of Ian McLachlan, President of the National Farmers’ Federation:

“Conservation and management of remnant vegetation is linked to the wider issues of land management, which often require cooperation and commitment of resources beyond those available to individuals. It may therefore be necessary for government and community groups to stimulate greater community involvement in revegetation projects and better management practices.

Above all there is a need for understanding and cooperation between land managers and the wider community to ensure that a balance is achieved between agricultural development and conservation of native vegetation.”

(Breckwoldt, 1986)

1.1.1 Project objectives

The ultimate aim of the project is to develop an integrated package of incentives to encourage, to the maximum extent possible, the voluntary retention of native vegetation on privately owned land in the wheatbelt region of Western Australia. These incentives will consist of effective measures that can be taken by Local, State and Federal Governments and community groups to encourage the retention of native vegetation and which are also acceptable to landholders.

Incentives to encourage the maintenance, regeneration and replanting of native vegetation are included as well as those to discourage continued clearing.

Possible elements of such a package of incentives include tax rebates and deductions, rate rebates, assistance with fencing materials and design, management agreements, volunteer youth work schemes and education programs including extension work and demonstration farms. These incentives will be discussed in greater detail in Chapter 2.

Due to the strong interests in native vegetation retention expressed by the Central South Regional Development Advisory Committee this region of the wheatbelt was chosen for a case study for the development of a package of incentives.

The specific tasks to be carried out in the course of the project were as follows:

1. To examine the extent of clearing in the study area by mapping the remnant native vegetation in the shires of Pingelly, Tammin, Dumbleyung and Lake Grace.

2. Briefly review procedures and status of native vegetation retention and replanting in Australia and overseas.
3. Survey landholders in the shires of Pingelly, Tammin, Dumbleyung and Lake Grace to
determine:
   a) landholders’ general attitudes to native vegetation and in particular their reasons
      for wishing to clear or retain bushland on their properties;
   b) landholders’ attitudes to a system of vegetation retention incentives and their
      likely impact on management decisions.

4. Draft recommendations on measures by which Local, State and Federal Government
   bodies and community groups can encourage the retention, maintenance, regeneration
   and replanting of native vegetation on privately owned land in the wheatbelt region.

The project has been funded by:
Conservation Council of Western Australia
Department of Agriculture
Department of Conservation & Land Management
Department of Regional Development and the North West
Greening Australia
Department of the Arts, Sport, the Environment, Tourism & Territories
Land Resource Policy Council (Department of Premier & Cabinet)

The WA Farmers Federation and the Environmental Protection Authority have given the
project full support.

1.2 CAUSES FOR CONCERN

1.2.1 Land degradation

With the clearing of land for agriculture annual crops and pastures have replaced native
vegetation causing watertables to rise and exposing areas to land degradation.

Forms of land degradation include water and wind erosion, salinity, loss of soil fertility and
vegetation degradation. Vegetation degradation will be discussed separately under section
1.2.3. It has been reported that only 35 per cent of cleared farmland in the south-west of WA
is thought to be stable under present management systems. About 40 per cent requires soil
conservation measures including fencing, contouring and other management practices to
control both water and wind erosion and a further 25 per cent needs special attention mainly
to prevent wind erosion (Carder and Humphry, 1983).

The costs of land degradation to the wheatbelt farmer are high. Estimated annual losses
include $38 million to wind erosion, $19 million to water erosion and waterlogging, $11
million to soil structure decline and $26 million to salinity. Secondary salinity now affects
more than 300,000 ha of once productive agricultural land in the State and saline run-off and
seepage has rendered the majority of rivers in the south-west useless as industrial, agricultural
and urban water resources (Department of Agriculture, Annual Report 1985/86).

Direct cash loss to the Jerramungup area due to wind erosion was estimated by officers of the
Department of Agriculture at $1.5 million in 1981: a cost of $17,900 per farm affected
(Carder and Humphry, 1983). Losses caused by water erosion, waterlogging and flooding in
the Shire of Kondinin during 1974 were estimated at $13 million. Meteorological records show that on average such losses can be expected there during one year in five (Marsh and Carter, 1983).

1.2.2 Loss of flora and fauna

The flora of the wheatbelt is one of the richest in the world and many species are unique to the area. The highest concentrations of rare and threatened native plants in Australia occur in this region. Fifty-two wheatbelt species are thought to be extinct although populations of some of these plants may still exist in remnant native vegetation yet to be surveyed (Hopper, 1986). Recent surveys have rediscovered 39 rare species including the underground orchid *Rhizanthella gardneri*. Also numerous localised species were found, many of which are new to science.

With the clearing of bush for agriculture, the introduction of feral animals, alteration of fire regimes and other disturbances, 17 of the 43 species (40 per cent) of mammals recorded from the region since European settlement are believed to have totally disappeared and only 12 are considered to be moderately common to abundant (Kitchener et al. 1980).

Most of the original species of birds still occur in the wheatbelt, although it is possible that species have been lost from individual nature reserves (Kitchener et al. 1982). The short-billed White-tailed Black Cockatoo and Major Mitchell’s Cockatoo have undergone a reduction in range through reduction in food supply and nest sites (Saunders, 1985). In the south-west of the State 83 per cent of the land birds are dependent on native vegetation for all or some of their annual requirement (Smith, 1987). Loss of bird species can therefore be expected due to the degradation of remnant vegetation and continued clearing.

1.2.3 Vegetation decline

Decline of both trees and understorey in remnant bushland in the wheatbelt is now a major cause of concern. The maintenance and regeneration of remaining remnants are important aspects of the overall management of native vegetation in the region. In very large or contiguous areas natural processes may continue to function as before but those processes can be disrupted in small scattered remnants of native vegetation such as those occurring in the wheatbelt, leading to vegetation decline. Disturbances include alteration to fire regimes, grazing of stock, new transfer of nutrients and water, increase in salinity, the removal of species of plants and animals and the invasion of weeds and feral animals (Saunders et al. 1987; Hobbs, 1987). Results obtained by CSIRO in an area of 1,760 km² near Kellerberrin demonstrate the severity of the problem in this area. Of the 531 remnants of native vegetation involved in the study only 60 did not show obvious signs of deterioration as a result of grazing by domestic stock or other disturbances (Saunders et al. 1987).

Domestic stock cause extensive damage principally through grazing to understorey vegetation and regenerating seedlings which are often completely lost. Larger shrubs and trees were shown to be less prone to direct damage except by ringbarking and root trampling in a South Australian study (Sullivan and Yenning, 1984).

The understorey scrub and heath areas play an important role in conservation. In Victoria, studies indicate that the level of grazing in remnant patches of native vegetation was the most
important factor after size of the area in determining the number of species of birds and mammals it could carry (Breckwoldt, 1986).

Research carried out in 1982 by the WA Division of the Institute of Foresters of Australia in the Narrogin district indicated that 43 per cent of existing rural trees had been lost from the study area over a 38 year period. Trees were being lost across the whole landscape and the rate of tree loss in the last decade (1972-1981) had risen sharply relative to the preceding 30 years (1943-1972) (Brown, unpublished). The suspected cause of branch dieback given by Kimber et al. (1984) in the survey of tree decline in the shires of Wyalkatchem and Tammin were in decreasing order of importance: weed killer, drought, salinity, physical damage, insect damage, old age and fire. Kimber et al. also indicated that the decline appeared to be of recent origin.

1.2.4 Impact of climatic change
There is international concern over rising atmospheric carbon dioxide levels resulting largely from the rapid increase in combustion of fossil fuels (the ‘Greenhouse Effect’). Evidence suggests that in the south-west of Western Australia annual air temperatures may rise by 4-5°C in several decades and that the total rainfall will be reduced, particularly winter rains (Chittleborough, 1985). Reduced winter rainfall and increasing emphasis on rainfall from storm events outside the winter period is likely to exacerbate wind and water erosion problems experienced under present cropping regimes. In this event revegetation for windbreaks, for reducing secondary salination and along streamlines for erosion control becomes even more important. Alternative uses for marginal wheatbelt country and revegetation of saline and eroded areas have been put forward by Chittleborough as strategies available for adapting to global climatic change in the south-west of Western Australia.

1.3 BENEFITS OF REMNANT VEGETATION ON FARMLAND IN THE WHEATBELT OF WESTERN AUSTRALIA

1.3.1 Shade and shelter
Livestock and crop production can be increased where remnant vegetation acts as a windbreak and provides shade. Benefits recorded from uses of windbreaks in Western Australia include protection from sand blasting and soil erosion, silt traps to catch windblown sand and a reduction in chilling deaths of newborn lambs. In 1981 neo-natal losses in breeding flocks due to starvation and exposure were reported to be $20 per ha of farm area on the Esperance plains (Overheu, 1982). Breckwoldt (1986) reports on research conducted at Armidale, NSW where protection from wind during rain when temperatures were less than 5°C increased lamb survival by 27 per cent.

In further research at Armidale at high stocking rates, wool production was increased by a mean of 31 per cent over 5 years if the sheep were protected by an efficient windbreak. Sheep on sheltered plots were also an average of 6 kg/head heavier. Increases in the survival rate of shorn sheep were also recorded with losses in an unsheltered paddock as high as 11 per cent with no losses recorded for an adjoining protected paddock (Bird et al. 1984).

Pasture and crop yields have been shown to be as much as 30 per cent higher in a downwind zone extending about ten times windbreak height. The total area receiving some protection from a windbreak can reach up to twenty five times its height. While there is a loss of
production immediately adjacent to windbreaks because of competition for nutrients by the roots of trees and crop and pasture species and interception of rain by the canopy, this loss is compensated by the increased production in the more extensive area that is protected (Bird et al. 1984).

The wildlife found in remnant vegetation on rural lands can also be of direct benefit to the land owners as predators and parasites of agricultural pests (Breckwoldt, 1986).

### 1.3.2 Control of land degradation

Remnant vegetation can play an important role in regulating hydrological processes, nutrient cycling and erosion on surrounding land. The retention of selected areas of native vegetation can help regulate land degradation in newly farmed areas and selective regeneration and replanting can help control existing degradation processes. Areas of importance include aquifer recharge zones, steep slopes or soils susceptible to erosion.

The role of shelter belts in the control of wind erosion has already been mentioned in the previous section. In addition maintenance and regeneration of native vegetation along watercourses can reduce gullying by reducing the rate of stream flow thus minimising the loss of soil.

Another consequence of vegetation clearing is induced soil salination. Without deep-rooted trees to remove water, the watertable rises towards the surface bringing dissolved salts with it. The benefits of replanting salt affected areas with trees and shrubs include the lowering of the watertable, conversion of salty areas into future stock shelter belts and reducing wind erosion which together with sheep trampling causes bare saltland areas to enlarge (Negus, 1984).

### 1.3.3 Conservation of flora and fauna

Only about 3 per cent of the wheatbelt has been set aside as reserves for wildlife conservation (Hopper, 1986) and many vegetation types are poorly represented in these areas. Some remnants on farmland are all we will ever have of certain species or ecosystems. Some farmers are already involved in the conservation of rare and endangered plants. For example, four rare eucalypts and an unnamed _Darwinia_ are protected within a 350 ha reserve on a farm at Badgingarra (Hopper, 1986).

While rare species usually receive considerable attention some of the more common species should not be forgotten. Salmon gum (_E. salmonophloia_) woodlands were regarded by early settlers as indicators of soils with good agricultural potential. Today, representation of salmon gums in their natural form in the wheatbelt is mainly dependent upon areas retained on farmland.

Areas of remnant vegetation are needed as corridors or stepping stones of natural habitat between reserves to allow movement of wildlife. This movement enables the interchange of breeding stock to take place and therefore increases the genetic diversity of populations. It also permits recolonisation following fire or other dramatic falls in populations.

Just how many species a remnant of vegetation can maintain increases with its size, the diversity of habitat, how well it is protected, the proximity of other remnants, and the
presence of corridors. But even remnants as small as one hectare have been found to be of value for conservation and should be retained.

A recent survey of the Avondale Flora and Fauna Reserve (Beverley), 50 ha in size and in a severely degraded condition, recorded 132 species of native plants and 276 animal species including two species of native mammals, 26 species of birds, five species of lizards, four species of frogs and 237 species of invertebrates (Lamont, 1984).

The Sugar Glider has been reported in Victoria as surviving in remnants as small as 1.5 ha, particularly if they were interconnected or separated by only short distances from other remnants of native vegetation (Breckwoldt, 1986). The reticulated velvet gecko (*Oedura reticulata*) is reported as being able to survive in areas of remnant vegetation as small as one hectare scattered among cleared land in the WA wheatbelt (How and Kitchener, 1983). A diversity of spiders has also been found in isolated reserves in the wheatbelt indicating that they can exist in relatively small areas (B.Y. Main, 1987).

1.3.4 Aesthetic, educational and recreational values

Privately owned remnant vegetation can contribute to landscape quality. Country travel is made more pleasant by the presence of natural vegetation. ‘Wildflower Tours’ are becoming an important feature in the tourist industry. During 1987 there will be a heavy emphasis on wildflowers in promotions by the WA Tourism Commission.

Remnants of native vegetation can be important for scientific research by filling a gap in our knowledge of the original vegetation of cleared areas and by increasing our knowledge of soil dynamics and other processes by comparison.

The remnants also help create a public awareness of nature and nature conservation, especially amongst rural people.

1.3.5 Conservation of genetic resources

Retention of areas of remnant native vegetation throughout the wheatbelt can maximise genetic variability. The value of genetic variability can be seen with different populations of River Red Gums (*E. camaldulensis*). These populations have provided stock genetically suited to a range of different environments making it suitable for planting in many countries and providing a highly salt-tolerant variety which may have a role to play in salinity control. Agriculture can benefit from remnant vegetation that contains genetic material that can be used in a changed or changing environment (Breckwoldt, 1986).

There is also potential for a number of species in the wheatbelt to be of future use and value to other sectors of society. Already *Melaleuca uncinata*, a very common wheatbelt plant, has been found to be a source of fire retardant chemical and *Pimelea ferruginea*, *P. physodes* and *P. argentea* as having active anti-cancer properties, particularly against leukemia (Muir, 1981).

1.3.6 Commercial uses

The total worth of the native cut flower, seed and nursery products industries was $5.2 million at the wholesale level in the 1980/81 financial year (Burgman and Hopper, 1982). Extreme difficulty is presently being experienced by the seed industry in meeting the demand.
for many species from the wheatbelt where clearing has reduced areas of native vegetation. About 50 per cent of the cut flower stems picked in 1980/81 were from privately owned land (Burgman and Hopper, 1982). Future potential for the industry exists mainly with the cultivation of native species for cut flowers, gardens and revegetation projects. Retention and maintenance of existing areas of remnant vegetation will be of importance as a source of seeds and cuttings.

Other long-term production possibilities for native vegetation in the wheatbelt include ornamental fruits, oil (eucalypt leaves), fuelwood, timber and fence posts. Very recently the first commercial crop of quandongs were sold in Adelaide for $14 a kilogram (Atkinson, 1985).
CHAPTER 2. INCENTIVES FOR THE VOLUNTARY RETENTION OF NATIVE VEGETATION

2.1 PROCEDURES FOR NATIVE VEGETATION RETENTION AND REPLANTING IN AUSTRALIA AND OVERSEAS

2.1.1 Australian Capital Territory

Landscape Conservation Reserves can be established on Crown lease land under the Nature Conservation Ordinance Act, 1980. The Department of Territories and Local Government provides management advice and technical support. The purpose of the scheme is to protect important habitats and flora and fauna from outside threats and disturbances.

Areas have been replanted under Community Employment Programs. The National Capital Development Commission has conducted research on rural tree decline. Government grants for demonstration projects have been made. Greening Australia has been active in schools and competitions. Leases have been re-drafted to encourage landholders in the ACT to replant and fence off areas for regeneration and the use of native species by ACT Forests has increased.

2.1.2 New South Wales

A voluntary scheme for establishing wildlife refuges over freehold, leasehold and Crown lands has been established in NSW under the National Parks and Wildlife Refuge Act, 1974. The purpose of the scheme is to promote private conservation on land outside existing reserves. Landowners can apply to the NSW National Parks and Wildlife Service to establish a wildlife refuge on their property. If the application is approved by the Director of the NPWS and the Minister for Environment, management plans are prepared after consultation with the landowner. The plan of management makes refuge owners honorary rangers. The duration of the scheme is with the existing owner and must be reviewed with subsequent owners. Financial assistance to refuge owners is available but scarcity of funds within the Department for wildlife refuges has been reported (Kennedy, 1984). Covenants are signed between the NPWS and refuge owners if materials or finance is supplied. The refuge can be revoked at either the request of the landholder or the NPWS Director. Over 430 wildlife refuges are now in existence in NSW with an area almost equal to half that of the State’s National Parks and Nature Reserves. Eighty per cent of the refuge owners are rural producers.

The acquisition of land under the National Parks and Wildlife Act, 1974 is the most secure method of reserving land for the conservation of flora and fauna in NSW. An act of Parliament is required to revoke a decision to reserve land, mining requires agreement of both Houses of Parliament, all areas are on the National Register and the National Parks and Wildlife Service can override unfavourable zonings under the Environmental Planning and Assessment Act, 1979. However, because of a shortage of funds the Service is limited in its ability to acquire land for flora and fauna conservation. The time involved in reaching government approval provides a further constraint (Giblin and King, 1987).

Alterations to the National Parks Act (1974) to accommodate heritage agreements have been drafted.
Through the Environment Planning and Assessment Act 1979 the Minister for Planning and Environment has the power to control vegetation clearing through local Town Planning Schemes. The intent of the Act is to represent a total environmental management process covering urban and rural planning, environmental protection and resource development functions. It has been reported that land use planning in NSW has not as yet been satisfactorily applied for the conservation of natural vegetation, particularly at the local government level where few planning guidelines exist because of the lack of State and regional policies (Giblin and King, 1987).

Revegetation is encouraged through National Tree Program! Greening Australia demonstration projects and publications and extension work in State Government departments.

### 2.1.3 Northern Territory

The Conservation Commission of the Northern Territory may assess perpetual leasehold land for reservation under the Crown Land Act. This land can be managed in conjunction with areas outside the leased area and management advice and assistance is available.

The Conservation Commission may also enter into joint management agreements on Aboriginal, private or leasehold land under the Territory Parks and Wildlife Act 1974. Provisions are available for financial assistance and signs are provided if required.

Under the same Act the Conservation Commission may initiate Protected Area Management on private or Aboriginal land in agreement with the landholder. The purpose of the scheme is to protect fauna from illegal trapping and killing. The agreement can be entered on the land title for a fixed period or in perpetuity and provisions are available for financial assistance.

Revegetation is being encouraged by an extension officer in Alice Springs, free trees and tree planting trials. National Tree Program/Greening Australia have been involved in producing publications and with tree planting.

### 2.1.4 Queensland

The Rural Nature Conservation Program has been initiated to integrate nature conservation with rural enterprise. A pilot project on the Darling Downs in southern Queensland has been started with both the involvement of the Queensland National Parks and Wildlife Service and the rural community. The scheme involves individual property owners, producer organisations and other government departments and rural organisations. Advice and assistance with property management plans are available along with field days, displays and pamphlets.

Landholders may apply to enter into an agreement under the National Parks and Wildlife Act (1975) to establish a fauna refuge on their property. A management plan is required and the agreement only applies to the existing landholder and must be re-negotiated with new owners. Management advice and technical support is available.

Landowners may establish a fauna sanctuary under the Fauna Conservation Act (1974-1979). The agreement is voluntary and no obligations apply. The habitat is assessed by the National Parks and Wildlife Service and management advice and signs are available. Most of the
1,343 fauna sanctuaries, however, are on Crown and local government lands (Breckwoldt, 1983).

An interdepartmental committee on tree decline in rural areas was set up in 1981 and surveys to assess tree decline and community attitudes have been carried out. Revegetation is encouraged by Greening Australia with trial demonstrations and employment oriented projects. Maps indicating parts of the State where trees can be economically re-established have been produced.

2.1.5 South Australia

In recent years the South Australian Government has introduced a number of programs for the retention and regeneration of native vegetation in the agricultural areas of that State.

The Heritage Agreement Scheme was introduced in 1980 and a Revegetation Scheme in 1981. The aims of the Revegetation Scheme were to encourage natural regeneration of degraded areas of native vegetation and the use of direct seeding methods. To encourage tree planting committees have been formed and the Woods and Forests Department has established a Rural Tree Scheme to provide inexpensive tree seedlings.

Heritage Agreements

The voluntary Heritage Agreement Scheme is designed to assist landowners to retain and protect areas of native vegetation on their properties. The Agreement does not affect land ownership - this remains with the property owner. The incentives offered under the Scheme include relief from State and local government rates and taxes, fencing subsidies and management advice and assistance on request. The landowner can also apply for financial assistance with the management of weeds and pest control. By August 1985, 485 applications had been received and a total of 189 areas met the criteria for approval to enter into a Heritage Agreement. These areas were assessed on the basis of size, presence of rare or endangered plants and animals, number and rarity of plant associations, presence of weeds and pests, degree of disturbance by grazing of livestock and the value of the area in connecting other areas of native vegetation. The Agreements are registered on the land title as running for a fixed term or to last in perpetuity and may be broken by either party with mutual consent providing that the State government recovers all expenses.

It was found that the Heritage Agreement scheme was not enough on its own to solve the problem of land clearing and in May 1983 regulations under the Planning Act were introduced to control the clearing of native vegetation. After 18 months, following controversy and legal challenge by farmers, discussions were held with the United Farmers and Stockowners of South Australia Inc., which resulted in the drafting of a Native Vegetation Management Act. The new act supersedes the Planning Act with respect to the clearing of native vegetation. It establishes a Native Vegetation Authority of South Australia with equal representation from agricultural and conservation interests. There is also financial assistance where property values are lowered as a result of restrictions on clearing land (Native Vegetation Authority of South Australia, 1986). Under the Native Vegetation Management Act landowners who have been refused approval to clear are automatically entitled to a Heritage Agreement.
Native Vegetation Management Act, 1985

Controls on clearing and assistance for management of areas of native vegetation in South Australia are now provided for under the Native Vegetation Management Act 1985. Clearing of vegetation is no longer prescribed as a development under the Planning Act. Under the new Act, the Native Vegetation Authority considers applications to clear native vegetation and makes recommendations to the Minister for Environment and Planning for the provision of management assistance.

The Authority’s functions include advice to the Minister on Heritage Agreements, payments that the Minister should make on areas refused approval to clear (that are subject to a Heritage Agreement) and payments that the Minister should make in special circumstances.

The Act also formalises an existing Native Vegetation Advisory Committee to provide broadly based advice to the Minister on native vegetation management.

