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of Remnant Vegetation on Private Land in the Box-Ironbark Region of Northern Victoria

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Dookie College, Institute of Land and Food Resources
University of Melbourne

Research Report 1/00

National Research and Development Program on Rehabilitation, Management and Conservation of Remnant Vegetation

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Preface

Clearing of native vegetation from much of Australia's prime agricultural land has caused the widespread fragmentation of natural ecosystems, reducing their viability and threatening maintenance of native flora and fauna and the ecological processes upon which productive rural landscapes depend. The degradation of ecosystem processes in the agricultural zone is the result of a particular suite of ecological, economic, social and institutional circumstances. These must be understood before effective policies and programs to combat degradation can be established. Recognising this, the Land and Water Resources Research and Development Corporation (LWRRDC) funded a review entitled Remnant Vegetation in the Rural Landscape; a consultancy report which highlighted:

- the difficulty in planning and conducting essential long-term ecological research due to the annual funding cycle of existing programs; and
- the lack of an adequate understanding of the socio-economic factors which influence land managers' decisions regarding remnant vegetation.

In response to the findings of the review, Environment Australia and LWRRDC joined together to establish a national program of research and development on the rehabilitation, management and conservation of remnant native vegetation. The program, which commenced in 1994, aims to assist government agencies, community groups and landholders to better manage and protect remnant native vegetation through application of improved knowledge and understanding gained from research. The program has a strong emphasis on practical outcomes in managing remnant native vegetation and promotes the development of effective links between vegetation managers and researchers. The program has two main themes: ecological research and socioeconomic research. A range of projects was funded in 1994 to examine different aspects of the ecology of native vegetation, and develop practical methods for better management by individual landholders. A number of projects, primarily based in the extensively cleared and highly degraded woodland ecosystems, identify the key processes by which different types of disturbance influence the long term maintenance and conservation of remnant native vegetation. The projects develop and demonstrate practical measures to reconstruct, rehabilitate or manage remnant vegetation in highly degraded or altered landscapes.

In addition to developing a broadly-based ecological understanding, it is also important to understand the range of socioeconomic issues which influence the protection and sustainable management of remnant native vegetation.

Projects funded under this component range from identifying the market and non-market values of, and the attitudes of rural landholders to, remnant vegetation. Projects also focus on the development of improved legislation, incentives and effective mechanisms/systems that would assist landholders to retain native vegetation on private land. The range of projects will contribute significantly to an understanding of the socio-economic issues influencing the protection and management of remnant native vegetation.

The research and development program, part funded by Environment Australia under Bushcare, is already providing a valuable information base on the ecological, economic and social values of remnant vegetation. It is highlighting the importance of ensuring that off-reserve nature conservation measures are supported by private landholders and that economic and ecological values are included in the decision making process. The series of papers arising from this program is aimed at ensuring widespread dissemination of the research results in the expectation that the knowledge gained from this investment will lead to improved management of native vegetation and therefore, sustainable land management and the conservation of biodiversity. This paper presents the findings from a mail survey of landholders' perceptions of remnant vegetation on Private Land in the Box - Ironbark region of northern Victoria. Following the paper are the proceedings from the workshop that discussed the paper's findings and determined

future directions for the conservation and management of Box-Ironbark remnants on private land in northern Victoria

For more information about the research and development program please contact LWRRDC or Environment Australia. For information about assistance available under Bushcare for management of remnant vegetation please contact Environment Australia.

Phil Price, LWRRDC
Andrew Campbell, Environment Australia

Contents

Executive summary

The Box-Ironbark ecosystem in northern Victoria has been substantially cleared, and is not well represented in conservation reserves. Programs conducted by various agencies and community groups targeting private land remnants have been based on voluntary participation and education, and have not been successful in attracting large numbers landholders with Box-Ironbark remnants or large areas of remnant. Many areas of quality remnant of this ecosystem are thought to exist on private land, however, little is known of these remnants, the perceptions of these remnants by landholders, and how they may be managed. This project was developed to gather information on all of these questions, to identify the various landholder groups within the Box-Ironbark region, and how the conservation management of remnants on private land may be enhanced in the future by this knowledge.

The information on remnants and landholders was gathered in a variety of ways: by mail survey, phone survey of non-respondents to the mail survey, and interviews of landholders. A workshop and Focus Group sessions were conducted with landholders and other stakeholders to investigate the ways in which the management of remnants on private land may be improved in the future. The results of these latter activities are documented in Appendix II.

This Research Report focuses primarily on the mail survey results. This survey was conducted in eight separate areas within the Box-Ironbark region in northern Victoria. A total of 358 landholders responded to the mail survey with an overall response rate of 72%. These landholders manage properties totalling 164,000 ha, of which approximately 5,900 ha was rated by landholders as being Box-Ironbark remnant greater than 1 ha in area (approximately 4% of the area of properties surveyed), which represents 2% of the Box-Ironbark remnant remaining. Over 50% of the remnant area surveyed was self-assessed by respondent landholders as being of moderate to high habitat quality.

There was a diversity in response across the surveyed group. Factors such as property size, level of education, extent of off-farm income, and the linkage of these to farm profitability, were variables identified as influencing the presence, perception and management of Box-Ironbark remnants on private. land.

The survey identified two broad landholder groups with common characteristics, perceptions, values and attitudes: landholders with properties <150 ha in area, and those with properties 150 ha or larger. Landholders with higher levels of education, irrespective of the area of the property, and landholders who view their Box-Ironbark remnants more for their productive purposes, such as clearing, were also identified as separate groups with a different range of views and values on their remnants. All groups manage significant areas of Box-Ironbark remnant, however, 80% of the remnant area is managed by the 50% of respondent landholders with properties ≥150 ha.

Landholders with both smaller and larger properties appear to have the basic intent and interest to conserve and appropriately manage Box-Ironbark remnants, but are both limited by reasons that are largely economic:

- for smaller property landholders who derive their predominant income off-farm, a lack of time and/or knowledge that is largely due to less time spent on their properties, and a lesser reliance on the profitability of their Property;
- for larger property landholders who derive their income largely on-property, considerations for the conservation and management of remnants must be tempered by the need for the property to be productive and profitable.

These economic "blocks" raise some questions as to how conservation and management of Box-Ironbark remnants may best be achieved in the future, particularly when programs and organisations currently involved in the promotion of private land conservation are relatively poorly resourced, generalist, reactionary, and generally poorly recognised and utilised by landholders.

Past strategies and programs have clearly not targeted all of these landholder groups effectively, probably due to insufficient information on them. There is a need to devise separate strategies for each landholder group to achieve conservation of Box-Ironbark remnants on private land, and these are outlined for each landholder group within the surveyed area.

1. Introduction

Box-Ironbark is a generic term that has been applied to woodland or forest ecosystems that are dominated by either Box or Ironbark eucalypts. These ecosystem types were once common from Victoria through to Queensland on the lower fertility soils and lower rainfall areas of the inland slopes of the Great Dividing Range. The Box-Ironbark region in Victoria actually incorporates a number of different community types or ecological vegetation classes (EVC's) (Muir *et al.* 1995), and extends from Wodonga in the northeast to Stawell and the northern Grampians in the southwest (Fig. 1; Muir *et al.* 1995). Most of the Box-Ironbark region is west of the Goulburn River.

Box-Ironbark vegetation consists of open stands of relatively large trees in either forest or woodland formation. When Europeans first settled Victoria, a substantial portion of the land was distributed in extensive grazing leases. These leases included large areas of forests where the amount of timber harvested was small. Grazing of sheep on this native vegetation began in the 1830's (Newman 1961, and has been a major land use to the present day. With the discovery of gold in central Victoria in the 1850's, the Box-Ironbark region became the centre of growth and activity of 19th century Australia. Much of the region was cleared of its Box-Ironbark vegetation, and the timber used to stabilise mineshafts, provide firewood for the mining population, and to allow for food production for a rapidly growing population. Little thought was given to the preservation of the native vegetation (Calder *et al.* 1994).

Up to 1995, it had been estimated that 75% of the original 10,000 km^2 of Box-Ironbark forest and woodland had been cleared (750,000 ha), resulting in threats to, and extinctions of, plant and animal populations and communities (Calder *et al.* 1994; Office of the Commissioner for the Environment (OCE) 1992). The vegetation that remains is highly fragmented and modified by indirect influences such as introduced plants and animals, and direct land use impacts such as grazing, timber cutting and mining, resulting in some large areas of remnans on public land (approximately 200,000 ha), and many small yet significant areas of remnant vegetation on private land (<40,000 ha, or 15% of remaining Box-Ironbark remnants (Davidson unpublished 1996). These remnants were often under-utilised because of their low productivity or inaccessibility, but are now threatened by commercial activities (Newman 1961; Davidson unpublished 1996).

There is greater awareness of the importance of the Box-Ironbark ecosystem in Victoria. The area of Box-Ironbark remnants reserved for conservation management is small (<27,000 ha), and some community types are poorly represented on public land, though they are known to exist on private land (Davidson unpublished 1996). In response, the Department of Natural Resources and Environment (DNRE) is currently producing a Conservation Plan for the Box-Ironbark ecosystem. The former Land Conservation Council (now the Environment Conservation Council), has undertaken a special investigation of the public land portion of the ecosystem (Environment Conservation Council 1997).

The Box-Ironbark ecosystem forms an important element of the Wimmera, Avoca, Loddon, Campaspe, Goulburn and Ovens river catchments, which are ail north flowing streams in the Murray-Darling Basin. The native vegetation of the Box-Ironbark region plays an important role in salinity management because it occurs on recharge areas for groundwater systems (Muir *et al.* 1995). Relationships identified between the clearing of remnant vegetation and degradation problems, such as erosion and salinity, has provided additional impetus for government programs to properly manage native vegetation (Platt 1995).

On a statewide basis, 65% of Victorian native species are known to exist on private land (OCE 1992). While the amount of Box-Ironbark remnants on private land is small relative to public land areas, these remnants are thought to significantly enhance the biodiversity of the region, as there are 70 rare or threatened vascular plants in the region (Muir *et al.* 1995) many of which are found predominantly on private land.

The message is clear; landholders have a major role to play in the conservation of the Box-Ironbark ecosystem because many remnants are either on private land or on adjacent public land

such as roadsides, which are impacted by the management of private land (Blankers 1993).

A number of statewide programs have evolved in recent years to assist landholders with private land conservation. The DNRE program *Land for Wildlife* offers limited on-ground practical advice, potential funding assistance and can help landholders access information on conserving native vegetation. The *Land for Wildlife* scheme is voluntary, and field officers have no legislative control over the management of private areas (Platt 1995). Notwithstanding some success, *Land for Wildlife* has attracted moderate numbers of landholders, often with small areas of remnant vegetation (Platt 1995). The Trust for Nature - Victoria is a community group which offers extension services and a covenanting program where landholders can enter a legally binding agreement that they, and future owners, manage the land according to current best practice (Trust for Nature 1996).

Groups such as the Victorian National Parks Association (VNPA) and Greening Australia Victoria (GAV) also have been involved in community projects managing Box-Ironbark remnants on private land. Many community driven groups have started in recent years to tackle degradation problems on a local level under Landcare. The number of Landcare groups advocating improved management of native vegetation on private land appears to be increasing (Curtis 1996).

These programs tend to respond to landholder inquiry rather than being proactive by identifying remnants worthy of attention.

Improved management of remnant vegetation on private land requires landholder co-operation. Understanding landholder perceptions of the nature and value of the remnants is essential to establishing effective partnerships to better manage remnants on private land. This project was developed to gather this information, and hopefully to contribute to conservation of Box-Ironbark remnants on private land.

The project principals successfully applied for funding from the Land and Water Resources Research and Development Corporation (LWRRDC) and Environment Australia (EA) through the National Remnant Vegetation R & D Program to examine socio-economic influences on the management of remnant vegetation. Funding of $72,250 was provided over 1996-97, with a further $50,000 of in-kind support provided Dookie College, University of Melbourne, Charles Sturt University (CSU), and the Department of Natural Resources and Environment.

This Research Report presents the findings from the mail survey of landholders' perceptions of remnant vegetation on private land in Victoria.

2. Project Objectives

The specific objectives of this project were:

1. Improve the conservation and management of remnant vegetation on private land in the Box-Ironbark region of Northern Victoria by gathering information from rural landholders about:

   (a) the value of Box-Ironbark remnants;
   (b) how money dedicated to Box-Ironbark remnant management could be best used;
   (c) potential problems associated with Box-Ironbark remnants;
   (d) the size, management and quality of Box-Ironbark remnants on private land;
   (e) landholder contact with private and government programs.

2. Improve linkages between major stakeholders through their participation in developing project research methodology and disseminating findings.

3. Provide a forum in which the research findings can be presented and discussed by policy makers, extension staff, community groups and key landholders.

This Research Report addresses Objective 1 specifically. The outcomes regarding Objectives 2 will be addressed in this Research Report, and outcomes for Objective 3 is reported in Appendix II of this publication.

3. Methodology

3.1. Project Outline

The project methodology was developed by Dr. Steve Hamilton and Dr. Allan Curtis, and is a mixture of qualitative and quantitative research. A summary of the methodology employed is outlined below. Individual sections expand on aspects of the research methodology related to findings presented in this report.

1. Formation of a Steering Committee with representatives from DNRE, key community groups and landholders.

2. Selection of eight sub-catchments from across the Box-Ironbark region. These sub-catchments were typical of the whole region and represent a range of land management practices and demographics, and have some Box-Ironbark remnants present on private land. Attention was paid to linkage with related projects (i.e. Fauna Conservation Project; LWRRDC Project reference number DUV2, Dr. Andrew Bennett Project Supervisor).

3. The mail survey:

   - Development of survey questionnaire;
   - Pre-testing of survey on two selected landholder groups;
   - Mail survey of 552 rural property owners from within the 8 sub-catchments selected.
   - All landholders within each sub-catchment surveyed.
   - Mail follow-up to enhance response rate.

1. A phone survey of 50 landholders who did not respond to the mail survey to ascertain their reasons for non-response and to gather information about their perceptions of Box-Ironbark remnants.

2. Face-to-face interviews of 29 landholders selected on the basis of their response to the mail survey to extract more detailed information on their perceptions and management of Box-Ironbark remnants on private land;

3. A two day Workshop of researchers, agency staff, community groups, Local Government and key landholders to present and discuss preliminary mail survey findings and explore the future of Box-Ironbark remnants on private land, and strategies to enhance the conservation of the ecosystem;

4. Four half-day focus group sessions held at two locations with landholders and Local Government representatives to further explore the themes discussed at the Workshop.

