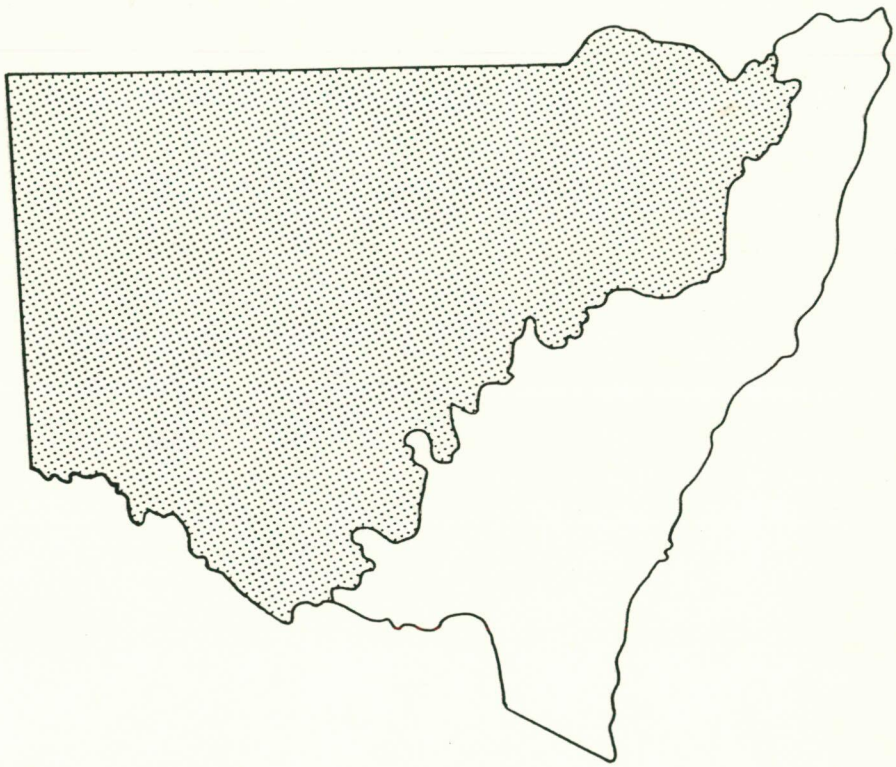
AN ECONOMIC AND SOCIAL SURVEY OF LICENSED KANGAROO TRAPPERS AND CHILLER OPERATORS



M.D. Young

R.J. Delforce

July, 1984

CSIRO Division of Wildlife & Rangelands Research, Deniliquin.

VOLUME I

TABLE OF CONTENTS

Chapter 1. Aims and Objectives of Study

1.1 Background

1.2 Purpose of study

1.3 Nature of the management program and design of project

1.4 Structure of the report

Chapter 2. The Kangaroo Management Program

2.1 Overview

2.2 Legislation

2.3 Program objectives

2.4 The Kangaroo Management Program's structure

2.4.1 Monitoring

2.4.2 State quota and numbers taken

2.4.3 Controls on the location of chillers throughout zones

2.4.4 Restrictions on numbers taken

2.4.5 Restrictions on trappers

2.4.6 Reporting procedures

2.5 Trends and recent policy changes

2.5.1 Population trends

2.5.2 Trends in licence numbers

2.5.3 Relationship between kangaroo population and quota

Chapter 3. Research Methodology

3.1 Introduction

3.2 Data collected

3.2.1 Data from NPWS records

3.2.2 Data from chiller operators

3.2.3 Data from licensed trappers

3.3 Survey method

3.4 Questionnaire design

3.4.1 Questions common to both chiller operators and licensed trappers

3.4.2 Questions unique to chiller operators

3.4.3 Questions unique to licensed trappers

3.5 Survey sample

3.5.1 Sample proportions

3.5.2 Replacement rate

3.5.3 Relationships between current licensed trapper population and immediate past licensed trapper population

Chapter 4. Chiller Operation as an Occupation

4.1 Introduction

4.2 Social status

4.3 Nature of the occupation

4.4 Capital structure

4.5 Economic status

Chapter 5. Kangaroo Trapping as an Occupation

5.1 Introduction

5.2 Social status

5.3 Nature of the occupation

5.4 Capital structure

5.5 Econommic status

Chapter 6. Interactions Between Licensed Trappers, Landholders and Kangaroos

6.1 Introduction

6.2 Informal arrangements with s.121 licensed occupiers

6.3 Harvesting methods

6.4 Effects of price changes on harvesting activities

Chapter 7. Interactions Between Licensed Trappers, Chiller Operators and Licensed Fauna Dealers

7.1 Introduction

7.2 The "chain of command" from fauna dealers to chiller operators to licensed trappers

7.2.1 Influence of fauna dealers on chiller operators

7.2.2 Influence of chiller operators on licensed trappers

7.3 The direct link between licensed fauna dealers and licensed trappers

Chapter 8. Influence of NPWS Regulations on Kangaroo Trapping

8.1 Introduction

8.2 Illegal shooting of kangaroos

8.3 Getting around the NPWS regulations

8.4 Possible changes to NPWS regulations

8.4.1 Responses to changes hypothesized by the researchers

8.4.2 Licensed trappers' desired changes

Chapter 9. Overview and Policy Recommendations

9.1 Introduction

9.2 Overview of licensed trappers and chiller operators as people

9.3 Overview and policy ramifications by subject area

9.4 Summary

Appendix 1 List of broad hypotheses used to assist in survey design

PREFACE

This report is the first of a series which will describe and analyse the present status of the N.S.W. Kangaroo Management Program and, where appropriate, recommend changes to it. The report draws upon data collected from a survey of licensed kangaroo trappers and chiller operators. We would like to thank these respondents for their time, co-operation and, we believe, their frankness. The identity of all those interviewed has remained, and will continue to remain, confidential to CSIRO. The name and identity of each and every person interviewed has been destroyed.

The preparation of this report has involved many people and, while the responsibility for it must remain with the authors, we would particularly like to thank all the licensed fauna dealers who gave us the support needed to make the survey possible. The project is a joint one with the National Parks and Wildlife Service of N.S.W. and we would particularly like to acknowledge the assistance of Jack Giles, Leighton Llewellyn, Mal Swain and the late Fred Hersey of the Service. Within CSIRO we would like to thank all of our colleagues for their support, especially Tony Little who patiently processed all of the survey data, Max Gentle who introduced us to a data management package known as SIRS, Kathy Wicks for preparing all the figures, and Aileen Cornish who patiently typed the many drafts which we produced. We would also like to thank Graeme Caughley who provided the kangaroo density data for each of the chillers surveyed.

Finally, we would like to thank all the people who contacted us at the commencement of this study and went to considerable length to suggest the hypotheses we should test. As this is the first of a series of reports, much of the data is presented with little comment. We trust that in such cases those wishing to use such data will wait until complementary information from fauna dealers and landholders, and about the market for kangaroo products has also been collected.

Chapter 1

AIMS AND OBJECTIVES OF STUDY

1.1 Background

The National Parks and Wildlife Service of New South Wales (NPWS) maintains a Kangaroo Management Program which is structured to meet the dual aims of

(i) ensuring the survival of viable populations of all macropods throughout their full range; and

(ii) reducing the impact of kangaroos on the incomes received by rural landholders.

To aid their conservation all the 15 macropods still found within N.S.W. are protected under the National Parks and Wildlife Act, 1974 and only the four most abundant species - the red kangaroo (Macropus rufus), the eastern grey (M. giganteus), the western grey (M. fuliginous) and the wallaroo (M. robustus) - are considered to cause sufficient damage to landholders' crops and pastures to justify an industry-based damage mitigation program. The damage mitigation aim is achieved by licensing landholders (occupiers), shooters (trappers) and fauna dealers to take and, if they wish, process kangaroos for commercial gain.

1.2 Purpose of study

All stages of the program are regulated and in recent years some of its commercial aspects have caused a number of difficult administrative problems for the NPWS. Moreover, there has never been an objective evaluation of these aspects of the program. Consequently, in May, 1983 the NPWS entered into a collaborative research project with the CSIRO Division of Wildlife and Rangelands Research to obtain reliable information on all social and economic aspects of the management program and determine the most appropriate way to continue to administer it.

Subsequently, the NPWS indicated that, having regard to the Kangaroo Management Program's aims and objectives, the goals of the joint research project were:

(i) to gain a more complete understanding of the economic factors which limit the capacity of the kangaroo industry at times when it is necessary to take large numbers of kangaroos and to contract when, for reasons of conservation, only small numbers of kangaroos may be taken;

(ii) to determine, with the benefit of the information referred to above, if the kangaroo management program should be redesigned and if so, on what basis;

(iii) inter alia in (ii), from an economic/effectiveness standpoint, to determine whether it is desirable and/or essential to retain the policy of management zones and a limited number of fauna dealers and if not, how should this policy be changed;

(iv) to determine whether there is a better method of determining optimum numbers of licensed trappers, fauna dealers and skin dealers than at present, and if so, what method;

(v) to determine if it is prudent to 'open-up' the industry and if so, how;

(vi) to determine if there is a feasible method of removing decisions relating to commercial aspects of the industry from the Service and if so, what options are there?

In relation to the last objective, the Service must retain control of maximum culling levels in order to satisfy its responsibilities for conservation.

1.3 Nature of the management program and design of project

Figure 1.1 presents an interactive model of the kangaroo management program. Kangaroos are perceived to cause damage to landholders' crops, fences and water, and the pastures grazed by livestock. Recognizing this, landholders seek permission from the NPWS to take kangaroos from their property. Simultaneously, licensed trappers seek permission from the NPWS to take kangaroos for commercial gain and, via chiller operators, supply their carcasses plus skins and skins alone to licensed fauna dealers. Licensed fauna dealers in turn supply various markets with kangaroo products.

(Insert Figure 1.1)

In order to facilitate orderly data collection and analysis the collaborative research project is divided into the four stages of data collection indicated below:

- STAGE ONE - the collection of data from licensed trappers and chiller operators;
- STAGE TWO - the collection of data from licensed fauna dealers;
- STAGE THREE - the collection of data from rural landholders; and
- STAGE FOUR - the collection of data on the market for kangaroo products.

It is envisaged that, where possible, interim conclusions and recommendations would be made at the completion of each stage and that a final report encompassing the conclusions which can be drawn from aggregating all stages of the project would be presented to the NPWS upon completion of Stage Four. Figure 1.2 summarizes the logic behind adopting this framework.

In each stage information is collected on a series of linkages between the various aspects of the program from a different information source. In Stage Three information on the linkage between kangaroos and crops and livestock will be obtained via the construction of a simple regional competition model and the

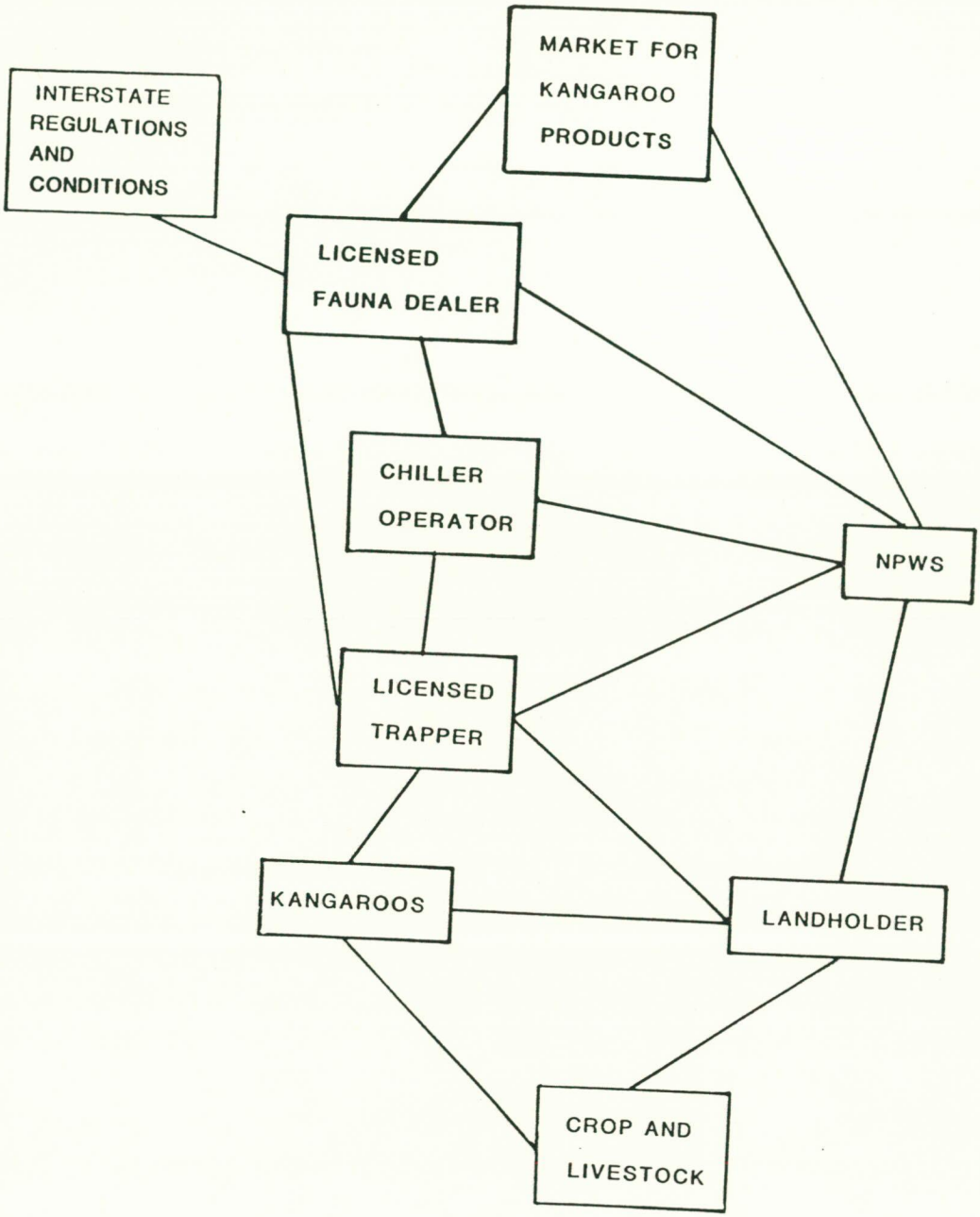


Fig. 1.1 Nature of the interactions which influence the number of kangaroos taken under the management program.

elucidation of shadow prices from landholders. Without this information it is not possible to evaluate the consequences of making any trade-offs between the program's conservation and damage mitigation objectives nor determine the optimum number of licensed trappers. The alternative is to administer the program by setting simplistic constraints such as the setting of an annual harvest quota and a minimum density of 1 kangaroo per square kilometre.

(Insert Figure 1.2)

The remainder of this report refers to Stage One of the project and describes data primarily collected from licensed trappers and the operators of the chillers which they supply. In recognition of the kangaroo management program's aims the primary objectives for this stage of the project were:

(i) to identify licensed kangaroo trapper profiles and the methods they use to take kangaroos for commercial purposes;

(ii) to identify and quantify the economic state (costs and incomes) of licensed kangaroo trappers under the current kangaroo harvesting program;

(iii) to identify and, where possible, quantify the impact of NPWS management policies on the activities and economic state (costs and incomes) of licensed kangaroo trappers;

(iv) to identify and, where possible, quantify the impact of the actions and market strategies of licensed fauna dealers and chiller operators on the activities and economic state (costs and incomes) of licensed kangaroo trappers;

(v) to identify and, where possible, quantify the impact of rainfall on the activities and economic state (costs and incomes) of licensed kangaroo trappers;

(vi) to identify and, where possible, quantify the interaction between landholders and licensed trappers as perceived by licensed trappers.

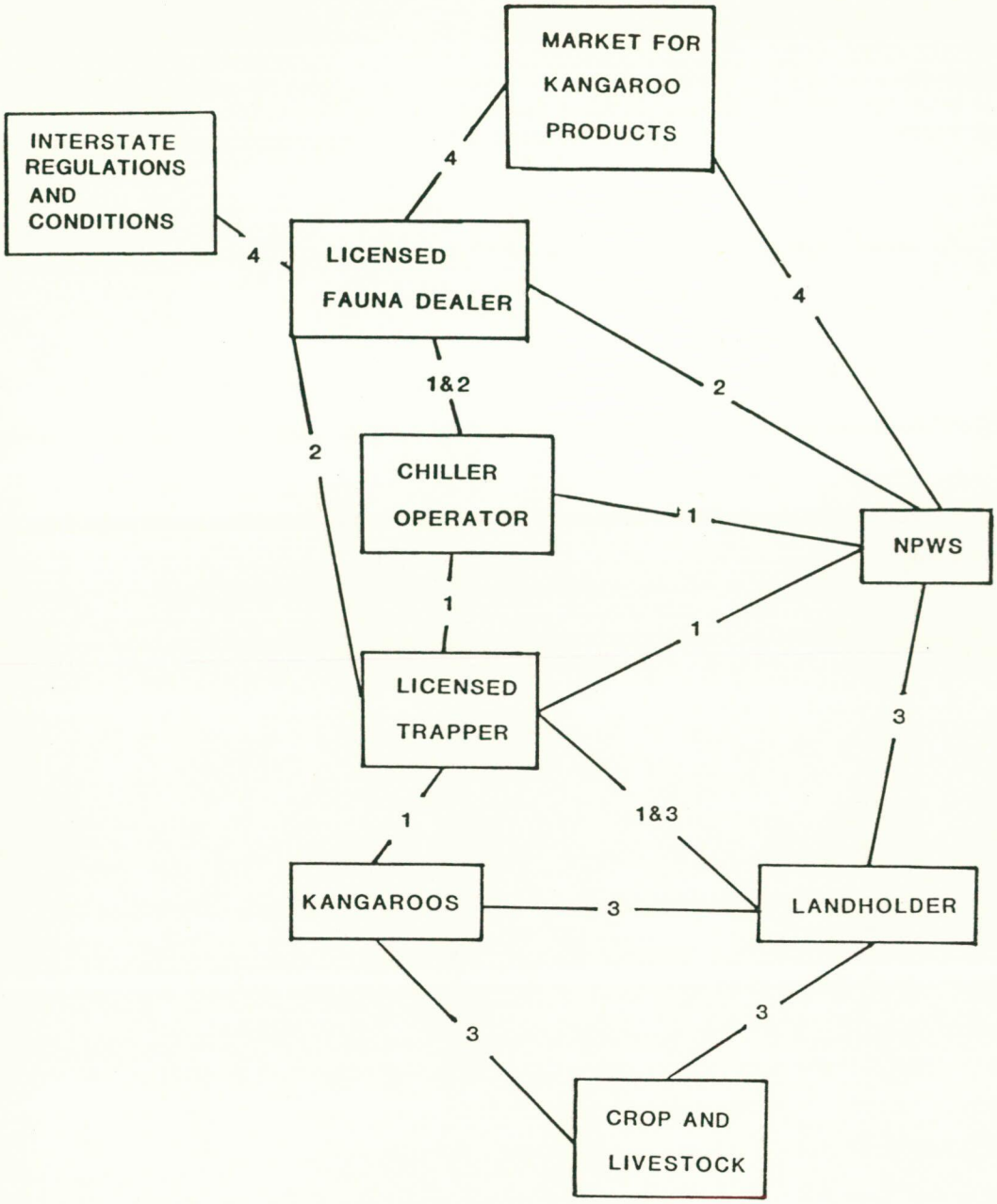


Fig. 1.2 Interactions to be studied in each stage of the project.
Each number represents a project stage.

Based on these objectives and also comments solicited from a broad cross section of people interested in the Kangaroo Management Program a general and then a more specific set of hypotheses were formulated to guide questionnaire design and analysis (Appendix 1). These hypotheses stress the need to collect information on the dynamic nature of the kangaroo product industry and particularly the tendency of red and grey kangaroo populations to fluctuate in response to seasonal conditions.

Collectively, the objectives implied a need for a survey of both chiller operators and licensed trappers using stratified selection criteria to ensure that the major regional characteristics of the program were identified.

1.4 Structure of the report

The remainder of this report is divided into eight chapters. Chapter 2 describes the nature and recent history of the kangaroo management program and Chapter 3 the research methodology adopted for this stage of the project and the nature of the sample taken. Chapter 4 then reports on chillers which are the principal field management unit of the program and the people who manage them. Information on the socio-economic status of licensed kangaroo trappers is then presented in Chapter 5 and the manner in which trappers obtain access to and find kangaroos is presented in Chapter 6. Chapter 7 then examines the interactions which occur between licensed trappers and chiller operators. Finally, Chapter 8 reports on the effects which the NPWS have on the above processes so that Chapter 9 can draw general conclusions and, where appropriate, make recommendations about those aspects of the kangaroo management program which relate to licensed trappers and chiller operators.

Chapter 2

THE KANGAROO MANAGEMENT PROGRAM

2.1 Overview

The National Parks and Wildlife Act, 1974 enables the NPWS to license people to take protected species for commercial gain (section 123 or s.123). Regulations under the Act and guidelines contained within various policy files determine the nature of the procedures used.

Key elements within the program are:

(i) "the commercial harvest area" - that part of New South Wales where the taking of kangaroos for commercial purposes is permitted;

(ii) "licensed fauna dealer" - a person who holds either a section 124 (or s.124) Fauna Dealer (Kangaroo) Licence to trade in both kangaroo skins and meat (i.e. whole carcasses) or a section 125 (or s.125) Skin Dealer (Kangaroo) Licence which only permits trade in skins;

(iii) "licensed trappers" - people licensed under section 123 (or s.123) to take kangaroos for commercial gain;

(iv) "chillers" - the registered premises where trappers deliver kangaroo carcasses for storage until transfer to a processing works;

(v) "chiller operators" - people who manage chillers for licensed fauna dealers;

(vi) "licensed occupier" - a landholder who holds a licence issued under section 121 (or s.121) to take a specified number of nominated species of kangaroos or can authorize a holder of a section 120 or s.123 licence to do this;

(vii) "occupiers' tag" - the cloth tag which must be attached to any kangaroo taken under a s.121 licence.

(viii) "royalty tag" - the tag which must be attached to any kangaroo carcass or skin which is to be sold for a commercial purpose.

These definitions are used in the remainder of this report.

2.2 Legislation

The principal Act which has enabled the Kangaroo Management Program to be established is the National Parks and Wildlife Act, 1974. This Act classifies all kangaroos as protected fauna and makes the Director of the National Parks and Wildlife Service responsible for their protection and care (section 92). Similar arrangements apply in all other Australian States and Territories (Poole, 1978).

Related legislation includes the construction and maintenance of chillers and processing premises which is controlled under the Public Health Act, 1902, and the more recently proclaimed Commonwealth Wildlife Protection (Regulation of Exports and Imports) Act, 1982, which prevents the overseas export of any kangaroo products which have not been taken under an approved management program. There is considerable interstate trading in kangaroo products and, although this is permitted under section 92 of the Constitution, fauna dealers are required under the National Parks and Wildlife Act, 1974 to obtain a section 126 (Import/Export) Licence before transferring kangaroo products between States.

2.3 Program objectives

On the 19th April 1984 the Federal Minister for Home Affairs and Environment approved a Kangaroo Management Program for New South Wales. Before that there was no formal definition of the current management program's objective beyond a number of general statements which indicated that it was designed to conserve kangaroos and mitigate the damage which kangaroos cause to landholders. However, these objectives are no longer considered appropriate (Shepherd and Giles, 1981) and the NPWS in an as yet unadopted draft kangaroo management licensing manual have indicated that they now consider that the program should be principally designed to:

(i) ensure the survival of viable populations of all species of macropods, including the four commercially exploited species, throughout their ranges;

(ii) maintain their population levels within limits to ensure conservation but so as not to cause significant losses to agricultural and pastoral industries;

(iii) to assist landholders, if they choose, in the utilization of kangaroos as an element of their overall land use practices.

Further aims of the program are:

(i) the protection of a representative range of kangaroo habitats, and to maintain populations in such areas at levels which will not impair the habitat in the long term;

(ii) the establishment of educational and extension programs to produce greater public acceptance of wildlife management principles and grazier/farmer acceptance of kangaroos on the range." (NPWS, 1982).

The rationale for excluding kangaroo damage mitigation from the program's objectives is that the NPWS, under its Act, has a mandate for the 'protection and care' of fauna but not for 'management' of fauna. Thus the program is now justified on the basis that without such a program landholders will undertake indiscriminate killing of macropods to the detriment of the species found on the land in question (NPWS, pers. comm., 1984). Nevertheless, the official management program as adopted by the Federal Minister states that the principal aims of the management program are:-

(1) to maintain populations of all species of macropodid over their natural range;

(2) to contain their deleterious effects on pastoral and agricultural production;

(3) to ensure that the best possible use is made of kangaroos taken in terms of the above.

The aim of kangaroo management is not to utilize kangaroos as a resource on a maximum sustainable yield basis. The commercial utilization of kangaroos is a management tool used by the National Parks and Wildlife Service to achieve the aims listed above.

Reliable data on the regional, as distinct from site specific, losses caused by kangaroos do not exist and hence the relationship between kangaroo populations and agricultural and pastoral losses is not known.

2.4 The Kangaroo Management Program's structure

2.4.1 Monitoring

Figure 2.1 indicates the ideal format and actual format of the program in a manner which highlights many of the difficulties caused by uncontrollable factors, especially the speed with which kangaroo populations respond to seasonal conditions. The actual population is estimated by aerial survey and from this quotas are set to ensure populations remain viable. In the past randomly distributed monitoring blocks have been surveyed every winter to provide an estimate of the total population in the commercial harvesting area. This estimate was then used to set an annual maximum permitted quota. However, this survey method does not permit the estimation of populations at a district level. A new survey technique which samples the entire commercial harvest area will be used in the winter of 1984 to rectify this deficiency. The main intention of the survey is to monitor trends in population numbers from year to year. It is not designed to obtain an accurate estimate of the absolute number of kangaroos in the areas surveyed.

(Insert Figure 2.1)

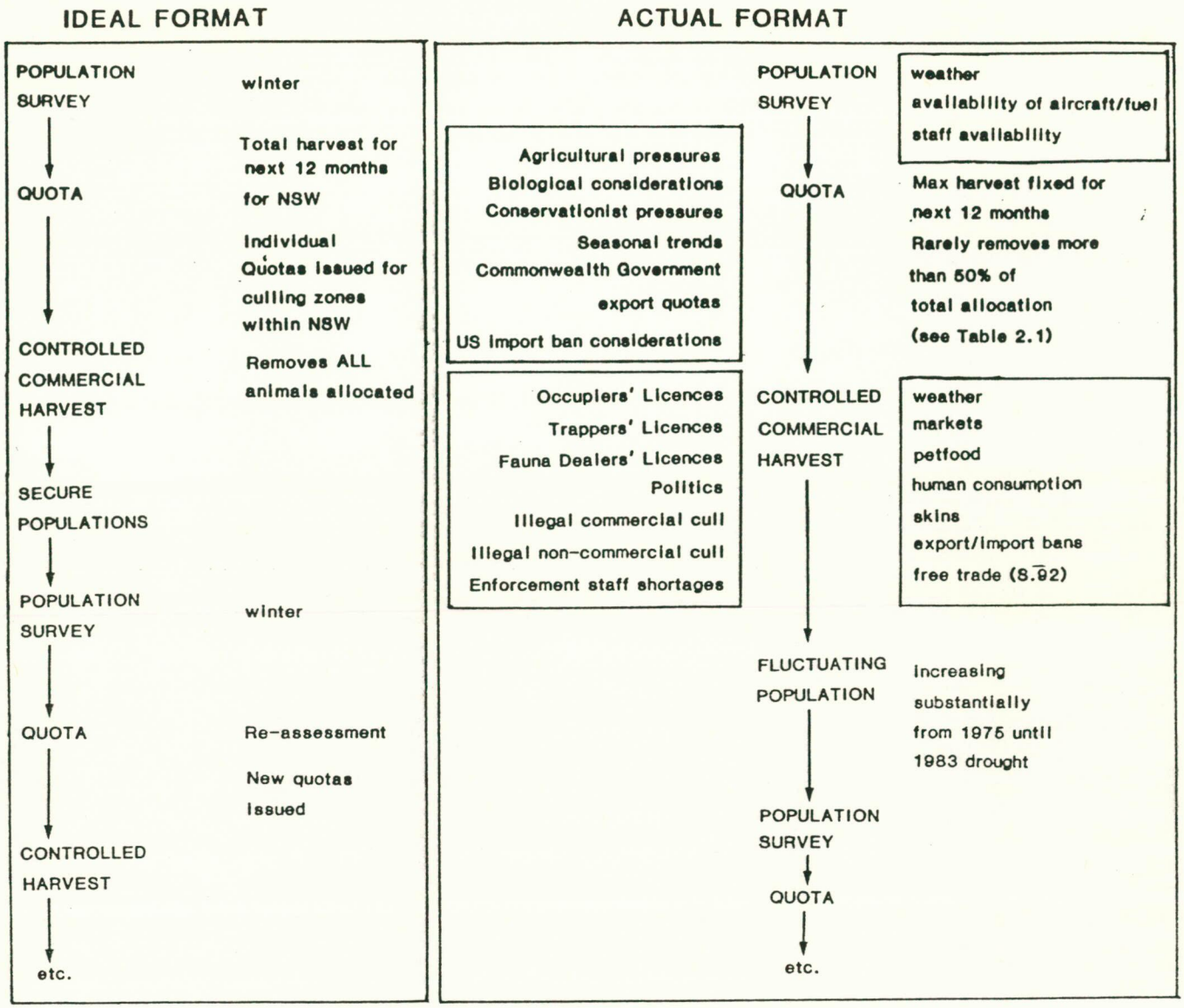


Fig. 2.1 Ideal and actual format of kangaroo management program (after Shepherd & Giles, 1981).

There is no aerial monitoring in the non-commercial harvest area where, with one exception, the removal of kangaroos for commercial gain is prohibited. However, when a landholder can demonstrate a need to remove kangaroos, he may obtain an occupier's licence to destroy a limited number of kangaroos (and may permit licensed shooters to do this). Commercial utilization in this part of the State is permitted only in areas along the Government-owned foreshores of Glenbawn and Burrendong Dams where kangaroo have been causing soil erosion problems.

