

THE STRUCTURE AND DYNAMICS OF AUSTRALIA'S SHEEP POPULATION

Prepared for



Australian Government

Department of Agriculture, Fisheries and Forestry

Office of the Chief Veterinary Officer

June 2006



Prepared by

Hassall & Associates Pty Ltd

PO Box 1052

DUBBO

NSW 2830

Ph: 02 6884 6250

Fax: 02 6884 6249

Blank Page

TABLE OF CONTENTS

EXECUTIVE SUMMARY.....	1
1 BACKGROUND.....	3
1.1 PURPOSE OF THE STUDY	3
1.2 TERMS OF REFERENCE	3
1.3 METHODS & DATABASE STRUCTURE	4
2 SHEEP IN AUSTRALIA.....	5
2.1 TRENDS	5
2.2 SHEEP REGIONS	5
2.3 PRODUCTION SECTORS	8
2.4 DISTRIBUTION OF PRODUCTION SECTORS BY REGION	9
2.5 SHEEP & FARM NUMBERS BY PRODUCTION SECTOR	11
2.6 IMPACT OF OVINE JOHNE'S DISEASE	12
3 REGIONAL SHEEP MOVEMENTS	15
3.1 DRIVERS OF MOVEMENT	15
3.2 SHEEP – BEEF RELATIONSHIPS	17
3.3 REGIONAL PROFILE & TYPICAL PROPERTIES	18
4 NATIONAL SHEEP MOVEMENTS	53
4.1 INTRODUCTION.....	53
4.2 KEY FACTORS INFLUENCING TURNOFF NUMBERS AND TIMING.....	53
4.3 NATIONAL PATTERNS & DRIVERS	54
4.4 MECHANISMS OF MOVEMENT	54
4.5 CONCLUSIONS.....	62
5 REFERENCES.....	64
APPENDIX 1 – TOP 140 STUD MERINO RAM DATA	66
APPENDIX 2 – NATIONAL SHEEP SALEYARD DATA	69
APPENDIX 3 – LIVE SHEEP EXPORT DATA.....	71
APPENDIX 4 – ABATTOIR THROUGHPUT DATA.....	72
APPENDIX 5 - GLOSSARY.....	74

Disclaimer - All care has been taken in the preparation of this report. Information from various sources has been incorporated in the report. Accordingly, we do not express any opinion on the accuracy of this information, nor does this company accept any responsibility to any other party who may rely on the content of this report.

HASSALL & ASSOCIATES PTY LTD (Inc in NSW). ABN 95 001 211 007

\\server\vol1\data\document\consulting\clients\lau1-406_daff_sheep_pop\reports\sheep study final report v4.doc

List of Tables

Table 1	Arrangement of data in the National sheep database	4
Table 2	Australian sheep regions	6
Table 3	Distribution of sheep across sheep regions and production sectors	10
Table 4	Percentage of sheep properties with cattle by region & production sector	17
Table 5	Region 3 Average Farm.....	20
Table 6	Region 3 Typical Farm.....	21
Table 7	Region 6 Average Farm.....	23
Table 8	Region 6 Typical Farm.....	24
Table 9	Region 7 Average Farm.....	26
Table 10	Region 7 Typical Farm.....	27
Table 11	Region 8 Average Farm.....	29
Table 12	Region 8 Typical Farm.....	30
Table 13	Region 9 Average Farm.....	32
Table 14	Region 9 Typical Farm.....	33
Table 15	Region 10a Average Farm.....	35
Table 16	Region 10a Typical Farm.....	36
Table 17	Region 10b Average Farm.....	38
Table 18	Region 10b Typical Farm.....	39
Table 19	Region 11 Average Farm.....	41
Table 20	Region 11 Typical Farm.....	42
Table 21	Region 12a Average Farm.....	44
Table 22	Region 12a Typical Farm.....	45
Table 23	Region 12b Average Farm.....	47
Table 24	Region 12b Typical Farm.....	48
Table 25	Region 124 Average Farm.....	50
Table 26	Region 124 Typical Farm.....	51
Table 27	Timing of shows and the regions that participate.	60

Blank Page

List of Figures

Figure 1	Sheep Regions	1
Figure 2	Sheep numbers by production sector	1
Figure 3	Significant patterns of movement	2
Figure 4	Australian sheep industry trends – 1990 to 2004	5
Figure 5	Australian sheep regions	6
Figure 6	Australian sheep population, proportion by region	7
Figure 7	Distribution of the Australian sheep flock by region	7
Figure 8	Australian sheep production sectors, proportion by type	9
Figure 9	National sheep & farm numbers by production sector	11
Figure 10	Destination of cull & surplus sheep from SRM & SRW sectors across Australia.....	12
Figure 11	Map of Australia showing OJD prevalence areas.....	13
Figure 12	Sheep numbers, beef numbers and crop areas	16
Figure 13	Merino Studs location by number of rams sold.....	55
Figure 14	Distribution of non merino studs by meat breed	56
Figure 15	Distribution of sheep saleyard centers by throughput.....	57
Figure 16	Numbers of live sheep exported by port	58
Figure 17	Live Export Ports and seasonality of exports.....	58
Figure 18	Sheep abattoir location & throughput	59

Blank Page

EXECUTIVE SUMMARY

Expert opinion and available data have been gathered to identify and map movements of sheep within and between regions. The prime use of this data will be by the Office of the Chief Veterinary Officer (OCVO) within the Australian Government Department of Agriculture, Fisheries and Forestry (DAFF) to model potential disease outbreaks.

The national sheep flock is currently estimated at 104 million with two thirds of these sheep located in Regions 9, 10b and 12b as shown in Figure 1. These three regions have a largely Mediterranean climate that is favorable for the production of improved annual pastures and is suitable for cropping. Around 50% of these sheep properties also run cattle.

Five sheep “experts” from around the nation used ABARE survey data together with their own knowledge to build a picture of a “typical” sheep farm for each of the 11 sheep regions across Australia.

The national sheep flock was dissected into five discrete production sectors:

- 1) Self replacing wool (SRW)
- 2) Self replacing meat (SRM)
- 3) Wether based (W)
- 4) Crossbred, and (XB)
- 5) Trading & Other (TO)

Sheep movements in terms of size and timing are driven primarily by the type of production sector involved. For example, 78% of the national flock is involved in self replacing breeding systems where the only movements onto those properties will be stud rams and the only significant movement off the property will be cull for age (CFA) rams and ewes and surplus young sheep (hoggets or lambs).

Sheep movements are mostly restricted to within a 200km radius from where they were born and bred. For stud animals this radius of movement might be extended to 500km.

Figure 1 Sheep Regions

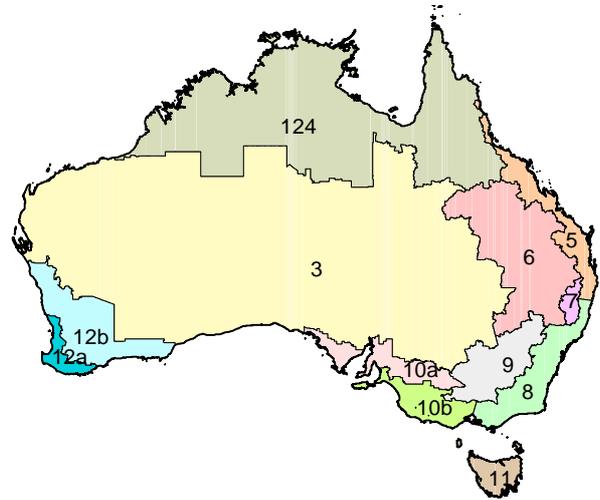
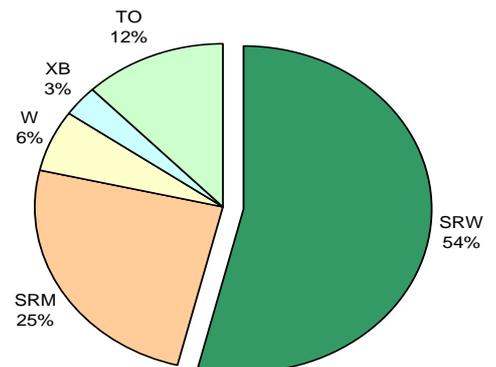


Figure 2 Sheep numbers by production sector



Droughts, recovery from droughts and large seasonal differentials will significantly increase the distances and number of sheep moved compared to a “normal” season. These factors drive the economics of the sale/purchase so that larger margins cover the increased travel costs. High value sheep, transport efficiencies and favourable commodity prices will also increase the distance sheep move.

The geographic distribution of sheep studs, saleyards and live export centers impact on the size and number of consignments. The decline in the number of sheep studs and abattoirs, the increasing popularity of sale mechanisms alternate to saleyards (including internet based auctions), seasonal conditions and favorable prices results in sheep traveling further than they have in the past.

The key factor influencing the size of sheep movements is economics and with a small profit margin for most sheep production sectors the distances sheep move will tend to be small. Other factors driving sheep movements include:

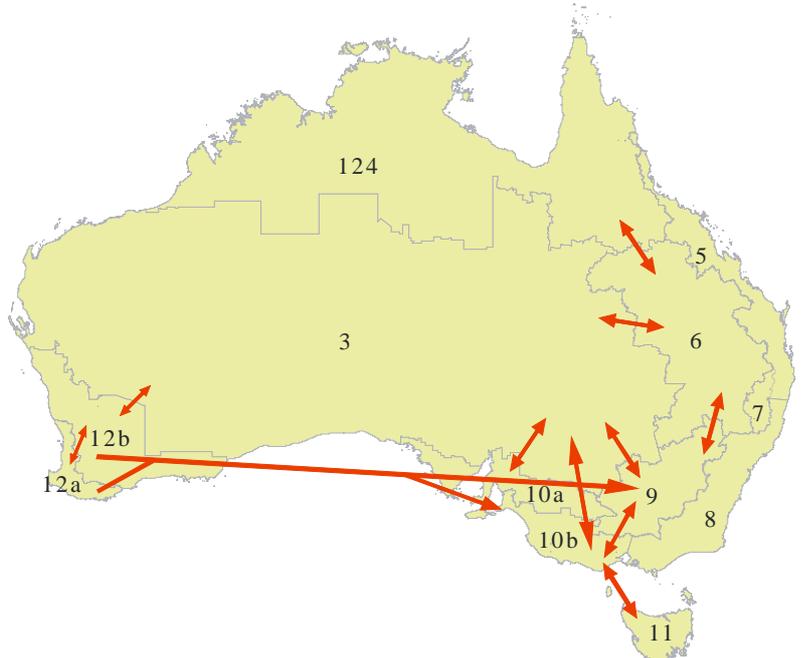
- ☆ Technology
- ☆ Flock structure/breeding systems
- ☆ Disease
- ☆ Seasons
- ☆ Commodity price cycles
- ☆ Droughts and recovery from drought

Mechanisms to facilitate the movement of sheep vary from region to region, however the dominance of the self replacing production sector means that the location and number of stud rams sold will be a major mechanism in sheep movement. Other mechanisms include:

- ☆ Saleyards
- ☆ Live Export Centres
- ☆ Abattoirs
- ☆ Shows
- ☆ Feedlots

The significant patterns of sheep movement are shown in Figure 3. The details on the size, timing and drivers of these movements are discussed in sections 3 and 4.

Figure 3 Significant patterns of movement.



1 BACKGROUND

1.1 Purpose of the Study

The focus of this study was to gather expert opinion and data where possible to identify and map geographic regions and production sectors across Australia and to document movements of sheep within and between regions. The study required sheep movements to be reported in terms of the number and size of the consignments, the season of movement, the type of source or destination (saleyard, abattoir, live export etc) and the destination/source regions from/to a “typical farm”. The prime use of this data will be its use by the OCVO within DAFF to model future disease outbreaks.

1.2 Terms of Reference

The main tasks outlined in the terms of reference were to:

1. Identify and describe all relevant sectors/production systems within the Australian sheep meat and wool industries and detail their standard operating practices.
2. Identify within each sector any practices that significantly affect between-flock interactions.
3. Detail the nature of feeding systems/pasture predominant in each production system.
4. Detail the typical size and age structure of flocks in each sector and whether other animals are typically present on the same property.
5. Detail broad movement patterns of sheep within and between each production system identified in Task 1.
6. Detail movements onto and off of ‘typical’ properties within each production system and region identified in Task 1.
7. Identify industry factors that impact on the nature, timing and direction of sheep movements within each production system
8. Identify key factors (meteorological, environmental, sociological, financial etc) that affect when production units make animal purchases and sales.
9. Identify key areas of congregation or clustering of sheep as a result of movements (e.g. Assembly of animals for live export, saleyards and agricultural shows)

1.3 Methods & Database Structure

To facilitate the study of the structure and dynamics of the sheep industry, Australia was mapped into sheep production regions based on aggregated Australian Bureau of Agricultural and Resource Economics (ABARE) survey regions (see Figure 5, p.6). Statistical data regarding the composition of sheep production systems within these regions has also been obtained from ABARE and is included in the central sheep database.

Sheep industry experts, state and territory departments of primary industries, Rural Lands Protection Board (RLPB) vets, Meat & Livestock Australia (MLA), National sheep stud associations, saleyard operators, AgForce Queensland as well as individual wool producers, have been consulted in order to identify sheep movements and the current issues faced by the various sheep producing regions.

The Microsoft® Office Excel database that was developed to tabulate the sheep movement data was a single page, flat database to facilitate pivot table and crosstab analysis. It has been provided separately to the OVCO. It is 12 columns wide and contains 1,145 individual records arranged as follows in table 1:

Table 1 Arrangement of data in the National sheep database

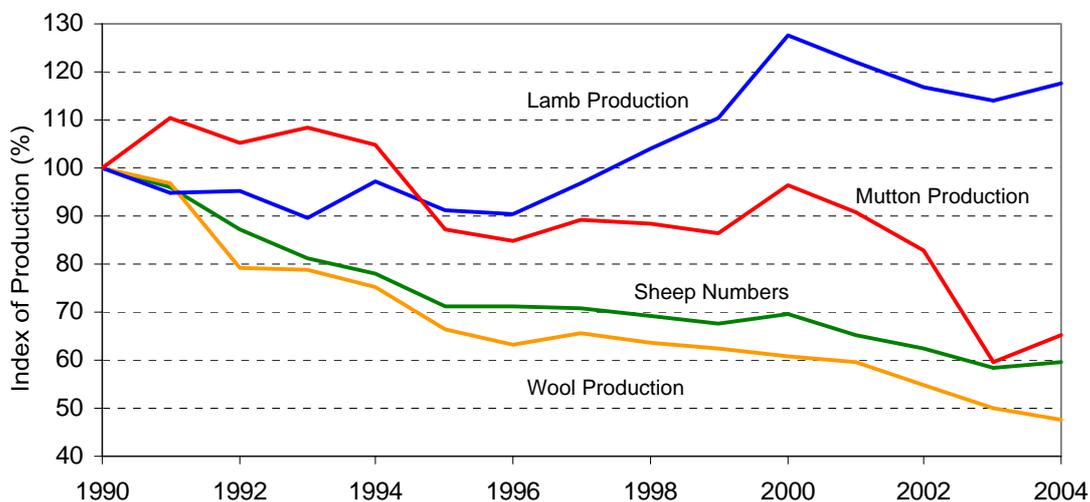
Database Area	Description of Data
Rows 1 - 80	ABARE National sheep data 2004/05 with sheep flock structure data, number of properties, numbers of sheep on and off each farm by sheep region and production sector described in section 3.
Rows 81 - 249	Sheep expert data on what an average <u>Self replacing wool farm</u> would look like in terms of structure, movement, sales and purchase of individual classes of sheep by destination/source, feeding systems, agistment issues and proportion of sheep properties that also ran cattle. This data is replicated for eleven sheep production regions identified in this study.
Rows 250 - 418	Sheep expert data as above for the <u>Self replacing meat sector</u> .
Rows 419 - 586	Sheep expert data as above for the <u>Wether based sector</u> .
Rows 587 - 761	Sheep expert data as above for the <u>Crossbred sector</u> .
Rows 762 - 936	Sheep expert data as above for a <u>Trading & Other sector</u> .
Rows 937 - 1145	Data checking and summary area. This was constructed to test the integrity and consistency of the data supplied by the sheep experts and to provide crosstab summary tables for the report.

2 SHEEP IN AUSTRALIA

2.1 Trends

Over the past 15 years, the Australian wool industry has been characterised by low wool returns, declining sheep numbers, falling wool production and rising lamb returns (Figure 4). This has been driven by a long-term decrease in raw wool demand and competition from alternative fibres. As a result, the industry has experienced significant structural adjustment, including a shift from wool and mutton production towards lamb production. Growing demand for Australian lamb exports from the US, Europe and Asia has seen the proportion of lamb production exported more than double since the early 1990's. This has contributed to increased specialisation, efficiency and profitability within the sheep industry.

Figure 4 Australian sheep industry trends – 1990 to 2004



Note: Wool production and sheep number indices are based on financial year data, with base year 1989/90 and Lamb and Mutton Production Indices are based on calendar year data with base year 1990 = 100%.

Source: ABARE 2005a.

2.2 Sheep Regions

Eleven sheep production regions, based on the ABARE survey regions were identified across Australia. In order to keep some commonality the regions were defined and named in the same way as in a similar study of the beef industry (Ausvet 2006).

In some regions there were good sheep husbandry reasons to split the existing regions, (i.e. 10a, 10b, 12a & 12b). In the case of northern Australia, Regions 1, 2 and 4 were aggregated as there are very few sheep in this region (0.5%). Region 5 was not included in this study as ABARE reports no commercial sheep numbers in this region. Regions, sheep numbers and their distribution are presented in Table 2, Figure 5 and Figure 7.