3.2. Project Management

1. The project was co-ordinated by the Project Team of Dr. Steve Hamilton (Dookie College, University of Melbourne) and Dr. Allan Curtis, (Johnstone Centre, Charles Sturt University).

2. All aspects of Project Management were overseen by a Steering Committee, which met on 5 occasions. The Steering Committee comprised:

   - Project Team
   - Fred King (Chairman, Landholder)
   - Dr. Andrew Bennett (Deakin University)
   - Ian Davidson (DNRE)
   - Susie Duncan (DNRE)
   - Ross Geddes (Landholder)
   - Alex Graham (Landholder)
   - Annette Muir (DNRE)
   - Steve Platt (DNRE)
   - Jim Robinson (Greening Australia Victoria)
   - Charlie Sherwin (Victorian National Parks Association)
   - James Todd (Trust for Nature - Victoria)

3. Recruitment of a M.App.Sc. student to undertake the mail survey and other data collection. Paul Dettmann, a Dookie College graduate, was selected, and post-graduate research was supervised by Dr. Steve Hamilton (Principal supervisor) and Dr. Allan Curtis.

3.3. Sub-Catchment Selection

Davidson (unpublished 1996) completed an overview report of Box-Ironbark remnants in northern Victoria, and divided the region into 22 geographic zones (Fig. 2). Sub-catchments from eight of these zones were chosen by the Steering Committee to be representative of the diversity of land use, geographic, topographic and demographic variation in the Box-Ironbark region (Fig. 2). The zones from which sub-catchments were chosen were:

- Bendigo: The southern and eastern environs of the City of Bendigo. Selected because of the high number of smaller land holdings, the presence of mining, and proximity to a major regional centre.

- Bolangum : Encompassing the township of Stawell, and Navarre, and the areas of Kanya, and Greens Creek. Selected because it contains many larger properties, and large areas of cropping land.

- Chiltern: Encompassing the township of Chiltern and surrounding areas. Selected because of higher rainfall, and large areas of public land Box-Ironbark remnants adjacent to private land, and being a large area of Box-Ironbark east of the Goulburn River.

- Lurg : Encompassing the areas of Glenrowan, Greta and Lurg. Selected because east of Goulburn River, and the area has had a high level of agency and community group contact (e.g. Landcare, *Land for Wildlife,* etc.).

- Maryborough: Encompassing the township of Maryborough and surrounding areas. Selected because much of the area has been substantially cleared, and the area is in close proximity to Melbourne.

- Rushworth: Encompassing the Rushworth State Forest and Puckapunyal Military Area, the townships of Rushworth, and Costerfield, and the area of Greytown. Selected because of its proximity to large areas of Box-Ironbark in State Forest, and low agricultural return due to poor soils.

- St. Arnaud: Encompassing the townships of St. Arnaud and Stuart Mill, and surrounding areas. Selected because of large property size, and mixture of cropping and grazing lands.
- Wedderburn: Encompassing the areas around the township of Wedderburn. Selected because *Eucalyptus* oil harvesting occurs in the area.

3.4. Data Collection

3.4.1. The Mail Survey

The mail survey aimed to:

1. Develop an appreciation of landholdersí perceptions of:
   - the value of Box-Ironbark remnants;
   - how money dedicated to Box-Ironbark remnants could be best used;
   - potential problems of Box-Ironbark remnants; and
   - their own knowledge of issues related to Box-Ironbark remnants.
2. Gain an understanding of the size, management and quality of remnants on private land.
3. Ascertain contact with private and government programs. A detailed description of the survey contents is included in Appendix I.

The Steering Committee adopted the mail survey format and style used by Curtis and DeLacy (1994), who followed the approach of Dillman (1978) in the development of the mail survey for this project. This approach included the following key steps:

- developing a distinctive survey booklet of high quality and professional presentation and useability;
- editing of draft survey by Steering Committee members;
- pre-testing the survey on a sample of landholders;
- enclosing a cover letter;
- reminder/thank-you notices to all landholders; and
- follow-up mailings of non-respondents.

The pre-testing of the survey was undertaken with two groups of landholders, and this process provided some useful editorial adjustment.

Country Fire Authority Regional Maps and Electoral-Rolls were used to identify all landholders in a sub-catchment within each of the eight sub-catchments chosen (between 60-80 individual landholders). Regional contacts provided further information in cases where information on a landholder was scant or incomplete.

Landholders were advised of the mail survey in a letter posted one week prior to the survey being distributed. All surveys had covering letters attached. The survey was followed with a thank-you/reminder notice ten days after the posting of the survey. Approximately six weeks later a new survey and covering letter was sent to landholders that had not returned a survey booklet. The distribution of survey recipients is detailed in Table 1. A follow-up phone survey of non-respondents was used to ascertain the reasons for non-response.

Table 1. Number of landholders provided with mail surveys in each sub-catchment.

Sub-catchment	Number of landholders
Bendigo	75
Bolangum	66
Chiltern	70
Lurg	71
Maryborough	70
Rushworth	68
St Arnaud	60
Wedderburn	72
Total	552

3.4.2. Phone Survey of Non-Respondents

From the landholders who declined to return the mail survey, a random sample of 50 landholders was selected, and contacted by phone during December 1996 to ascertain their reasons for non-response, and to determine if they were significantly different in their perceptions from landholders who did respond to the mail survey.

These Landholders were asked a summarised version of the questions posed to landholders in the mail survey. The phone survey provided little additional information, and most data has not been included in this report.

3.4.3. Landholder Interviews

A group of 29 landholders that responded to the mail survey were interviewed regarding their views and perceptions of Box-Ironbark remnants. Landholders chosen for interview were selected to reflect the diversity of opinions regarding Box-Ironbark remnants, property sizes, gender, and geographic location of landholders within the Box-Ironbark region. The interviews were conducted on the landholder's property using a semi-structured format. Interviews were recorded for future reference, and took between 30-90 minutes to complete. Landholders were asked questions such as what would be the best use of available monies to manage Box-Ironbark remnants, interaction with community groups and agencies, and the interaction of Box-Ironbark remnants management with programs promoting and establishment of farm forestry and perennial pasture. The interviews provided little additional information, and interview data have not been included in this report.

3.4.4. Workshop and Focus Groups

To assist in the dissemination of survey findings and to examine and develop strategies for the future of Box-Ironbark remnants on private land, a Workshop was conducted at Dookie College on the 3-4 April 1997. Representatives from research and tertiary institutions, community groups, Federal and State agencies, landholders, and Local Government participated. This Workshop provided some excellent outcomes, but did highlight the need to examine issues in more detail with both Local Government and Landholders, as both groups were under-represented at the Workshop and are key stakeholders in the future of Box-Ironbark remnants. As a consequence, four focus group sessions involving landholders and Local Government representatives were held in St. Arnaud and Wangaratta in June 1997. A complete description of the proceedings and outcomes of both of these activities is detailed in Appendix II.

3.5. Survey Response

An overall response rate of 72% was obtained for the mail survey. This was calculated by combining the number of useable surveys returned plus the number of surveys returned by those declining to participate (a total of 385 plus). This figure was divided by the total number of surveys that reached their destination (536) and a percentage calculated. Response rates by sub-catchment are listed in Table 2.

3.6. Data Analysis

Survey data was entered into a statistical analysis package, SPSSx (Version 7.5.1, 1996). Calculation of significant differences in response between sub-catchments and between different agricultural enterprises was ascertained through a one-way ANOVA, giving least significant difference (LSD) to the 5%, 1% and 0.1% levels. Significant relationships between other factors were calculated using the chi-square, with Spearmanís co-efficient being used to ascertain significance to the 5%, 1% or 0.1% levels.

As the data from the survey has been collected using a clustered sampling approach (i.e. a sub-catchment as a cluster), rather than a simple random sample, advice was obtained from

Table 2. Response rate for each sub-catchment to the mail survey (RTS = returned to sender).

Sub Catchment	Surveys sent	RTS	Returned by non-participants	Useable surveys returned	Response rate rate (%)
Bendigo	75	1	3	49	70
Wedderburn	72	1	6	40	65
St. Arnaud	67	4	8	32	63
Bolangum	66	3	1	44	71
Chiltern	71	3	2	50	76
Lurg	78	8	1	48	70
Maryborough	72	6	3	47	76
Rushworth	77	15	3	48	82
Total	577	41	27	358	72

the Statistical Consulting Centre at the University of Melbourne (Parkville Campus) to determine the need to correct for this variation in approach. It was ascertained that the clustered nature of sampling the population had very little impact on the precision of the data collected. Also, because of the finite nature of the population, inferences drawn about the data are likely to be conservative.

4. Results

A copy of the mail survey sent to landholders is provided in Appendix I. Throughout the tables and text, N is used to denote the total number of respondents to a question, and n the number of respondents who completely answered that particular question.

4.1. Profile of Box-Ironbark Remnants

It is useful to quantify the areas of Box-Ironbark remnants on private land and what these areas comprise. Landholders were asked to fill in a short section identifying the vegetation elements on their property.

4.1.1. Quantity

Most landholders (65%)indicated they managed an area of Box-Ironbark remnants (defined as an area greater than 1 ha) (Table 3). Almost half the landholders who managed Box-Ironbark remnants had between 5 and 30 ha (mean 26 ha, and median 10 ha) (Table 4), which was usually in one or two patches (for 53% of Box-Ironbark remnants). These areas are significant from an ecological viewpoint because of their size, i.e. the larger the area, the less prone Box-Ironbark remnants are to edge effects (i.e. weed invasion). For 54% of Box-Ironbark remnants, the largest patch did not exceed 10 ha (mean 17 ha, median 7 ha).

Table 3. Presence or absence of Box-Ironbark remnants greater than 1 ha on respondent landholders properties (N = 358; n = 352).

Yes (%)	No (%)
65	33

When the total number of landholders was considered, mean largest patch was 11 ha, and median 2 ha. Mean total area was 17 ha, and median 3 ha. In total, the survey respondents were managing approximately 164,000 ha and of this 5,893 ha was Box-Ironbark remnants. This represents 4% of the total area surveyed (i.e. 96% of Box-Ironbark remnants has been cleared in the area surveyed), and 2%

Table 4. The distribution of Box-Ironbark remnant area on each property (N = 233; n = 227).

Box-Ironbark remnants area	% of landholders
>5 ha	26
5-15 ha	28
15-29.9 ha	17
30-59.9 ha	14
>60 ha	12

of Box-Ironbark remnants remaining in Victoria. A total of 119 properties across all sub-catchments had no Box-Ironbark remnants, a total property area of 36,068 ha (22% of the total area surveyed).

There was a significant relationship (to the 0.1% level) between the existence of Box-Ironbark remnants on a property and property size, with larger properties more likely to have Box-Ironbark remnants, and in larger patches.

Between sub-catchments, there were significant differences in the presence or absence of Box-Ironbark remnants. The Chiltern sub-catchment had significantly fewer properties with Box-Ironbark remnants than Maryborough, St. Arnaud, Bolangum and Bendigo (Table 5). When considering the total area of Box-Ironbark remnants in each region, Rushworth had the highest with 30% of the sub-catchment area being Box-Ironbark remnants, and Bolangum the least, with only 3% (Table 6). This may have implications in terms of which regions are targeted or prioritised for programs associated with Box-Ironbark remnant management.

Table 5. The presence or absence of Box-Ironbark remnants on respondent landholders properties across sub-catchments (%).

	Bendigo	Wedderburn	St. Arnaud	Bolangum	Chiltern	Lurg	Maryborough	Rushworth
Yes	68	76	69	70	49	58	77	67
No	32	24	31	30	51	42	23	33
n	47	38	32	44	49	48	47	48

Table 6. Comparison of the mean area of largest patch of Box-Ironbark remnant (ha), mean total area of Box-Ironbark remnants on properties (ha) and mean size of property (ha) of respondent landholders across sub-catchments (%).

	Bendigo	Wedderburn	St. Arnaud	Bolangum	Chiltern	Lurg	Maryborough	Rushworth
Mean area largest patch	7.6	34.9	21.4	13.8	17.4	15.4	15.9	77.1
Mean total area	9.2	55.7	36.4	32.9	21.4	17.1	20.1	403.1
Mean property size	61	1,010	652	1,151	101	239	444	1,326
% of Box-Ironbark remnants on property	15	6	6	3	21	7	5	30
Properties with no Box-Ironbark remnants	15	9	10	13	25	20	11	16
Area With no Box-Ironbark remnants	228	6,077	4,188	13,198	2,024	2,825	2,553	4,975

Non-respondent landholders surveyed by phone managed an average of 31 ha of Box-Ironbark remnants, however this included one area of 400 ha, and the median area was 2 ha. While the sample size of the non-respondent survey was small (N = 50, n = 29), these results indicate no differences between respondent and non-respondent groups in terms of the area of Box-Ironbark remnants on their properties.

Key Points

- 4% of area surveyed is Box-Ironbark remnant (96% cleared);
- 65% of respondents have Box-Ironbark remnants;
- 119 properties across all sub-catchments had no Box-Ironbark remnants, a total property area of 36,068 ha (22% of the total area surveyed);
- The median area for those who had Box-Ironbark remnants was 10 ha;
- 46% of respondents with Box-Ironbark remnants had remnant patches > 10 ha;
- Variation in the amount of Box-Ironbark remnants on properties surveyed ranged from 3 to 30% across the eight sub-catchments;
- Mail survey non-respondents and respondents were found not to be different in the area of Box-Ironbark remnants on their properties.

4.1.2. Quality

In attempting to derive a guide as to the quality of the habitat within their Box-Ironbark remnants, landholders were asked to indicate the abundance of various ecosystem components as none, few, some and many. These components included large old trees, medium trees, small trees, prickly native shrubs, other native shrubs, native grasses, weeds, wood on the ground, and standing dead trees. All of these components would normally be present in undisturbed Box-Ironbark remnants and their presence/absence or abundance would be indicative of a certain level of habitat quality and land use history. The framing of the question asked of landholders was based on examination of other guides on the assessment of habitat quality (e.g. Goldney and Wakefield 1996), and on the experience of the Steering Committee.

For example:

- the presence of mature trees indicates the likely presence of hollows for arboreal nesting species, likewise for standing dead trees;
- the presence of all age groups of trees likely indicates that minimal disturbance (especially stock grazing) has occurred;
- wood on the ground provides protection and habitat for ground-dwelling fauna, and also indicates minimal disturbance (no fuel wood collection);
- the presence of prickly shrubs only indicates reduced biodiversity and habitat value, because these species are unpalatable and are generally left by stock, and the presence of other shrub species indicates enhanced biodiversity value.