2.4.2 State quota and numbers taken

Table 2.1 compares the trend in kangaroo populations and the number of kangaroos taken for commercial purposes in recent years. The annual quota has been set at between 7 and 15% of the estimated population. It was achieved only once, that being in 1980. The reasons for this are complex and their identification represents one of the motivations for this study. Essentially, however, it would appear that in general market demand and other regulatory restrictions such as those which restrict the location of chillers, rather than the level of the quota set, limit the number of kangaroos taken in New South Wales.

(Insert Table 2.1)

The issue of the annual State kangaroo harvesting quota is coupled with and linked to the annual aerial population survey. The survey is conducted in July each year and quotas are issued on a calendar-year basis. The consequence is that each survey is taken approximately half way through any previous quota period. Should the survey indicate a population decline, then the NPWS can reduce the actual number taken by restricting the issue of occupiers' licences, not issuing new licences, setting dealer quotas and so on. This was done in 1983, for instance, when the survey indicated that kangaroo numbers had fallen by an average of 43% in response to the previous drought.

Table 2.1. Number of red and grey kangaroos in the commercial harvest area and the number taken for commercial purposes 1973-1983. The quota is set for the calendar year and the population estimated in July of the previous year.

Year	Estimated population[a]	Quota	Number taken[b]	% Population taken[c]
1973	n.e.	213,000	132,400	-
1974	n.e.	216,000	95,000	-
1975	3,653,000	212,900 (12%)	123,000	3.4
1976	n.e.	319,400	96,700	-
1977	4,699,000	321,500 (7%)	167,200	3.6
1978	4,383,000	345,000 (8%)	220,000	5.0
1979	4,288,000	645,000 (15%)	520,000	12.1
1980	6,174,000	645,000 (10%)	619,023	10.9
1981	7,000,000	689,000 (10%)	488,647	7.0
1982	9,400,000	838,000 (9%)	664,342	7.0
1983	5,500,000	843,000 (15%)	400,477	7.0
1984	4,233,000	500,000 (12%)	-	-

n.e. No estimate made
a) Does not include wallaroos
b) Includes wallaroos, the annual quota is usually 5,000
c) Overestimate as wallaroos are not included in the population estimate

2.4.3 Controls on the location of chillers throughout zones

The combination of NPWS restrictions on the location of chiller sites, the allocation of these sites to licensed fauna dealers and the rate of issue of occupiers' tags also influence the number of kangaroos taken under the management program. A key restriction is the allocation of zones to major fauna dealers so that, in most cases, each fauna dealer has an exclusive right to process any kangaroo carcasses delivered to a chiller located within their zone.

The rationale for introducing the zone system is summarized in Fox (1974). As a result of the drop in kangaroo densities during the drought of the late 1960's, the NPWS reduced the rate of issue of occupiers' licences to have kangaroos removed. As a consequence, the financial viability of the 19 licensed fauna dealers operating in 1968 became tenuous and as a result of discussions with them it was suggested that each should be given a zone of exclusive operation. It was believed that this approach would enable fauna dealers to plan their operations and act accordingly.

> "A limit [was] to be set to the numbers of predatory industrial components [fauna dealers] and production space [zones] allocated so that the industrial component can begin to plan to use a limited harvest on an area large enough to allow the operator to rotate his operation." (Fox, 1974:50).

By mid-1970 the number of zones and zone operators had dropped to 9. These zones whose boundaries followed county boundaries, were adopted in the kangaroo management plan. Since then there have been only minor changes to zone boundaries, although several fauna dealers have been allocated rights to a number of zones. The current distribution of these zones is displayed in Figure 2.2. At December 1983 all active chillers located in zones 4 and 8 were registered by Vacik Investments; most in zone 6 and the majority in zone 10 by Suburban Pet Supplies Ltd.; and most in zones 1 and 11 by Pet Care Coop. Ltd.

In addition, 5 other licensed fauna dealers held a limited number of registered chiller sites throughout zones 2, 6, 9, 10, and 11. It appears to be present NPWS policy to license only one major fauna dealer in each zone. Zone boundaries bear no relationship to those of monitoring blocks nor NPWS administrative regions.

(Insert Figure 2.2)

All current chiller sites are registered in the name of a licensed fauna dealer. In exceptional circumstances, however, a trapper's licence may be endorsed to permit him to register and operate a chiller (s.10c). The licencee of a chiller site is free to supply the fauna dealer of his choice. Nevertheless, as chillers are usually registered in a fauna dealer's name, other fauna dealers can only be supplied with the registering dealer's consent. Most fauna dealers own the chillers and appoint licensed trappers to operate them on their behalf.

Providing a licensed trapper purchases royalty tags directly from the NPWS there are no restrictions on the chiller site to which he can supply kangaroos. Thus, when a chiller(s) is located on a zone boundary it is possible for some kangaroos taken in one zone to be delivered to a chiller registered in another fauna dealer's name. Similarly, there is no requirement that a chiller be located within a fauna dealer's zone. However, many trapper's licences are only endorsed for a single zone.

It is current NPWS policy to register a chiller site within a fauna dealer's zone whenever there are sufficient kangaroos to support a chiller and no other chillers near that site. Exception to this spacing requirement is possible when an application to locate a chiller site in a town is made.

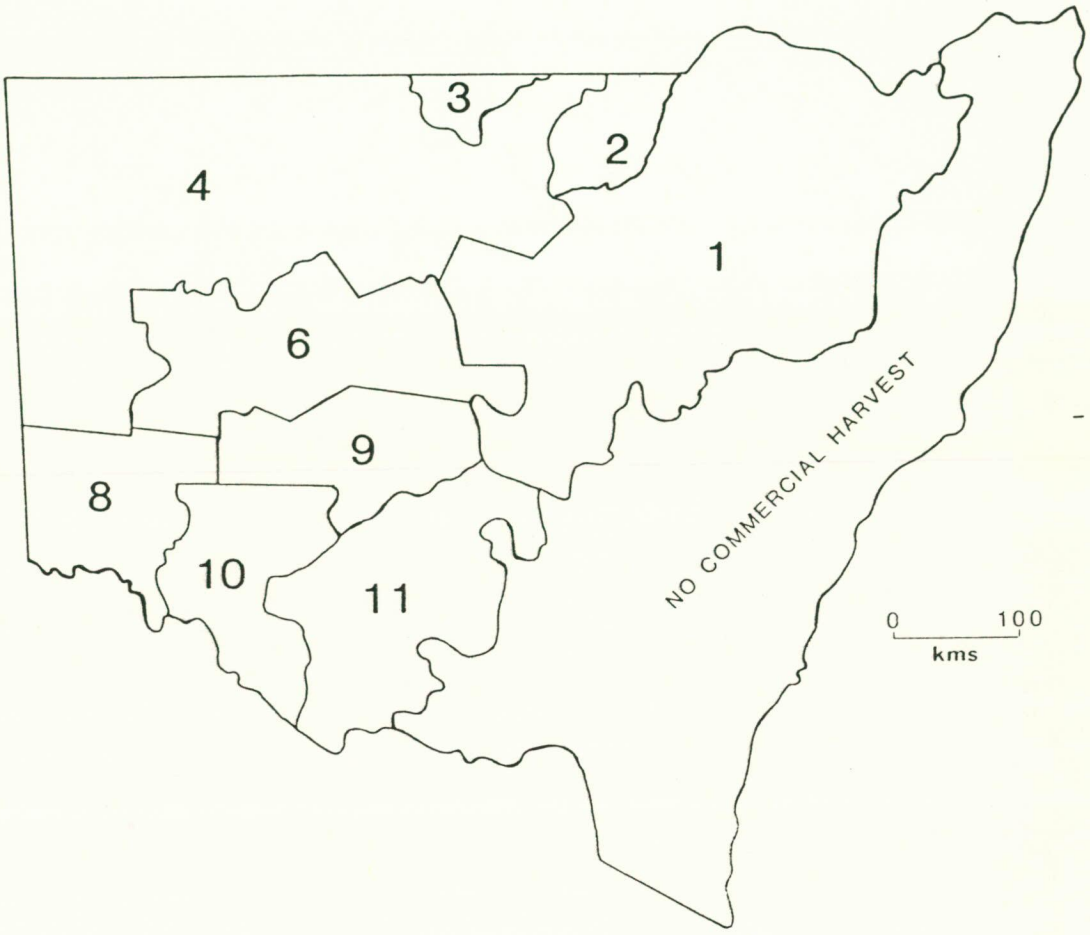


Fig. 2.2 Location of licensed fauna dealer zones in 1983.

Each zone has a number whose origin is historical.

2.4.4 Restrictions on numbers taken

A consequence of allocating zones to fauna dealers is that they need not fear competition from other dealers within a zone, even when landholders consider that insufficient kangaroos are being taken from a zone. Consequently, when the NPWS perceives that insufficient kangaroos are being taken it can request the appropriate fauna dealer to increase the number of kangaroos taken from the problem area by increasing the number of chillers. When a fauna dealer does not comply the Service considers and usually threatens to register a chiller site in another fauna dealer's name. Furthermore, by attaching conditions to fauna dealer licences the NPWS can and on occasions has set maximum and minimum quotas for problem areas. In the last year a State maximum quota was also allocated to each licensed fauna dealer in recognition of the decline in kangaroo numbers.

The actual number of kangaroos taken is also controlled by the requirement that landholders apply for a s.121 occupiers' licence to take kangaroos. The draft policy manual requires an applicant for such a licence to demonstrate unreasonable economic hardship or inconvenience because of high kangaroo numbers in his locality. However, at present a landholder need only apply on Form 32 which requests population estimates and, by implication, requires the support of a Pastures Protection Board and the support of a NPWS officer who has made a ground inspection. Occupiers' tags are then issued in response to the NPWS's assessment of the validity of the request and its opinion of the current status of the population in that region and the State as a whole.

Whenever the market for kangaroo products declines, environmental conditions decline or numbers fall to a level which makes it unprofitable to continue operating a chiller it is shut down until circumstances change or, in many cases, it is moved elsewhere. The distribution of registered chiller sites in a selection of years is displayed in Figure 2.3.

(Insert Figure 2.3)

Fig. 2.3 Location of kangaroo chillers in NSW between 1957-1983 (after Poole 1978).

In parallel, with the allocation of zones to major fauna dealers to enable them to take kangaroo carcasses, a number of licensed trappers have had their licences endorsed to enable them to take kangaroo skins without a carcass and supply them to the fauna dealer of their choice operating in any zone. Twenty-nine fauna dealers hold Statewide licences which permit them to buy skins directly from licensed trappers in this way. These dealers are free to acquire skins from all zones but must transact such business at their registered premises. Agents in the field, however, may arrange such transactions.

2.4.5 Restrictions on trappers

Two types of s.123 trappers' licences are issued with varying restrictions and endorsements. The first type is commonly known as a "resident or occupier trapper's licence", which is usually only issued to an occupier or one of his employees. Such a licence is restricted to the occupier's property and, occasionally, a neighbouring one. The second type of trapper's licence permits a trapper to take kangaroos from any property providing he has the written permission of the occupier of that property and attaches an occupier's tag to each kangaroo taken. Whenever possible, trappers are required to take kangaroo carcasses withtheir skins attached, but a few have their licences endorsed to permit them to take kangaroo skins and leave the carcass. Usually a skin endorsement also authorizes a trapper to stockpile skins. In recent months most skin endorsements have been cancelled and they are now only being issued on a property-by-property basis when a need is demonstrated. Most trapper licences also restrict the licencee to taking kangaroos from one zone.

Licensed trappers may take kangaroo carcasses for sale as pet food or human consumption. For human consumption hygiene standards are higher and inter alia, require rigs to be galvanized or stainless steel, and all carcasses to be gutted

immediately after they are shot and delivered to a chiller within two hours of sunrise.

Before taking any kangaroo for commercial purposes a licensed trapper must obtain royalty tags (15 cents each) from either the NPWS or a licensed fauna dealer if he is willing to supply them and attach one of these together with an occupier's tag to each carcass taken. When royalty tags are obtained from a licensed fauna dealer all kangaroos with these tags must be delivered to the dealer who supplied the royalty tags.

The total number of current s.123 (trapper) licences on issue to occupiers or residents of properties is unrestricted and to retain such a licence an occupier need only pay the annual licence fee. However, to have a general trapper's licence renewed for a further 12 months a non-resident trapper must take 500 kangaroos per annum or have shot on at least 50 nights in the preceding year and hold a current shooter's licence. To first obtain a general trapper's licence a person requires the written approval of a number of licensed occupiers to take kangaroos from their properties, a written undertaking from a licensed fauna dealer to accept them and a current shooter's licence issued under the Firearms and Dangerous Weapons Act. Each NPWS administrative district is allocated a set number of shooters and a demonstrated need to increase this number at any time must be shown. The location of NPWS administrative districts is shown in Figure 2.4.

(Insert Figure 2.4)

2.4.6 Reporting procedures

The nature and frequency of the reporting procedures required by the NPWS to enable them to monitor the numbers of kangaroos taken are indicated in Table 2.2. Details of the forms and information collected are listed in the Fauna Protection Regulations, 1949.

(Insert Table 2.2)

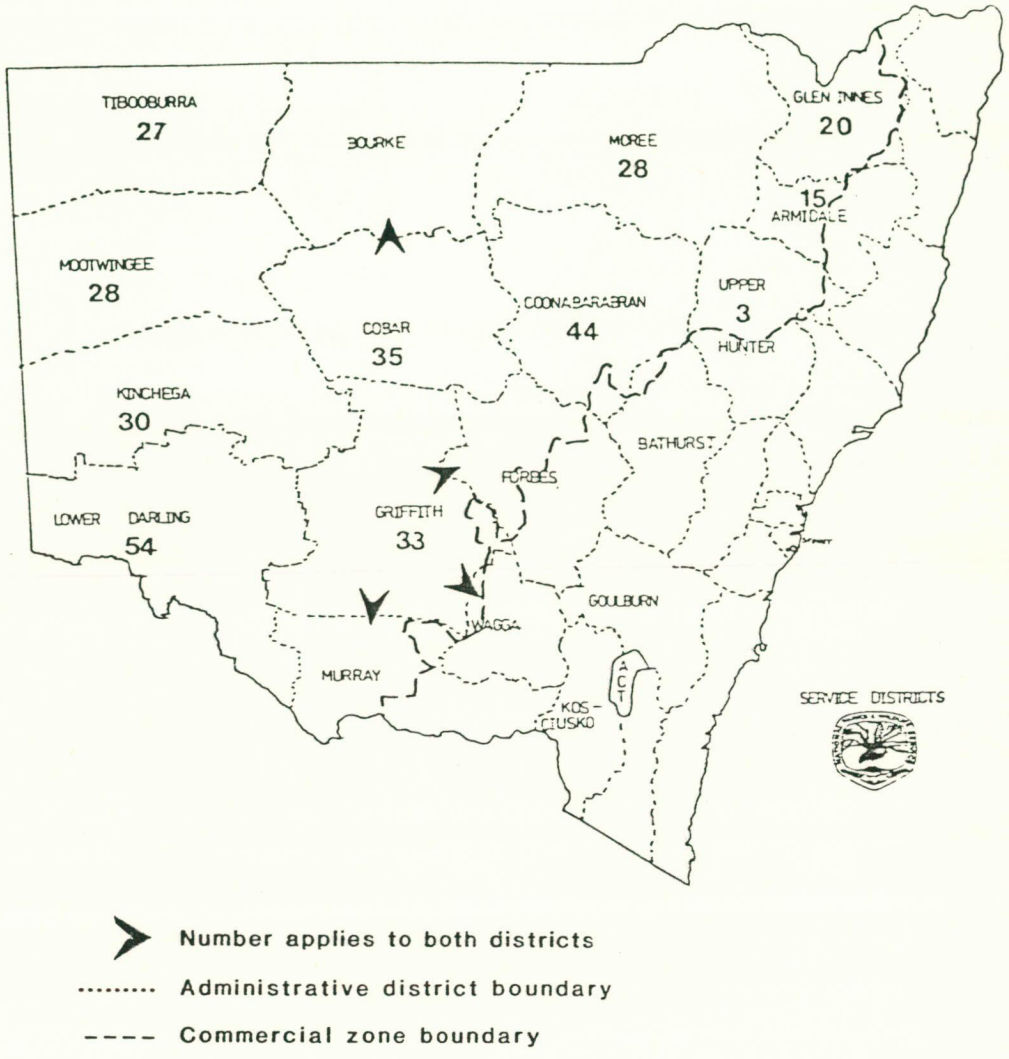


Fig. 2.4 The distribution of licensed trappers within NPWS administration districts in June 1983. (After L.Lewellyn, pers.comm.1984)

Table 2.2. Nature and frequency of reports required by the NPWS

Type of Licence	Nature of Report	Frequency of Submission
Occupier's	No report on rate of tag utilization required	-
Trapper's	Nightly report on species, sex, weight and royalty tags by property where each kangaroo was taken	Monthly
Chiller	Summary of all kangaroos delivered and collected from chiller by trapper and date	Monthly

2.5 Trends and recent policy changes

2.5.1 Population trends

Information on recent trends in the kangaroo population has already been discussed in Table 2.1 and Section 2.1. Populations fluctuate largely in response to seasonal conditions (Grigg, 1984; Caughley et al., 1984). These fluctuations occur at both a regional and state level. For example, following the 1982-83 drought the estimated population of red kangaroos dropped by 41% largely as the result of death by starvation. Similarly the estimated total population of grey kangaroos fell by 45%. However, this decline was not uniform and in the Far West of the commercial harvesting area the decline was 63% (NPWS, 1983). The consequence was that the taking of western grey kangaroos in all but exceptional circumstances has been prohibited in zones 3, 4, 6, 8, 9 and 10 since April 1984. Similarly, skin only trapping has been restricted to a few properties and all general skin endorsements have been withdrawn.

Research by Caughley et al. (1984) has found that most of the changes in the population of red and grey kangaroos can be explained by changes in rainfall conditions and that at a regional level the impact of the management program on the total population is less than that of climatic factors. However, the management effects are significant and act to slow the rate of increase in wet years and increase the rate of decrease in dry years (Table 2.3).

(Insert Table 2.3)

2.5.2 Trends in licence numbers

The numbers of people who have held kangaroo trappers' licences in each year from 1976-1983 are shown in Table 2.4. The number peaked in 1979 when the harvest quota was nearly doubled from 345,000 to 645,000 and nearly 1,200 people were issued new trappers' licences. At the time the NPWS was trying to increase the harvest but in the course of doing this it found that it attracted a large

Table 2.3. A simple estimate of the change in the red and grey kangaroo population if no kangaroos were taken in any one year. Compounding effects are ignored.

Year ending	Estimated[a] population in December	No. kangaroos taken during the year	A Annual net population change after culling %	B Change[b] in population if all kangaroos taken survived %	B-A
1976	n.e.				
1977	4,541,000	321,500	-	-	-
1978	4,335,500	345,000	-4.5	+2.5	7.0
1979	5,231,000	645,000	+20.7	+35.5	14.8
1980	6,587,000	645,000	+25.9	+38.3	12.4
1981	8,200,000	689,000	+24.5	+35.0	10.5
1982	7,450,000	838,000	-9.2	+1.1	10.3
1983	4,866,500	400,477	-34.7	-29.3	5.4

n.e. No population estimate in 1976.

a) Actual estimates are taken in July and the December estimate was obtained by averaging figures for the following and preceding July estimate.

b) The assumption that all kangaroos would survive if not shot by a trapper depends upon seasonal conditions. In drought conditions such as late 1982 many may have died from starvation.

number of part-time trappers. Since then it has moved to reduce the number to a core of professional trappers and resident trappers.

(Insert Table 2.4)

2.5.3 Relationship between kangaroo population and quota

Figure 2.5 presents comparative data on the relationship between the total population of red and grey kangaroos, the number taken and the annual quota. With the exception of the 1979-80 period, the quota has not been achieved with the harvest generally representing approximately 50% of the quota. The reasons for this are complex and not just due to market conditions, restrictions on the issue of licences and seasonal conditions. Other factors also have a significant influence. A recent check of the returns for 1980 has revealed that an error in the previously reported "over-harvest" in 1980 (Shepherd and Giles, 1981) did not occur. Table 2.1 contains the correct estimate for the number of kangaroos taken in 1980: 96% of the quota for that year.

(Insert Figure 2.5)

Table 2.4. Number of trapper's licences at 31st December, 1976-1983

Year	Resident Licences	General Licences	Total
1976			222
1977			225
1978			320
1979			1,501
1980			1,184
1981			720
1982			571
1983	111	202	313

Source: NPWS, pers. comm. (1984)

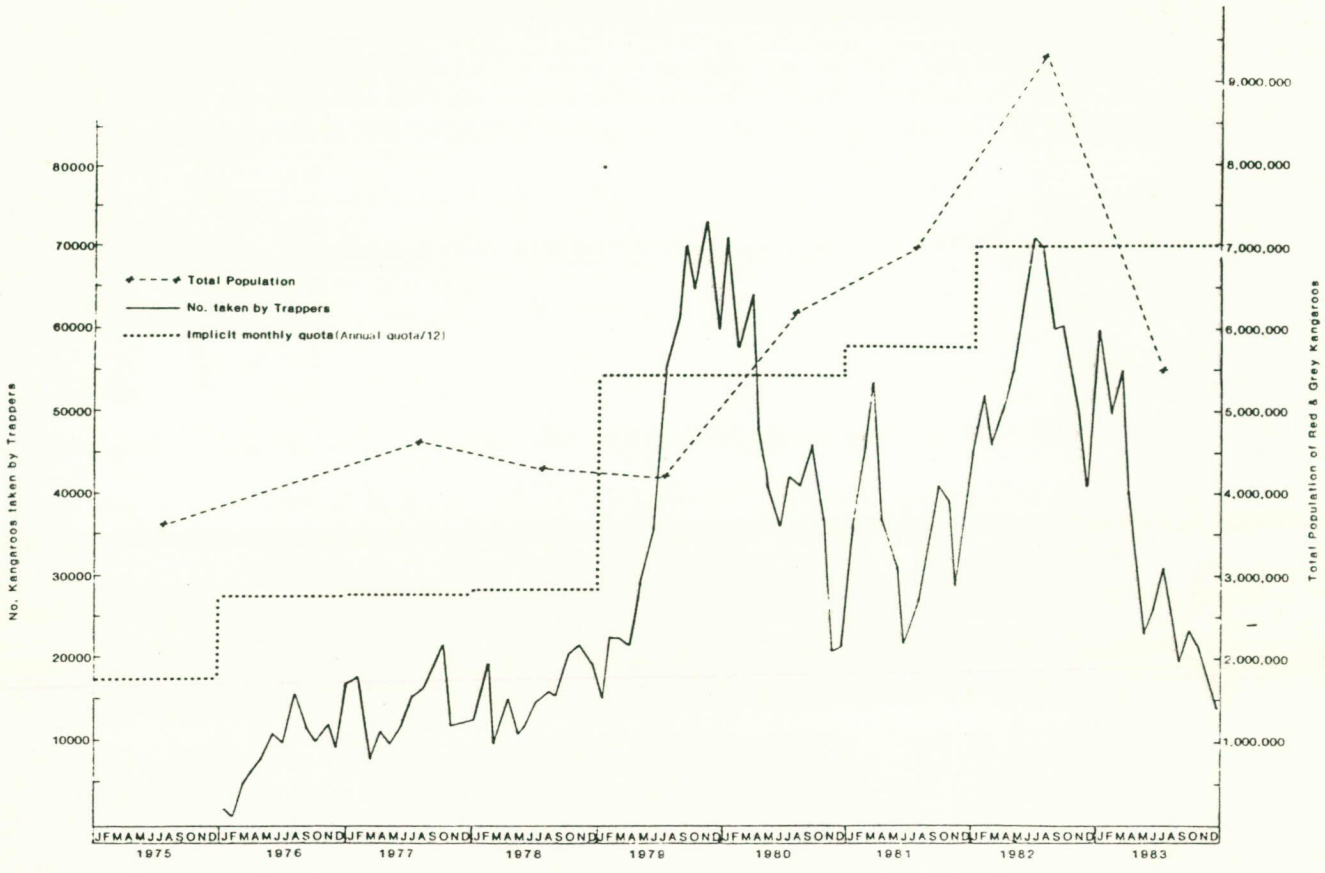


Fig. 2.5 Annual distribution of kangaroo population and monthly number of kangaroos taken by licensed trappers under the management program, 1975–1983.
The dotted line indicates the implicit monthly quota.
There was no population census in 1976. (After M.Swain,pers.comm.1984)

References

Australian National Parks and Wildlife Service (1984). 'Kangaroo Management Programs of the Australian States'. Commonwealth of Australia, Canberra.

Grigg, G. (1984). 'Roo harvesting: are kangaroos really under threat?' Australian Natural History 21(4): 122-129.

Caughley, J., Bayliss, P. and Giles, J. (1984). Trends in kangaroo numbers in western New South Wales and their relation to rainfall. (National Parks and Wildlife Service, manuscript in preparation).

Fox, A.M. (1974). Kangaroos in New South Wales. N.S.W. National Parks and Wildlife Service, unpublished manuscript.

National Parks and Wildlife Service (1982). Kangaroo Licensing Manual, Draft 3, December 1982.

National Parks and Wildlife Service (1983). Aerial survey of kangaroos on the monitor blocks, July 1983. Unpublished manuscript.

Poole, W.E. (1978). Management of kangaroo harvesting in Australia. Australian National Parks and Wildlife Service, Occasional Paper No. 21.

Shepherd, N. and Giles, J. (1981). Kangaroo management in New South Wales. In 'Kangaroos and Other Macropods of New South Wales' (Ed. C. Haig.) New South Wales National Parks and Wildlife Service, Parks and Wildlife Series.

Chapter 3

RESEARCH METHODOLOGY

3.1 Introduction

In this chapter, details are presented of the data collected and collated in the research, the adopted method of survey, the analytical approach, the design of survey questionnaires, and the outcomes of the surveys. The method of survey includes a description of its basic design, the implied data requirements and the procedure of sample selection.

3.2 Data collected

Research data were collected from two sources: (a) NPWS official records and (b) licensed trappers and chiller operators. Access to confidential Service records was assured under the terms of the research contract. Data from licensed trappers and chiller operators were obtained by personal interview.

3.2.1 Data from NPWS records

The NPWS collects and partially processes detailed figures on the trapping activity of all licensed trappers and the commercial output of kangaroo carcases and skins at all registered chiller sites. Records for licensed trappers are obtained from forms which are meant to be completed at the end of each night's shooting. They contain information on the properties from which kangaroos have been taken and the number, carcass weight, species and sex of all kangaroos taken by each licensed trapper. Chiller records contain information on all kangaroos which enter and leave each chiller and also the names of all the licensed trappers who supply the chiller(s) at each registered site.

3.2.2 Data from chiller operators

This information was collected by survey and included data on the social status (family structure, education, age and job history) and economic status (incomes and costs) of chiller operators, details of the operation of chillers, capital structure (ownership of equipment and plant), and interactions with licensed trappers and licensed fauna dealers. Information was also sought on the history and current activities of licensed trappers operating out of the chiller(s) at each registered site, along with the whereabouts and current employment of past (no longer active) trappers. This latter information was needed to facilitate the selection of licensed trappers for survey as the Service's records, because of processing delays, tended to reflect the situation approximately 3-6 months before the date of the research survey. Pilot testing revealed that many licensed trappers were no longer active and hence these records gave a poor indication of those who were currently taking kangaroos.

3.2.3 Data from licensed trappers

These data were also collected by survey and included information on the nature of the profession (for instance, time requirements and trapping experience), the social status and economic status of licensed trappers, capital structure, trapping techniques, interactions with licensed fauna dealers, chiller operators and landholders, and perceptions of the influences of NPWS regulations and policies on their activities and desired changes to these regulations.

3.3 Survey method

The survey method is based upon a stratified random sample of chiller operators and was designed on the assumption that chiller operators, acting as

field agents for the licensed fauna dealer of their particular management zones, effectively control the harvesting behaviour of licensed trappers by stipulating when each trapper can supply kangaroo carcasses to the chiller, weather permitting. Chiller operators are able to exert this control because a licensed (carcass) trapper must have access to a chiller(s) at a registered site to be able to take kangaroos for commercial gain. Chiller operators were also believed to be able to exert pressure on licensed trappers to have them shoot during times when the supply of kangaroos is limited and licensed fauna dealers need them to meet market commitments. For example, during sustained wet periods it is difficult for trappers to drive on wet country. It seemed necessary, therefore, to survey both licensed trappers and chiller operators in order to obtain a complete understanding of the industry structure at the in-field level. The strategy was that the location of all active chiller sites would be identified from NPWS records and in consultation with licensed fauna dealers. A sub-group would then be selected from this for interview. Subsequently, licensed trappers would then be selected for interview according to a predetermined sampling procedure and in light of the information collected from the chiller operator. All interviews were conducted by the one person.

Examination of NPWS records of registered chiller sites and discussions with licensed fauna dealers indicated that there are three locational categories of chillers: (a) western property chillers, (b) western town chillers and (c) eastern town chillers. The arbitrarily selected east-west dividing line is shown in Figure 3.1. This figure also indicates the location of the zone boundaries discussed in Chapter 2. However, pilot testing revealed that a significant number of these registered sites were no longer operational. Thus, all fauna dealers were contacted to determine which sites were currently active and met the following criteria:

(a) the chiller(s) had supplied carcasses in at least three months of the last twelve months;

(b) the chiller(s) had supplied carcasses in at least one month of the last three months;

(c) the chiller(s) had licensed trappers who have at least 500 kangaroos shooting experience; and

(d) the chiller(s) had taken carcasses and not just skins alone.

(Insert Figure 3.1)

The term 'active' means that licensed trappers have deposited kangaroo carcasses and/or skins into the chiller(s) during the period in question. Chillers need to be active in the last three months to ensure that chiller operators and licensed trappers who were selected for interviewing had current knowledge of industry conditions. Criterion (c) ensures that only experienced licensed trappers were interviewed and avoids the data problems which arise when new entrants to an industry lack the knowledge needed to answer questions.

As noted in Chapter 2, it is currently NPWS policy not to place skin-only endorsements on s.123 trapper licences unless exceptional circumstances prevail. The numbers of licensed trappers with such endorsements were too small for meaningful statistical analysis of the results. However, some data pertaining to this sector of the industry were obtained from licensed (carcass) trappers who have previously had their licences so endorsed.

Western property chillers are largely single-trapper units (77%), with the sole licensed trapper being also the chiller operator. In contrast, all western and eastern town chiller sites are used by more than one licensed trapper.