When assessing applications to clear the Authority considers the following factors:

- The importance of the vegetation as a habitat for wildlife.
- The presence of rare or endangered species.
- The value of the area as a wildlife ‘corridor’ or ‘stepping stone’.
- Its value as a remnant of former vegetation types.
- Its amenity value to the district.
- Whether clearing will create or contribute to soil erosion or soil salinisation, or lead to the deterioration in the quality of surface and sub surface water.
- The value of the area as livestock shade and shelter.
- The effect of retention on farm management and fire control.

If permission to clear land is refused the owner of the land is entitled to a payment that is equivalent to any reduction in the market value of the land resulting from the Authority’s decision with the provision that part or all of the area involved becomes subject to a Heritage Agreement. The Government is not bound to make a payment if the land is not subject to a Heritage Agreement or where the total area of native vegetation on the property is less than 12.5 per cent of the area of the holding. Also the land in question must have been acquired prior to May 1983 and considered suitable for permanent agriculture.

2.1.6 Tasmania

Native vegetation can be protected on private land through Private Reserves under the National Parks and Wildlife Act, 1970. The property must contain suitable wildlife habitat and be managed so that agricultural practices do not conflict with the wildlife areas. The proclamation is approved by Cabinet and signed by the Governor. The management plan must have the agreement of the private land owner and proclamations since 1977 have been registered on the land title. If the Director of the National Parks and Wildlife Service is made managing authority with the consent of the owner, then the property is eligible for financial assistance, although funds are limited. Professional advice and signs to publicise the reserves are also available. Twenty-three private reserves were established in Tasmania by 1983.
covering about 9,000 ha (Stadler, 1983) but only one, the Cape Portland Wildlife Sanctuary, has a management plan in effect.

Municipal Planning Schemes allow councils the power to enforce tree preservation orders in appropriate zones which include places such as ridgetops and riverbanks. At present there are very few planning schemes which are in operation. One example is the Tinderbox Hiris skyline which is subject to a Tree Preservation Order under the Kingsborough Municipal Planning Scheme.

Revegetation has been encouraged by the Forestry Commission’s Treescape Scheme providing a ‘dollar-for-dollar’ assistance for tree growing projects on private land. The scheme is aimed at encouraging the establishment and/or management of trees and forests on rural property for their scenic, environmental or recreational values.

Research work on rural tree decline and the regeneration of natural vegetation has been carried out. Greening Australia/National Tree Program activities have been organised.

2.1.7 Victoria

A new Flora and Fauna Conservation Guarantee Act is at present being introduced into Victoria. The act would provide a prescribed mechanism for listing species, communities or ecosystems for special protection, and potentially endangering processes for proper management. The Act proposes to set up a committee of scientific advisors to recommend to the Minister whether a listing should take place. The Act then requires statements of intended action to be prepared in relation to each listing. Under the Act, Interim Protection Orders will protect these listings. The effect will be selective and not involve general clearance controls (Department of Conservation, Forests and Lands, Victoria, 1986).

The Native Flora and Fauna Guarantees are aimed at both public and private land. The Act will provide for a private landholder to enter into a voluntary agreement with the Department of Conservation, Forests and Lands, or with another relevant public authority, to manage the property in part or in whole for the protection of flora and fauna. This agreement will make the landholder eligible for management assistance and certain incentives (Department of Conservation, Forests and Lands, 1986).

The Land Protection Service of the Department of Conservation, Forests and Lands runs the Land Protection Incentives Scheme, under which financial and technical assistance is available for fencing, planting and general works relating to the protection of rare and endangered plants, habitat improvements, maintenance of remnant vegetation, erosion and salinity control.

The Victoria Conservation Trust can provide financial assistance to private landholders in special cases, although the landholder is then required to agree to a covenant protecting that area from future destruction. The Trust can also purchase parcels of land of scientific, ecological or scenic interest and accepts gifts of private land on behalf of the State.

Under the Soil Conservation and Land Utilisation Act, it is possible to prevent clearing in designated water catchments.
Individual shires can bring in clearing controls under the Town and Country Planning Act. These controls have seldom been used.

Revegetation is being encouraged by the Tree Growing Assistance Scheme established in 1980. This is a State government scheme to provide financial and technical assistance. The scheme formerly emphasised tree planting but now encourages the preservation of native vegetation to a greater extent. Also Community Employment Programs and the Australian Trust for Conservation Volunteers have been involved in revegetation projects.

The Potter Farmland Plan was initiated in 1984 bringing together private enterprise, the community and Government agencies to establish demonstration farms to show how land degradation can be controlled with more appropriate land management including the re-establishment of vegetation.

2.1.8 Western Australia

The Soil and Land Conservation Regulations (1985) require any landowner or landuser to notify the Commissioner of Soil Conservation of intent to clear any area of land of more than 1 ha at least 90 days before the commencement of the clearing. If land degradation is considered likely to occur a Soil Conservation Notice can be issued. This notice can prevent or place conditions on the clearing. Conditions include retention of native vegetation for wind breaks and protection of watercourses. Conservation of flora and fauna is not considered. So far departmental officers and landholders have been able to reach agreement on clearing and development plans and no Soil Conservation Notices have been issued. For large areas 10-12% of the area is retained under native vegetation and in many places a larger proportion is left uncleared (Dept. of Agriculture Annual Report, 1985/86).

The Soil and Land Conservation Act 1945-1982, makes provisions for the establishment of Soil Conservation Districts and the setting up of District Advisory Committees. In the wheatbelt farmers make up the greater proportion of members of the district committees representing shire councils, primary producer organisations or as ‘persons actively engaged in land use in the district’ (Section 23(2b)). This District’s Committees aim at directing resources to soil conservation problems and ensuring that land-users are closely involved in identifying problems and assisting in the development of solutions.

For 1985-86 the State Government provided $172,000 as a contribution towards the cost of projects carried out by district committees within their district. This included money for a tree handbook, tree establishment, direct seeding, tree planters and fencing materials. By 30 June 1986, 42 Soil Conservation Districts were established in the State with district committees appointed and 27 others are in various stages of formation.

The Western Australian government has imposed clearing controls in catchment areas by amending the Country Areas Water Supply Act (1947). The water supply catchments involved are the Wellington Reservoir, Mundaring Weir Catchment, Warren River Water Reserve, Kent River Water Reserve and Denmark River Catchment. Applications to clear native vegetation are received by the Water Authority. The catchments are subdivided into four zones ranging from Zone A, in which permission to clear is not normally granted, to Zone D in which permission is usually granted subject to the statutory limitation that 10 per cent of the land in question remains uncleared. Compensation and property purchases have taken place when applications to clear have been refused.
Under the WA Wildlife Conservation Act (1950), a landowner may be restricted from certain operations on private land in the interests of conserving rare and endangered flora. Compensation is available when an owner or occupier of private land, who has been refused permission to remove rare flora on that land suffers loss of use or enjoyment of the land. In some cases the State Government may offer to buy or exchange the land involved. Under Section 13 of the Act the Minister may enter into management agreements with the owners of private land for the establishment for wildlife sanctuaries.

The Department of Conservation and Land Management is responsible for the conservation and protection of flora and fauna throughout the State, and in particular the administration of the Wildlife Conservation Act (1950). Under Section 16 of the Conservation and Land Management Act (1984), the Executive Director of the Department can enter into agreements with the owner, lessee or licensee of any land for the management of the land by the Department as a nature reserve. At the present time no agreements have been entered into.

The Department of Conservation and Land Management has also involved the local community in the formulation and development of management plans for nature reserves which provides information and helps to promote nature conservation.

That Department also advises private landowners on matters related to the conservation of flora and fauna as well as tree and shrub planting and care. The Department of Agriculture also provides an extension service to farmers which includes advice on tree planting (Section 2.2.7). The Muresk Institute of Agriculture has started a project designed to provide a management plan which combines conservation with economically viable farming (see Section 2.2.7 for further details).

The Main Roads Department promotes the importance of conserving roadside vegetation and is involved in replanting and regenerating degraded areas. Departmental activities include the purchase of private land to widen roadside verges and workshops to inform and encourage local government on methods and the need for conserving vegetation on these verges.

Greening Australia coordinates the roles of both government and voluntary groups in conservation and revegetation programs and is responsible for administering the National Tree Program grants, getting other voluntary organisations started and the community involved. The operations of Greening Australia are jointly funded by the Federal and State Government. The organisation is also involved in fund raising and finding sponsors. For 1986/87 the State Government has made available $103,000 which includes funds to conduct the John Tonkin Tree Awards ($10,000). Federal funds which amount to $47,000 in 1986/87 came through the National Tree Program. Five tree persons are now employed by Greening Australia. They aim to provide expertise, small incentives and develop enthusiasm. Greening Australia was involved in the North Lake Toolibin project which won the ABC National Tree Care Award.

Revegetation and regeneration are also encouraged by Men of the Trees, WA Naturalists, Land Management Society, local shires and Alcoa.
2.1.9 Federal government
The Federal Government provides money to encourage revegetation through the National Tree Program. The Program’s coordinating committee is planning a promotion of the value of remnant vegetation and the NTP Task group has produced a guide listing information available on trees by States and Territories.

The Federal Government has also implemented the National Soil Conservation Program. Western Australia was allocated $1,047,858 of the program’s funding for 1986-87. Projects that have been financed include demonstrations of techniques to overcome native vegetation decline.

Revegetation projects have been initiated through the Community Employment Program. However this Program has now been discontinued.

Some tax concessions are available for tree planting with regard to land degradation and tax concessions for clearing native vegetation have been removed.

The Australian National Parks and Wildlife Service can give some assistance to States in nature conservation programs. Funds for these programs could be used for the conservation and management of remnants of native vegetation in the future.

Research is being conducted by CSIRO on the extent, condition and ecology of remnant vegetation in an area of 1,760 km² near Kellerberrin. This study will aid the development of effective management procedures for native vegetation in the wheatbelt.

2.1.10 Overseas
The Queen Elizabeth the Second National Trust is an independent organisation in New Zealand established by an act of Parliament in 1977. The aim of the Trust is to provide, enhance, and protect open space for the benefit and enjoyment of New Zealand. The Trust works with a wide range of organisations and can help landowners to protect some or all of their land through an Open Space Covenant or by caring for and managing bequeathed or gifted land including areas of native vegetation. Included in the Open Space Covenants are incentives in the form of fencing subsidies for regeneration and relief from local rates. The covenant is registered against the title and binds the present and any subsequent owner to manage the area in a specified way with the Trust as the permanent trustee.

The Wairarapa Catchment Board (NZ) prepares Soil and Water Conservation Farm Plans for landholders and providing the owner adheres to the plan (a Land Improvement Agreement is signed) tree planting, fencing and soil conservation works are heavily subsidised. The Catchment Board has also passed bylaws (for soil conservation purposes) to control clearing, dam construction and wells and bores.

The Netherlands is at present introducing management agreements to be implemented by the Agricultural Land Management Foundation. Under the agreements farmers must perform or refrain from a number of agreed actions with respect to nature and landscape conservation but the land remains in agricultural use. Compensation is assessed against similar ‘comparison areas’ where the actions have not been imposed.
The Wildlife and Countryside Act (1981) in the United Kingdom provides for protection of sites of special scientific interest which number some 4,000. Under the Act, farmers must apply for consent before carrying out any activities such as land drainage or clearing which may affect the site. If the Nature Conservancy Council refuses consent they must compensate the farmer for loss of income incurred. The compensation is based on annual profit foregone and the amount must be revalued annually.

There are four basic types of management agreements which can be entered into in the United Kingdom. Agreements for the protection of sites of scientific interest (Countryside Act 1968, Section 15), national nature reserve agreements (National Parks and Access to the Countryside Act 1949), agreements to conserve or enhance the natural beauty or amenity of the countryside or promote public enjoyment of such land (Wildlife and Countryside Act 1981), and access agreements (National Parks and Access to the Countryside Act 1949, and Countryside Act 1968). Financial assistance is available.

The Countryside Commission has set up a demonstration farms project to show that profitable farming can be run in conjunction with management for conservation by integrated resource planning (see Section 2.2.7 for details).

### 2.2 POSSIBLE ELEMENTS OF AN ‘INCENTIVE PACKAGE’

#### 2.2.1 Taxation rebates and concessions

The advantages and disadvantages of using income tax to encourage the retention, regeneration and revegetation of trees have been discussed by Edwards and Thomson (1985). Advantages are that the system is familiar to farmers, simple to operate and the concession is handled by mechanisms already in place. A range of income tax provisions could become available with little or no change to the existing procedures to be followed.

Disadvantages involve the varying benefits to individuals which will arise. Some farmers will not pay tax in a given year and with the present system of income tax, deductions on taxable incomes give greater benefits to farmers with higher incomes. For this reason Edwards and Thomson propose rebates as a more equitable solution.

The Income Tax Assessment Act provides deductibility for expenditure on tree planting on farms as part of soil conservation programs. The outright deduction for expenditure to prevent or combat soil erosion has now been extended to ‘land degradation’ (Section 75D). The term ‘land degradation’ refers not only to soil erosion but includes other effects detrimental to the land such as the decline of soil fertility or structure, degradation of natural vegetation, salinisation and the effects of deposits of eroded material (Horwath and Horwath, Chartered Accountants, pers. comm.). The extended definition applies to expenditure on or after 20 September 1985. The Act does not provide assistance where trees are planted for other purposes, e.g. flora and fauna reserves, education and scientific research, visual improvements or shade.

The costs of erecting or extending fences to exclude livestock or vermin from areas affected by land degradation are fully deductible and would now apply to areas where native vegetation has been degraded (Section 75D).
Edwards and Thomson (1985) suggest that concessions for land degradation be extended to include a tax rebate of 10 cents in the dollar and tax deductibility for capital and maintenance costs of on-farm nature conservation. A rebate of 10 cents in the dollar was also suggested to apply to the tax liability of a farmer in proportion to the fraction of his/her farm given over to native vegetation.

The Chairman of the Victorian Farmers Federation Farm Trees Program Council has suggested 150 per cent deductibility for all costs incurred in the year of expenditure for tree planting and protection, pointing out that tax deductibility is a major incentive for farmers to proceed with tree growing (Report of the House of Representatives, 1986).

The Land Resource Policy Council (1986) has recommended:

“that the Western Australian Government seek the support of farmer organisations 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.”

The House of Representatives Standing Committee on Environment and Conservation has recently reported on ‘Fiscal Measures and the Achievement of Environmental Objectives’. The Committee has recommended:

“that the Minister for Arts, Heritage and Environment and the Treasurer urgently review taxation provisions which could apply to tree planting and vegetation conservation for nature and soil conservation purposes to promote and encourage tree planting and vegetation retention”.


2.2.2 Local Government rate rebates

In 1980 the Central South Regional Development Advisory Committee initiated the ‘Project Tree Cover’ which was funded equally by the Dumbleyung Shire ($5,000) and the State Government ($5,000). The project aimed to encourage tree planting and the regeneration of native vegetation in Dumbleyung Shire. In addition to accepting administrative responsibilities and costs associated with the project the Dumbleyung Shire Council offered further encouragement to farmers to participate in present and future schemes by foregoing rates payable on land involved in the project. However, it was found that the Local Government Act prevented councils from foregoing rates.

At the 1983 Country Shire Councils Association’s annual conference, Dumbleyung Shire Council successfully moved:

“That this conference recommend to the Minister for Local Government that the Local Government Act be amended to make provision for a rate rebate where a land owner fences a portion of his land off to re-establish or retain native vegetation on that portion of land and that the State Government be requested to make funds available for that purpose.”

The response by the State Government has been that the valuations of rural land for rating purposes must be based on ‘unimproved value’, i.e. what the land is worth excluding all improvements. Valuations on arable land left in a natural state or replanted to native vegetation cannot be reduced because the action is on a voluntary basis. If there are legal restrictions on the use of land then the value of that land can be reduced accordingly. This is
happening in the case of restrictions imposed under the Country Areas Water Supply Act. Similar revaluations can be expected under the Soil and Land Conservation Act. The situation is less clear with respect to the use of the Conservation and Land Management Act (SiB) or the Wildlife Conservation Act (S13(1)). In general, however, if the land’s value is altered by law then a change in valuation would follow. For example, the zoning of land for conservation purposes by a shire should result in revaluation of that land and lowering or elimination of rates.

In South Australia a similar problem was resolved by the State Government agreeing to directly reimburse farmers that proportion of their rates which relates to land which they have agreed to retain under native vegetation (see South Australian Heritage Agreements Section 2.1.5). The Central South Regional Development Advisory Committee considers that a similar scheme could be operated in Western Australia and that the older established areas of the wheatbelt, in particular, would benefit greatly.

If the shire reduces rates for uncleared land it has been suggested that the rates on cleared land must go up to make up the difference in income to the shire. The Water Authority of Western Australia have suggested that this would be about a 2.3 per cent increase. The amount would vary depending on the areas involved.

2.2.3 Grants and subsidies

The greatest single cost involved in the regeneration, maintenance and revegetation of native bushland is that of providing protective fencing. A fencing subsidy therefore, both encourages landholders to retain native vegetation in the first instance, and increases the likelihood that the vegetation will continue to be effectively protected in the longer term. Because of the costs involved there is a need to research and demonstrate the effectiveness of low cost alternative fencing such as electric fencing.

In South Australia farmers who have agreed to retain areas of their land under native vegetation are eligible for a grant equal to the cost of fencing the land concerned (see Section 2.1.5 for Heritage Agreements).

Under the WA Wildlife Conservation Act a landowner may be prevented from carrying out operations on private land in the interests of conserving rare and endangered flora. There is no formal mechanism to assist farmers with resources to help meet the cost of these restrictions. Where farmers have identified rare or new species they need to fence these areas at their own expense to ensure preservation. This has caused ill-feeling amongst some farmers who are now less likely to cooperate with government programs for the retention of native vegetation.

In 1986 Greening Australia (WA) received grant applications from 490 applicants seeking funding for revegetation and regeneration to a total of $750,000. The total amount available for distribution was $56,000. It was therefore only possible to approve 8 per cent of grant applications. Nearly three times as many projects came forward in 1986 as in the previous year.
2.2.4 Low interest finance

At the present time WA farmers are experiencing serious hardship, especially in outer areas of the northern and eastern wheatbelt (Ripley and Kingwell, 1984; Taylor, 1984). Low interest loans could encourage fencing of native vegetation for maintenance and regeneration when the farm budget would otherwise give these activities a low priority.

Loans could also be made available to assist landholders experiencing particular economic hardship to alleviate the pressure to clear more land.

2.2.5 Schemes to provide employment

On some farms limited time will relegate maintenance, regeneration and revegetation of native plants to a low priority. The availability of outside sources of labour for replanting and fencing may encourage many farmers to get started.

This approach has been adopted in the Lodden-Campaspe catchment area in Victoria. Following a study of revegetation strategies for the Salting Action Liaison Team, the Victorian Government provided $300,000 of its sesquicentennial funds.

The grant is being used to train people in all aspects of tree establishment on farms, and employ them to establish some 60,000 trees and shrubs on demonstration areas throughout the region.

Revegetation has been encouraged under Community Employment Programs in the Australian Capital Territory, Queensland and Victoria. However, this program has now been discontinued.

Groups that organise training programs for young people which could include the propagation and replanting of native plants include Westrek and TAFE. The Men of the Trees, Greening Australia and the Australian Trust for Conservation Volunteers coordinate activities for volunteer workers.

The House of Representatives Standing Committee on Environment and Conservation (1986) has acknowledged the contribution that the Community Employment Program has made to tree planting on public lands and has recommended that:

“the Minister for Arts, Heritage and Environment and the Minister for Employment and Industrial Relations review the criteria used to assess community employment programs to make funds available for tree planting and vegetation conservation works on private lands in those cases where a community benefit is clearly demonstrable”.

Initiation of future employment programs may contribute to replanting.

2.2.6 Management agreements

Many forms of management agreements exist in other states of Australia and overseas. The main purpose of these agreements is to encourage the landholder to manage the land to conserve the native flora and fauna. Incentives are available with the government providing financial and technical assistance for the retention of strategically located areas of native vegetation in return for a binding undertaking not to clear that land. Examples of agreements are Queen Elizabeth Trusts in New Zealand (Section 2.1.10) and Heritage Agreements in
South Australia (2.1.5). Some agreements are not financially orientated such as the establishment of wildlife refuges on private land in New South Wales (Section 2.1.2).

2.2.7 Demonstration farms and extension work

In recent years the Countryside Commission of England and Wales, an organisation with the objective of protecting and preserving the British countryside has set up demonstration farms. Management plans are prepared by a planning committee made up of the owner and/or manager and experts in wildlife, archaeology, landscape architecture and farm management.

In 1986 the Muresk Institute of Agriculture initiated a project designed to provide a management plan which combines conservation with economically viable farming. The aim is to produce management plans for demonstration farms that provide for both short-term profitability and the long-term viability of agricultural land. A total farm plan for the Muresk Institute of Agriculture’s farm campus is being developed and will be used as an example for future demonstration farms. The Tammin Soil Conservation District Advisory Committee has selected a ‘Demonstration farm’ within the shire and the planning process for better farming and better conservation is in progress. The Jerramungup Soil Conservation Advisory Committee is also proceeding towards selecting a demonstration farm.

In Victoria the Potter Farmland Plan was initiated in 1984 involving private enterprise, the community and Government. Whole farm plans were developed for demonstration farms to show how land degradation can be controlled through more appropriate land management and re-establishment of vegetation.

State and federal government bodies involved in land management, such as agriculture and the conservation of flora and fauna, provide extension services including information and advice on the maintenance, regeneration and replanting of native vegetation.

The Department of Agriculture has a single extension service which provides advice and information on many aspects of farming. The approach of the Department is to provide a ‘generalist’ agricultural advisory service. Topics which may include advice on the retention, maintenance, regeneration and replanting of native vegetation are as follows:

- Development of new agricultural land (including clearing and retention of vegetation for soil conservation, salinity prevention and other purposes).
- Farm planning for soil conservation and agricultural production (including fencing layout, shelterbelts and other vegetation protection or re-establishment).
- Specific soil conservation measures (including planting of trees for prevention of wind erosion and stabilisation of areas subject to water erosion).
- Amelioration of salinity (including planting of trees to lower the watertable and planting salt tolerant shrubs as a fodder reserve).
- Stock and crop production (including planting of trees as windbreaks and for supplementary fodder).
Research by the Department is also carried out into the following areas:

- Shelterbelt designs for prevention of wind erosion.
- Impact of trees on the hydrology of whole catchments.
- Species and establishment techniques for salt tolerant shrubs.
- Tree species (including indigenous species) for fodder purposes.

The advisory service provided by the Department of Conservation and Land Management is specialised and developed around tree planting, direct seeding, natural regeneration and protection of rare and endangered species and other matters related to the conservation of flora and fauna. That Department’s advisory service works closely with the Department of Agriculture applying its tree expertise to the many purposes farmers have for tree planting. These include timber production, nature conservation, soil conservation, fodder and aesthetics. Research and demonstration projects carried out by the Department of Conservation and Land Management which are relevant to the retention and re-establishment of native vegetation in the wheatbelt include:

- species evaluation for various purposes;
- direct seeding techniques;
- natural regeneration techniques;
- causes of vegetation decline (insects, diseases, etc.);
- surveys, population genetics and monitoring of occurrence of rare and endangered species;
- ecological studies of remnant vegetation.