Collection of landholder-assessed data through the survey has limitations as landholders will have varying opinions, for example, of what is "few" or "many", or what constitutes wood on the ground, or what is a "old large" tree. The need for ground-truthing of such data is obvious. A sample of properties needs to be selected, and the quality assessment given by landholders compared to those of scientific experts.

Survey data showed that many Box-Ironbark remnants contained a range of age classes of trees, including many with old trees (21% of Box-Ironbark remnants; >1,500 ha) (Table 7). None of the Box-Ironbark remnants had no medium trees, and only 3% had no small trees (43 ha). There was an abundance of native shrub species in at least 20% of Box-Ironbark remnants (21,250 ha), 58% of Box-Ironbark remnants had some or many native grasses (>3,850 ha), and 20% had no weeds (569 ha). In addition, 20% of Box-Ironbark remnants had abundant wood on the ground (1,980 ha), with 75% indicating some or many (4,830 ha). While only 6% indicated many standing dead trees (550 ha), some 83% had few or some (4,840 ha).

Table 7. Presence/absence and abundance of ecosystem components in Box-Ironbark remnants on respondents properties by (a) percentage and (b) area of Box-Ironbark remnants (N = 233; n = 225-233).

(a)	Large trees (%)	Medium trees (%)	Small trees (%)	Prickly shrubs (%)	Other shrubs (%)	Native grasses (%)	Weeds (%)	Wood on ground (%)	Dead trees (%)
None	9	0	3	28	21	3	20	3	12
Few	30	18	12	28	33	38	41	21	44
Some	39	46	27	21	26	36	31	56	39
Many	20	37	59	19	16	22	6	20	7

(b)	Large trees (ha)	Medium trees (ha)	Small trees (ha)	Prickly shrubs (ha)	Other shrubs (ha)	Native grasses (ha)	Weeds (ha)	Wood on ground (ha)	Dead trees (ha)
None	313	0	43	580	389	14	569	16	273
Few	1,401	569	210	1,421	1,556	1,742	2,440	807	1,976
Some	2,339	1,859	810	1,879	2,373	1,846	1,667	2,858	2,862
Many	1,569	3,239	4,623	1,707	1,259	2,016	864	1,979	549
% area with	90.1	96.2	95.8	85.0	88.0	95.1	84.4	95.8	91.6

These results would tend to indicate that there are still considerable areas of moderate to high quality Box-Ironbark remnants on private land (at least 20% of the Box-Ironbark remnants surveyed, or 1,200 ha), and there are considerable habitat opportunities for fauna in these Box-Ironbark remnants. There would also seem to be considerable evidence of many Box-Ironbark remnants regenerating after disturbance, such as grazing, with 59% of Box-Ironbark remnants having many small trees (4,600 ha), compared to many medium trees (39%; 3,200 ha) and many large trees (20%; 1,570 ha).

However, there is also evidence from this data that many of the Box-Ironbark remnants (at least 40% of Box-Ironbark remnants, or around 1,800 ha) have experienced light to moderate grazing or other disturbance (Table 7):

- 19% of Box-Ironbark remnants had many prickly shrubs (1,700 ha);
- 58% had none or few other shrubs (2,000 ha);
- 80% of Box-Ironbark remnants have some weeds present (4,970 ha), and smaller properties (<150 ha) were significantly more "weedy" (to the 4.8% level);
- 41% had none or few native grasses, indicating replacement by weeds (1,750 ha).

Indeed, there is an inverse relationship between grazing of Box-Ironbark remnants and the abundance of all shrubs (at the 5% level). Grazing is more frequent on properties ≥150 ha in area than properties <150 ha. There was no relationship between grazing and the presence and abundance of weeds.

There would appear to be a proportion of the Box-Ironbark remnants (up to 10% of the total number of Box-Ironbark remnants or <1,000 ha) that has been severely impacted by direct and indirect disturbances, and would have low or negligible habitat and conservation value on this basis. These Box-Ironbark remnants have:

- many weeds (6%, or 864 ha);
- no other shrubs (21%, or 389 ha);
- no native grasses (3%, or 14 ha);
- no wood on ground (3%, or 16 ha);
- no small, large or dead trees (3, 9 and 12%, or 43, 313 and 273 ha respectively).

When all the nine categories against which landholders rated their ecosystem components were combined, (i.e. a rating out of 41 to give an index of habitat quality; each ecosystem components given a maximum rating of 3 or 5 depending on assessed contribution to habitat

quality), there were several factors which had a correlation with habitat quality (Table 8). Total Box-Ironbark remnants and property area, *Land for wildlife* contact, existence of property plan, education level, intention to clear and level of interest were all positively related to habitat quality.

Clearly, landholders that have larger properties with a considerable area of Box-Ironbark remnants, and that have a level of education and interest in Box-Ironbark remnants, are more likely to have higher quality Box-Ironbark remnants. Landholders with larger areas of Box-Ironbark remnants and larger properties are more likely to clear Box-Ironbark remnants, which may indicate a tendency to retain Box-Ironbark remnants only as a potential resource.

Table 8. Relationship between habitat quality index and factors relating to Box-Ironbark remnants. Factors that are significantly related to habitat quality index (P <0.05) are indicated in bold type.

Factor	Spearman's rs	Significance
Total Box-Ironbark remnant area	.345	**.000**
Land for Wildlife contact	.220	**.000**
Existence of property plan	.202	**.000**
Area of property	.199	**.000**
Level of interest in Box-Ironbark remnants	.192	**.000**
Intention to clear Box-Ironbark remnants	.191	**.003**
Education level	.127	**.020**
Level of knowledge on Box-Ironbark remnants	.112	**.036**
Timber harvesting in Box-Ironbark remnants	.124	.064
Seed collection	.124	.065
Group membership	-.079	.143
Reducing grazing for regeneration	.053	.435
Grazing of Box-Ironbark remnants	-.031	.639

Table 9. The extent of Box-Ironbark remnants in relation to habitat quality index. Habitat quality classes assigned on the basis of likely minimum combined totals of key ecosystem components.

Habitat quality index (maximum of 49)	Area of Box-Ironbark remnants (ha)
Excellent (>32)	996
Good (25-32)	2,282
Moderate (17-24)	2,075
Poor (9-16)	440
Very poor (0-8)	484

Of the 5,900 ha of Box-Ironbark remnants in the surveyed area, more than 3,250 ha (more than 55 % of the Box-Ironbark remnants in the area surveyed) is rated as good or excellent quality, which tends to indicate that the estimate of the area of high quality Box-Ironbark remnants using the habitat quality index is higher than inferred from data in Table 7 (<1,200 ha).

Under 1,000 ha of Box-Ironbark remnants is assessed as poor or very poor quality by habitat quality index (Table 9), which supports the estimate of <1,000 ha of poor quality Box-Ironbark remnants inferred by the data in Table 7. This is an encouraging result, and would indicate a higher quality of the Box-Ironbark remnants on private land than anticipated.

Education level of the Principal Property Manager/s and their partner were positively related to the presence of Box-Ironbark remnants on properties containing prickly shrubs, wood on ground, and dead trees (all to 5% significance). This may be as a result of more educated landholders being more able to identify different species, or having a greater appreciation of the value of biodiversity and habitat.

Key points

- At least 20%, and maybe up to 55% (1,200 to 3,250 ha) of Box-Ironbark remnants are of moderate to high habitat quality;
- Habitat quality is strongly positively related to area of Box-Ironbark remnants and property, level of education and interest, level of knowledge, contact with the *Land for Wildlife* program, intention to clear Box-Ironbark remnants and existence of a property plan;
- At least 40% of Box-Ironbark remnants (or at least 1,800 ha) have been considerably impacted by grazing or other disturbance, but may still be of moderate habitat quality;
- Grazing is more frequent in properties ≥150 ha in area than smaller properties;
- Up to 10% of Box-Ironbark remnants (<1,000 ha) appears to have been severely impacted by grazing or other disturbance, and is of low to negligible habitat quality;
- Owners of larger properties are more likely to have maintained older trees and left wood on the ground;
- Education level is related to the presence of several key habitat components in Box-Ironbark remnants;
- The assessment of remnant habitat quality by landholders needs evaluation.

4.2. Managing Box-Ironbark Remnants

It is important to understand how Box-Ironbark remnants are being managed on private land in order to plan for its conservation. Survey recipients were asked to rate the frequency of various activities in their Box-Ironbark remnants as never, occasionally or every year. The most common activities occurring in the Box-Ironbark remnants were firewood collection (92%), grazing (87%), pest control (80%), sheltering stock (77%) and weed control (76%) (Table 10). Timber harvesting for fencing material, bee keeping, reducing stocking to encourage regeneration of plants, bird watching, and tidying up and burning sticks were less common, but still took place on many properties. Less frequent activities were seed collecting, prospecting, burning-off and gravel mining.

These figures demonstrate the high level of use and management of Box-Ironbark remnants by landholders, both in beneficial ways (weed and pest control) and also detrimental ways (i.e. grazing, firewood collection). Perhaps the greatest threat to the Box-Ironbark remnants is grazing which occurs every year on 57% of properties, and occasionally on 30% of properties. Agencies seeking to improve management of Box-Ironbark remnants may be encouraged by the degree of weed and pest control which is occurring, however they will be challenged to slow the rates of income producing activities such as grazing, and bee keeping.

There is a significant positive relationship between property size and using Box-Ironbark remnants for sheltering stock, bee keeping, grazing, mineral prospecting, and pest control. There is a negative relationship between property size and tidying up sticks in Box-Ironbark remnants. Presumably this task becomes more onerous for a single property owner/family unit as property size increases. Hence there is a need to target smaller property owners about the problems of tidying up and burning sticks.

Table 10. Activities in Box-Ironbark remnants on private land (N = 233; n = 226-233).

Activities	Never	Occasionally	Every Year
Grazing	13	30	57
Pest control	20	38	43
Sheltering stock	23	33	43
Firewood collection	8	51	42
Weed control	26	43	30
Bird watching	37	39	24
Tidying sticks	36	46	18
Reducing stocking	47	33	16
Planting trees/shrubs	49	41	11
Fencing timber	35	57	9
Fencing for stock access	42	47	9
Bee keeping	57	35	7
Burning	77	19	3
Prospecting	86	10	3
Seed collecting	72	24	2
Gravel mining	93	6	0

Group membership is closely related to property size, with managers of larger properties more likely to be a member of a group, making these findings more significant. The practice of reducing stocking rates to allow regeneration in remnants was found to increase with group membership, whereas the opposite was true when compared to property size. It was found that 44% of non group members reduce stocking rates (both occasionally and every year groups) to encourage regeneration, whereas 61% of group members practice reducing of stocking rates (this is significant to <5%). This may indicate that group membership increases adoption of conservation management techniques, and that Landcare is having a significant impact on biodiversity conservation. Larger properties are presumably less likely to reduce stocking to encourage regeneration as this would decrease the earning potential of the property, and larger farms are viewed as a business enterprise.

There was found to be no significant relationship between group membership and planting of native trees and shrubs. This is contrary to the findings of Curtis and DeLacy (1997) and Mues *et al.* (1994), however both studies were analysing numbers of trees planted, rather than simply whether or not they were planted, giving a more reliable measure of the relationship.

In terms of sub-catchment variations in activities, the Wedderburn sub-catchment had the highest levels of stock reduction to encourage regeneration of plants, though this may have been for firewood production (as was mentioned in one interview), or *Eucalyptus* oil harvesting. Bendigo had the highest level of planting native trees and shrubs (71% of landholders planting native trees and shrubs). Grazing of Box-Ironbark remnants was least common in Bendigo, presumably because of the smaller property sizes and more "hobby" farms (less need to make a profit). Harvesting of timber for fencing materials was most common in Maryborough, Wedderburn, Chiltern and Bolangum, all being significantly higher than the Bendigo sub-catchment, again probably due to larger property sizes needing more fencing materials.

St. Arnaud had the highest level of bee keeping activity, significantly more than all sub-catchments except Rushworth. Tidying up sticks was most common in Chiltern, significantly more than Bolangum, Lurg, St. Arnaud and Wedderburn. Bird watching occurred most in Bendigo, Chiltern Rushworth and Lurg, and least in Bolangum.

Gravel extraction was most common in the St. Arnaud sub-catchment, and was minimal in the Bendigo, Chiltern, Maryborough and Lurg sub-catchments. Bendigo had lower levels of pest and weed control than all other sub-catchments, consistent with a pattern of less intervention and disturbance on smaller non-commercially viable properties. Firewood collection was highest in the Chiltern, Maryborough and St. Arnaud sub-catchments, all being significantly higher than the Bendigo sub-catchment (LSD = 0.05).

Key Points

- Common activities are firewood collection, grazing, pest control, sheltering stock, and weed control;
- Rare activities are seed collection, prospecting, gravel mining and burning-off;
- Grazing occurs every year on 57% of properties;
- Differences between sub-catchments in terms of activities in Box-Ironbark remnants tends to follow demographics, property size and regionally predominant land use;
- Community group members were more likely to reduce stocking rates to encourage the regeneration of Box-Ironbark remnants than landholders not involved in a group.

4.3. The Value of Box-Ironbark Remnants

Landholders were asked to indicate the extent they valued Box-Ironbark remnants on their properties according to its various attributes. This question was asked using a five point Likert scale (not important - very important). For analysis purposes the five points were collapsed into a three point scale. The survey indicated that shade (78% indicated very important), water table control (76%), river protection (76%) and erosion control (73%) were the most highly valued attributes of Box-Ironbark remnants (Table 9). Habitat (67%) and wildlife corridor values (61%) rated highly, consistent with work done in the United Kingdom (Lofthouse 1974). Aesthetic values were also highly regarded (65% indicated very important). With the exception of shade, the rating of these values is consistent with work undertaken by Jenkins (1998) on remnant vegetation on private land in south-western Western Australia.

This demonstrates that over half the landholders surveyed have a high regard for Box-Ironbark remnants for each of the resource conservation aspects (water table, river protection, habitat, erosion control). Less valued, although still important qualities, were firewood production, timber production, recreation and added capital value. Gravel production was not considered an important characteristic (Table 11).

There was an inverse relationship between property size and the extent respondents valued Box-Ironbark remnants as a place for native plants and animals to live, as a habitat corridor, and a place for recreation (all significant to the 0.1% level). On the other hand, as area increased, so did the importance of Box-Ironbark remnants for timber, gravel mining, and the importance of shade (all to the 0.1% level of significance). This information suggests that landholders with larger properties were more concerned about features that returned a profit, whereas smaller landholders were more concerned about recreation and preservation of habitat.