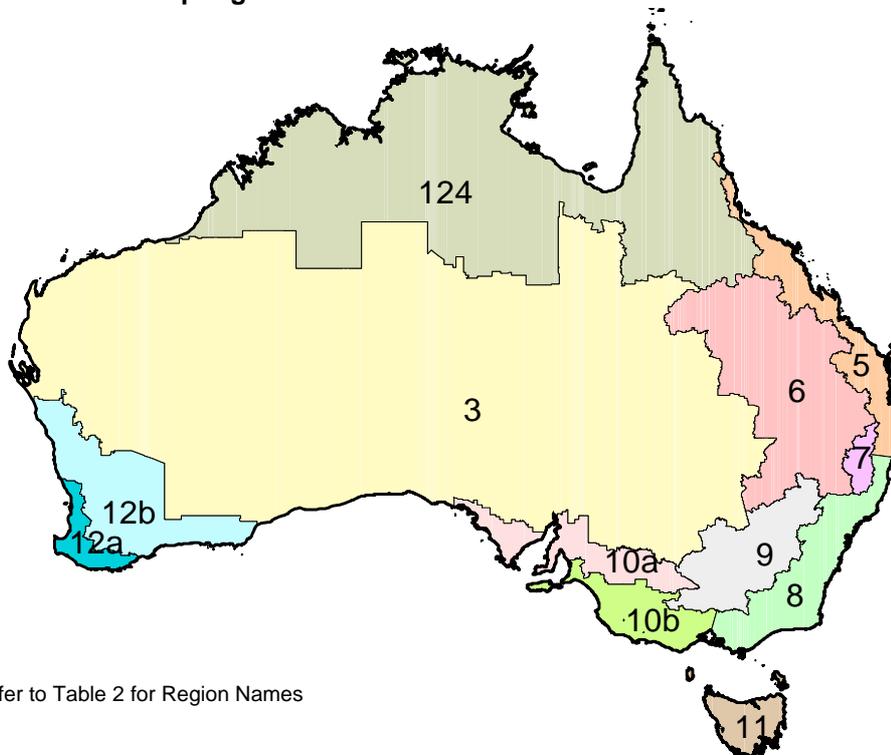
Based on data collected by ABARE in 2004/05, the Australian sheep population is estimated at 104.29 million. The largest three regions by population are the Southern High Rainfall (10b),

Eastern Wheat Sheep (9) and the Western Wheat Sheep (12b) – all located in the southern half of Australia. These three regions combined account for almost two thirds of the national flock.

Table 2 Australian sheep regions

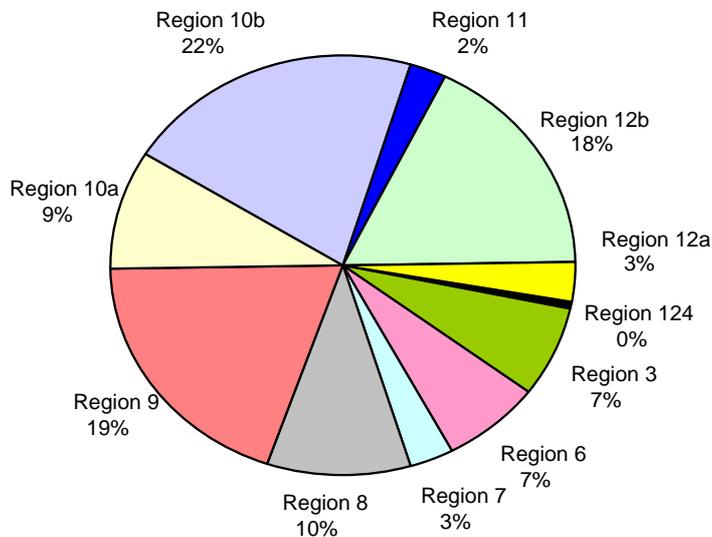
	Sheep Region	Sheep Numbers (2004/05 - Million)	ABARE survey regions
124	Northern tropics	0.44	311, 712, 511, 313, 714
3	Central pastoral	7.40	711, 599, 111, 512, 411, 312
5	Northern high rainfall	0.00	332, 331, 18% 132
6	Northern wheat/sheep	7.11	121, 314, 321, 322
7	Armidale high rainfall	3.40	29% of 131
8	Eastern high rainfall	10.36	71% of 131, 82% of 132, 57% of 231
9	Eastern wheat/sheep	20.31	122, 123, 223
10a	Southern wheat/sheep	9.62	221, 421, 422
10b	Southern high rainfall	21.69	222, 43% of 231, 431
11	Tasmania	2.40	631
12a	Western high rainfall	3.22	531
12b	Western wheat/sheep	18.30	521, 522

Figure 5 Australian sheep regions



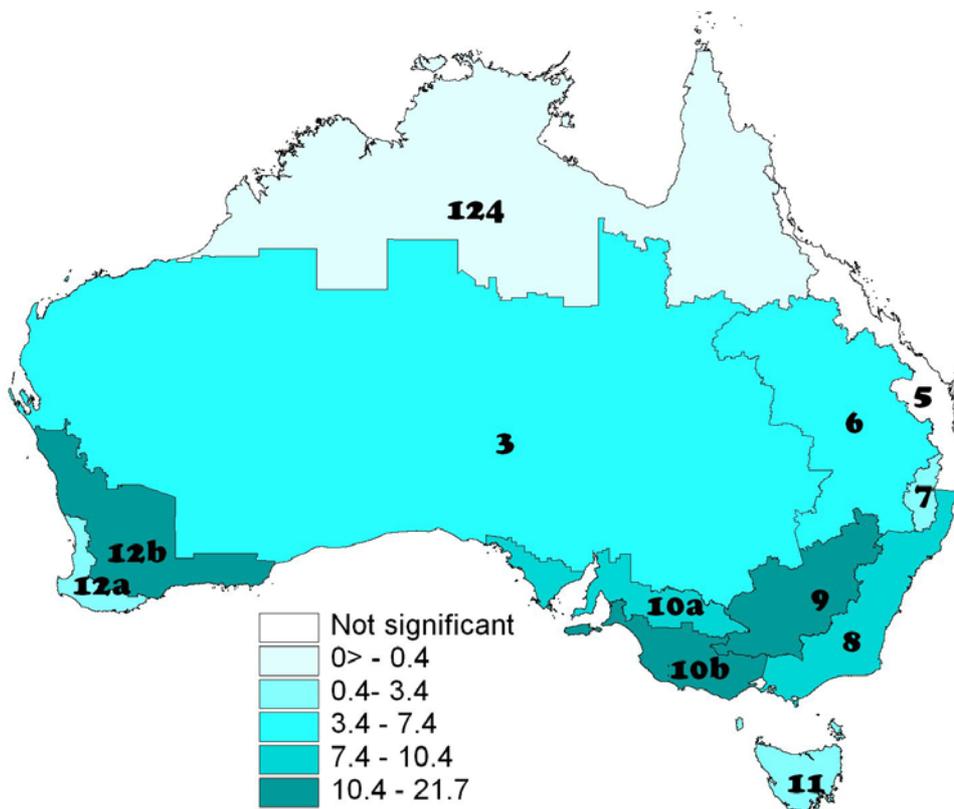
Refer to Table 2 for Region Names

Figure 6 Australian sheep population, proportion by region



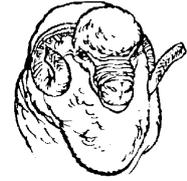
Source: ABARE 2005b.

Figure 7 Distribution of the Australian sheep flock by region



2.3 Production Sectors

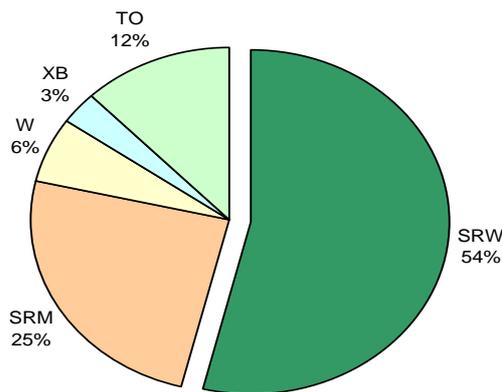
The Australian sheep industry is characterised by a diverse range of production sectors. The following definitions were used by ABARE to stratify the national sheep flock into five production sectors.



- A. Self replacing wool (SRW) – exists where sheep purchases represent less than 10% of the average number of sheep in a flock. This sector breeds its own ewe replacements with sheep sales comprising surplus young wethers and culls for age (CFA) sheep. Replacement rams are the only sheep purchase. In more recent times sheep producers in this sector are increasingly marketing surplus sheep into the more profitable lamb market.
- B. Self replacing meat (SRM) – exists where sheep and lamb receipts are greater than 50% of total receipts. Very similar in structure to the self replacing wool sector with a reduced focus on wool quality and an emphasis on carcass attributes. This sector includes the traditional meat sheep breeds such as the White Suffolk, Dorset and traditional wool flocks finishing surplus sheep as lambs rather than hoggets. In some cases terminal meat sires might be used over the oldest ewe age group. It also includes the more recent imports of breeds like the Dorper and Damara that don't produce any harvestable wool.
- C. Wethers (W) – exists where wethers represent more than 50% of opening and closing sheep numbers. Replacement wethers are purchased with CFA wethers sold.
- D. Cross Bred (XB) – exists where cross bred ewes represent more than 30% of ewes mated. In this sector the replacement ewes are purchased with all young sheep sold as lambs. The most common crossbred ewe is the first cross ewe which is usually the offspring of a Border Leicester ram and a merino ewe. These are usually mated to a meat ram like the Dorset.
- E. Traders and other (TO) – the sheep not belonging to any of the above sectors, includes sheep feedlots.

In reality few, if any, of the sheep production regions will solely exhibit characteristics of these “Typical” sectors. This is because an individual sheep producer may run two or even three different flocks of sheep from the different sectors listed above. As an aid to understanding the structure and dynamics of the national sheep flock these definitions were used to represent the “typical” properties found in each region.

By far the largest sheep production sector in Australia is the self replacing wool enterprise. Just over half of the national flock is in this sector (54%). A further quarter of the flock resides in the self replacing meat sector.

Figure 8 Australian sheep production sectors, proportion by type

Source: ABARE 2005b.

The remaining quarter is regarded as part of the cross bred, wether-based or trading (and other) sectors at 6%, 3% and 12% of the national sheep flock sheep respectively.

The implications of the dominance of the self replacing sectors (79% of the national flock) highlights three issues in relation to future sheep movements.

First, there has been a large shift to finer micron wool produced on larger framed sheep that are better suited to mutton or live sheep exports. While overall merino wool production has fallen, the production of 19 micron and finer wool has risen in volume terms over the last 15 years and it has moved from 5 to 30% of the clip. This may mean less sheep movements between properties as specialist woolgrowers, although they buy rams, tend to avoid introducing other sheep into the flocks which they have carefully bred for this specialty purpose.

Second, there has been a reduction in the number of wethers kept beyond two years old (yo) which were only economical to run when wool prices were high. Reduced wether numbers allow sheep producers to run more ewes and given reasonable lamb and mutton prices this could mean larger movements to abattoirs or live shipment points in the future.

Third, there now appears to be a lot more joining of older merino ewes, run by specialist woolgrowers, to 'terminal sires' including Dorsets, Borders etc, with implications for higher lamb movements to saleyards and generally from lower to higher rainfall areas.

2.4 Distribution of production sectors by region

The distribution of these production sectors is determined to some extent by environmental factors that influence the quality of the pastures. For example, sheep production systems that derive the majority of their income from the production of lamb (SRM & XB) require a productive, high protein pasture to enable the lambs to reach market weights over a short time frame. Being high rainfall regions, these wheat/sheep areas more commonly have the right environmental conditions or the availability of irrigation to produce these pastures and are therefore suitable for the lamb producing sectors.

Eighty-four per cent of the national flock is located in areas that receive more than 350mm of rainfall per annum (pa). Conversely, the pastoral region of Australia (Region 3) has a very harsh climate with very low (<350mm) and unreliable rainfall. These environments are not always suitable for the production of the high quality pastures required to turn off quality prime lambs. Meat & Livestock Australia (MLA) are encouraging producers in these areas to concentrate on breeding lambs and turning them off at 12-14 weeks for another farm to finish them or to send to a feedlot. This breeding/finishing system may see greater numbers of lambs move from region 3 to the wheat/sheep Regions of 9 and 10b for finishing on improved or irrigated pastures. Whilst some of these movements may involve saleyards, others may be more difficult to monitor as they may involve shifting sheep to another farm owned by the same producer/group or direct farm to farm sales.

However, location of a particular production sector usually has more to do with sheep producers varying the enterprise mix to take advantage of market opportunities or to reduce their exposure to a particular commodity (i.e. lamb, wool, hogget etc). This is certainly the case in WA where the right environmental conditions exist to produce high quality pastures but there are no XB flocks documented by ABARE in either region 12a or 12b. This is because sheep producers have decided to run SRM flocks which provide the opportunity to market both wool and lamb to suit market demand.

The distribution of sheep across regions and production sectors is shown in Table 3.

Table 3 Distribution of sheep across sheep regions and production sectors

No	Sheep Region Name	Production Sector & Numbers of sheep ('000)					
		Total	SRW	SRM	W	XB	TO
124	Northern tropics	436	436	0	0	0	0
3	Central pastoral	7,406	4,804	1,589	0	208	804
5	Northern high rainfall	0	0	0	0	0	0
6	Northern wheat/sheep	7,115	4,877	503	0	1,440	296
7	Armidale high rainfall	3,404	2,531	0	0	0	872
8	Eastern high rainfall	10,357	5,519	2,173	973	763	929
9	Eastern wheat/sheep	20,309	9,640	5,252	996	718	3,704
10a	Southern wheat/sheep	9,623	4,344	3,515	0	166	1,598
10b	Southern high rainfall	21,694	9,491	5,832	4,097	0	2,273
11	Tasmania	2,402	1,929	313	51	0	110
12a	Western high rainfall	3,224	1,861	1,103	0	0	259
12b	Western wheat/sheep	18,320	10,861	5,538	0	0	1,922
	Totals	104,290	56,293	25,818	6,118	3,295	12,766

SRW = self replacing wool, SRM = self replacing meat, W = wethers, XB = crossbred, TO = trading & other.

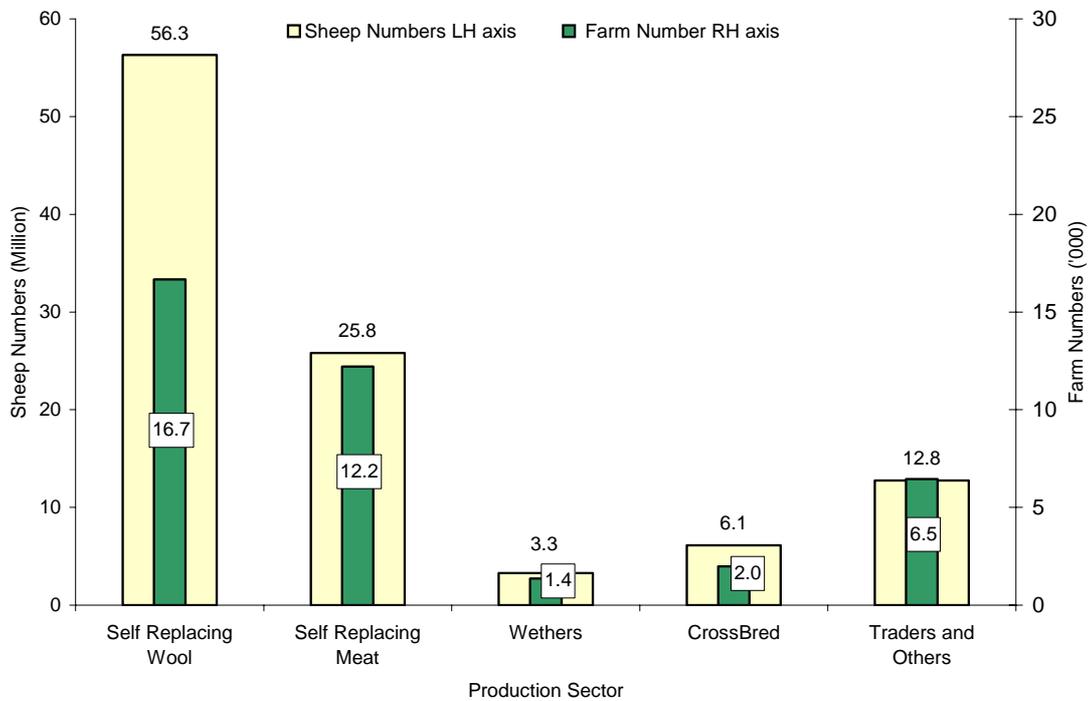


2.5 Sheep & Farm numbers by production sector

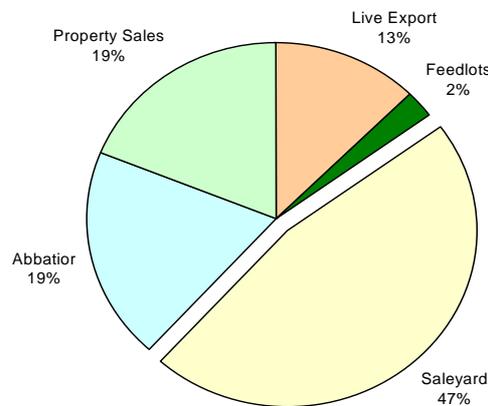
Declining wool prices, declining sheep infrastructure on properties, a lack of labour and low profitability compared to alternative enterprises have seen the number of properties across Australia that derive a significant proportion of their income from sheep fall from some 80,000 properties in 1980 to 37,000 in 2004 (ABARE 2004). Aggregation of smaller sheep properties into larger holdings has been part of this process. Over the same period national sheep numbers have fallen from a peak of 173 million (1980) to 95 million (2004). High lamb prices have seen some flock rebuilding in more recent times with the national flock estimated at 104 million in 2005. ABARE (2006) are not expecting sheep numbers to rebuild significantly in the near future with forecasts of the national sheep flock reaching 108 million by 2010.

In terms of sheep movement, this means that there are less sheep to move around the country compared to 20 years ago.

Figure 9 National sheep & farm numbers by production sector



The destination of surplus and CFA sheep from self replacing sheep systems will vary by region and the marketing focus (ie wool or meat), however, averages across the SRW and SRM production sectors for all regions of Australia is shown in Figure 10.

Figure 10 Destination of cull & surplus sheep from SRM & SRW sectors across Australia

The majority of sheep sold to saleyards will be on-sold to an abattoir or meat processor. Of the 8.5 million sheep sold through NSW saleyards, 7.5 million (88%) are sales to abattoirs. This dissection of saleyard throughput is not available for other states. However National Livestock Reporting Service data indicates that 2 of the largest saleyards in WA are selling 50% of sale sheep direct to abattoirs with the remaining 50% represented by store sales.