Based on the information supplied by all licensed fauna dealers at the commencement date of a pilot survey (10th November 1983) there were 14 active western property chillers, 9 active western town chillers and 14 active eastern

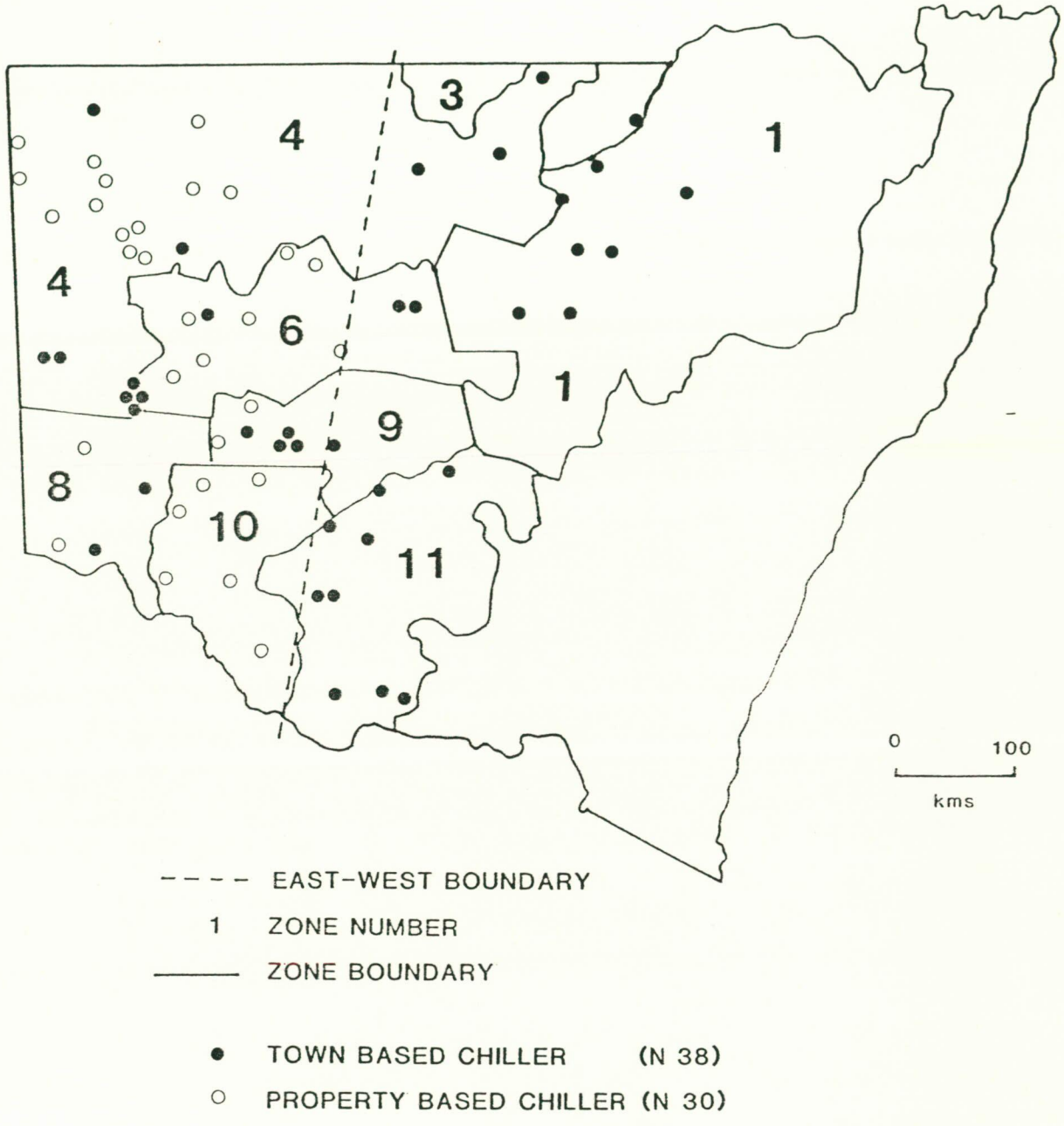


Fig. 3.1 Location of registered chillers within the commercial harvesting area at December 31st 1983. None of the registered property chillers in the Eastern half of the area were active at the start of the survey.

town chillers which met the four criteria previously stated. There were no property based chillers registered in the eastern half of the commercial harvesting area at the date of the survey.

Given the resources available it was not possible to conduct a complete census of all the chiller operators nor all the licensed trappers using the chillers. Consequently, a sample of chiller operators and licensed trappers was undertaken with a view to ensuring that most analyses could proceed using either 2 x 2 or 2 x 3 contingency tables, student-t test and regression analysis. This approach requires at least 60 trappers to be interviewed and for them to be stratified across the three categories of chillers identified (Figure 3.1).

As many as possible of the licensed trappers operating out of the 14 western property chillers had to be surveyed in order to obtain a satisfactory number of respondents for statistical comparison between trappers using these chillers and town chillers. Thus, it was decided to conduct a census of all western property trappers who could be contacted. This left 47 (60 - 13) licensed trappers to be interviewed across the 23 (9 + 14) western and eastern town chillers. A sampling strategy was devised so that approximately equal numbers (23) of western and eastern licensed trappers would be selected. The sampling procedure involved firstly generating separate random orderings of the two sets of town chillers. As some chillers retain up to 16 licensed trappers the number of trappers interviewed from any one chiller site was limited to a maximum of five at any one site in order to ensure coverage of a large portion of the commercial harvesting area of N.S.W. The trappers actually interviewed in each case were selected randomly from the list of active licensed trappers supplied by the chiller operator. Attempts were made, however, to interview all trappers where there were only six or seven currently active at a chiller site. Interviewing then proceeded down the randomly generated list of chiller sites

until the appropriate number of licensed trappers had been interviewed. Nevertheless, termination was only effected upon full random sampling of the registered chiller site area where interviews were being conducted at the time. Random replacement was used when an initially selected licensed trapper could not be contacted or indicated that he was either too busy or unwilling to be interviewed. The incidence of this is reported in section 3.5.2.

Thirteen property chiller trappers, 24 western town chiller trappers and 23 eastern town chiller trappers were actually interviewed. Of those, 89.5% had normal professional (non-resident) s.123 licences, 7% had professional licences endorsed enabling them to take kangaroos for either carcasses or skins only and 3.5% had resident licences which permitted them to trap on one property only. The latter group were either property managers, managers' sons or property employees. There were 11 property chiller operators and 13 town chiller operators involved. All the property chiller operators and 9 of the 13 town chiller operators were also licensed trappers.

All data were collected on the understanding that the identities of all respondents will remain confidential to CSIRO and would not be disclosed to either the NPWS, to the general public or any other instrumentality. Moreover, only aggregated data are contained in this report. These precautions ensure that conclusions cannot be made by the Service or the public about individual chiller operators and individual licensed trappers. Records of the identity of each and every person interviewed have been destroyed.

3.4 Questionnaire design

Under the adopted survey method, separate questionnaires were developed for chiller operators and licensed trappers. The questions on each were designed to provide the data needed to meet the research objectives outlined in

Chapter 1 and wherever possible, questions common to both questionnaires were used. Where a chiller operator was also an active licensed trapper, he was asked the additional questions which relate solely to licensed trappers. Copies of the two questionnaires are contained in Appendices 2 and 3. Show cards were used to aid articulation where this was felt necessary. Several respondents were not asked all questions either because time did not permit all questions to be asked or because some questions were inadvertently overlooked by the interviewer.

3.4.1 Questions common to both chiller operators and licensed trappers

The common questions sought data on: (i) social status; (ii) level of involvement in the kangaroo harvesting industry and other commercial trapping activities (foxes, rabbits, feral pigs, goats and cats); (iii) job history; (iv) the commercial kangaroo product involved (whether kangaroos were taken for pet food or human consumption or skins only); (v) perception of local kangaroo densities; (vi) interactions with landholders; (vi) perceived effects of rainfall on commercial trapping activities; (viii) perceptions of the extent of illegal shooting and its perceived effects on the number of kangaroos taken by each respondent; (ix) degree of mobility (that is, would they move elsewhere if pressured to do so under prevailing economic conditions and/or NPWS requirements); (x) economic status and income structure; (xi) interactions with NPWS management personnel; (xii) perceived effects of NPWS in-field restrictions and kangaroo management practices on economic status, the extent of trapping and trapping activities, per se; and (xiii) desired changes to NPWS in-field restrictions, kangaroo management practices and/or industry licensing policies.

3.4.2 Questions unique to chiller operators

The questions unique to chiller operators in order of elucidation sought data on the: (i) operation of the chiller(s) at the registered chiller sites; (ii) level of experience as a chiller operator; (iii) influence of licensed fauna dealers on the operation of the chiller(s) at the registered chiller site; (iv) choice of location of the registered chiller site; (v) use of the chiller(s) at the registered chiller site for handling non-kangaroo products (e.g. foxes, rabbits and feral pigs); (vi) past and active licensed trappers using the chiller(s) at the registered chiller site and perceptions of the harvesting behaviour and job history of these licensed trappers; (vii) time spent operating the chiller(s) at the registered chiller site; (viii) controls exercised over the licensed trappers using the chiller(s) at the registered chiller site; (ix) capital structure (inventory and ownership of plant and equipment) of the chiller(s) at the registered chiller site and desired changes, if any, to capital structure.

3.4.3 Questions unique to licensed trappers

These questions in order of elucidation sought data on the: (i) level of experience as a licensed trapper; (ii) past and current levels of trapping effort, and reasons for any observed changes; (iii) nature of, and reasons for, any seasonal variations in trapping effort; (iv) reasons for becoming a licensed trapper; (v) time spent in the occupation of licensed trapping; (vi) current annual number of kangaroos taken and perceived effects, if any, of the activities of other licensed trappers on this; (vii) size of the current area from which kangaroos are taken; (viii) price effects on the number taken; (ix) interactions with other licensed trappers; (x) nature of, and non-price-related factors influencing, trapping activities; (xi) accuracy of records kept

compulsorily for the NPWS; (xii) capital structure (inventory and ownership of plant and equipment); (xiii) factors influencing the comparative level of effort spent on trapping and non-trapping, if any, activities; (xiv) perceived best-alternative occupation; and (xv) future kangaroo trapping aspirations.

3.5 Survey sample

3.5.1 Sample proportions

The sample proportions taken during this survey are summarized in Table 3.1. Records held by the NPWS indicate that there were 28 registered western property chiller sites, 13 registered western town chiller sites, 24 registered eastern town chiller sites and 3 registered eastern property sites licensed during the quarter ending 21st December 1983 (Fig. 3.1). This compares to 14, 9, 14 and 0 registered chiller sites respectively, which were active and met the four sampling criteria stated in section 3.3. That is, only 37 (54%) of the 68 registered chiller sites were active. This difference is due to NPWS policy which permits inactive sites to remain registered. Following the stratified selection procedures set out above, the operators of 24 (65%) active registered chiller sites were selected for survey with the consequence that the operators of 11 of 14 (79%) of active western property sites, 7 of 9 (78%) of active western town sites and 6 of 14 (43%) of active eastern town sites were interviewed.

NPWS records indicate that within the entire commercial harvesting area there were 313 trappers licensed on December 30th, 1983. Of these, 79 were active and delivering kangaroo carcasses to the 24 registered chiller sites included in the survey. Thus, assuming that the survey is representative of the entire population, it is estimated that in the quarter ending December 1983

approximately 133 trappers of the 313 licensed trappers in N.S.W. were active. As Table 3.1 immplies, a significant proportion of the estimated 180 inactive trappers are most likely to be resident trappers who only hold a licence to take kangaroos from a specific property.

A better guide to the sample proportion for licensed trappers seems to be the percentage of the total N.S.W. commercial harvest of kangaroos for the financial year ending 30th June 1983 represented by the 52 of the 60 licensed trappers surveyed who provided estimates of their harvest in that year. NPWS records suggest that 607,023 kangaroos were harvested in that period. The combined harvest of the respondents is estimated to be 258,587 kangaroos. Thus, the licensed trappers interviewed accounted for 43% of the total number of kangaroos taken during that financial year.

(Insert Table 3.1)

3.5.2 Replacement rate

Random replacements were necessary for eight (or 13 per cent) of the initial randomly selected licensed trappers using town chillers. Of these, three could not be contacted and five either were unable to be interviewed for logistical reasons or were unwilling to be interviewed. The reasons given for the latter ranged from 'just no', to 'too busy', to 'cannot see the benefit to me'. Due to the difficulty associated with contacting people in the more remote parts of western N.S.W. the operators of three of the 14 western property chiller sites could not be contacted.

Table 3.1. Estimated distribution of survey sample throughout the commercial culling area

	East		West		Total
	Town chiller	Property chiller	Town chiller	Property chiller	
Population estimates					
No. registered chillers	23	0	13	31	67
No. licensed trappers	n.a.	n.a.	n.a.	n.a.	313[a]
No. active sites	14	0	9	14	37
Estimated no. active trappers	68	0	48	17	133
Survey data					
No. active sites surveyed	6	0	7	11	24
No. trappers interviewed	23 (38%)	0	24 (40%)	13 (22%)	60
Estimated proportion of active trappers interviewed	34%	-	50%	76%	45%[b]
Proportion of active chillers surveyed	43%	-	78%	79%	65%
No. active trappers at surveyed chillers	29	0	37	13	79

n.a. Not available.

a) 202 of these held general trappers' licences which permit them to shoot on any property within their area and 111 held resident licences which restrict a trapper to a specified property.

b) Additional information was obtained on a further 25 trappers from the chiller operator which they supplied.

3.5.3 Relationships between current licensed trapper population and immediate past licensed trapper population

The period of survey and the three months prior to it was a time of fairly sustained rainfall and massive plant growth. These conditions make kangaroos more difficult to find and the ground more difficult to traverse with the consequence that many licensed trappers either temporarily or permanently gave up trapping (see Section 6.3). Moreover, according to the NPWS, the size of the kangaroo population fell by 41% between the start and end of the 1982/83 financial year. It is inferred that this was caused by the drought conditions which prevailed throughout the commercial harvest area towards the end of 1982 and in early 1983. The net result of these various factors is that the survey was undertaken during a period of depleted kangaroo populations, low trapping effort or activity, and a reduced number of licensed trappers. Some caution is needed, therefore, in any attempts to extrapolate the research results, conclusions and recommendations made in this report to conditions of high kangaroo numbers and high harvesting effort. The financial data collected straddles the drought period and the attitudinal data were mostly obtained from licensed trappers who have extensive experience (see Chapter 5). Data from the subsequent stages of this study, however, will be used to overcome deficiencies.

Chapter 4

CHILLER OPERATION AS AN OCCUPATION

4.1 Introduction

In this chapter, data are presented on the social characteristics of chiller operators, the nature of the occupation of chiller operation, the nature and ownership of plant and equipment used in operating chillers, and details of income earned from all sources and costs incurred in earning this income. Social characteristics include the age, sex, family structure, education and vocational history of chiller operators. The nature of the occupation consists of a brief description of the job, per se, hours worked and chiller operating experience.

4.2 Social status

Data on where each chiller operator was brought up and their ages, family structure and level of education are contained in Tables 4.1 to 4.3.

(Insert Table 4.1)

Where brought up

The majority originate either locally (54.2%) or elsewhere in N.S.W. (12.5%). Thus, many would be expected to have good knowledge of their area and close ties to the local community.

Age

Most (70.8%) are under 40 years of age, with a maximum age of 53. Australian Bureau of Statistics (hereafter ABS) census data for the year 1981 indicate that for the comparable census category of employed male 'farmworkers and foremen' 68.6% were under 40 years of age and 12.8% between 50 and 60 years

Table 4.1. Origin and age of chiller operators (n = 24)

		Percentage
Where brought up		
Locally (within 100 km)		54.2
Elsewhere in N.S.W.		12.5
Other Australian State		29.2
Overseas		4.2
		100.1
Age (years)		
20 - 29	16.7	
30 - 39	54.2	70.9
40 - 49		16.7
50 - 60		12.5
		100.1

1981 ABS census (Males)	Farmworkers and foremen	Farmers, fishermen hunters & timbergetters
Under 40	68.6	49.1
40 - 49	12.6	18.8
50 - 59	12.8	18.6
60+	2.2	13.4

of age. Thus, chiller operators appear to have a similar proportion in the younger age group as a comparable group of male farm workers.

Sex

All but one of the chiller operators were male.

Family structure

Most are either married (70.8%) or living in a de facto relationship (4.2%). Of these, most (87.8%) had been married for five years or more and all have children. Most spouses (77.8%) are less than 40 years of age and only a few (11.1%) have jobs. The 1981 ABS census proportion of married male employees for 'farmworkers and foremen' was 49.2%. Thus, chiller operators exhibit a higher proportion of married individuals than does a comparable group of male farm workers.

(Insert Table 4.2)

Level of education

Half had acquired a secondary education level to grade 9 or grade 10 under the current N.S.W. school syllabus, with one-quarter an education level of grades 11 or 12. Several respondents (23.8%) indicated that they had post-school qualifications, for example, a carpenter, cook, motor mechanic, qualified butcher and electrician. Data on the grades achieved at school are not readily available from the 1981 ABS census. However, a comparison on the basis of age at leaving school is possible. In this regard, 66.7% of chiller operators left school between the ages of 13 and 15 years and 28.6% over 15 years of age, while for the comparable census group of 'farmers, fishermen, hunters and timbergetters', 53.4% left school between 13 and 15 and 47.3% between 16 and 18

Table 4.2. Family structure of chiller operators

	Percentage	
Family structure		
(1) Marital status		
Married	70.8	
De facto	4.2	
Divorced	4.2	
Widowed	-	
Never married	20.8	
	100.0	(n = 24)
(2) Years married (where relevant)		
Less than 5	12.5	
5-9	25.1	
10-14	25.1	
15-19	18.8	
20 or more	18.8	
	100.3	(n = 16)
(3) Number children (where relevant)		
None	10.5	
1-3	73.7	
4+	15.8	
	100.0	(n = 19)
(4) Spouse age		
20-29	16.7	
30-39	61.1	
40-49	16.7	
50-60	5.6	
	100.1	(n = 18)
(5) Spouse has a job		
Yes	11.1	
No	88.9	
	100.0	(n = 18)

years. Thus, chiller operators left school at a proportionately younger age than did comparable male workers.

(Insert Table 4.3)

Details of the job history and current other employment of chiller operators are presented in Table 4.4.

(Insert Table 4.4)

Job history

A variety of answers were given for the last job the respondents had before becoming a chiller operator. The most common last job was stationhand (22.7%), followed by meatworker or abattoirs worker (13.6%), shearer (9.1%) and rabbit trapper (9.1%). For some (13.6%) it was their first job. All previous jobs held by chiller operators could be classified either as (a) solely rural oriented or solely primary industry oriented or (b) ones which could be undertaken in rural areas. Thus, chiller operators appear to have an immediate history of rural-oriented employment prior to becoming operators.

Other sources of income

Most (83.3%) chiller operators are also licensed kangaroo trappers. With few exceptions, these respondents started off as licensed trappers and later took over the operation of the relevant chiller(s) after several years of trapping experience. In addition, many said they have trapped other animals for commercial gain in the last three years (or less) - namely foxes (for 66.7% of respondents), rabbits (20.8%), feral pigs (8.0%), feral cats (8.0%) and feral goats (8.0%). The majority (75.0%) said that they had had a non-trapping job in the last three years or less. A considerable diversity in the type of other job(s) was reported, with no more than three respondents having the same

Table 4.3. Education levels achieved by chiller operators

	Percentage
Level of education	
Grade when leaving school (N.S.W. syllabus)	
6	10.0
8	5.0
9	40.0
10	10.0
11 & 12	25.0
Don't know	10.0
	100.0 (n = 20)

Age at leaving school (years)	Survey sample (%)	1981 ABS census (%)[a]
No schooling	-	0.5
5 - 12	4.8	2.4
13 - 15	66.7	53.4
Over 15	28.6	43.7
	100.1	100.0

a) N.S.W. male 'farmers, fishermen, hunters and timbergetters.

Table 4.4. Vocational history of chiller operators

	Percentage	
Last job before a chiller operator		
Stationhand	22.7	
Meatworker	13.6	
Shearer	9.1	
Rabbit trapper	9.1	
Carpenter	4.6	
Electrician	4.6	
Storeman	4.6	
Mechanic	4.6	
Office worker	4.6	
Other	9.1	
First job	13.6	
	100.2	(n = 23)
Other income sources		
(1) Non-kangaroo trapping[a]		
Foxes	66.7	
Rabbits	20.8	
Feral pigs	8.0	
Feral cats	8.0	
Feral goats	8.0	
		(n = 24)
(2) Non-trapping job		
Yes	75.0	
No	25.0	
	100.0	(n = 24)
(3) Nature of non-trapping job		
Heavy machinery operator	16.7	
Stationhand	11.1	
Fox skin buyer or exporter	11.1	
Trucking contractor	11.1	
Labourer	11.1	
Sharefarmer	11.1	
Shearer	5.6	
Property manager	5.6	
Property part-owner	5.6	
Storeman	5.6	
Other	28.1	
	100.6	(n = 18)

Table 4.4 (Page 2)

	Percentage	
(4) Combined employment		
Only a chiller operator	4.2	
Also traps kangaroos &/or other animals	20.8	
Also has a non-trapping job	12.5	
Also traps animals & has a non-trapping job	62.5	
	100.0	(n = 24)

a) Some respondents shot more than one animal type

non-trapping job. Overall, only one respondent (4.2%) was a full-time chiller operator in that he had no other job or trapping activity; 20.8% also trapped kangaroos or other animals, 12.5% also had a non-trapping job(s) and 62.5% also both trapped kangaroos or other animals and had a non-trapping job.

4.3 Nature of the occupation

Table 4.5 gives the history of chiller operation (and hence kangaroo trapping) in the areas of interview as indicated by respondents and their personal histories of chiller operation.

(Insert Table 4.5)

History of chiller operation in the area

Chillers have been operated in the various areas of survey from between 2 and 30 years, at an average of 14.3 years. Kangaroos were first delivered to the currently licensed sites from less than one to 22 years ago, at an average of 5.1 years. Thus, the taking of kangaroos for commercial purposes has been occurring in some areas for a long time.

Respondents' personal histories of chiller operation

Using the commencement date of the survey (November 1982) as time zero, the respondents have themselves been operating chillers from between 0.5 and 20 years, at an average of 4 years. Three respondents now concurrently operate other chillers either locally or elsewhere in their zone. Several respondents (33.3%) had in the past operated a chiller(s) at another site(s). The reasons stated for why the chiller(s) location was moved were either that the chiller operator changed his personal residence and took the chiller(s) with him, the lease on the land ran out, he was told to do so by the fauna dealer, or the

Table 4.5. History of chiller operation in the area and personal operating histories of chiller operators (n = 24)

History of chiller operation in the area	
(1) Length of time chillers in the area (years)	
Average	14.3
Range	2 - 30
(2) Length of time current site been active (years)	
Average	5.1
Range	<1 - 22
Respondents' personal histories of chiller operation	
(1) Length of time been operating a chiller(s) (years)	
Average	4.0
Range	0.5 - 20
(2) Previously operated a chiller(s) elsewhere	
Yes	33.3
No	66.7
	100.0

chiller(s) was moved to a more central position in relation to the properties from which kangaroos are taken to supply the chiller(s).

Specific details of the logistical operation of chillers at the various licensed sites of the survey sample are shown in Table 4.6. This consists of the number of separate chiller units at the sites and the commercial purpose for which kangaroos handled by the chiller(s) at the sites are used.

(Insert Table 4.6)

Logistics of chiller operation

Most licensed chiller sites have either one (66.7%) or two (20.8%) separate chiller units, with a maximum of six at one site. Since the first of July 1982, most (79.2% of) sites handled kangaroos for pet food only, with some (16.7%) accepting kangaroos for pet food and skins and one (4.2%) handling animals for pet food, skins only and human consumption. For multiple product types, most (75.0 to 90.0% of) kangaroos were for pet food purposes. Prior to 1st July 1982, a reduced majority (62.5%) of licensed sites handled kangaroos for pet food only, more (20.8%) for pet food and skins only and a sizeable minority (16.7%) for pet food and human consumption. Thus, it would seem that since 1st July 1982 a shift in commercial operation has occurred in the form of a reduction in human consumption products and an increased concentration on pet food products. The reasons for this will be examined later in the project when information from licensed fauna dealers and about market conditions are collected.

Use of chillers for non-kangaroo trapping products

Respondents were also asked if chillers at the various sites were used to handle other animals which were taken for commercial utilization. One said that

Table 4.6. Details of the logistical operation of chillers (n = 24)

	Percentage
Number of chiller units at the site	
1	66.7
2	20.8
3	8.3
6	4.2
	100.0

Commercial product type	From 1st July 1982	Before 1st July 1982
Pet food only	79.2	62.5
Pet food & skins only	16.7	20.8
Pet food & human consumption	-	16.7
Pet food, skins only & human consumption	4.2	-
	100.1	100.0

his chiller(s) was used for storing fox skins, two said for rabbits, four for feral pigs and two for feral goats. All these chillers were town chillers, with no incidence of this with property chillers. All the relevant respondents said that this occurs only rarely and then only when the relevant chiller units had no kangaroo carcasses in them.

Data on the average hours worked per week as a chiller operator and assistance (if any) given by others in this regard are presented in Table 4.7. This does not include the time spent trapping kangaroos for the 83.3% of respondents who are licensed trappers.

(Insert Table 4.7)

Hours worked

Paid help was only used by about one-quarter (26.1%) of respondents to assist in the operation of their chiller(s). The average time and range of time per week for the various activities associated with the operation of a chiller(s) are given in Table 4.7. The averages include zero observations and exclude missing data. The average total time spent per week was nearly 9 hours, although the range was quite large and is a function of chiller size. On average, most time was spent on weighing kangaroo carcasses (183 minutes), on bookwork (154 minutes), and on clearing and cleaning the chiller (153 minutes).

Chiller operator mobility

The stated degree of mobility of chiller operators is shown in Table 4.8. Respondents were asked to indicate what they thought they would do if they had to move 200 km away in order to get enough kangaroos to keep their chiller(s) operating viably. This implies that kangaroo numbers in the present locality were (temporarily) too low for the respondent to make a living, and that there

Table 4.7. Time worked per week as chiller operator and people employed by the chiller operator at each site (n = 24)

Paid help by others	Percentage
Yes	26.1
No	73.9
	100.0

Time worked as chiller operators	Average (Minutes)	Range (Minutes)
Weighing kangaroo carcases	183	00 - 420
Bookwork	154	30 - 450
Clearing & cleaning chiller(s)	153	60 - 360
Repairing & servicing chiller(s)	30	00 - 240
Other	45	00 - 720
Total time by operator	531	270 - 1170
Total time by paid employees	371	0 - 6750

would be no problems in obtaining kangaroos from licensed trappers in the new area. As this was a rather hypothetical question qualified responses were expected, and were given, in many cases. Nearly 30% would move there permanently, while most others would either give up operating their chiller(s) (25.0%), stop operating until numbers locally built up again (25.0%) or go there until numbers built up again locally (12.5%). The reasons stated by those who would not move were mainly that they either had personal ties to the local area and did not want to move, or it would be hard to secure enough properties or trappers in the new area in order to operate their chiller(s), or that current licensed trappers would be unwilling to move there.

(Insert Table 4.8)

4.4 Capital structure

An inventory of the main equipment used in operating chillers and the ownership of the various items of equipment are contained in Table 4.9. The majority (60.8%) of chiller units are all owned by fauna dealers, with the remainder either all owned by the chiller operator (21.7%), some owned by each party (13.0%) or all leased by the chiller operator (4.3%). The desirability of the relevant chiller operators changing chiller ownership is addressed later in section 7.2 of this report.

(Insert Table 4.9)

4.5 Economic status

Chiller operators were asked to provide data on their income from all sources during the 1982/83 financial year and the costs which they incurred in earning this income are summarized in Table 4.10. These data are presented in the form of averages and ranges of the various values. All zero observations

Table 4.8. Mobility of chiller operators (n = 24)

	Percentage
Move there permanently	29.2
Go until local numbers build up again	12.5
Stop until local numbers build up again	25.0
Give up kangaroo trapping	25.0
Don't know	8.3
	100.0

Table 4.9. Equipment used in operating chillers and ownership of equipment

Item	Percent occurrence	Ownership %			
		Fauna dealer	Chiller operator	Mixed	Leased
1. Chiller units					
1 unit	65.2	43.5	21.7	-	-
2 units	21.7	13.0	-	8.7[a]	-
3 units	8.7	4.3	-	4.3[a]	-
6 units	4.3	-	-	-	4.3
	100.0 (n = 23)				
2. Winch for handling carcasses					
1 unit	29.1	20.8	8.3	-	-
2 units	4.2	-	4.2	-	-
No winch	66.7	-			
3. Scales for weighing carcasses					
1 unit	62.5	58.3	4.2	-	-
2 units	4.2	-	4.2	-	-
No scales	33.3	-	-	-	-
4. Hooks for hanging carcasses					
-	-	75.0	25.0	-	-
5. Assorted hoses, pumps, pipes					
Yes	20.8	4.2	16.6	-	-
No	79.2	-	-	-	-
6. Water tanker					
Yes	4.2	-	4.2	-	-
No	95.8	-	-	-	-

a) 'Mixed' means that some items are owned by the chiller operator and some are owned by the fauna dealer.

are included in the averages and missing observations excluded. Chiller operators were also asked to indicate the average monthly prices received by the licensed trappers using their chiller(s) since 1st July 1982. These data will be presented later in the discussion of section 5.5 on the economic status of licensed trappers.

(Insert Table 4.10)

Incomes and costs

Income resulting directly from chiller operation takes the form of a commission on the number or total weight of kangaroo carcasses handled by the chiller(s) at the registered site. No wage or retainer apart from a commission was paid to the respondents for operating their chiller(s). Only those costs borne by chiller operators are included with those met by fauna dealers being excluded. A commission was received by about half (52.2%) of respondents. Its nature varies from one to five cents per kilogram of dressed carcass handled by their chiller(s), 30 or 40 cents per kangaroo and 20% of the total value of payments to trappers for kangaroos passed through the chiller(s).

A stratification of chiller operation commission by (a) sole trapper chillers and (b) two or more trappers at the chiller is presented in Table 4.11. Only 11.1% of sole trapper-chiller operators received a commission compared to most (90.9%) chiller operators with two or more trappers operating out of their chiller(s). Moreover, most (90.0%) town chiller operators received a commission compared to a few property chiller operators (20.0%). Thus, it seems that it is mostly those operators of multiple-trapper and town chillers who receive a commission. At the time of the survey only two (or 18.2% of) property chillers were used by more than one licensed trapper.