Greater profitability of properties was significantly related to lower value of Box-Ironbark remnants as a habitat corridor, and a habitat. Profitability was also directly related to enhanced value of Box-Ironbark remnants for timber production, and gravel mining. Since the most profitable farms tended to be larger, (significant to <0.1%), these results are similar to those for property size.

Table 11. The value of Box-Ironbark remnants to landholders (N = 358; n = 337-349).

Valued for: (%)	Not important	Some importance	Very important	Don't know
Shade for stock	7	12	78	1
Water table	6	13	76	1
River protection	7	11	76	2
Erosion control	5	17	73	1
Habitat	6	23	67	1
Aesthetic	6	26	65	0
Habitat corridor	11	24	61	0
Firewood	8	31	58	1
Recreation	14	35	46	0
Timber production	18	40	38	0
Added capital value	14	43	38	2
Gravel mining	58	23	7	4

It was found that 33% of Principal Property Managers consider that Box-Ironbark remnants lift the productivity of their property, and 48% believe that it does not, with the remainder unsure (N = 233; n = 233). Principal Property Managers of larger properties (≥150 ha) believed that Box-Ironbark remnants lifted their production more than Principal Property Managers of smaller properties (<150 ha) (significant to 5% level). This result likely indicates the higher productive usage of larger properties. Principal Property Managers of grazing properties believed that Box-Ironbark remnants increased production of their properties compared to Principal Property Managers of mixed crop/livestock properties (significant to 5% level). This would reflect the enhanced utilisation of Box-Ironbark remnants for stock shelter compared to tangible crop production increases.

There were no significant differences between age of Principal Property Managers and value attached to Box-Ironbark remnants, or whether or not landholders actually had any Box-Ironbark remnants on their properties. There was a significant relationship between education levels of the Principal Property Manager, and Box-Ironbark remnants value for habitat, as a wildlife corridor (significant to <1%), and for aesthetics (significant to <5%) with more highly educated managers valuing these characteristics more. This is interesting considering education levels are not related to property size, and may be due to an increased understanding of the importance of issues relating to wildlife corridors and flora and fauna habitat. Female Principal Property Managers rated animal and plant habitat, habitat corridors, and recreation, significantly higher than male Principal Property Managers (at the 5% level). They also placed a lower value on using the trees for timber production than male Principal Property Managers, significant at the 5% level. These results are consistent with the findings of Curtis *et al*. (1994).

Key points

- Land protection and production aspects were the most valued feature of Box-Ironbark remnants, with habitat and wildlife values regarded highly;
- Box-Ironbark remnants were less valued for firewood and timber production, recreation and added capital value aspects;
- Landholders with smaller properties valued Box-Ironbark remnants more for recreation and habitat issues, while landholders with larger properties regarded issues relating to production and profitability more highly;
- 33% of Principal Property Managers believed that Box-Ironbark remnants lifted production on their properties, with Principal Property Managers with larger properties and/or grazing enterprises more likely to believe in the value of Box-Ironbark remnants in lifting production;
- The more highly educated Principal Property Managers valued habitat and wildlife issues more highly. Education of landholders is not linked to property size;
- Female Principal Property Managers rated habitat and wildlife values more highly than male Principal Property Managers.

4.4. Intention of Clearing

Landholders were asked to indicate whether they would consider clearing any of their Box-Ironbark remnants in the future. Data indicated that 75% of landholders would not clear any, and of the 24% that indicated they would consider clearing (Table 12), 64% indicated that it would only be a small amount (to install fence lines, harvest timber for fencing, etc).

A total of 19 landholders (8%) of the 233 with Box-Ironbark remnants on their properties indicated they might consider clearing all or a large part of their Box-Ironbark remnants for reasons such as increasing area of arable land or pasture.

These landholders manage 5,423 ha in area (average of 286 ha per property), with 574 ha of Box-Ironbark remnants in total (30 ha on average per property), 10% of the total area, and appreciable amount of the Box-Ironbark remnants on private land. As results have indicated that landholders with areas of quality Box-Ironbark remnants on larger properties are more likely to clear Box-Ironbark remnants, this should be a target group for programs aimed at improved conservation management of remnants.

Landholders who would consider clearing all or a large part of their Box-Ironbark remnants are in most respects typical (group membership, age, property size), however they are different from other landholders because they value Box-Ironbark remnants for habitat, aesthetic beauty, recreation and as a wildlife corridor significantly less. They also believe weed and pest control are a better use of money than other landholders, and organising volunteer labour a poorer use of money.

Hodgkins *et al.* (1997) found 11% of landholders in the Central West of New South Wales, would consider clearing some of their remnant vegetation, and Wilson (1992) presented data indicating 12% of landholders in the Catlins region of New Zealand would consider clearing some remnant vegetation, lower than the results of this survey for all landholders, but a similar result to those who have Box-Ironbark remnants.

Table 12. Landholders response to consideration of clearing their Box-Ironbark remnants (N = 233; n = 230).

Would you consider clearing?	% of respondents
Yes	24
No	75

Key Points

- Box-Ironbark remnants are valued for shade, erosion, river protection, water table protection, habitat and wildlife corridor values, aesthetics and firewood;
- Owners of larger properties were more concerned about profitable aspects, whereas owners of smaller properties are concerned about recreation, aesthetics and habitat values;
- Women managers rated habitat, corridor and aesthetic values higher than men;
- 75% of landholders would not consider clearing their Box-Ironbark remnants;
- 92% of landholders with Box-Ironbark remnants would not consider clearing all or a large part of their Box-Ironbark remnants, and valued Box-Ironbark remnants more highly for habitat, aesthetic beauty, recreation and as a wildlife corridor than those who would clear significantly.

4.5. Concerns About Box-Ironbark Remnants

In order to gain a complete picture of landholders perceptions of native vegetation, it is important to understand what they consider as potential problems. Landholders were asked to rate on a four point Likert scale (collapsed to two) their level of concern for various issues related to the management of Box-Ironbark remnants.

Landholders have the greatest level of concern for Box-Ironbark remnants as a haven for pest animals (73%) (Table 13). There was a high level of concern for Box-Ironbark remnants as a fire hazard (65%), and as a source of weeds (54%). Issues of trespassing and trees falling on fences were of low concern (Table 13).

Table 13. Landholder concerns about Box-Ironbark remnants on private land (N = 358; n = 341-347).

	Fire hazard	Pest animals	Weeds	Trees on fences	Trespassing
Little/No Concern (%)	31	24	41	61	65
Some/Great Concern (%)	65	73	54	36	20

A significant relationship existed between property size and concern about trees falling on fences, (to 0.1% significance), concern as a haven for pest animals (to 1% significance), and concern about Box-Ironbark remnants being a source of weeds (to 5% significance). This is probably due to:

1. the fact that the number of these problems would increase as area of property increased, and therefore the problems would be encountered more often; and

2. managers of larger properties are running a business and these problems are time consuming and expensive to manage, and reduce production.

There were no significant relationships between any of the potential concerns and education, off-farm work, presence or absence of Box-Ironbark remnants, or gender/age of Principal Property Manager.

Key Points

- Weeds, pests and fire considered the main concerns of landholders regarding Box-Ironbark remnants;
- Principal Property Managers of larger properties are more concerned about weeds, pests and trees falling on fences.

4.4. Level of Interest

The survey asked landholders if they were interested in learning more about their Box-Ironbark remnants (Table 14). Data indicated 87% of respondents were interested in learning more about their Box-Ironbark remnants, and 40% of respondents indicated that they were very interested in learning more about their Box-Ironbark remnants. It is possible that respondents were giving the response they considered 'socially desirable'. The high level of expressed landholder interest in learning about Box-Ironbark remnants, combined with the high survey response rate (72%) suggests that there may be a good deal of interest in learning more about Box-Ironbark remnants.

There were several factors that had a significant relationship to the level of landholder interest in learning about Box-Ironbark remnants. The level of knowledge factor (a combined value from all level of knowledge categories; Table 14) was significantly related to level of interest, as was the education level of the Principal Property Manager, both to the 0.1% level of significance, showing that higher

Table 14. Level of landholder interest in Box-Ironbark remnants (N=358; n=346).

Interested in learning more	% of landholders
No	9
A little	47
Very Interested	40

educated landholders, and those with a higher level of knowledge are inclined to be more interested in learning about their Box-Ironbark remnants. This shows that to a certain extent we are 'preaching to the converted' in reaching those who are more highly educated and understand the issues related to Box-Ironbark remnants. Gender was also related to level of interest with women Principal Property Managers being significantly more interested in learning about their Box-Ironbark remnants (significant to 5%).

Interest in learning more about Box-Ironbark remnants was found to be significantly related to activities such as bird watching occurring on the property (significant to <0.1%), reducing stocking to allow plants to regenerate (significant to <l%), and not harvesting timber for fencing material (significant to <l%). This may indicate that those who would like to learn more about their Box-Ironbark remnants have already taken an interest in the subject, and understand the related issues.

Interestingly, length of time lived in the area was related to interest in Box-Ironbark remnants, with newer arrivals to the area being significantly more interested in learning about their Box-Ironbark remnants (significant to 1%). Those landholders that had Box-Ironbark remnants on their properties were more interested in learning about their Box-Ironbark remnants (significant to 1%).

This in an encouraging finding for those attempting to improve management of Box-Ironbark remnants.

Of the 9% of landholders (n = 34) who were not interested in learning more about their Box-Ironbark remnants, 50% managed no Box-Ironbark remnants, and those that did managed 306 ha in total (mean 19 ha, median 15 ha). The total managed area of those who were not interested was 19,095 ha (mean 561 ha, median 143 ha), counting several properties in excess of 2,000 ha. Principal Property Managers who did not wish to learn more about their Box-Ironbark remnants also had considerably less Box-Ironbark remnants on their property (2% of the total area as opposed to the mean of 4% across the surveyed area).

There was found to be no significant relationship between property size and level of interest in Box-Ironbark remnants.

Key Points

- 87% of landholders indicate they are interested in learning more about their Box-Ironbark remnants;
- Landholders with a higher level of education and knowledge are more interested in learning about Box-Ironbark remnants than other groups;
- Female Principal Property Managers are more interested in learning about their Box-Ironbark remnants than male Principal Property Managers;
- Those landholders who manage Box-Ironbark remnants are more interested in learning about it;
- People new to an area are more interested in learning about their Box-Ironbark remnants;
- Those landholders not interested in learning more about Box-Ironbark remnants had either no Box-Ironbark remnants on their properties, or on average only half of the area of Box-Ironbark remnants than the group who were interested.

4.7. Level of Knowledge

Landholders were asked to rate their own level of knowledge on topics such as the causes of rural tree decline, the impact of foxes on native animals, the importance of the shrub layer, how to identify birds, shrubs, trees and native grasses, and the role trees have in increasing production through shelter. This question was asked in a five point Likert scale. For analysis purposes, the categories high and very high were collapsed, as were low and fair. Landholders level of knowledge was considered high if it was >33%.

Landholders consider their level of knowledge high on the impact foxes have on native fauna (53%), the role trees play in increasing production through shelter (48%) tree identification (40%), the importance of the shrub layer (38%), and identification of bird species (36%) (Table 15). Less well known were the causes of rural tree decline (28%) identification of native grasses (16%), and shrubs (12%) (Table 15). This indicates that many landholders need assistance in the development of an inventory of what their Box-Ironbark remnants contain, and that the message of the importance of biodiversity in general, and the understorey in particular, is not widespread.

Table 15. Level of knowledge of landholders on various issues (N = 358; n = 349-352).

Topic	None	Low	High
The causes of rural tree decline (%)	7	63	28
The impact of foxes on fauna (%)	3	42	53
The importance of the shrub layer (%)	4	55	38
Identification of birds (%)	4	59	36
Identification of shrubs (%)	7	80	12
Identification of trees (%)	2	57	40
The role trees have in increasing production through shelter (%)	3	47	48
Identification of native grasses (%)	13	69	16

When all the eight categories which landholders rate their level of knowledge were combined, (i.e. a rating out of 40 to give an index of level of knowledge), there were several factors which had a correlation with level of knowledge (Table 16). Group membership and time spent living on a property were positively related to level of knowledge (indicating a relationship between development of knowledge over time), as was amount of time lived in the area, presence of Box-Ironbark remnants on the property, property size, existence of a property plan, and the extent to which the Principal Property Manager engages in off-farm work.

Table 16. Relationship between level of knowledge index and factors relating to Box-Ironbark remnants. Factors that are significantly related to level of knowledge index (P <0.05) are indicated in bold type.

Factor	Spearman's rs	Significance
Length of time on a farm	0.2500	**0.000**
Member of a 'Group'	-0.1790	**0.000**
Length of time in area	0.1743	**0.001**
Box-Ironbark remnants on property	0.1790	**0.001**
Area of property	0.1685	**0.002**
Property plan	0.1315	**0.020**
Extent off-farm work Principal Property Manager	-0.1125	**0.034**
Partner involved	-0.0864	0.112
Profitable farm	-0.0838	0.125
Age	0.0794	0.142
Education	0.0437	0.422
Gender	-0.0223	0.685

Key Points

- Group membership and length of time on a farm have highest correlation with level of knowledge;
- Identification of shrubs, grasses, and the causes of rural tree decline were relatively poorly known;
- Managers of larger properties have higher level of knowledge;
- Landholders with Box-Ironbark remnants had higher level of knowledge;
- There are significant positive relationships between the level of knowledge and the length of time of the Principal Property Manager in the area and on the farm, the presence of Box-Ironbark remnants on the property, the area of the property, group membership, and existence of a property plan.

4.8. Use of Funds

Landholders were asked to rate proposals for spending resources to improve management of Box-Ironbark remnants as a 'poor use of money' to 'best use on money' on a four point Likert scale. The proposals were providing technical advice, providing fencing material, organising volunteer labour, paying labour costs, establishing demonstrations, paying landholders to reduce stocking rates, and controlling weeds and vermin.

Landholders clearly believed the control of weeds and vermin is the best use of money (78% indicating very good or best use of money) (Table 17). This could be for a variety of reasons, such as a reflection that landholders are more aware of weeds being a problem, or self-interest, as weeds and vermin can cause an economic loss to the property. As it was not specified whether weed and vermin control was for management of private or public land, landholders may be reacting against the perceived reduction in weed and pest control and management in State Parks, State Forests and other public lands and reserves managed by the DNRE.

Payment of fencing materials (62% indicating very good or best use of money) and labour (59% indicating very good or best use of money) to assist in fencing out Box-Ironbark remnants and revegetation were also considered valuable ways to utilise resources. Organising volunteer labour was also viewed as a good use of money (49% indicating very good or best use of money) (Table 17).