Greening Australia has 5 tree persons who provide advice, coordinate local groups and get involved in vegetation conservation. The organisation also produces pamphlets and displays to promote the retention and re-establishment of native vegetation.

Expansion of extension work with regard to native vegetation retention and re-establishment carried out by government and community groups will allow these organisations to play a greater role in managing native vegetation in the wheatbelt for soil and nature conservation purposes.

One option is to organise workshops where farmers as well as relevant ‘experts’ may contribute. This approach may lead to a better understanding between the different groups involved and find solutions to the problems of native vegetation management which are acceptable to the majority involved.

**2.2.8 Compensation and land purchase**

Compensation for restrictions on the utilisation of private land is usually controversial. If compensation is considered there are three forms it can take: acquisition of the land at market value; payment equal to the value of production foregone; and payment equal to the value of the land before controls less value of land following their imposition. Acquisition is initially very expensive and can impose high ongoing management costs. Problems also arise in calculating the value of production foregone and in the complexities of land valuation.
Following controversy and legal challenge by farmers, compensation is now paid in South Australia for land which the claimant is prevented from clearing. However, payments will only be made where a landholder is required to retain native vegetation over and above an area equivalent to 12.5 per cent of the property, the area involved becomes subject to a Heritage Agreement and is considered suitable for permanent agriculture. Compensation is calculated on the basis of the value of cleared land less the value of the land in its natural state.

In the Netherlands compensation for loss of production is being considered in relation to management agreements.

In Western Australia compensation and property purchases have taken place when applications to clear have been refused under the Country Areas Water Supply Act (1947). Compensation is only paid when the landholder is required to retain native vegetation over and above an area equivalent to 10 per cent of the property.

Purchase of land is the approach adopted by the State Planning Commission for parks and recreation reserves, but it is a slow and very expensive way to conserve areas.

Some landholders sell land for less than market value or donate land for conservation reasons but the number is small and incentives such as tax concessions to encourage the donation of land may be necessary.
CHAPTER 3. THE EXTENT OF REMNANT VEGETATION IN THE STUDY AREA

3.1 METHOD OF MAPPING AND ANALYSIS

The remaining native vegetation in each of the shires of Dumbleyung, Lake Grace, Pingelly and Tammin has been mapped using the most recent aerial photographs held by the Department of Land Administration. Table 3.1 shows the dates of the photography used for each shire.

Table 3.1. Dates of aerial photography

<table>
<thead>
<tr>
<th>Shire</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pingelly</td>
<td>December 1983</td>
</tr>
<tr>
<td>Dumbleyung</td>
<td>February 1984</td>
</tr>
<tr>
<td>Tammin</td>
<td>January 1984</td>
</tr>
<tr>
<td>Lake Grace</td>
<td>January 1984</td>
</tr>
</tbody>
</table>

The information obtained from the photographs was used to correct the vegetation overlays of the 1:100,000 topographic maps. In the case of Lake Grace Shire the vegetation overlay had been produced by the most recent photography and therefore it was used directly.

These 1:100,000 overlays were then digitised using the Intergraph Graphics Design Software (IGDS) on the Land Data Centre Vax 11/785 computer system. The line work created was then cleaned and made into complex shapes (polygons) using the Graphics Polygon Processing Utility Software (GPPU). These polygons then had a Data Management and Retrieval System (DMRS) data base attached to them to allow the loading of attributes. The attributes loaded are listed in Table 3.2.

The attributes of area and perimeter were loaded automatically using the Area Utility of GPPU. Reports of the total area of native vegetation remaining in each shire were then generated.

Table 3.2. Attributes in data base

<table>
<thead>
<tr>
<th>Shire</th>
<th>Polygon identifier</th>
<th>Type</th>
<th>Area</th>
<th>Perimeter</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>public</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>private</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3.2 THE EXTENT OF REMNANT VEGETATION IN FOUR SHIRES OF THE WHEATBELT REGION

A summary of the area of native vegetation remaining in the shires of Dumbleyung, Lake Grace, Tammin and Pingelly at the beginning of 1984 is presented in Table 3.3. The figures indicate that shires in the old established farming areas have been cleared extensively with
only 7 per cent of the Shire of Tammin still covered with native vegetation, 10 per cent of Dumbleyung Shire and 14 per cent of Pingelly Shire.

Lake Grace Shire had retained approximately 31 per cent of its total area under native vegetation. A large proportion of this shire, mainly the eastern section, has only recently been developed for agriculture. The last land release for agricultural development in the area took place in 1984 and areas of vacant Crown land still remain.
SHIRE OF PINGELLY
PERMANENT VEGETATION SURVEY

PRIVATE LAND
PUBLIC LAND

PREPARED BY
GEOGRAPHIC INFORMATION SYSTEM GROUP
DEPARTMENT OF AGRICULTURE

UTM PROJECTION

34
Table 3.3. The extent of remnant vegetation in four Shires of the wheatbelt region in 1984

<table>
<thead>
<tr>
<th></th>
<th>Dumbleyung</th>
<th>Lake Grace</th>
<th>Pingelly</th>
<th>Tammin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Shire area (ha)</td>
<td>255,200</td>
<td>925,000</td>
<td>123,300</td>
<td>108,700</td>
</tr>
<tr>
<td>Total area of remnant vegetation (ha)</td>
<td>26,578</td>
<td>282,990</td>
<td>17,026</td>
<td>7,642</td>
</tr>
<tr>
<td>Area of remnant vegetation on private land (ha)</td>
<td>16,050</td>
<td>109,132</td>
<td>8,934</td>
<td>5,812</td>
</tr>
<tr>
<td>Area of remnant vegetation on public land (ha)</td>
<td>10,528</td>
<td>173,857</td>
<td>8,092</td>
<td>1,830</td>
</tr>
<tr>
<td>Percentage of shire retained under native vegetation</td>
<td>10.4</td>
<td>30.6</td>
<td>13.8</td>
<td>7.0</td>
</tr>
<tr>
<td>Percentage of the shire with private land retained under native vegetation</td>
<td>6.3</td>
<td>11.8</td>
<td>7.2</td>
<td>5.3</td>
</tr>
<tr>
<td>Percentage of the shire with public land retained under native vegetation</td>
<td>4.1</td>
<td>18.8</td>
<td>6.6</td>
<td>1.7</td>
</tr>
</tbody>
</table>

In the old established farming areas of Tammin, Pingelly and Dumbleyung Shires the greatest proportion of the remnant vegetation was found on private land. This was particularly evident in Tammin Shire where native vegetation situated on public land covered only 1.7 per cent of the total shire area. There is little available Crown land remaining in these areas which can be acquired for reservation for soil and nature conservation.

Similar results have been obtained by CSIRO in an area of 1,760 km² near Kellerberrin where remnant vegetation covers 5.7 per cent of the area. The greatest proportion of this remnant vegetation was found on privately owned land, particularly woodlands (Saunders et al. 1987). Farmer cooperation for the effective management of native vegetation in the wheatbelt is therefore needed to control land degradation, loss of flora and fauna and to help meet climatic change.

Many of these areas of remnant vegetation will not survive in the long term without management. They are susceptible to deterioration because of their size and isolation. Most of the remnant vegetation in the shires of Dumbleyung, Pingelly, Tammin and the western section of Lake Grace were small and scattered (Figures 1-4). Approximately three quarters of the remnant vegetation blocks occurring on private land were less than 30 ha (Table 3.4). On public land the block size tended to be larger but the majority of remnants were still less than 200 ha (Table 3.5).
Management of native vegetation on farmland in the wheatbelt of Western Australia

Table 3.4  The size distribution of remnant vegetation blocks on private land in the Shires surveyed

<table>
<thead>
<tr>
<th>Area (ha)</th>
<th>Dumbleyung</th>
<th>Lake Grace</th>
<th>Pingelly</th>
<th>Tammin</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>%</td>
<td>No.</td>
<td>%</td>
</tr>
<tr>
<td>&lt; 5</td>
<td>74</td>
<td>14.3</td>
<td>129</td>
<td>12.0</td>
</tr>
<tr>
<td>5-10</td>
<td>137</td>
<td>26.5</td>
<td>202</td>
<td>18.8</td>
</tr>
<tr>
<td>10-20</td>
<td>125</td>
<td>24.2</td>
<td>262</td>
<td>24.4</td>
</tr>
<tr>
<td>20-30</td>
<td>63</td>
<td>12.2</td>
<td>130</td>
<td>12.1</td>
</tr>
<tr>
<td>30-40</td>
<td>31</td>
<td>6.0</td>
<td>68</td>
<td>6.3</td>
</tr>
<tr>
<td>40-80</td>
<td>52</td>
<td>10.1</td>
<td>106</td>
<td>9.8</td>
</tr>
<tr>
<td>80-120</td>
<td>10</td>
<td>1.9</td>
<td>35</td>
<td>3.3</td>
</tr>
<tr>
<td>120-160</td>
<td>7</td>
<td>1.3</td>
<td>19</td>
<td>1.8</td>
</tr>
<tr>
<td>160-200</td>
<td>6</td>
<td>1.2</td>
<td>15</td>
<td>1.4</td>
</tr>
<tr>
<td>200-500</td>
<td>9</td>
<td>1.7</td>
<td>51</td>
<td>5.1</td>
</tr>
<tr>
<td>500-1000</td>
<td>1</td>
<td>0.2</td>
<td>28</td>
<td>2.6</td>
</tr>
<tr>
<td>&gt;1000</td>
<td>1</td>
<td>0.2</td>
<td>24</td>
<td>2.2</td>
</tr>
<tr>
<td></td>
<td>516</td>
<td></td>
<td>1073</td>
<td></td>
</tr>
</tbody>
</table>

Table 3.5  The size distribution of remnant vegetation blocks on public land in the Shires surveyed

<table>
<thead>
<tr>
<th>Area (ha)</th>
<th>Dumbleyung</th>
<th>Lake Grace</th>
<th>Pingelly</th>
<th>Tammin</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>%</td>
<td>No.</td>
<td>%</td>
</tr>
<tr>
<td>&lt; 5</td>
<td>1</td>
<td>2.0</td>
<td>2</td>
<td>1.6</td>
</tr>
<tr>
<td>5-10</td>
<td>2</td>
<td>3.9</td>
<td>2</td>
<td>1.6</td>
</tr>
<tr>
<td>10-20</td>
<td>5</td>
<td>9.8</td>
<td>6</td>
<td>4.9</td>
</tr>
<tr>
<td>20-30</td>
<td>2</td>
<td>3.9</td>
<td>4</td>
<td>3.2</td>
</tr>
<tr>
<td>30-40</td>
<td>7</td>
<td>13.7</td>
<td>5</td>
<td>4.1</td>
</tr>
<tr>
<td>40-80</td>
<td>10</td>
<td>19.6</td>
<td>12</td>
<td>9.8</td>
</tr>
<tr>
<td>80-120</td>
<td>4</td>
<td>7.8</td>
<td>13</td>
<td>10.6</td>
</tr>
<tr>
<td>120-160</td>
<td>4</td>
<td>7.8</td>
<td>5</td>
<td>4.1</td>
</tr>
<tr>
<td>160-200</td>
<td>3</td>
<td>5.9</td>
<td>8</td>
<td>6.5</td>
</tr>
<tr>
<td>200-500</td>
<td>8</td>
<td>15.7</td>
<td>27</td>
<td>21.9</td>
</tr>
<tr>
<td>500-1000</td>
<td>3</td>
<td>5.9</td>
<td>16</td>
<td>13.0</td>
</tr>
<tr>
<td>&gt;1000</td>
<td>2</td>
<td>3.9</td>
<td>23</td>
<td>18.7</td>
</tr>
<tr>
<td></td>
<td>51</td>
<td></td>
<td>123</td>
<td></td>
</tr>
</tbody>
</table>

Further mapping and field survey of remnant vegetation in the wheatbelt is needed so that priority areas can be targeted in relation to relative scarcity of native vegetation, ecosystems and rare and endangered plants. Information is needed not only on the extent of clearing but also on the size, shape and distribution of these remnants of native vegetation. This data can be used for future planning for nature and soil conservation on a regional and catchment basis.
3.3 LANDHOLDER ESTIMATES OF UNCLEARED LAND FOR THE CENTRAL SOUTH REGION OF THE WHEATBELT

Information on the amount of uncleared land remaining on agricultural establishments in the wheatbelt is available from data supplied by the Australian Bureau of Statistics. These figures are based on landholder estimates. Table 3.6 compares data supplied from the mapping with landholder estimates for 1983/84 in the shires of Tammin, Dumbleyung, Pingelly and Lake Grace. The figures correspond closely except for a discrepancy of nearly three per cent in the Shire of Tammin. This discrepancy is probably due to the exclusion from the mapping of areas of saltland which are regularly subjected to inundation. These areas would have been included by landholders in their estimates of uncleared land. The data based on farmer estimates must be viewed with caution but can be used as an indication in cases where further information from mapping is not available.

Table 3.6. Area estimates from the mapping of remnant vegetation on privately owned land (1984) compared with landholder estimates (ABS 1983/84)

<table>
<thead>
<tr>
<th></th>
<th>Dumbleyung</th>
<th>Lake Grace</th>
<th>Pingelly</th>
<th>Tammin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total shire area (ha)</td>
<td>255,200</td>
<td>925,000</td>
<td>123,300</td>
<td>108,700</td>
</tr>
<tr>
<td>Area of uncleared land remaining on agricultural establishments (Table 3.3)</td>
<td>16,050</td>
<td>109,133</td>
<td>8,934</td>
<td>5,812</td>
</tr>
<tr>
<td>% of the shire with private land retained under native vegetation (1984) (Table 3.3)</td>
<td>6.3</td>
<td>11.8</td>
<td>7.2</td>
<td>5.3</td>
</tr>
<tr>
<td>% of the shire with private land remaining uncleared (ABS 1983/84)</td>
<td>6</td>
<td>11</td>
<td>8</td>
<td>8</td>
</tr>
</tbody>
</table>

From Australian Bureau of Statistics data of 1985/86 landholder estimates the percentage of farmland retained under native vegetation in the Central South Region of the wheatbelt has been calculated (Table 3.7). Note that previous percentages have been based on total shire area. Of the 13 shires included, only 5 (38 per cent) have retained over 10 per cent of farmland under native vegetation.

Table 3.7. Landholder estimates for the extent of remnant vegetation on agricultural establishments (ABS 1986)

<table>
<thead>
<tr>
<th>Shire</th>
<th>% of farmland retained under native vegetation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brookton</td>
<td>9</td>
</tr>
<tr>
<td>Corrigin</td>
<td>8</td>
</tr>
<tr>
<td>Caballing</td>
<td>10</td>
</tr>
<tr>
<td>Dumbleyung</td>
<td>7</td>
</tr>
<tr>
<td>Kondinin</td>
<td>11</td>
</tr>
<tr>
<td>Kulin</td>
<td>11</td>
</tr>
<tr>
<td>Lake Grace</td>
<td>13</td>
</tr>
<tr>
<td>Narrogin</td>
<td>9</td>
</tr>
<tr>
<td>Pingelly</td>
<td>9</td>
</tr>
<tr>
<td>Wagin</td>
<td>10</td>
</tr>
<tr>
<td>Wickepin</td>
<td>10</td>
</tr>
<tr>
<td>Williams</td>
<td>12</td>
</tr>
<tr>
<td>West Arthur</td>
<td>17</td>
</tr>
</tbody>
</table>
CHAPTER 4. FARMER SURVEY

4.1 SURVEY OBJECTIVES

The objectives of this survey were to determine:

a) landholders’ general attitudes to native vegetation and in particular their reasons for wishing to clear or retain bushland on their properties;

b) landholders’ attitudes to a system of vegetation retention incentives and their likely impact on management decisions.

4.2 METHOD

4.2.1 Data collection

Information was obtained by personal interview. A questionnaire was developed to standardise the interviews. It was refined with advice from people regularly involved in the areas of agriculture, conservation, social survey, statistics and local conditions. The Australian Bureau of Statistics was also consulted. The questionnaire was divided into four parts:

Section A: Details of property, including environmental health and management of remnant bushland.

Section B: Landowners’ general attitudes to native vegetation and in particular their reasons for wishing to clear or retain bushland on their properties.

Section C: Landholders’ attitude to a system of vegetation retention incentives and their likely impact on land clearance decisions.

Section D: Demographic characteristics.

A letter of introduction was sent to selected land holders explaining the purpose of the survey and appointments were made by phone approximately one week later. Interviews were conducted from April to June 1986. A copy of the letter of introduction and the questionnaire is presented in Appendix 1.

The pilot survey consisted of 26 interviews conducted in the Shire of Pingelly. The data collected has been included in the results. Additional questions were asked in subsequent interviews to provide further information on tree planting, future clearing and the use of shire rate subsidies as an incentive to retain native vegetation.

Publicity about the study was provided by articles in local newspapers, the West Australian Newspaper and the aims of the project were outlined on the ABC television regional news before interviewing commenced.

4.2.2 Sample design

Due to the interest in native vegetation retention expressed by the Central South Regional Development Advisory Committee this region of the wheatbelt was chosen for the survey. The shires of Dumbleyung, Lake Grace, Pingelly and Tammin were selected for study as they represent a range of farming situations in the sample including both new land and older
established farming areas. The sample frame was also chosen to include variability in the percentage of farmland uncleared in the shire, the area of nature reserves, the existence of soil conservation districts and individual farm incomes and indebtedness (Table 4.1).

Table 4.1. Characteristics of the shires surveyed

<table>
<thead>
<tr>
<th></th>
<th>Dumbleyung</th>
<th>Lake Grace</th>
<th>Pingelly</th>
<th>Tammin</th>
</tr>
</thead>
<tbody>
<tr>
<td>% Farmland uncleared (ABS 1984-85)</td>
<td>6.8</td>
<td>12.7</td>
<td>8.9</td>
<td>7.4</td>
</tr>
<tr>
<td>% area of Shire set aside for nature conservation</td>
<td>3.8</td>
<td>8.6</td>
<td>6.4</td>
<td>1.3</td>
</tr>
<tr>
<td>Soil Conservation District</td>
<td>Proposed</td>
<td>Part of shire with Ravensthorpe</td>
<td>-</td>
<td>Soil Conservation District - Advisory Committee appointed</td>
</tr>
<tr>
<td>% of farmers and farm workers with income &gt; $15,000 per annum (ABS 1981 census)</td>
<td>30</td>
<td>20</td>
<td>24</td>
<td>15</td>
</tr>
<tr>
<td>Change in farm indebtedness from March 1983 to March 1984 (Ripley Kingwell, 1984)</td>
<td>$8,000 increase</td>
<td>East - $27,000 increase</td>
<td>West - $8,000 increase</td>
<td>Increase $15,000</td>
</tr>
</tbody>
</table>

The Australian Bureau of Statistics recommended that 25 per cent of farming establishments be surveyed in each shire. The land holders to be interviewed were selected randomly from listings supplied by the Agricultural Protection Board. The data collected was computer processed for sorting and analysis.

4.2.3 Sample response

The response rate was 88.6 per cent (Table 4.2). Only five landholders out of the 167 approached were not interested in participating in the survey. Demographic characteristics of the landholders surveyed are presented in Appendix 2.

Table 4.2. Sample response

<table>
<thead>
<tr>
<th></th>
<th>Number of landholders</th>
<th>Percentage of total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interviewed</td>
<td>148</td>
<td>88.6</td>
</tr>
<tr>
<td>Retired or sold out</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>Unable to contact or unavailable</td>
<td>9</td>
<td>5</td>
</tr>
<tr>
<td>Not interested</td>
<td>5</td>
<td>3</td>
</tr>
</tbody>
</table>

4.2.4 Analysis of data

The data collected from interviews with landholders were coded onto computer data sheets and loaded into the WARIS (Rosenthal et al. 1986) database system resident on the Western Australian Department of Agriculture PRIME computer. The subsequent retrievals, analysis and reporting were performed with the various modules that make up the WARIS system. A number of general routines were developed to interface with the WARIS system to perform specific analysis not currently performed by the WARIS system. The result of the analyses are presented throughout this report.
Database structure

The WARIS system lends itself to site related observations. In structuring the data each Shire was regarded as a major group. Within a group was a number of sites (farms) and the responses made were site related observations. Not all the information gathered on the questionnaires were coded for entry into the database. Only information which would not breach confidentiality and non-text data were included in the database. This structure enabled analysis to be performed between sites, grouped by shire or on a total survey basis.

Validation

The pre-processing and validation of the data prior to loading into the database was performed using standard WARIS modules:
- WAFD: scheme definition
- WASDF: preparing data
- WACP: checking the data
- WALDF: listings of the data.

Retrieval, analysis and reporting

The standard modules in the WARIS system handled all of the retrieval of data and some of the analysis. General software was developed to perform specific types of analysis using WARIS Interim Analysis Listings (IAL) as their input. This software was developed to integrate readily with the other WARIS modules and enabled quick analysis and reporting. For example the cross-tabulation module enables a cross tabulation of any size to be formed with either frequency or statistical information displayed within each cell of the table.

The main modules used were:
- WARP: retrievals
- WAQT: tabulating numeric data
- XTABL: cross tabulations and statistics (Mlodowski, unpublished)
- WADOP: structured reporting.

4.3 RESULTS

4.3.1 Physical characteristics of properties surveyed

The total area of the properties surveyed was approximately 317,716 hectares representing 27 per cent of the area covered by rural establishments in the Shires of Dumbleyung, Lake Grace, Pingelly and Tammin. Table 4.3 shows that the average area and the proportion of these properties left uncleared correspond closely to data provided by the Australian Bureau of Statistics (1985/86). This indicates that properties surveyed are representative in terms of clearing characteristics of farming establishments in the four shires. Both old established and new farming areas were included in the survey with the time at which blocks of land were first cleared ranging from under 10 years to over 80 years.

Data obtained from landholders interviewed indicate that the highest proportion of farmland surveyed retained under native vegetation was found in Lake Grace Shire (13.6 per cent) where part of the region has only recently been released for agriculture. In the Pingelly shire about 10 per cent of the original vegetation had been retained in the area surveyed. In this
shire lateritic ridges which are non arable have been left uncleared and most of the original vegetation was woodland. Tammin and Dumbleyung shires had retained just over 6 per cent each.

Only 14 per cent of the remaining native vegetation surveyed had been fenced off from stock. Most farmers that were interviewed suggested that the reason for fencing these areas was due to the presence of plants that are poisonous to livestock.