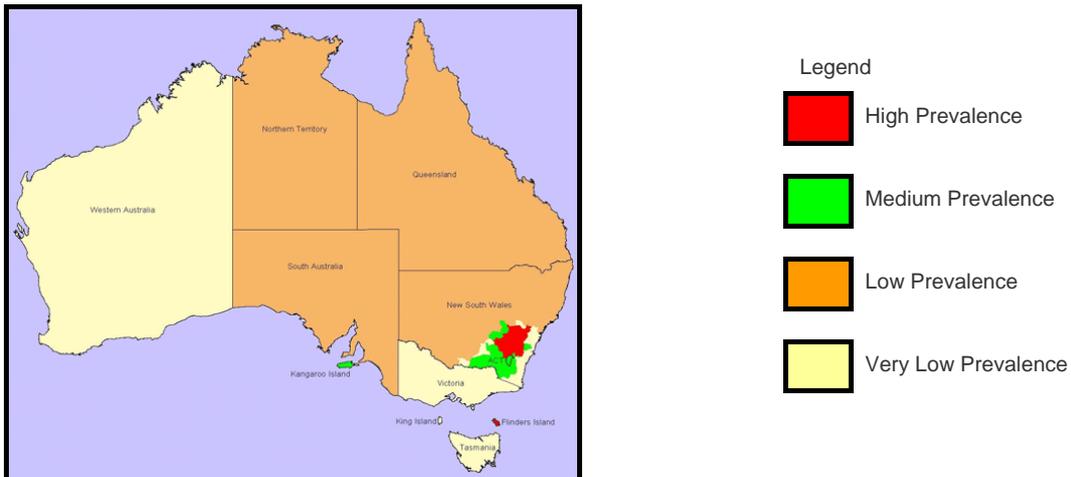
2.6 Impact of Ovine Johne's Disease

Ovine Johne's Disease (OJD) is caused by the bacterium *Mycobacterium paratuberculosis*, which is predominantly found in the small intestine. The disease is characterised by a thickening of the intestinal wall, resulting in animals being unable to absorb nutrients effectively. There is no cure for this wasting disease, with infected animals dying within 3 to 6 months of infection.

Prior to the onset of OJD in Australia, there were no restrictions on sheep movements within, or between, regions. However, following the initial discovery of OJD in Australia in 1980, sheep movements between regions have been affected, with restrictions in New South Wales in place until June 2004. Restrictions have now been replaced by a national system of risk-based trading, the Assurance Based Credit scheme, whereby purchasers notify the government if they are planning to introduce sheep to the state. If this introduction is deemed to be risky, the government may investigate the matter further and may undertake risk mitigation activities, such as vaccination of the introduced flock, adjacent flocks and lambs from those flocks.

Current restrictions are largely self regulated with the onus on the purchaser to inform the appropriate RLPB board if high risk sheep are moved into the area. The high prevalence of the disease in region 8 means that sheep producers from region 6 and 9 are reluctant to agist sheep into this region or to buy restocker sheep or rams from this region. The same probably applies to the other regions, however transport costs would be more of a limiting factor than the risk of acquiring OJD.

Figure 11 Map of Australia showing OJD prevalence areas.



Source: NSW Department of Primary Industries website.

Dubbo RLPB Vet, Clive Roberts has a rule of thumb in relation to OJD and Footrot, “If you draw a line east/west and north/south through Dubbo, then the risk of acquiring OJD or footrot is an issue if you agist into or purchase stud or restocker sheep from the south east sector”. Sheep studs in OJD areas are probably most affected in terms of sheep movement, as it very important for them to sell their rams to remain viable. A vaccination program currently underway is reducing some of the impact OJD has had on sheep moving into and out of districts with a high OJD prevalence in region 8.

Blank Page



3 REGIONAL SHEEP MOVEMENTS

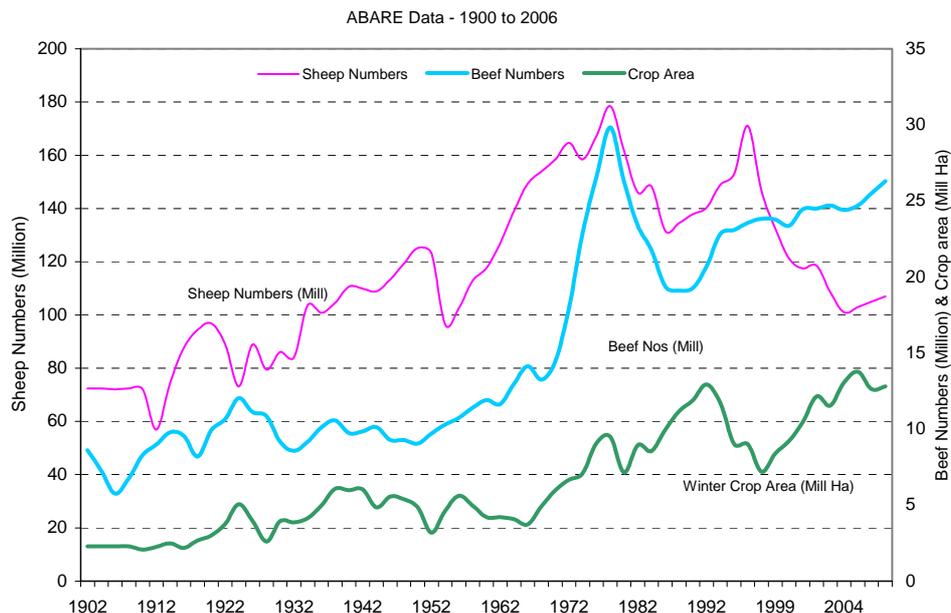
3.1 Drivers of Movement

There are drivers of sheep movement that are common to all sheep regions particularly when considering movements between regions.

- 1) **Economics** – low margin per animal – New South Wales (NSW) Department of Primary Industries (DPI) (2006) are currently showing a gross margin return (i.e. cash receipts less cash costs) of around \$20 per dry sheep equivalent (DSE) for SRW production sectors. This means sheep producers often cannot afford to transport sheep very far for sale, to put sheep on agistment during droughts or to drought feed them for extended periods. Economics tends to limit the number of consignments and distances sheep move. High value sheep such as stud animals and prime lambs will move greater distances than the average sheep.
- 2) **Technology** – B-double transport vehicles are more efficient because they can legally carry 50% more sheep per single prime mover compared to a standard semi trailer. These vehicles have reduced stock transport costs by some 15% and so may assist in increasing sheep movements.
- 3) **Flock structure/breeding systems** – self replacing systems by their very nature have fewer movements compared to a crossbred or trading system. Aside from ram movements, self replacing systems breed their own ewe replacements and only sell cull or surplus young stock. Crossbred systems need to buy in replacement ewes as they sell all of the ewe and wether portions as lambs. Trading systems by definition buy and sell a variety of sheep classes throughout the year.
- 4) **Disease** – the risk of acquiring OJD (see section 2.6) or Footrot from sheep agisted into Region 8, or from stud/store sheep purchased from Region 8 still dampens sheep movements into adjoining Regions (R9 & R6). Disease is more likely to be a limiting factor on a local/regional scale as opposed to a national scale.
- 5) **Seasons – agistment** – in droughts some sheep are agisted (i.e. moved to another farm that has available pasture). However low profitability and risk of contracting a disease significantly limit the proportion of properties that agist sheep, especially when compared to the cattle industry. Across all regions 75% of sheep properties in the self replacing production sectors would never agist sheep and in the lower rainfall areas this proportion increases towards 100%. Seasons, and more importantly a big differential in seasonal conditions, is likely to increase the number of consignments and the distance sheep move.

- 6) **Commodity price cycles** – National data for sheep numbers, beef numbers and crop areas from ABARE over the period 1900 to 2006 is shown in Figure 12. In response to cycles in commodity price, and hence the profitability of comparative enterprises, producers have swapped into or out of sheep, beef and cropping; at times doubling or halving national statistics. In the years leading up to 1990 the reserve price scheme held wool prices artificially high and mixed enterprise properties reduced crop areas and increased sheep numbers by almost 40% on a national scale. Following the collapse of the reserve price scheme, producers quickly reduced sheep numbers and expanded their cropping areas.

Figure 12 Sheep numbers, beef numbers and crop areas



Producers in the mixed livestock cropping regions (i.e. 9, 10a and 12b) are in the best position to respond to changes in commodity price cycles as they have the resources and infrastructure and are in a position to swap from one enterprise to the other more easily than the high rainfall regions where cropping is not really an option.

It is therefore in the wheat sheep regions where more significant changes in the total sheep population will occur with cycles in commodity prices.

- 7) **Droughts and recovery from drought** – droughts markedly increase sheep movements mainly in terms of sheep moving off farm for sale to abattoirs. Recovery from drought will also increase sheep movements as properties restock sheep that either died or were sold off during the drought. This demand for re-stockers may spike the price sufficiently where store sheep from Western Australia are sold into the eastern states. In 2005/06 this may have doubled the number of store sheep moving from WA to Region 9, from 25,000 to 50,000. (John Knight, manager Wagga Wagga saleyards pers comm).

3.2 Sheep – Beef Relationships

Cattle require much taller pastures to graze efficiently than do sheep. Whilst it is true they are complimentary in their grazing habits in mixed farming systems, if feed becomes short, producers will tend to either sell or agist cattle before sheep. This is largely driven by economics due to the high cost involved with drought feeding cattle. People are probably more willing to accept cattle in preference to sheep on agistment as the numbers involved are much smaller, they tend not to be as hard on the pastures and fences don't have to be of as high a standard.

The proportion of sheep properties that also have beef cattle has been summarized from ABARE data and presented in Table 4. The following trends are evident:

- ☆ In the high rainfall areas the proportion of properties with cattle increases.
- ☆ Wool producing sectors (SRW & W) have higher proportions of properties with cattle compared to the meat producing sectors (SRM, XB).
- ☆ In Western Australia, the proportion of sheep properties with cattle is almost half that of the eastern states' wheat/sheep and high rainfall regions.

Table 4 Percentage of sheep properties with cattle by region & production sector

No.	Region Description	Production Sector - % properties with cattle				
		SRW	SRM	W	XB	TO
124	Northern tropics	100		100		
3	Central pastoral	35	25	100		60
6	Northern wheat/sheep	90	91	100		68
7	Armidale high rainfall	96				100
8	Eastern high rainfall	79	70	21	49	77
9	Eastern wheat/sheep	60	45	25	25	22
10a	Southern wheat/sheep	20	20	30		20
10b	Southern high rainfall	60	50		70	50
11	Tasmania	70	57		74	94
12a	Western high rainfall	40	20			24
12b	Western wheat/sheep	20	30		73	57

Source: ABARE Data 2004/05.

3.3 Regional Profile & Typical Properties

Five sheep 'experts' were asked to apply their industry expertise to the analysis of sheep industry data (ABARE and others) to define typical sheep movements for each sheep production sector and region in Australia. Each of these experts had over 30 years experience in the sheep industry and all currently own/manage a sheep flock or have family involvements in sheep. Some also have sheep stud and sheep processing backgrounds. The experts were;

1.	Bob Hall	JRL Hall & Co	Western Australia
2.	Graham Peart	GRASS Merino Stud	New South Wales
3.	Jack Langberg	PIRSA	South Australia
4.	Bob Richardson	Ex AWC	Victoria
5.	Ian McConnell	QDPI & F	Queensland

It should be noted that the definitions used to dissect the ABARE data were quite broad and there are in reality many variations on the five production sectors used in this study. The final data tables were therefore somewhat "muddied" in trying to dissect the national flock into five discrete categories. It is for this very reason that expert industry knowledge was used to analyse these tables to derive "average" and "typical" sheep movements.

"Average farm movements" - The ABARE data was used as a basis for the experts to define the flock structure of an average farm and the numbers of ewes joined. In some cases this base data was modified in light of local knowledge in order to more closely reflect longer term movements. Numbers of sheep sold and purchased were broken down into various sheep classes, assigned to a season and allocated on a percentage basis to live export, feedlot, saleyard, abattoir or on property destinations to/from particular regions. The percentages used aimed to profile the proportion of sheep sold to different destinations across the region. In this way the regional profile of sheep movements can be estimated by multiplying "average farm" data by the number of properties.

Due to the regional focus in this table it was not possible to calculate the number of actual consignments to a particular destination. For example, some SRW properties send sheep to abattoirs, some to export, some to feedlots etc. and they have usually developed a marketing strategy to maximize returns from a particular destination. Droughts, commodity price cycles and disease will all impact on destinations and sources available to individual sheep breeders. The majority of individual properties would not send sheep to all of the potential turnoff destinations (i.e. live export, abattoir, saleyard etc).

"Typical farm movements" - These tables represent a summary of expert opinion that shows the number of animals, number of consignments, season of movement and destination/source region for movements on/off "typical" properties within each production sector. Whilst it is recognised that such tightly defined properties may not exist in reality, this table represents the most likely behaviour of a farm located within each region. The range in flock sizes within a production sector and a region was calculated from the ABARE data set with average, maximum and minimum flock sizes at the 90% confidence interval.



Region 3 - Central Pastoral

Geography

The Central Pastoral region is the largest sheep producing region by geographic area (439M ha), covering the majority of Western Australia, South Australia, the far west of New South Wales, south-western Queensland and the southern half of the Northern Territory. The region is largely dominated by arid zone soils with deep sand dunes. These soils tend to be red in colour due to their poor leaching ability. There are three deserts in the region, and thus significant areas have limited grazing opportunities.



Climate

Rainfall in the Central Pastoral area is generally below 350mm pa and highly variable. As plant growth is largely determined by available moisture, biomass production can vary by a factor of 10 from year to year. Plant establishment occurs intermittently, perhaps once every five years or more. Drought is a natural part of this cycle.

Pastures

Most livestock production in the Central Pastoral Region will continue to come from native grasses and shrubs such as saltbush, although some pasture introduction is possible in favoured areas. Pasture composition is largely determined by climate but is also altered by grazing pressure and fire. Pasture grasses are either perennial or ephemeral. Perennial grasses produce seed many times and are important in providing stable pastoral production, a quick response to small rainfall events and maintaining ground cover. Ephemeral species grow quickly after rain, set seed and die in a very short time, producing transient forage that is not always palatable. Over-grazing can result in the elimination of palatable perennials such as saltbush and a reduction in the seed reserves of favoured ephemeral species.

Dominant Production Sector

In the region 65 per cent of the flock are utilised in self replacing wool production enterprises. A further 20 per cent of sheep are part of the wether based enterprises. The Merino is the dominant breed, with surplus stock sold for meat. Merinos are regularly joined with meat breeds including Border Leicester, Dorset and Suffolk. Exotic meat breeds, such as Dorper, Damara, Dohne or SAMM, are becoming more common and may be used solely or crossed with Merino.

Farm Size

There is a large variation in the size of pastoral leases with a range between 3,000 and 500,000 hectares.

Stocking Capacity

The average stocking rate is 0.6 - 2 Dry Sheep Equivalent (DSE)/ha.

Current Issues:

- ☆ Drought, low lamb survival rates, difficulty in securing shearers and the high cost of maintaining assets such as shearing sheds within current OH&S specifications means sheep producers are looking to hardy meat sheep breeds suited to this environment.
- ☆ In some seasons sheep may be moved or sold to higher rainfall/irrigated farms for finishing.
- ☆ Dorpers and Damaras are increasing in numbers as they are hardy, don't require shearing or crutching and are highly fertile, protective mothers.

Table 5 Region 3 Average Farm

TABLE A – AVERAGE FARM	Production Sector – Region 3				
	SRW	SRM	W	XB	TO
Number of properties	824	402	68		281
Movements Off per “average” farm					
Live Export	10.9%	5.8%	36.1%		
to region	50/50 10b/12a	50/50 10b/12a	50/50 10b/12a		
Feedlots	4.4%	5.2%			
to region	50/50 10b/12b	50/50 10b/12b			
Saleyard	71.9%	49.1%	30.9%		100%
to region	33/33/33 12b/10b/9	33/33/33 12b/10b/9	33/33/33 12b/10b/9		33/33/33 12b/10b/9
Abattoir	12.8%	25.1%	23.5%		
to region*	33/33/33 12b/10b/9	33/33/33 12b/10b/9	33/33/33 12b/10b/9		
Property Sales		14.7%	9.5%		
to region		33/33/33 12b/10b/9	33/33/33 12b/10b/9		
Total Movements off	4025	1853	1143	0	2157
Numbers On per “average” farm					
Purchases	38	15	880		10
from region	33/33/33 12b/10b/9	33/33/33 12b/10b/9	33/33/33 12b/10b/9		33/33/33 12b/10b/9
Management movements					
Feed Pasture only (Prop of properties %)	100	100	100		100
Lamb muster frequency	3	2	1		2
Ewe Muster frequency	2	2	2		2
Ram Muster Frequency	2	2	2		2
Never seek agistment (Prop of properties %)	100	80	100		80
Season agistment sought		Autumn			Autumn
Region agistment sought		33/33/33 12b/10b/9			33/33/33 12b/10b/9

Note 1: xx/xx = percentage split, yy/yy = regional split. Note 2: Region 6: Northern wheat/sheep, Region 8: Eastern high rainfall, Region 9: Eastern wheat/sheep, Region 10a: Southern wheat/sheep and Region 10b: Southern high rainfall.

Region Specific Drivers

- ☆ OJD has had little impact on sheep movements due to the vast majority of the region being classified as having a low to very low prevalence of the disease. Most sales from this region are to other regions. This is due to the absence of live export ports, abattoirs and saleyards in the region.
- ☆ Due to the relatively harsh/poor nature of pastures, store lambs may be moved or sold to another property in region 9,10b or to a feedlot for finishing, particularly in a dry season.



Typical Farm management cycle

- ☆ A summer joining with a winter lambing.
- ☆ Weaning in spring with culling of rams, ewes and hoggets.
- ☆ Ram purchases about the same time as weaning.
- ☆ Lambs/weaner sales vary with climate & season but are usually in spring or autumn.
- ☆ Most of the larger annual ram sales occur in the spring.
- ☆ Shearing tends to be clustered around autumn and spring but can occur at any time.