Paying landholders to reduce stocking rates (42% indicating poor use of money), providing technical advice (35%) and demonstration sites (22%) were viewed as a poor use of money by many respondents (Table 17). Of interest is the degree of negative feeling expressed about the option of

paying landholders to reduce their stocking rate. This may be due to the threat of too much Government control or intervention in activities on their farm, the challenging of traditional family farming practices, or the view from those already undertaking conservation management that others should not be funded to do so. Demonstration sites and provision of technical advice were not highly regarded by many respondents, which may be due to them having been over-used by agencies, and having lost their impact.

There was a significant relationship between property size, and support of payment of fencing costs, weed control and paying labour to assemble fencing (significant to 5%) with landholders managing larger properties believing these uses more worthwhile. This may again be due to the fact that larger properties are run more like a business, and agency money, which has the potential to increase productivity, will always be welcome. The fact that landholders are more interested in on-ground works than advice and regulation was further highlighted in interviews,

In contrast, as property size increased, landholders were less interested in technical advice. Age likewise was correlated with technical advice with younger managers considering it less useful (both significant to 5%). Group membership was found to be related significantly (to the 1% level) to fencing material being a good use of funds. This may be due to the focus Landcare has had on fencing and fencing grants (Curtis 1996).

Key Points

- On-ground works, especially weed and pest control are most highly valued;
- Members of groups consider fencing more important than do other landholders;
- Paying landholders to reduce their stocking rates is considered a poor use of funds by 42%.
- Demonstration sites and provision of technical advice are not highly regarded by 35%, possibly due to being over-used by agencies.

4.9. Recognition of Private and Government Programs

The survey asked respondents to indicate whether they had any contact with private or government programs or organisations to assist them in managing their Box-Ironbark remnants. This was ascertained through a number of questions. Landholders were asked to indicate if they knew of any private or government programs or organisations to assist them in management of their Box-Ironbark remnants, which ones they knew of, what sort of contact they had with them, and which had been the most useful. Approximately half (54%) of landholders indicated they knew of such a program or organisation, whilst 32% indicated they did not know of any (the remaining 14% did not answer the question). This poor response may be partly due to poor question design, or may simply reflect poor knowledge of services available to landholders.

Landholders were asked to indicate which program or organisation they had most contact with. Programs that were contacted most by landholders were the National Landcare Program (NLP) (22%), *Land for Wildlife* (LFW) (11%), and the Land Protection Incentive Scheme (LPIS) (7%) (Table 16). The Natural Resources Conservation League (NRCL) was also recognised (2%).

Table 17. Landholder response on use of available funding for Box-Ironbark remnant management (N = 358; n = 340-347).

	Provide technical advice	Pay for fencing materials	Volunteer labour	Pay labour	Demonstration sites	Reduce stocking rates	Weeds and pest animal control
Poor Use (%)	35	8	16	11	22	42	6
Good Use (%)	43	25	29	26	39	24	14
Very good/Best use of money (%)	19	62	49	59	34	31	78

Poorly recognised programs or organisations (less than 1% of landholders indicating they were most contacted) were Save the Bush, Greening Australia, Natural Resource Management Strategy, Conservation Covenants (Trust for Nature - Victoria), Australian Trust for Conservation Volunteers, and the Victorian National Parks Association (Table 18). This indicates that programs which can provide on-ground works and/or technical advice on an individual landholder basis, i.e. Landcare, *Land for Wildlife* and the Land Protection Incentive Scheme, gain more recognition from landholders.

Table 18. Most contacted programs and organisations (N = 358; n = 168).

Program/Organisation	% of Landholders
National landcare Program	22
Land for Wildlife	11
Land Protection Incentive Scheme	7
Natural Resources Conservation League	2
Greening Australia	0
No Answer	14

There was a significant relationship between knowledge of programs and organisations and property size (to the 1% level), with landholders managing larger properties knowing about more programs. Group membership was also positively related to knowledge of programs and organisations (to 0.1% significance).

When property size is compared to recognition of programs, an interesting trend emerges. The *Land for Wildlife* program is regarded more highly by holders of smaller properties, whereas the National Landcare Program and the Land Protection Incentive Scheme are more highly regarded by holders of larger properties. This may allude to the differences in the landholder group; landholders with small properties are more likely to be interested in conservation and group advice provides that (e.g. *Land for Wildlife),* whereas landholders with larger properties are more interested in programs that provide on-ground works.

Key Points

- Programs and organisations which provide on-ground works and/or technical advice were the most contacted;
- The National Landcare Program, *Land for Wildlife,* and the Land Protection Incentive Scheme were identified as the most often contacted programs;
- Most programs and organisations are relatively unknown to landholders;
- Extension and technical advice from private land conservation programs are more favoured by landholders with smaller properties, whereas landholders with larger properties prefer programs that lead to funding and on-ground works.

4.10. Property Profile

Landholders were asked various questions about their property, including size, enterprise, and whether a property plan had been developed for the property. Within the Box-Ironbark region where soils are generally poor, livestock grazing makes up the major agricultural enterprise. It was found that 46% of properties were grazing only, with a further 28% mixed cropping and grazing (Table 19).

Table 19. Agricultural enterprise on properties of respondent landholders (N = 358; n = 347).

Enterprise	% of Properties
Sheep	22
Cattle	17
Cattle and Sheep	7
Crop	0
Crop/Livestock	28
Horticulture	3
Other	22

Property size varied from 1 to 11,000 ha, however there were generally more smaller properties, with 31% of landholders managing less than 40 ha, and 49% of landholders managing less than 150 ha (generally not a viable holding) (Table 20). The 49% of landholders who have under 150 ha manage a total of 7,204 ha (only 4% of the area surveyed) and 1,177 ha of Box-Ironbark remnants (20% of the Box-Ironbark remnants in the area surveyed). Mean property size was 470 ha across all sub-catchments, however, property sizes in the Bendigo sub-catchment were lower and property size was higher in the Bolangum, Wedderburn and St. Arnaud sub-catchments (Table 21).

Table 20. Distribution of property size for survey respondents (N = 358; n = 347).

Size of property (ha)	% of respondents
0-39 ha	31
40-399 ha	31
400-999 ha	19
≥1,000 ha	16

Table 21. The mean property size across the sub-catchments (N = 358; n = 349).

Sub-catchment	Mean area (ha)
Bendigo	61
Wedderburn	1010
St. Arnaud	652
Chiltern	101
Lurg	239
Maryborough	444
Rushworth	1326
Bolangum	1151
Overall	470

Most properties (71%) indicated that they had neither written a property management plan (Table 22) nor made a profit in the past five years (54%). There was, however, a relationship between property size and profitability (significant to <0.1%). Larger properties were more profitable and more likely to have a management plan (significant to <0.1%) (Table 23). It was found that 28% of properties surveyed were managed with a plan, including 34% of the Box-Ironbark remnants managed with a plan. Seventy percent of the area surveyed was managed profitably, and this included 59% of the Box-Ironbark remnants.

Table 22. Development of Property plan on properties of respondents (N = 358; n = 315).

Property plan	% of landholders
Never developed	71
Have plan or in process of development	17

Table 23. Relationship between property size of respondents and property plan development (N = 358; n = 315).

Property plan	0-39 ha (%)	40-399 ha (%)	400-999 ha (%)	≥1000 ha (%)
Never completed	95	84	67	63
Have plan or in process of development	5	16	33	37

Key Points

- 46% of properties surveyed were grazing only, 74% have some grazing;
- 49% of properties were less than 150 ha in area, which represents only 4% of total area surveyed, but 20% of the Box-Ironbark remnants;
- Average property size is 470 ha;
- Larger properties are profitable and smaller properties are not;
- Larger properties are more likely to be managed with a plan, however most properties do not have a property management plan;
- Mixed cropping properties were more profitable than grazing properties;
- 70% of the area of the Box-Ironbark region is managed profitably;
- 34% of Box-Ironbark remnants are managed with a plan.

4.11. Landholder Profile

Personal information about the landholder completing the survey was requested in order to profile the Principal Property Managers and partners with Box-Ironbark remnants on private land. Personal information included years lived in the area, years lived on a farm, gender, whether the farm was managed with a partner, age, education level, extent of off-farm work, and membership of Landcare/community groups.

The mean amount of time that the Principal Property Managers had lived in the area was 32 years, with a median of 30. The mean years lived on the property was 29, with a median of 25 (Table 24).

Table 24. The number of years that landholders have lived in their current area, and on the property (N = 358; n = 349-353).

	Years landholders lived in their area (%)	Years landholders have lived on a farm (%)
<10 years	11	8
10 - 19 years	23	25
20 - 29 years	15	22
30-39 years	13	15
40-49 years	13	10
50-59 years	12	9
≥60 years	11	8

4.11.1. Co-management

More than 70% of properties are managed with a partner (Table 25). There was some variation across the sub-catchments, with Bolangum having the highest level of partner co-management (93%), and the Maryborough sub-catchment having the lowest (63%). It appears that the areas containing more large properties, and the areas further away from a major provincial centre, are more likely to have properties co-managed.

Table 25. Management of properties of respondent landholders with a partner (N = 358; n = 341).

Manage With Partner	% of respondents
Yes	71
No	25

Key Points

- Larger properties are more likely to be managed with a partner;
- Properties farther away from a regional centre are more likely to be managed with a partner.

4.11.2. Gender

Most Principal Property Managers were men (85%), and most partners were women (75%) (Table 26). This proportion increased significantly as area increased. Between sub-catchments, there were differences in the percentage of women as Principal Property Managers, with Rushworth having 18%, significantly more than the more intensive cropping areas of Bolangum and Wedderburn with only 3%. This is presumably because returns are higher in these areas, so most males would be employed full-time on-farm rather than get off-farm income.

Table 26. Gender of Principal Property Manager (N = 358; n = 334) and partner (N = 273; n = 254).

	Gender - Principal Property Manager (%)	Gender - Partner (%)
Female	8	75
Male	85	19

Key Point

- Larger properties are more likely to be managed by males.

4.11.3. Age

Although 75% of landholders were over the age of 35 (Table 27), it is interesting to note that on properties over 1,000 ha, almost 40% of Principal Property Managers were under 45, and 65% under 55. There was shown to be a strong relationship between age of Principal Property Managers and property size, with larger properties being managed by younger people (significance to <1%) (Table 27).

The Chiltern and Bolangum areas had significantly lower aged Principal Property Manager, compared to the Bendigo sub-catchment. This may be related to property size, as the Bendigo sub-catchment had the lowest average property size.

Key Point

- Larger properties are generally managed by younger landholders.

4.11.4. Education

The most common highest education level across all area sub-catchments and all property sizes was junior secondary (Table 28). There were no significant relationships between area

Table 27. Age of principal Property Manager (N = 358; n = 344) and partner (N = 273; n = 263).

Years	Age of Principal Property Manager (%)	Age of Partner (%)
<25	0	0
25-35	5	11
35-45	25	24
45-55	25	29
55-65	24	20
>65	17	13
Mean Age	47	45

of property and education, although as property size increased, the percentage of certificate and short course level education rose, and degree level education fell.

Table 28. Highest level of education of Principal Property Manager (N = 358; n = 340) and partner (N = 273; n = 256).

Highest level of education	Principal Property Manager (%)	Partner (%)
Primary	10	8
Junior secondary	36	35
Senior secondary	18	21
Certificate/Short courses	15	10
Degree/Diploma	15	21

Age was highly correlated to education with younger managers likely to have a higher education level (significant to <0.1%). Landholders with properties under 150 ha in area were more educated than landholders with properties >150 ha (significant to the 1% level).

When education was examined relative to sub-catchment, Lurg recorded the highest percentage of degree graduates, and was found to have a significantly higher education level than the Bolangum sub-catchment. This may be related to a higher level of education for those who work off-farm, as the extent of off-farm work is higher in all sub-catchments except Chiltern and Bendigo.

Key Points

- The most common highest level of education of Principal Property Managers and partners was junior secondary;
- Landholders on properties <150 ha were more highly educated than landholders on properties ≥150 ha;
- Sub-catchments near regional centres had more highly educated landholders.

4.11.5. Hours Worked Off-farm

Landholders were asked to indicate whether they or their partners were engaged in work off-farm, and if so, for how many hours per week. Almost half (45%) of all Principal Property Managers, and 41% of partners indicated they worked off-farm (Table 29).

Of these, 41% (18% of total respondents) worked more than 19 hours per week (considered 'full-time') and 54% worked less than 19 hours per week (Table 30). There was a significant relationship between age and off-farm work (significant to 0.1%), with younger people working more off-farm. There was a highly significant inverse relationship between size of property and the amount of time landholders spend working off-farm (significant to 0.1%) (Table 31).

Table 29. Involvement in off-farm work of Principal Property Manager (N = 358; n = 342) and partner (N = 273; n = 254).

	Principal Property Manager (%)	Partner (%)
Yes	45	41
No	50	53

Table 30. Hours worked off-farm (working landholders only) for both Principal Property Manager (N = 162; n = 154) and partner (N = 110; n = 107).

Hours	Principal Property Manager (%)	Partner (%)
20 hours or less	41	47
>20 hours	54	50

The Chiltern sub-catchment had the highest level of off-farm work, with 63% of Principal Property Managers working off-farm (Table 31). This was significantly more than all sub-catchments except Bendigo and Lurg. St. Arnaud on the other hand had the lowest percentage with only 25% of Principal Property Managers working off-farm. This indicates that those landholders who reside close to a regional centre (Albury/Wodonga or Bendigo) are more likely to be engaged in off-farm work.

Key Points

- Younger people work more hours off-farm;
- 55% of Principal Property Managers work full-time on-farm;
- 18% of Principal Property Managers and partners work full-time off-farm;
- Landholders residing close to a regional centre are more likely to work off-farm.

4.11.6. Group Membership

Membership of a Landcare, Soilcare or similar community group was indicated by 40% of Principal Property Managers, and 28% of partners (Table 32). These results are consistent with those reported by Curtis (1996). A number of those landholders interviewed who indicated they were not members of a group, suggested that it would be worthwhile program with which to become involved.

The Lurg sub-catchment had the highest level of group membership with 73% (Table 33). This is not surprising considering the focus of various programs in the Lurg sub-catchment over the past decade, i.e. the Molyullah-Tatong Tree and Land Protection Group, and their extensive involvement in the project to conserve the highly endangered Regent Honeyeater (Lee pers. comm. 1996). Bolangum likewise had a high level of group participation (69%),

Table 32. Group membership of Principal Property Managers (N = 358; n = 346) and partners (N = 273; n = 273).