The proportion of farmland surveyed affected by salt was estimated by farmers interviewed as 4 per cent. This is higher than the estimate for the agricultural region of the State which is 2 per cent (Carder and Humphry, 1983). Data collected on wind and water erosion has not been included in the survey results as respondents found estimates difficult without a more precise definition of the term ‘affected’ being supplied.

Nearly three quarters of farmers interviewed indicated that the remaining areas of native vegetation on their properties were used for the regular grazing of stock (Table 4.4). Many stipulated that even though stock had regular access to these areas, grazing was not the primary purpose. Shade and shelter of stock was not included in the relevant question and will be discussed in other sections.

Table 4.3. Physical characteristics of properties surveyed

<table>
<thead>
<tr>
<th></th>
<th>Dumbleyung</th>
<th>Lake Grace</th>
<th>Pingelly</th>
<th>Tammin</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of farming establishments surveyed</td>
<td>33</td>
<td>74</td>
<td>26</td>
<td>15</td>
<td>148</td>
</tr>
<tr>
<td>Average size of establishment surveyed (ha)</td>
<td>1,913</td>
<td>2,669</td>
<td>1,183</td>
<td>1,716</td>
<td>2,143</td>
</tr>
<tr>
<td>Average size of establishment in the shire (ha) (ABS 1985-86)</td>
<td>1,706</td>
<td>2,429</td>
<td>1,327</td>
<td>1,830</td>
<td>2,022</td>
</tr>
<tr>
<td>Proportion of farmland surveyed retained under native vegetation (%)</td>
<td>6.3</td>
<td>13.6</td>
<td>10.4</td>
<td>6.6</td>
<td>11.3</td>
</tr>
<tr>
<td>Proportion of farmland in the shire retained under native vegetation (%) (ABS 1985-86)</td>
<td>6.8</td>
<td>12.7</td>
<td>8.9</td>
<td>7.4</td>
<td>10.6</td>
</tr>
<tr>
<td>Proportion of remaining native vegetation growing on arable land (%)</td>
<td>31</td>
<td>51</td>
<td>28</td>
<td>45</td>
<td>46</td>
</tr>
<tr>
<td>Proportion of remaining native vegetation fenced (%)</td>
<td>24</td>
<td>12</td>
<td>11</td>
<td>24</td>
<td>14</td>
</tr>
<tr>
<td>Proportion of farmland surveyed affected by salt (%)</td>
<td>4.6</td>
<td>3.0</td>
<td>5.5</td>
<td>8.6</td>
<td>4.0</td>
</tr>
<tr>
<td>Length of time since the initial clearing of each block of land* (% response)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0-10 yrs</td>
<td>-</td>
<td>19</td>
<td>-</td>
<td>-</td>
<td>9</td>
</tr>
<tr>
<td>11-20 yrs</td>
<td>3</td>
<td>28</td>
<td>-</td>
<td>7</td>
<td>15</td>
</tr>
<tr>
<td>21-40 yrs</td>
<td>24</td>
<td>34</td>
<td>4</td>
<td>-</td>
<td>23</td>
</tr>
<tr>
<td>41-80 yrs</td>
<td>67</td>
<td>61</td>
<td>23</td>
<td>87</td>
<td>58</td>
</tr>
<tr>
<td>80 yrs and over</td>
<td>12</td>
<td>-</td>
<td>65</td>
<td>27</td>
<td>15</td>
</tr>
<tr>
<td>unsure</td>
<td>-</td>
<td>-</td>
<td>8</td>
<td>-</td>
<td>1</td>
</tr>
</tbody>
</table>

* Possibly more than one block of land in each farming establishment.
Of the farmers interviewed, 38 per cent utilised areas of native vegetation to dump rubbish and 27 per cent indicated that the shire or Main Roads Department had removed gravel from areas of remnant bushland on their properties. Native vegetation was used to a lesser extent as a source of fence posts (12 per cent), firewood (15 per cent), honey (6 per cent) and emergency grazing (3 per cent) (Table 4.4).

Table 4.4. Uses of native vegetation surveyed

<table>
<thead>
<tr>
<th>Uses of native vegetation surveyed</th>
<th>Number of respondents</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regular grazing</td>
<td>105</td>
<td>71</td>
</tr>
<tr>
<td>Rubbish dump</td>
<td>57</td>
<td>38</td>
</tr>
<tr>
<td>Gravel</td>
<td>40</td>
<td>27</td>
</tr>
<tr>
<td>Firewood</td>
<td>22</td>
<td>15</td>
</tr>
<tr>
<td>Fence posts</td>
<td>18</td>
<td>12</td>
</tr>
<tr>
<td>Honey</td>
<td>9</td>
<td>6</td>
</tr>
<tr>
<td>Emergency grazing</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>Cut flowers</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

n = 148. More than one alternative may be selected.

4.3.2 Clearing of native vegetation on properties surveyed

Fifty one per cent of respondents had cleared native vegetation on their properties during the last 10 years. The highest proportion of these landholders (70 per cent) and the highest rate of clearing (19 per cent of area surveyed) was found in Lake Grace Shire where new agricultural land has been released as recently as 1984. In the Shire of Tammin only one farmer interviewed had cleared land in the past 10 years and this was an area of only 5 hectares. Figures in Table 4.5 indicate that areas cleared in the Pingelly Shire were smaller than those cleared in the Dumbleyung and Lake Grace Shires with 46 per cent of respondents in Pingelly clearing only 2 per cent of the area surveyed. In all shires, land was cleared for both cropping and pasture with provision being made for firebreaks in most situations.

Of the landholders who had cleared land over the past 10 years, 10 per cent now clear a regular amount of land each year, 26 per cent cleared only when economic pressures made it necessary and 14 per cent would have cleared more land if more money had been available. In general, landholders in Dumbleyung and Lake Grace Shires indicated that clearing had been given a major priority in farm development but that they had now finished. Some comments that were made include:

- The farm was cleared as quickly as possible so that it would be viable.
- The farm was cleared according to a farm development plan, economic pressures tended to make clearing more difficult.
- I cleared when money was available.

Only 16 (11 per cent) respondents were planning to clear in the future.
Table 4.5. Clearing of native vegetation on properties surveyed

<table>
<thead>
<tr>
<th></th>
<th>Dumbleyung</th>
<th>Lake Grace</th>
<th>Pingelly</th>
<th>Tammin</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of establishments that have cleared land over the past 10 years (n = 148)</td>
<td>11(33%)</td>
<td>52(70%)</td>
<td>12(46%)</td>
<td>1(7%)</td>
<td>76(51%)</td>
</tr>
<tr>
<td>Number of hectares cleared</td>
<td>3,783</td>
<td>37,558</td>
<td>684</td>
<td>5</td>
<td>42,030</td>
</tr>
<tr>
<td>Proportion of area surveyed cleared in the past 10 years (%)</td>
<td>6</td>
<td>19</td>
<td>2</td>
<td>0</td>
<td>13</td>
</tr>
<tr>
<td>Average number of hectares cleared per establishment on which clearing occurred (n = 76)</td>
<td>343.9</td>
<td>722.3</td>
<td>57</td>
<td>5</td>
<td>553</td>
</tr>
<tr>
<td>range (ha)</td>
<td>2-1,600</td>
<td>41-2,024</td>
<td>1-486</td>
<td>1-2,024</td>
<td></td>
</tr>
<tr>
<td>Number of land holders planning to clear in the future (n 148)</td>
<td>Yes 2(6%)</td>
<td>9(12%)</td>
<td>5(19%)</td>
<td>0</td>
<td>16(11%)</td>
</tr>
<tr>
<td>Maybe</td>
<td>0</td>
<td>6(8%)</td>
<td>2(8%)</td>
<td>0</td>
<td>8(5%)</td>
</tr>
</tbody>
</table>

As indicated in Table 4.6 by far the most important reason for clearing native vegetation was to increase the area of productive land (90 per cent response rate). Other reasons for clearing included vermin control (18 per cent) and to remove undesirable plants (25 per cent), usually ‘poison’. One farmer commented that it was cheaper to clear areas of poison than it was to fence. Five per cent of the farmers surveyed also cleared to remove unsightly scrub. All but one of these farmers was from the Shire of Pingelly. Those interviewed specified that the vegetation cleared was degraded or dead and that they did not consider native vegetation unsightly in general. The term ‘tidy up’ was preferred.

The major reason for clearing in the future was also to increase the area of productive land. In the Pingelly Shire where 7 respondents are considering clearing in the future, 2 gave their most important reason as ‘tidying up’.
Table 4.6. Reasons for clearing native vegetation

<table>
<thead>
<tr>
<th>Reason for Clearing</th>
<th>Main reasons Respondents</th>
<th>Main reasons Percentage</th>
<th>Most important Respondents</th>
<th>Most important Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Past reasons</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Increase area of productive land</td>
<td>70</td>
<td>92</td>
<td>68</td>
<td>90</td>
</tr>
<tr>
<td>Remove undesirable plants and diseases</td>
<td>19</td>
<td>25</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Control vermin</td>
<td>14</td>
<td>18</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clear unsightly scrub (tidy up)</td>
<td>5</td>
<td>7</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Remove a fire hazard</td>
<td>4</td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Restructure (for fencing or working of paddock)</td>
<td>4</td>
<td>5</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Farm development plan</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Fear of government controls</td>
<td>2</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>In accordance with lease</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(n = 76)</td>
<td>76</td>
<td>100%</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Future reasons</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Increase area of productive land</td>
<td>22</td>
<td>87</td>
<td>20</td>
<td>84</td>
</tr>
<tr>
<td>Control vermin</td>
<td>4</td>
<td>17</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Remove undesirable plants</td>
<td>3</td>
<td>12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clear unsightly scrub (tidy up)</td>
<td>3</td>
<td>12</td>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>Restructure (for fencing or working of paddock)</td>
<td>3</td>
<td>12</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Remove a fire hazard</td>
<td>1</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fence posts</td>
<td>1</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(n = 24)</td>
<td>24</td>
<td>100%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Over half the respondents stated that they received no professional or outside advice on matters related to clearing. For those who did obtain advice the major source was the Department of Agriculture (Table 4.7). The proportion of landholders surveyed that obtained advice from the Department being greater in Lake Grace Shire (38 per cent) than in the Dumbleyung Shire (18 per cent) or the Pingelly Shire (17 per cent). This is probably due to that Department’s involvement in formulating development plans with farmers on new land releases.

Table 4.7. Advice which has influenced clearing decisions

<table>
<thead>
<tr>
<th>Source</th>
<th>Respondents</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Department of Agriculture</td>
<td>24</td>
<td>32</td>
</tr>
<tr>
<td>Other farmers</td>
<td>13</td>
<td>17</td>
</tr>
<tr>
<td>Farm consultants</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Greening Australia</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Media</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Land Management Society</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>No advice</td>
<td>43</td>
<td>56</td>
</tr>
</tbody>
</table>

n = 76. More than one alternative may be selected.
4.3.3 Revegetation

The proportion of respondents involved in replanting trees and shrubs on their properties in each of the shires surveyed was 80 per cent in Tammin, 67 per cent in Dumbleyung, 58 per cent in Lake Grace and 50 per cent in Pingelly. The extent of replanting ranged from small trial areas to larger areas where a budget allocation of $3,000 had been made for contract planting. Only two respondents had been involved in direct drilling experiments.

Table 4.8. Revegetation on properties surveyed

<table>
<thead>
<tr>
<th>Species planted (n = 91)</th>
<th>Respondents</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Western Australian native species (but not indigenous to the area)</td>
<td>77</td>
<td>85</td>
</tr>
<tr>
<td>Indigenous native plants (‘local natives’)</td>
<td>50</td>
<td>55</td>
</tr>
<tr>
<td>Eastern States native species</td>
<td>39</td>
<td>43</td>
</tr>
<tr>
<td>Exotic species</td>
<td>31</td>
<td>34</td>
</tr>
</tbody>
</table>

More than one alternative may have been selected.

<table>
<thead>
<tr>
<th>Advice (n = 91)</th>
<th>Respondents</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nurseries and contract planters</td>
<td>34</td>
<td>37</td>
</tr>
<tr>
<td>Department of Conservation and Land Management</td>
<td>27</td>
<td>30</td>
</tr>
<tr>
<td>Department of Agriculture</td>
<td>20</td>
<td>22</td>
</tr>
<tr>
<td>Other farmers</td>
<td>17</td>
<td>19</td>
</tr>
<tr>
<td>Greening Australia</td>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td>Tree Committee/Alcoa</td>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td>Shire</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

More than one alternative may have been selected.

Table 4.8 shows that the most popular trees and shrubs for replanting were those native to Western Australia but not growing naturally in the general area of the Shire. The majority of landholders interviewed were planting river red gums (*Eucalyptus camaldulensis*) with smaller numbers planting ornamental trees usually native to the WA Goldfields and salt bush (*Atriplex* sp.). Over half the respondents had planted ‘local’ native species or those occurring naturally in the area. These included sheoaks (*Casuarina obesa, Allocasuarina huegelii*), salmon gums (*E. salmonophloia*), York gum (*E. loxophleba*), wandoo (*E. wandoo*), gimlet (*E. salubris*), swamp mallet (*E. spathulata*), moort (*E. platypus*), flat-topped yates (*E. occidentalis*), Morrel (*E. longicornis*), brown and blue mallet (*E. astringens, E. gardneri*), and broombush (*Melaleuca uncinata*). Species from the Eastern States such as Tasmanian blue gums (*E. globulus*), sugar gums (*E. cladocalyx*) and lemon-scented gums (*E. citrodora*) were planted by 43 per cent of respondents while exotic species such as pines (mainly *Pinus radiata*), tamarisks and tree lucerne (*Cytisus proliferus*) were less popular (34 per cent).

Over one third of the respondents obtained advice on matters related to replanting from nurseries and contract planters. Other major sources of advice were the Department of Conservation and Land Management (30 per cent) and the Department of Agriculture (22 per cent).
Management of native vegetation on farmland in the wheatbelt of Western Australia

Of the landholders interviewed 61 per cent were interested in replanting areas of their farms with ‘local’ native species (Table 4.9). Respondents in the Shires of Dumbleyung, Lake Grace and Tammin were also asked if they were interested in planting other species besides or as well as ‘local’ natives. Nearly half of these respondents were interested in replanting with Western Australian native species (mainly *E. camaldulensis*) and 37 per cent were interested in replanting with exotic species. Exotic species of greatest interest were pines (for wind breaks), tree lucerne (for fodder) and tamarisks (for salinity control). These results are similar to those obtained in a survey of landholders’ attitudes to farm revegetation conducted in South Australia where 67.7 per cent of respondents indicated that they would prefer to use native species for replanting and 32.1 per cent would like to plant some of their property with exotics as well (Dowling, 1985).

Forty-one per cent of respondents were also prepared to plant whatever species were available or as they were advised. As 30 per cent of respondents obtained advice from the Department of Conservation and Land Management on matters related to tree planting it would seem that the Department is in a good position to encourage future revegetation projects. This would include the use of indigenous species where possible to increase the value of replanted areas for nature conservation.

**Table 4.9. Future interests in revegetation**

<table>
<thead>
<tr>
<th>Respondents</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Landholders interested in replanting (n = 148)</td>
<td>127 81</td>
</tr>
<tr>
<td>Replanting (n = 148)</td>
<td>90 61</td>
</tr>
<tr>
<td>Landholders interested in replanting indigenous trees and shrubs (n = 148)</td>
<td>8 5</td>
</tr>
<tr>
<td>- yes</td>
<td>81 66</td>
</tr>
<tr>
<td>- unsure</td>
<td>38 47</td>
</tr>
<tr>
<td>Exotic species</td>
<td>33 41</td>
</tr>
<tr>
<td>Species available / species advised to plant</td>
<td>30 37</td>
</tr>
<tr>
<td>Western Australian native species not indigenous to the area</td>
<td>11 14</td>
</tr>
<tr>
<td>Eastern States species (n = 81)</td>
<td>30 14</td>
</tr>
</tbody>
</table>

The main purpose given by landholders interviewed for replanting are given in Table 4.10. Erosion control (54 per cent), shade and shelter for stock (51 per cent), salinity control (42 per cent) and scenic reasons (39 per cent) were the most common responses. Differences noted between the shires include a higher proportion of landholders replanting for erosion control in Tammin Shire (92 per cent) and salinity control in Pingelly Shire (70 per cent). Only 22 per cent of respondents in the Pingelly Shire gave ‘scenic’ as a purpose for planting.

Similar results have been obtained in a survey carried out in the central wheatbelt (Kondinin to Kellerberrin) in 1981 although farmers interviewed in this region were more likely to give aesthetics as a reason for replanting. In that survey reasons given for planting trees were erosion control (50 per cent), shelter for stock (43 per cent), shade for stock (32 per cent), salinity rehabilitation (46 per cent) and aesthetics (59 per cent) (Fry and Goss, 1985).
Table 4.10. Purpose for replanting

<table>
<thead>
<tr>
<th>Purpose for replanting</th>
<th>Respondents</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Erosion control</td>
<td>68</td>
<td>54</td>
</tr>
<tr>
<td>Shade and shelter</td>
<td>65</td>
<td>51</td>
</tr>
<tr>
<td>Salinity control</td>
<td>53</td>
<td>42</td>
</tr>
<tr>
<td>Scenic</td>
<td>51</td>
<td>39</td>
</tr>
<tr>
<td>Commercial</td>
<td>8</td>
<td>6</td>
</tr>
<tr>
<td>Conservation of native vegetation</td>
<td>7</td>
<td>6</td>
</tr>
<tr>
<td>Increase rainfall</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Restructuring of farm</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

n = 127. More than one alternative may have been selected.

4.3.4 Attitude towards native vegetation

To determine attitudes towards native vegetation on farmland, landholders were asked to what degree they agreed or disagreed with the statements in question 19 (see Table 4.11). The original intention was to add these items to provide an index of attitudes to native vegetation. Because of reactions to some of the statements, only the response totals and some comments have been included for general interest.

Reaction by landholders to some of the statements included suspicion on how the results would be used, confusion between attitudes to native vegetation on roadside verges, farmland or nature reserves and concern expressed by respondents that agreement/disagreement with the given statements would not correctly reflect their attitude toward native vegetation.

Table 4.11. Attitudes of landholders to native vegetation rate of response by item (%) n = 148

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly agree</th>
<th>Agree</th>
<th>Not sure</th>
<th>Disagree</th>
<th>Strongly disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Native vegetation harbours undesirable plants and diseases</td>
<td>1</td>
<td>27</td>
<td>6</td>
<td>57</td>
<td>8</td>
</tr>
<tr>
<td>2. Native vegetation is pleasing to look at</td>
<td>26</td>
<td>74</td>
<td>1</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>3. Native vegetation is a fire hazard</td>
<td>1</td>
<td>33</td>
<td>5</td>
<td>59</td>
<td>1</td>
</tr>
<tr>
<td>4. Native vegetation is important for the control of salinity and erosion</td>
<td>33</td>
<td>65</td>
<td>1</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>5. Native vegetation is costly to maintain</td>
<td>3</td>
<td>29</td>
<td>3</td>
<td>60</td>
<td>5</td>
</tr>
<tr>
<td>6. Native vegetation is important for the conservation of flora/ fauna</td>
<td>28</td>
<td>68</td>
<td>1</td>
<td>3</td>
<td>-</td>
</tr>
<tr>
<td>7. Native vegetation shelters vermin and feral animals</td>
<td>12</td>
<td>77</td>
<td>2</td>
<td>9</td>
<td>-</td>
</tr>
<tr>
<td>8. Native vegetation stands add to the value of my property</td>
<td>6</td>
<td>65</td>
<td>11</td>
<td>17</td>
<td>-</td>
</tr>
<tr>
<td>9. Native vegetation reduces the productive capacity of my property</td>
<td>-</td>
<td>24</td>
<td>3</td>
<td>68</td>
<td>5</td>
</tr>
<tr>
<td>10. Native vegetation is important for the shade and shelter of stock</td>
<td>36</td>
<td>62</td>
<td>-</td>
<td>3</td>
<td>-</td>
</tr>
<tr>
<td>11. Maintenance of native vegetation takes too much of my time</td>
<td>-</td>
<td>7</td>
<td>3</td>
<td>84</td>
<td>5</td>
</tr>
<tr>
<td>12. Native vegetation is important for farm stability and production</td>
<td>8</td>
<td>68</td>
<td>11</td>
<td>13</td>
<td>-</td>
</tr>
</tbody>
</table>
A number of landholders who agreed that native vegetation harbours undesirable plants (poison and weeds were mentioned) and vermin and feral animals (rabbits usually mentioned, occasionally kangaroos) suggested that this did not necessarily mean that they had a negative attitude towards the bush on their properties; they would rather have the bush with the undesirable plants and animals than no bush at all.

Landholders disagreeing with the statement that ‘native vegetation is a fire hazard’ usually wanted to specify that the area had to be managed properly, including provision for firebreaks.

The majority of landholders disagreeing with the statements that ‘native vegetation is costly to maintain’ or ‘maintenance takes too much of my time’ indicated that they did not spend time or money on the remnant vegetation on their properties. One farmer commented ‘it just looks after itself’. Most landholders who agreed with the statement that ‘native vegetation is costly to maintain’ suggested that fencing was the greatest expense. One respondent also pointed out that fencing was cheaper than replanting.

Landholders interviewed were more likely to agree that native vegetation is important for farm stability rather than production and would therefore have preferred these alternatives in different statements.

As indicated in Table 4.12 the majority of landholders interviewed considered the benefits of native vegetation on farmland in their shire to outweigh the disadvantages (82 per cent). This result is higher than that obtained in a survey of Tasmanian farmers where approximately 60 per cent of respondents felt that the benefits of native vegetation outweigh the disadvantages (Stadler, 1983).

Table 4.12. Attitude toward native vegetation on farmland in the shire

<table>
<thead>
<tr>
<th></th>
<th>Respondents</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Benefits greatly outweigh disadvantages</td>
<td>60</td>
<td>40</td>
</tr>
<tr>
<td>2. Benefits outweigh disadvantages</td>
<td>62</td>
<td>42</td>
</tr>
<tr>
<td>3. Benefits about equal disadvantages</td>
<td>23</td>
<td>15</td>
</tr>
<tr>
<td>4. Disadvantages outweigh benefits</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>5. Disadvantages greatly outweigh benefits</td>
<td>3</td>
<td>2</td>
</tr>
</tbody>
</table>

4.3.4.1 Reasons for retaining native vegetation

The majority of landholders interviewed selected alternatives leading to economic benefits such as stock shelter and restoration of degraded land as the most important reasons for retaining native vegetation. The rating of shade and shelter was 44 per cent, erosion control 18 per cent, and soil salinity 13 per cent. Approximately one half of the respondents indicated that they considered environmental factors such as the preservation of flora and fauna and natural bushland and aesthetic values when retaining areas of native vegetation on their properties although these were not primary reasons (Table 4.13).
Table 4.13. Reasons for retaining native vegetation

<table>
<thead>
<tr>
<th>Reason</th>
<th>Main reasons</th>
<th>Percentage</th>
<th>Most important</th>
<th>Respondents</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shade and shelter</td>
<td>140</td>
<td>94</td>
<td>65</td>
<td>44</td>
<td></td>
</tr>
<tr>
<td>Erosion control</td>
<td>115</td>
<td>78</td>
<td>26</td>
<td>18</td>
<td></td>
</tr>
<tr>
<td>Soil salinity control</td>
<td>95</td>
<td>64</td>
<td>20</td>
<td>13</td>
<td></td>
</tr>
<tr>
<td>Preservation of flora/fauna</td>
<td>74</td>
<td>50</td>
<td>11</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>Scenic reasons</td>
<td>73</td>
<td>49</td>
<td>2</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Preservation of natural bushland</td>
<td>71</td>
<td>48</td>
<td>19</td>
<td>13</td>
<td></td>
</tr>
<tr>
<td>No suitable land left to clear</td>
<td>49</td>
<td>33</td>
<td>5</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Cost of clearing</td>
<td>13</td>
<td>9</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Environmental</td>
<td>3</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tall timber left as too difficult to clear originally</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

n = 148. More than one alternative may have been selected.