Table 6 Region 3 Typical Farm

TABLE B - TYPICAL FARM	Production Sector – Region 3				
	SRW	SRM	W	XB	TO
Numbers (Consignments) Off					
Live Export	422 (1)	78 (1)	275 (1)		
To Region	50/50 10b/12a	50/50 10b/12a	50/50 10b/12a		
Season	Spr/Sum	Summer	Spring		
Feedlots					
To Region					
Season					
Saleyard	3603 (3)	699 (2)	593 (3)		1550 (3)
To Region	33/33/33 12b/10b/9	33/33/33 12b/10b/9	33/33/33 12b/10b/9		33/33/33 12b/10b/9
Season	Summer	Sum/Aut	Spr/Sum/Aut		Spr/Sum
Abattoir		1076 (2)	275 (2)		607 (2)
To Region		33/33/33 12b/10b/9	33/33/33 12b/10b/9		33/33/33 12b/10b/9
Season		Spring	Autumn		Spring
Property Sales					
To Region					
Season					
Total Movements off	4025 (4)	1853 (5)	1143 (6)		2157 (5)
Numbers (Consignments) On					
Purchases	38 (1)	15 (1)	880 (2)		510 (2)
from Region	33/33/33 12b/10b/9	33/33/33 12b/10b/9	33/33/33 12b/10b/9		33/33/33 12b/10b/9
Season	Summer	Spring	Spring		Summer
Total Sheep/Farm - 30 June #					
Average	6035	4939	2876		3364
Max (90% confidence interval)	6745	5249	5476		4132
Min (90% confidence interval)	5324	4629	276		2597

Note 1: (Z) = No of consignments – numbers per consignment may vary, Note 2 - xx/xx = percentage split, yy/yy = regional split
 Note 3: Region 9: Eastern wheat/sheep, Region 10a: Southern wheat/sheep and Region 10b: Southern high rainfall.

ABARE Data 2004/2005.

Region Specific Drivers

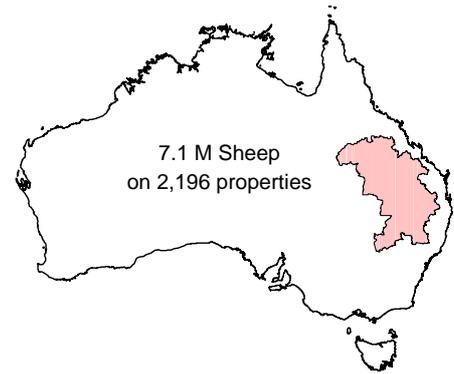
- ☆ Due to the large size of this region and the cost of transport in relation to the small margin on sheep, movements out of this region tend to be to the closest region.



Region 6 - Northern Wheat/Sheep

Geography

The Northern Wheat/Sheep Region extends from the central region of NSW up through central Queensland to the area south of Cape York Peninsula. Flat to undulating topography.



Climate

On the western side of the Great Divide, the rainfall drops quickly to an annual median of about 700 mm and then gradually decreases further. At the same time, average maximum temperatures gradually increase with increasing distance from the coast. Further to the west the land slowly flattens out to the dry inland plains, marked by cold nights and warm days. It is in the west where the hottest temperatures in the state most commonly occur during summer and where the annual median rainfall drops below 200 mm.

Pastures

In southern Queensland, the presence of dense stands of mulga may be utilised as a feed source in periods of drought. Mitchell grass is an important pasture species in some parts of the region. Improved pastures are a valuable source of livestock fodder. Well managed lucerne and mixed grass/legume pastures will provide similar or greater annual dry matter (DM) production than forage crops. The pastures within the northern wheat/sheep region are generally high quality and seasonally reliable.

Dominant Production Sector

The region has an estimated 69 per cent of the flock utilised in self replacing wool production systems and 20 per cent for wether based production systems. The eastern parts of the Northern Wheat/Sheep Region in Queensland and New South Wales are the region's prime lamb production area, typified by Australasian, British and British-Merino crosses. The dominant breeds for Merino crosses include Border Leicester, Suffolk, Southdown and Dorset.

Stocking Capacity

Carrying capacity in the region varies, ranging from 2.5 sheep per hectare in the south-eastern areas down to 0.2 sheep per hectare in the relatively harsh western districts. Stocking rates of 7 - 12 DSE/ha and above are possible on well managed pastures. In the more temperate areas to the south, annual lamb marking percentages can be over 100 per cent. However, this rate can fall to as low as 18 per cent in the western districts of the region.

Farm Size

Sheep and wool producing properties vary in size from 400 to 100,000 hectares.

Current Issues

- ☆ The western part of this region is devoted primarily to wool production. Exotic breeds are a relatively small proportion of the region's flock but are of increasing importance, particularly in the Cunnamulla and Mitchell areas.
- ☆ Merino lamb losses to wild dogs can be quite high in this region (around 20-50%). Dorpers & Damaras are highly protective mothers and losses to wild dogs are much lower in these flocks.
- ☆ Many sheep properties in the northern part of the region are switching to cattle.

Table 7 Region 6 Average Farm

TABLE A – AVERAGE FARM	Production Sector – Region 6				
	SRW	SRM	W	XB	TO
Numbers of properties	1204	428	453		111
Movements Off per “average” farm					
Live Export					
to region					
Feedlots	1.2%				
to region	6				
Saleyards	71.5%	71.5%	62.9%		88.5%
to region	6	6	6		6
Abattoirs	11.5%		30.2%		11.5%
to region*	6	6	6		6
Property Sales	15.8%	28.5%	6.9%		
to region	6	6	6		
Total Movements off	1831	519	816		1048
Numbers On per “average” farm					
Purchases	13	4	850		6
from region	50/40/10 6/9/7	6	6		6
Management movements					
Feed Pasture only (Prop of properties %)	95	95	100		90
Lamb muster frequency	3	4	2		2
Ewe Muster frequency	4	5	2		2
Ram Muster Frequency	2	2	2		2
Never seek agistment (Prop of properties %)	85	85	100		100
Season agistment sought	Spring	Spring			
Region agistment sought	9	9			

Note 1: xx/xx = percentage split, yy/yy = regional split. Note 2: Region 6: Northern wheat/sheep, Region 7: Armidale high rainfall and Region 9: Eastern wheat/sheep.

Region specific drivers

- ☆ Auctions Plus (formerly CALM) is selling around 600,000 sheep out of north Queensland (mainly Region 6) and around 75% are store sales off farm. Gary Dick (Auctions Plus General Manager) suggests this may be facilitating sheep movement into Regions 8, 9 and 10b.
- ☆ There is still buyer resistance to sheep from Region 8 and 9 due to the high incidence of OJD in the southern areas. Purchasers are supposed to notify the relevant RLPB that they have purchased sheep from these areas; however there is some confusion as to what extent this regulation is policed.

Typical Farm Management Cycle

- ☆ A late autumn joining with a late spring early summer lambing.
- ☆ Weaning in mid summer at 18 weeks with culling of rams, ewes and hoggets.
- ☆ Lambs/weaner sales usually occur in the autumn.
- ☆ Ram purchases about the same time as lamb sales in the autumn.
- ☆ Most of the larger annual ram sales occur in the spring or autumn.
- ☆ Shearing tends to be during winter pre-lambing.

Table 8 Region 6 Typical Farm

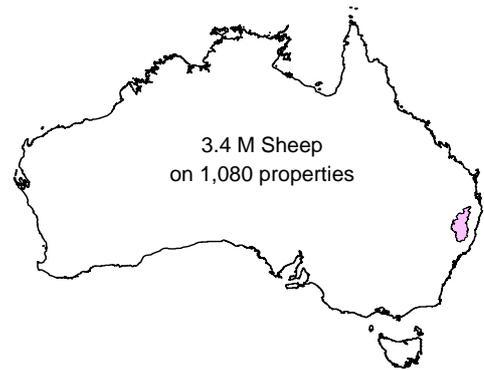
TABLE B - TYPICAL FARM	Production Sector – Region 6				
	SRW	SRM	W	XB	TO
Numbers (Consignments) Off					
Live Export					
To Region					
Season					
Feedlots					
To Region					
Season					
Saleyard	1239 (3)	126 (2)	290 (2)		860 (3)
To Region	6	6	6		6
Season	Aut/Win	Autumn	Autumn		Aut/Win
Abattoir	217 (2)	393 (3)	409 (3)		188 (3)
To Region	6	6	6		6
Season	Aut/Win	Aut/Win	Aut/Win		Aut/Win
Property Sales	375 (1)		222 (1)		
To Region	6		6		
Season	Autumn		Autumn		
Total Movements off	1831 (6)	519 (5)	816 (5)		1048 (6)
Numbers (Consignments) On					
Purchases	13 (1)	4 (1)	850 (2)		1048 (3)
from Region	50/40/10 6/7/9	6	6		6
Season	Autumn	Spring	Autumn		Summer
Total Sheep/Farm - 30 June #					
Average	3849	1005	2906		3640
Max (90% confidence interval)	4429	3269	4644		5412
Min (90% confidence interval)	3269	834	1167		1869

Note 1: (Z) = Number of consignments – numbers per consignment may vary, Note 2 - xx/xx = percentage split, yy/yy = regional split. Note 3: Region 6: Northern wheat/sheep, Region 7: Armidale high rainfall and Region 9: Eastern wheat/sheep. **ABARE Data 2004/2005**

Region 7 - Armidale High Rainfall Region

Geography

The Armidale High Rainfall region is located west of the Great Dividing Range and the region stretches from south of Armidale up to the Queensland border. It is the smallest region defined for the sheep population study.



Climate

Due to the region's elevation, the climate tends to be temperate throughout the year, with rainfall from 700mm in the western areas up to 1200mm in the east. Elevated areas are very cold in the winter with severe frosts and occasional snow.

Pastures

Productive, temperate pasture species in this environment are frost and cold tolerant, producing the bulk of feed during the winter and spring months. Common pasture species in the region include white clover (*Trifolium repens*), tall fescue (*Festuca arundinacea*), perennial ryegrass (*Lolium perenne*) and redgrass (*Bothriochloa macra*). The pasture within this region is highly productive but very reliant on rainfall timing due to the extreme temperature faced in winter.

Dominant Production Sector

Approximately three quarters (74 per cent) of sheep are utilised for self replacing wool production, with the balance formed by trading or other use. Poll Dorset, White Suffolk and Border Leicester are the three primary meat breeds used for crossing with ewes in the region. Less than 1 per cent of the region's sheep flock is made up by exotic sheep breeds, with the main breeds present being the SAMM and Dohne. The Damara is also used to some extent in cross breeding.

Farm Size

These properties ranged in size from about 1200 ha on the north east slopes to over 6000 ha on the western clay soils.

Stocking Capacity

The average stocking rate is 6 - 10 DSE/ha.

Current Issues

- ☆ The presence of Chilean Needle Grass, which is unpalatable to livestock.
- ☆ Increasing resistance of internal parasites to drenches.
- ☆ A movement into more cattle grazing.

Table 9 Region 7 Average Farm

TABLE A – AVERAGE FARM	Production Sector – Region 7				
	SRW	SRM	W	XB	TO
Numbers of properties	739				341
Movements Off per “average” farm					
Live Export to region					
Feedlots to region	2.2%				
Saleyards to region	62.8%				92.4%
Abattoirs to region*	12.7%				7.6%
Property Sales to region	22.2%				
Total Movements off	1316				1091
Numbers On per “average” farm					
Purchases from region	9				503
	85/10/5 7/8/9				7
Management movements					
Feed Pasture only (Prop of properties %)	80				70
Lamb muster frequency	7				3
Ewe Muster frequency	9				3
Ram Muster Frequency	7				2
Never seek agistment (Prop of properties %)	100				100
Season agistment sought					
Region agistment sought					

Note 1: xx/xx = percentage split, yy/yy = regional split. Note 2: Region 7: Armidale high rainfall.

Region specific drivers

- ☆ Most sheep from the region are slaughtered in either Wallangarra, just north of the Queensland border, or Dubbo.
- ☆ Some cross-bred ewes move into the region from the Central West slopes and plains, around Trangie and Narromine. However, producers are increasingly wary of the threat of OJD despite there being no formal restrictions on sheep trade in New South Wales.

Typical Farm Management Cycle

- ☆ Autumn joining with a spring lambing.
- ☆ Weaning in summer with culling of rams, ewes and hoggets.
- ☆ Ram purchases about the same time as weaning (January/February).
- ☆ Lambs/weaner sales in early winter.
- ☆ Most of the larger annual ram sales occur in February.
- ☆ Shearing tends to be in the spring (August/September).

Table 10 Region 7 Typical Farm

TABLE B - TYPICAL FARM	Production Sector – Region 7				
	SRW	SRM	W	XB	TO
Numbers (Consignments) Off					
Live Export					
To Region					
Season					
Feedlots					
To Region					
Season					
Saleyard	822 (2)				707 (3)
To Region	7				7
Season	Spring				Spring
Abattoir	340 (2)				384 (3)
To Region	7				7
Season	Spr/Sum				Spr/Sum
Property Sales	154 (2)				
To Region	7				
Season	Spr/Sum				
Total Movements off	1316 (6)				1091 (6)
Numbers (Consignments) On					
Purchases	9 (1)				503 (3)
from Region	85/10/5 7/8/9				7
Season	Summer				Summer
Total Sheep/Farm - 30 June #					
Average	3943				3137
Max (90% confidence interval)	4441				4687
Min (90% confidence interval)	3444				1587

Note 1: (Z) = No of consignments – numbers per consignment may vary, Note 2 - xx/xx = percentage split, yy/yy = regional split.

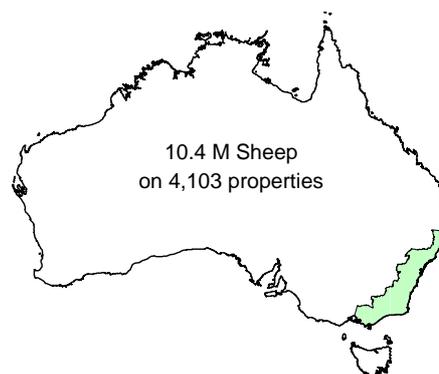
Note 3: Region 7: Armidale high rainfall, Region 8: Eastern high rainfall and Region 9: Eastern wheat/sheep.

ABARE Data 2004/2005.

Region 8 - Eastern High Rainfall

Geography

The Eastern High Rainfall region stretches in a crescent from northern New South Wales, through south eastern NSW including the Southern Tablelands and Snowy Mountains, down to the outskirts of Melbourne. Landscapes in the region vary, from the relatively flat areas near the eastern seaboard to the escarpments of the Tablelands.



Climate

Climate varies dramatically from frost free, high rainfall coastal plains to the snow covered peaks of Mt Kosiosko (2,280m). Rainfall varies from 600mm pa on the southern slopes to over 2000mm on the north coast.

Vegetation

Pastures range from productive, temperate pasture species which are frost and cold tolerant to a range of species adapted to the high rainfall environments including Kikuyu and Phalaris. In non agricultural areas vegetation is very diverse and extends to dry forests (such as Turpentine), heaths and moist forests located in valleys.

Dominant Production Sector

The dominant production system is self replacing wool production, at 53 per cent of sheep, with self replacing meat production systems also prominent at 20 per cent of the population. The dominant wool producing sheep breed is the merino. Increasingly, merinos are being joined with meat breeds as a result of the current high lamb prices and continuing low wool prices. Merinos are largely crossed with traditional meat breeds including Poll Dorset, White Suffolk, and to a lesser extent Border Leister, Dohne and SAMM.

Farm Size

Farm size varies from a few hectares on the densely populated coastal areas to around 2,000ha on the southern slopes and Tablelands.

Stocking Capacity

The average stocking rate is 4 - 8 DSE/ha.

Current Issues

- ☆ The high incidence of OJD in the region.
- ☆ Degradation of pastures by Serrated Tussock in the southern parts of the region.
- ☆ Sheep studs are investing in vaccination programs for OJD to try and maintain sales of stud stock to other regions.

Table 11 Region 8 Average Farm

TABLE A – AVERAGE FARM	Production Sector – Region 8				
	SRW	SRM	W	XB	TO
Numbers of properties	1925	1061	495	303	319
Movements Off per “average” farm					
Live Export to region					
Feedlots to region					
Saleyard to region	505 8	340 8	140 50/50 8/9		
Abattoir to region*	204 50/50 8/9	138 50/50 9/10b	214 50/50 9/10b	1923 50/50 9/10b	1907 50/50 9/10b
Property Sales to region	200 8	185 50/50 9/10b	291 50/50 9/10b	1365 50/25/25 8/9/10b	350 50/25/25 8/9/10b
Total Movements off	909	663	644	3288	2257
Numbers On per “average” farm					
Purchases from region	8 8	5 60/20/20 8/9/10b	700 60/20/20 8/9/10b	564 50/50 8/9	608 50/50 8/9
Management movements					
Feed Pasture only (Prop of properties %)	80	70	100	100	50
Lamb muster frequency	4		2	5	5
Ewe Muster frequency	4		3	5	5
Ram Muster Frequency	3		3	5	5
Never seek agistment (Prop of properties %)	95	70	100	95	100
Season agistment sought	Winter	Autumn		Autumn	
Region agistment sought	8	8		8	

Note 1: xx/xx = percentage split, yy/yy = regional split. Note 2: Region 8: Eastern high rainfall, Region 9: Eastern wheat/sheep and Region 10b: Southern wheat/sheep.

Region specific drivers

- ☆ Footrot in the region means that there is buyer resistance outside this region. Producers in nearby regions fear that they might bring footrot onto their properties if they buy stud/store sheep from these regions or agist their own sheep into this region.
- ☆ Given the relatively high mutton prices, the majority of producers send their stock to the Southern Meats Abattoirs (Harden) and others in the region for slaughter.
- ☆ Sheep movements out of and into the region remain affected by OJD.