Table 4.10. Chiller operators' incomes from all sources and costs incurred in earning income for the 1982/83 financial year (n = 20)

	Average ($)	Range ($)
Income from chiller operation		
Gross income from chiller operation	4,443	0 - 20,533
Less total costs of chiller operation	1,463	0 - 8,020
Net income from chiller operation	2,980	-1,580 - 12,513
Net income from trapping[a]	8,491	0 - 27,207
Net income from other non-shooting occupations	5,423	0 - 34,615
Total net income 1982/83	16,894	4,026 - 34,615

a) 16 of the chiller operators who could provide financial information were also licensed trappers.

The average gross income from chiller operation was $4,443. It was on average much greater for town chiller operators ($8,311) than for property chiller operators ($575), which reflects the fact that most property chiller operators are not paid a commission. It is also slightly greater on average for respondents with two fauna dealers ($3,782) than with just one fauna dealer operating ($3,193). The average chiller operating cost was $1,463. Thus, the average net income from chiller operation was approximately $2,980. Some net chiller operation incomes were negative, reflecting the fact that either costs exceeded income or that some chiller operators pay for the running costs of their chiller(s) and do not receive a commission.

The average net trapping income of the chiller operators was about $8,491. The various components of income from trapping activities and the breakdown of costs incurred in earning trapping income will be discussed later under the economic status of licensed trappers (see section 5.5). A stratification of chiller operators' net trapping income by the number of trappers using the chiller is given in Table 4.11. Average net trapping income for operators of sole-trapper chillers is greater than for those operating multiple-trapper chillers suggesting that operators of multiple-trapper chillers either require more time to run their chiller(s) and consequently have less time for trapping and/or offset reduced trapping income with (increased) income in the form of a commission for operating their chiller(s).

(Insert Table 4.11)

The average net income from the other non-shooting occupations listed in Table 4.4 was $5,423. A stratification of this by the number of trappers using the chiller(s) is also shown in Table 4.11. It is much greater for respondents

Table 4.11. Stratification of average net income per chiller operator by number of trappers using the chiller (n = 20)

	Number of trappers		
	Sole trapper	2-5 trappers	6+ trappers
Net trapping income ($)	12,284	7,087	853
Net income from other non-shooting occupations	1,552	4,931	18,350
Net chiller operation income ($)	-420	5,029	7,713
Total net income ($)	$13,416	$17,047	$26,916
Number of respondents	9	8	3
Comparison of average total net incomes of			
Chiller operators - licensed trappers ($)		15,763	
Licensed trappers only ($)		15,961	
Chiller operators only ($)		21,417	

operating multiple-trapper chillers than those operating single-trapper chillers. The latter were mainly property chillers where, as noted earlier, less non-trapping employment opportunities are likely to exist.

The total average net income from all sources was $16,894 (Table 4.10). As seen in Table 4.11, this increases progressively as the number of trappers using the respondents' chiller(s) increases. It is also indicated in Table 4.11 that net chiller operation income increases progressively as the number of trappers increases. A possible reason for the latter trend was noted previously.

A comparison of total net incomes for (a) those chiller operators who trap kangaroos, (b) those who do not and (c) licensed trappers only is also contained in Table 4.11. There is no significant difference between the two types of licensed trappers. Chiller operators who do not trap kangaroos have a greater average total net income than the two types of trappers.

Chapter 5

KANGAROO TRAPPING AS AN OCCUPATION

5.1 Introduction

Elicited data on the social characteristics of licensed trappers, the nature of the occupation of licensed kangaroo trapping, the ownership of plant and equipment used, and details of income earned from all sources and costs incurred are reported in this chapter. Social characteristics include licensed trapper age, sex, family structure, education, vocational history and future employment aspirations. The nature of the occupation involves a brief description of the job, *per se*, hours worked and licensed trapping experience.

5.2 Social status

Details of where each licensed trapper was brought up and their ages, family structure and level of education are presented in Tables 5.1 and 5.2.

(Insert Table 5.1)

Where brought up

Most originate either locally (58.3%) or elsewhere in N.S.W. (18.3%). Thus, most might reasonably be expected to have long-term knowledge of the environment in which they work and live.

Age

Most (81.6%) are under 40 years of age. The maximum age is 57, but only a small minority (6.7%) fall in the 50 to 60 years age group. ABS census data for the year 1981 for groups of employed males in N.S.W. which are comparable to licensed kangaroo trappers are shown in Table 5.1. Thus, licensed kangaroo trappers appear to have a much larger proportion in the younger age category than do comparable groups of male farm workers.

Table 5.1. Origin, age and family structure of licensed trappers

	Percentage		
Where brought up			
Locally (within 100 km)	58.3		
Elsewhere in N.S.W.	18.3		
Other Australian State	16.7		
Overseas	6.7		
	100.0 (n = 60)		
Age (years)			
20 - 29	28.3		
30 - 39	53.3		
40 - 49	11.7		
50 - 60	6.7		
	100.0 (n = 60)		
1981 ABS census (Males)	Farmworkers and foremen		Farmers, fishermen hunters & timbergetters
Under 40	68.6		49.1
40 - 49	12.6		18.8
50 - 59	12.8		18.6
60+	6.0		13.4
	100.0		99.9
Family structure			
(1) Marital status	Survey sample		
Married or de facto	68.3		49.2
Divorced	3.3		2.8
Separated, not divorced	-		2.2
Widowed	1.7		1.1
Never married	26.7		44.6
	100.0 (n = 60)		99.9
(2) Years married (where relevant)			
Less than 5	2.6		
5 - 9	39.5		
10 - 14	31.6		
15 - 19	7.9		
20 or more	18.4		
	100.0 (n = 38)		

Table 5.1 (Page 2)

	Percentage	
(3) Number of children		
None	4.9	
1-3	68.3	
4-10	24.4	
More than 10	2.4	
	100.0	(n = 41)
(4) Spouse age		
20 - 29	41.5	
30 - 39	43.9	
40 - 49	9.8	
50 - 60	4.8	
	100.0	(n = 41)
(5) Spouse has a job		
Yes	12.2	
No	87.8	
	100.0	(n = 41)

Sex

All licensed trappers were males.

Family structure

The majority are either married (65.0%) or living in a de facto relationship (3.3%). Of these, most (71.1%) were married for between 5 and 15 years and almost all (95.1%) have children. Most spouses (85.4%) are less than 40 years of age. Only a few (12.2% of) spouses have jobs. The 1981 ABS census proportion of married male employees in a comparable group was 49.2%. Thus, during the period surveyed licensed kangaroo trappers exhibit a much higher proportion of married individuals than do comparable groups of male workers. This social profile of licensed trappers is not consistent with press statements by some who assert that licensed trappers tend to be itinerant workers.

(Insert Table 5.2)

Level of education

The majority had acquired a secondary education level to grade 9 (31.4%) or grade 10 (27.5%) under the current N.S.W. school syllabus, with some (19.6%) acquiring an education level of grades 11 or 12. Only a few respondents (16.7%) indicated that they had any particular post-school qualification. The type of qualification cited included a carpenter, cook, motor mechanic, electrician, butcher, and a university science degree. As with chiller operators (see section 4.2), 1981 ABS census data are only readily available for the age at leaving school. In this regard, for the survey sample, 46.3% of licensed trappers left school between the ages of 13 and 15 years and 46.3% between 16

Table 5.2. Education levels attained by licensed trappers (n = 51)

	Percentage
(1) Grade when leaving school (N.S.W. syllabus)	
5 & 6	7.8
8	7.8
9	31.4
10	27.5
11 & 12	19.6
Don't know	5.9
	100.0

(2) Age at leaving school (years)	Survey sample (%)	1981 ABS census[a] (%)
5 - 12	7.4	2.4
13 - 15	46.3	53.4
16+	46.3	43.7
Never attended school	0.0	0.5
	100.0	100.0

a) N.S.W. male farmers, fishermen, hunters and timbergetters.

and 18 years of age, while the overall averages for comparable groups in the ABS 1981 census were 53.4% between 13 and 15 years and 43.7% 16 and over. Thus, licensed trappers left school at an age which is not significantly different from comparable male workers.

Data on licensed trappers' job history, reasons for becoming a licensed kangaroo trapper, perceived best alternative activity to kangaroo trapping and future employment aspirations are displayed in Tables 5.3, 5.4 and 5.5.

(Insert Table 5.3)

Job history

As with chiller operators, a variety of answers were given for the last job the respondents had before becoming a licensed kangaroo trapper. The most common last job was stationhand (24.5%), followed by meatworker or abattoirs worker (11.3%) and shearer (11.3%), mine worker (7.5%), electrician (5.7%), carpenter (5.4%) and rabbit trapper (5.7%). However, for a few respondents (9.4%) licensed kangaroo trapping was their first job. All of the indicated last jobs are either (a) solely rural oriented or solely primary industry oriented or (b) could be undertaken in rural areas. Thus, licensed kangaroo trappers appear to have an immediate history of rural-oriented employment prior to becoming licensed kangaroo trappers.

Current other jobs

Most said they have trapped or shot other animals for commercial gain in the last three years or less - namely foxes (for 83.9% of respondents), rabbits (26.8%), feral pigs (17.9%), feral cats (14.3%) and feral goats (3.6%). The majority (75.0%) said that they had a non-trapping job in the last three years

Table 5.3. Vocational history of licensed trappers

	Percentage	
Last job before a licensed trapper[a]		
Station hand	24.5	
Meat worker	11.3	
Shearer	11.3	
Mine worker	7.5	
Rabbit trapper	5.7	
Carpenter	5.7	
Electrician	5.7	
Fox trapper	3.8	
Storeman	3.8	
Heavy machinery operator	3.8	
Labourer	3.8	
Other	9.4	
First job	9.4	
		(n = 40)
Current other job		
(1) Non-kangaroo trapping		
Foxes	83.9	
Rabbits	26.8	
Feral pigs	17.9	
Feral cats	14.3	
Feral goats	3.6	
		(n = 56)
(2) Non-trapping job		
Yes	75.0	
No	25.0	
	100.0	(n = 56)
(3) Nature of non-trapping job[a]		
Stationhand	25.0	
Fox skin buyer or exporter	10.0	
Heavy machinery operator	10.0	
Trucking contractor	10.0	
Mine worker	10.0	
Labourer	7.5	
Sharefarmer	5.0	
Shearer	5.0	
Other	37.5	
		(n = 40)

Table 5.3 (Page 2)

	Percentage	
(4) Combined employment		
Only traps kangaroos	1.8	
Also traps other animals	26.8	
Also has a non-trapping job	10.7	
Also traps other animals and has a non-trapping job	60.7	
	100.0	(n = 56)

a) In some cases more than one response was mentioned.

or less. Of these, the most common was stationhand (25.0%), followed by fox skin buyer or exporter (10.0%), heavy machinery operator (10.0%), trucking contractor (10.0%), mine worker (10.0%), and labourer (7.5%). Overall, only one (1.8%) respondent was a full-time licensed kangaroo trapper in that he had no other job or trapping activity, 26.8% also trapped other animals, 10.7% also had a non-trapping job(s) and 60.7% also both trapped other animals and had a non-trapping job. An analysis of the importance of each category of employment in terms of its contribution to the taxable incomes of licensed trappers is presented later in section 5.5.

Why respondent became a licensed kangaroo trapper

The reason most suggested for originally becoming a licensed kangaroo trapper was because it was the respondent's best opportunity of obtaining employment (23.7%), followed by the respondent liked the idea of being a licensed kangaroo trapper (20.3%), the money seemed good at the time (13.6%), the combined reason that the respondent needed a job and liked the idea of being a licensed kangaroo trapper (11.9%), the combined reason that the respondent needed extra income to supplement income from existing employment and licensed kangaroo trapping seemed his best opportunity for this (6.8%) and the respondent liked the idea of self-employment which licensed kangaroo trapping afforded (6.8%). All these reasons essentially mean that for these respondents licensed kangaroo trapping was perceived at the time to be either their best opportunity to gain employment or the type of employment to which they were most suited.

(Insert Table 5.4)

Table 5.4. Reasons for taking up licensed trapping

	Percentage
Why began licensed trapping[a]	
My best employment opportunity	23.7
I liked the idea of shooting	20.3
It was good money then	13.6
I needed a job and liked the idea of shooting	11.9
It was my best prospect for earning extra income	6.8
I liked the idea of self-employment	6.8
Following in my father's footsteps	3.4
Other	20.4
	(n = 59)
Alternative employment if gave up licensed trapping[a]	
Find a new (unspecified) job or go on the dole	55.0
Work more in current part-time non-trapping job	21.7
More leisure	13.3
Other non-kangaroo trapping	20.0
	(n = 60)

a) More than one response occurred in some cases.

Best alternative activity

All licensed trappers were asked how they would spend the time they currently spend kangaroo trapping if they gave it up altogether. Over half (55.0%) of the respondents said that they would either find another job if they could or go on the dole, although they did not indicate an immediate prospect of alternative employment. Sizeable minorities indicated that they would spend more time either in their current part-time non-trapping employment (21.7%), or in leisure (13.3%), or in other commercial trapping activities such as foxes, rabbits, feral goats and feral pigs (20.0%).

(Insert Table 5.5)

Future kangaroo trapping aspirations

The majority (60.3%) expected, ceteres paribus, to trap kangaroos under licence for the rest of their working life. Things these respondents cited which would change this aspiration included licensed kangaroo trapping becoming no longer profitable enough (60.0%), obtaining another job with lots more money (42.9%), too few kangaroos to trap in the area (31.4%) and becoming sick of licensed kangaroo trapping (11.4%). Of those (39.7%) who said they expected not to always work as a licensed kangaroo trapper, the majority (56.5%) expected to give up within 5 years. However, a substantial minority (30.4%) were unsure as to when exactly they expected to give up although they were certain that they would not remain a licensed kangaroo trapper all their working lives. The reasons given for why they expected to give up licensed kangaroo trapping some time in the future included the expectation that the respondent would be sick of it by then (43.5%), the desire to commence a new venture or to concentrate more on a current part-time, non-trapping job (8.7%), expecting to have earned all

Table 5.5. Future aspirations of licensed trappers

	Percentage	
Future licensed trapping aspirations		
(1) Always want to trap kangaroos		
Yes	60.3	
No	39.7	
	100.0	(n = 58)
(2) (If yes) what would make you stop[a]		
No longer profitable enough	60.0	
Another job with lots of money	42.9	
Too few kangaroos to harvest	31.4	
Get sick of the job	11.4	
Price too low	5.7	
Unable to do the job anymore (physically)	5.7	
Other	5.7	
		(n = 35)
(3) (If no) when expect to stop		
Within 1 to 2 years	34.8	
Within 3 to 5 years	21.7	
Within 6 to 11 years	13.1	
Don't know	30.4	
	100.0	(n = 23)
(4) (If no) why expect to stop then[a]		
Probably be sick of doing it by then	43.5	
Would have earned all want to by then	13.0	
Want to spend more time with children at night	13.0	
To build up current non-trapping job	8.7	
Not profitable enough by then for full-time employment	8.7	
Other	21.5	
		(n = 23)

a) Multiple answers were recorded in some cases.

the respondent wanted from it by then (13.0%), expecting that it would not be profitable enough to be the main source of income by then (8.7%), and the desire to spend more time at home with children than is now possible in the job (13.0%).

5.3 Nature of the occupation

Table 5.6 gives data on the commercial purpose for which kangaroos are taken and licensed trappers' preferences for commercial purpose, the level of licensed kangaroo trapping experience, the original and current level of trapping effort and any seasonal differences in effort.

(Insert Table 5.6)

Commercial purpose(s) for kangaroos harvested

Most (70.7%) have no choice in relation to the commercial purpose for which they take kangaroos. Of those that did 41.0% chose pet food alone either because it was easier and/or less time-consuming or gives the best return. An equal number chose pet food and skins only in combination amd the remainder (14.3%) pet food and human consumption because they both produced good returns and/or in order to diversify their product type. Those who said that they had no choice were asked to indicate what product type they would prefer to take if they did have such a choice. Most (80.9%) said pet food alone, usually because it was easier. Others said either human consumption (14.3%) because it gives a higher return, it is easier, gives a better use of the product (carcass) or requires less kangaroos to be harvested. The remainder said either skins only (2.4%) because it has lower operating costs or both pet food and skins only (2.4%) because they thought this was easier.

Table 5.6. Product type, licensed trapping experience, original and current trapping effort and seasonal differences in effort (n = 60)

	Percentage	
Product type	From 1st July 1982	Before 1st July 1982
Pet food only	75.0	55.0
Pet food and skins only	20.0	10.0
Pet food and human consumption	3.3	26.7
Pet food, skins only and human consumption	1.7	6.7
Not licensed then	-	1.7
	100.0	100.1
Licensed trapping experience (years)		
1 to 3		25.0
4 to 8		51.7
10 to 27		23.3
		100.0
Original trapping effort (nights/week)		
1 or 2		23.3
3 to 5		61.7
6 or 7		15.0
		100.0
Current trapping effort (nights/week)		
1 or 2		38.9
3 to 5		57.6
6 or 7		3.4
		99.9
Change in effort since beginning		
Increased		56.7
Decreased		13.3
Unchanged		30.0
		100.0
Why effort has increased		
Changed from part-time to full-time		85.7
To cover increased non-shooting costs		14.3
		100.0 (n = 7)

Table 5.6 (Page 2)

	Percentage	
Why effort has decreased		
Want to spend less time trapping	36.1	
Too few roos for original involvement	16.7	
Now take as many in less time	13.9	
Spend time on non-trapping job	8.3	
Other	25.0	
	100.0	(n = 26)
Seasonal differences in effort		
No seasonal differences	66.1	
More in summer	22.0	
More in winter	11.9	
	100.0	

From 1st July 1982, all respondents took kangaroo carcasses for use as pet food, a small proportion (21.7%) had at some time had their licences endorsed for them to take kangaroos for skins only and a few (5.0%) had taken kangaroo carcasses for human consumption purposes. Most (75.0%) had in this time only taken carcasses for pet food, others had taken kangaroos for both pet food carcasses and skins only (20.0%), pet food and human consumption (3.3%) and all three (1.7%). It seems, therefore, that commercial kangaroo harvesting is currently geared towards the markets for pet food and skins. Of course, where carcasses are taken the kangaroo meat and skin are both utilized.

Prior to 1st July 1982, the majority (55.0%) of licensed trappers took pet food carcasses only, 10.0% took both pet food carcasses and skins only, 26.7% took pet food carcasses and human consumption carcasses, and 6.7% took kangaroos for all three purposes, while one respondent was then not licensed. The incidence of carcasses taken for human consumption is seen to be much greater before 1st July 1982. Most respondents who were then geared towards taking kangaroos for human consumption now appear to have shifted to taking them for pet food only, with the proportion of skins only utilization increasing only slightly.

There appears to be a greater incidence of skins only shooting in the west (69.2%) than in the east (30.8%). This reflects NPWS policy of concentrating skin shooting in the more remote western portion of the commercial harvesting area of the State.

Licensed kangaroo trapping experience

Most (75.0% of) licensed kangaroo trappers have been operating more than three years, with several (23.3%) for ten or more years. One quarter of the respondents are relatively inexperienced in that they have only three years or

less experience. Thus, it seems that current licensed trappers as a whole are fairly experienced trappers. This reflects the belief of section 3.6 that those currently in the industry are a long-term professional core of licensed trappers.

Original trapping effort

When first becoming a licensed kangaroo trapper, a minority (23.3%) began under minimum trapping effort of one or two nights per week. The majority (76.7%) operated three or more nights per week. Some (15.0%) originally operated at maximum trapping effort of six or seven nights per week.

Current trapping effort

Currently, 38.9% of respondents trap on two or less nights per week and 61% three or more nights per week. Only 3.4% now operate at maximum effort. Most have either increased their effort (56.7%), or decreased their effort (13.3%) since they began trapping. The main reason stated for why effort has increased is that the respondent has changed from a part-time to a full-time licensed kangaroo trapper (85.7%). Reasons why effort has decreased include the desire to spend less time trapping kangaroos (36.1%), kangaroo numbers are now too low for the original level of effort (16.7%), now take as many kangaroos in less time (13.9%) and now spend time, or more time, on non-trapping employment (8.3%).

Seasonal differences in trapping effort

For the majority (66.1%) there was no difference in trapping effort between summer and winter. For those who inject more effort in summer than in winter (22.0%) the reasons include, inter alia, that licensed occupiers want greater

effort then to protect wheat crops from kangaroos, kangaroos are easier to find in summer mainly because of reduced watering sites, it is wetter in winter and therefore trapping activity is reduced and there are other work commitments in winter. For more effort in winter (11.9%) the reasons stated included, inter alia, that it is easier to trap in winter than in summer because trapping can be started and finished earlier each night in winter and the related notion that trapping nights are longer in winter and therefore effort can be more intense then, and there is a much greater risk of vehicle exhaust-induced fires during summer and hence effort is decreased then to reduce overall risk.

As noted in section 5.2, many licensed kangaroo trappers take foxes and other animals and/or have non-trapping employment. Table 5.4 shows the factors which the relevant trappers stated determined how their time is proportioned (a) between trapping kangaroos versus other animals and (b) between all trapping activity and non-trapping employment.

(Insert Table 5.7)

Time spent trapping kangaroos versus trapping other animals

For the majority of trappers (56.3%) other animals are only taken if they are seen while out trapping kangaroos. For others, other animals are only taken if there are lots of them around (37.5%) or only if their quality and/or price is good (35.4%). It would seem that for most respondents maintaining the taking of kangaroos either comes first or is equally the most important consideration when deciding how trapping effort or time is to be spent.

Time spent trapping versus undertaking non-trapping employment

For the largest proportion (46.2%) of those with non-trapping employment, the non-trapping job always comes first in determining time spent. Others stated that the demand for their non-trapping services (23.1%), the number of

Table 5.7. Determinants of time spent in trapping kangaroos, other animals and non-trapping employment

	Percentage
Time spent trapping kangaroos versus other animals[a]	
Only trap other animals if see them while trapping kangaroos	56.3
Number of other animals around	37.5
Quality and/or price of other animals around	35.4
Number of kangaroos around	6.3
Other	4.2
Time spent trapping versus non-trapping employment[a]	
Non-trapping job always comes first	46.2
Demand for his non-trapping services	23.1
Licensed kangaroo trapping always comes first	10.3
Number of kangaroos around	7.7
Trade-off of kangaroo numbers and demand for non-trapping services	7.7
Other	12.9

a) Multiple responses recorded in some cases.

kangaroos around or the latter two combined (7.7%) was the most important determinant. Only a few (10.3%) said that kangaroo trapping comes first irrespective of the abundance of kangaroos. This means that 69.3% of those with non-trapping employment place premier importance on non-trapping employment. It was noted in section 5.2 that 71.4% of the respondents who answered the relevant question have a non-trapping job. Thus, overall 49.5% (69.3 x 0.714) of respondents regard non-trapping employment as the most important determinant of how they spend their total working effort or time.

Data on the average hours worked per night of trapping and the assistance (if any) given by others are presented in Table 5.8.

(Insert Table 5.8)

Hours worked

The average time in minutes for various component activities and the range of values for each activity are presented in the table. The average total time was 684 minutes, although this ranged from 390 to 1035 minutes over the sample. The average components of time spent were in actually shooting kangaroos (260 minutes), driving out and back (127 minutes), dressing carcasses (93 minutes), reloading cartridge cases (53 minutes), weighing carcasses and putting them in the chiller (36 minutes), repairing and servicing rifles and knives (33 minutes), loading vehicle at the beginning of each night (23 minutes), total bookwork (20 minutes), and repairing and servicing trapping vehicle (15 minutes). Large ranges occur for each of these activities.

Table 5.8. Average time worked by licensed trappers and help provided to licensed trappers

	Average	Range
Hours worked (minutes per night)		
Loading vehicle at beginning of each night	23	0 - 60
Driving out and back	127	0 - 300
Shooting kangaroos	260	150 - 480
Dressing carcasses	93	30 - 150
Weighing carcasses	36	0 - 60
Cleaning trapping vehicle	24	0 - 60
Repairing or servicing trapping vehicle	15	0 - 120
Repairing or servicing knives, tools, rifles, etc.	33	0 - 60
Reloading cartridge cases	53	0 - 120
Total bookwork	20	0 - 45
Total trapping time	684	390 - 1035[a]
Help by others	Percentage	
No help	39.6	
Help by paid employees	26.4	
Help by friends (unpaid)	15.1	
Help by wife (unpaid)	9.4	
Help by family members (unpaid)	9.4	
	99.9	(n = 53)

a) n = 55 except for time shooting kangaroos and dressing kangaroos where n = 54.

Help by others

The majority (60.4%) have some form of help from others. Help was provided by either paid employees (26.4%) or unpaid labour by friends (15.1%), wife (9.4%) or family members (9.4%). For paid employees, payment was mostly on a per nightly basis with the payment ranging from $20 to $40 per night. Other methods of payment were at the rate of $250 per week or 2 cents per dressed kilogramme or 30 cents and 55 cents per animal taken by the licensed trapper or 20.0% of gross income earned during the period of paid help. For unpaid employees, the arrangement with the respondent was that wives who help were all partners in the trapping business, family members were either helping just for interest or as a family responsibility to aid the family income-earning process, and friends were either helping for interest or in repayment of a favour. The frequency at which assistance occurred by each group varies from just occasionally to always for family and paid employees, while most wives help always and all friends only occasionally.

A variety of help was performed by the different groups as shown in Table 5.9. For paid employees, all opened gates, most helped with loading of kangaroo carcasses into chiller (92.9%) and dressing carcasses (85.7%), and many picked up carcasses (64.3%) and worked spotlights (57.1%).

(Insert Table 5.9)

Others' use of trapping rig

Only a few (8.6% of) respondents have other people using their rigs. Use was by either other licensed kangaroo trappers or by fox shooters.

(Insert Table 5.10)

Table 5.10. Use of trapping vehicle by others

	Percentage
Others' use of trapping rig	
Not used by others	91.4
Used by other licensed trappers	6.9
Fox trapper	1.7
	100.0

Table 5.9. Tasks performed by helpers of licensed trappers

	Paid employees	Friends	Wife	Family members
Drive out	7.1	-	-	-
Drive back	35.7	25.0	40.0	40.0
Shoot kangaroos	35.7	25.0	-	-
Open gates	100.0	100.0	100.0	100.0
Work spotlight	57.1	37.5	80.0	80.0
Dress kangaroos	85.7	25.0	20.0	20.0
Put on tags	21.4	-	20.0	-
Load carcasses into chiller	92.9	75.0	40.0	60.0
Pick up carcasses	64.3	62.5	-	80.0
Load bullets	14.3	-	-	-
Cook meals in the paddock	7.1	-	-	-
Company while trapping	-	-	-	20.0
Total number of respondents	14	8	5	5

Mobility of licensed trappers

As with chiller operators, trappers were asked to indicate what they thought they would do if they had to move 200 kilometres away for up to six months in order to find enough kangaroos to make a living. This implies that kangaroo numbers in the present locality were (temporarily) too low for the trapper to make a living, and that there would be no problems in obtaining occupiers' tags to trap in the new area. As was the case for chiller operators, qualified responses were given in many cases. Relatively few (21.1%) said that they would move there permanently, while the largest proportion (33.3%) said that they would give up kangaroo trapping. Most of the others said that they would stop until local populations built up sufficiently (17.5%) or go to the new area until this happened (19.3%). The most commonly stated reason by those who would not move at least temporarily was that they had ties to their local community which they did not want to break.

(Insert Table 5.11)

Table 5.11 also shows a cross-tabulation of whether respondents would (a) move permanently or temporarily or (b) give up trapping or stop until local populations built up again by (i) east/west and (ii) town/property chiller classifications. Western trappers are more likely to move than eastern trappers; and property trappers are more likely to move than town ones. This might mean western trappers in towns and on properties are more financially dependent on trapping kangaroos than are eastern (town) trappers and are therefore more likely to move if maintenance of a living from kangaroos depended from kangaroos depended on such a move. Moreover, most property trappers interviewed had relatively temporary residences on the property (caravans or shearing quarters) and may therefore be more amenable to such a move. Of course, there are several exceptions to the latter generalization.

Table 5.11. Trappers' willingness to move to another area with kangaroos and 200 km away if local kangaroo densities temporarily too low

	Percentage
Trapper mobility	
Move there permanently	21.1
Go temporarily until local numbers build up again	19.3
Stop shooting until local numbers build up again	17.5
Give up kangaroo trapping	33.3
Other	3.5
Don't know	5.3
	100.0

Cross-tabulations of trapper mobility

East/west division	East (%)	West (%)
Move permanently or temporarily	28.6	56.3
Would not move	71.4	43.7
	100.0	100.0

Town/property division	Town (%)	Property (%)
Move permanently or temporarily	39.0	66.7
Would not move	61.0	33.3
	100.0	100.0

5.4 Capital structure

Data on the type of trapping equipment used and ownership of equipment are contained in Table 5.12. The table shows firstly the occurrence of use of each type of equipment and secondly the distribution of ownership of equipment for those who had each separate item. Generally, trappers own their own equipment. The most popular rifles are the 0.222 and the 0.22-250, with most owning more than one rifle. The 0.17 is normally only used for fox shooting.

(Insert Table 5.12)

Respondents were also asked to specify what they thought would be the replacement costs of a trapping rig (vehicle and frame) for each commercial purpose of section 5.3. Summary estimates of these are contained in Table 5.13. The average cost of a rig for handling carcasses for pet food was about $13,000, that for human consumption just under $15,000 and that for skins only about $11,500. These are replacement costs for a new vehicle. Secondhand purchases would be less than this.

Table 5.13 also shows the legal category under which capital is held. Most are under either sole operation (51.8%) or a partnership with wife (33.9%) or partnership with family (7.1%).