4.3.4.2 Proportion of farmland to be retained as native vegetation

Approximately three quarters of landholders suggested that 10 per cent of their properties or more should be retained under native vegetation. The responses ranged from 2 to 50 per cent with a mean value of 14 per cent. Those respondents indicating that over 30 per cent of their property should be retained usually had large areas affected by land degradation.

Table 4.14. Proportion of properties that should now be left in a natural state

<table>
<thead>
<tr>
<th>Mean</th>
<th>14%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Range</td>
<td>2-50%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Number in each category</th>
<th>Respondents</th>
<th>Proportion (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 5%</td>
<td>31</td>
<td>21</td>
</tr>
<tr>
<td>5-9</td>
<td>34</td>
<td>23</td>
</tr>
<tr>
<td>10</td>
<td>13</td>
<td>9</td>
</tr>
<tr>
<td>11-14</td>
<td>8</td>
<td>5</td>
</tr>
<tr>
<td>15</td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td>16-19</td>
<td>25</td>
<td>17</td>
</tr>
<tr>
<td>20</td>
<td>17</td>
<td>12</td>
</tr>
<tr>
<td>21-25</td>
<td>8</td>
<td>5</td>
</tr>
<tr>
<td>25 and over</td>
<td>(n = 148)</td>
<td></td>
</tr>
</tbody>
</table>

If all the property was arable
Mean 12%
Range 2-50%

4.3.4.3 Attitude to rare and endangered plants

Three quarters or respondents were prepared to inform the Department of Conservation and Land Management of the presence of rare and endangered plants on their properties although many specified that this would not be so if greater areas than a few hectares were involved. Landholders and their families were generally prepared to participate in protecting rare and
endangered plants. Seventy two per cent were willing to manage the area involved for the conservation of these plants with regard to weed and fire control and 48 per cent were willing to fence at their own expense (Table 4.15). Nearly one third of respondents felt strongly enough to specify that they thought the government should assist with fencing.

Many landholders suggested that greater personal contact between the Department of Conservation and Land Management and farmers is needed. Respondents also wished to obtain more information regarding rare and endangered plants, especially after publicity over a disputed case in the Geraldton area.

Table 4.15. Response to rare and endangered plants

<table>
<thead>
<tr>
<th>Number of landholders who would inform CALM Department about rare and endangered plants</th>
<th>Respondents</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>yes</td>
<td>112</td>
<td>76</td>
</tr>
<tr>
<td>unsure</td>
<td>13</td>
<td>9</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Level of participation</th>
<th>Respondents</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manage area</td>
<td>106</td>
<td>72</td>
</tr>
<tr>
<td>Monitor the population</td>
<td>95</td>
<td>64</td>
</tr>
<tr>
<td>Fence at own expense</td>
<td>71</td>
<td>48</td>
</tr>
<tr>
<td>Government assistance with fencing</td>
<td>43</td>
<td>29</td>
</tr>
<tr>
<td>Ignore the area</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Apply to clear</td>
<td>3</td>
<td>2</td>
</tr>
</tbody>
</table>

4.3.5 Attitude to incentives to retain native vegetation

In response to questions relating to native vegetation retention incentives most landholders interviewed referred to tree planting rather than maintenance, regeneration or clearing of remnant bushland.

4.3.5.1 Fencing subsidies

As presented in Tables 4.16 and 4.17 by far the most effective form of government assistance suggested by respondents for the retention of native vegetation on their properties was the provision of fencing subsidies. It was pointed out that fencing was the major cost involved in tree planting and regeneration. With regard to the extent of fencing subsidies required, 57 per cent of landholders indicated that sharing equally in the cost of fencing materials with the State Government would influence them to retain and/or replant areas ‘a lot’, while 30 per cent indicated ‘some’. Landholders in the shires of Lake Grace and Dumbleyung were more likely to be influenced ‘a lot’ by a 50:50 fencing subsidy. The response rate for each shire was 63 per cent in the Lake Grace shire, 67 per cent in the Dumbleyung Shire, 38 per cent in the Pingelly shire and 40 per cent in the Tammin shire. Nearly one half of the landholders who were not interested in a 50:50 fencing subsidy indicated that they would be influenced ‘a lot’ by a fencing subsidy covering the full cost of materials involved.

In general comments made by those respondents expressing little interest in fencing subsidies indicated that they wished to utilise all available areas of native vegetation on their properties for stock shelter and were therefore not interested in fencing. One farmer stated that he was not interested in ‘hand outs’.
Table 4.16. Effective forms of government assistance

<table>
<thead>
<tr>
<th></th>
<th>Respondents</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fencing subsidies</td>
<td>93</td>
<td>63</td>
</tr>
<tr>
<td>Supply of trees</td>
<td>40</td>
<td>27</td>
</tr>
<tr>
<td>Tax concessions</td>
<td>25</td>
<td>17</td>
</tr>
<tr>
<td>Advice, management assistance and research</td>
<td>16</td>
<td>11</td>
</tr>
<tr>
<td>Rates relief</td>
<td>10</td>
<td>7</td>
</tr>
<tr>
<td>Total cost of replanting</td>
<td>10</td>
<td>7</td>
</tr>
<tr>
<td>Loan of machinery</td>
<td>9</td>
<td>6</td>
</tr>
<tr>
<td>Labour</td>
<td>7</td>
<td>5</td>
</tr>
<tr>
<td>Purchase of land by Government</td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td>Low interest loans</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>General economic relief for farmers</td>
<td>3</td>
<td>2</td>
</tr>
</tbody>
</table>

4.3.5.2 Supply of trees

Twenty seven per cent of respondents thought the supply of low-cost trees for revegetation would be an effective form of government assistance for the overall retention of native vegetation on their properties. Nearly one third of these respondents specified that the seedlings should not be completely free so that farmers would still be encouraged to plant and care for the seedlings supplied. Only 7 per cent of respondents suggested that the government should pay for the full cost of replanting. The response rate for the supply of low cost trees for each shire was 15 per cent in Pingelly shire, 18 per cent in Dumbleyung shire, 20 per cent in Tammin shire and 36 per cent in Lake Grace shire.

Table 4.17. Influence of incentives on management decisions

<table>
<thead>
<tr>
<th></th>
<th>% response (n = 148)</th>
<th>A lot</th>
<th>Some</th>
<th>Not at all</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fencing subsidy 50:50</td>
<td>57</td>
<td>30</td>
<td>13</td>
<td></td>
</tr>
<tr>
<td>Management advice and loan machinery</td>
<td>37</td>
<td>42</td>
<td>21</td>
<td></td>
</tr>
<tr>
<td>Rate rebate</td>
<td>30</td>
<td>49</td>
<td>22</td>
<td></td>
</tr>
<tr>
<td>Demonstration farms</td>
<td>30</td>
<td>47</td>
<td>23</td>
<td></td>
</tr>
<tr>
<td>Low interest loan</td>
<td>28</td>
<td>29</td>
<td>43</td>
<td></td>
</tr>
<tr>
<td>Rate exemption (n = 122)</td>
<td>20</td>
<td>46</td>
<td>34</td>
<td></td>
</tr>
<tr>
<td>Proportional tax concession</td>
<td>15</td>
<td>40</td>
<td>45</td>
<td></td>
</tr>
<tr>
<td>Tax concession for gift</td>
<td>12</td>
<td>19</td>
<td>69</td>
<td></td>
</tr>
</tbody>
</table>

4.3.5.3 Tax concessions

Tax concessions were suggested by 17 per cent of respondents as effective forms of government assistance for the retention of native vegetation. Table 4.18 shows that 10 per cent of the cost of replanting and/or maintaining native vegetation as a tax rebate or deduction would not be sufficient to affect the management decisions of most of the landholders interviewed (‘offset’ through taxation was explained as a deduction or rebate). A greater proportion of landholders in the Tammin Shire (33 per cent) indicated that they would be influenced by a 10 per cent deduction or rebate compared with the Pingelly shire (23 per cent), the Lake Grace shire (16 per cent) and the Dumbleyung shire (15 per cent). Forty one per cent of respondents specified that a 100 per cent deduction or rebate would be necessary...
and 13 per cent specified no tax incentive of any magnitude would encourage them to replant or fence areas of bushland. A few of these respondents pointed out that they didn’t pay tax. Comments made that generally represent the range of views expressed by respondents are as follows:

- *A tax incentive is a good idea as the government can’t afford handouts.*
- *One hundred per cent deduction is needed because of the high cost and work involved. It is for everyone’s benefit in the long run.*
- *I am already claiming 100 per cent for replanting and fencing for soil conservation reasons.*
- *It used to be 100 per cent deduction for clearing, why not 100 per cent for replanting.*
- *Need 100 per cent deduction/rebate to encourage during rural crisis and some people don’t pay much tax.*
- *Fifty five per cent would be fair because both society and the farmer benefits.*
- *One hundred and fifty per cent at least. Tax incentive would be unfair, direct grants better.*
- *Replanting would not increase the productive capacity of my property enough to make it worthwhile.*

Table 4.18. Level of tax concession needed to effect management decisions

<table>
<thead>
<tr>
<th>%</th>
<th>Respondents</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>28</td>
<td>19</td>
</tr>
<tr>
<td>20-50</td>
<td>29</td>
<td>20</td>
</tr>
<tr>
<td>55-80</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>100</td>
<td>61</td>
<td>41</td>
</tr>
<tr>
<td>120-400</td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td>No tax concession sufficient</td>
<td>19</td>
<td>13</td>
</tr>
</tbody>
</table>

Only 15 per cent of respondents indicated that a tax rebate based on the proportion of their property remaining under native vegetation would influence their management decisions ‘a lot’. The majority of respondents commented that the 10 cents in the dollar rebate stated in the example was not sufficient and that they felt this option would be too complex and open to abuse.

A tax concession based on the value of land set aside as a nature reserve was the least popular incentive suggested in question 37 (Appendix 1) with 69 per cent of respondents indicating that this incentive would effect their management decisions ‘not at all’. A number of landholders stated that they did not want to relinquish ownership of any land to the government.

4.3.5.4 Advice

Eleven per cent of respondents suggested advice and research would be an effective form of government assistance and 6 per cent suggested a loan scheme for machinery. A loan of machinery usually referred to a tree planter but post hole diggers and direct seeding machinery were suggested by some respondents. The category of advice and research included research on salinity, tree decline, direct seeding (for revegetation) and wind breaks,
management assistance with weed and vermin control and advice on tree planting and the maintenance of native vegetation. Although the initial response was low, 37 per cent of landholders interviewed indicated that management advice and assistance would effect their management decisions ‘a lot’ and 30 per cent specified ‘a lot’ for demonstration farms (Table 4.17). Demonstration farms were explained as whole farm demonstrations showing the most effective way of managing native vegetation in a given situation.

The response rate for each shire with respect to management advice and assistance influencing management decisions ‘a lot’ was 20 per cent in the Tammin shire, 27 per cent in the Dumbleyung shire, 38 per cent in the Pingelly shire and 45 per cent in the Lake Grace shire. The response rate for ‘demonstration farms’ was similar in all four shires.

### 4.3.5.5 Rates

Only 7 per cent of landholders suggested rate relief as an effective form of government assistance. When directly questioned about the effect of a rate rebate on management decisions, 30 per cent of respondents indicated that it would influence them ‘a lot’. A rate rebate was explained as a reimbursement by the State Government. The response rate for each shire was 24 per cent in the Dumbleyung shire, 26 per cent in the Lake Grace shire, 35 per cent in the Pingelly shire and 53 per cent in the Tammin shire. During the pilot survey in Pingelly Shire, concern was expressed by respondents about the source of finance for rate relief. In the Shires of Tammin, Dumbleyung and Lake Grace, landholders were asked to what extent a rate exemption (i.e. the shire going without the money) would affect their management decisions. This option was less popular with only 20 per cent of respondents indicating that their management decisions would be influenced ‘a lot’. The response rates were 13 per cent in Lake Grace shire, 24 per cent in Dumbleyung shire and 40 per cent in Tammin shire. Comments made by farmers illustrating the range of opinions expressed include:

- *If farmers don’t pay rates to the shire on areas of native vegetation then the rates will go up on cleared land.*
- *The shire can’t afford to go without the money and the farmer is still paying in the long run. The State Government should reimburse the shires.*
- *Benefit to all Australia, not just the shire, so the State Government should pay.*
- *Rate relief is not needed as it is in the farmers interest to look after his own farm. Native vegetation adds value to a property.*
- *An exemption from the shire is better as simpler and less administration.*
- *I’m not looking at large areas of bush on my farm so there is not enough money involved to encourage me to replant or fence.*

### 4.3.5.6 Employment schemes

Only 5 per cent of respondents suggested that provision of labour would be an effective form of government assistance for native vegetation retention on their properties. When asked if they were interested in participating in a youth work scheme, 108 (73 per cent) respondents said ‘yes’ and 10 (7 per cent) were ‘unsure’. Similar results were obtained for all four shires. Some landholders were concerned that areas required to be replanted on their properties were not large enough to warrant the use of a scheme. Those who stated that they were definitely not interested in a work scheme gave as their reasons concern over standard of work, worries
over time commitments with supervision, disillusionment with CEP schemes conducted within the shire, labour not being a major problem or that they felt the work did not need to be done on their property. Most respondents expressed the opinion that an employment scheme would be better suited to tree planting rather than fencing.

4.3.5.7 Low interest loans

Low interest loans were not a popular form of incentive for the retention of native vegetation (Table 4.16 and Table 4.17). The response from landholders interviewed in the Lake Grace Shire was more positive with 42 per cent indicating that low interest loans would influence their management decisions ‘a lot’ compared with 23 per cent in Pingelly Shire, 13 per cent in Tammin Shire and 9 per cent in Dumbleyung Shire. This may reflect the situation of recently released land where fencing programs have not been completed.

4.3.5.8 Management agreements

The management agreement set out in question 38 (Appendix 1) is based on the Heritage Agreement Scheme in South Australia. The Heritage Agreements are voluntary and run for an agreed period of time.

Financial incentives included in the scheme are a rate rebate for the area of native bushland involved and a grant covering the full cost of fencing. Management advice and assistance is available. The landowner must repay the back rates and the grant money if he/she breaks the agreement. Questions asked by landholders during the interview were answered in relation to the South Australian scheme. Table 4.19 shows that the response to the management agreement was very positive with an acceptance rate of 70 per cent. Over half of the respondents also indicated that they would probably participate in such a scheme, 70 per cent having a specific area in mind. Areas suggested for the agreements in the shires of Lake Grace, Dumbleyung and Tammin ranged from 1-283 ha with an average size of 37 ha. The vegetation types of these areas were mostly woodlands (75 per cent) and scrub/heath (50 per cent). Mallee was also found on 41 per cent of the areas but granite outcrops (8 per cent) and wetlands (5 per cent) were rare.
Table 4.19. Management agreements

<table>
<thead>
<tr>
<th>Introduction to Western Australia</th>
<th>Respondents</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Definitely yes</td>
<td>42</td>
<td>28</td>
</tr>
<tr>
<td>Probably yes</td>
<td>63</td>
<td>42</td>
</tr>
<tr>
<td>Perhaps</td>
<td>22</td>
<td>15</td>
</tr>
<tr>
<td>Probably no</td>
<td>16</td>
<td>11</td>
</tr>
<tr>
<td>Definitely no</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>(n = 148)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Participation of landholder</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Definitely yes</td>
<td>19</td>
<td>13</td>
</tr>
<tr>
<td>Probably yes</td>
<td>62</td>
<td>42</td>
</tr>
<tr>
<td>Perhaps</td>
<td>27</td>
<td>18</td>
</tr>
<tr>
<td>Probably no</td>
<td>21</td>
<td>14</td>
</tr>
<tr>
<td>Definitely no</td>
<td>19</td>
<td>13</td>
</tr>
<tr>
<td>(n = 148)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Vegetation type of suggested area</th>
<th>Respondents</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Woodland</td>
<td>48</td>
<td>75</td>
</tr>
<tr>
<td>Scrub/heath</td>
<td>32</td>
<td>50</td>
</tr>
<tr>
<td>Mallee</td>
<td>26</td>
<td>41</td>
</tr>
<tr>
<td>Granite Outcrop</td>
<td>5</td>
<td>8</td>
</tr>
<tr>
<td>Wetlands</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>Unsure</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>(n = 64)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Comments made illustrating the range of concerns and views expressed by respondents in relation to management agreements include:

- Sounds good as long as the agreements are not compulsory.
- The scheme would be good for ‘poison’ areas or areas needed for erosion and salinity control.
- Farmers need incentive to maintain, these incentives are good as the main cost is fencing.
- This is getting close to solving the problem with the government as well as farmers contributing to the good of all.
- The farmer at Geraldton with the rare plants could have done with some help in this form.
- An agreement with the government is not worth the paper it is written on.
- For advantages gained the workload and responsibilities would outweigh and it would only affect small areas.
- I don’t like the government having control over land which the farmer owns.
- The length of time of the agreement is a worry. If the agreement is on the title to the land it may affect the sale.
4.3.6 Responsibility for vegetation retention on farmland

With regard to the costs of retaining native vegetation on farmland, approximately 40 per cent of respondents indicated that both the State and Federal Governments should be involved ‘a lot’ and approximately one half indicated ‘some’ involvement for these government bodies. Table 4.20 indicates the respondents preference for ‘some’ involvement for farmers (77 per cent), local shires (49 per cent) and community and voluntary groups (52 per cent). Comments made include:

- It is to both the farmers and the country’s advantage so both should be involved.
- The shire can supply equipment and wages.
- It is the farmers land so he must be involved in the costs.
- Everyone should be involved to some extent as it is for the good of all. The farmer is the caretaker of the land.
- The State Government released the land in the first place so it should be responsible for retaining bush now.

The majority of respondents (84 per cent) thought that farmers should have ‘a lot’ of involvement in the management decisions involved in retaining native vegetation on farmland. Most farmers did not like the idea of outside interference with the running of their properties. However, 64 per cent suggested that the State Government should have ‘some’ say and 51 per cent suggested ‘some’ shire involvement. The least popular option for involvement in management decisions was the federal government with 68 per cent of respondents indicating ‘not at all’.

Comments made by respondents include:

- Local shires do not have the expertise to advise on management decisions nor the funds to help in costs.
- Government departments should have some involvement in an advisory capacity.
- The shire should not be involved because of personality clashes.
- The Federal Government is too far away and should not be involved.
- The Department of Agriculture should be involved with farm plans.
- The Department of Agriculture has the expertise which farmers wouldn’t have.
- Farmers shouldn’t give too much control away as locals know the area but if money is asked for then the funding organisations should have some say.
Table 4.20. Responsibility for costs and management decisions (% response rate in each category)

<table>
<thead>
<tr>
<th>Costs</th>
<th>A lot</th>
<th>Some</th>
<th>Not at all</th>
</tr>
</thead>
<tbody>
<tr>
<td>State Government</td>
<td>44</td>
<td>50</td>
<td>6</td>
</tr>
<tr>
<td>Federal Government</td>
<td>40</td>
<td>47</td>
<td>13</td>
</tr>
<tr>
<td>Farmers</td>
<td>17</td>
<td>77</td>
<td>6</td>
</tr>
<tr>
<td>Local shires</td>
<td>13</td>
<td>49</td>
<td>37</td>
</tr>
<tr>
<td>Community/voluntary groups</td>
<td>5</td>
<td>52</td>
<td>42</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Management decisions</th>
<th>A lot</th>
<th>Some</th>
<th>Not at all</th>
</tr>
</thead>
<tbody>
<tr>
<td>Farmers</td>
<td>84</td>
<td>16</td>
<td>-</td>
</tr>
<tr>
<td>State Government</td>
<td>11</td>
<td>64</td>
<td>24</td>
</tr>
<tr>
<td>Local shires</td>
<td>10</td>
<td>51</td>
<td>38</td>
</tr>
<tr>
<td>Community/voluntary</td>
<td>1</td>
<td>36</td>
<td>62</td>
</tr>
<tr>
<td>Federal Government</td>
<td>4</td>
<td>28</td>
<td>68</td>
</tr>
</tbody>
</table>

4.4 DISCUSSION

4.4.1 Implication of survey results

Incentives to retain native vegetation include those required to encourage the maintenance, regeneration and replanting of remnant bushland as well as those required to discourage continued clearing. When looking for effective incentives the following information gathered from the survey should be taken into account.

The survey results indicate that the majority of the landholders in the shires surveyed have now completed clearing operations. Most of the respondents intending to clear in the future are from the Lake Grace shire where land has recently been released for agricultural development. These survey results are supported by data from the Department of Agriculture on applications to clear since January 1986 under the Soil Conservation Regulations (see Table 4.21).

Table 4.21. Applications to clear from shires surveyed (January 1986 to March 1987)

<table>
<thead>
<tr>
<th>Shire</th>
<th>No. of establishments involved</th>
<th>Hectares</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dumbleyung</td>
<td>1</td>
<td>50</td>
</tr>
<tr>
<td>Lake Grace</td>
<td>13</td>
<td>2,697</td>
</tr>
<tr>
<td>Pingelly</td>
<td>1</td>
<td>35</td>
</tr>
<tr>
<td>Tammin</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

In the Lake Grace shire 11 of the landholders who applied to clear have properties situated east of Newdegate. This area includes many new land situations.

The results also indicate strong interest in tree planting with 61 per cent of respondents interested in planting indigenous native species (species which grow naturally in the area), and 41 per cent of respondents prepared to plant whatever species are available or whatever
species they are advised to plant. This suggests potential for increasing the value of replanted areas by enhancing the conservation of native flora and fauna.