Typical Farm Management Cycle

- ☆ A summer joining with an autumn/winter lambing.
- ☆ Weaning in early summer with culling of rams, ewes and hoggets.
- ☆ Ram purchases prior to joining in for meat sires but in spring for fine wool rams.
- ☆ Lambs/weaner sales usually in spring, but some in autumn in poor seasons.
- ☆ Most of the larger fine wool annual ram sales occur in the spring.
- ☆ Shearing in early summer to avoid grass seed contamination of the fine wool.

Table 12 Region 8 Typical Farm

TABLE B - TYPICAL FARM	Production Sector – Region 8				
	SRW	SRM	W	XB	TO
Numbers (Consignments) Off					
Live Export					
To Region					
Season					
Feedlots					
To Region					
Season					
Saleyard	420 (2)	527 (2)	140 (2)		
To Region	8	8	50/50 8/9		
Season	Summer	Summer			
Abattoir	209 (1)	136 (2)	213 (2)	2188 (3)	1147 (2)
To Region	50/50 8/9	50/50 9/10b	50/50 9/10b	50/50 9/10b	50/50 9/10b
Season	Summer	Summer	Sum/Aut	Summer	Summer
Property Sales	280 (2)		291 (1)	1100 (1)	1110 (1)
To Region	8		50/50 9/10b	50/25/25 8/9/10b	50/25/25 8/9/10b
Season	Summer		Sum/Aut	Summer	Summer
Total Movements off	909 (5)	663 (4)	644 (5)	3288 (4)	2257 (3)
Numbers (Consignments) On					
Purchases	8 (1)	5 (1)	700 (1)	564 (3)	608 (3)
from Region	8	60/20/20 8/9/10b	60/20/20 8/9/10b	50/50 8/9	50/50 8/9
Season	Autumn	Summer	Summer	Summer	Spr/Sum
Total Sheep/Farm - 30 June #					
Average	3575	2836	4375	1570	3058
Max (90% confidence interval)	5092	4190	7128	2041	3975
Min (90% confidence interval)	1482	2085	1623	1099	2140

Note 1: (Z) = No of consignments – numbers per consignment may vary, Note 2 - xx/xx = percentage split, yy/yy = regional split.

Note 3: Region 8: Eastern high rainfall, Region 9: Eastern wheat/sheep and Region 10b: Southern wheat/sheep.

ABARE Data 2004/2005.

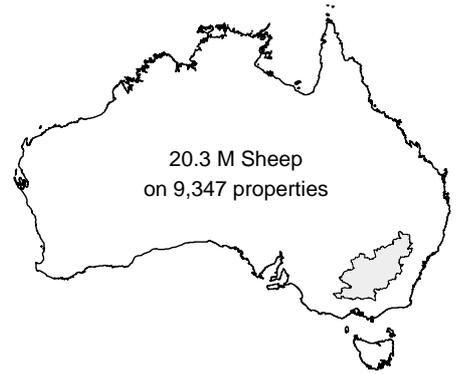
Region specific drivers

- ☆ The major driver for movement here is the presence of OJD & footrot which confine the majority of sales within the region. Most other sales are dominated by proximity to the region, however, sales to abattoirs and other properties will occur where there is a marketing advantage and/or evidence that OJD/footrot is not a problem on a specific farm.

Region 9 - Eastern Wheat/Sheep

Geography

The Eastern Wheat/Sheep region occupies much of central New South Wales and extends south, into central Victoria. Specifically, the region incorporates the Murrumbidgee, Central West and Central Macquarie in NSW, and the eastern Murray region around the NSW and Victorian border.



Climate

On the western slopes the rainfall gradually decreases from 950mm pa on the upper slopes to 350mm pa on the western border. The frequency of winter snowfalls also decreases from east to west. Average maximum temperatures gradually increase as height above sea level decreases. Further to the west the land slowly flattens out into the dry inland plains, marked by cold nights and warm days.

Vegetation

A wide range of annual pastures and winter/summer crops are produced on irrigated and dryland properties across the region. Annual pastures include lucerne, phalaris, sub clover and white clover while wheat, oats, barley and canola are common winter crops that mixed sheep/cropping properties would produce. Native vegetation in the region varies considerably. Common species include Box, Gum and Grey Box, however, the area incorporates several landscapes including native grasslands, alpine herb fields, wet forests and woodlands. The Central West and Macquarie are characterised by Coolabah, Black Box, River Red Gum and Bimble Box woodlands, as well as Mitchell grass and wire grass. Red gums are also prevalent in the eastern Murray area.

Dominant Production Sector

Self replacing wool and meat production systems dominate at 47 per cent and 26 per cent of the sheep population respectively. A further 18 per cent of sheep are utilised for trading or other production purposes. Exotic meat breeds such as Damara and Dorper are becoming of increasing importance in the region. Increasingly, merino ewes are being crossed with meat breeds due to prevailing lower wool prices. It is estimated that, currently, close to 50 per cent of ewes are joined with meat breed rams.

Stocking Capacity

The average stocking rate is 3 - 7 DSE/ha.

Current Issues

- ☆ More Merino ewes are being crossed with meat breeds.
- ☆ Although there has been a trend to increased percentages of merino ewes joined to meat rams, recent surveys (MLA 2005) suggest this is stabilized and in the 2005 lamb survey 64% of merino ewes were joined to merino rams.
- ☆ Meat breeds such as the Dorper & Damara are increasing in importance.

Table 13 Region 9 Average Farm

TABLE A – AVERAGE FARM	Production Sector – Region 9				
	SRW	SRM	W	XB	TO
Numbers of properties	3228	2816	271	893	2229
Movements Off per “average” farm					
Live Export to region					
Feedlots to region	4.4% 9	5.4% 9			
Saleyards to region	45.4% 9	54.9% 9	69.9% 9	39.5% 9	48.4% 9
Abattoir to region*	20.8% 80/20 9/10b	28.9% 9	28.0% 9	60.5% 9	46.6% 9
Property Sales to region	29.4% 9	10.8% 9	2.1% 9		5.0% 9
Total Movements off	1357	957	708	818	1193
Numbers On per “average” farm					
Purchases from region	10 9	7 9	700 9	194 9	5 9
Management movements					
Feed Pasture only (Prop of properties %)	85%	75%	100%	80%	60%
Lamb muster frequency	5	7	3	4	4
Ewe Muster frequency	6	7	3	5	3
Ram Muster Frequency	5	5	3	2	2
Never seek agistment (Prop of properties %)	90%	90%	100%	95%	100%
Season agistment sought	Autumn	Autumn	-	Autumn	
Region agistment sought	6	6		6	

Note 1: xx/xx = percentage split, yy/yy = regional split. Note 2: Region 6: Northern wheat/sheep, Region 9: Eastern wheat/sheep and Region 10b: Southern high rainfall.

Region specific drivers

- ☆ OJD still dampens movement of sheep in the region even with restrictions removed in 2004. Risk of OJD infection limits purchases from and agistment into region 8.
- ☆ Agistment to region 8 is also limited by the fact that sheep properties in region 8 are generally high input, high stocking rate, smaller grazing systems that don't often have spare feed available to take on agistment.
- ☆ This region lies in NSW where on average 88% of sales to saleyards are to slaughter and for the two major centres (Dubbo & Wagga Wagga) there are no store sales. The major store sheep selling centres in the region would be Narromine in the north and Jerilderie in the south.
- ☆ Of the sheep sales through the Dubbo saleyard that are not for slaughter (mainly re-stockers) 80% would tend to move north and west within a 200km radius of the saleyard. Most of these sales would stay within the region, maybe 30% into the bottom tip of region 6.
- ☆ Of the sheep sales through the Wagga Wagga saleyard that are not for slaughter (mainly re-stockers) 85% would tend to move from the west to the east within a 200km radius of the saleyard. This may move some sheep into Region 8.

- ☆ The National Merino Sheep Show and Export Ram Sale is held in Dubbo every August. This is a national event that attracts entries from right across Australia.
- ☆ During periods of recovery from drought or when strong seasonal differences exist between the eastern and western states, a spike in the price of store sheep might see up to 50,000 re-stocker sheep move from WA (R12a + R12b) to region 9 for sale in saleyards. (John Knight pers comm. Wagga Wagga Saleyards).

Typical Farm Management Cycle

- ☆ A summer joining with a winter lambing.
- ☆ Weaning in spring with culling of rams, ewes and hoggets.
- ☆ Ram purchases about the same time as weaning.
- ☆ Lambs/weaner sales vary with climate & season and are usually in spring or autumn.
- ☆ Most of the larger annual ram sales occur in the spring.
- ☆ Shearing tends to be clustered around autumn and spring but can occur at any time.

Table 14 Region 9 Typical Farm

TABLE B - TYPICAL FARM	Production Sector – Region 9				
	SRW	SRM	W	XB	TO
Numbers (Consignments) Off					
Live Export					
To Region					
Season					
Feedlots					
To Region					
Season					
Saleyard	647 (2)	62 (1)	130 (1)	279 (2)	498 (2)
To Region	9	9	9	9	9
Season	Spr/Sum	Spring	Spring	Spr/Sum	Spring
Abattoir	675 (3)	895 (4)	578 (4)	539 (3)	695 (4)
To Region	80/20 9/10b	9	9	9	9
Season	Spr/Sum	Spr/Sum	Spr/Sum	Spr/Sum	Spr/Sum
Property Sales	35 (1)				
To Region	9				
Season	Spring				
Total Movements off	1357 (6)	957 (5)	708 (5)	818 (5)	1193 (6)
Numbers (Consignments) On					
Purchases	10 (1)	7 (1)	700 (1)	194 (2)	5 (1)
from Region	9	9	9	9	9
Season	Spring	Spring	Spring	Spring	Spring
Total Sheep/Farm - 30 June #					
Average	3,126	1,794	3,333	1,380	2,263
Max (90% confidence interval)	3,487	1,922	4,646	3,602	2,596
Min (90% confidence interval)	2,765	1,665	2,019	843	1,930

Note 1: (Z) = No of consignments – numbers per consignment may vary, Note 2 - xx/xx = percentage split, yy/yy = regional split.

Note 3: Region 9: Eastern wheat/sheep and Region 10b: Southern high rainfall.

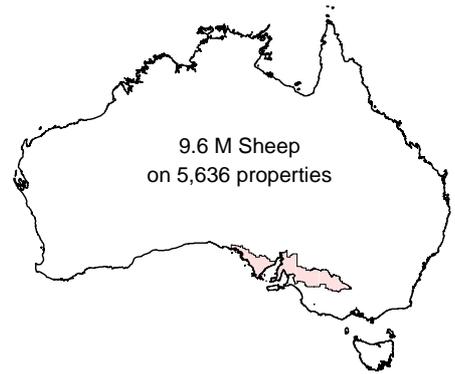
ABARE Data 2004/2005.



Region 10a - Southern Wheat/Sheep

Geography

The Southern Wheat/Sheep region extends from north-western Victoria into South Australia, to the Eyre Peninsula. The area west of the South Australian-Victorian border is characterised by dune ridges with intervening flats, creating seasonal freshwater lakes and swamps. Sporadic volcanic hills and granite outcrops are also features of the landscape.



Climate

Median annual rainfall ranges from 275 to 600 mm pa. The climate of South Australia varies from hot and dry in the interior to the milder and wetter climates of the southern Mount Lofty Ranges and the southeast coast of South Australia and southern Victoria.

Pastures

Increased use of superphosphate and medic pastures in the Eyre Peninsula since the 1950's has resulted in improved soil fertility and pasture productivity. The pastures within this region are high quality and very productive.

Dominant Production Sector

Around 47 per cent of the flock are utilised in self replacing wool production systems, with a further 37 per cent used in self replacing meat production systems. There are very few exotic sheep in the region, with no commercial exotic sheep flocks. Merinos in the region tend to be crossed with Dorset and White Suffolk.

Farm Size

The farm holdings range from only 160 hectares to about 2300 hectares.

Stocking Capacity

The average stocking rate is 7 - 12 DSE/ha.

Current Issues

- ☆ Alternative enterprises such as cropping and cattle production are much more profitable than sheep. Consequently, producers in this mixed cropping/livestock region are shifting their enterprise mix from sheep into mixed farming and intensive cropping.
- ☆ Increasing worm resistance.

Table 15 Region 10a Average Farm

TABLE A – AVERAGE FARM	Production Sector – Region 10a				
	SRW	SRM	W	XB	TO
Numbers of properties	1749	2769	75		1043
Movements Off per “average” farm					
Live Export	7.7%	5.3%	60%		37.7%
to region	10b	10b	10b		10b
Feedlots	5.1%	4.9%			4.5%
to region	10a	10a			10a
Saleyard	51.9%	56.2%	20.0%		34.7%
to region	50/50 10a/10b	10a	10a		10a
Abattoir	20.0%	28.7%	20.0%		23.1%
to region*	10a	10a	10b		10a
Property Sales	15.3%	4.9%			
to region	10a	10a			
Total Movements off	980	636	990		1195
Numbers On per “average” farm					
Purchases	13	5	1000		306
from region	10a	10a	10a		10a
Management movements					
Feed Pasture only (Prop of properties %)	80	80	100		80
Lamb muster frequency	3	3	2		3
Ewe Muster frequency	3	3	3		3
Ram Muster Frequency	3	2	3		3
Never seek agistment (Prop of properties %)	70	70	100		80
Season agistment sought	Autumn	Autumn			Autumn
Region agistment sought	10b	10b			10a

Note 1: xx/xx = percentage split, yy/yy = regional split. Note 2: Region 10a: Southern wheat/sheep and Region 10b: Southern high rainfall.

Region specific drivers

- ☆ There is very little movement of sheep to other regions and this is restricted to the movement of stud stock for breeding purposes.
- ☆ The live export of wethers out of this region is significant.

Typical Farm Management Cycle

- ☆ A summer joining with an autumn/winter lambing.
- ☆ Weaning in spring with culling of rams, ewes and hoggets.
- ☆ Ram purchases at weaning (in the spring).
- ☆ Lambs/weaner sales usually in spring but some in autumn in poor seasons.
- ☆ Most of the larger fine wool annual ram sales occur in the spring.
- ☆ Shearing in winter to early spring.

Table 16 Region 10a Typical Farm

TABLE B - TYPICAL FARM	Production Sector – Region 10a				
	SRW	SRM	W	XB	TO
Numbers (Consignments) Off					
Live Export	118 (2)		792 (1)		
To Region	10b		10b		
Season	Win/Spr		Winter		
Feedlots					
To Region					
Season					
Saleyard	588 (2)	179 (2)			913 (2)
To Region	50/50 10a/10b	10a			10a
Season	Spring	Spring			Spring
Abattoir	449 (2)	457 (3)	198 (2)		571 (3)
To Region	10a	10a	10b		10a
Season	Spr/Sum	Spring	Winter		Spr/Sum/Aut
Property Sales					
To Region					
Season					
Total Movements off	980 (6)	636 (5)	990 (3)		1195 (5)
Numbers (Consignments) On					
Purchases	13 (1)	5 (1)	1000 (2)		306 (2)
from Region	50/50 10a/10b	50/50 10a/10b	10b		10a
Season	Summer	Spring	Spring		Spring
Total Sheep/Farm - 30 June #					
Average	2106	1286	2712		1824
Max (90% confidence interval)	2528	1411	4643		2084
Min (90% confidence interval)	1684	1162	782		1565

Note 1: (Z) = No of consignments – numbers per consignment may vary, Note 2 - xx/xx = percentage split, yy/yy = regional split.

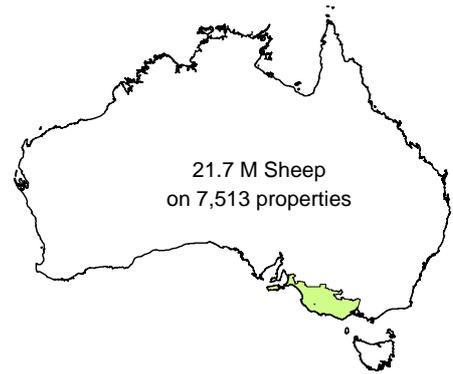
Note 3: Region 10a: Southern wheat/sheep and Region 10b: Southern high rainfall.

ABARE Data 2004/2005.

Region 10b - Southern High Rainfall

Geography

The Southern High Rainfall region extends west from the Victorian Midlands, across the South Australian-Victorian border, and east to Kangaroo Island. The Victorian Midlands is characterised by undulating terrain with areas of woodland on relatively poor soils. The Grampians National Park is located in the east of the region, as are the goldfields.



Climate

The coastal strip south of the ranges is generally wetter except in the far east where the Strezlecki Ranges shelter eastern regions from the moisture laden south westerly winds. The probability of early autumn and late spring rains is considerably higher than north of the divide.

Pastures

Pastures in the Southern High Rainfall region are typically perennial ryegrass and subterranean clover whereas perennial grasses and white clover dominate in the Gippsland. These productive pastures rely heavily on the seasonal rainfall to maximise growth throughout the year.

Dominant Production Sector

A large number of sheep, 44 per cent, are utilised in self replacing wool production systems. This production is predominantly fine wool. Another 27 per cent are utilised in self replacing meat production systems. With 19 per cent of sheep also found in cross bred production systems, this region has by far the largest number of sheep in cross bred production systems. The majority of merino cross-breeding is undertaken with Dorsets and White Suffolks. The majority of the flock tends to be bred in the region, however, some ewe purchases are made from southern New South Wales and pastoral South Australia.

Stocking Capacity

The average carrying capacity is 4 - 6 DSE/ha.

Current Issues

- ☆ Increasing worm resistance amongst the flock.
- ☆ Competition for land (arising from sub-division for hobby properties).
- ☆ Moves to alternative enterprises such as tree crops and cattle.