(Insert Table 5.13)

5.5 Economic status

Prices received

An indication of the prices received by licensed trappers per kilogram of carcasses for pet food utilization from 1st July, 1982 is provided in Table 5.14. Where the carcass is taken for pet food, licensed trappers are paid for carcass weight with the skin attached and with (usually all of) the head, tail, hoppers, paws and gut removed. No separate payment is made for the skin. The

Table 5.12. Equipment used in trapping kangaroos and ownership of equipment

Item	Percentage with item	Ownership		
		Trapper	Leased (by trapper)	Chiller operator
1. Vehicle & frame	100.0	96.2	1.9	1.9
2. Winch				
Yes	46.3	44.4	-	1.9
No	53.7	-	-	-
3. Spotlight				
1 unit	88.9	87.0	-	1.9
2 units	11.1	11.1	-	-
4. Dressing lights				
1 unit	17.2	17.2	-	-
2 units	53.5	53.5	-	-
3 or 4	12.1	10.7	-	1.7
No dressing lights	17.2	-	-	-
5. Rifles (calibre)[a]				
0.17	44.4	44.4	-	-
0.222	64.1	62.2	-	1.9
0.22 - 250	62.2	62.2	-	-
0.243	22.2	22.2	-	-
0.250	13.0	13.0	-	-
Other	9.3	9.3	-	-
6. Scope				
6 power	25.9	25.9	-	-
8 power	46.3	46.3	-	-
10 power	22.2	22.2	-	-
12 power	16.7	14.8	-	1.9
20 power	3.7	3.7	-	-
Other	5.6	5.6	-	-

Table 5.12 (Page 2)

Item	Percentage with item	Ownership		
		Trapper	Leased (by trapper)	Chiller operator
7. Dressing knives				
2	16.4	16.4	-	-
3	20.0	20.0	-	-
4 or more	63.6	61.8	-	1.8
8. Dressing machete	16.4	16.4	-	-
Yes	83.6	-	-	-
No				
9. Communication radio				
Yes	50.0	50.0	-	-
No	50.0	50.0	-	-
10. Trailer (to take extra carcasses)				
Yes	27.3	27.3	-	-
No	72.7	72.7	-	-
11. Caravan (property trappers)				
Yes	18.2	18.2	-	-
No	81.8	81.8	-	-

a) Percentages for 'rifles' represent the incidence of use of each rifle of the stated calibre. They do not sum vertically to 100.0% as many trappers use a combination of rifles.

Table 5.13. Rig replacement costs and trapping business tax category

Average rig replacement cost	$
Pet food rig	13,000
Human consumption cost	15,000
Skins only cost	11,500
Trapping business tax category	**Percentage**
Sole operation	51.8
Partnership with wife	33.9
Partnership with family	7.1
Private company	3.6
Other	3.6
	100.0

table indicates the average price per month and range of values per month. It is seen that a sizeable variation in the price received in each month occurs across the commercial harvesting area of the State. For 40.7% of respondents, a deduction ranging from 1 to 10 cents/kg was imposed for kangaroos not shot in the head. The maximum and also average price increased throughout the last survey period.

(Insert Table 5.14)

The price for skins only varied between $1.50 and $4.50 per skin depending, inter alia, upon the size, species and/or quality of the product, with an average of about $3.00 per skin. One respondent indicated that bullet holes in the spine area of the skin may be subject to a deduction of $0.50 per skin over the normal range of prices. However, only scanty data on skins-only prices were obtained and none on prices per kg for human consumption carcasses. More precise data on this will be collected during the proposed survey of fauna dealers in Stage Two of the study.

Incomes and costs

Data on licensed trapper income from all sources during the 1982/83 financial year and total costs incurred in earning this income are presented in Table 5.15. The table shows the averages and ranges of values in each case. Averages include zero responses and exclude missing data, with the number of valid observations shown in parentheses. The inclusion of income from operating a chiller(s) reflects the fact that 16 of the licensed trappers who could provide financial information and were interviewed were also chiller operators. The components of this chiller income were discussed earlier in section 4.5.

Table 5.14. Average monthly prices received for pet food carcasses since 1st July, 1982

	Average (cents/kg)	Range (cents/kg)
1982		
July	18.6	17 - 21
August	18.6	17 - 21
September	18.6	17 - 21
October	18.8	17 - 22
November	18.9	17 - 22
December	19.3	17 - 22
1983		
January	19.5	17 - 22
February	19.8	17 - 22
March	19.8	17 - 23
April	20.1	17 - 23
May	20.2	17 - 23
June	20.5	17 - 23
July	20.6	17 - 25
August	20.7	17 - 25
September	21.2	17 - 25
October	21.5	17 - 28
November	22.3	20 - 28
December	22.9	20 - 28

Gross income is the total amount of money paid to a licensed trapper in the financial year and total costs the total amount paid to other people who supply goods and services plus an allowance for the depreciation of capital assets. Costs do not include income tax and, when for income tax advantages only a licensed trapper operates a partnership with his wife, all income was attributed to the trapper.

(Insert Table 5.15)

The most important gross trapping income was that from trapping kangaroos. Fox shooting generates the only other significant form of trapping income, which reflects the observation in section 5.2 that most (84% of) respondents trap foxes. Gross non-kangaroo trapping income in the east averages $3,574 per trapper and is decidedly greater than that in the west, which averages $2,466 per trapper. Average net income from all trapping activity (excluding any income from operating a chiller) was $9,361. Average net income from non-trapping employment was $5,932, which reflects the observation that most (71% of) respondents have some non-trapping job (see section 5.2). Average total net (taxable) income was $15,927. There is, however, a considerable range in each of these values across respondents.

These results might imply that a diversity of income source is necessary for financial well-being amongst licensed trappers in the kangaroo products industry. Indeed, as noted in section 5.2, only one licensed trapper indicated that trapping kangaroos was his only source of income. However, this mere observation of a diversity in the source of income gives no indication of the importance of non-kangaroo related income as a contribution to the total net taxable incomes of respondents. Distributions of the ratios of gross income from trapping other animals to total net income and net income from non-trapping employment to total net income are displayed in Table 5.16. These distributions give a measure of the financial importance of non-kangaroo related employment.

Table 5.15. Licensed trappers' incomes from all sources and costs incurred in earning income for 1982/83 financial year (n = 54)

	Average ($)	Range ($)	
		Minimum	Maximum
1. Income from trapping activities			
Gross income from - kangaroos	16,355.33	1,100	46,800
- foxes	2,342.33	0	9,000
- rabbits	139.07	0	2,250
- feral pigs	378.24	0	5,500
- feral cats	9.67	0	180
- feral goats	27.78	0	1,500
Total gross income from trapping	19,252.42	1,700	59,800
Less total costs of trapping	9,891.28	1,157	31,546
Net income from trapping	9,361.14	177	34,981
2. Net income as a chiller operator[a]	634.15	-1,580	12,355
3. Net income from other non-shooting occupations	5,931.61	0	28,000
4. Total net income 1982/83	15,926.90	3,011	34,981
5. Total net income 1981/82	17,972.00	4,026	34,981

a) 16 of the 54 licensed trappers who could provide financial information were also chiller operators.

Trapping costs of other animals are assumed to be negligible in calculating these ratios. This is not strictly true as some costs would be incurred. The costs may be minimal, however, for the reasons noted later in this section of the report. The ratio of net income from non-shooting sources of income to total net income is greater on average in the east (0.53) than in the west (0.25). The ratio is also greater for town trappers (0.42 on average) than property trappers (0.15 on average). In other words, non-shooting income makes a greater contribution to total taxable income in the east than it does in the west and for town trappers than property trappers. This may simply be because job availability is greater in the east, but it may equally be a reflection of the greater density of kangaroos in some parts of the western parts of the commercial shooting area.

(Insert Table 5.16)

Differences in average values of gross income from kangaroos, gross trapping income, net trapping income, net income from other non-shooting occupations and total net income according to east/west and town/property divisions and regional kangaroo density, and differences in net trapping income according to the number of licensed fauna dealers in the zone were analysed. The results of those for which clear differences were observed are displayed in Table 5.17. All net income estimates are net income before tax estimates.

Net income from other non-shooting occupations is also much greater for town trappers than for property trappers. The latter group live on properties for (at least) long periods, which may make all non-trapping work except on-farm work impracticable. As might be expected, gross kangaroo income and net trapping income increase as regional kangaroo density increases. That is, the level of harvest (and hence income generated) would be expected to increase as the animals become more numerous. Full details of the method used to derive the density classes are presented in section 6.3.

Table 5.16. Relative importance to licensed trappers of other sources of income

	Proportion
Gross income from foxes, rabbits, pigs, cats and goats/gross trapping income	
East/west division	
east	0.25
west	0.13
Non-shooting net income/total net income	
East/west division	
east	0.53
west	0.25
Town/property division	
town	0.42
property	0.15

Average net trapping income is $1,366 greater in areas where there are competing fauna dealers than where there is just one fauna dealer accepting carcasses from licensed trappers. These observed differences may be simply a random effect or due to some unrelated hidden effect. There were no differences identified for all variables in the case of total net income.

(Insert Table 5.17)

It seems that net income from trapping also varies with years of experience in kangaroo trapping. The average net income for trappers with between one and three years is $6,261, whereas for greater than three years it is $10,413. Thus, it seems that net trapping income increases with trapping experience.

The comparison of net incomes in the 1982/83 and 1981/82 financial years for the 82% of respondents able to supply 1981/82 net incomes shows that on average total net income in 1982/83 was $2,045 down on that in 1981/82. Three respondents, however, reported that their 1982/83 net income was $676, $1,289 and $2,000 more than that which they received in 1981/82. The average gross income per kangaroo was about $3.80. It was greater in the west ($3.95) than in the east ($3.55).

The breakdown of total trapping costs into component costs is given in Table 5.18. Pilot testing suggested that licensed trappers were unable to partition costs between those incurred while trapping kangaroos and those incurred trapping other animals where relevant. Thus, only total trapping costs were obtained. This means that the cost per kangaroo is likely to be over-estimated where other animals are also trapped. This is supported by the fact that the average cost per kangaroo for those respondents who also trapped other animals was $2.73, compared to $2.25 for those who only trapped kangaroos. As many respondents (at least 58.4%), however, only shot other animals while out trapping kangaroos, the overestimation may not be as large as this comparison

Table 5.17. Observed differences in various average income and average income per kangaroo taken

		Total[a] ($)	Average per kangaroo taken	n
1. Gross income from kangaroos				
- East/west division				
	east	10,393	3.55	19
	west	20,149	3.96	29
- Regional kangaroo density				
	low	14,519	3.81	9
	medium	14,952	3.98	23
	high	20,270	3.84	10
- Number of licensed fauna dealers				
	1	13,782	3.72	31
	2	21,096	3.93	17
2. Gross income from all trapping				
- East/west division				
	east	14,015	5.12	19
	west	22,615	4.19	29
- Number of fauna dealers				
	1	16,676	5.19	31
	2	24,050	4.75	17
3. Net income from all trapping				
- East/west division				
	east	6,260	2.11	19
	west	11,295	2.57	29
- Town/property division				
	town	8,115	2.40	37
	property	13,612	2.34	11
- Regional kangaroo density				
	low	7,308	2.50	9
	medium	9,024	2.49	23
	high	11,582	2.14	10
- Number of fauna dealers				
	1	8,856	2.59	31
	2	10,222	2.02	17

Table 5.17 (Page 2)

		Total[a] ($)
4. Net income from non-trapping employment		
- East/west division		
	east	7,993
	west	4,620
- Town/property division		
	town	6,923
	property	2,464

a) For all total average incomes in this table n = 54 except for those tabulated with density where, because of some missing values for density n = 48.

might suggest. For the remainder of this report is is assumed that this over-estimation can be ignored.

(Insert Table 5.18)

The average cost per kangaroo was $2.64. It is probably an overestimation for the reasons noted earlier. Cross-tabulations of it by each of east/west and town/property division, and the number of licensed fauna dealers operating were undertaken. It is greater in the east ($3.01) than in the west ($2.39). It is also greater for town trappers ($2.87) than property trappers ($1.85), which may be because the latter travel less as they usually have their own strategically located chiller. There is no difference in average cost per kangaroo according to regional kangaroo density.

The observed differences in relation to the east/west and town/property divisions might be explained with reference to the relevant average variable trapping costs per kangaroo. This represents those costs which vary according to the level of trapping effort, namely: fuel, bullets, vehicle repair and servicing, lights, royalties, protective clothing, wages, telephone, and repairs and/or replacement of rifles, rifle barrels and tools. This variable cost component is greater in the east ($2.17 per animal) than in the west ($1.88 per animal), while it is greater for town trappers ($2.15 per animal) than for property trappers ($1.48 per animal). This may in turn be because eastern trappers cover a greater area than do western trappers and town trappers a greater area than do property ones (see later in section 6.3). In other words, variable costs are greater in each case because more fuel is used to cover the larger areas.

Table 5.18. Average component trapping costs

	Total ($) (n = 54)		Per kangaroo taken (n = 49)	
Variable costs: Vehicle				
Fuel	3,060.00		0.78	
Repairs	830.87		0.25	
Tyres	561.90		0.19	
Servicing	221.27		0.08	
		4,674.04		1.30
Variable costs: Shooting				
Bullets	934.20		0.22	
Royalty tags	628.82		0.15	
Rifle barrel replacement	233.64		0.09	
Rifle replacement	164.35		0.04	
Lights	110.46		0.03	
		2,071.47		0.53
Fixed costs: Vehicle				
Depreciation	881.47		0.27	
Vehicle registration	295.11		0.12	
Vehicle instalments/repayments	142.47		0.04	
Vehicle insurance	112.31		0.05	
		1,431.36		0.48
Fixed costs: Other				
Wages	724.94			
Accounting	141.31			
Telephone	98.98			
Protective clothing	89.36			
Tools & knives	47.42			
Interest on plant	44.35			
Other insurance	35.55			
Shooter's licence	33.00			
Postage/stationery	15.91			
Other	314.55			
		1,545.37		0.37
Total costs		9,722.24		2.68[a]

a) Difference between sum of itemized average costs per kangaroo ($2.68) and total average cost per kangaroo ($2.64) due to rounding errors.

The average net income per kangaroo was $1.16. This figure is probably a slight underestimation due to the possible overestimation of average cost for some respondents. Average net income per kangaroo was greater for property licensed trappers ($1.91 per animal) than for town licensed trappers ($0.93 per animal). It was also greater for western town trappers ($1.35) than for eastern town trappers ($0.54). These observed differences would be expected given that there were no differences in average gross return per kangaroo in relation to these divisions, and given that average cost per kangaroo was greater in the east than in the west and greater for town trappers than for property trappers.

Chapter 6

INTERACTIONS BETWEEN LICENSED TRAPPERS, LANDHOLDERS AND KANGAROOS

6.1 Introduction

In this chapter, data are presented on the informal arrangements which licensed trappers believe exist under the current management programme between licensed trappers and s.121 licensed occupiers, the trapping methods used by licensed trappers to take kangaroos for commercial purposes and the effects various hypothetical price changes would have on licensed trappers' activities. The former includes data on how s.121 occupiers' tags are obtained and on any difficulties experienced in attempting to obtain these tags. Data on trapping methods include actual number of kangaroos taken, decisions on where to trap each night, sex and weight preferences for kangaroos and actual trapping methods *per se*. The hypothetical price changes include positive and negative changes in prices received and increases in royalty payments. This latter information is useful for predicting how licensed trappers might respond to various changes to the structure of the existing commercial industry. Such changes would include both those induced by changes in NPWS regulations and those instigated directly by licensed fauna dealers.

It is stressed that during this stage of the study no data were acquired on s.121 licensed occupiers' perceptions of their interactions with licensed trappers nor from those landholders who chose not to apply for such a licence. Consequently, a full analysis and discussion of matters pertaining to the use of occupiers' tags is not possible.

6.2 Informal arrangements with s.121 licensed occupiers

Under the requirements of the NPWS Kangaroo Management Program, it is necessary that a licensed trapper obtain s.121 occupiers' tags from the licensed occupier before he is able to trap kangaroos on a property. Data on

how such tags are obtained and whether there are any difficulties in obtaining them are presented in Table 6.1.

(Insert Table 6.1)

Obtaining s.121 occupiers' tags

In this regard, respondents were asked to indicate how occupiers' tags were first obtained for the last five (different) properties for which they have obtained tags to trap kangaroos. It was stressed to respondents that the question related to their first contact with the landholder and not subsequent contacts when additional tags were being sought. Nevertheless, the interviewer considers that a few respondents (less than 10%) may have misinterpreted the question and responded as for additional tags. In the majority (82.5%) of cases this was by the trapper phoning or visiting the relevant landholder(s) and asking him for tags he already had or, if he had none, asking him to apply for an s.121 occupier's licence to obtain tags to allow the licensed trapper to take kangaroos from the property. The relevant licensed occupier(s) approached the trapper to have him trap on the property on 8.7% of occasions.

This could be simply, though possibly incorrectly, interpreted as meaning that licensed trappers perceive that the decision by landholders to apply for an s.121 occupier's licence is the result of their lobbying the landholders to apply. However, consideration must also be given to the needs of a landholder who may be quite willing for a trapper to take kangaroos from their property and may have gone looking for a licensed trapper if he had not been approached. Similarly, in some cases, trappers are difficult to contact. The contact process may begin by a landholder spreading the word that he wants kangaroos removed and the trapper then responding at his convenience. For this question to be objectively resolved it is necessary to determine landholders' reasons for

Table 6.1. Methods of obtaining s.121 occupiers' tags

	Percentage	
First obtaining s.121 occupiers' tags[a]		
Trapper asking occupier to apply for a licence	82.5	
Licensed occupier approached trapper to take kangaroos	8.7	
Other	8.7	
	99.9	(n = 263)
Incidence of landholders not applying to remove kangaroos		
(1) Number of properties with no licensed trapping		
Licensed trapping occurs on all properties in the area	27.6	
Less than 10 properties with many roos and no trapping	60.3	
Greater than 10	10.3	
Don't know	1.7	
	99.9	
(2) Perceived reasons why landholders do not apply		
Landholders do not believe in killing kangaroos	19.5	
Just want no trapping on their properties	63.4	
Shoot the kangaroos themselves	9.8	
Worried trappers might shoot stock	2.4	
Don't know	2.4	
Other	2.4	
	99.9	

Main seasonal determinants of properties sought for trapping[b]

	Summer	Winter
Those with the most kangaroos	38.4	34.0
Willingness of landholder to let me on	15.4	26.0
Knowing the landholder	13.5	10.0
Open type of country	7.7	2.0
Mixture of forest and open country	3.8	6.0
Stoney-hilly country	-	6.0
Nothing in particular	7.7	2.0
Other	15.2	18.0

a) Percentage of times for the last five properties that the approach was made by the relevant person. Missing observations excluded.

b) The percentages are the percentage of licensed trappers who mentioned the determinant for that season. Multiple answers recorded in some cases.

applying and also how licensed trappers locate those landholders. Notwithstanding, before issuing an s.121 occupier's licence it is the responsibility of the NPWS to ensure that a demonstrated need to take kangaroos exists. Thus, the procedures used by the Service in determining whether or not an unequivocal need has been demonstrated also require examination.

Respondents were also asked if it had ever been necessary for them to buy occupiers' tags or pay a percentage of their income to licensed occupiers in order to obtain tags to trap on a property. Only 3 (or 5.0% of) respondents said that they had to purchase tags, with the number of tags bought being 500, 600 and 1000. The indicated price ranged from 20 to 35 cents per tag. No incidence of licensed trappers paying a percentage of their incomes to licensed occupiers was reported.

Difficulties in obtaining tags

Only two respondents had difficulties in getting enough tags in the area where they trap, and the difficulties reported were non-seasonal in nature. The reasons cited for these difficulties were either that other licensed trappers have the properties tied up or that the landholders approached have previously had bad experiences with licensed trappers and now want no licensed trapping on their properties. However, no information was provided on the nature of the bad experience(s) involved. Thus, failure to obtain enough occupiers' tags does not appear to be a factor limiting the number of kangaroos taken in 1983.

Respondents were also asked if there were properties in their trapping area with high kangaroo numbers and no licensed trapper taking kangaroos from these properties. The majority (70.7%) of respondents said that this was not the case, and that licensed trappers were taking kangaroos from all properties with high kangaroo numbers. Most of the remainder indicated that there were less

than ten such properties in their trapping areas. The explanations given were that landholders wanted no licensed trapping on their properties either with no reason given (63.4%) or mainly because they do not believe in having kangaroos killed (19.5%) or they (or their stationhands) shoot the kangaroos under their s.121 occupier's licence (9.8%).

Seasonal differences in the properties sought for trapping purposes

The most important determinant on which properties licensed trappers attempt to obtain occupiers' tags in summer is the perceived number of kangaroos on the properties (38.4%), followed by the willingness of licensed occupiers to allow kangaroo trapping at that time (15.4%), being well acquainted with the landholder (13.5%) and seeking open type of country (7.7%). The most important thing in winter is also the perceived number of kangaroos (34.0%), followed by the willingness of the licensed occupier in winter (26.0%), knowing the landholder (10.0%), and seeking properties with a mixture of forest and open country (6.0%) or stoney, hilly country (6.0%).

Table 6.2 gives the degree to which properties are shared with other licensed trappers and the influence (if any) of skins only trapping on trapping. This latter information is important for formulating desirable policies in relation to skins only trapping.

(Insert Table 6.2)

Property sharing arrangements amongst licensed trappers

Most (87.9% of) respondents are the only trappers operating on the properties on which they trap. Of these, the majority (68.6%) believe that it is not practical to share properties, while others stated that the relevant

Table 6.2. Property sharing and the significance of skins only trapping

	Percentage	
Property sharing		
(a) Incidence		
Do not share properties	87.9	
Share properties	12.1	
	100.0	(n = 58)
(b) Why property sharing does not occur[a]		
Not practical	68.6	
Occupiers want them only	13.7	
Lets the trapper do his own thing	5.9	
Only trapper in the area	3.9	
Occupiers only want one trapper at a time	3.9	
Can't get blamed for other trappers' mistakes	3.9	
Other	3.9	
		(n = 51)
Skins only trapping		
(a) Incidence		
Occurs in their trapping area	53.7	
Does not occur in their trapping area	37.0	
Unsure if it occurs	9.3	
	100.0	(n = 54)
(b) Effect on respondents' incomes		
Yes	51.7	
No	44.8	
Don't know	3.5	
	100.0	(n = 29)
(c) How affected incomes		
Direct competition for respondents' properties	53.3	
Removes many kangaroos quickly	20.0	
Concentrates on breeding doe	13.3	
Shoots out the populations	6.7	
Don't know	6.7	
	100.0	(n = 15)

Table 6.2 (Page 2)

	Percentage	
(d) Want skins only trapping banned?		
Yes	48.3	
No	51.7	
	100.0	(n = 29)
(e) Why want skins only trapping banned[a]		
Waste the carcass	71.4	
Take too many kangaroos	50.0	
Leave carcass in paddock for flies and vermin	21.4	
Puts kangaroo populations at risk	14.3	
Its existence is a nuisance	7.1	
		(n = 14)

a) Percentage of licensed trappers who mentioned this reason. Some expressed more than one reason.

licensed occupiers want them only on their properties (13.7%) or it is desirable as it lets the trapper work the property exactly how he wants (5.9%).

Skins only trapping

Where skins only trapping occurs in the area (53.7% of respondents), almost half of the relevant respondents or 27.8% (53.7 x 0.517) of all trappers surveyed believed the practice has affected trapping incomes by either direct competition for their properties (53.3%), the perceived tendency that skins only trappers remove many kangaroos in a short time (20.0%), and the perceived tendency that skins only trappers take many breeding does because of the quality of their skins (13.3%). Half of the relevant respondents or 25.9% (53.7 x 0.483) of all trappers surveyed want skins only shooting stopped mainly because skins only trappers waste the carcass (71.4%), take too many kangaroos (50.0%), and leave carcasses in the paddock to breed up flies, foxes, feral pigs, etc. (21.4%).

It seems that skins only trapping occurs in areas of medium to high kangaroo densities, in that there was none reported in low regional density areas, 60% of respondents in medium density areas said that it occurs and all said it does in high density areas. The high density areas occur mainly in the western part of the commercial harvesting area.

6.3 Harvesting methods

Table 6.3 contains a summary of estimated average kangaroo densities per km^2 in the trapping regions where interviews were conducted, the respondents' perceived kangaroo densities on the properties where they trap relative to the relevant estimated average regional density and an index of the area in which they trap kangaroos. The estimates of density were provided by Dr. Graeme Caughley on a map sheet basis from his aerial population surveys throughout New

South Wales between 1980 and 1982. At the time of the interviews it was assumed that for any chiller site Caughley's estimate provides the best index of kangaroo density. Consideration was also given to using the 1984 winter population survey data but inspection of it suggests that the density for 1982/83 is probably more closely correlated with the pre-drought estimates made by Caughley. When a licensed trapper operated in two adjoining map sheets the density estimates for the two adjoining map sheets were averaged. Using these estimates all the licensed trappers at each chiller site were ranked according to density and the top 25% with a 1982 density in excess of 17 kangaroos per square kilometre classified as high and the bottom 25% whose density was under 13 kangaroos per square kilometre as low.

(Insert Table 6.3)

Perceived kangaroo densities on the properties trapped

Most (83.3% of) trappers believe that the properties from which they take kangaroos have the same densities of kangaroos as other properties in their region. Many said that this reflects the fact that kangaroos move extensively amongst properties within their region, making it difficult to compare individual properties to the region as a whole in this way. We had expected most to say that they actively sought and mainly took kangaroos from high density properties. But as kangaroos appear to be taken from nearly all properties in most areas the question was not particularly meaningful.

Area from which kangaroos are taken

An index of the total area from which a licensed trapper takes kangaroos is difficult to derive as none shoot on all properties within an area, some only shoot on some paddocks within a property and kangaroos move between properties.

Table 6.3. Perceived kangaroo densities and index of area of harvest of licensed trappers

	Percentage
Kangaroo density relative to regional density	
Shoot on properties with higher than average density	14.8
Shoot on properties with lower than average density	1.9
Shoot on properties with same density	83.3
	100.0
Index of area of harvest (km^2)	
0 - 4,999	23.4
5,000 - 9,999	33.3
10,000 - 19,999	23.4
20,000 - 29,999	6.7
30,000 +	13.3
	100.1
Stratification of area of harvest	km^2
(a) Town east trappers	13,144 (n = 21)
Town west trappers	21,562 (n = 22)
Property west trappers	5,042 (n = 11)
(b) East/west division	
east	13,144 (n = 21)
west	16,055 (n = 33)
(c) Town/property division	
town	17,451 (n = 43)
property	5,042 (n = 11)

Nevertheless, the area from which kangaroos are taken will always be less than the area of the arc defined by the furthest point to which a licensed trapper drives in each quadrant of the compass and hence this measure provides an estimate of the potential area. Western trappers (16,055 km^2) cover a larger potential area than do eastern trappers (13,144 km^2). Town trappers (17,451 km^2) cover a much larger area than do property trappers (5,042 km^2). The latter would be expected as most of the property trappers interviewed trapped on properties near to where they were located. As indicated in the previous chapter, this has a substantial effect on their operating costs and hence their profitability.

Kangaroos taken in 1982/83

Table 6.4 shows the number of kangaroos taken for commercial purposes during the 1982/83 financial year, whether the respondents wanted to take more kangaroos in that time and the effects of other licensed trappers on the number taken. The majority (67.4%) of trappers surveyed took less than 5,000 kangaroos in this time. Some (7.6% of) respondents took 10,000 or more kangaroos. Considerable variation amongst licensed trappers in the number of kangaroos taken is evidenced in these results. It appears that western trappers took more kangaroos on average (5,220 kangaroos per trapper) than do eastern trappers (2,854 kangaroos per trapper) and property trappers (6,282 kangaroos per trapper) more than town ones (3,781 kangaroos per trapper). Furthermore, more were taken by respondents in high density areas (5,273 kangaroos per trapper) than those in medium (3,807) and low density (3,564) areas. Regional kangaroo density tends to be greater in the west than in the east, so the two trends may be related. That is, one would expect more animals to be taken from areas of higher density.

The majority (63.6%) of trappers wanted to take more kangaroos, with the extra number ranging from 300 to 5,000 and averaging 1,525 per respondent. The reasons for not getting the desired extra animals included that the relevant chiller operator or fauna dealer did not want any more kangaroos from the trapper (25.7%), there were not enough kangaroos around (17.1%), other employment commitments prevented this (14.3%) and it was too wet in the period to permit this (11.4%).

Almost two-thirds of the respondents believed that the presence of one more full-time licensed trapper would have meant that they would have taken less kangaroos, with a range of 200 to 3,000 and average of 820 less per respondent. Those who said that one more trapper would not have affected the number they took were then asked if two more licensed trappers would affect the number they took. Only one of the relevant respondents said that it would. Many of these respondents stated that this would have no effect because they have all the properties on which they trap tied up.

(Insert Table 6.4)

Data on the trapping decisions made by licensed trappers, their perceptions of the habitat preferences of kangaroos and the effect of rainfall on their activities are contained in Table 6.5.

(Insert Table 6.5)

Decisions about on which property to trap tonight

Respondents were asked to specify the most important thing determining on which property they choose to trap on any particular night. Half rotate properties in a regular, fairly set sequence to ensure all properties for which the trapper has occupiers' tags are serviced regularly. A large minority (27.3%) of respondents choose the proper[illegible] the

Table 6.4. Kangaroos taken for commercial purposes, 1982/83

	Percentage	
Number of kangaroos taken for commercial purposes, 1982/83		
Less than 1,000	15.4	
1,000 - 2,999	23.1	
3,000 - 4,999	28.9	
5,000 - 9,999	25.0	
10,000 +	7.7	
	100.1	(n = 52)
Extra kangaroos wanted to take		
(1) Yes	63.6	
No	36.4	
	100.0	(n = 55)
(2) Amount more		
Average	1,525	
Range	300 - 5,000	
(3) Why failed to take the extra animals[a]	Percentage	
Not wanted by chiller operator/fauna dealer	25.7	
Not enough kangaroos around	17.1	
Prevented by other work commitments	14.3	
Too wet to permit this	11.4	
Kangaroos too poor in drought	8.6	
Had a break from trapping for a while	8.6	
Other	17.1	
Competition effects of other licensed trappers		
(1) Effect of one more licensed trapper in the area		
No effect	30.9	
Take less kangaroos	58.2	
Don't know	10.9	
	100.0	(n = 55)
Average amount less	820	
Range of amount less	200 - 3,000	

Table 6.4 (Page 2)

	Percentage	
(2) If "no effect" in (1)		
Effect of two more licensed trappers in the area		
No effect	93.8	
Take less kangaroos	3.1	
Don't know	3.1	
	100.0	(n = 32)

a) One respondent stated two reasons for not taking the extra kangaroos.