Interest in maintenance and regeneration of remnant bushland does not seem to be as high. Respondents estimated that only 14 per cent of remaining native vegetation in the area surveyed is fenced off from stock, the major reason being the presence of ‘poison’ plants. Many landholders pointed out that they did not spend time or money on remnant bushland on their properties and did not consider fencing areas for maintenance and regeneration necessary. Some farmers also preferred to clear native vegetation or ‘tidy up’ rather than look at the regeneration of the area concerned.

The great majority of respondents thought the benefits of native vegetation outweigh the disadvantages on farmland in their shire and 61 per cent were interested in replanting with indigenous native species. This would appear to be mainly for soil conservation and stock shelter. Although conservation of flora and fauna and natural bushland were generally taken into consideration they were not of primary concern. Most landholders supported the preservation of rare and endangered plants on their own properties if small areas were concerned but 29 per cent of respondents felt that assistance with fencing materials should be provided. Landholders pointed out that the conservation of flora and fauna was for the benefit of all and therefore the costs should be shared.

Incentives should therefore aim to encourage the retention, maintenance, regeneration and replanting of native vegetation in the wheatbelt by:

- discouraging the continued clearing of native vegetation in old established farming areas and regulating clearing in new land situations;
- encouraging the maintenance and regeneration of remaining native vegetation;
- promoting the benefits of remnant vegetation on farmland especially for the conservation of flora and fauna;
- converting interest in replanting to practice, with emphasis on the use of indigenous native species wherever possible.

4.4.2 Incentive package

Involvement in the costs of retention of native vegetation was, in order of landholder preference, State Government, Federal Government, farmers, local shires and community and voluntary groups. Seventy seven per cent of respondents thought that farmers should have ‘some’ involvement.

Landholders interviewed showed an overwhelming preference for fencing subsidies as an effective incentive for the overall retention of native vegetation. Other incentives, in order of landholder preference, were the supply of low cost trees, tax concessions, extension work by Government departments, relief from local government rates, worker schemes and low interest loans.

Involvement of local, State and Federal governments in a package of incentives for the retention of native vegetation on farmland in the wheatbelt of Western Australia is detailed in Chapter 5.
The less popular incentives such as relief from local government rates and worker schemes should be used in conjunction with other incentives, for example, fencing subsidies or the supply of low cost trees.

Introduction of incentives in the form of a management agreement would appear to be an effective method of promoting the maintenance and regeneration of remnant vegetation as well as securing the area from future clearing. The management agreement outlined in the questionnaire and based on the Heritage Agreements in South Australia obtained an acceptance rate of 70 per cent with incentives in the form of a full fencing subsidy and rate rebate. The Heritage Agreements run for an agreed period of time, usually in perpetuity, and back rates and the grant money for fencing must be repaid if the agreement is broken. State government and farmers sharing the cost of fencing materials 50:50 seemed an acceptable subsidy to most landholders. However, for flora and fauna conservation, a full subsidy may be needed in some cases. Flexibility of approach should be maintained. Farmer preference was for the State government financing rate relief in the form of a rebate thus ensuring that local shires do not go without needed finance. Introduction of incentives in the form of a management agreement has the advantage of providing fencing subsidies and rate relief in a manner least likely to be misused. A management agreement also gives the government body involved security for the money that has been invested in the area.
CHAPTER 5. CONCLUSIONS AND RECOMMENDATIONS

5.1 THE NEED TO PROMOTE THE RETENTION OF NATIVE VEGETATION

For the effective management of native vegetation in the wheatbelt region of the State for soil and nature conservation the cooperation of private landholders is essential. The nature reserve system does not sample the landscape adequately (Hopkins and Saunders, 1987) and little crown land is available in the old established farming areas for reservation. The involvement of landholders is needed to deal with land degradation on a regional or catchment basis. Map work carried out in the Shires of Dumbleyung, Lake Grace, Pingelly and Tammin indicate that in the older farming areas the greatest proportion of native vegetation remaining is found on private land. Similar results have been obtained in the Kellerberrin area where 471 (89 per cent) of the 531 remnants of native vegetation surveyed also showed obvious signs of deterioration (Saunders et al. 1987).

Private landholders, however, may not have the financial resources or motivation necessary for the retention, maintenance, regeneration and replanting of native vegetation on their properties and therefore support and encouragement is needed from government and community groups. This can be achieved by the setting of policies and objectives to promote native vegetation retention, maintenance and re-establishment in the wheatbelt through education, the inventory and monitoring of resources, research, planning and financial incentives.

The results of the farmer survey provide a guideline for the management of native vegetation in the wheatbelt of Western Australia by individuals, government and community groups. Respondents indicated strong interest in tree planting but not in maintenance and regeneration of native vegetation on the farmland surveyed. The great majority of landholders interviewed thought that the benefits of native vegetation on farmland outweigh the disadvantages but this would appear to be for soil conservation reasons rather than for nature conservation. Schemes introduced to effectively encourage the voluntary retention and re-establishment of native vegetation on privately owned land in these areas should therefore have the following objectives:

1. To discourage the continued clearing of native vegetation in old established farming areas and regulate clearing in new land situations.
2. To encourage the maintenance and regeneration of the remaining native vegetation.
3. To promote the benefits of remnant vegetation on farmland especially for the conservation of flora and fauna.
4. To convert interest in replanting to practice, with emphasis on the use of indigenous species wherever possible.

Landholders indicated that a fencing subsidy would be the most effective financial incentive for the retention and re-establishment of native vegetation in the wheatbelt. Other incentives, in order of landholder preference, were the supply of low cost trees, tax concessions, extension work by government departments, relief from local government rates, worker schemes and low interest loans. The management agreement outlined to respondents and based on the Heritage Agreements in South Australia was accepted by 70 per cent of landholders interviewed. The Heritage Agreements in South Australia are outlined in Section 2.1.5. The introduction of incentives through a management agreement has the advantage of
providing security for money invested in the area. Details of the specific roles of local, State and federal government and community groups are detailed in Section 5.5.

5.2 PROMOTION THROUGH EDUCATION

The important role of remnants of vegetation on private land in soil and nature conservation requires the involvement of the landholders in the planning and management of native vegetation in the wheatbelt region as a whole. To achieve a high level of involvement an education program is needed to promote the benefits of native vegetation on farmland, publicise reasons for concern, foster pride in local flora and fauna, provide information and advice on good management procedures and promote existing and future incentive schemes. The program would need to reach a wide range of people throughout the community, as well as landholders, including teachers, engineers, shire personnel, accountants, bank managers to name a few.

The education program can be introduced through extension work by government and community groups. Numerous avenues are available including the work of extension officers, involvement of private landholders in management plans for nature reserves and soil conservation districts, the communication of research results, provision of information and advice through written material, talks, demonstrations and workshops, and the use of the media, especially television.

**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 program which increases community awareness of the value of native vegetation on farmland and demonstrates appropriate procedures for maintenance, regeneration and replanting.

5.3 THE NEED FOR AN INVENTORY OF RESOURCES, MONITORING AND FURTHER RESEARCH

For effective decision making regarding the retention, maintenance, regeneration and replanting of native vegetation in the wheatbelt, information on existing biological and physical resources and the processes involved in the long-term viability of remnant vegetation is needed. An inventory of biological and physical resources including the extent, composition and condition of native vegetation provides a baseline so that changes can be monitored over time.

Conditions vary from shire to shire and the information gathered from mapping and field survey of the remaining vegetation is necessary for the establishment of priority areas with regard to the relative scarcity of remnant vegetation, ecosystems and species including rare and endangered plants. These priority areas can be targeted for management agreements, fencing subsidies and other incentive schemes.

**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 region of Western Australia to determine its extent, condition and composition.
Research is also needed to develop effective procedures for the maintenance, regeneration and replanting of native vegetation in the wheatbelt. Information required can be obtained through monitoring programs, the study of the interaction of remnants and cleared land, ecological studies of individual species, communities and ecosystems, population genetics, vegetation decline, community attitudes, development of cost effective methods of fencing and revegetation techniques, and the role of remnants in land degradation and shelterbelts. Leading research agencies include the Department of Agriculture, the Department of Conservation and Land Management and CSIRO, but community support is also needed.

**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.

**5.4 THE NEED FOR REGIONAL AND LOCAL PLANNING**

For the effective retention and re-establishment of native vegetation in the wheatbelt overall planning is needed. For nature conservation individual reserves need to be looked at in the context of a whole system or network of remnant vegetation on public and privately owned land (Hopkins and Saunders, 1987) (Saunders et al. 1987) taking into consideration the importance of bush corridors along watercourses and fence lines. The need to tackle land degradation on a regional, catchment area or shire basis has already been recognised by the formation of Soil Conservation Districts.

Careful planning is needed on a shire or a regional basis for the wheatbelt as a whole with the voluntary retention, maintenance, regeneration and replanting of native vegetation encouraged through incentive schemes.

**Recommendation 4**

That the need for overall planning in the wheatbelt be recognised 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.

There is also a need for the promotion of the retention, maintenance, regeneration and replanting of native vegetation through whole farm planning. Whole farm planning provides assistance to the individual farmer by helping him/her to develop good farming practices that take into consideration the short and long term viability of the property. Soil and nature conservation can be taken into consideration and financial incentives may be provided. The Wairarapa Catchment Board in New Zealand prepares Soil and Water Conservation Farm Plans for landholders and providing the owner adheres to the plan (a management agreement is entered into) tree planting, fencing for regeneration and soil conservation works are heavily subsidised.
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.

In the farmer survey landholders interviewed suggested, on average, that 14 per cent of their properties should be retained under native vegetation. In the wheatbelt it has been estimated that 3 per cent of the region has been set aside for nature conservation (Hopper, 1986) with further crown reserves in existence for water, timber, railway, road, public utility and other purposes.

It can therefore be assumed that an objective to retain or re-establish native vegetation on a minimum of 15 per cent of the land has general farmer support in the wheatbelt areas of the State if the retention or re-establishment on privately owned land is on a voluntary basis encouraged through incentive schemes. Fifteen per cent has recently been recommended by the LRPC report.

In view of concern over land degradation and flora and fauna conservation, shires where only 10 per cent or less of privately owned land have been retained under native vegetation need special attention. These shires will mainly be in older established farming areas and any further clearing should be discouraged through incentives and the Soil Conservation Regulations.

Of the 13 shires which are found in the Central South Region of the State and also in the wheatbelt (300-600 mm average annual rainfall), only 5 (38 per cent) have retained over 10 per cent of privately owned land under native vegetation.

Recommendation 6

That shires within the wheatbelt region 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.

5.5 THE ROLE OF GOVERNMENT AND COMMUNITY GROUPS

In the formulation of policies and objectives by government and community groups, the importance of the retention, maintenance, regeneration and replanting of native vegetation in the wheatbelt needs to be recognised. These policies and objectives influence the direction of extension work, research, planning and the allocation of sometimes limited finances. For the efficient use of resources in the promotion of the retention and re-establishment of native vegetation in this region the following role for various organisations has been put forward.

5.5.1 Role of State Government

5.5.1.1 Department of Agriculture

The Division of Resource Management within the Department of Agriculture is directly responsible for the administration of the Soil and Land Conservation Act 1945-1982 and the assessment and solution of land degradation problems. Part of the solution to these problems involves the retention, maintenance, regeneration and replanting of native vegetation on
farmland in the wheatbelt. The Department also has a role to play in promoting native vegetation for shade and shelter of stock and for commercial ventures.

The Department would appear to be the best agency for regulating clearing in the wheatbelt. Thirty per cent of respondents in the farmer survey had obtained advice on clearing from the Department and 64 per cent indicated that the State Government should have some say in management decisions involved in retaining native vegetation on farmland with some respondents referring to the Department of Agriculture. It would appear that landholders generally accept the role of the Department in the regulation of clearing. Twenty two per cent of landholders interviewed had also obtained advice on matters concerned with tree planting from the Department of Agriculture.

Possible avenues through which the Department can encourage the retention, maintenance, regeneration and replanting of native vegetation on farmland in the wheatbelt are:

1. Continuation of soil conservation regulations for the regulation of clearing.

2. Management Agreements through the Soil and Land Conservation Act with the involvement of whole farm planning or Soil Conservation Districts.

3. Extension work
   - Promotion through whole farm planning.
   - Promotion through demonstration farms.
   - Field day demonstrations of trial plantings, direct seeding and fencing for regeneration and maintenance.
   - Advice and promotion of the replanting, maintenance and regeneration of native vegetation through department advisers and literature.
   - Promotion of the benefits of remnant vegetation on farmland.
   - Publicising research results.
   - Publication of information on the flora of the region by the WA Herbarium.


5. Research
   - Continued research on the role of remnant vegetation in the control of land degradation.
   - Development of cost effective methods of fencing and revegetation.
   - Continued research on shelter belts on farms.

6. Soil conservation districts
   - Fencing subsidies for the maintenance and regeneration of native vegetation as well as replanting.
   - The financing of tree planters, post hold diggers and direct seeding machinery.
   - Subsidies for the cost of seeds and plants.
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.

5.5.1.2 Department of Conservation and Land Management

The Department of Conservation and Land Management is responsible for the conservation and protection of flora and fauna throughout the State and in particular the administration of the Wildlife Conservation Act 1950. This Department should therefore be the leading agency in the promotion of the conservation of flora and fauna on private land in the wheatbelt. In the farmer survey the Department was also the main government organisation giving advice to landholders on matters related to tree planting (30 per cent response rate) and should therefore take a leading role in this area. The Department is in a good position to promote the planting of ‘local’ or indigenous native species for the conservation of flora and fauna in the wheatbelt as well as for aesthetics, farm production and soil conservation reasons.

Possible avenues through which the Department can encourage the retention, maintenance, regeneration and replanting of native vegetation on privately owned land in the wheatbelt are:

1. Management agreements - provision for management agreements has been made under the Wildlife Conservation Act and the Conservation and Land Management Act. Management agreements similar to the Heritage Agreements in South Australia (Section 4.4.2) would encourage the conservation of flora and fauna with the use of fencing subsidies and rate rebates as incentives.

2. Fencing subsidies for rare and endangered plants.

3. Extension work
   - Advice on and promotion of the maintenance, revegetation and regeneration of native vegetation through extension officers and literature.
   - Promotion of revegetation with indigenous species where possible.
   - Increase of staff for liaison with farmers and local shires on rare and endangered plants, nature reserve management, the promotion of the benefits of native vegetation on farmland, especially for nature conservation.
   - Representation on Soil Conservation Committees.
   - Workshops (use of expert advice and local knowledge).
   - Publicising research results.
   - Involvement of landholders in management plans for nature reserves.
   - Demonstrations of direct seeding, maintenance and regeneration procedures.

4. Inventory of resources including mapping and field survey of remnant vegetation.
5. Research
   - Continued research on direct seeding and regeneration of native vegetation.
   - Vegetation decline.
   - Development of procedures for the maintenance, regeneration and replanting of remnant vegetation including ecological studies and population genetics.
   - Species evaluation for various purposes.

6. Seed and plant supply scheme to share costs with farmer.

**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.

5.5.1.3 Other departments

The Main Roads Department has a role to play in the retention and re-establishment of native vegetation in the wheatbelt on privately owned land by continuing to promote the conservation and regeneration of native vegetation on road verges and by purchasing private land. The Department can also encourage local landholders to voluntarily set back fences to expand the roadside verges through subsidies for fencing and seeds and plants. One benefit to the farmer would be the increase in the width of wind breaks.

The Department of Regional Development and the North West has a role to play in the promotion of the retention, maintenance, regeneration and replanting of native vegetation in the wheatbelt through the Regional Development Advisory Committees.

The State Planning Commission is in a position to encourage the retention, maintenance, regeneration and replanting of native vegetation in the wheatbelt through the development of regional planning policies and by assisting in the development of local planning schemes in which provision for incentive schemes can be made.

The Department of Employment and Training can also promote the retention and re-establishment of native vegetation by including revegetation and propagation of native plants in training projects, e.g. Westrek.

5.5.1.4 Heritage legislation

Heritage legislation is at present being drafted for introduction into Western Australia. This legislation could provide for management agreements with landholders for the conservation of areas of native vegetation similar to the Heritage Agreements in South Australia which obtained a 70 per cent acceptance rate from landholders interviewed. Provisions under the new legislation includes voluntary management agreements and a heritage fund which could allow for fencing subsidies and reductions in rates by shires.
5.5.2 Role of Federal Government

The main avenues through which the Federal Government can effectively assist in the retention and re-establishment of native vegetation in the wheatbelt of Western Australia is through tax concessions and employment schemes. With the decision to discontinue the Commonwealth Employment Program taxation concessions become even more important.

In general farmers seem to be against direct involvement of the Federal Government in management decisions regarding the retention of native vegetation on farmland. Intervention through incentives such as tax concessions would therefore be more acceptable and effective.

Results from the farmer survey indicate that a 100 per cent deduction or rebate on the costs of replanting trees and shrubs and maintaining native vegetation would be needed to encourage the majority of farmers to increase their activities (Edwards and Thomson (1985) propose rebates as more equitable). These concessions need to be for the conservation of flora and fauna as well as for soil conservation. Tax concessions for the proportion of native vegetation retained and gifts of land for conservation purposes were not as popular with landholders interviewed. Tax concessions for gifts of land may still be of value as only a small number of donations would make the introduction of the concession worthwhile especially if the areas were of special value.

The report joins with the Land Resource Policy Council Report (Dept. of Premier and Cabinet) and the House of Representatives Standing Committee on Environment and Conservation in recommending:

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.

The Federal Government is also in a position to provide finance for education programs, research and incentive schemes including fencing subsidies and the supply of plants and seeds through the National Tree Program, the National Soil Conservation Program and CSIRO.

5.5.3 Role of Local Government

Farmer preference was for only ‘some’ involvement of the shire in the costs involved in the retention of native vegetation in the wheatbelt. Acceptable involvement would therefore be to share the costs possibly with the State Government of schemes to encourage the retention and re-establishment of native vegetation in the area. Local government is also in a good position to promote the retention, maintenance, regeneration and replanting of native vegetation through participation on Soil Conservation Committees and in the development of local planning schemes.

As relief from local government rates was not a popular alternative in the farmer survey for encouraging the retention of native vegetation, this incentive should be used in conjunction with more effective incentives such as fencing subsidies or the provision of subsidised plants and seeds in incentive schemes. The relief of local government rates in the form of a rebate is to be preferred, i.e. the authority involved in the incentive scheme would reimburse the
landholder for rates paid on the area concerned. This would ensure that the shire does not go without needed funds.

**Recommendation 10**

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

**5.5.4 Role of community groups**

Greening Australia is already directly involved in the retention, maintenance, regeneration and replanting of native vegetation in the wheatbelt and plays an important coordinating role because of the diverse interests of the groups involved in the organisation. Greening Australia should therefore continue to promote the retention and re-establishment of native vegetation in the wheatbelt through:

1. **Extension work**
   - Lobbying government organisations and country based groups.
   - Promotion through literature and displays.
   - The appointment of Tree persons.
   - Field days.
   - Awards.

2. **Grants for**
   - Research.
   - Demonstrations.
   - Costs involved in the maintenance, regeneration and replanting of native vegetation including fencing.

3. **Coordination of government, community groups and individuals involved in Greening Australia programs.**

There are a number of other community groups which are also in a position to promote the retention and re-establishment of native vegetation in the wheatbelt.

The role of women in the conservation of native vegetation can be promoted through the Country Women’s Association.

Thirty seven per cent of landholders interviewed in the farmer survey who had replanted trees and shrubs on their properties had obtained advice from nurseries and contract planters. The Australian Nurserymens Association would therefore appear to be in a strong position to encourage the conservation of native vegetation by encouraging the planting of indigenous trees and shrubs.

Replanting of native vegetation in the wheatbelt can also be encouraged with the provision of labour by the Australian Trust for Conservation Volunteers. With the decision to discontinue the CEP projects more reliance will now be placed on volunteer and community groups for assistance with replanting. Nearly three-quarters of landholders interviewed were interested in youth worker schemes, mainly for tree planting.
Other organisations that are in a position to promote the retention and re-establishment of native vegetation in the wheatbelt include the WA Farmers Federation, Men of the Trees, the Land Management Society, Wildflower Societies, Regional Advisory Committees, the Council of WA, Rotary and Apex.

**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 programs involving education, extension, research, direct grants and volunteer workers.

**5.6 THE NEED FOR CO-ORDINATION**

The results of the farmer survey indicate that in general landholders in the wheatbelt see a value for remnant native vegetation on their properties with regard to sustaining and increasing production through soil conservation and shade and shelter for stock. They are less likely to value these areas for flora and fauna conservation. This demonstrates the need for promotion in this area and emphasises the importance of cooperation between those involved in flora and fauna conservation and those involved in farm management. An executive officer is needed to coordinate and promote the activities of the many government departments, community groups and individuals involved in the retention and re-establishment of native vegetation in the wheatbelt.

**Recommendation 12**

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

I would like to thank the following organisations for their valuable assistance: for financial assistance - the Conservation Council of WA, the Department of Agriculture, the Department of Conservation and Land Management, the Department of Regional Development and the North West, the Department of the Arts, Sport, the Environment, Tourism and Territories, Greening Australia, and the Land Resource Policy Council; for the administration of finances - the Conservation Council of WA, especially Barbara Churchward; for their support - the Environmental Protection Authority and the WA Farmers Federation.

Special thanks are extended to the following individuals: Greg Beeston and Greg Mlodawski (Department of Agriculture), for the map work and computer analysis of the questionnaire; to Kevin Goss (CALM) Michael McGrath and David Bennett, for their support and valuable suggestions; Geoff Syme (CSIRO) for invaluable advice with the survey design, methodology and interpretation of data; Richard Strickland and Malcolm Winthrope (Australian Bureau of Statistics), for their assistance with the questionnaire and sample design; Viv Read, for the use of information compiled from the proceedings of the LRPC workshop and for his critique of drafts; and also to Graham Arnold (CSIRO), for making available the results of research on remnants of native vegetation near Kellerberrin.

Thanks are also extended to John Blyth (Dept. of CALM), Joanna Griffith (Dept. of Regional Development), Ted Giffin (Conservation Council of WA), Bifi Meier (WA Farmers Federation), Terry Murphy (President, Dumbleyung Shire), Basil Schur (Campaign to Save Native Forests), Frank Schaper (Greening Australia), Graham Spencer (Dept. of Agriculture) and Gary Whisson (Environmental Protection Authority), for their support and input into drafts and recommendations.

I would also like to thank all of the landholders who participated in the survey and Carlene Pearson for her word processing.
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Dear Landholder

I am a consultant working on a project studying remnant vegetation in wheatbelt areas. The most important part of this project involves finding out how you, the landowner, view native vegetation on farmland and also how you feel about various incentives which are designed to help you maintain areas of natural bushland on your property. The sorts of incentives under consideration are rates and tax relief, fencing subsidies and volunteer worker schemes.