Table 17 Region 10b Average Farm

TABLE A – AVERAGE FARM	Production Sector – Region 10b				
	SRW	SRM	W	XB	TO
Numbers of properties	3274	2347		702	1190
Movements Off per “average” farm					
Live Export	6.5%	5.8%			
to region	10b	10b			
Feedlots	4.3%	5.2%		8.7%	7.6%
to region	10b	10b		10b	10b
Saleyard	63.7%	54.4%		45.5%	29.7%
to region	10b	10b		10b	10b
Abattoir	14.1%	30.0%		45.7%	57.9%
to region*	10b	10b		10b	10b
Property Sales	11.5%	4.5%			4.9%
to region	10b	10b			10b
Total Movements off	1205	1335		3435	1545
Numbers On per “average” farm					
Purchases	18	8		615	407
from region	50/50 10a/10b	50/50 10a/10b		10b	10a
Management movements					
Feed Pasture only (Prop of properties %)	70	50		60	60
Lamb muster frequency	4	4		4	4
Ewe Muster frequency	4	4		4	3
Ram Muster Frequency	3	2		3	3
Never seek agistment (Prop of properties %)	65	60		90	70
Season agistment sought	Winter	Autumn		Autumn	Autumn
Region agistment sought	10b	10b		10b	10b

Note 1: xx/xx = percentage split, yy/yy = regional split. Note 2: Region 10a: Southern wheat/sheep and Region 10b: Southern high rainfall.

Region specific drivers

- ☆ The majority of the flock tends to be bred in the region, however, some ewe purchases are made from southern New South Wales (region 9) and pastoral South Australia (10a).
- ☆ Movement of sheep into the region is limited due to the presence of footrot.

Typical Farm Management Cycle

- ☆ A summer joining with an autumn/winter lambing.
- ☆ Weaning in spring with culling of rams, ewes and hoggets.
- ☆ Ram purchases at weaning (in the spring).
- ☆ Lambs/weaner sales usually in spring through to autumn.
- ☆ Most of the larger fine wool annual ram sales occur in the spring.
- ☆ Shearing tends to be around autumn and spring but can occur at any time.

Table 18 Region 10b Typical Farm

TABLE B - TYPICAL FARM	Production Sector – Region 10b				
	SRW	SRM	W	XB	TO
Numbers (Consignments) Off					
Live Export	157 (1)	60 (1)			
To Region	10b	10b			
Season	Summer	Winter			
Feedlots					
To Region					
Season					
Saleyard	599 (2)	558 (2)		2147 (3)	907 (3)
To Region	10b	10b		10b	10b
Season	Spring	Win/Spr		Spr/Sum	Spr/Sum
Abattoir	499 (2)	717 (2)		1288 (2)	638 (2)
To Region	10b	10b		10b	10b
Season	Spr/Sum/Aut	All year		Aut/Spr	Sum/Aut
Property Sales					
To Region					
Season					
Total Movements off	1205 (5)	1335 (5)		3435 (5)	1545 (5)
Numbers (Consignments) On					
Purchases	18 (1)	8 (1)		615 (2)	407 (2)
from Region	50/50 10a/10b	50/50 10a/10b		10b	10a
Season	Summer	Spring		Summer	Spring
Total Sheep/Farm - 30 June #					
Average	3130	2725		5038	3404
Max (90% confidence interval)	3404	3047		10522	4727
Min (90% confidence interval)	2856	2402		447	2081

Note 1: (Z) = No of consignments – numbers per consignment may vary, Note 2 - xx/xx = percentage split, yy/yy = regional split.

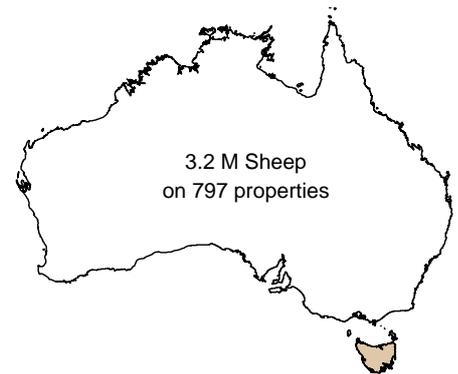
Note 3: Region 10a: Southern wheat/sheep and Region 10b: Southern high rainfall. **ABARE Data 2004/2005.**



Region 11 - Tasmania

Geography

Tasmania is the most mountainous Australian state. The Midlands, located between the Central Plateau sloping south-east and the mountains of the north-east corner of the state, is a highly productive agricultural area. Sheep are the most prevalent livestock in Tasmania with a majority of the flock located in the eastern half of the state (in particular, the Oatlands area). However, an estimated 20 per cent are located on the north-west coast and Bass Strait islands.



Climate

Tasmania enjoys for the most part a 'temperate maritime' climate. The sea, never more than 115km distant, suppresses temperature extremes. The prevailing westerly airstream leads to a marked variation of cloudiness, rainfall and temperature. The result is that the West Coast and highlands are cool, wet and cloudy and the East Coast and lowlands are milder, drier and sunnier.

Pastures

Approximately half of the region's fine wool flock is grazed on native grasslands as this is lighter feed which facilitates the production of finer wool. Common native pasture species in the region include kangaroo grass and tussock grass.

Dominant Production Sector

In this region the self replacing wool enterprises are the dominant production system at 80 per cent of the sheep population. A further 13 per cent are utilised in self replacing meat production enterprises. Wool producing breeds tend to be run in those areas of the state where rainfall is below 700mm. The wool production flock structures have changed over time as the demand for finer-wool breeds has increased. As a result, the Merino is the dominant sheep breed in Tasmania. Tasmanian wool thus tends to be approximately one micron finer than wool from the rest of Australia. Coupled with the fact that the wool tends to be relatively free from vegetable matter, Tasmanian superfine merino wool regularly achieves some of the highest prices in the world. The region also has a small flock of specialty carpet breeds, however flock numbers are declining due to competition from cheap imports.

Farm Size

The average sheep and wool producing farm size ranges from 100 ha to 700 ha.

Stocking Capacity

The average stocking rate is 7 - 11 DSE/ha.

Table 19 Region 11 Average Farm

TABLE A – AVERAGE FARM	Production Sector – Region 11				
	SRW	SRM	W	XB	TO
Numbers of properties	286	101		370	40
Movements Off per “average” farm					
Live Export		6.2%			
to region		10b			
Feedlots					
to region					
Saleyard	61.7%	47.0%		55.7%	57.2%
to region	11	11		90/10 11/10b	90/10 11/10b
Abattoir					
to region*					
Property Sales	38.3%	46.7%		44.3%	42.8%
to region	11	11		90/10 11/10b	11
Total Movements off	2638	1505		621	2803
Numbers On per “average” farm					
Purchases	20	10		2	605
from region	11	11		11	11
Management movements					
Feed Pasture only (Prop of properties %)	70	70		50	60
Lamb muster frequency	4	5		5	5
Ewe Muster frequency	5	6		6	6
Ram Muster Frequency	5	6		6	6
Never seek agistment (Prop of properties %)	70	70		100	70
Season agistment sought	Autumn	Autumn			Autumn
Region agistment sought	11	11			11

Note 1: xx/xx = percentage split, yy/yy = regional split. Note 2: Region 10b: Southern high rainfall and Region 11: Tasmania.

Region specific drivers

- ☆ Store lambs are sold into Region 10b to finish on improved pastures under centre pivot irrigators or on cereal stubbles. Prime lambs go direct to abattoirs.
- ☆ On average one third of Tasmania's lamb drop (approximately 250,000 head) move to the mainland (R10b) for either processing or finishing. This movement has been historically driven by a lack of processing capacity in Tasmania. However, recent increases in capacity may reduce total lamb movement in the future.
- ☆ A small number of lambs are also transported to Tasmania from the Australian mainland for fattening. In 2005/2006 there was a consignment of 5,000 head but around 500 may be a more long term average. These are very much opportunistic movements designed to take advantage of good seasonal or market conditions.
- ☆ Variations in the poppy growing contract areas also influence lamb numbers going north. This year the area of poppy contracts fell and producers are putting in improved pastures under the pivot irrigators to finish lambs rather than transporting them to the mainland. This situation will reverse in years where the areas of poppy contracts are larger than normal.

Typical Farm Management Cycle

- ☆ A summer joining with an autumn/winter lambing.
- ☆ Weaning in early summer with culling of rams, ewes and hoggets.
- ☆ Ram purchases prior to joining in for meat sires, but in spring for fine wool rams.
- ☆ Lambs/weaner sales usually in spring but some in autumn in poor seasons.
- ☆ Most of the larger fine wool annual ram sales occur in the spring.
- ☆ Shearing in early summer to avoid grass seed contamination of the fine wool.

Table 20 Region 11 Typical Farm

TABLE B - TYPICAL FARM	Production Sector – Region 11				
	SRW	SRM	W	XB	TO
Numbers (Consignments) Off					
Live Export					
To Region					
Season					
Feedlots					
To Region					
Season					
Saleyard	1310 (2)	755 (2)		346 (2)	1603 (3)
To Region	11	11		90/10 11/10b	90/10 11/10b
Season	Summer	Summer		Summer	Summer
Abattoir					
To Region					
Season					
Property Sales	1328 (2)	750 (2)		275 (2)	1200 (2)
To Region	11	11		90/10 11/10b	11
Season	Summer	Summer		Sum/Aut	Sum/Aut/Win
Total Movements off	2638 (4)	1505 (4)		621 (4)	2803 (5)
Numbers (Consignments) On					
Purchases	20 (1)	10 (1)		2 (1)	605 (3)
from Region	11	11		11	11
Season	Summer	Spring		Sum/Aut	Sum/Aut
Total Sheep/Farm - 30 June #					
Average	7411	4042		679	3843
Max (90% confidence interval)	8044	4719		1069	5154
Min (90% confidence interval)	6778	3364		288	2533

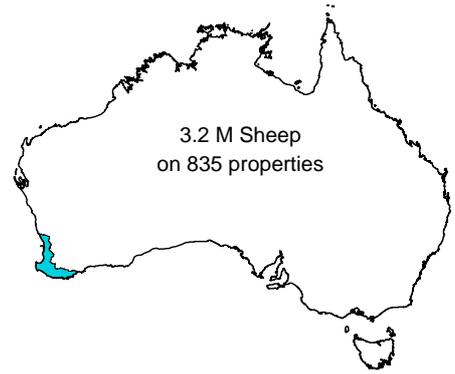
Note 1: (Z) = No. of consignments – numbers/consignment may vary, Note 2 - xx/xx = percentage split, yy/yy = regional split.

Note 3: Region 10b: Southern high rainfall and Region 11: Tasmania. **ABARE Data 2004/2005.**

Region 12a - Western High Rainfall

Geography

The Western High Rainfall region follows the coast of the south-most western tip of Western Australia.



Climate

Australia's south west enjoys a mild Mediterranean climate with a cool wet winter and a warm dry summer. Winter (June to August) daytime temperatures average about 16 degrees while summer (December to February) averages a comfortable 27 degrees. As a general rule, the further south, the cooler the temperature.

Pastures

The coastal plains are dominated by heathlands and shrublands that support hundreds of plant species per square kilometre. Growing perennials to mitigate dryland salinity is a challenge that Western Australian farmers currently face. There are also many farmers that use lucerne-based pastures in their grazing systems.

Dominant Production Sector

In this region 59 per cent of the flock are used in the self-replacing wool production system. A further 30 per cent are utilised in the self-replacing meat sheep production system. The population density in this region is one of the highest, given that it has the third highest sheep population and one of the smallest land areas. The presence of exotic sheep breeds in the region is limited to hobby properties. It is unlikely that this will develop further in the future, due to the suitability of more traditional breeds to the region's climate. Merinos are the general base of the region's flock, with Poll Dorsets, Suffolks and Border Leicesters utilised in cross-breeding.

Farm Size

Farm sizes range from 30-40ha hobby properties around the densely populated areas to 2500-4000ha properties concentrating on cropping and grazing.

Stocking Capacity

The average stocking rate is 1 – 6 DSE/ha.

Table 21 Region 12a Average Farm

TABLE A – AVERAGE FARM	Production Sector – Region 12a				
	SRW	SRM	W	XB	TO
Numbers of properties	280	403			152
Movements Off per “average” farm					
Live Export	41.0%	67.9%			30.6%
to region	12a	12a			12a
Feedlots	2.2%	2.4%			6.9%
to region	12a	12a			12a
Saleyards	20.2%	9.9%			14.2%
to region	50/50 12a/12b	30/70 12a/12b			12a
Abattoir	21.1%	18.5%			44.9%
to region*	30/60/10 12a/12b/10b	30/60/10 12a/12b/10b			12a
Property Sales	15.4%	1.3%			3.4%
to region	25/24/25/25 6/8/9/10a	30/70 12a/12b			
Total Movements off	1350	1573			2966
Numbers On per “average” farm					
Purchases	10	12			160
from region	60/40 12a/12b	60/40 12a/12b			12a
Management movements					
Feed Pasture only (Prop of properties %)	20	40			20
Lamb muster frequency	4	6			6
Ewe Muster frequency	6	2			5
Ram Muster Frequency	6	5			5
Never seek agistment (Prop of properties %)	60	80			70
Season agistment sought	Winter	Winter			Win/Sum
Region agistment sought	12a	12a			12a

Note 1: xx/xx = percentage split, yy/yy = regional split. Note 2: Region 6: Northern wheat/sheep, Region 8: Eastern high rainfall, Region 9: Eastern wheat/sheep, Region 10a: Southern wheat/sheep, Region 10b: Southern high rainfall, Region 12a: Western high rainfall and Region 12b: Western wheat/sheep.

Region specific drivers

- ☆ Lack of processing facilities in WA can lead to a glut of lambs and an inability of abattoirs to meet processing demand. Consequently, one major carrier has moved up to 90,000 sheep from WA to SA for slaughter in a year (the droughts in SA had lead to spare abattoir capacity). In 2005/2006 the total number of WA lambs (R12a + R12b) processed in SA reached 250,000 (Jack Langberg PIRSA pers comm.) This was an exceptional year with a very good season in WA, a poor season in SA and record lamb prices to cover the additional freight. In an average year this number is closer to 100,000 lambs.
- ☆ Movement of sheep to SA for slaughter usually occurs in the spring through to summer.
- ☆ During periods of recovery from drought or when strong seasonal differences exist between the eastern and western states, a spike in the price of store sheep might see up to 50,000 re-stocker sheep move from WA (R12a + R12b) to region 9 for sale in saleyards. (John Knight pers comm. Wagga Wagga Saleyards). A longer term average movement would be around 25,000 sheep.

Typical Farm Management Cycle

- ☆ Late spring joining with a winter lambing.
- ☆ Weaning in spring with culling of rams, ewes and hoggets.
- ☆ Ram purchases in the spring.
- ☆ Lambs/weaner sales vary with climate & season but are usually in spring or autumn.
- ☆ Most of the larger annual ram sales occur in the spring.
- ☆ Shearing tends to be in summer with a special shearing before Christmas to sell the culls.

Table 22 Region 12a Typical Farm

TABLE B - TYPICAL FARM	Production Sector – Region 12a				
	SRW	SRM	W	XB	TO
Numbers (Consignments) Off					
Live Export	934 (2)	470 (2)			534 (2)
To Region	12a	12a			12a
Season	Spr/Sum	Spr/Sum			Spr/Sum
Feedlots		248 (1)			918 (1)
To Region		12a			12a
Season		Spring			Spring
Saleyard	128 (2)	239 (2)			276 (2)
To Region	50/50 12a/12b	30/70 12a/12b			12a
Season	Summer	Spring			Spring
Abattoir	278 (2)	616 (2)			1238 (2)
To Region	30/60/10 12a/12b/10b	30/60/10 12a/12b/10b			12a
Season	Summer	Spring			Spr/Sum
Property Sales	10 (1)				
To Region	25/24/25/25 6/8/9/10a				
Season	Spring				
Total Movements off	1350 (7)	1573 (7)			2966 (7)
Numbers (Consignments) On					
Purchases	10 (1)	12 (1)			160 (3)
from Region	60/40 12a/12b	60/40 12a/12b			12a
Season	Spr/Sum	Spr/Sum			Spring
Total Sheep/Farm - 30 June #					
Average	3702	3363			3688
Max (90% confidence interval)	4116	3994			4261
Min (90% confidence interval)	3288	2731			3115

Note 1: (Z) = Number of consignments – numbers per consignment may vary, Note 2 - xx/xx = percentage split, yy/yy = regional split.

Note 3: Region 6: Northern wheat/sheep, Region 8: Eastern high rainfall, Region 9: Eastern wheat/sheep, Region 10a: Southern wheat/sheep, Region 10b: Southern high rainfall, Region 12a: Western high rainfall and Region 12b: Western wheat/sheep.

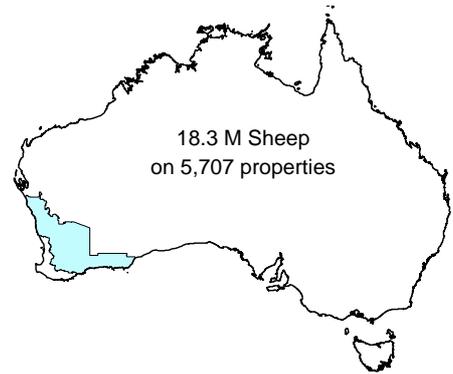
ABARE Data 2004/2005.



Region 12b - Western Wheat/Sheep

Geography

The Western Wheat/Sheep region is situated in the south-western corner of Western Australia, spreading south from Kalbarri in the north to Esperance on the south coast.



Climate

The Western Wheat/Sheep region is located in the Mediterranean climatic region. The annual rainfall varies from a maximum of 700mm per year on the coast to 300mm inland. The average maximum temperature in February is 26.3C and the average minimum temperature in July is 8.1C. Western Wheat/Sheep has a windy climate which combined with the sandy topsoils makes wind erosion a hazard on exposed soil. This poses most risk in combination with strong pre-frontal N-NW winds in the early winter. A strong summer SE sea "breeze" is a feature of the sandplain areas.

Pastures

Animal production uses either permanent annual and perennial pastures or annual based pastures grown in rotation with cropping operations. Perennial pastures are being used for reducing groundwater recharge and increasing out-of-season feed supply while saltland pastures are being used for increased productivity and profitability of saline land. Saline land covers a large amount of area within this region. Lucerne has been a key perennial species in this region.

Dominant Production Sector

In this region 58 per cent of the flock are utilised in self replacing wool production. A further 34 per cent of the total flock are engaged in self replacing meat production with the remainder classified as trading and other use. Although the number of exotic sheep in the region is largely limited to hobby properties, there is significant interest in exotic breeds as an option for the future. This is due to their relatively low maintenance and ability to survive in harsh conditions. Like the Western High Rainfall region, the flock is built on a Merino base, with Poll Dorset, Suffolk and Border Leicester crosses.