Table 6.5. Trapping decisions, perceptions of kangaroo habitat preferences and the effect of rainfall on trapping activity

	Percentages
On which property to trap tonight?[a]	
Regularly rotate properties	50.9
Property with most kangaroos on it	27.3
Property where occupier presses trapper to shoot	16.4
Only traps on one property	3.6
Only traps on two properties	1.8
Cropping lands around harvest time	1.8
Perception of kangaroo habitat preferences[a]	
Open country	51.0
Around waterholes in summer	43.1
Amongst or on edge of the trees	43.1
Destocked or ungrazed areas	39.2
Green pick, thunderstorm areas	11.8
Grazed areas	3.9
Mitchell grass areas	3.9
Where seek kangaroos on the property[a]	
Knowledge of where kangaroos are (from above)	93.0
Drive around until finding them	15.5
Where occupier says the kangaroos are	12.1
Where occupier specifically says to shoot	1.7

a) More than one response given in some cases.

most kangaroos, while for others (16.4%) the wishes of licensed occupiers is the most important determinant. Some respondents have only one (3.6%) or two properties (1.8%) on which they trap.

Perception of kangaroo habitat preferences

Licensed trappers believed that kangaroos are usually found in open, often red soil, grazed areas (where the sheep/cattle are) (51.0%), around waterholes for drinking particularly in summer (43.1%), amongst or on the edge of trees or forested areas for shelter (43.1%), in areas not being grazed by domestic sheep (39.2%), and on greenpick areas which usually result from summer thunderstorms (11.8%). No attempt was made to differentiate between red and grey kangaroos in these questions. Those respondents who suggested destocked or ungrazed areas believed that kangaroos avoid sheep because they either do not like the smell of sheep particularly their urine or they compete directly with sheep for the same grasses. They felt that this was not the case with cattle.

Where trappers seek to find kangaroos on a property

Respondents were asked to specify where they seek kangaroos upon first entering a property at night. Most (93.0%) said that they seek kangaroos on the basis of their previously-stated perceptions or knowledge of the habitat preference of the animals. For instance, they drive from dam to dam (especially in summer) or seek out open country, ungrazed country or timbered country according to how their preferences are perceived. Others said that they either go where the landholder says most kangaroos are located (12.1%) or where the landholder specifically asks them to take kangaroos (1.7%) or they simply drive around the property until they find kangaroos to take (15.5%).

Sex and weight preferences for kangaroos harvested

Respondents were asked to specify the order in which they would take the following: (1) a 21 kg doe with no visible joey; (2) a 22 kg buck; (3) a 23 kg buck; and (4) a 24 kg doe with a visible joey. Weights are dressed weights. This requires the respondent to assume hypothetically that it would be possible to take all four kangaroos if desired and was designed to give an indication of whether or not licensed trappers attempt to husband the local kangaroo population. The questions were designed so that the heaviest animal was a doe, which if left would raise another kangaroo to shoot, but if shot would bring greater short term income than the other animals. The short term financial advantage of taking a 24 kg doe with a visible joey over a 22 kg buck is approximately 50 cents. The distribution of these preference combinations is shown in Table 6.6. The first-stated number in each case is the kangaroo which would be taken first. Trappers were asked to indicate if they would normally not take a particular individual, as reported in the table. The incidence of this is indicated by an asterisk against the number for the relevant animal. The analysis tells whether kangaroos are selected by perceived weight (or size) alone or if tradeoffs are made to permit management or sustained yield from the harvested populations of kangaroos.

First preference is nearly always for the largest male, followed by the other male (50.0%), or the heaviest animal regardless of sex (46.2%). Respondents in the latter category said that they would take the doe because it was largest and therefore most profitable. Some respondents also added that if a joey could be seen, then it would be large enough to survive by itself and could be taken later.

One (1.9%) respondent indicated that he does not take any doe at all. Several other respondents said that they would either not take a doe with a visible joey (13.4%) or not take a doe with no visible joey (9.7%). The former group of respondents believed that taking such a doe will also kill the joey which contrasts with the earlier-stated rationale in relation to taking a doe with a visible joey. The latter group of respondents said that they would not take a doe because this probably meant that there was a small suckling joey inside the pouch which would not survive on its own and which would not be harvestible at a later time. All 21.2% of respondents who do not take either or both doe and the 53.8% who would first take the largest buck (animal 3) appear to attempt to farm the kangaroo resource they are trapping for maximum long-term economic and/or biological yield. In relation to removal of does, however, there is a lack of unanimous agreement amongst the relevant trappers as to how this is best achieved.

(Insert Table 6.6)

Shooting methods

Table 6.7 shows the relative percentages of where in the body trappers shoot kangaroos. On average 88.1% of all kangaroos taken by the sample respondents are shot in the head or neck and 11.9% shot in the chest. A draft code of practice for kangaroo culling formulated by the Council of Nature Conservation Ministers recommends that licensed trappers be directed to shoot animals in the head or neck, and that the percentage shot in parts of the body other than the head or neck should not exceed 10% of kangaroos taken in a night's shooting (CONCOM 1983). Licensed trappers appear on average to be approximately complying with this draft code of practice at present when, it is stressed, no such code of practice is actually in existence. Table 6.7, in

Table 6.6. Licensed trappers preferences for various sex and weight of kangaroos (n = 52)

		Percentages
Sex and weight preferences		
Buck first		
3241	19.2	
3241*	3.9	
3214	13.5	
3214*	11.5	
321*4*	1.9	
		50.0
Heaviest first		
4321	42.3	
4321*	3.9	
		46.2
Other		
3124	1.9	
3421	1.9	
		3.8
		100.0

1 = a 21 kg doe with no visible joey
2 = a 22 kg buck
3 = a 23 kg buck
4 = a 24 kg doe with a visible joey

* This animal would not be shot

fact, shows that 83.6% of respondents shoot 90.0% or more kangaroos in the head or neck. It seems, therefore, that most would have little difficulty in meeting any such requirement should it be legislated in the future.

(Insert Table 6.7)

Estimated shooting accuracy

Respondents were asked to estimate how many kangaroos they expected to shoot clean on average from 100 shots fired as a measure of shooting accuracy. The results appear in Table 6.8. The majority (63.0%) expected 90% accuracy or better, with the remainder either 80 to 89% accuracy (22.2%) or 70 to 79% accuracy (14.8%). A cross-tabulation of shooting accuracy by years of licensed kangaroo trapping experience is also provided in Table 6.8. There is a tendency with experience (more than three years) for shooting accuracy to converge on 90% (61.9% of respondents).

(Insert Table 6.8)

Effect of rainfall on harvesting

Data on how rainfall affects the number of kangaroos taken for commercial purposes were obtained in reference to the three months prior to the day of interview for each licensed trapper. These are shown in Table 6.9. This period was described relative to an average season as being either very wet (68.5%) or wet (22.2%) by most respondents, while a few felt it was average (7.4%) or dry (1.9%). For those who described the period as very wet, most (97.1% of) respondents said this decreased their harvest levels because either the country was too wet to drive a vehicle on it (63.3%) or the kangaroos spread out too much making them difficult to find (20.0%) or the grass had grown too long to find them (13.3%), with many combinations of these reasons. For those who

Table 6.7. Distribution of what part of the body the licensed trappers shoot kangaroos (n = 55)

Percentage shot in head	Percentage shot in chest	Relative frequency (%)	Cumulative frequency (%)
100	0	38.2	38.2
90-99	1-10	45.5	83.6
80-89	11-20	5.5	89.1
70-79	21-30	1.8	90.9
60-69	31-40	0.0	90.9
50-59	41-50	0.0	90.9
40-49	51-60	1.8	92.7
30-39	61-70	1.8	94.6
20-29	71-80	1.8	96.4
10-19	81-90	0.0	96.4
1-9	91-99	0.0	96.4
0	100	3.6	100.0

Table 6.8. Stated shooting accuracy of licensed trappers

	Percentages
Percentage of kangaroos shot	
In the head	88.1
In the chest	11.9
	100.0

Number of clean hits from 100 shots	Years of experience		
	1 - 3 yrs	4 or more	Total
70 - 79	33.3	9.5	14.8
80 - 89	33.3	19.0	22.2
90+	33.3	71.4	63.0
	99.9	99.9	100.0

described it as wet, equal proportions said it either decreased the number of kangaroos they took (45.5%) or did not affect the number they took (45.5%), while one respondent said the wet conditions in the previous three months had increased the number he had taken. The decrease was caused by one or combinations of the reasons noted above for very wet or the fact that kangaroos stay in timbered areas where harvesting is difficult. No percentages are quoted as only one or two respondents indicated each different reason. The percentage change in the level of harvest noted ranged from 10.0 to 98.0%, for an overall average of about 56.0%.

(Insert Table 6.9)

Licensed trappers were asked whether there was a minimum total dressed weight of kangaroos which they seek to obtain each night before returning to the chiller and if there was a particular latest time each night they would stay out. The results are contained in Table 6.10. This table also shows licensed trappers' assessments of the minimum long-term total dressed weight of kangaroos they would want to average in order to remain a commercial licensed trapper given the prices received and costs incurred at the moment.

(Insert Table 6.10)

Minimum total dressed weight before returning home each night

The majority (66.1%) said that there was a minimum nightly weight sought. About half of these cited 500 kg per night and one-quarter 1,000 kg per night, at an average of about 730 kg per night. The remaining (33.9% of) respondents mostly indicated that they take as many kangaroos as possible until it is time to return to the chiller for the night.

Table 6.9. Effect of rainfall on the number of kangaroos taken

	Percentage
(a) Relative wetness of last three months	
Very wet	68.5
Wet	22.2
Average	7.4
Dry	1.9
Very dry	-
	100.0

(b) Effect on numbers taken

Relative wetness	Number of kangaroos taken		
	Increased	Decreased	Unaffected
Very wet	2.9	97.1	-
Wet	9.1	45.5	45.5
Average	-	50.0	50.0

(c) Why number decreased	Percentage
Country too wet	63.3
Kangaroos spread out	20.0
Grass too long	13.3
Less kangaroos around	3.4
	100.0

(d) Change in number taken	
Average	56.0
Range	10.0 - 98.0

Table 6.10. Respondents desired nightly weight and time constraints

	Percentage
Minimum total dressed weight	
Yes	66.1
No	33.9
	100.0
- Stated minimum (kg)	
500	51.3
1000	25.6
Other	23.1
	100.0
Latest time at night	
Yes	44.1
No	55.9
	100.0
- Stated latest	
2 a.m.	38.5
3 a.m.	38.5
5 a.m.	15.4
Other	7.6
	100.0
Desired minimum long-term weight	
500	44.4
600	11.1
700	7.4
1000	22.2
Other	14.9
	100.0

Latest time staying out at night

The majority (55.9%) said that there is no particular time before sunrise at which they try to return home at night. That is, they seek to stay out as long as it takes to obtain either a full load or on relatively unsuccessful nights of trapping the minimum load per night that they require. For those who do have a latest time per night for returning to the chiller (44.1%), the most common times are 2 a.m. (38.5%) and 3 a.m. (38.5%). The latest time indicated was 5 a.m. (15.4%).

In a normal period, one might expect some statistical difference between full-time professional trappers and part-time or weekend trappers in terms of their responses to these questions on a minimum total dressed weight per night and latest time. For instance, one might expect full-time trappers to be more likely to have a minimum total dressed weight and to have no latest time before sunrise. In other words, they would stay out as long as it takes to get the total weight they want. However, as noted in section 3.6, it is believed that the survey sample represents mostly a sample of the long-term professional core of licensed trappers in the industry. Thus, an analysis of any statistical differences between full-time and part-time trappers in this regard would be meaningless.

Desired minimum long-term total dressed weight per night

The minimum long-term total dressed weight per night that would be required for the trapper to remain in the industry under currently received prices and incurred costs was mostly either 500 kg (44.4%) or 600 kg (11.1%) or 1,000 kg (22.2%). This presumably is the amount respondents believe is necessary to make a reasonable living. The range of amounts quoted is quite large.

6.4 Effects of price changes on harvesting activities

The data obtained in this regard are useful for predicting how licensed trappers would respond to changes in the NPWS Kangaroo Management Program which are likely to have a particular effect on net incomes from kangaroo trapping. It would also be useful to predict their responses to price changes instigated by licensed fauna dealers. Both positive and negative price (or net income) changes were examined. A NPWS-instigated net income change would be to increase royalty payments per kangaroo made by licensed trappers. Responses to such an increase in royalty and positive and negative changes in prices received per kg of dressed carcass for pet food utilization are displayed in Table 6.11.

(Insert Table 6.11)

Responses to increased royalties

Respondents were asked to state whether a doubling of the current cost of royalty tags from the present 15 cents to 30 cents per tag would increase, decrease or have no effect on each of (a) the length of time spent trapping per night, (b) the number of kangaroos taken per night and (c) the total dressed weight of kangaroos taken per night. In the case of average time spent per night, most (80.4%) said that this would have no effect, with an increase resulting for a few (16.1%). For the majority (62.5%) there would be no effect on the number of kangaroos taken per night and for most others (32.1%) this would be increased. For the total dressed weight of kangaroos per night, there would for the majority (62.5%) be no effect or otherwise mostly an increase (33.8%). Interestingly, two respondents believed that such an increase in royalty tags would cause them to cease trapping kangaroos.

Table 6.11. Effects of price changes on number taken

	Effect on number taken			
	Increased	Decreased	Unaffected	Give up
Increased royalty				
Length of time per night	16.1	-	80.4	3.6
Number of kangaroos taken	32.1	1.8	62.5	3.6
Total dressed weight of kangaroos	33.8	-	62.5	3.6
Increased price per kg - pet food				
(a) 10% increase				
Nights per week	7.3	90.1	1.8	-
Length of time per night	1.8	96.4	1.8	-
Number of kangaroos taken	5.5	92.7	1.8	-
Total dressed weight of kangaroos	5.5	92.7	1.8	-
(b) 25% increase				
Nights per week	34.6	50.9	14.6	-
Length of time per night	21.8	76.4	1.8	-
Number of kangaroos taken	25.5	70.9	3.6	-
Total dressed weight of kangaroos	25.5	70.9	3.6	-
(c) 50% increase				
Nights per week	58.2	27.3	14.6	-
Length of time per night	49.1	43.6	7.3	-
Number of kangaroos taken	54.6	38.2	7.3	-
Total dressed weight of kangaroos	52.7	40.0	7.3	-
Decreased price per kg - pet food				
(a) 10% decrease				
Nights per week	5.6	79.6	13.0	1.9
Length of time per night	16.7	81.5	-	1.9
Number of kangaroos taken	22.2	75.9	-	1.9
Total dressed weight of kangaroos	24.1	74.1	-	1.9
(b) 25% decrease				
Nights per week	3.7	24.1	22.2	50.0
Length of time per night	37.0	13.0	-	50.0
Number of kangaroos taken	40.7	9.3	-	50.0
Total dressed weight of kangaroos	42.6	7.4	-	50.0
(c) 50% decrease				
Nights per week	-	1.9	-	98.2
Length of time per night	-	1.9	-	98.2
Number of kangaroos taken	-	1.9	-	98.2
Total dressed weight of kangaroos	-	1.9	-	98.2

Responses to increases in prices received per kilogramme

Licensed trappers' responses in terms of the number of nights trapped per week, length of time spent shooting, number of kangaroos taken and total dressed weight of kangaroos to progressive increases in prices received were elicited. Price increases of 10, 25 and 50% were used. For this purpose it was assumed that costs incurred remain constant. The questions were posed in terms of whether each factor would be increased, decreased or unaffected with each price increase. The most common response is to decrease each factor for both a 10 and 25% increase in price received. The most popular response for a 50% price increase is to increase each factor. In other words, effort (reflected by each thing) decreases as price increases by up to 25% because the same profit can be earned from progressively reduced effort. However, for a 50% increase about half the respondents increase effort to earn as much as possible, although large proportions would continue to decrease effort.

Responses to decreases in prices received per kilogramme

With a 10% decrease, most respondents would decrease effort, in many stated cases to reduce total costs until price increases again. However, as price decreases further by 25 and 50%, progressively more respondents would stop trapping until at 50% all but one (or 1.9%) would give up.

Reference

CONCOM (1983). Draft code of practice for kangaroo culling, June 1983.

Unpublished statement.

Chapter 7

INTERACTIONS BETWEEN LICENSED TRAPPERS, CHILLER OPERATORS AND LICENSED FAUNA DEALERS

7.1 Introduction

In this chapter data relating to the structure of the commercial kangaroo industry as perceived by chiller operators and licensed trappers are analysed. Of particular concern is the manner in which decisions are believed to be made on the commercial operation of chillers and on regional harvesting activity in terms of the intensity and product(s) taken. It would seem that an industry 'chain of command' exists in that, under existing NPWS restrictions and harvesting quotas, fauna dealers control the overall intensity and product type within their allocated zone(s) indirectly through instructions issued to chiller operators. Chiller operators then in turn control the number taken and the type of product (pet food and/or human consumption) taken by licensed trappers. Where licensed trappers believe that this control is unfavourable financially and there is only one licensed fauna dealer operating in their area (63.3% of respondents), they have no recourse in this regard as kangaroo carcasses cannot be taken without access to a chiller(s) at a registered site. They must either accept the price offered or destroy the carcasses.

Licensed trappers were asked to indicate the extent of control exercised by chiller operators, whether they felt these controls were fair, the perceived fairness of the prices they receive and the desired changes (if any) to the way in which they are treated by licensed fauna dealers.

Several licensed trappers have recently sought to establish a union of licensed trappers and the incidence of, and reasons for, unionism were also discussed with respondents. Data were also obtained from chiller operators on the controls which fauna dealers exert and the controls they subsequently place on licensed trappers in response to their dealer's instructions. These various data are analysed in this chapter.

7.2 The 'chain of command' from fauna dealers to chiller operators to licensed trappers

7.2.1 Influence of fauna dealers on chiller operators

Data on the control exerted by licensed fauna dealers on chiller operators are given in Table 7.1. Half the chiller operators said that they chose the site where their chillers should be located. Most others (37.5%) said that this was the fauna dealer's decision. Very few (4.2%) said it was due to a specific directive given by the NPWS. Of course, the Service must approve the sites of location of all chillers. One would expect that, for chiller operators who said they determine location, the general area where chillers are located would be determined by the fauna dealers, with chiller operators determining the actual address. The reasons for actual chiller site location were mainly that it was a central location for the properties served (63.3%) and it was the chiller operator's home base (22.7%). Fauna dealers determine the nature of the commercial product (pet food or human consumption) the chiller(s) should handle in most (86.4% of) cases. This reflects the fact that virtually all (95.8%) are the licensees of the relevant chiller site and/or the majority (66.8% - see Table 4.9) own the chillers involved. Some chiller operators also act as agents for fauna dealers who buy skins from licensed trappers who shoot kangaroos for their skins only. The final transaction, however, must be conducted on the licensed fauna dealer's premises and not the chiller site.

(Insert Table 7.1)

Table 7.1 also indicates the nature of any controls exerted by fauna dealers in relation to the day-to-day operation of chillers since 1st July, 1982. Nearly half of the respondents (43.5%) believe that controls do apply in this regard. The most common type of control was quotas on the number or total weight of dressed carcasses that the chiller(s) should supply the fauna dealer's

Table 7.1. Control exerted by licensed fauna dealers on chiller operators

	Percentages	
Person who chose site		
Chiller operator	50.0	
Fauna dealer	37.5	
Previous chiller operator	8.3	
NPWS	4.2	
	100.0	(n = 24)
Why the location was chosen		
Central location for the properties served	63.6	
Chiller operator's home base	22.7	
To minimize transport costs	4.6	
To minimize licensed trappers' costs	4.6	
Decision made by previous chiller operator	4.6	
	100.1	(n = 22)
Choice of commercial kangaroo product handled		
Chiller operator	13.6	
Fauna dealer	86.4	
	100.0	(n = 22)
Licensee of chiller site		
Chiller operator	4.2	
Fauna dealer	95.8	
	100.0	(n = 24)
Direct controls exerted by fauna dealers		
(1) Incidence of controls		
Yes	43.5	
No	56.5	
	100.0	(n = 23)
(2) Type of control[a]		
Quotas on chiller production	70.0	
Said no more carcasses for a while	20.0	
Did not pick up carcasses when chiller full	10.0	
Underweighing of carcasses	10.0	
		(n = 10)

a) One respondent reported two control measures.

processing works. Quotas took the form of either a maximum total dressed weight of carcasses from the chiller site, in which case the quota ranged from 2,000 to 13,000 kg per week, or a total number of 100 carcasses per week.

The other types of fauna dealer control were that they occasionally say no more kangaroos from the chiller site for a while, they didn't pick up carcasses in the chiller(s) for a while or dealers underweighing carcasses at the processing works.

As an indication of chiller operators' satisfaction with the controls exerted on them by licensed fauna dealers, respondents were asked to indicate if they wanted any changes to the ownership structure of chillers and also whether they would like to see more fauna dealers allowed to operate in their zone of the commercial harvesting area of N.S.W. The results are detailed in Table 7.2. At sites where the chiller operator does not own all of the chiller units on the site (78.3%) only three chiller operators (16.7%) would rather own all the chillers themselves. All three of these would like to then be free to supply the fauna dealers of their choice. The main reasons why they said they would like this flexibility in whom they can supply were either (a) to get the best, or a better price or (b) as security in case the respondent falls out with the current dealer.

(Insert Table 7.2)

In addition, chiller operators were asked if they would like to see more fauna dealers in their zone, to which less than half (45.8%) said that they would. The reasons why are shown in the table. However, it is suspected that many chiller operators are here answering as licensed trappers and not chiller operators. The answers to this question as trappers are presented later in section 8.6.

Table 7.2. Desired changes to chiller ownership structure and desire for more licensed fauna dealers

Desired changes to chiller ownership structure by those who do not own chillers (%)		
Want to own all chillers	16.7	
Do not want to own them	83.3	
	100.0	(n = 18)
Desire for more licensed fauna dealers		
(1) Yes	45.8	
No	54.2	
	100.0	(n = 24)
(2) Why want more fauna dealers		
To get a better price	27.3	
New dealer may take carcasses when present one does not	27.3	
Would increase business turnover	18.1	
May get a fairer all-round deal	9.1	
Would hope to get the new fauna dealer licence himself	9.1	
More competition is a good thing	9.1	
	100.0	(n = 11)

7.2.2 Influence of chiller operators on licensed trappers

Chiller operators influence the number of kangaroos taken by licensed trappers directly through setting chiller operation restrictions on trappers, such as quotas. Possible other, less direct, influences include helping trappers initially to obtain s.121 occupiers' tags or in supplying 15 cent royalty tags to trappers on behalf of the licensed fauna dealer. As noted in section 2.4.3, the latter means that the licensed trapper is required under NPWS regulations to supply the kangaroo carcasses or skins with these royalty tags attached to a chiller site registered by the relevant fauna dealer. Data were obtained on both direct and indirect influences. The results are presented in Table 7.3.

(Insert Table 7.3)

Indirect influence on licensed trappers

As was seen in section 6.2, chiller operators do not lobby landholders to have them apply for a s.121 occupier's licence for particular licensed trappers to trap on their properties. They see it as the responsibility of the individual trapper to obtain his own occupier's tags.

Almost half (45.8%) of the licensed trappers interviewed obtain royalty tags from the chiller operator or fauna dealer. The reasons stated for why these respondents prefer to obtain royalty tags from their licensed fauna dealer include that in this way the royalty payment is not made until the respondent is paid for the animals harvested (37.0%), it means less bother in actually physically obtaining the tags (33.3%) and the NPWS are too slow sending the required tags (18.5%). Of those respondents who obtain royalty tags from the NPWS (54.2%) the reasons why were mainly that either the relevant fauna dealer does not supply them (62.5%) or it means the trapper is able to supply whichever

Table 7.3. Indirect influence of chiller operators on licensed trappers

	Percentage	
(1) Source of royalty tags		
Chiller operator or fauna dealer	45.8	
NPWS	54.2	
	100.0	(n = 59)
(2) Why buy off fauna dealer/chiller operator[a]		
Do not pay until paid for kangaroos	37.0	
Less bother to get tags	33.3	
NPWS too slow in mailing out tags	18.5	
Get business from fauna dealer this way	11.1	
No special fuel costs to get them (NPWS tags mean a trip to town)	11.1	
Saves time (No need to make a special trip to town)	7.4	
NPWS do not issue the tags here	3.7	
		(n = 27)
(3) Why buy off NPWS		
The fauna dealer does not supply them	62.5	
The licensed trapper can supply the dealer or chiller operator he likes	18.8	
Less bother to get tags	9.4	
Did not know that fauna dealer supplies them	9.4	
	100.1	(n = 31)

a) More than one reason was reported in some cases.

dealer he likes (18.8%) or it is less bother to physically obtain the tags (9.4%).

(Insert Table 7.4)

Direct influence on licensed trappers

Data were obtained from both licensed trappers and chiller operators on the direct influence of chiller operators on licensed trappers' harvesting patterns.

View of chiller operators

Some chiller operators (29.2%) said that they periodically set quotas on the number or total weight of dressed kangaroo carcasses each licensed trapper can supply their chillers (16.7%), pressure trappers to take kangaroos at particular times especially in wet periods when the supply is short (8.3%) or say 'no more' when the chiller(s) are full (4.2%). However, most (70.8%) believe that they do not influence their trappers' decision patterns. Of those who believed they do influence harvesting patterns, all said that they set quotas on trappers to ensure that the quotas set initially on them by the fauna dealer are not exceeded and they encourage trappers to trap at certain times in order to maintain chiller production of kangaroo carcasses.

Chiller operators were also asked to indicate how they would actually manage their licensed trappers if the fauna dealer told them to reduce the number of kangaroo carcasses handled by their chiller(s). The majority (57.1%) said that they would offer the quota only to their more reliable trappers, while most others would either offer an equal share to all trappers (21.4%) or an equal share to their full-time trappers only (14.3%). The reasons why they would distribute any quota in this way were either that it would mean they would

Table 7.4. Direct influence of chiller operators on licensed trappers

	Percentage	
Direct influence		
Chiller operator's view		
(1) Chiller operator influence		
Do not influence trappers	70.8	
Quotas on supply of kangaroos	16.7	
Pressure trappers to shoot	8.3	
Say 'no more' when chiller full	4.2	
	100.0	(n = 23)
(2) How would quota be distributed		
Offer it only to the more reliable trappers	57.1	
Offer it equally to all trappers	21.4	
Offer it equally to full-time trappers	14.3	
Proportion it according to harvest level in normal times	7.2	
	100.0	(n = 14)
(3) Why distribute this way		
To retain more reliable trappers	60.0	
Fairest for all trappers	40.0	
	100.0	(n = 10)
Licensed trapper's view		
(1) Chiller operator influences		
Does influence trappers	53.8	
Does not influence trappers	46.2	
	100.0	(n = 39)
(2) How influences		
Chiller delivery quotas	71.4	(n = 15)
Said 'no more kangaroos for a while'	14.3	(n = 3)
Rejection of carcasses delivered to chiller	4.8	(n = 1)
Kangaroos not collected when chiller full	4.8	(n = 1)

Table 7.4 (Page 2)

	Percentage	
(c) Is the quota fair?		
Yes	55.6	
No	44.4	
	100.0	(n = 18)

retain the services of their more reliable trappers (60.0%) or that it would be fairest for all trappers concerned (40.0%).

View of licensed trappers

The majority (53.8%) of licensed trappers said that their chiller operators have at some time influenced the number of kangaroo carcasses they have harvested. Most (75.0%) of these said that this influence was in the form of periodic chiller delivery quotas. Many (44.4%) of those with quotas believed that the level of quota set was unfair because it was either too little to make a living or the individual deserved a higher quota because he was a good trapper. One respondent said that he had had one carcass rejected because it was dirty and undersized and another felt that his carcasses were occasionally underweighed. The only other cited cases of chiller operator influence were that three respondents were told not to deliver carcasses for a while as the chiller they supplied was full.

7.3 The direct link between licensed fauna dealers and licensed trappers

Data on the number of fauna dealers licensed to take kangaroo carcasses in the zone where each respondent traps, trappers' desire for more competition between fauna dealers, the respondents' assessed fairness of prices received and desired changes in the way that they are treated by their fauna dealer(s) are given in Tables 7.5 and 7.6.

(Insert Table 7.5)

Number of fauna dealers

For the majority (63.3%) of licensed trappers only one fauna dealer is operating in their zone. All the remaining respondents (36.7%) have two deal[illegible] accepting kangaroo carcasses. Thus, for the majority of respondents, there is

Table 7.5. Direct links between licensed fauna dealers and licensed trappers

	Percentage	
Number of fauna dealers operating in area		
One dealer	63.3	
Two dealers	36.7	
	100.0	(n = 60)
Desire for more licensed fauna dealers		
(a) Yes	55.0	
No	43.3	
Don't know	1.7	
	100.0	(n = 60)
(b) **Why want more fauna dealers**		
To get a better price	43.8	
More competition is a good thing	25.0	
New dealer may take carcasses when present one does not want them	15.6	
May get a fairer all-round deal	6.3	
Currently inequitable	3.1	
Might get paid more quickly	3.1	
Would increase business turnover	3.1	
	100.0	(n = 32)
Are current prices fair?		
(1) Yes	41.4	
No	56.9	
Don't know	1.7	
	100.0	(n = 58)
(2) **Why prices unfair**[a]		
Prices too low for trapping costs faced	87.9	
Fauna dealer/operator should bear more of costs	9.1	
Trappers deserve more because they work hard	6.1	
Dealers get a lot and give trappers little	6.1	
		(n = 33)

a) More than one response to why prices were unfair occurred in some cases.

no option as regards to whom they can supply harvested kangaroos. There were two cases of licensed trappers concurrently supplying two different fauna dealers.

More competition between fauna dealers

The majority (55.0%) said that they would like to see more fauna dealers operating in their zone mainly either because they believe that they may get a better price for their product (43.8%) or the belief that more competition would be a good thing (25.0%) or the new fauna dealer(s) might accept their kangaroos when the existing one does not want them (15.6%).

Fair price received

The majority (56.9%) of licensed trappers said that the prices they receive are unfair. The main reasons why they thought prices were unfair were that they were too low for the trapping costs faced (87.9%) and the fauna dealer or chiller operator should bear more of the costs (9.1%). A large minority (41.4%) of respondents, however, seem satisfied with the price they currently receive.