I appreciate that farmers are busy people and that your spare time is probably limited. However, as you are part of a small randomly selected sample your opinions are of great importance. Individual answers will be held in strict confidence and only group totals will be used in the study.

There is wide interest in the results of this survey. The Primary Industry Association gives the survey full support and the sponsoring organisations of the project are as follows: Land Resource Policy Council, Department of Agriculture, Department of Conservation and Land Management, Conservation Council of WA, Greening Australia, Department of Regional Development and the North West.

I trust that you will participate in this important study and I will ring you in the next few weeks to make an appointment that is mutually convenient to both of you.

Yours sincerely

Anne Coates
NATIVE VEGETATION ON FARMS SURVEY

This survey involves finding out how you, the landholder, view native vegetation on farmland and also how you feel about various incentives which are designed to help you maintain areas of natural bushland on your property.

The term ‘native vegetation’ is used to mean natural bushland. It does not include introduced species such as Pines or Blue Gums, etc.

SECTION A

I would just like to start off by gathering some information about your property.

1. What is the total area of your property in the .................................................. shire? ..................................................  □□□□□
   (i) How many hectares do you own? ..................................................  □□□□□□□□□
   (ii) How many hectares do you lease ..................................................  □□□□□□□□□
   If land leased ask Q. 2.

2. Do you make the decisions about clearing and fencing the native vegetation on the land which you lease?
   Yes .................................................. □
   No .................................................. □
   If No, ask the person being interviewed not to include this area when answering the following questions.

3. How long ago was the first bush cleared on this property?
   0-10 .................................................. □
   11-20 years .................................................. □
   21-40 years .................................................. □
   41-80 years .................................................. □
   80 years or over .................................................. □
   unsure .................................................. □

4. How many hectares of your property still has native vegetation? (This includes water courses and trees along fence lines.) .................................................. □□□□□□□□□

5. How many hectares of this native vegetation is growing on land which you consider could be suitable for cropping? .................................................. □□□□□□□□□

6. How many hectares of the native vegetation on your property is fenced off from stock? .................................................. □□□□□□□□□

7. How many hectares of native vegetation has been cleared on your property over the last ten years? .................................................. □□□□□□□□□
   If none go to Q. 2.

8. How is this cleared land now being used?
   Pasture .................................................. □
   Crop .................................................. □
   Dam site .................................................. □
   Fire break .................................................. □
   Other (specify) .................................................. □
   .................................................. □□□□□□□□□

9. Do you clear a set amount of land every year as part of your farm development project?
   Yes .................................................. □
   No .................................................. □
   If none go to Q. 2.

10. Is this in keeping with the conditions of a lease?
    Yes .................................................. □
    No .................................................. □

11. Would you have cleared more land if you had had more money available?
    Yes .................................................. □
    No .................................................. □
12. Did you clear only when economic pressures made it necessary?
   Yes ............................................................ ☐
   No ............................................................. ☐

13. Have you had advice which has influenced your land clearing decisions from any of the following sources?
   Department of Agriculture ................................. ☐
   Farm consultant ............................................. ☐
   Other farmers ................................................ ☐
   Other (specify) ............................................. ☐

14. Have you ever replanted trees and shrubs on this property on areas which have been previously cleared? This does not include trees planted around the house.
   Yes ............................................................ ☐
   No ............................................................. ☐

If No, go to Q. 17.

15. What species have you planted?
   Exotics ......................................................... ☐
   Local native plants ........................................ ☐
   Native to WA (not local) .................................. ☐
   Eastern States ............................................. ☐

16. Where did you get advice on matters concerned with replanting trees and shrubs?
   Department of Agriculture ................................. ☐
   CALM (recent) ............................................. ☐
   CALM (Forestry Dept.) .................................... ☐
   CALM (Fisheries & Wildlife) ............................ ☐
   Other farmers ............................................. ☐
   Greening Australia ....................................... ☐
   Other (specify) ............................................. ☐

17. Are the areas of native vegetation on your farm used as:
   A source of fence posts .................................. ☐
   A source of firewood .................................... ☐
   A source of seeds/cut flowers for commercial purposes ..................................... ☐
   Emergency grazing of stock in drought .................. ☐
   Regular grazing of stock .................................. ☐
   A source of honey ......................................... ☐
   A source of gravel .................................... ☐
   A rubbish dump ......................................... ☐
   Other .......................................................... ☐

18. How many hectares of your property is affected by the following:
   1. Salt .......................................................... ☐
   2. Wind erosion .............................................. ☐
   3. Water erosion ............................................ ☐
   4. Any other factor affecting the soil stability .......... ☐

SECTION B

This section asks for your opinion on native vegetation and your reasons for clearing or retaining bushland on your property.

19. I will read some statements about native vegetation. Would you please tell me to what extent you agree or disagree with these statements by using the following alternatives (card).
   1. Native vegetation harbours undesirable plants and diseases .................................. ☐
   2. Native vegetation is pleasing to look at .......................................................... ☐
   3. Native vegetation is a fire hazard ................................................................. ☐
   4. Native vegetation is important for the control of salinity and erosion .................... ☐
5. Native vegetation is costly to maintain .........................................................
6. Native vegetation is important for the conservation of native flora and fauna .................................................................
7. Native vegetation shelters vermin and feral animals .................................................................
8. Native vegetation stands add to the value of my property .................................................................
9. Native vegetation reduces the productive capacity of my property .................................................................
10. Native vegetation is important for the shade and shelter of stock .................................................................
11. Maintenance of native vegetation takes too much of my time .................................................................
12. Native vegetation is important for farm stability and production .................................................................

20. How do you regard native vegetation on farmland in your shire. Please choose from one of the following (card).

1. Benefits greatly outweigh disadvantages .................................................................
2. Benefits outweigh disadvantages .................................................................
3. Benefits about equal disadvantages .................................................................
4. Disadvantages outweigh benefits .................................................................
5. Disadvantages greatly outweigh benefits .................................................................

22. If all of your property was arable, i.e. suitable for cropping and you were starting to clear from the beginning wheat proportion do you think should be left in a natural state? .................................................................

23. Which of the following are your main reasons for leaving native vegetation on your property?
You may choose more than one (card).

1. No land left that would be suitable for cropping/pasture .................................................................
2. Cost of clearing does not make further clearing worthwhile .................................................................
3. Preservation of flora and fauna .................................................................
4. Erosion control .................................................................
5. Soil salinity control .................................................................
6. Preservation of natural bushland for future generations .................................................................
7. Scenic reasons .................................................................
8. Shade and shelter for stocks .................................................................
9. Other (specify) .................................................................

24. Which of these is most important? .................................................................

If landholder has cleared in the last ten years ask Q. 25.

25. Which of the following were your main reasons for clearing native vegetation on your property?
You may choose more than one.

1. To increase area of productive land .................................................................
2. To remove undesirable plants and diseases .................................................................
3. To control vermin .................................................................
4. To clear unsightly scrub .................................................................
5. Fear of stricter government controls in the future .................................................................
6. To remove a fire hazard .................................................................
7. Other (specify) .................................................................
Management of native vegetation on farmland in the wheatbelt of Western Australia

26. Which of these is most important? ................................... 

27. Do you have plans to clear in the next 5-10 years?
   Yes ....................................................... ........................................ 
   No ............................................................ ........................................ 
   Maybe ........................................................ 

If No, go to Q. 30. If Yes/Maybe How many hectares ..............................................

28. Which of the following are your main reasons for clearing native vegetation on your property in the future?
   1. To increase area of productive land ............ ........................................ 
   2. To remove undesirable plants and diseases ........................................... 
   3. To control vermin .......................................................... 
   4. To clear unsightly scrub ..................................................... 
   5. Fear of government controls in the future ................................................ 
   6. To remove a fire hazard ....................................................... 
   7. Other (specify) ................................................................. 

29. Which of these is most important? ................................... 

30. Are you interested in replanting areas of your farm with native trees and shrubs? By native trees and shrubs I mean those growing naturally in this area.
   Yes ............................................................... ........................................ 
   No ........................................................................... 
   Unsure ......................................................................... 

For what purpose ............................................................ 
Which other species are you interested in planting ...........................................

The next two questions relate to rare and endangered plants, i.e. those plant sin danger of becoming extinct and protected by law.

31. If you were aware that there were rare and endangered plants on your property would you inform the Dept. of CALM (Fisheries & Wildlife). Only a few hectares are involved.
   Yes ........................................................................... 
   No ...........................................................................
   Unsure ....................................................................... 

32. If there were rare and endangered plants on your property (only a few hectares are involved) would you and your family (card). You may select more than one alternative.
   1. Ignore the area as you are just not interested in rare and endangered plants ..................................... 
   2. Manage the area concerned for the conservation of these plants, e.g. fire and weed control 
   3. Apply to clear the area concerned .................. 
   4. Be prepared to keep an eye on the population and report the number and condition of the plants to CALM ........................................... 
   5. Be prepared to fence the area concerned at your own expense ........................................ 
   6. Other (specify) ............................................................. 

26. Which of these is most important? ................................... 

27. Do you have plans to clear in the next 5-10 years?
   Yes ............................................................... ........................................ 
   No ........................................................................... 
   Maybe ....................................................................... 

If No, go to Q. 30. If Yes/Maybe How many hectares ..............................................

28. Which of the following are your main reasons for clearing native vegetation on your property in the future?
   1. To increase area of productive land ............ 
   2. To remove undesirable plants and diseases ........................................... 
   3. To control vermin .......................................................... 
   4. To clear unsightly scrub ..................................................... 
   5. Fear of government controls in the future ................................................ 
   6. To remove a fire hazard ....................................................... 
   7. Other (specify) ................................................................. 

29. Which of these is most important? ................................... 

30. Are you interested in replanting areas of your farm with native trees and shrubs? By native trees and shrubs I mean those growing naturally in this area.
   Yes ............................................................... ........................................ 
   No ........................................................................... 
   Unsure ......................................................................... 

For what purpose ............................................................ 
Which other species are you interested in planting ...........................................
SECTION C

In this section I would like to find out your attitude to a number of potential vegetation retention incentives.

33. What do you think would be the most effective ways for the government to help you to retain areas of native vegetation on your property.

.........................................................
........................................................
........................................................

34. If the government was prepared to offset through taxation 10% of the cost of replanting trees and shrubs and maintaining native vegetation on your property would this be sufficient to affect your management decisions?

Yes .............................................. ☐
No .................................................. ☐
Unsure ........................................... ☐

35. If No/Unsure, what proportion would be necessary? .............................................. ☐☐

Why ........................................................
...........................................................................

36. Would you be interested in young people from a voluntary youth work scheme working on your property at no cost to you and helping to replant trees and shrubs and maintain native vegetation, e.g. fencing under your direction.

Yes .................................................. ☐
No .................................................... ☐
Unsure ............................................... ☐
If No, why ...........................................
...........................................................................

37. To what extent would the following incentives influence you to retain and/or replant areas of native vegetation on your property? Please choose one of the following alternatives:

1. A lot ............................................. ☐
2. Some .......................................... ☐
3. Not at all ....................................... ☐

Areas to be included:

1. Areas of native vegetation retained.
2. Areas fenced for regeneration.
3. Areas replanted with native trees and shrubs.

1. Rate rebate on land retained under native vegetation. Reimbursement from the State government ..........................................
2. Low interest loans for costs involved in revegetation and maintenance of native vegetation, e.g. fencing, fire control, etc ..........................................
3. State government sharing fencing costs for native vegetation 50/50 with farmer materials only ..........................................
4. Management advice and assistance with maintenance of native vegetation (not financial, e.g. loan of machinery) ..........................................
5. Demonstration farms showing conservation farming techniques, e.g. where best to leave native vegetation to control salinity, wind and water erosion, etc ..........................................
6. Granting of the full value of any land set aside forever as a nature reserve as a deduction from taxable income in the year of the gift ..........................................
7. Grants covering the cost of fencing of native vegetation materials only .............................................
Management of native vegetation on farmland in the wheatbelt of Western Australia

8. Proportion of reduction in tax burden being directly related to the proportion of the farm remaining under native vegetation, e.g. ($10,000 x 10% x .1 = $100) ________________ ☐

9. Exemption from rates on land retained under native vegetation. In this case the money is not paid to the shire ________________ ☐

38. In some countries and in other States of Australia a farmer can voluntarily enter into an agreement with the government to retain and manage an area of native vegetation on his land for an agreed period of time in return for certain concessions.

In one such agreement the farmer receives a rate rebate for the area of native bushland involved in the agreement plus a grant covering the cost of fencing. Also management advice and assistance is available. However back rates and the grant money must be repaid if the landowner does not stick to the agreement.

Would you like to see a similar scheme operating in WA. Please choose from the following (card).

Definitely yes ___________________________ ☐
Probably yes ___________________________ ☐
Perhaps _________________________________ ☐
Probably no ______________________________ ☐
Definitely no ____________________________ ☐
Why _________________________________ ☐


39. Would you participate in such a scheme?

Definitely yes ___________________________ ☐
Probably yes ___________________________ ☐
Perhaps _________________________________ ☐
Probably no ______________________________ ☐
Definitely no ____________________________ ☐

If No, go to Q. 41.

40. Do you have a specific area in mind?

Do you have a specific area in mind?

Yes _________________________________ ☐
No _________________________________ ☐

If Yes go to Q. 40.

Size of area in hectares ____________________________ ☐☐☐☐

Species of plants present ________________________________

Vegetation type ________________________________

41. To what degree do you think the following groups should become involved in the costs involved with retaining native vegetation on farmland.

Please choose from the following:

1. A lot _________________________________ ☐
2. Some ________________________________ ☐
3. Not at all ____________________________ ☐

Farmers _________________________________ ☐
Local shires _________________________________ ☐
State government ________________________________ ☐
Federal government ________________________________ ☐
Community or voluntary groups ________________________________ ☐
Other (specify) ________________________________ ☐

42. To what degree do you think the following groups should become involved in the management decisions involved in retaining native vegetation on farmland.

Please choose from the following:

1. A lot _________________________________ ☐
2. Some ________________________________ ☐
3. Not at all ____________________________ ☐

Farmers _________________________________ ☐
Local shires _________________________________ ☐
State government ________________________________ ☐
Federal government ________________________________ ☐
Community or voluntary groups ________________________________ ☐
Other (specify) ________________________________ ☐
The answers to these questions will give me a clearer picture of the farmers assisting with the survey. The information is needed to make sure we have a representative sample of the community. It will, of course, be strictly confidential.

43. What is your age?
   - Under 21 ........................................... □
   - 21-30 ........................................... □
   - 31-40 ........................................... □
   - 41-50 ........................................... □
   - 51-60 ........................................... □
   - More than 60 years ............................ □

44. What is the highest level of education you have attained?
   - Primary school .................................. □
   - Secondary school - year 10 ................... □
   - Secondary school - year 12 ................... □
   - Technical college ................................. □
   - Agricultural college ............................ □
   - University ........................................ □
   - Courses relating to farming ................... □

45. Do you work in another occupation apart from farming?
   - Yes ............................................... □
   - No ............................................... □

If No, go to Q. 47.

46. What is your other occupation?
   - Professional ..................................... □
   - Managerial ...................................... □
   - Skilled worker .................................. □
   - Unskilled worker ................................. □
   - Other (specify) .................................. □

47. How long have you owned/operated the oldest part of your present property?
   - Under 2 years .................................. □
   - 2-5 years ......................................... □
   - 6-10 years ....................................... □
   - 11-20 years ...................................... □
   - 21-30 years ...................................... □
   - 31-40 years ...................................... □
   - More than 40 years ............................ □

48. How long have you been farming?
   This would only include those years in which you have been making the major management decisions on the farm.
   - Under 2 years .................................. □
   - 2-5 years ......................................... □
   - 6-10 years ....................................... □
   - 11-20 years ...................................... □
   - 21-30 years ...................................... □
   - 31-40 years ...................................... □
   - More than 40 years ............................ □

49. How do you see your farming income in relation to other farmers incomes?
   - Higher than most ................................ □
   - About average .................................. □
   - Lower than most ................................. □

50. What percentage of your income do you get from your property? ............................. □

51. What do you like most about farming? ..........................
APPENDIX 2. DEMOGRAPHIC CHARACTERISTICS OF LANDHOLDERS SURVEYED

Table 1. Age of respondents

<table>
<thead>
<tr>
<th>Age</th>
<th>No.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under 21</td>
<td>-</td>
<td>-</td>
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<tr>
<td>21-30</td>
<td>16</td>
<td>11</td>
</tr>
<tr>
<td>31-40</td>
<td>49</td>
<td>33</td>
</tr>
<tr>
<td>41-50</td>
<td>41</td>
<td>28</td>
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<tr>
<td>51-60</td>
<td>30</td>
<td>20</td>
</tr>
<tr>
<td>60+</td>
<td>12</td>
<td>8</td>
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n = 148

Table 2. Education level completed by respondents

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<thead>
<tr>
<th>Education</th>
<th>No.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary school</td>
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<td>13</td>
</tr>
<tr>
<td>Secondary school - year 10</td>
<td>80</td>
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<tr>
<td>Secondary school - year 12</td>
<td>17</td>
<td>12</td>
</tr>
<tr>
<td>Technical college</td>
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<td>5</td>
</tr>
<tr>
<td>Agricultural college</td>
<td>21</td>
<td>14</td>
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<tr>
<td>University</td>
<td>3</td>
<td>2</td>
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<tr>
<td>Courses relating to farming</td>
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<td>-</td>
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n = 148

Table 3. Occupation of respondents

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<thead>
<tr>
<th>Occupation</th>
<th>No.</th>
<th>%</th>
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<tbody>
<tr>
<td>Full-time farmers</td>
<td>131</td>
<td>88</td>
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<tr>
<td>Number of respondents with other occupations</td>
<td>17</td>
<td>12</td>
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n = 148

<table>
<thead>
<tr>
<th>Occupation</th>
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<th>%</th>
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<tbody>
<tr>
<td>Professional</td>
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<td>0</td>
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<tr>
<td>Managerial</td>
<td>1</td>
<td>6</td>
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<tr>
<td>Skilled worker</td>
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<td>70</td>
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<tr>
<td>Unskilled worker</td>
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<td>24</td>
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<tr>
<td>Other</td>
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n = 17
Table 4.  Length of property ownership by respondents

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<thead>
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<th></th>
<th>No.</th>
<th>%</th>
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<tbody>
<tr>
<td>under 2 yrs</td>
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<td>1</td>
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<tr>
<td>2-5</td>
<td>9</td>
<td>6</td>
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<td>6-10</td>
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<td>14</td>
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<td>11-20</td>
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<td>27</td>
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<tr>
<td>31-40</td>
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</tr>
<tr>
<td>more than 40 years</td>
<td>4</td>
<td>3</td>
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<td></td>
<td>148</td>
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Table 5.  Length of time spent farming by respondents

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<thead>
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<th>No.</th>
<th>%</th>
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</thead>
<tbody>
<tr>
<td>under 2 yrs</td>
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<td>3</td>
</tr>
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<td>2-5</td>
<td>3</td>
<td>2</td>
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<td>11-20</td>
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<td>31-40</td>
<td>23</td>
<td>15</td>
</tr>
<tr>
<td>more than 40 years</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>148</td>
<td></td>
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Table 6.  Income of respondents

<table>
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<th></th>
<th>No.</th>
<th>%</th>
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<tbody>
<tr>
<td>Higher than most</td>
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<td>23</td>
</tr>
<tr>
<td>Average</td>
<td>100</td>
<td>68</td>
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<tr>
<td>Lower than most</td>
<td>14</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>148</td>
<td></td>
</tr>
</tbody>
</table>

Proportion of income from farm

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<th>No.</th>
<th>%</th>
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<tr>
<td>50%</td>
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<td>6</td>
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<tr>
<td>50-75%</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>75-99%</td>
<td>18</td>
<td>12</td>
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<tr>
<td>100%</td>
<td>116</td>
<td>78</td>
</tr>
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DIVISION OF RESOURCE MANAGEMENT TECHNICAL REPORTS, ISSN 0729-3135

1.* LAND DEGRADATION IN THE FITZROY VALLEY
   RANGELAND MANAGEMENT BRANCH

2.* REPORT ON THE CONDITION OF THE GASCOYNE CATCHMENT
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3.* WIND EROSION IN THE JERRAMUNGUP REGION 1980-81
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4.* AGRICULTURAL DEVELOPMENT IN THE NORTH KIMBERLEY
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5.* VISIT OF WORKING PARTY ON NORTH KIMBERLEY AGRICULTURE DEVELOPMENT 1977
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9. PRELIMINARY GROUNDWATER INVESTIGATIONS IN RELATION TO SOIL SALINITY AT FITZGERALD
   C. HENSCHKE