Farm Size

Farm sizes range from 30-40 ha hobby properties around the town to 2500-4000 ha properties concentrating on cropping and grazing.

Stocking Capacity

The average stocking rate is 4 – 9 DSE/ha.

Current Issues

☆ The high cost of transport (\$20/hd) restricts the movement of sheep from west to east to high value stud animals and prime lambs.

Table 23 Region 12b Average Farm

TABLE A – AVERAGE FARM	Production Sector – Region 12b				
	SRW	SRM	W	XB	TO
Numbers of properties	3069	1889			749
Movements Off per “average” farm					
Live Export	40.7%	61.3%			36.0%
to region	12a	12a			12a
Feedlots	1.3%	1.0%			11.5%
to region	12a	12a			12a
Saleyards	21.4%	13.1%			17.8%
to region	50/50 12a/12b	20/80 12a/12b			12a
Abattoir	23.9%	22.7%			31.9%
to region*	12a	30/60/10 12a/12b/10b			12a
Property Sales	12.6%	1.8%			2.9%
to region	50/50 12a/12b	20/80 12a/12b			50/50 12a/12b
Total Movements off	2999	1240			1224
Numbers On per “average” farm					
Purchases	20	10			406
from region	80/20 12a/12b	80/20 12a/12b			12a
Management movements					
Feed Pasture only (Prop of properties %)	10	30			20
Lamb muster frequency	5	5			6
Ewe Muster frequency	5	2			5
Ram Muster Frequency	5	5			5
Never seek agistment (Prop of properties %)	60	80			70
Season agistment sought	Winter	Winter			Win/Sum
Region agistment sought	12a	12a			12a/12b

Note 1: xx/xx = percentage split, yy/yy = regional split. Note 2: Region 10b: Southern high rainfall, Region 12a: Western high rainfall and Region 12b: Western wheat/sheep.

Region specific drivers

- ☆ A lack of processing facilities in WA can lead to a glut of lambs and the inability of abattoirs to meet processing demand. One major carrier has moved up to 90,000 sheep from WA to SA for slaughter in a year (droughts in SA had lead to spare abattoir capacity). In 2005/2006 the total number of WA lambs (R12a + R12b) processed in SA reached 250,000 (Jack Langberg PIRSA pers comm.) This was an exceptional year with a very good season in WA, a poor season in SA and record lamb prices to cover the additional freight. In an average year this number is more like 100,000 lambs.
- ☆ Movement of sheep to SA for slaughter usually occurs in the spring through to summer.
- ☆ During periods of recovery from drought or when strong seasonal differences exist between the eastern and western states, a spike in the price of store sheep might see up to 50,000 re-stocker sheep move from WA (R12a + R12b) to Region 9 for sale in saleyards. (John Knight pers comm. Wagga Wagga Saleyards). A longer term average movement would be around 25,000 sheep.
- ☆ There is a significant live export trade in this region.



Typical Farm Management Cycle

- ☆ Late spring joining with an autumn lambing.
- ☆ Weaning in spring, culling rams, ewes and hoggets. Most cull ewes sold on farm.
- ☆ Ram purchases about the same time as weaning.
- ☆ Lambs/weaner sales usually in spring.
- ☆ Most of the larger annual ram sales occur in the spring.
- ☆ Shearing in the spring.

Table 24 Region 12b Typical Farm

TABLE B - TYPICAL FARM	Production Sector – Region 12b				
	SRW	SRM	W	XB	TO
Numbers (Consignments) Off					
Live Export	1118 (2)	460 (2)			377 (2)
To Region	12a	12a			12a
Season	Spr/Sum	Spr/Sum			Spr/Sum
Feedlots					211 (1)
To Region					12a
Season					Spring
Saleyard	719 (1)	475 (2)			327 (2)
To Region	50/50 12a/12b	30/70 12a/12b			12a
Season	Spr/Sum	Spring			Spr/Sum
Abattoir	962 (2)	305 (2)			349 (2)
To Region	12a	30/60/10 12a/12b/10b			12a
Season	Spring	Spring			Spring
Property Sales	200 (1)				
To Region	50/50 12a/12b				
Season	Spring				
Total Movements off	2999 (6)	1240 (6)			1224 (7)
Numbers (Consignments) On					
Purchases	20 (1)	10 (1)			406 (3)
from Region	80/20 12a/12b	80/20 12a/12b			12a
Season	Spring	Spring			Win/Spr/Sum
Total Sheep/Farm - 30 June #					
Average	7222	3064			1888
Max (90% confidence interval)	7796	3848			4528
Min (90% confidence interval)	6648	2280			753

Note 1: (Z) = No of consignments – numbers per consignment may vary, Note 2 - xx/xx = percentage split, yy/yy = regional split.

Note 3: Region 10b: Southern high rainfall, Region 12a: Western high rainfall and Region 12b: Western wheat/sheep.

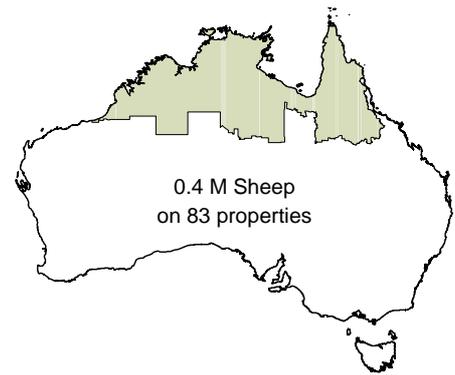
ABARE Data 2004/2005.



Region 124 - Northern Tropics

Geography

The Northern Tropics region spans across the Kimberley of Western Australia, the northern half of the Northern Territory and the Cape York Peninsula and Gulf area of Queensland. The region is largely comprised of pastoral country in the seasonally dry tropical region of Australia, characterised by almost exclusive summer rainfall and a relatively dry winter.



Climate

The monsoon trough is a broad area of low atmospheric pressure running east-west through the tropics in the summer months. During the summer it lies for lengthy periods over north Australia, and is the source of much rainfall. Tropical cyclones can develop off the coast in the wet season, usually forming within an active monsoon trough. Heavy rain and high winds, sometimes of destructive strength, can be experienced along the coast within several hundred kilometres of the centre of a cyclone. Northern and, to a lesser extent, central parts of Australia experience two distinct seasons: the "wet" (October to April) and the "dry" (May to September). The change between seasons is usually gradual, with transition months of October and November (often called the "build-up") at the start of the wet, and April at its end.

Pastures

The Northern Tropical sheep flock is run largely on open Mitchell and Flinders grass plains, with little tree cover.

Dominant Production Sector

The majority of the flock is located in the northern Queensland areas of Winton and Richmond due to the lower suitability of the Northern Territory and Kimberley region for sheep production. Due to the semi-arid nature of the landscape, seasonal flock nutritional deficiencies and low reproduction rates characterise the production system in the region. Consequently, exotic meat sheep breeds are of increasing importance, as they are more suited to the tropical climate. These breeds include Damara and Dorper. The sheep flocks in this region are small. Although not included in the ABARE data, local DPI staff have indicated that there are several wether flocks of around 1,500 head that are used in rotation with cattle to assist in the control of cattle tick.

Carrying capacity

Stocking rates for the unimproved land in northern Australia are generally quite low, about 1 sheep to 25 ha.

Current Issues

- ☆ Wild dogs lead to significant sheep losses. (30-50%).
- ☆ Lack of labour with sheep experience is driving people out of sheep and into cattle.
- ☆ Low profits, wild dogs and a lack of labour means there are probably very few sheep left in this region as at June 2006 (Gary Dick pers. comm.)

Table 25 Region 124 Average Farm

TABLE A – AVERAGE FARM	Production Sector – Region 124				
	SRW	SRM	W*	XB	TO
Numbers of properties	83		N/A		
Movements Off per “average” farm					
Live Export					
to region					
Feedlots					
to region					
Saleyard					
to region					
Abattoir	73.9%		100.0%		
to region*	6		6		
Property Sales	26.1%				
to region	6				
Total Movements off	3442		560		
Numbers On per “average” farm					
Purchases	34		575		
from region	6		6		
Management movements					
Feed Pasture only (Prop of properties %)	20		100		
Lamb muster frequency	3				
Ewe Muster frequency	2		1		
Ram Muster Frequency	2				
Never seek agistment (Prop of properties %)	50		100		
Season agistment sought	Winter				
Region agistment sought	6				

Note 1: xx/xx = percentage split, yy/yy = regional split. Note 2: Region 6: Northern wheat/sheep. Note: No ABARE Data – Experts assumptions where possible.

Region specific drivers

- ☆ The risk of Bluetongue disease spreading into the region’s cattle population and consequently affecting exports is a reason for the low number of sheep in the region.

Typical Farm Management Cycle

- ☆ Autumn joining with a late spring lambing.
- ☆ Weaning in spring with culling of rams, ewes and hoggets.
- ☆ Lambs/weaner sales usually in early winter.
- ☆ Large annual ram sales occur in the spring/autumn.
- ☆ Shearing tends to be in winter pre-lambing.

Table 26 Region 124 Typical Farm

TABLE B - TYPICAL FARM	Production Sector – Region 124				
	SRW	SRM	W	XB	TO
Numbers (Consignments) Off					
Live Export					
To Region					
Season					
Feedlots					
To Region					
Season					
Saleyard					
To Region					
Season					
Abattoir	2542 (3)		560 (2)		
To Region	6		6		
Season	Autumn		Autumn		
Property Sales	900 (1)				
To Region	6				
Season	Autumn				
Total Movements off	3442 (4)		560 (2)		
Numbers (Consignments) On					
Purchases	34 (1)		575 (1)		
from Region	50/50 6/9		6		
Season	Summer		Spring		
Total Sheep/Farm - 30 June ³					
Average	5028		1650		
Max (90% confidence interval)	6800		1980		
Min (90% confidence interval)	3257		1320		

Note 1: (Z) = No of consignments – numbers per consignment may vary, Note 2 - xx/xx = percentage split, yy/yy = regional split.

Note 3: Region 6: Northern wheat/sheep. **ABARE Data 2004/2005.**

Blank Page



4 NATIONAL SHEEP MOVEMENTS

4.1 Introduction

A range of seasonal, sociological & financial considerations influence the patterns of movement of sheep. In understanding the movements of sheep it is helpful to consider:

1. the key factors that influence the numbers and timing of sheep turnoff from a farm
2. the mechanisms by which sheep are sold, transferred and moved between farms or to abattoirs.

4.2 Key factors influencing turnoff numbers and timing

The key factors which influence the timing and numbers of sheep turned off any farm are market signals, seasonal conditions and management expertise. These factors also influence the number of properties running sheep enterprises and the number of sheep on each farm.

Wool and Lamb prices – The largest impact will be on turnoff numbers from each farm. Wool and lamb prices are especially important on mixed wheat sheep properties and when prices are low producers will devote less of their management time and dollars to nutrition, disease and parasite management which in turn reduces weaning percentages and turn off numbers. Currently, lamb and beef prices are double or in some cases triple the long term averages so there is some pressure to get out of SRW sheep and into beef or SRM sheep where environmental conditions or infrastructure such as cattle yards exist. High prices mean higher turn off numbers and justification for more movement to a finishing farm or feedlot.

Enterprise change – Personal preferences and the costs associated with major changes in the enterprise mix are significant factors that will limit significant changes in turnoff numbers or timing. The SRW sector is quite dynamic and when wool prices are high more management attention is devoted to wool and when lamb prices are high more attention is devoted to sale carcass. Tradition and conservative management reduce major swings in enterprise mix or management.

Seasonal conditions – Favourable seasonal conditions will lead to higher ewe fertility and weaning percentages and vice versa. In poor seasons or drought movements increase initially as producers sell down stock. Recovery from drought may see a spike in movement as producers restock. The impact on the timing of sales will be quite low.

Breed of sheep – A swing into more breeds like the Dorper would influence turnoff numbers more so than the timing of turnoff. Exotic breeds like the Dorper are capable of weaning 150% lambs (100 ewes with 150 lambs at weaning), Crossbreds in the order of 110% and Merinos 85%. The Dorper weaning percentage indicates the increased fertility as well as the excellent mothering capabilities of this breed.

Pasture productivity – Large areas of the pastoral region (R3) are suitable for breeding and wool production but are not reliably productive for lamb finishing. Economics may make it feasible to sell lambs from these regions earlier for finishing on other farms with more productive pastures or feedlots. Generally these farms will be in Regions 9 or 10b.

Personal preference & management – Personal preference, management and farm structure (enterprise mix, numbers of farms owned) will influence the timing of sheep sold, bought or moved to another farm.

Running down or building flock numbers – If producers decide to move into more cattle and cropping and less sheep then annual turnoff numbers will be higher and vice versa.

4.3 National patterns & drivers

National patterns are driven largely by economics given the small profit margin per sheep. In turn, proximity to marketing outlets, market price signals and personal preference will influence movement patterns.

West to East - Prime lamb and stud sheep from WA (Regions 12a & 12b) move to the eastern states – around 100,000 prime lambs annually, nearly all to abattoirs. Up to 25,000 store lambs also move to Wagga Wagga (Region 9) for sale in this region in an average year. Actual numbers will be very dependent on relative seasonal conditions. Movement is driven by marketing to a price advantage and the lack of prime lamb processing facilities in the west.

East to West - There is very limited movement east to west and this is restricted to mainly stud stock.

North to South – The general movement of sheep in the eastern states is from north to south – driven by access to the major saleyard and abattoir facilities. Restocker sheep also move from Queensland into NSW given differentials in seasonal conditions.

South to North – Store lambs move from Region 11 to Region 10b and numbers are driven by relative seasonal conditions, prices and a lack of processing capacity. Around 250,000 lambs (or one third of the Tasmanian lamb drop) move on average during the summer months. These movements are facilitated by the Bass Strait stock transportation subsidy and are contingent on seasonal conditions being different between Victoria and Tasmania.

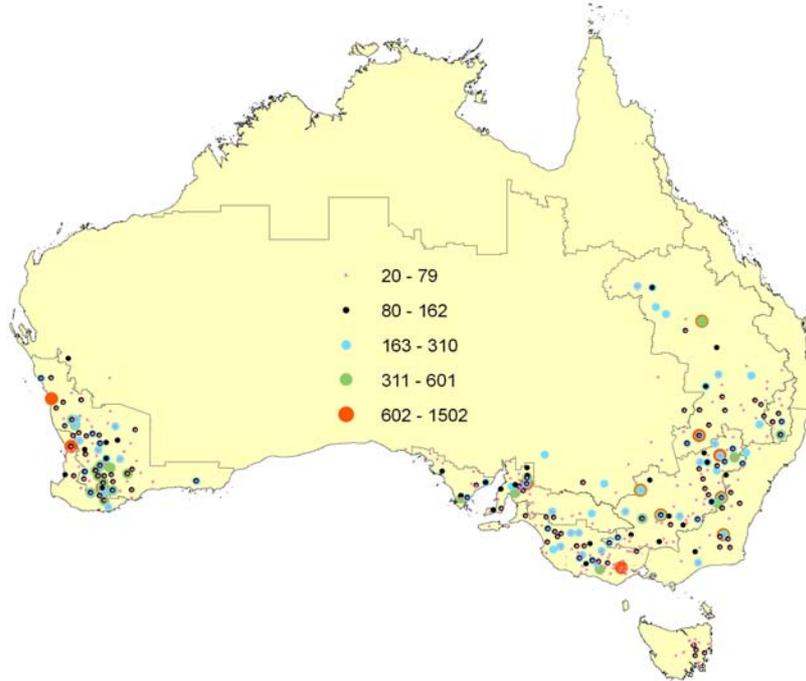
4.4 Mechanisms of movement

Given the importance of self replacing sheep sectors in the Australian sheep population and the preference to purchase rams from sheep studs, the location and number of rams sold will have a major impact on where sheep move around the country. Transport to saleyards, abattoirs, shows, live export ports, other farms, feedlots and agistment are other movement mechanisms.

Merino Sheep Studs - Although the number of rams required per farm is small (e.g. 2 rams per 100 ewes joined) movement of rams from studs to breeders will be significant across the country given that most flocks (except pure trading and wethers) will usually purchase some rams each year. Average ram sale numbers over the period 2002 to 2004 were 105, 815 stud rams from 1,038 stud Merino ram producers (Australian Stud Merino Breeders Association). Details behind this figure are presented in Appendix 1.

The location of those Merino studs that sell more than 20 rams per year is shown in Figure 13. In a similar trend to overall sheep numbers, the number of Merino stud farms has almost halved since 1991.

Figure 13 Merino stud location by number of rams sold



Source: Australian Stud Merino Breeders Association data 2002 – 2004.

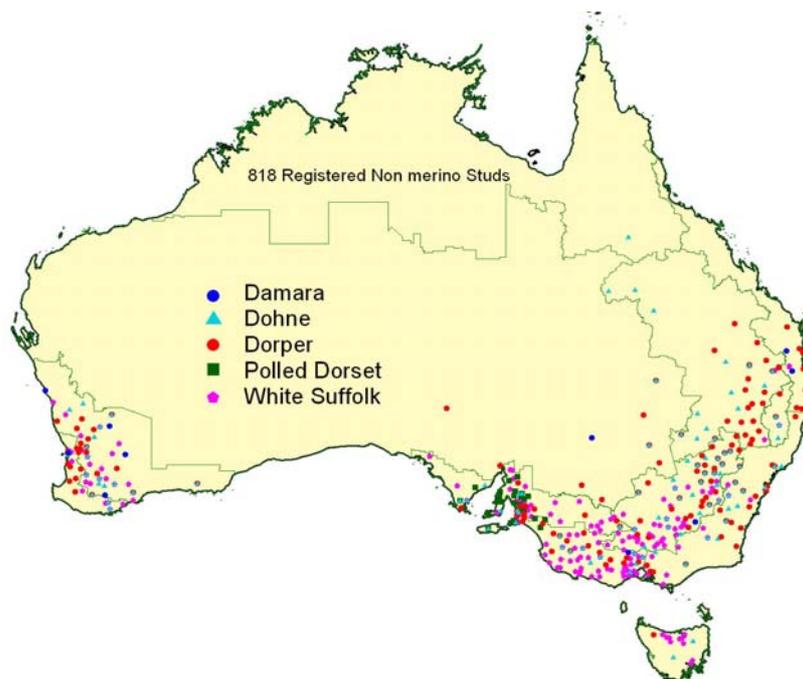
In terms of movement, Bill O'Hallaran (Armidale DPI) has a rule of thumb that for most studs only a small percentage of stud Merino rams would be sold outside a 500km radius of the stud. This would be particularly true of the medium to small studs selling less than 500 rams per year.