	Principal Property Manager (%)	Partner (%)
Yes	40	28
No	56	72

Table 31. The relationship between property size of respondents landholders and hours worked off-farm for both Principal Property Managers (N = 169; n = 162) and partners (N = 110; n = 108).

Principal Property Manager	0-39 ha (%)	40-399 ha (%)	400-999 ha (%)	≥1000 ha (%)	Partner	0-39 ha (%)	40-399 ha (%)	400-999 ha (%)	≥1000 ha (%)
19 or less hours/week	18	33	58	57	19 or less hours/Week	34	22	54	59
>20 hours/week	82	67	42	43	>20 hours/week	66	78	46	41

Table 33. Group membership for Principal Property Managers across sub-catchments.

Group	Bendigo	Wedderburn	St. Arnaud	Bolangum	Chiltern	Lurg	Maryborough	Rushworth
Yes	6	32	34	69	45	73	43	29
No	94	68	66	31	55	27	57	71
n	47	37	32	42	49	45	46	48

both significantly more than all other areas. Bendigo had the lowest level of group membership with only 6%, perhaps due to the fact that the sub-catchment is closest to a major provincial centre, and landholders may be either retired or commuting to the city. The group membership in the Bendigo sub-catchment was significantly less than all other sub-catchments.

There was shown to be a very significant relationship between property size and participation in groups (significant to <0.1%) with larger property owners being more likely to be involved in a group. This supports the findings of Curtis and DeLacy (1994) on Landcare in the northeast of Victoria, indicating that the notion of Landcare groups being filled with hobby farmers is incorrect. Also interesting is the positive relationship between hours spent in off-farm work and group membership, again significant to 0.1%. This may indicate that groups are providing a social meeting place, especially important for those who are not involved in many hours of off-farm work each week.

Key Points

- 40% of Principal Property Managers are landcare group members
- Group membership increases with property size;
- Less time spent off-farm working equated to higher group membership.

5. Discussion

A total of 358 landholders responded to the mail survey with an overall response rate of 72%, ranging from 63 to 82% across the eight sub-catchments surveyed. These landholders manage properties totalling 164,000 ha, of which approximately 5,900 ha was rated by landholders as being Box-Ironbark remnants greater than 1 ha in area (approximately 4% of the properties surveyed). This represents 2% of the Box-Ironbark remnants remaining, and indicates that up to 16% of Box-Ironbark remnants in Victoria may be on private land, consistent with estimates by Davidson (unpublished 1996).

As was expected, there was a diversity in response across the surveyed group. However, it does appear as if factors such as property size, level of education and extent of off-farm income, and the linkage of these to farm profitability, are variables influencing the presence, perception and management of Box-Ironbark remnants. The data does seem to cluster into two broad groups with similar characteristics, perceptions, values and attitudes: landholders with properties <150 ha in area, and those with properties 150 ha or larger, with the value of 150 ha seen as critical to likelihood of profitability of the property.

Small property landholders

The average property size of 470 ha and average area of Box-Ironbark remnants of 17 ha for all respondent landholders is deceptive, as:

- only 65 % of respondents have Box-Ironbark remnants (232 landholders);

- 49% of respondents (176 landholders) manage properties less than 150 ha in area, representing less than 4% of the area surveyed (<6,560 ha; mean of 37 ha), incorporating 20% of the Box-Ironbark remnants in the area surveyed (1,180 ha; mean of 6.7 ha of Box-Ironbark remnants/property);
- 31% of respondents manage properties less the 40 ha in area, which includes many of the so-called "hobby" farmers.

The Principal Property Managers and partners in this group tend to manage properties that are not profitable (choice of property more likely based on lifestyle than employment and income), have lived on the property and in the area for less time, are likely to spend more time working off-farm than Principal Property Managers and partners with larger properties.

This group manages a disproportionate amount of Box-Ironbark remnants on private land in northern Victoria, and the characteristics of this group indicate they are more likely to perceive and manage their Box-Ironbark remnants quite differently to landholders with larger properties. As a group they are:

- less knowledgeable on issues concerning Box-Ironbark remnants and identification of plants and animals, however, despite this, they value their Box-Ironbark remnants more highly for recreation, aesthetics and habitat than landholders with larger properties;
- more highly educated than landholders with larger properties;
- managing Box-Ironbark remnants that are generally much smaller than on larger properties, and will be more prone to weed invasion and other edge effects, and indeed are more likely to have weeds, and less likely to have mature trees and wood on the ground;
- more likely to manage their Box-Ironbark remnants in certain ways inappropriate for conservation purposes, with tidying-up and burning of sticks a more frequent activity of smaller properties;
- more likely to utilise technical advice and extension options from the various programs, and are less likely to pursue programs that lead to funding for on-ground works, than landholders with larger properties; and
- less likely to belong to a community group such as Landcare or Soilcare.

Landholders with small properties are less reliant on the property for profit than landholders with larger properties, largely due to the properties not being commercially profitable. Indeed, this group uses their Box-Ironbark remnants less frequently for shelter and grazing of stock, most likely due to many properties in this category having no stock grazing at all, or stock grazing being non-viable. This group also feel less knowledgeable about their Box-Ironbark remnants (and their properties generally), as they have been associated with the area and the property for less time, and spend less time on their properties due to off-farm work commitments than landholders with larger properties.

While landholders with small properties value their Box-Ironbark remnants for habitat, recreation and aesthetic values more frequently, they have less time to engage in on-ground works within their Box-Ironbark remnants, or to seek funding for these works. Their shorter period of association with the property and the area equates also to a higher level of interest in Box-Ironbark remnants. However, of the activities undertaken in their Box-Ironbark remnants, they are more likely to engage in certain activities that are not conversant with conservation management, such as tidying and burning sticks. They are unlikely to gain advice on conservation management of Box-Ironbark remnants or to have the adoption of conservation management techniques reinforced, as they are less likely to be involved in a community group.

All of these points indicate that while there is a desire to retain the natural values of their Box-Ironbark remnants, i.e. what probably attracted them to the property in the first instance, the landholders with smaller properties do not necessarily have the time or knowledge available to render appropriate conservation management.

A proportion of this group do go to the trouble of seeking advice, and it is likely that this group are already "converts" to conservation management, and engage in activities such as bird watching, reduction of stocking rates and no collection of timber in Box-Ironbark remnants. As this group are more educated overall, they are more likely to seek the technical information required from appropriate programs than landholders with larger properties. This tendency is exacerbated by the set of values placed on the Box-Ironbark remnants, and the decreased reliance on profitability of the property, and provides some indication as to the reason behind a considerable number of landholders with smaller properties becoming involved in volunteer private land conservation programs such as Land for Wildlife.

Large property landholders

Landholders with properties 150 ha or larger in areas constituted 51% of the respondents (182 landholders), representing 96% of the area surveyed (153,600 ha; mean of 844 ha), incorporating 80% of the Box-Ironbark remnants in the area surveyed (4,720 ha; mean of 27 ha Box-Ironbark remnants/property), or approximately 3.1% of the area of these properties.

The Principal Property Managers and partners in this group tend to manage properties that are profitable, have lived on their properties and the area for longer times, and are likely to spend less time working off-farm than Principal Property Managers and partners with smaller properties. Landholders of larger properties are less highly educated.

The Principal Property Managers in this group manage a disproportionately smaller amount of Box-Ironbark remnants on private land in northern Victoria than the smaller property landholders, and have characteristics that indicate that they are less likely to perceive and manage their Box-Ironbark remnants differently to landholders with smaller properties. As a group they are:

- rated as more knowledgeable on a variety of issues concerning Box-Ironbark remnants than landholders with smaller properties, and value their Box-Ironbark remnants more highly for land protection and production aspects compared to habitat and wildlife issues;
- managing Box-Ironbark remnants that are generally larger than on smaller properties, and will be less prone to weed invasion and other edge effects, and indeed are less likely to have weeds, and more likely to have mature trees and wood on the ground;
- more likely to utilise their Box-Ironbark remnants for shelter and grazing of stock, timber production and to undertake pest control, but are less likely to cut trees for fence posts or to tidy-up and burn sticks, compared to landholders with smaller properties. There is a strong relationship between profitability and decreased value of Box-Ironbark remnants for habitat and wildlife aspects which impacts on this group;
- more likely to seek funds for on-ground works in association with Box-Ironbark remnants, and less likely to utilise technical advice and extension options than landholders with smaller properties; and
- more likely to belong to a community group than smaller property landholders.

These landholders are reliant on their property as their main source of income, and thus factors relating to profitability, such as use of Box-Ironbark remnants for timber, sheltering and grazing of stock, etc., are of paramount consideration. Due to this emphasis, the use of Box-Ironbark remnants to protect the land resources of the property ("utilitarian" values), e.g. erosion control and salinity management, is also valued as of considerable importance. Some landholders within this group clearly view Box-Ironbark remnants as potentially productive areas for timber and gravel mining. The importance of these values to landholders is consistent with the work of Hodgkins *et al.* (1997) in the central west of New South Wales, Wilson (1992) in the Catlins region of New Zealand, and Jenkins (1998) in Western Australia.

While habitat and wildlife values are viewed as important, this group still rates production and land protection values more highly, which

indicates a stewardship of the Box-Ironbark remnants of their property, that is limited and impinged upon by the necessity to maintain a productive farm. This indicates that landholders beliefs about their Box-Ironbark remnants does not necessarily dictate their actions in managing the area, as was found by Cary (1993).

Landholders with larger properties clearly feel as though they have knowledge in the areas related to Box-Ironbark remnants (and presumably the management of their properties in general) and, by inference, their desire to remain the primary managers of Box-Ironbark remnants. This is most likely due to their knowledge of their properties (more time spent on property and less on off-farm work), and for this reason, they do not seek technical and extension advice (and know of few of the associated programs and organisations) and do not favour reduction in stocking rates, but would rather funding or resources for on-ground works or labour. This group's greater participation in community groups compared to smaller property landholders will favour their access to funding and resources, while suspicion of agency intervention or "control" over their properties could also be another factor favouring resources for on-ground works over advice and subsidies in this group.

Like the smaller property landholders, a small proportion of this group do go to the trouble of seeking advice, and again, it is likely that this group are "converts" to conservation management of Box-Ironbark remnants.

All of these points indicate that there is essentially a desire to retain, and a recognition of, the natural values of their Box-Ironbark remnants, which may have been developed over long-term association with the property, and may indeed be generational. However, the landholders of larger properties are attempting to maintain large areas a productive and profitable agricultural enterprises, and this must, by financial imperative, be the dominant management objective.

Considerations

The high response rate indicates that the Project Team and Steering Committee did their job in terms of appropriate methodology and implementation of a high quality and well-considered survey, however, it also demonstrates that there is a high latent landholder interest across all groups. This is interestingly one of the highest response rates across a conservative rural community for what is effectively a "green" related issue, and this result should largely dispel the myth of landholder disinterest in remnant vegetation conservation and management.

The high response and level of interest does need to be tempered somewhat by this project being largely about values and perceptions, and landholders were not specifically asked if their interest would be translated into action.

Both smaller and larger property landholders appear to have the basic intent and interest to conserve and appropriately manage Box-Ironbark remnants, but are both limited by reasons that are largely economic:

- for smaller property landholders who derive their predominant income off-farm, a lack of time and/or knowledge that is largely due to less time spent on their properties, and a lesser reliance on the profitability of their Property;
- for larger property landholders who derive their income largely on-property, considerations for the conservation and management of Box-Ironbark remnants must be tempered by the need for the property to be productive and profitable.

These economic "blocks" raise some questions as to how conservation and management of Box-Ironbark remnants may best be achieved in the future, particularly when programs and organisations currently involved in the promotion of private land conservation are generalist, reactionary, relatively poorly resourced and rarely recognised by landholders. There would appear to be the need to devise different strategies to achieve conservation of Box-Ironbark remnants based on the groupings and data collected in this project. Past strategies and programs have clearly not targeted all of these groups effectively, probably due to insufficient information on the target groups. The main target groups appear to be:

1. larger property landholders (excluding those in Group 2);
2. more highly educated landholders;
3. smaller property landholders (excluding those in Group 2); and
4. landholders who utilise Box-Ironbark remnants for production.

The more highly educated landholders across all groups valued Box-Ironbark remnants for habitat and wildlife more highly than other groups and are more likely to seek advice from an appropriate source. This group has a strong conservation ethic, and is already "converted" to conservation management practices, and is probably already managing their Box-Ironbark remnants, whether they are part of a program or not. Any program can cater for this group by the provision of appropriate technical advice in a suitable format. This group may currently be getting this information through the existing *Land for Wildlife* scheme, and thus, may not require any further targeting.

While smaller property landholders, notwithstanding the "converted" group, may be more inclined to manage Box-Ironbark remnants for conservation, the obstacles imposed by their smaller unproductive properties combined with less time spent on-farm need to be overcome. It would seem that this group is more amenable to technical advice and extension, and thus a more proactive approach towards landholders with Box-Ironbark remnants of quality by a variety of programs such as *Land for Wildlife* is likely to be successful. There would need to be assessment of the priorities of resourcing the interaction with this group to ensure Box-Ironbark remnants are of significant habitat quality, as many of the smaller Box-Ironbark remnants will be of lesser quality. This group constitutes 50% of the landholders in this region, but only 20% of the Box-Ironbark remnants area. Sharing the cost of management of Box-Ironbark remnants may be more of an option with this group, with more off-farm income and smaller Box-Ironbark remnants to manage.

The obstacle to larger property landholders is one of profitability and priority; in general Box-Ironbark remnants will only be managed for conservation if economic circumstances can allow it. By and large, the Box-Ironbark remnants on their properties is in better ecological condition than Box-Ironbark remnants on smaller properties, thus the larger remnants on such properties may be of higher priority to manage than smaller, lower quality Box-Ironbark remnants. This group constitutes 50% of the landholders in the region, and is managing up to 80% of the Box-Ironbark remnant area in northern Victoria, and therefore will be central to any programs or strategies. These landholders appear to be largely aware of the issues and even the appropriate management, and are likely to respond to incentives for on-ground works associated with the appropriate management of Box-Ironbark remnants. These landholders may not respond well to legislative control or regulation of Box-Ironbark remnant management, and may react strongly to attempts to remove full control of sections of their property from them, although this aspect has not been investigated in this project.

Data indicated that 75% of respondents would not clear their Box-Ironbark remnants at all, however, the 19 landholders who favoured considerable clearing (540 ha or 10% of the total Box-Ironbark remnants in the area surveyed) valued habitat and wildlife significantly less than the remainder. This is a difficult group to evaluate, as some form of legislative approach will still not engender a conservation ethic, and education is relatively unlikely to be successful, given their increased interest in utilisation of Box-Ironbark remnants for productive reasons, such as timber harvesting. Appropriate financial incentives for the management of higher quality Box-Ironbark remnants may be the only approach in this situation.