(Insert Table 7.6)

Desired changes to fauna dealer's treatment

The majority (61.4%) of licensed trappers would like changes to the way in which they are treated by fauna dealers. Most wanted fauna dealers to pay either a higher price (60.0%) or a more stable price (8.6%) and to pay the trapper when he delivers kangaroo carcasses to the chiller site and not some time later as now is usually the case (17.1%). A large minority (38.6%) seem satisfied with the way in which they are treated by their fauna dealer.

Table 7.6. Licensed trapper aspirations for change in fauna dealer relationship

	Percentage	
Desired changes to treatment by fauna dealers		
(1) Yes	61.4	
No	38.6	
	100.0	(n = 57)
(2) Changes desired[a]		
Higher price	60.0	
Pay on the spot	17.1	
More stable price	8.6	
Take more kangaroos from trapper	5.7	
No quotas or higher level of quota	5.7	
Make cheques out to trapper - not chiller operator who redistributes money	5.7	
Do not underweigh carcasses	2.9	
Carcasses become dealer's property once entering the chiller (now only at processing works)	2.9	
Don't let part-time trappers operate	2.9	
Recommence human consumption utilization	2.9	
		(n = 35)

a) Percentage of licensed trappers who desired a change and requested a specific change. Some desired more than one change.

It is clear from these various data that a majority of licensed trappers are dissatisfied to some extent with fauna dealers, particularly in relation to the prices they receive. One might expect this, however, as more of a good thing (here gross income) will always be wanted by the majority of people. Nevertheless, this is not to say that some respondents are disadvantaged by the prices they receive. The remaining desired changes are of a non-monetary nature and relate to either the actual logistics of payment (for example, on the spot rather than later) or the imposition of quotas or the nature of the informal contracts between fauna dealers and trappers.

The incidence of, and reasons for, unionism amongst licensed trappers are detailed in Table 7.7.

Unionism amongst licensed trappers

Only a few (17.0% of) respondents are currently members of a union, mainly the Australian Workers Union. No property trappers were union members compared to about 23% of town trappers. The probable relative lack of contact between the property trappers who reside on different properties might partly explain this. The majority (60.0%) of union members joined because it was required for a non-trapping job, while those who joined as licensed trappers did so either because others did or to get a better price. Non-unionists (83.0%) were then asked if they would like to join a trappers' union. Only a few (20.4%) said yes, mainly either to get a better price (90.0%) or feel more secure (30.0%). Most (79.6%) did not want to join a trappers' union, mostly either because they cannot see any benefits in unionism (50.0%) or they are hostile to unionism (26.3%) or they are satisfied with how things are now (13.2%).

Table 7.7. Unionism amongst licensed trappers

	Percentage	
(1) Currently a union member?		
Yes	17.0	
No	83.0	
	100.0	(n = 59)
(2) Why current members joined		
Required for non-trapping job	60.0	
To get a better price	30.0	
Because others did	10.0	
	100.0	(n = 10)
(3) Would current non-unionists like to join?		
Yes	20.4	
No	79.6	
	100.0	(n = 49)
(4) Why current non-unionists would like to join[a]		
To get a better price	90.0	
To feel more secure	30.0	
To be able to sell more kangaroos	10.0	
To stop fauna dealers underweighing carcasses	10.0	
(5) Why current non-unionists would not like to join		
Cannot see the benefits of it	50.0	
Hostile to unionism	26.3	
Happy with things as they are now	13.2	
Fall out with fauna dealer	5.3	
I'm a boss - not a unionist	2.6	
Because others did not	2.6	
	100.0	(n = 38)

a) Percentage of those who held this view. Some expressed more than one reason.

Chapter 8

INFLUENCE OF NPWS REGULATIONS ON KANGAROO TRAPPING

8.1 Introduction

The nature of NPWS regulations and restrictions which apply under the current N.S.W. Kangaroo Management Program were outlined in detail in Chapter 2. The main features of the program in this regard are that landholders must apply to the NPWS or its delegated representative for an s.121 occupier's licence in order to have kangaroos removed from their properties. If the Service believes that a demonstrated need to remove kangaroos exists, then occupier's tags equal in number to the number of kangaroos that can be taken from the property are issued to the occupier along with the licence. These tags must only be used for kangaroos taken from that particular property. If commercial utilization of these kangaroos is desired, they can only be removed by s.123 licensed trappers. Commercial utilization is normally based on the whole carcass. In certain circumstances, a special endorsement is placed on an s.123 trapper's licence to permit the removal of the skin only, in which case the carcass must be left on the property. Royalty tags must be purchased and one attached to the carcass or skin of every kangaroo taken for commercial utilization. Then either the carcass with its skin attached must be taken to a registered chiller site or the skin alone taken to an s.125 licensed skin dealer.

Licensed trappers, chiller operators and licensed fauna dealers are required to supply monthly returns about the number of kangaroos they have taken. NPWS officers also regularly monitor all three groups. For instance, surveyed licensed trappers indicated that they have either spoken to or received a letter from a NPWS officer from 1 to 25 times, at an average of 7.4 times in the last six months. On average this is more than once a month. In addition, officers also regularly monitor the location of chillers, the tags attached to

carcasses in chillers, etc. Hence, the total contact, which includes the latter indirect contacts, would be greater than the direct contact figures suggest.

In this chapter, the effects of the various present NPWS regulations on the activities of licensed trappers, licensed trappers' efforts to get around the regulations for different reasons and their responses to some possible changes in NPWS regulations are discussed. The chapter begins, however, with an examination of trappers' perceptions of the type(s) of illegal shooting which takes place in the area where they operate and the influence, if any, of this on the number of kangaroos they take.

8.2 Illegal shooting of kangaroos

Respondents were asked to indicate if any illegal shooting of kangaroos occurs in their trapping areas and, if so, the types of illegalities which occur. They were also asked to state whether illegal shooting affected the number of kangaroos they took during the 1982/83 financial year. Where the respondents said that it had, they were asked whether they had personally done anything about it. The responses to these various questions are presented in Table 8.1.

(Insert Table 8.1)

Types of illegal shooting

All licensed trappers believed that illegal shooting occurs in their area of harvest. Table 8.1 shows the percentage of respondents who believe each type occurs. The most common types of illegality cited by respondents were unlicensed landholders shooting them for dog meat (96.5%) or in droughts (87.7%), unlicensed people shooting them (93.0%), landholders shooting them for fox bait (77.2%), and licensed trappers poaching on properties for which they

Table 8.1. Illegal shooting of kangaroos

	Percentage
Types of illegal shooting[a]	
Unlicensed landholders shooting them for dog meat	96.5
Unlicensed (non-landholders) people shooting them	93.0
Unlicensed landholders shooting them in droughts	87.7
Landholders shooting them for fox bait	77.2
Licensed trappers poaching	59.6
Fox shooters shooting them for fox bait	31.6
Landholders organizing 'kangaroo drives'	19.3
Landholders poisoning them in droughts	14.0
Unlicensed 'townies' shooting them for dog meat	10.5
	(n = 57)
Effect of illegal shooting on the number of kangaroos taken	
(1) Did it reduce the number taken in the 1982/83 tax year?	
Yes	36.4
No	47.3
Don't know	16.4
	100.1 (n = 55)
(2) Have the affected trappers tried to do something about it?	
Yes	50.0
No	50.0
	100.0 (n = 20)
(3) What they have done?[b]	
Reported it to the NPWS	72.7
Reported it to the occupier	18.2
Asked occupier to watch out for the culprits	9.1
Reported it to the police	9.1
	(n = 11)

a) Percentage of licensed trappers who stated that this occurred in the area where they took kangaroos for commercial purposes. In many cases more than one type of illegal shooting was reported.

b) Percentage of those who had tried to do something. In some cases more than one reaction was reported.

did not have s.121 occupier's tags (59.6%) and fox trappers shooting them for fox bait (31.6%). The difficult, if not impossible, task of having respondents estimate the number of kangaroos taken illegally was not attempted.

Effect of illegal shooting on harvest levels in the 1982/83 tax year

Nearly half (47.3%) of the respondents believe that illegal shooting did not affect their level of harvest during 1982/83. A large minority (16.4%) of licensed trappers did not know if it had done so. The number of kangaroos less ranged from 10 to 2,500, although most (75.0%) of the relevant respondents were unable to say how many less kangaroos were involved. Half the affected respondents have tried to do something to stop people from taking kangaroos illegally, the most common being to report them to the NPWS (72.7%).

8.3 Getting around the NPWS regulations

The monthly returns which licensed trappers are required to lodge with the Service include, inter alia, records of the number, weight, sex and species of all kangaroos taken commercially on each night of trapping in the relevant period, the time from their first to their last shot fired each night and the property upon which each kangaroo was taken. Data were obtained on the accuracy of these various records. These are shown in Tables 8.2 and 8.3.

(Insert Table 8.2)

Accuracy of recorded time from first to last shot

Half the respondents said that they make up the times they enter in their books. Many of these trappers said that this is because either they do not fill out their books until the end of the relevant month and then cannot remember the actual times or they have no incentive to keep this accurate or to go to the

Table 8.2. Accuracy of records provided to the NPWS

	Percentage
Accuracy of recorded time from first to last shot	
Within 15 minutes	3.4
Within 30 minutes	11.9
Within 1 hour	32.2
Make it up	50.8
Do not enter times in records book	1.7
	100.0
Percentage accuracy of recorded details of kangaroos taken	
(1) Number of kangaroos taken	
Make it up	1.7
90-99%	10.2
100%	88.1
	100.0
(2) Weight of each kangaroo taken	
Make it up	6.9
90-99%	6.9
100%	86.2
	100.0
(3) Sex of each kangaroo taken	
Make it up	35.6
70%	1.7
80%	6.8
90-99%	15.2
100%	39.0
Don't know	1.7
	100.0
(4) Species of each kangaroo taken	
Make it up	1.7
80%	1.7
90%	1.7
100%	94.9
	100.0

(5) Overall accuracy of records

All four items completely accurate	39.0
One/more item(s) not completely accurate	61.0
	100.0

(6) Why the inaccuracies occur[a]

Too much bother to record it accurately	54.8
Cannot remember accurately by the time filling it out	19.4
Often just guess sex of carcasses	16.1
Often cannot tell sex once animal has been dressed	6.5
NPWS do not care whether or not this is accurate	6.5
Numbers often inaccurate as discard undersized carcasses	3.2
Species often inaccurate as record some reds as greys	3.2
Convenience	3.2

(n = 35)

a) In some cases more than one reason for inaccuracies was mentioned.

trouble necessary. Most of the remainder (32.2%) believe that their recorded total kangaroo shooting times are accurate to only within one hour. It seems, therefore, that the recorded length of shooting per night is generally inaccurate.

An attempt was made to objectively interpret the returns from the six licensed trappers who felt that their records were accurate in all aspects. However, the resulting catch-effort data were virtually uninterpretable on an individual scale. Figure 8.1 contains a correctly completed example of the form which the NPWS requires trappers to complete on the lesser of a nightly or property basis. As can be seen, the licensed trapper is required to enter the date three times, his address and that of the fauna dealer he supplies every night, as well as several long licence numbers. An additional return with all the above repeated is also required for each separate property visited on the same night.

(Insert Fig. 8.1)

Accuracy of recorded details of kangaroos taken

(a) Number of kangaroos taken

Most (88.1% of) respondents believe that they record this with total accuracy. One (1.7%) respondent said that his records in this regard are fabricated.

(b) Dressed weight of each carcass

About the same number of respondents record this with total accuracy as in the case of recorded numbers. However, some respondents (6.9%) appear to fabricate their recorded weights.

National Parks and Wildlife Act, 1974

TRAPPER'S (Kangaroo) RETURN

TRAPPER'S NAME: N. P. WILDE LICENCE No. M 6248

Address: "TIANGA" DEEPWATER N.S.W.

PROPERTY WHERE FAUNA WAS TAKEN: "GUNYA" DEEPWATER

Property Licence No.: 001/2,501 - 2,700 Time of First Shot: 7·30 PM

Number of Fauna Taken: 38 Time of Last Shot: 12·30 AM

Date: 25TH JUNE, 1974 (a separate return is to be used for each day).

TO WHOM FAUNA WAS SOLD OR CONSIGNED:
(Dealer's Name) H. CANON

Dealer's Address: MAIN STREET, DEEPWATER Date: 26TH JUNE, 1974

	Species Sold: GREY KANGAROOS						Species Sold: BLACK WALLAROOS				Species Sold: RED KANGAROOS			
MALE	15 KG	18 KG	22 KG				29 KG				15 KG			
	23 KG	20 KG	17 KG				27 KG				16 KG			
	19 KG	19 KG	20 KG				21 KG				13 KG			
	15 KG	20 KG					23 KG				15 KG			
	22 KG	24 KG									12 KG			
	23 KG	21 KG									14 KG			
FEMALE	13 KG	12 KG					15 KG				12 KG			
	15 KG	13 KG					19 KG				13 KG			
	12 KG										12 KG			
	17 KG													
	13 KG													
	14 KG													
Kg	201 KG	147 KG	59 KG				134 KG				202 KG			
	23 TOTAL No.		407 Kg. TOTAL WEIGHT				6 TOTAL No.		134 Kg. TOTAL WEIGHT		9 TOTAL No		202 Kg. TOTAL WEIGHT	

ROYALTY TAGS USED: First No.: 5,501 Last No.: 5,538

This copy to remain in book.

National Parks and Wildlife Service,
A.D.C. House,
189 Kent Street,
SYDNEY, N.S.W. 2000
Telephone: 237 6500

Signed as a true and accurate statement:

N. P. Wilde — Signature of Licensee

26-6-74 — Date

Fig. 8.1 The official example of the nightly return to be completed by licensed trappers.

(c) Sex of each kangaroo taken

Only about one-third (39.0%) of respondents record the sex of each kangaroo taken with total accuracy, while a similar proportion (35.6%) fabricate their recorded sexes.

(d) Species of each kangaroo taken

Almost all (94.9% of) licensed trappers record the species they take accurately, although some varying levels of inaccuracy are evident in the results. One respondent in particular indicated that he often records some red kangaroos as grey kangaroos in order to meet restrictions placed on s.121 occupier's licences regarding the relative numbers of each species which can be taken from various properties.

It appears, therefore, that the records of licensed trappers are generally not completely accurate, and their records of the sexes of kangaroos taken are particularly unreliable.

A distribution of the stated reasons for the various inaccuracies indicated above is also given in Table 8.2. About half those respondents who do not record all details accurately (61.0% of the sample) said that inaccuracies occur because either it is too much bother to go to the effort of making all records accurate (54.8%) or it was simply convenient not to make the effort (3.2%). Others said that either they cannot remember accurately by the time they fill out the forms (19.4%), just guess the sex of each carcass (16.1%) or often cannot tell the sex once the animal has been dressed (6.5%). Two (6.5%) of the relevant respondents believe that the NPWS do not care whether or not their records are accurate as the respondents believed that the Service does not use the figures.

Accuracy of recorded properties where kangaroos were taken

Under the current NPWS regulations, s.121 occupier's tags can only be used for kangaroos taken from the properties for which the tags have been issued. Three potential breaches of this regulation were envisaged when the survey strategy and, particularly, the licensed trapper questionnaire were formulated. Firstly, it was felt that tags might be swapped around between the properties for which the trapper has tags to let him take kangaroos. That is, for instance, the respondent traps on properties A and B for both of which he has occupier's tags, but sometimes uses tags for property A on kangaroos actually taken from property B, and vice versa. In other words, the respondent effectively regards occupier's tags as area (rather than property) tags, where the area is defined as the properties for which he has occupier's tags. Secondly, it was felt that licensed trappers might take kangaroos from through-roads on properties for which they do not have occupier's tags and also along roads enroute to the properties for which they do have tags. Finally, it was felt that licensed trappers might take kangaroos from properties (off-road or non-through road) for which they do not have property tags, that is, they 'poach'.

In order to obtain a consistent average of the incidence of each of these breaches of the regulations, respondents were first asked to indicate the number of kangaroos they had taken on each of the last five nights of trapping prior to the day of their interview. They were then asked to indicate how many, if any, of these kangaroos were taken under each of the three circumstances just stated. This approach assumes that, on average, the last five nights are representative of typical trapping conditions and has the advantage that trappers are likely to be able to recall what they did on recent nights.

These figures were then converted to estimate the average percentage of kangaroos taken under each of the above three circumstances for the sample of licensed trappers. The results are contained in Table 8.3. Overall, 17.8% of kangaroos had s.121 property tags swapped around, while the percentages of all kangaroos taken from through-roads and on properties for which licensed trappers did not have s.121 occupier's tags were both less than 1%. The combined percentage of all kangaroos taken under one of these breaches of the regulations for the trappers sampled was 19.0%.

(Insert Table 8.3)

The reasons indicated as to why the relevant licensed trappers swap tags are also shown in Table 8.3. The most popular reason is that the respondent often concentrates for many nights on one property and cannot wait for the NPWS to replenish his depleted supply of occupier's tags; a situation which he believes forces him to use tags of another property (60.0%). Other reasons are that the respondent often traps on more than one property per night but states that it was only one in order to avoid extra-tedious bookwork which would otherwise be required (40.0%), he often needs to take a few kangaroos from another property to complete the nightly load and only records it as one property in order to avoid the extra bookwork (36.0%) and, more simply, for convenience (16.0%) or to reduce the inconvenience or bother of recording it accurately (8.0%). Another stated reason is that the relevant kangaroos have moved by the time the NPWS supplies the relevant tags, which causes the respondent to use the tags on the property to where the kangaroos have gone (8.0%). The final reason was that the respondent has tags for a string of connected properties and he is able to follow them each night as they move from property to property, but he records all as being taken from the one property in order to avoid the extra bookwork (4.0%). Thus, it would seem that most tag

Table 8.3. Accuracy of recorded properties where kangaroos are taken

Average percentage of kangaroos	
Taken with swapped s.121 occupier's tags	17.8
Shot on roadsides	0.7
Shot on properties with no s.121 tags	0.5
Total percentage taken under breaches of regulations	19.0
Reasons for swapping s.121 tags[a]	
Cannot wait for NPWS to replenish supply of tags	60.0
Often trap on 2 properties per night but record as one	40.0
Often trap a few extra on another property to complete a load	36.0
Convenience	16.0
Too much bother to record accurately	8.0
Kangaroos often moved by time NPWS send tags	8.0
Follow kangaroos moving from property to property	4.0

a) Percentage of licensed trappers who stated that they had swapped some tags in the last 5 shooting nights. In some cases more than one reason was reported.

swapping occurs in response to what respondents appear to regard as unnecessary bookwork associated with doing the right thing or administrative delays within the Service in relation to the reissuing of occupiers' tags.

All respondents who shoot kangaroos from through-roads on properties for which they do not have occupier's tags said that this only occurs on the way out or back from the property(ies) on which they intend to trap that night. Most indicated that this occurs only in cases where the animal is 'too big to let go'. No specific reasons were recorded for the three trappers who trapped kangaroos off through-roads on properties for which they did not have occupiers' tags.

8.4 Possible changes to NPWS regulations

Data on possible changes to current NPWS regulations were collected in two forms: firstly, the responses of licensed trappers to various hypothesized changes suggested by the researchers; and secondly, open-ended questions in which the respondents were able to indicate the nature of any changes they desired. The reasons for all responses were also elicited.

8.4.1 Responses to changes hypothesized by the researchers

Data were obtained from licensed trappers on their responses to two possible changes hypothesized by the researchers. These changes involved lifting current NPWS limits on the number of kangaroo trappers licensed in each administrative region of the commercial harvesting area of the State and increasing the numbers of licensed fauna dealers in the management zones.

Lifting the limits on the number of licensed trappers

These data indicate licensed trappers' evaluations of the likely effects of NPWS policies designed to increase the number of kangaroos being taken at times when the Service believes this is desirable, as was the situation in the years 1979 and 1980. A discussion of this is given in section 2.5. Respondents here were asked whether they thought removing the restriction on the number of licences would lead to more people obtaining licences, more kangaroos being taken in their area, and the reasons for their set of beliefs. They were also asked whether they wanted this change and, if so, why. The results are given in Table 8.4.

(Insert Table 8.4)

The majority (69.5%) thought that this change would mean that the number of licensed trappers operating in their area would increase because either they knew of people who currently want a trapping licence but cannot get one under apparent current restrictions (90.2%) or they knew of landholders who would apply for a trapping licence under such circumstances (9.8%). About the same proportion of respondents (67.8%) believed that this would increase the number of kangaroos taken in their area because an increase in the number of licensed trappers would increase the number taken. About one-third (35.6%) of respondents believed that the removal of such limits would have other effects. These were that this would make it more difficult for currently licensed trappers to obtain s.121 tags (42.9% of the relevant respondents) and lead to poaching (38.1%) because the number of properties upon which licensed trapping occurs is limited, the professional licensed trapper would disappear (9.5%) because it would be impossible for him to make a reasonable living, it would place kangaroo populations at risk (4.8%) as current populations cannot handle extra trapping pressure or it would significantly reduce their numbers (4.8%)

Table 8.4. Responses of licensed trappers to removing the limits on the number of licensed trappers

	Percentage	
Would this increase the number of licensed trappers?		
(1) Yes	69.5	
No	22.0	
Don't know	8.5	
	100.0	(n = 59)
(2) Why this would increase		
People want licences now and cannot get them	90.2	
More landholders would get licences	9.8	
	100.0	(n = 41)
Would this increase the number of kangaroos taken from the area?		
(1) Yes	67.8	
No	27.1	
Don't know	5.1	
	100.0	(n = 59)
(2) Why this would increase		
More licensed trappers means more kangaroos taken	100.0	(n = 39)
Would this have any other effects?		
(1) Yes	35.6	
No	40.7	
Don't know	23.7	
	100.0	(n = 59)
(2) What other effects?[a]		
More difficult for current trappers to obtain s.121 tags	42.9	
Poaching	38.1	
Professional licensed trapper would disappear	9.5	
It would place kangaroo populations at risk	4.8	
Kangaroo numbers would significantly decrease	4.8	
Saturation of market with carcasses/skins	4.8	
		(n = 21)

(3) Why these would occur

Supply of s.121 properties is limited	75.0
Existing populations cannot handle extra trapping pressure	10.0
More kangaroos would be shot	10.0
It would be impossible to make a reasonable living	5.0
	100.0 (n = 20)

Do licensed trappers want no limits on the number of people who can hold a general trapper's licence?

Yes	0.0
No	98.3
Don't know	1.7
	100.0 (n = 59)

a) Percentage of licensed trappers who mentioned an effect. In one case more than one effect was reported.

and the market would be saturated (4.8%) because many more kangaroos would be taken than at present. All respondents would not like to see the limits removed for the various previously-stated reasons.

Increasing the number of licensed fauna dealers

Under the current N.S.W. NPWS Kangaroo Management Program, strict controls are placed upon the number of fauna dealers who are licensed to operate in each management zone. This was discussed in detail in section 2.4. One possible change in management regulations would be to permit more licensed fauna dealers in, or free or freer entry of other fauna dealers into, each management zone. Respondents were asked whether they thought such a change(s) would result in a better price for their product, mean more kangaroos being taken in their harvesting region or have any other effects, and the reasons for their set of beliefs. As before, they were also asked whether they wanted this change and, if so, why.

As indicated in Table 8.5 almost half (45.0% of) the respondents believed this would lead to a higher price for their harvested kangaroos because of the competition it would generate between the licensed fauna dealers. A slightly less proportion (40.0%) believed it would increase the level of harvest in their region because either there would be licensed trappers from other areas coming into the subject's area in response to the likely increase in price that would occur (54.2%), more would be shot because the new dealers would also want kangaroos (29.2%) and local trappers would respond to the possible better price by taking more kangaroos (16.7%). One respondent believed that more fauna dealers would mean that there would in general be less kangaroos because more would be taken. Sizeable proportions of respondents did not know whether this change would have each of the stated effects.

(Insert Table 8.5)

Table 8.5. Responses of licensed trappers to increasing the number of licensed fauna dealers in their zone

	Percentage
Would this mean a better price for licensed trappers?	
(1) Yes	45.0
No	35.0
Don't know	20.0
	100.0 (n = 60)
(2) Why price would be better	
Better price because of competition between fauna dealers	100.0 (n = 32)
Would this increase the number of kangaroos taken from the area?	
(1) Yes	40.0
No	46.7
Don't know	13.3
	100.0 (n = 60)
(2) Why this would increase	
More trappers in the area as price may be better	54.2
More dealers, so more kangaroos wanted	29.2
Current trappers would respond to possible better price	16.7
	100.1 (n = 24)
Would this have any other effects?	
(1) Yes	2.5
No	75.0
Don't know	22.5
	100.0 (n = 40)
(2) What other effects?	
There would be less kangaroos around	Only 1 respondent
(3) Why this would occur	
More trappers in the area, so more kangaroos shot	Only 1 respondent

The majority (55.0%) want more fauna dealers in their zone mostly because it may mean they will get a better price (43.8%), more competition per se is a good thing (25.0%) and the new dealer(s) may take carcasses when the current one(s) will not (15.6%). Many respondents seem satisfied with the present number of licensed fauna dealers in their zone (43.3%). The proportion of licensed trappers who want more licensed fauna dealers in their zone is shown in Table 8.6. Those with only one fauna dealer in their zone exhibit a slightly greater intensity of preference for more fauna dealers (65.4%) than do those with two fauna dealers (50.0%).

(Insert Table 8.6)

8.4.2 Licensed trappers' desired changes

Licensed trappers were asked to state, firstly, the most important ways in which they believe the NPWS affects them as licensed trappers and whether they would like any changes to these things and why they wanted any indicated changes. They were then asked if there were any other changes at all which they wanted in relation to the industry per se, the way the Program and/or industry is administered by the NPWS or anything else.

Specific ways in which the NPWS affects licensed trappers

The results in this regard are given in Table 8.7. The most important way cited was the requirement that licensed trappers provide the NPWS with detailed records of their activities (96.6% of respondents). The most commonly-desired changes to these bookwork requirements were to generally reduce what has to be recorded (22.0%) as it is too much bother or takes too much time with no monetary compensation and, more specifically, times from first to last shot

Table 8.6. Respondents' attitudes to the introduction of more fauna dealers

		Percentage	
Do licensed trappers want more fauna dealers?			
(1)	Yes	55.0	
	No	43.3	
	Don't know	1.7	
		100.0	(n = 60)
(2)	Cross-tabulation by currently one dealer and currently two dealers	Now one dealer	Now two dealers
	Yes	65.4	50.0
	No or don't know	34.6	50.0
		100.0 (n = 26)	100.0 (n = 14)
(3)	Why want more licensed fauna dealers		
	Might get a better price	43.8	
	More competition is a good thing	25.0	
	New dealer may take carcasses when current one will not	15.6	
	Might get a better all-round deal from current dealer	6.3	
	Would increase business turnover	3.1	
	Inequitable as it is now	3.1	
	Might get paid more quickly	3.1	
		100.0	(n = 32)

(6.8%) and the royalty tag sequences (3.4%) should not be recorded, or only the number taken (5.1%) or that and the species of each kangaroo taken (3.4%) should be recorded. The more specific desired changes were mainly because the current bookwork is too much bother or it is the only way that licensed trappers would keep accurate records. The only other (non-bookwork) changes desired were that the NPWS should only place restrictions on s.121 occupier's licences on the number that can be taken from each property and not the number of each species (5.1%) as it would let trappers do legally what they now do illegally, abolish the management zone system (1.7%) and start prosecuting illegal shooters (1.7%) as illegal shooting affects trappers' incomes.

(Insert Table 8.7)

Other changes desired by licensed trappers

Data on any other changes desired by respondents are displayed in Table 8.8. The most popular desired other change was to issue 'area tags' or tags that can be used over any property for which the trapper has permission to take kangaroos (47.2%), because it would inter alia make the job easier or it would let the trapper do legally what he now does illegally. Other changes were that royalty payments should be abolished and a greatly increased trapper's licence fee introduced in their place (38.9%), inter alia to eliminate weekend trappers or make it better for the full-time professional licensed trapper and that the NPWS should not license weekend trappers (30.6%) for the last reason above. Some (25.0%) respondents wanted the Service to introduce a system of transferable trapper licences to enable licensed trappers to receive a lump sum return when they leave the industry on their original investment in setting themselves up in the industry. A few respondents also wanted a general reduction in the

Table 8.7. Specific ways in which the NPWS affects licensed trappers and changes suggested by the licensed trappers

	Percentage
Most important ways in which the NPWS affects licensed trappers[a]	
Bookwork	96.6
Through the Service's policy on issuing s.121 occupier's tags	5.1
Monitoring of chillers	3.4
Put limits on the number of each species taken	3.4
Through the Service's policy on licensing trappers	3.4
Minimum dressed weight per kangaroo	3.4
Failure to control illegal trapping	1.7
Royalty charge	1.7
Kangaroo harvest quotas	1.7
Desired changes	
(1) Bookwork[b]	
No changes suggested	45.8
Reduce what has to be recorded	22.0
Do not record times of first and last shot	6.8
Only record the numbers shot	5.1
One return per month only indicating number and sex	5.1
Only record number and property where shot	5.1
Only record number and species	3.4
Only record number, species and property	3.4
Should not have to record royalty tag sequence	3.4
Only record total number, weight and property	1.7
(2) Other desired changes	
No changes suggested	91.5
Only restrict numbers, not numbers of each species, that can be taken from each property	5.1
Start prosecuting illegal shooters	1.7
Scrap the management zone system	1.7
	100.0

a) Percentage of licensed trappers who mentioned each way in which NPWS affects them. More than one response was recorded in some cases. (n = 59)

b) Percentage of responses to changes. More than one change was suggested in one case. (n = 59)

number of licensed trappers (19.4%) either to eliminate weekend licensed trappers, make it better for the full-time professional trapper or there are now too many trappers for the number of kangaroos in their area. Interestingly, one respondent wanted the commercial industry shut down for two years to let the kangaroo populations build up again.

(Insert Table 8.8)

Table 8.8. Other changes desired by licensed trappers

	Percentage	
Are any other changes desired?[a]		
Yes	61.0	
No	39.0	
	100.0	(n = 59)
What changes are desired?		
Issue 'area tags'	47.2	
Abolish royalty charges, but greatly increase trapper licence fee	38.9	
Don't license part-time or weekend trappers	30.6	
Transferable licences	25.0	
Reduce the number of licensed trappers	19.4	
License more fauna dealers into the area	13.9	
NPWS should stop running the kangaroo industry	11.1	
Free choice of to whom to sell carcasses	8.3	
Permit 'boning-out' co-ops run by licensed trappers	8.3	
Shut down the industry for two years	2.8	
Stabilize prices paid to licensed trappers	2.8	
Stop unlicensed landholders trapping kangaroos illegally	2.8	
Stop s.121 occupiers trapping as 'resident trappers'	2.8	
NPWS should issue more tags per s.121 occupier's licence	2.8	
Permit human consumption of kangaroos in N.S.W.	2.8	
Do not specify species on s.121 occupier's licences	2.8	
		(n = 36)

a) Percentage of licensed trappers who desire a change. Several desired several changes.