11. PROGRESS REPORT ON EFFECTS OF CONTOUR BANKING ON SURFACE RUNOFF BERKSHIRE VALLEY EXP. VALLEY
    K. BLIGH

12.* SHIRE OF MANJIMUP BRIEF ASSESSMENT OF PHYSICAL LAND RESOURCES WITH RESPECT TO HORTICULTURAL LAND USE
    M. WELLS

13. LAND RESOURCE SURVEY REPORT ON THE BRIGADOON DEVELOPMENT
    M. WELLS

14. BRIEF STUDY OF LAND CAPABILITY IN COASTAL REGION SHIRE OF HARVEY
    M. WELLS, P. HESP

17.* AN ASSESSMENT OF INTERCEPTOR BANKS AT DANGIN
    C. HENSCHKE

18.* SOIL FACTORS AFFECTING FLOOD RUNOFF ON AGRICULTURAL CATCHMENTS IN WESTERN AUSTRALIA
    D.J. McFARLANE

19.* HYDROLOGICAL STUDIES IN SOIL SALINITY
    C. HENSCHKE

21.* SOILS AND GEOLOGY OF THE BERKSHIRE VALLEY EXP. CATCHMENT
    M. WELLS and D. McFARLANE

22.* SUMMARY OF BROOME AND DERBY PINDANA STUDIES
    P. DOLLING

24. VLAMING HEAD - TANTABIDDI WELL - COASTAL RESOURCE SURVEY
    P. HESP, J.G. MORRISSEY

25. RURAL (NON IRRIGATION) WATER SUPPLIES IN WA. A PERSPECTIVE TO THE YEAR 2000
    I. LAING

26. WATER EROSION ON POTATO LAND DURING THE 1983 GROWING SEASON DONNYBROOK
    D. McFARLANE
<table>
<thead>
<tr>
<th>Title</th>
<th>Author</th>
</tr>
</thead>
<tbody>
<tr>
<td>29.* Study Tour Report Soil Conservation Research in New South Wales and Its Significance to Research on Water Erosion in Western Australia</td>
<td>D. McFarlane</td>
</tr>
<tr>
<td>30. Agricultural Water Quality Criteria</td>
<td>R. George</td>
</tr>
<tr>
<td>32.* Water Use by Some Crops in the Southern Agricultural Areas of WA</td>
<td>R.A. Nulsen</td>
</tr>
<tr>
<td>33. A Study of Alternative Sites for Equestrian/Hobby Farm Development in the Karratha Area</td>
<td>B. Kok</td>
</tr>
<tr>
<td>34. Soil Survey Kings Park Board - Wungong Annex</td>
<td>M. Wells</td>
</tr>
<tr>
<td>38. Land Resource Survey, Fall Point, Broome WA</td>
<td>P. Curry, P. Hesp</td>
</tr>
<tr>
<td>40. Study Tour, Research on Soil Structure and Its Relationship with Cultivation Practices in SE Queensland</td>
<td>C.W.L. Henderson</td>
</tr>
<tr>
<td>41. Impact of Petroleum Exploration Activity on Range Resources and Pastoral Pursuits in the West Kimberley</td>
<td>N. Klepacki, S. Black</td>
</tr>
<tr>
<td>42. Through Flow Troughs for the Measurement of Shallow Seepage on Hillslopes</td>
<td>C.J. Henschke, J.A. Bessell-Browne</td>
</tr>
<tr>
<td>43.* Estimation of Runoff for Ungauged Catchments in the Agricultural Areas of Western Australia</td>
<td>D. McFarlane, J.R. Davies</td>
</tr>
<tr>
<td>44. Shire of Rockingham, A Study of Land Resources and Planning Considerations</td>
<td>M. Wells, R. Oma, N. Richards</td>
</tr>
<tr>
<td>45. The Role of Minimum Tillage Considerations Soils</td>
<td>B. Crabtree</td>
</tr>
<tr>
<td>47.* Shire of Wanneroo, A Study of Land Resources and Planning Considerations</td>
<td>M.R. Wells, N.L.B. Richards, A.J. Clarke</td>
</tr>
<tr>
<td>49.* Report on Land Degradation Investigations: Kent River Soil Conservation District</td>
<td>R. Colman, D. Miers</td>
</tr>
<tr>
<td>51.* Water Spreading and Waterponding in New South Wales and Their Relevance to Western Australia</td>
<td>J. Quilty</td>
</tr>
<tr>
<td>52.* Evaluation of Risk Factors Leading to Soil Destabilisation on the South Coast Sandplain of Western Australia</td>
<td>R.V.R. Gwynn, P.A. Findlater, J.R. Edwards</td>
</tr>
<tr>
<td>53.* The Soils of Falls Farm Catchment Cuballing, Western Australia</td>
<td>R.A. Sudmeyer</td>
</tr>
<tr>
<td>Title</td>
<td>Author</td>
</tr>
<tr>
<td>----------------------------------------------------------------------</td>
<td>---------------------------------------------</td>
</tr>
<tr>
<td>54. ‘DRAINS’ A METHOD OF FINANCIALLY ASSESSING DRAINS USED TO MITIGATE WATERLOGGING IN SOUTH-WESTERN AUSTRALIA</td>
<td>JOHN S. SALERIAN DON McFARLANE</td>
</tr>
<tr>
<td>55. ‘BANKS’ A METHOD OF FINANCIALLY ASSESSING BANKS USED TO MITIGATE WATER EROSION IN SOUTH-WESTERN AUSTRALIA</td>
<td>JOHN S. SALERIAN DON McFARLANE</td>
</tr>
<tr>
<td>56. THE ECONOMICS OF SALTLAND AGRONOMY</td>
<td>JOHN S. SALERIAN CLIVE MALCOLM EDDIE POL</td>
</tr>
<tr>
<td>57. WATER EROSION SURVEY IN THE NORTHAM DISTRICT AFTER STORMS IN JUNE 1987</td>
<td>D.J. McFARLANE A.T. RYDER</td>
</tr>
<tr>
<td>58. INVESTIGATION OF A SALINE VALLEY ON ALLANDALE RESEARCH FARM</td>
<td>D.J. McFARLANE R. ENGEL A.T. RYDER</td>
</tr>
<tr>
<td>59. WATER EROSION IN THE GERALDTON AREA DURING THE JUNE-JULY 1986</td>
<td>K.J. BLIGH</td>
</tr>
<tr>
<td>60. CONSUMPTION OF WATER BY LIVESTOCK</td>
<td>G. LUKE</td>
</tr>
<tr>
<td>61. SURVEY OF RESEARCH PRIORITIES IN WATER EROSION WATER-LOGGING AND FLOODING IN SOUTH-WESTERN AUSTRALIA</td>
<td>D.J. McFARLANE E.G. BARRETT-LENNARD</td>
</tr>
<tr>
<td>62. REVIEW OF WISALTS BANK INSTALLATIONS</td>
<td>C.J. HENSCHKE</td>
</tr>
<tr>
<td>63. ASSESSMENT OF LAND CAPABILITY FOR ON-SITE SEPTIC TANK EFFLUENT DISPOSAL</td>
<td>M. WELLS</td>
</tr>
<tr>
<td>64. STORAGE LIFE OF FARM DAMS</td>
<td>G.J. LUKE C.G. DENBY</td>
</tr>
<tr>
<td>65. EVAPORATION DATA FOR WESTERN AUSTRALIA</td>
<td>G.J. LUKE K.L. BURKE T.M. O’BRIEN</td>
</tr>
<tr>
<td>66. A REVIEW OF MACHINERY FOR CROPPING WITH REDUCED WATER EROSION</td>
<td>K.J. BLIGH</td>
</tr>
<tr>
<td>68. AN ASSESSMENT OF LAND CAPABILITY FOR RESIDENTIAL LAND USES, BABBAGE ISLAND CARNARVON, WESTERN AUSTRALIA</td>
<td>M.R. WELLS V.P.M. OMA</td>
</tr>
<tr>
<td>69. THE LAND RESOURCES AND CARRYING CAPACITY OF THE GASCOYNE LOCATIONS 228 AND 299, NORTH OF CARNARVON, WESTERN AUSTRALIA</td>
<td>M.R. WELLS V.P.M. OMA A.McR. HOLM</td>
</tr>
<tr>
<td>70. CODE LISTS FOR COMPUTERISED SOIL AND LAND RESOURCE DATA RECORDING</td>
<td>P.D. KING M. WELLS</td>
</tr>
<tr>
<td>71. THE USE OF PERMEABILITY, CONDUCTIVITY AND RESISTANCE IN THE DESCRIPTION OF WATER MOVEMENT IN SOILS AND PLANTS</td>
<td>H. BORG</td>
</tr>
<tr>
<td>72. THE CONCEPT OF PRIME AGRICULTURAL LAND - A WESTERN AUSTRALIAN PERSPECTIVE</td>
<td>V.T. READ</td>
</tr>
<tr>
<td>73. A METHOD FOR ASSESSING WATER EROSION RISK IN LAND CAPABILITY STUDIES - SWAN COASTAL PLAIN, DARLING RANGE WESTERN AUSTRALIA</td>
<td>M. WELLS</td>
</tr>
<tr>
<td>74.</td>
<td>SOILS OF THE KOJANEERUP ANNEX OF THE MOUNT BARKER RESEARCH STATION</td>
</tr>
<tr>
<td>75.</td>
<td>SOIL CONSERVATION AND MANAGEMENT STRATEGIES FOR LAKE TOOLIBIN CATCHMENT</td>
</tr>
<tr>
<td>76.</td>
<td>CARLTON PLAINS SOIL SURVEY IN THE SHIRE OF WYNDHAM/EAST KIMBERLEY</td>
</tr>
<tr>
<td>77.</td>
<td>THE EFFECT OF SMALL EARTH STRUCTURES AND CHANNEL IMPROVEMENT ON AGRICULTURAL FLOODING IN SOUTH WESTERN AUSTRALIA</td>
</tr>
<tr>
<td>78.*</td>
<td>LAND CAPABILITY ASSESSMENT FOR THE SHIRE OF ALBANY</td>
</tr>
<tr>
<td>79.</td>
<td>AN ASSESSMENT OF SOIL CAPABILITY FOR ON SITE EFFLUENT DISPOSAL EAST CARNARVON, WESTERN AUSTRALIA</td>
</tr>
<tr>
<td>80.</td>
<td>EVALUATING PRIME AGRICULTURAL LAND IN THE SHIRE OF MANJIMUP</td>
</tr>
<tr>
<td>81.</td>
<td>SALINITY IN WESTERN AUSTRALIA - A SITUATION STATEMENT</td>
</tr>
<tr>
<td>82.</td>
<td>SMALL FARM LAND EXPERIMENTAL CATCHMENTS IN WESTERN AUSTRALIA</td>
</tr>
<tr>
<td>83.</td>
<td>THE RELATIONSHIP BETWEEN THE CONCENTRATION OF TOTAL SOLUBLE SALTS AND OSMOTIC POTENTIAL IN SOIL, GROUND AND SURFACE WATER FOR SEVERAL REGIONS IN WESTERN AUSTRALIA</td>
</tr>
<tr>
<td>84.</td>
<td>PROBLEM DISTRICTS FOR ON-FARM WATER CONCENTRATION IN SOUTH WESTERN AUSTRALIA</td>
</tr>
<tr>
<td>85.</td>
<td>CATCHMENT SALINITY: REPORT ON A STUDY OF THE EAST PERENJORI CATCHMENT</td>
</tr>
<tr>
<td>86.</td>
<td>ASSESSMENT OF MANAGEMENT STRATEGIES FOR REDUCING LAND DEGRADATION PROBLEMS IN THE EAST PERENJORI CATCHMENT</td>
</tr>
<tr>
<td>87.</td>
<td>PUMPS - A METHOD OF FINANCIALLY ASSESSING GROUNDWATER PUMPING USED TO MITIGATE SALINITY IN SOUTH-WESTERN AUSTRALIA</td>
</tr>
<tr>
<td>88.</td>
<td>PRELIMINARY GROUNDWATER AND SALINITY INVESTIGATIONS IN THE EASTERN WHEATBELT 1. BRENNANSD CATCHMENT</td>
</tr>
<tr>
<td>89.</td>
<td>PRELIMINARY GROUNDWATER AND SALINITY INVESTIGATIONS IN THE EASTERN WHEATBELT 2. MERREDIN CATCHMENT</td>
</tr>
<tr>
<td>90.</td>
<td>PRELIMINARY GROUNDWATER AND SALINITY INVESTIGATIONS IN THE EASTERN WHEATBELT 3. WELBUNGIN AND BEACON RIVER CATCHMENT</td>
</tr>
<tr>
<td>91.</td>
<td>USING PUMPS AND SYPHONS TO CONTROL SALINITY AT A SALINE SEEP IN THE WALLATIN CREEK CATCHMENT</td>
</tr>
<tr>
<td>92.</td>
<td>PRELIMINARY GROUNDWATER AND SALINITY INVESTIGATIONS IN THE EASTERN WHEATBELT 4. KITTO’S HILLSLOPE, TAMMIN: 1985-1990</td>
</tr>
<tr>
<td>TITLE</td>
<td>AUTHOR</td>
</tr>
<tr>
<td>----------------------------------------------------------------------</td>
<td>---------------------------------------------</td>
</tr>
<tr>
<td>REPORT ON THE APPLICATION OF AN EVAPOTRANSPIRATION EQUATION TO THE WACA DOME</td>
<td>P.R. SCOTT</td>
</tr>
<tr>
<td>SOIL MANAGEMENT FOR SUSTAINABLE AGRICULTURE</td>
<td>G.A. ROBERTSON</td>
</tr>
<tr>
<td>LESCHENAUT PENINSULA - A STUDY OF LAND RESOURCES AND PLANNING CONSIDERATIONS</td>
<td>V.P.M. OMA</td>
</tr>
<tr>
<td>MINIMAL-SOIL-DISTURBANCE SOWING IN NEW SOUTH WALES AND ITS RELEVANCE TO REDUCING WATER EROSION IN WESTERN AUSTRALIA</td>
<td>K.J. BLIGH</td>
</tr>
<tr>
<td>RESPONSE BY STYLOSANTHES HAMATA AND S. SCABRA TO PHOSPHATE ON THREE SOILS IN THE NORTH KIMBERLEY OF WESTERN AUSTRALIA</td>
<td>A.McR. HOLM, M.D. D’ANTUONO</td>
</tr>
<tr>
<td>JERDACUTTUP LAND RESOURCE AND CAPABILITY STUDY</td>
<td>G. MOORE, S.T. GEE, D. VINCENT</td>
</tr>
<tr>
<td>AGROFORESTRY - INTEGRATION OF TREES INTO THE AGRICULTURAL LANDSCAPE</td>
<td>P.R. SCOTT</td>
</tr>
<tr>
<td>KINGS PARK SOIL SURVEY</td>
<td>J. BESSELL-BROWNE</td>
</tr>
<tr>
<td>COST OF ALTERNATIVE IRRIGATION SYSTEMS FOR VEGETABLE CROPS</td>
<td>G. LUKE, T.C. CALDER</td>
</tr>
<tr>
<td>POTENTIAL FOR HORTICULTURE ON THE SWAN COASTAL PLAIN - STAGE I MOORE RIVER TO DUNSBOROUGH</td>
<td>G. MOORE</td>
</tr>
<tr>
<td>BACKGROUND PAPERS TO WAWA'S SOUTH-WEST PUBLIC IRRIGATION DISTRICT STRATEGY STUDY</td>
<td>G. LUKE (COMPILED BY) I.A.F. LAING, R. TAYLOR and L. WILKINSON, G. OLNEY, P.R. GEORGE, P. ARKELL</td>
</tr>
<tr>
<td>WATER EROSION ON VEGETABLE GROWING LAND IN SOUTH WESTERN AUSTRALIA</td>
<td>D.J. McFARLANE, N. DELROY, H.V.B. GRATTE, J.P. MIDDLEMAS, A. VAN VREESWYK, I.M.C. KISSOCK</td>
</tr>
<tr>
<td>SALINITY AND WATERLOGGING ON THE ESPERANCE DOWNS RESEARCH STATION</td>
<td>J. McFARLANE, A.T. RYDER</td>
</tr>
<tr>
<td>BUSSELTON-MARGARET RIVER-AUGUSTA LAND CAPABILITY STUDY; METHODOLOGY AND RESULTS VOL. 1 AND VOL. 2</td>
<td>P. TILLE, N. LANTZKE</td>
</tr>
<tr>
<td>A WHOLE FARM ECONOMIC MODEL FOR DETERMINING THE PROFITABILITY OF STRATEGIES WHICH REDUCE THE RISK OF WIND EROSION ON THE SOUTH COAST OF WESTERN AUSTRALIA</td>
<td>A. BATHGKE</td>
</tr>
<tr>
<td>TOWARDS BETTER MINIMUM TILLAGE FOR SOUTH COASTAL SANDPLAIN SOIL</td>
<td>W.L. CRABTREE</td>
</tr>
<tr>
<td>HORTICULTURAL CAPABILITY STUDY OF SOILS ADJACENT TO PLANTATIONS AT CARNARVON, WESTERN AUSTRALIA</td>
<td>M.R. WELLS, J.K. BESSELL-BROWNE</td>
</tr>
</tbody>
</table>
116. THE IMPACT OF MINING AND MINING EXPLORATION ACTIVITY ON RANGE RESOURCES AND PASTORAL PURSUITS IN THE PILBARA, GASCOPYNE, MURCHISON AND GOLDFIELDS REGIONS OF WESTERN AUSTRALIA

H.J. PRINGLE

117. CATCHMENT DRAINAGE - THREE CASE STUDIES

J.E.P. GREEN

118. TRANSPERSION AND WATER RELATIONS OF IRRIGATED PEACH TREES AT MANJIMUP, WESTERN AUSTRALIA

P.R. SCOTT

119. SURVEY OF IRRIGATION EFFICIENCIES ON HORTICULTURE PROPERTIES IN THE PEEL-HARVEY CATCHMENT

S. MILANI

120. A REVIEW OF FOUR ON-FARM WATER SUPPLY DEMONSTRATION FARMS

M.H.M. CASEY

121. TACKLING SALINITY ON THE ESPERANCE SANDPLAIN

S.J. HEARN

122. GROUND WATER INVESTIGATIONS IN THE JERRAMUNGUP SHIRE

S. MARTIN

123. THE MALLEE ROAD CATCHMENT PROJECT

R. SIEWERT

124. AN ASSESSMENT OF THE IMPACT OF OPTHALMIA DAM ON THE FLOODPLAINS OF THE FORTESCUE RIVER ON ETHEL CREEK AND ROY HILL STATIONS

A.L. PAYNE

A.A. MITCHELL

125. CROP IRRIGATION REQUIREMENT PROGRAM

G.J. LUKE

P.A. AYLEMORE

E.J. HAUCK

126. CLIMATE, PHYSIOGRAPHY, GEOLOGY, HYDROLOGY AND LAND USE IN THE NORTH STIRLINGS AREA - A PRECURSORY REPORT

R. LENNARD

R.A. NULSEN

C.E. SOUTHWELL

127. NO-TILLAGE SEEDERS AND THEIR ADOPTION IN NORTH AMERICA - WITH RELEVANCE TO WESTERN AUSTRALIA

K. BLIGH

128. CALIBRATION AND USE OF A COMBINATION ATMOMETER TO ESTIMATE ETATRANSPIRATION AND MONITOR SOIL MOISTURE STORAGE ON FARMLAND CATCHMENTS IN WESTERN AUSTRALIA

K. BLIGH

129. SOILS OF THE EAST BEVERLEY ANNEX OF THE AVONDALE RESEARCH STATION

N. LANTZKE

130. INTEGRATED CATCHMENT MANAGEMENT - UPPER DENMARK CATCHMENT

R. FERDOWSIAN

K.J. GREENHAM

131. LAND RECLAMATION IN THE NORTH STIRLING LAND CONSERVATION DISTRICT

F. LEWIS

132. INFLUENCE OF WATER SUPPLY ON PRODUCTIVITY IN THE NORTH-EASTERN WHEATBELT

E.J. HAUCK

133. DEEP DRAINS - A CASE STUDY AND DISCUSSION

R.J. SPEED

J.A. SIMONS

134. LAND RESOURCES OF THE KELLERBERRIN REGION

W.M. McARTHUR

135. FODDER TREES AND SHRUBS FOR HIGH RAINFALL AREAS OF SOUTH WESTERN AUSTRALIA

D.M. PATABENDIGE

P.R. SCOTT

E.C. LEFROY
Management of native vegetation on farmland in the wheatbelt of Western Australia

<table>
<thead>
<tr>
<th>TITLE</th>
<th>AUTHOR</th>
</tr>
</thead>
<tbody>
<tr>
<td>136. LANDPROC (VERSION 3.2) - A LAND CAPABILITY ASSESSMENT PROGRAM FOR A PERSONAL COMPUTER</td>
<td>T.D. OVERHEU, B. KIPLING, P.D. KING</td>
</tr>
<tr>
<td>137. METHODS FOR CALCULATING SOLAR POSITION AND DAY LENGTH INCLUDING COMPUTER PROGRAMS AND SUBROUTINES</td>
<td>M.L. RODERICK</td>
</tr>
</tbody>
</table>

RESOURCE MANAGEMENT TECHNICAL REPORTS, ISSN 1039-7205

| 138. THE ROLE OF TREES IN SUSTAINABLE AGRICULTURE, A NATIONAL CONFERENCE, REPRINTS OF WESTERN AUSTRALIAN PAPERS | P.R. SCOTT |
| 139. ECONOMICS OF FARM WATER SUPPLY IN WESTERN AUSTRALIA | K. WHITE, E. HAUCK |
| 140. DATA SET AND CODE DEFINITIONS FOR SOIL PROFILE DESCRIPTION (DAWA REGIONAL MAPPING PROGRAM) | B.R. PURDIE |
| 141. RANGELAND REFERENCE AREAS | D. BLOOD |
| 142. FLORISTIC SURVEY OF REMNANT VEGETATION IN THE BINDOON TO MOORA AREA, WESTERN AUSTRALIA | E.A. GRIFFIN |
| 143. FLORISTIC SURVEY OF REMNANT VEGETATION IN THE DANDARAGAN AREA, WESTERN AUSTRALIA | E.A. GRIFFIN |
| 144. NORTHERN SANDPLAINS BETWEEN FLORISTIC SURVEY OF PERTH AND GERALDTON | E.A. GRIFFIN |
| 126. CLIMATE, PHYSIOGRAPHY, GEOLOGY, HYDROLOGY AND LAND USE IN THE NORTH STIRLINGS AREA - A PRECURSORY REPORT | R. LENNARD, R.A. NULSEN, C.E. SOUTHWELL |
| 127. NO-TILLAGE SEEDERS AND THEIR ADOPTION IN NORTH AMERICA - WITH RELEVANCE TO WESTERN AUSTRALIA | K. BLIGH |
| 128. CALIBRATION AND USE OF A COMBINATION ATMOMETER TO ESTIMATE EVAPTRANSPIRATION AND MONITOR SOIL MOISTURE STORAGE ON FARMLAND CATCHMENTS IN WESTERN AUSTRALIA | K. BLIGH |
| 129. SOILS OF THE EAST BEVERLEY ANNEX OF THE AVONDALE RESEARCH STATION | N. LANTZKE |
| 130. INTEGRATED CATCHMENT MANAGEMENT - UPPER DENMARK CATCHMENT | R. FERDOWSIAN, K.J. GREENHAM |
| 131. LAND RECLAMATION IN THE NORTH STIRLING LAND CONSERVATION DISTRICT | F. LEWIS |
| 132. INFLUENCE OF WATER SUPPLY ON PRODUCTIVITY IN THE NORTH-EASTERN WHEATBELT | E.J. HAUCK |
| 133. DEEP DRAINS - A CASE STUDY AND DISCUSSION | R.J. SPEED, J.A. SIMONS |
| 134. LAND RESOURCES OF THE KELLERBERRIN REGION | W.M. MCEARTHUR |
| 135. FODDER TREES AND SHRUBS FOR HIGH RAINFALL AREAS OF SOUTH WESTERN AUSTRALIA | D.M. PATABENDIGE, P.R. SCOTT, E.C. LEFROY |
| 136. LANDPROC (VERSION 3.2) - A LAND CAPABILITY ASSESSMENT PROGRAM FOR A PERSONAL COMPUTER | T.D. OVERHEU, B. KIPLING, P.D. KING |
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   M.L. RODERICK

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   K. WHITE

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   B.R. PURDIE

141. RANGELAND REFERENCE AREAS
   D. BLOOD

142. FLORISTIC SURVEY OF REMNANT VEGETATION IN THE BINDOON TO MOORA AREA, WESTERN AUSTRALIA
   E.A. GRIFFIN

143. FLORISTIC SURVEY OF REMNANT VEGETATION IN THE DANDARAGAN AREA, WESTERN AUSTRALIA
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144. NORTHERN SANDPLAINS BETWEEN FLORISTIC SURVEY OF PERTH AND GERALDTON
   E.A. GRIFFIN

* Not in print.