There are concerns about Box-Ironbark remnants in relation to weeds, pest animals and fire hazard across all landholder groups. Provision of resources for on-ground works such as weed and pest animal control, and education regarding the relationship between Box-Ironbark remnants and these issues of concern is required to change current negative attitudes, and to encourage appropriate conservation management.

6. Acknowledgements

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Appendix I

Landholder Questionnaire

1. Managing Remaining Native Bush in Your Area

In all areas covered in this survey there are pockets of remaining native bush on private land, roadsides and reserves. How do you value the remaining native bush in your area? Indicate your views for the topics below. Select one of the following responses for each topic:

	Not important	Minimal importantance	Some importantance	Important	Very important	Don't know
To provide shade and shelter for stock						
Firewood collection						
Aesthetic Value						
Recreational value						
Habitat Corridor						
To manage the water table						
For erosion control						
Timber production (posts etc.)						
Added capital value (increasing the value of your farm)						
Source of gravel						
Place for native plants and animals to live						
To protect rivers and streams from erosion and silting						

If funds were available for management of remaining native bush on private land, how do you think this money could be best used? Circle the number of the most appropriate response from:

	Poor use of money	Good use of money	Very good use of money	Best use of money
Employ people to provide technical advice				
Pay part of fencing material costs				
Organise volunteer labour to assist in fencing and replanting				
Pay part of the labour costs to assist in fencing and replanting				
Establishing demonstration sites for management of native species				
Paying landholders to reduce stocking rates and encourage natural regeneration				
Controlling weeds and vermin				

2. Private and Government Programs

There are a number of private and government programs attempting to work with landholders to manage remaining native bush.

Do you know of any private or government sponsored programs to assist you in managing the remaining native bush in your area or on your farm?

❑ YES ❑ NO (go onto section 3)

If YES, which programs do you know of (circle the number of the program) ?

❑ Land For Wildlife (Department of Natural Resources and Environment)

❑ Save the Bush (Australian Nature Conservation Agency)

❑ Land Protection Incentive Scheme (Department of Natural Resources and Environment)

❑ Greening Australia (e.g. Corridors of Green)

❑ Natural Resource Management Strategy (Murray-Darling Basin Commission)

❑ National Landcare Program

❑ Natural Resources Conservation League

❑ Conservation Covenants (Trust for Nature)

❑ Australian Trust for Conservation Volunteers

❑ Victorian National Parks Association

❑ Private Trusts

❑ Other (please specify) .....

What contact have you had with these programs? For each program tick the appropriate responses in the table below.

❑ Know of, but no formal contact

❑ Personal contact with staff

❑ Newsletter received

❑ Funding has been received

❑ Technical advice provided

❑ Work taken place on property

What was the most useful aspect of the program(s)? Write in the space below.

.....

.....

.....

Which program have you had the most contact with? Circle the most appropriate answer.

- ❑ Land For Wildlife (Department of Natural Resources and Environment)
- ❑ Save the Bush (Australian Nature Conservation Agency)
- ❑ Land Protection Incentive Scheme
- ❑ Greening Australia
- ❑ Natural Resource Management Strategy (Murray-Darling Basin Commission)
- ❑ National Landcare Program
- ❑ Natural Resources Conservation League
- ❑ Conservation Covenants (Trust for Nature - Victoria)
- ❑ Australian Trust for Conservation Volunteers
- ❑ Victorian National Parks Association
- ❑ Private Trusts
- ❑ Other (please specify)

3. Concerns about remaining native bush in your area

How does the remaining native bush in your area concern you? Please indicate your views for the topics listed below by circling the appropriate number from:

	No concern	Little concern	Some concern	Great concern
Fire Hazard				
Place to live for pest animals				
Source of weeds				
Trees fall on fences				
Used for recreation which leads to trespassing				

4. Level of Knowledge

Indicate what you believe is the current level of your knowledge for each of the topics listed below. Circle number of best description from:

	None	Low	Fair	High	Very High
Causes of rural tree decline					
Impact of foxes on native birds and animals					
Importance of shrub layer for native wildlife					
Identification of local bird species					
Indentification of shrub species					
Indentification of tree species					
The role trees have of increasing production through shelter					
Indentification of native grass species					

Are you interested in learning more about the native plants and animals in your area? Circle the most appropriate response below.

❑ Not Interested ❑ A little Interested ❑ Very Interested

5. Managing Remaining Native Bush on your farm

The term "remaining native bush" has been used throughout this survey. This is "an area of land larger than 1 ha (2.5 acres) of native trees which have not yet been substantially cleared or have regenerated." The term "your farm" refers to the total area managed by you in your area.

Do you have any remaining native bush on your farm (an area larger that 1 ha (2.5 acres) which has not been substantially cleared, or has regenerated)?

❑ YES ❑ NO (go onto section 7).

IF YES

How many different patches of remaining native bush are on your farm? .....

How large is the largest patch of remaining native bush on your farm? .....

How much remaining native bush in total is present on your farm? .....

Do you believe remaining native bush lifts production on your property?

❑ YES ❑ NO ❑ DON'T KNOW

If YES

How does remaining native bush lift production on your property? .....

Would you consider clearing any of the the remaining native bush on your farm?

❑ YES ❑ NO

IF YES

How much of the remaining native bush would you consider clearing?

❑ All ❑ A Large Part ❑ A Small Amount.

Under what circumstances?.....

In the past 5 years have any of the following activities occurred in the remaining native bush on your farm? Please indicate on the table by circling never, occasionally or every year.

	never	occasionally	every year
Firewood collection			
Weed control			
Pest Animal control			
Burning Off			
Gravel mining			
Timber harvesting for fencing material			
Grazing			
Planting native trees and shrubs			
Fencing to manage stock access			
Reduced stocking to encourage regeneration of plants			
Bird-watching			
Tidying up and burning sticks			
Bee Keeping			
Seed Collection			
Mineral Prospecting			
Sheltering stock			

6. Your remaining native bush

Look at the photos on the previous page. They show remaining native bush with tree, shrub, and understorey species present, and fallen timber on the ground (important for native wildlife), and an area of well grazed Grey Box Woodland. In the following table tick the boxes which correspond to what is present in your remaining native bush.

	None	Few	Some	Many
Very large old trees				
Medium to large trees				
Small trees				
Prickly native shrubs				
Other native Shrubs				
Native grasses				
Introduced weeds				
Wood on the ground				
Standing dead trees				

What are the native plant species present in your remaining native bush which you have identified ? (write in the space below)

.....

.....

.....

What are the weeds present in your remaining native bush? (write in the spaces below)

.....

.....

.....

What are the wildlife species present in your remaining native bush? (write in the space below)

.....

.....

.....

Have you noticed the disappearance of any wildlife from your native bush over the last 20 years? (write in the space below)

.....

.....

.....

7. Information about Yourself

How long have you lived in your local area?

I have lived in my local area for..... years.

How long have you been a farmer or lived on a farm or rural property as an adult?

I have been a farmer/lived on a farm/rural property for..... years

Do you manage your farm with a partner? (circle number of correct response)

❑ YES ❑ NO (if no fill in the following section for yourself only)

Please circle the appropriate answers on the following table for yourself (and your partner if applicable)

Gender ❑ Woman

❑ Man

Age ❑ Under 25 years

❑ 25-34 years

❑ 35-44 years

❑ 45-54 years

❑ 55-64 years

❑ Over 65 years

Highest education level completed

❑ Primary school or below

❑ Junior secondary (Form 4/Year 10)

❑ Senior Secondary (Form 6/Year 12)

❑ Certificate/Short Course

❑ Degree or Diploma

In the past 12 months did you earn income from off-farm work?

❑ YES ❑ NO

If yes, how many hours did you work on average off farm? .....

Landcare groups, Tree groups, Soilcare groups and other similar organisations have formed in many areas around Victoria. While it is difficult to define membership, you could probably consider yourself a member if you have participated in more than one group activity in the past 12 months.

Are you a member of a Landcare, Tree, Soilcare or similar "Group"? (Circle number of correct response)

❑ YES ❑ NO

Is your partner a member of a Landcare, Tree, Soilcare or similar "Group"? (Circle number of correct response)

❑ YES ❑ NO

8. About Your Property.

Area of your farm is ..... hectares

Select the description below that best describes the farming enterprise(s) of your farm.

❑ Mostly sheep grazing.

❑ Mostly cattle grazing.

❑ Mixed cattle and sheep grazing.

❑ Mostly cropping.

❑ Mixed crop and livestock.

❑ Horticulture.

❑ Other (please specify) .....

Have the managers of "your farm" prepared written management plans that cover the financial operation, property design or layout and the physical environment of "your farm"? (circle the number of the correct response)

❑ Never involved in preparing a written property management plan.

❑ Have completed/in the process of completing a management plan.

On average has "your farm" returned a profit in the past five years? (farm income exceeded all farm expenses before tax) (circle number of correct response)

❑ YES ❑ NO

Appendix II

The Box-Ironbark Workshop

Proceedings from the Workshop held on the 3-4 April 1997 at the University of Melbourne, Dookie College

Steve Hamilton (ed.)

The Workshop

Over the 3rd and 4th of April 1997, a total of 87 people from a variety of groups assembled at Dookie College in response to a need for the development of future directions for the conservation and management of Box-Ironbark remnants on private land in northern Victoria.

It is a matter of record that the Box-Ironbark region has been a neglected area of the State in terms of sustainable conservation management, on both public and private land. The region, by nature of its climate, potential agricultural productivity and geological past, has been heavily impacted by agriculture and mining. Less than 5% of the Box-Ironbark vegetation present prior to European settlement now exists on private land, and clearing still continues at an estimated rate of more than 1,000 ha per annum. There is a need to develop strategies to manage remaining Box-Ironbark remnants on private land.

The Land Conservation Council (now the Environment Conservation Council) looked at the public lands within the Box-Ironbark region in northern Victoria as part of a Special Investigation. While this reported an resolutions on public land management of Box-Ironbark, there remains an obvious need to evaluate the future management of the many private land remnants that still exist. This clearly involves consultation with the landholders of the region.

The Workshop took its rise as one of the major outcomes of a joint Land and Water Resources Research and Development Corporation (LWRRDC)-Environment Australia funded project aimed at investigating the perceptions of farmers to the remnants of Box-Ironbark woodlands and forests they have on their properties. Considerable data collection had been gathered by various surveys of landholders with remnants on such issues as: the amount of remnant left on private land, the way in which it is managed and valued, and its habitat quality. This type of baseline information had never been determined for Box-Ironbark remnants, or for that matter, remnants of most habitat types. The data and interpretation of the results of these surveys are reported earlier in this publication.

The summary findings of this project were presented at the Workshop, providing a summary of the landholder perspective. Many of the people who have an involvement in Box-Ironbark management were invited to the workshop, including landholders, landholder and community groups, catchment agencies, local government, State and Federal conservation agencies, and tertiary institutions and scientists. A list of participants is provided in the back of these proceedings.

The aim of the Workshop was to examine a number of key areas in detail, including:

Who are the current key players in Box-Ironbark management on private land?
What is the vision of Box-Ironbark remnants on private land in the future?
What are the current impediments and issues relating to Box-Ironbark management?
What are the strategies and pathways that need to be in place to achieve the future vision?

These Proceedings are a record of the major discussions and resolutions achieved in the three workshop sessions over the two days. These are presented in summary form, as they were developed, with no alteration of the original sentiments/words expressed by the participants.

Dr. Steve Hamilton
Workshop Organiser

What are the key features of an integrated and coordinated approach to management and conservation of Box-Ironbark?

Approach: This session was preceded by introductions from Mr. Ian Davidson (Greening Australia - NSW) and Mr. Kevin Ritchie (Department of Natural Resources and Environment). In this session, participants were asked to identify the key features of an integrated and coordinated approach to the conservation and management of Box-Ironbark on private land. In essence, participants were asked to provide an image for the future of conservation and management of Box-Ironbark, and the approaches, policy and planning frameworks that needed to be in place to achieve this future. After discussion all individual points were recorded on the wall and grouped according to broad themes. The themes developed are outlined in the table opposite.

Who are the key organisations in Box-Ironbark conservation and what are their roles and programs?

Approach: In this session, participants organised themselves into four workgroups based on a logical grouping of the organisations represented: policy and planning, landholders, research and extension/education. Each group was asked to describe the various organisations involved, their roles and programs as they relate to Box-Ironbark conservation on private land. The compiled results are provided below under the headings of the four major groups.

Policy Workgroups

Non-Government Organisations, e.g. Victorian National Parks Association (VNPA), Australian Conservation Foundation (ACF)

The Role	The Programs
Lobbying for biodiversity conservation	• National Woodlands Campaign • National Mining Campaign • Victorian Box-Ironbark Campaign • Grassy Ecosystems Reference Group • Submissions, Friends Groups and Public Relations

Land Conservation Council (Environment Conservation Council)

The Role	The Programs
Provide recommendations to State Government on balanced use of public land	• Box-Ironbark Special Investigation Inventory + information compilation + consultation → descriptive report → develop recommendations → advise State Government

Local Government

The Role	The Programs
➔ Strategic planning	• Planning scheme • Roadside management plans • Contribute to regional catchment strategy
➔ Enforcement	• Permits, penalties—native vegetation retention controls • Bylaws, e.g. stock routes
➔ Information dissemination	• Contact point
➔ Incentives/encouragement	• Possible rate rebates
➔ Facilities	• Provision of meetings places, photocopying, etc.