Chapter 9

OVERVIEW AND POLICY RECOMMENDATIONS

9.1 Introduction

In this chapter, the various policy ramifications of the analysis of the data elicited from licensed trappers and chiller operators are examined. The chapter commences with an overview of licensed trappers and chiller operators as people-types and the incomes they earn in the kangaroo products industry. The remaining data are then summarized in groups according to their broad subject area and their policy conclusions are investigated. It should be noted that no licensed trappers who take kangaroos only for their skins, as distinct from kangaroo carcasses with the skins attached, were included in the sample of licensed trappers.

It is stressed that any policy conclusions made in relation to the analysis of the licensed trapper and chiller operator data are interim recommendations only. They are contingent upon their verification by the data to be collected later from fauna dealers and landholders and on the market for kangaroo products. Many of the policy questions which surround the taking of kangaroos for commercial purposes are not considered in this report on the first stage of our work. We take the view that none of the major decisions which need to be taken with regard to the NPWS Kangaroo Management Program are so vitally urgent that they should be made without the support of reliable and accurate data.

9.2 Overview of licensed trappers and chiller operators as people

The data on chiller operators and licensed trappers indicate that those presently working in the industry are comparable in social characteristics to other similar groups of people. With regard to chiller operators -

- 54% were brought up within 100 km of their present residence;
- 71% are under 40 years of age which is similar to 69% of farm-workers and foremen who were under 40 at 1981 census;
- 71% are married and of these 88% have been married for five years and over and all who are married have children - in contrast 60% of farm-workers and foremen are married;
- 67% left school between the age of 13 and 15 which compares with 53% of the farmers and fishermen who left school between the ages of 13 and 15 (Tables 4.1, 4.2, 4.3, 5.1 and 5.2).

Of the 60 licensed trappers surveyed 20 were also chiller operators and as a total group licensed trappers are similar in social characteristics to chiller operators; 65% of trappers are married and of these almost all (95%) have children. Qualifications held by licensed trappers include carpenter, electrician and a university science degree. Generally, the above statistics do not support the popular image of kangaroo shooters.

Kangaroo trapping was their first occupation for 9% of trappers with the most common last job being stationhand (24%), meat or abattoirs worker (11%) and shearer (11%).

The average net incomes received by licensed trappers during 1982/83 was $15,927. However, this ranged substantially from $3,011 to $34,981. The top 25% of respondents averaged $25,116 and the bottom 25% $9,011. Thus, there is a financial upper echelon of licensed trappers who earn high incomes and a bottom group who earn very little. These figures include income from both trapping and non-trapping employment (Table 5.15).

As indicated in Table 9.1 the profitability of taking kangaroos for various purposes varies from east to west, from property to town located chillers and it is also greater in areas with high kangaroo densities. The implications of

these data are firstly that in the case of all but property located chillers, the taking of kangaroos for commercial purposes is not a highly profitable occupation. Furthermore, given current prices, costs are such that it is uneconomic to take very small kangaroos and in areas of low kangaroo densities it appears to be difficult to find sufficient kangaroos to cover average shooting costs. In 1982/83 the top 25% of licensed trappers averaged $2.32 per kangaroo and the bottom 25% lost $0.31 per kangaroo. The middle 50% averaged $1.32 per kangaroo taken for commercial purposes. The latter figure reflects the observation that several licensed trappers took just enough kangaroos to retain their licences, and did this irrespective of cost.

For various reasons during the 1982/83 financial year 64% of licensed trappers indicated that they were not able to take as many kangaroos as they wished. On average those who wanted to take more indicated that they wished to take an additional 1,525 kangaroos and the most commonly stated reasons for not being able to do this were either that the fauna dealer or chiller operator they supplied did not want to take any more or that there were not enough kangaroos around (Table 6.4).

(Insert Table 9.1)

The most profitable kangaroo trapping operations are found in association with property located chillers. This is due to the much lower costs associated with working on a property with kangaroos nearby. Net trapping income also appears to be a function of kangaroo density and the average is $7,308 in areas where the density is less than 13 kangaroos per square kilometre, $9,024 when it is between 13 and 17 kangaroos per square kilometre and $11,582 when it is greater than 17 kangaroos per square kilometre (Table 5.17).

Most trappers (75%) have four or more years' licensed trapping experience and the majority (60%) want to continue to trap kangaroos for the rest of their working lives (Table 5.5 and 5.6).

Table 9.1. Distribution of returns and costs per kangaroo from taking kangaroos for commercial purposes

	Average gross kangaroo income per kangaroo	Average total shooting cost per kangaroo[a]	Average net kangaroo income per kangaroo
Location of chiller			
East Town	3.55	3.01	0.54
West Town	4.08	2.72	1.36
Property	3.76	1.85	1.91
Kangaroo density			
Low (<13 km^{-2})	3.81	2.51	1.30
Average (13-17 km^{-2})	3.98	2.93	1.05
High (>17 km^{-2})	3.84	2.00	1.84
All chillers	3.80	2.64	1.16

a) Includes some costs associated with shooting foxes, etc.

Only one of the 60 trappers interviewed was solely dependent on kangaroo trapping for a livelihood. All others have adapted to the uncertainties of kangaroo trapping by developing linkages with other industries. The ratio of net non-trapping income to total net income is 0.53 in the East and 0.25 in the West of the commercial harvesting area. Overall, the average non-trapping net income was $5,932 and the average net trapping income was $9,361. But, once again, there was a substantial range in these values (Table 5.15).

Most licensed trappers consider it important to have an alternative source of income and 69% give these alternative sources higher priority. It would seem, therefore, that diversification in income source is essential for the financial well-being of licensed trappers. This appears to enable them to modify their trapping effort in response to variations in kangaroo population, and seasonal and market circumstances (Table 5.7).

9.3 Overview and policy ramifications by subject area

Here, data elicited in the research on different aspects of the Kangaroo Management Program which relate to licensed trappers are summarized and any policy implementations for the Program are examined.

Restrictions on the number of trappers licensed at any one time

Figure 9.1 indicates the relationship between the number of kangaroos taken and the number of licences issued. No information on the distribution of these between resident trappers' licences and general trappers' licences on an East-West basis is available, but there are currently 111 trappers' licences held by resident occupiers. During the survey period all "resident licensees" were inactive.

A full recommendation as to the number of general licences to issue requires data from fauna dealers and landholders and also data on market conditions. However, ignoring the expansionary years of 1979, 1980 and to a lesser extent 1981 when large numbers of licences were issued, the data do suggest a 'take possibility curve' TT. Pending the collection of further data, and in view of the general satisfaction with the present structure and status quo, we recommend an interim limit on the issue of general trappers' licences in proportion to the quota and as summarized in Table 9.2 and Fig. 9.1. This assumes that no restrictions will be placed on the issue of trappers' licences to occupiers.

(Insert Fig. 9.1 and Table 9.2)

Minimum annual requirements on the number of kangaroos harvested and/or nights trapped

The majority (67%) of licensed trappers took less than 5,000 kangaroos in the 1982/83 financial year, with an overall average of 4,310 per respondent. On average the lowest quartile took 880 kangaroos and the top quartile took 8,790 kangaroos (Table 6.4).

As indicated in section 2.4.5, in order to have their licences renewed, trappers must under normal circumstances have taken a minimum of 500 kangaroos or have trapped on at least 50 nights in the year preceding the expiry date of their licence. Given that most (71%) trappers have a non-trapping job and 69% give their non-trapping job higher priority than their kangaroo trapping, it seems that many are dependent on non-trapping employment for their financial well-being. Moreover, it is probable that it is the ability of licensed trappers to obtain income from non-shooting occupations which enables them to adapt to changing trapping and market conditions such as a temporary reduction in kangaroo numbers or a temporary slump in the market for kangaroo products.

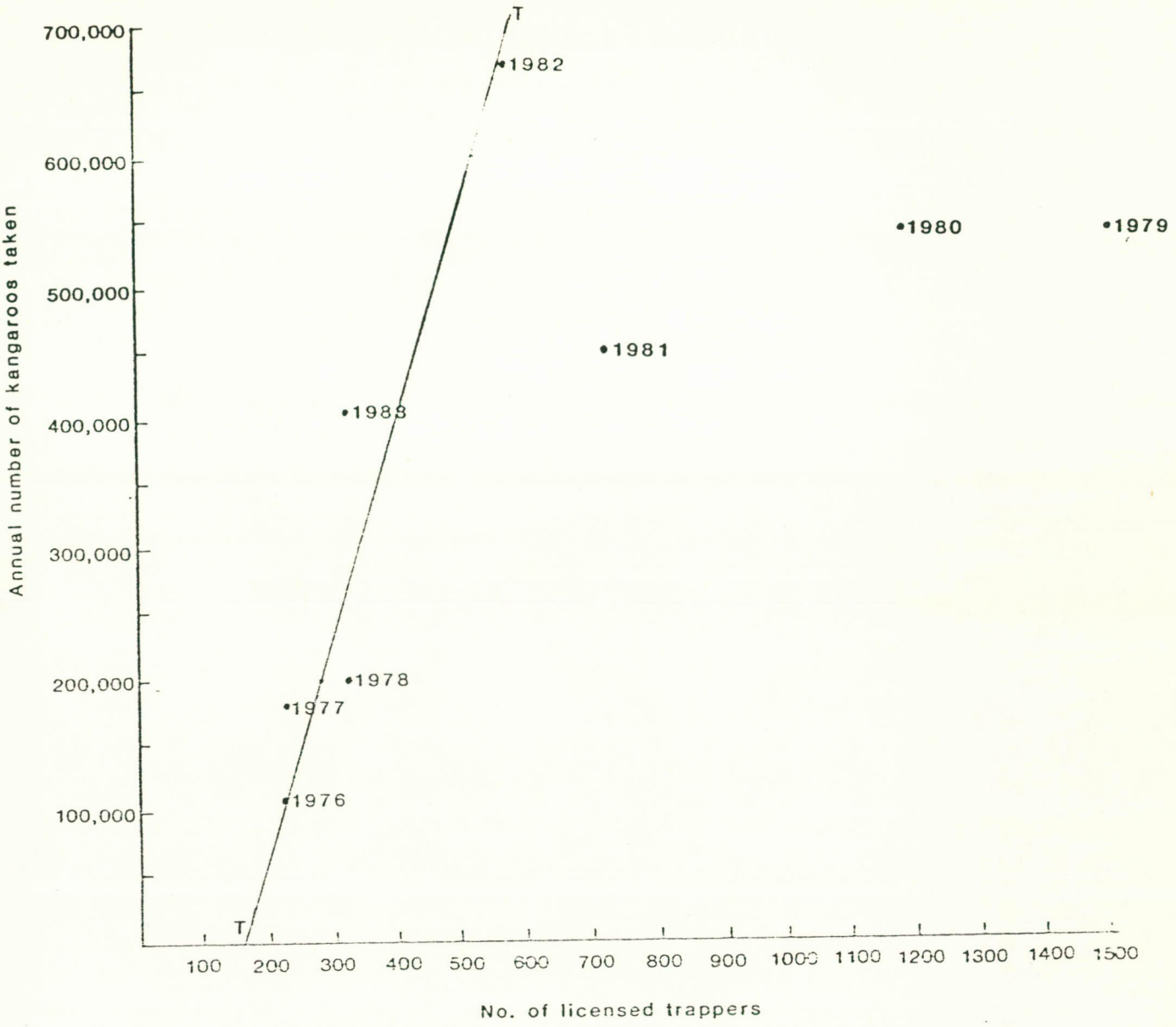


Fig. 9.1 Relationship between annual number of kangaroos taken and number of licensed trappers. The line TT is a 'take possibility' curve.

Table 9.2. Interim recommendation as to maximum number of general trapper's licences

Quota	No. of general licences[a]
200,000	180
400,000	300
600,000	440

a) Between points should be calculated by interpolation

Thus, NPWS policy in this regard must remain amenable to licensed trappers taking other jobs. Furthermore, any minimum requirement on the level of annual trapping effort should be such that it ensures that professional licensed trappers, including those who adopt a professional approach to their activities but are presently taking few kangaroos, are retained during temporary unfavourable trapping conditions or when landholders perceive that there is no need to have kangaroos removed from their properties. The requirement that trappers take at least 500 kangaroos per annum to retain their licence appears an appropriate and pragmatic solution to the difficult problem of finding a way to exclude those who view licensed trapping as a speculative, opportunistic part-time occupation, but still retain those who are simply taking low numbers of kangaroos because of temporary unfavourable circumstances. In the interim we recommend that, unless a need to reduce the number of general trappers' licences emerges, the minimum requirement remains at 500 per annum. The alternative approach of substantially raising the licence fee and lowering the royalty fee may force too many to give up their licences during unfavourable periods.

On a logistical note, it seems unnecessary to have the alternative minimum of 50 nights per annum because any licensed trapper who cannot take on average 10 (500/50) kangaroos per night of trapping would be highly unlikely to remain in the industry in the long term. During the survey we detected several trappers who were simply taking sufficient kangaroos to retain their licences until conditions improved. One might expect these respondents to trap on as few nights as possible and take as many kangaroos per night as possible in order to reduce the total annual cost to retain their trapping licences.

Illegal trapping of kangaroos by unlicensed people

All licensed trappers believe that illegal trapping occurs in the area where they take kangaroos. The most commonly mentioned types of illegal shooting included unlicensed landholders shooting kangaroos for dog meat (97% of respondents reported this in their area), other unlicensed people (non-landholders) shooting kangaroos (93% of areas) and unlicensed landholders shooting kangaroos in droughts (88% of areas). Some licensed trappers (36%) indicated that they considered that the number taken illegally had reduced the number of kangaroos which they were able to take for commercial purposes during the 1982/83 financial year. No other information was obtained on the distribution of the numbers taken illegally per annum due to the difficulties of specifying an objective estimate of each. But we can postulate that, as landholders are likely to be aware of all forms of illegal trapping on their properties, any decrease in the numbers taken by licensed trappers during times when landholders perceive that damage is being done to crops and/or pastures will probably result in an increase in the numbers taken illegally by landholders. Hence, in the interim, we recommend that the commercial framework on which the Kangaroo Management Program is presently based be retained until such time as we can establish the extent of losses caused to landholders and their likely responses to possible changes to the Program. The abolition, or further curtailment, of the commercial aspects of the Program is likely to increase the extent of these illegal activities.

Attitudes of licensed trappers to prices received and controls exerted by licensed fauna dealers and/or chiller operators

Responses from licensed trappers and chiller operators indicate that fauna dealers sometimes place delivery quotas on chiller operators and, through them,

on trappers. This process is facilitated by the zone system. Some dissatisfaction with the level of quotas received and treatment by licensed fauna dealers generally is evident amongst the licensed trappers surveyed. Prices received are considered 'unfair' by 57% of trappers and 55% want more fauna dealers in their zone (Table 7.5). The latter is mainly because the relevant respondents believe that they may receive a better price or better all-round deal as a result of competition between licensed fauna dealers.

The average current net return per kangaroo was estimated to be $1.16, which means that profit margins in many areas are small. Thus, it seems that if commercial (kangaroo) trapping is to remain economically viable for many professional licensed trappers, a substantial increase in the prices received by them will be necessary to offset the greatly increased average cost of trapping per kangaroo. Without such a significant increase in prices received, it is likely that many currently active licensed trappers will leave the industry. However, this matter can only be addressed properly after data have been obtained from licensed fauna dealers as to whether this will be possible under current market conditions.

Licensed trappers' methods of obtaining s.121 occupier's tags

During the survey each licensed trapper was asked how he first obtained occupiers' tags for each of the last five properties for which he had acquired such tags. It was stressed to the respondents that the question related to their first contact with the landholder and not subsequent contacts when additional tags were being sought. Nevertheless, the interviewer considers that a few respondents (less than 10%) may have misinterpreted the question and responded as for additional tags. Overall trappers indicated that in 83% of cases for the last five properties for which they had acquired occupiers' tags it was they who had approached the landholder (Table 6.1). At this stage it

would be incorrect to conclude from this that generally most landholders believe that kangaroos do not significantly reduce their incomes. The final interpretation of this response must await the collection of information from landholders. Consideration must also be given to the present status of the industry; that is, the kangaroo population is lower than normal and was dispersed at the time of the survey. The question of whether the landholder would have eventually applied for an s.121 occupier's licence had the trapper not approached him also needs to be addressed. Furthermore, before issuing an s.121 occupier's licence the NPWS is required to ensure that a demonstrated need exists. Thus, the proceedures used by the Service in determining whether or not an unequivocal need has been demonstrated also require examination.

Trapping methods

Since 1st July, 1982, all respondents trapped kangaroos for pet food carcass utilization, while small proportions also trapped kangaroos for human consumption carcass and skins only purposes. Long hours (almost 11.5 hours on average) are worked per night of trapping, with help being provided by others in 60% of cases. Only 38% of the time worked per night is spent shooting. Half of the licensed trappers appear to have fixed ties to their local region which would prevent them from moving to another region if this was required in order for them to remain in the industry (Tables 5.1, 5.8 and 5.11).

The number of nights per week and time per week spent shooting varies substantially from licensed trapper to licensed trapper. Of those surveyed 19% shot on one night per week, 20% shot on two nights per week, 17% on three nights per week and 44% on four or more nights per week. On nights when a full load is not achieved trappers either stay out until they have shot a minimum weight or until a certain time (Table 6.10).

The decision of which property to trap on for a particular night is mostly based on regularly rotating their properties or the perceived relative number of kangaroos on their properties on that night. Most of the trappers who rotate their properties do this either for logistical reasons or in an attempt to keep happy all the s.121 licensed occupiers with whom they co-operate (Table 6.5).

When faced with a range of kangaroos of which they could take at a particular instance, licensed trappers prefer to take either the largest male kangaroo they can see followed by the second largest male (for 50% of respondents) or a bigger doe with a visible joey followed by the largest male (for 46% of respondents). Many respondents attempt to 'farm' the kangaroo resource to obtain a maximum long-term economic yield by trading off weight and sex considerations, while others take kangaroos on the basis of perceived weight (or size) alone (Table 6.6).

The minimum long-term average total dressed weight per night required for licensed trappers to stay in the industry, ceteres paribus, was mostly 500 kg (44%), 600 kg (11%) or 1,000 kg (22%). This presumably is the amount they believe is necessary to make a reasonable living.

Accuracy of records kept compulsorily by licensed trappers

In an attempt to determine the accuracy of the trapping records supplied to the NPWS each licensed trapper was asked how accurate was each item in their returns. The prime purpose of this exercise was, if relevant, to identify the reasons why they were not 100% accurate and thereby identify ways to improve the quality of the information received by the NPWS. As indicated in sections 8.3 and 8.4, from a licensed trapper's viewpoint the forms seem repetitive and are in need of simplification.

The majority of licensed trappers (85%) either record the times they enter in their record books only to within one hour or they make up these times. Thus, it seems that these records and the estimates of trapping effort which could be derived from them are unreliable. Varying levels of average stated inaccuracy also occur in other records. In particular, 12% of respondents said that their records of the number of kangaroos taken were not completely accurate, 14% in the case of the recorded weights of the animals taken, 5% in the case of the species taken and 61% in the case of the sex of the animals taken (Table 8.2).

Inaccuracies also occur in the records of the properties where kangaroos are taken. Overall, 0.7% of all kangaroos taken by the sampled licensed trappers in the 1982/83 financial year were shot from through-roads on properties for which they have no s.121 occupier's tags, 18% of kangaroos taken by the sampled licensed trappers in the 1982/83 financial year had tags swapped around between the properties for which the trapper has occupier's tags and 0.5% were taken off-road from properties for which they did not have tags, that is, by 'poaching'. Incidence of tag swapping essentially means that the relevant respondents regard occupier's tags as 'area tags' and use them on different properties in the area for which they have tags. The main reasons stated for this were logistical in nature. They included that it occurs because the trapper often concentrates on one property for a long period and eventually needs to use other property tags to do this while he waits for the NPWS to replenish his supply of occupier's tags (60%) and wants to avoid the bother of having to fill out extra pages in his record book when trapping on more than one property in a particular night (40%) or on occasions when he completes a night's load on a second property (36%) (Table 8.3).

There may be some merit in adopting a policy of 'immediate area' versus property tags, whereby licensed trappers are able to take kangaroos from anywhere within a clearly specified group of adjoining or closely-located properties for which they have s.121 occupier licensee permission to remove kangaroos. Such an 'area' tag system would have to be limited to an 'immediate' parcel of propeties to avoid the possibility of localized over-harvesting. Clearly, if such a tag applied to a much larger area it may lead to the over-exploitation of local kangaroo populations as trappers concentrate on just a few higher yielding properties. Under the hypothesized system, however, a licensed trapper would be expected to have several sets of 'immediate area' tags. The Service would allocate a bundle of tags to a particular licensed trapper over an area where demonstrated damage is occurring and would be able to redistribute the tags for that area amongst other licensed trappers where it believes the properties are being unsatisfactorily serviced. Such a policy would certainly improve the efficiency of the trapping operations for the majority of licensed trappers.

This suggestion is presented tentatively as a possibility whose ramifications would require careful examination by the Service. It should not be taken to be a firm recommendation. Nevertheless, one might expect that accuracy of records would improve if either the forms were redesigned or licensed trappers were permitted and encouraged to enter on one page all the properties from which they took kangaroos on any single night.

Desired changes to NPWS regulations or policies

In terms of compulsory record-keeping for the NPWS on their trapping activities, 22% of licensed trappers want a general reduction in what has to be recorded as current requirements are too time-consuming and too much bother.

More specifically, others consider that the nightly times from first to last shot (7%) and the s.121 occupier's tag sequence (3%) should not be recorded or only the number of kangaroos taken and/or the species of each should be recorded (9%). Other desired changes included the adoption of an 'area tag' rather than property tag system (47%) to make the job easier or to let them do legally what is now done in breach of the regulations, the abolishment of royalty payments and their replacement by a greatly increased trapper's licence fee (39%) to eliminate part-time or weekend trappers, or that the Service should no longer license weekend trappers (31%) to make it better for the professional licensed trapper (Table 8.8).

We recommend that licensed trappers not be required to record times as these are generally not recorded accurately and, even when they were recorded accurately, we found the resultant catch-effort data to have little meaning at the local level at which the Program is managed.

The records which the Service keeps on the sex of each kangaroo taken also appear to be quite inaccurate. That is, many licensed trappers often just 'guess' at the end of each month of record the sex of each kangaroo on the basis of recorded weight in order 'to make the records look good'. Nevertheless, records of the number of kangaroos taken and their weight appear to be sufficiently accurate for monitoring purposes (Table 8.2).

Restrictions on the location of chillers

It seems to us to be an economically desirable characteristic of an enhanced Kangaroo Management Program that barriers to the location and movement of chillers be reduced as this may increase the profit margins of licensed trappers. Such a policy change may result in greater use of relatively mobile property chillers and would be more efficient economically because the net

return per kangaroo was observed to be greater for trappers using property chillers than for those using relatively immobile town chillers. Marginal net returns are greater because the travel costs are much less given that property-based chillers tend to be strategically located close to the area where the kangaroos are being taken. From the viewpoint of economic efficiency, greater flexibility of the policy on chiller location and mobility would mean that areas of high kangaroo population and/or damage could be more readily and more economically serviced. It could also result in fewer kangaroos being taken from areas of lower populations.

Pragmatically, free movement of chillers between registered sites would need to be limited to a general area such as a map sheet used by the Service for kangaroo population monitoring purposes. A set of sites between which chillers could be moved would need to be specified through negotiation between the Service and the relevant licensed fauna dealer. As the NPWS's stated rationale for basing the commercial taking of kangaroos under its program on the s.121 occupier's licence system is to prevent, at a local level, the taking of kangaroos from areas with very low density and as Service officers regularly monitor the operation of chillers at registered sites, such a policy would be feasible provided that fauna dealers are required to inform the relevant NPWS regional administrative office of any intended change in location at least one week in advance of moving it. Failure on the part of the NPWS to stop such an intention should be regarded as approval to move and penalties for failure to notify an intention to shift should be enforced. The Service currently retains the right to permit entry of other fauna dealers into any area which it believes is not being satisfactorily serviced by the zone operator. This right would need to be retained under such a change in policy. It was observed that about 40% of chiller operators and licensed trappers would be willing to move either permanently or temporarily if necessary. This is probably a large enough proportion of respondents to ensure that such a proposal is feasible.

9.4 Summary

In summary, this is an interim report and the examination of many of the important policy ramifications of the current kangaroo management program must await the collection of data in subsequent stages of the project. Under present economic conditions the taking of kangaroos from areas with very low densities is unlikely to be economically practicable as kangaroo trapping at these densities is not viable. Indeed, even at higher densities, trapping from anything but property chillers is only marginally profitable for many licensed trappers. Illegal shooting is occurring and we suspect that any further curtailment of the commercial program will only increase these activities. A policy change to encourage greater chiller mobility and closer spacing between chillers is suggested. Licensed trapper reporting requirements are substantial and could be modified to improve the quality of the information submitted to the NPWS by not requiring trappers to fill in the first and last time shot and permitting them to put an entire night's shooting on one page, irrespective of the number of properties visited during a night's trapping. A page format which permits multiple-property listing should be devised. It is recommended on an interim basis that the minimum number of kangaroos to be taken in order to retain a licence remain at 500 and that the maximum number of licences issued be related to the annual quota.

Appendix 1

List of broad hypotheses used to assist in survey design and data analysis

A.1 Hypotheses for chiller operators

1.H: For chillers owned by fauna dealers, the fauna dealers influence the chiller operators' activities by placing requirements and restrictions (e.g. by setting chiller quotas, bonuses and retainers) on chiller operators.

2.H: NPWS chiller licensing and location restrictions have not in reality directly influenced the location of chillers in the last 24 months.

3.H: Market forces and local kangaroo density are the main factors which have influenced the location of chillers in the last 24 months.

4.H: Chillers located in towns never (or only rarely) move once they are set up.

5.H: Chillers are located temporarily on properties and these chillers are moved when the average number of kangaroos taken per night falls below a predetermined number.

6.H: Chiller structure (or the number of part-time, intermediate and full-time licensed trappers) is a function of local kangaroo density, size of the town where located and habitat type.

7.H: Chiller operators believe that allowing more, or free entry of, licensed trappers into the industry would adversely affect currently licensed trappers.

8.H: Chiller operators believe that there is little voluntary transfer of licensed trappers to chillers owned by fauna dealers other than the one who owns the chiller which they are managing.

9.H: Chiller operators have accurate perceptions of the reasons why licensed trappers shooting out of their chiller enter and leave the industry.

10.H: Chiller operators are also dependent economically on their ability to process feral animal carcasses (e.g. wild pigs, rabbits and goats) and fox skins.

11.H: Chiller operators are able to manage the intensity of kangaroo culling in their area.

12.H: Chiller production is greatest or more effective with a mix of full-time and part-time licensed trappers.

13.H: The decision at the chiller operator level as to whether to supply at per food or human consumption hygiene standards is determined by the relative prices of the products.

A.2 Hypotheses for licensed trappers

The following broad hypotheses relating to licensed trappers are grouped below according to the six research objectives stated previously. More specific and detailed hypotheses are listed in section A.1.

(i) Licensed trapper profiles and trapping methods

1.H: Working as a licensed kangaroo trapper is no different to working in any other similar self-employed group (e.g. contract shearers, builders and painters).

2.H: There are a number of factors which differentiate licensed trappers from other comparable self-employed groups (e.g. they tend to be younger, less likely to be married, etc.).

3.H: The harvesting patterns of licensed trappers are influenced by the nature (species, sex and weight mix and kangaroo density) of the kangaroo populations being harvested.

4.H: Licensed trappers plan their shooting patterns in accordance with expected seasonal variation in the willingness of occupiers to allow shooting on their holding so that licensed trappers can obtain a stable supply of kangaroos throughout the year.

(ii) The current economic state of licensed trappers

Costs

1.H: The costs of licensed trappers are influenced by habitat type, vehicle and equipment operating and fixed costs, variable costs per night and kangaroo density.

Incomes

1.H: The relative profitability of shooting (kangaroos, foxes, rabbits, pigs and goats) and non-shooting employment opportunities influence the level of income from shooting activities.

2.H: The relative prices of kangaroo products, fox skins, rabbits, pigs and goats influence the proportion of total income obtained from kangaroo shooting.

(iii) The impact of NPWS kangaroo management policies on the activities and economic state of licensed trappers

1.H: The only direct influence of the NPWS on the activities of licensed trappers are record-keeping requirements, the endorsement of trapper licences, minimum shooting requirements and restrictions on the number of licences which may be held in a district.

2.H: With the exception of royalty tags, the only influence of the NPWS on the economic state of licensed trappers is through the allocation of zones and quotas to licensed fauna dealers, restrictions placed on the locations of chillers and the issue of occupiers' licences.

3.H: Licensed trappers comply with all NPWS and cruelty regulations pertaining to the culling of native animals.

4.H: The records maintained by licensed trappers provide an accurate account of their activities.

(iv) The impact of licensed fauna dealers and registered chiller operators on the activities and economic state of licensed trappers

1.H: The influence of licensed fauna dealers on the activities of licensed trappers is expressed indirectly through the incentives, restrictions and requirements they place on registered chiller operators.

2.H: Licensed fauna dealers manipulate prices paid to licensed trappers to influence their activities.

3.H: Chiller operators manipulate the activities of licensed trappers

(a) to maintain productivity requirements set on the chiller operator by fauna dealers and

(b) to retain the services of reliable licensed trappers in times of short-term depressed demand for kangaroo products.

(v) The impact of environmental factors on the activities and economic state of licensed trappers

1.H: Habitat and environmental factors such as drought, heavy rainfall on clay soils, dense shrub, wind, fog, etc., influence the activities of licensed trappers.

(vi) Licensed trappers' perceptions of the interactions between landholders and licensed trappers

1.H: There is a positive net benefit to both occupiers and licensed trappers from the kangaroo culling programme.

NOTE:

Appendix 1 (repeated), Appendix 2 - the Chiller Operator Questionnaire, and Appendix 3 - the Licensed Trapper Questionnaire, are contained in Volume II.