Environment Australia - Sustainable Landscapes Branch

The Role	The Programs
➔ Provide policy development at the national level for the Commonwealth Government. ➔ Funding for increasing native vegetation quality and cover.	• National Vegetation Initiative (NVI) —some contribution to property management planning, farm forestry, Green Corp. Regional land use

Department of Natural Resources and Environment (DNRE)(Flora Section, Vegetation Management Unit, Flora, Fauna and Fisheries - Regional)

The Role	The Programs
➔ Policy development ➔ Authoritative advice ➔ Strategic planning ➔ Liaison with DNRE and with stakeholders ➔ Frustrating non-government organisations	• Flora and Fauna Guarantee Program • *Land for Wildlife* • Box-Ironbark Conservation Program • Save the Bush • Tree Victoria • Native Vegetation Retention controls • Regional Forest Agreements

Landholder Workgroup

Landholders

The Role	The Programs
➔ On-ground management of Box-Ironbark remnants on private land. ➔ Representation on CALP Boards ➔ Provide peer group influence ➔ Facilitating ìprojectsî in local area	• Landcare (revegetation, education/awareness *(Land for Wildlife)** • Whole farm planning (Agroforestry networks)* • CFA (fuel management) • Roadside management plans (assessments) • Peer influence (VFF, local pubs, sporting clubs) • Catchment and Land Protection Boards • Local Government (ratepayer lobbying re planning and policy)

(* = agency initiated but landholder dependent)

Extension and Education Workgroups

University of Melbourne, Dookie College

The Role	The Programs
➔ Formal education ➔ Education service ➔ Information transfer	• Subjects within both Degree and Diploma courses • Tours by visiting groups • Excursions for visiting students • Holding Box-Ironbark Workshop • Preparation of education materials • Providing Box-Ironbark resource for education, extension and demonstration

Greening Australia

The Role	The Programs
Inform, empower and resource landholders to better manage remnant habitats	• Fencing incentives • Management advice on-ground • Act as a broker between Community and Government • Raising public awareness

Trust For Nature - Victoria

The Role	The Programs
Protectron in perpetuity for natural areas of significance on private land	• Covenants ➔ including stewardship program • Acquisition ➔ from revolving fund and public appeals • Survey of important sites • Education ➔ various ways !

Molyullah-Tatong Tree and Land Protection Group

The Role	The Programs
➔ Get research information to people on the ground ➔ Get public money to help people on the ground ➔ Get wider community labour to assist with works	• Enthuse people for attacking the problems • School excursions to see the issues, collect seed, propagate and plant • Arrange one-to-one farm visits to clarify ecological processes to landholders • Organise LEAP and Green Corp programs, prison labour, University groups, community volunteers to help secure funds

Department of Natural Resources and Environment

The Role	The Programs
➔ Environmental management (support) on public and private land ➔ Landholder support with technical information, Landcare, financial incentives, encouragement and education ➔ Selling Government policy	• *Land for Wildlife* • Salinity • Land Protection Incentive Scheme • Good Neighbour • Tree Victoria • Farm Smart • Threatened species • Farm Forestry • Monitoring

Research Workgroups

Catchment and Land Protection Boards/Catchment Management Authorities

The Role	The Programs
Encourage cohesion and co-operation at the regional level	• Target priority areas • Facilitate community links ➔ Landcare groups, Networks, Trust For Nature, Goulburn Valley Environment Group, many others • Ensure community concerns are raised • Continue consultation process • Access a diversity of resources

Land and Water Resources Research and Development Corporation

The Role	The Programs
Identify, fund and manage research and development that leads to sustainable use and management of natural resources	• Remnant vegetation • Salinity • Riparian/rivers • Grazing and cropping systems • Agroforestry • Catchment planning and management • Industry best practice

University of Melbourne, Burnley College

The Role	The Programs
Management of vegetation component of ecosystems: ➔ identify and develop ecological management of specific ecosystems; ➔ develop specific manipulation programs; ➔ technical aspects of large scale plant production, establishment and control.	• Grassland/woodland ecosystem • Urban sites: remnants, habitat creation, landscape education, POS

University of Melbourne, Dookie College

The Role	The Programs
Strategic baseline research	• Social survey • Ecological research • Basic survey • Co-ordination role • Demonstration of active management

Ecological Interactions (Consultants)

The Role	The Programs
➔ Identifying NSW White Box remnants that are significant ➔ Implementing protection for sites ➔ Researching ecology of White Box with respect to management	• Establishment of the White Box grassy woodland protected area network

Charles Sturt University, Johnstone Centre Albury

The Role	The Programs
Research: ➔ inventory ➔ evaluation ➔ understanding social and biological systems	• Economics of remnant native vegetation • Social science aspects (social dynamics and policy) • Understanding ecosystems

DNRE/Arthur Rylah Institute/Deakin University

The Role	The Programs
Research on fauna and threatening processes to provide baseline data for management and land use planning	• Research project (extinction processes and fauna conservation in remnant Box-Ironbark woodlands)

What is blocking us from achieving the key elements of a coordinated integrated approach to conserving/ managing Box-Ironbark?

Approach: This session was preceded by a presentation of a summary of the landholder survey results by Dr. Steve Hamilton. In this session, participants worked in small workshop groups to identify the things that are blocking the coordinated and integrated approach to the conservation of Box-Ironbark (specifically the six key features identified earlier). This was described to people as identifying the barriers, impediments and underlying obstacles that stop or get in the way of the achieving our desired future. Each workshop group returned with a list of the main blocks they had identified to a plenary session. These were listed on the wall and discussed, leading to a summary list of the major blocks as follows:

Cost-benefit of Box-Ironbark remnants

- Lack of community debate about conservation versus productivity and costs and benefits of land.
- Various views on who benefits, who should pay and who is responsible for the degradation.

Environmental education

- Untargeted, inappropriate or not enough environmental education.
- Biology not taught widely enough - not a compulsory subject.

The value and priority of Box-Ironbark conservation

- Box-Ironbark is not a high priority.
- Differing values between people on what life is for.
- Slow-growing community recognition of the significance of box ironbark remnants is not creating political pressure.
- Other competing priorities.

Land-use and land-use decision-making

- Entrenched attitudes to land use (social, economic, ecological).
- Landholders not making money.
- An incorrect assumption that landholders will voluntarily protect box ironbark in the public good.
- No effective liaison between groups (landholders, Government, non-Government).
- Inappropriate political ideology.
- Inappropriate/unsustainable farming systems.
- Current entrenched agri-business culture of land uses resists change.
- Inflexibility of approaches.

Communication blocks

- Unclear extension messages that do not have on-ground outcomes.
- Communication skills not recognised as important.
- Lack of basic on-ground research.
- Ad-hoc ways of obtaining, organising and transferring the various types of information needed.
- Lack of coordination between research and extension.

Political factors

- Short term focus of Government.
- Fear of voter backlash.
- Trend of Government to downsize and corporatise and reduce budget.
- Ceaseless fracturing of organisations causes competition, conflicting-messages and shifting of responsibilities.

Parochialism and competition between organisations

- Parochial approach (State, Local Government and relevant community groups) hinders Individuals and organisations bioregional planning.
- The number of organisations contributes to no clear focus to deliver outcomes.
- Competing interests between relevant groups makes it difficult to sustain individual enthusiasm, morale and motivation for Box-Ironbark.
- Competitive approach to resources which are available.

Strategies and actions to conserve and manage Box-Ironbark remnants on private land

Approach: In this session, participants were broken into three workgroups based on the organisations represented: policy and planning, research and extension/education. Each Workgroup was asked to devise strategies and actions for the conservation and management of Box-Ironbark remnants, to achieve the image described for the future and tackle the seven major blocks identified. With the key strategies and actions recorded, participants were asked to choose an action or strategy that they would be Involved with, and with other like-minded people, develop the detail to these strategies and actions. Consideration was to be given to what has already been done, who has to be involved, timelines, likely resources and possible pitfalls. A representative of each Workgroup presented the summary findings of that group back to the main audience. The compiled results are provided below under the headings of the three major functional groups.

Extension/Education Strategies

- Deliver relevant messages to the target audience that are translated into action;
- Have key messages that are coordinated;
- Strong awareness campaign on all aspects of Box-Ironbark;
- Use local media to publicise threatened species in the local area;
- Consistent advice;
- Provide opportunities for ìclose encountersî with vulnerable, rare or threatened species;
- Message that Box-Ironbark remnants are important;
- Identify what land managers need to protect box ironbark and then ensure extension provides; and
- Bring relevant people together to identify key messages/actions (out in the field)

Actions and Next Steps

- Get National Vegetation Initiative bid up
- Provide opportunities for close encounters revisit over time between agencies, landholders and groups
- Field session to identify the simple messages supporting education and extension
- Forum at catchment level (coordinated by Catchment and Land Protection Board)
- Identify ways of delivering messages and training
- Contact Local Government representatives

Policy and Planning Strategies

- Lobby both sides of politics for:
  - biodiversity strategies,
  - attention to temperate woodlands, and
  - awareness program;
- Rewards and incentives (at Commonwealth, State, Local Government and Catchment levels) to landowners to manage Box-Ironbark for conservation value (with educational component);
- Form a catchment management authority alliance to coordinate funding and strategies to manage Box-Ironbark; and
- Each of us commits to establish a network to communicate well about Box-Ironbark.

Research Strategies

Target research to quantify benefits - social, economic and environmental

- *What has already been done?* ➔ Some method development and some existing benefit information for other areas.
- *What needs to be done?* ➔ Better, more acceptable (dynamic and temporal) and more integrated methods (including stakeholders in the research process).
- *Who will carry this out?* ➔ Johnstone Centre (Charles Sturt University), landholders and stakeholders in the "Study Area". Possibly Dookie College, DNRE, LWRRDC. Also development of a "Team Concept".
- *What should be done next?* ➔ Mike Lockwood to invite potential "team" members to a meeting to work up the project.

Team concept for information feedback and links. Aim: to provide feedback and linkage between all players

- *What has already been done?* ➔ Adopting the approach used by some funding and research organisations e.g. CSIRO Divisions, Research and Development Corporations.
- *What needs to be done?* ➔ The other important players in Box-Ironbark need to adopt the same team approach.
- *Who will carry this out?* ➔ Landholders, Researchers, non-Government Organisations, Funders, Local Government, State and Federal agencies that provide funding, legislation and advice. A broker for this process must be located in the Box-Ironbark. Dookie College has successfully brokered the Workshop so stay with a successful broker.
- *What should be done next?* ➔ Identify one region close to Dookie to pilot a team and evaluate its success, seeking National Vegetation Initiative funding to do this.

Broker an on-going forum to ensure an integrated approach and better evaluation and decision-making

- *What has already been done?* - Currently a loose affiliation between agencies and other organisations but the structure of the Natural Heritage Trust is partly forcing groups to come together. Current organisations dealing with Box-Ironbark (e.g. Box-Ironbark Alliance) are not representative groups.
- *What needs to be done?* ➔ Need to establish a specific Box-Ironbark forum which represents the Catchment Management Authorities, DNRE and other agencies, Local Government, community and landholder groups and landholders.
- *Who will carry this out?* ➔ Dookie College as an ìindependentî broker should be in a position to coordinate this process.
- *What should be done next?* ➔ Parties need to be brought together as soon as possible in order to coordinate approaches to next years round of Natural Heritage Trust funding.

Information showbag and demonstration of what is possible

- *What has already been done?* ➔ Lots of information exists that is printed and unread.
- *What needs to be done?* ➔ Conduct field days on real farms and put together an information ìshowbagî.
- *Who will carry this out?* ➔ "Real" farmers, researchers and funding bodies.
- *What should be done next?* ➔ Dookie College to put together an NHT application to carry this out.

Summary

This Workshop has provided the first real opportunity for most of the major stakeholders involved in the conservation ëof Box-Ironbark in Victoria to assemble and formulate strategies and directions. In this sense, the forum was extremely valuable in establishing networks, future avenues of communication between stakeholders, and evaluation of common ground on a variety of issues. For many participants, the opportunity to be further educated on what Box-Ironbark is and what the issues are will ultimately be of considerable future benefit to its future conservation.

Some important stakeholder-groups were not well represented at the workshop, particularly local government and the landholders themselves. Considerable effort was made to invoive these groups in the Workshop (over 30 landholders involved in the original mail survey invited, and all northern Shires with Box-Ironbark vegetation), however, these efforts clearly were not overly successful. While it can be argued that the survey results in effect represented the landholder opinion, the lack of a strong local government presence was a major shortcoming.

Given that the Workshop was driven by the LWRRDC-Environment Australia funded project, an obvious final task for the Project Team was to assemble these key stakeholders in Focus Groups to discuss the issues raised at the Workshop, and to further explore their role in the process of conservation and management of Box-Ironbark.

Despite the fact the Project findings presented at the workshop were not the final results, they certainly contributed to vigorous debate, and in some cases, enlightenment in the attitudes of landholders to their Box-Ironbark remnants.

From my perspective, there were some very clear future pathways and directions set by participants at the Workshop.

Despite there being some initial opposition to the concept by some participants, it is a clear message that the landholders themselves need to be viewed as the key managers of Box-Ironbark remnants. We have to give landholders credit for being able to manage their own land in the long-term. The legislative or "big-stick" approach has rarely (if ever) worked, and hardly leads to trust between what should be partners in land management. We also need to recognise the financial pressures and hardships that many landholders are currently experiencing.

We also must recognise that they cannot be expected to become highly enthused and driven to undertake conservation works on their private land on their own. To enable landholders to manage their remnants, we need to be able to assist them in various ways:

- to develop consistent policies and approaches at all levels of government;
- to provide them, and the general rural community, with evidence of the value of the remnants in the first place, either by example or education;
- to encourage a stewardship ethic to facilitate long-term conservation management of remnants;
- to provide some form incentive, in the form of the basic resources, like fencing, labour and weed and pest control, to enable the conservation works to be carried out; and
- to provide on-going technical advice at the farm level, and to encourage participation in conservation programs, such as *Land for Wildlife*

The current situation confronting a landholder interested in remnant conservation is of changing (and pre-NHT) diminishing funding sources, and a variety of community and government groups (at different levels) all working in the same area, but rarely together, and often competitive. It is also clear that the Landcare movement is not totally managing this aspect of land management due to:

- incomplete landholder participation;
- lack of funding; and
- the wide diversity of issues tackled by Landcare groups.

This must be a significant impediment to private land conservation, and a source of great frustration and confusion to the landholders.

The clear message was that all of the stakeholder groups must start communicating, cooperating and integrating their functions to ensure consistency of programs and the pooling of the vast expertise available. A forum of all major stakeholders should be established on a regional basis as an on-going consultative and policy review body. Co-operative projects and resource sharing will also be outcomes of this process

The aim of the Workshop, and the Project, was to contribute to the conservation and better management of the remnants of Box-Ironbark vegetation on private land in Victoria. To this end, it was successful, as I have already seen evidence of better networking and integration, and greater commitment to future efforts by stakeholders who had up until now taken only a minor role. I am sure that many of the outcomes discussed will be realised.

I would really like to see a similar event staged in 4-5 years (whether Dookie does this or not), so that the then current status of Box-Ironbark can be examined, any progress made can be assessed, and the next steps in strategies and pathways formulated. The coming 5-year period is critical to the maintenance of the Box-Ironbark system, both on private and public land. Letís hope that we all meet then to discuss how well the system has been conserved on private land.

Dr. Steve Hamilton
Workshop Organiser
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