Whilst genetics plays a major role in the performance of Merino sheep, the environment and nutrition play an almost equal role in how the sheep expresses those genes. This is particularly important in terms of wool quality. In a survey of 350 stud Merino ram breeders and ram buyers conducted by Hassall & Associates in 1994, it was found that 81% of stud Merino ram buyers ranked “proven performance in the local district” as one of the most important factors influencing which stud they purchased their rams from. Similar breeding objectives and performance recording were also ranked highly.

Non Merino Sheep Studs

There are 385 registered White Suffolk studs and 220 Dorper studs in Australia. These studs are mapped in Figure 14. No data on numbers of non-Merino stud rams is available through the breeders associations, however, it is interesting to note the dominance of the White Suffolk and the Dorper in terms of the number and distribution of studs.

Figure 14 Distribution of non-Merino studs by meat breed

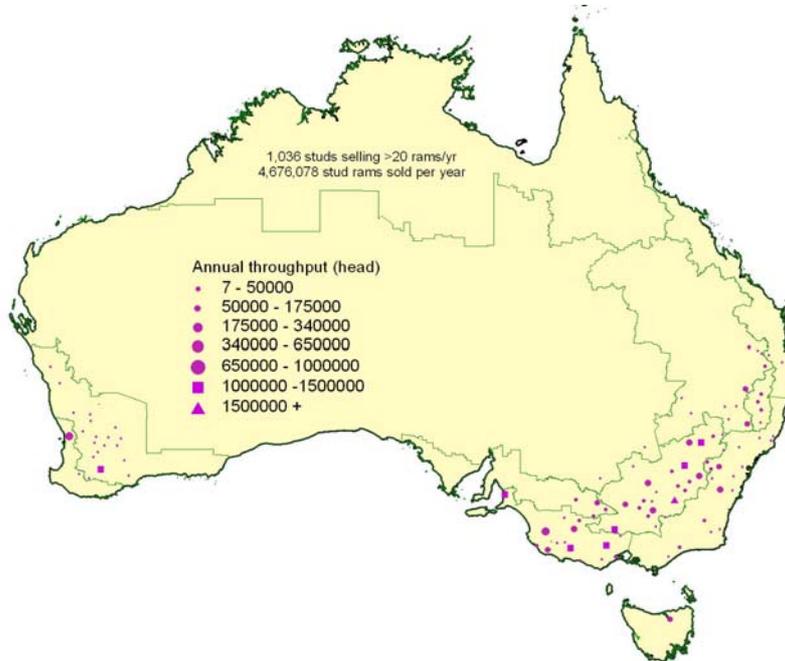


Source: Royal Agricultural & Horticultural Society Data (2005).

Saleyards

The distribution of sheep saleyard centers is shown in Figure 15 which illustrates the annual throughput at each centre based on National Livestock Reporting Service (NLRS) data. These saleyards had a combined throughput of 18.5 million in 2004/05.

Figure 15 Distribution of sheep saleyard centers by throughput



Source : National Livestock Reporting Service (NLRS) Data 2006

Store saleyards differ significantly in their operations from prime (slaughter destination) saleyards. Store sale stock tend to be uniform in size & quality, have large lot sizes and are often drafted on farm. In contrast, prime saleyards have more vendors, smaller lot sizes, mixed consignments and require specialised handling to prepare the stock in sale lines to maximise producer returns. This also means prime saleyards require a greater degree of infrastructure to support these activities.

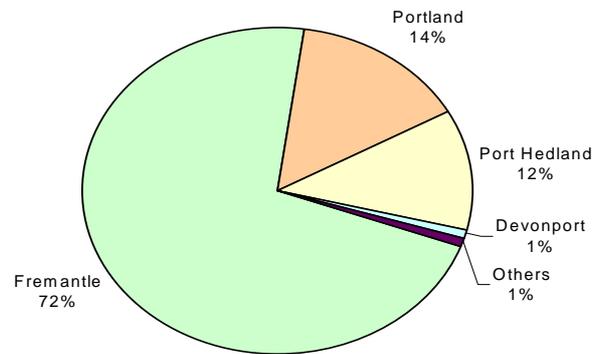
Increasing environmental and health constraints have reduced the number of saleyards and focused sheep selling to ten major centers across Australia. There are some 18.5 million sheep sold through the national saleyard network and of the 102 saleyards monitored by the NLRS, the top ten, by annual throughput, account for 65% of sales (NLRS Data 2004/05). More details of throughput by saleyard and sale type are included in Appendix 2.

The top ten saleyards include Wagga Wagga, Dubbo and Forbes in the east, Adelaide, Bendigo, Ballarat, Hamilton and Naracoorte in the south and Katanning and Midlands in the west. These are primarily for slaughter with only 8% (1.5 million) of these sales as store sheep which may go onto feedlots or to restockers. Significant store sheep sales (around 0.5 million head) occur in Narromine (Region 9) and Katanning (0.5 million) and Midland (0.4 million) both in (Region 12b). Katanning and Midland differ from the eastern states in that around 50% of throughput is for processing and 50% for store sales.

Live Export Centers

On average over the past nine years, 6.5 million live sheep have been exported from 25 centers around Australia. Wethers are the major class of animal for the live export market (90%), however, there are some live ewes and lambs exported to specialty markets. While there are quite a few live export centers, Fremantle, Portland and Port Hedland account for 98% of all live sheep exports.

Figure 16 Numbers of live sheep exported by port

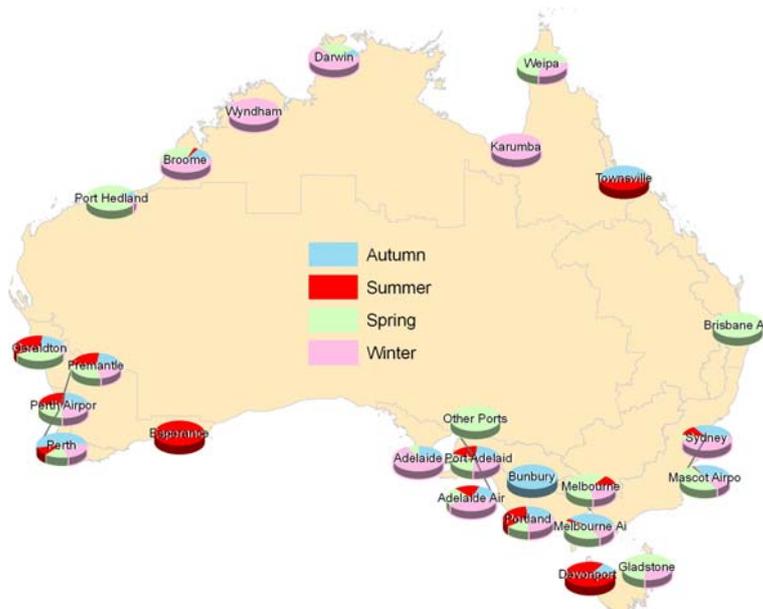


Source : ABS Data 2006

In the northern regions, live sheep are exported mostly in the spring and summer before the onset of the wet season when mustering and transport of stock becomes almost impossible. In the southern regions the pattern is more mixed, reflecting 1) the absence of a major wet season and year, 2) the opportunity to fatten wethers in various seasons and 3) a range of geographic locations supplying the major ports of Fremantle, Portland and Port Hedland.

The timing of this movement and on farm management are influenced by the timing of Ramadan which moves forward 11 days each year and influences a significant export market.

Figure 17 Live export ports and seasonality of exports

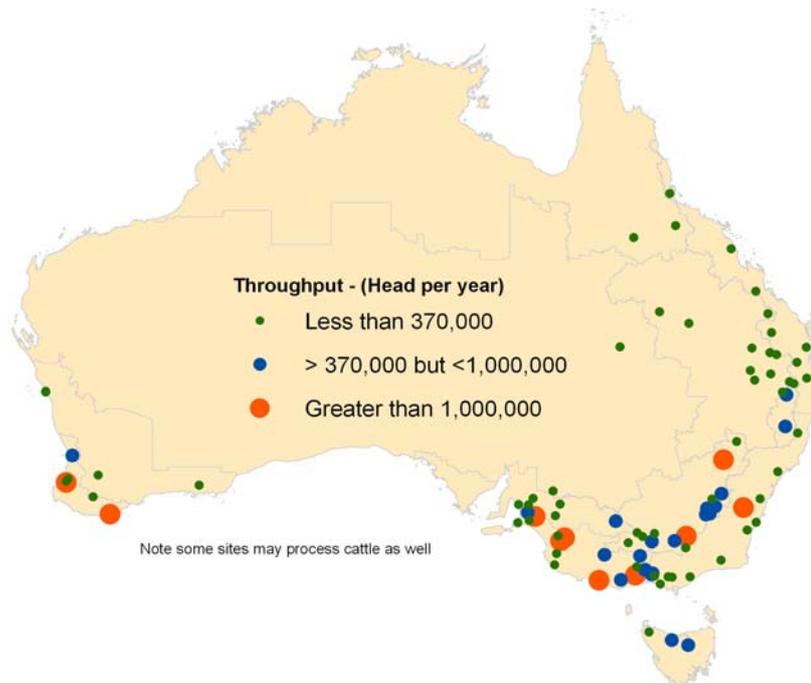


Source : ABS Data 2006

Abattoirs

ABARE is forecasting 27 million sheep and lambs to be processed in 2005/06, almost 50% of this total would be processed at the ten largest factories scattered through Regions 8, 9, 10a, 10b, 12a and 12b.

Figure 18 Sheep abattoir location & throughput



Shows

There are eight Royal Agricultural Society shows held in each capital city across Australia every year. These shows gain exhibitors from many different areas of Australia. Table 27 shows the timing of the show as well as the region that the sheep come from in order to attend the show.

Table 27 Timing of shows and the regions that participate.

Month	Show location	Participates (Regions)	Number of sheep
February	Canberra	8, 9, 10a and 10b	526
March	Sydney	3, 8, 9 and 10b	300 merinos 400 dual purpose
July	Darwin	124	Not available
August	Brisbane	5,6,7,8 and 9	Not available
September	Adelaide	3, 10a and 10b	Not available
September	Melbourne	3, 8, 9, 10a, 10b, 12a and 12b	750
September	Perth	10b, 12a and 12b	Not available
October	Hobart	11	250 - 300

Source : Various Show Society Data

Breeding & Finishing

Traditionally, SRW Merino flocks have been run in the pastoral region (Region 3) primarily for their wool, with CFA rams/ewes and surplus young sheep sold into the wheat/sheep regions (Regions 9, 10a and 12b). MLA and DPI (NSW) are encouraging sheep producers in region 3 to focus on breeding sheep and selling young weaners (12 to 14 weeks) into the more reliable wheat/sheep regions for finishing or to feedlots.

High lamb prices have made it economic to transport lambs and provide a margin for the finishing exercise. This can be a higher risk production strategy and long term profitability will be dependent on the relative prices of wool, lamb, mutton and replacement ewes.

The ultimate impact of this strategy on sheep movements is difficult to predict. There is consensus that breeding/finishing will raise weaning percentages and allow more ewes to be run per farm. In turn this should increase the number of young sheep moving into Regions 9, 10a and 12b. These movements will be around nine months earlier in the season.

As Region 3 has only around 7% of the national flock, the total scale of movement is relatively small. It may increase the proportion of movement that is between farms rather than to abattoirs.

Feedlots

Feedlots are generally located in the wheat/sheep region (Regions 6, 9, 10a & 12b). In good seasons they source most of their sheep from surplus young stock within the region. In poor seasons they need to source a greater proportion from Region 3. In Regions 7 and 8 the sheep are generally not suitable for feedlots as they are usually smaller framed, specialist fine wool sheep and producers are not keen to join them to a terminal sire in order to produce a more suitable lamb for the feedlot.

While lamb prices are high and grain prices are low, feedlots will provide a mechanism to move young sheep. In good seasons this movement will be predominantly intra-regional, with more inter-regional movement in the poor seasons.

Agistment

Agistment is not often used by sheep producers to provide feed for their stock in droughts or poor seasons. On average, across all regions and production sectors, 85% of sheep producers never agist their stock. The cost of transport and the actual cost of the agistment is often greater than the profit margin involved. There are also some concerns of OJD or footrot infecting their sheep during agistment (predominately to Region 8). The direction sheep move for agistment will depend greatly on significant seasonal differences between regions.

Agistment of sheep is not a mechanism frequently used for moving sheep.

4.5 Conclusions

Sheep movements are mostly restricted to a 200km radius from where they were born and bred. This is largely due to there being generally a small profit margin per sheep and producers' inability to economically justify moving sheep large distances. Other factors such as performance of bloodline in the local region and preference for same day purchase and arrival of sheep contribute to reasons why sheep tend not to move very far. For stud animals, this radius of movement might be extended to 500km as there are fewer animals to move, the producer may be able to transport them with farm vehicles and the economics of transport can be justified.

Sheep movements in terms of size and timing are driven primarily by the type of production sector involved. Because 78% of the sheep in the national flock are involved in self replacing breeding systems, the only movements onto the properties will be stud rams and the only movement off the properties will be CFA rams and ewes and surplus young sheep (hoggets or lambs). In terms of percentages of ewes in a SRW farm flock joined this would mean:

- ☆ 0.05% rams moving onto the farm
- ☆ 18% cull sheep
- ☆ 64% young surplus sheep leaving the farm.

These proportions will vary predominantly with weaning percentages which in turn are driven by nutrition and genetics.

Droughts, recovery from droughts and large seasonal differentials will significantly increase the distances and number of sheep moved compared to a "normal" season. For example, lamb movements from WA (R12a & 12b) to SA are up by 250% from 100,000 to 250,000 (2005/06) due to a strong seasonal differential and spare processing capacity in SA. These factors drive the economics of the sale/purchase so that larger margins cover the increased travel costs. High value sheep, transport efficiencies (such as B-doubles) and favourable commodity prices will also increase the distances sheep move.

The spatial distribution and the number of sheep sold from sheep studs, saleyards and live export centers will also impact on the size and number of consignments. The decline in the number of sheep studs and abattoirs and the increasing popularity of on-farm auction technology such as "Auctions Plus" (an internet based system) may increase the distances sheep move in the future.

Blank Page

5 REFERENCES

ABARE (2005a), *Australian Commodity Statistics*, Location: www.abare.gov.au

ABARE (2005b), *Sheep composition, by production system, Australia & by Regional Zone 2004/05*.

Location: www.abare.gov.au

ABARE (2004), *Australian Lamb 04.2*, November

Bureau of Meteorology (2006), *Climate Averages*.

Location: www.bom.gov.au

Commonwealth Department of Agriculture, Fisheries and Forestry (2006), *Snapshot of the Livestock Export Industry*.

Location: <http://www.affa.gov.au/content/output.cfm?ObjectID=E1B75863-343D-48A0-9CC388B4F451F899>

Commonwealth Department of the Environment and Heritage (2006), *Australia's 15 National Biodiversity Hotspots*.

Location: <http://www.deh.gov.au/biodiversity/hotspots/facts.html>

Commonwealth Department of the Environment and Heritage (2003), *Bushcare Support 2003: Native Vegetation Management*.

Location: <http://www.deh.gov.au/land/publications/nvm-nsw-act/pubs/nsw-act-central-west.pdf>

Hassall & Associates (1994) "An electronic register of Stud Merino ram breeders" *Wool Research & Development Corporation (WRDC)*

Government of South Australia (2006), *Atlas of South Australia*.

Location: <http://www.atlas.sa.gov.au/go/resources/atlas-of-south-australia-1986/regional-areas/south-east>

Murray Catchment Authority (2006), *The Catchment*.

Location: <http://www.murray.cma.nsw.gov.au/catchment.html>

Murrumbidgee Catchment Management Authority (2006), *Native vegetation in the Murrumbidgee Catchment*.

Location: <http://www.murrumbidgee.cma.nsw.gov.au/11.0.html>

National Farmers Federation (1991), *Australian Agriculture: the complete reference guide*, Morescope Pty Ltd, Victoria.

National Parks Association of New South Wales (2006), *Bioregions of Coastal New South Wales*.

Location: <http://www.npansw.org.au/web/journal/200002/Febbioregions.htm>

New South Wales Department of Primary Industries (2006), *Ovine Johne's Disease*. Location:

<http://www.agric.nsw.gov.au/reader/ojd>



Northern Tasmania Development (2006), *The Agriculture Industry*.

Location: <http://www.northerntasmania.info/invest/agriculture.html>

Parks & Wildlife Service Tasmania (2006), *Plants of Tasmania*.

Location: <http://www.parks.tas.gov.au/veg/grassland/index.html>

Queensland Department of Primary Industries & Fisheries (2006), *The Sheep and Wool Industry in Queensland*.

Location: <http://www2.dpi.qld.gov.au/sheep/7925.html>

Rural Workforce Support (2006), *Tasmanian GP Atlas*.

Location: <http://www.gpatlas.org.au/subsector.php?id=108348>

Tasmanian Department of Primary Industries, Water and Environment (2006), *Sheep*.

Location: <http://www.dpiwe.tas.gov.au/inter.nsf/ThemeNodes/EGIL-534748?open>

Tasmanian Department of Primary Industries, Water and Environment (2006), *Wool*.

Location: <http://www.dpiwe.tas.gov.au/inter.nsf/WebPages/EGIL-5HU344?open>

Tourism Tasmania (2006), *About Tasmania: climate*.

Location: <http://www.discovertasmania.com/home/index.cfm?SiteID=110>

Tourism Tasmania (2006), *What makes Tasmania different*.

Location:

http://www.discovertasmania.com.au/home/tasmedia_index.cfm?level1=story%20leads&level2=what%20makes%20tas%20different&tsdifferentid=5

University of New England (2006), *Kirby Pastures 3: Recommended Species of the Northern Tablelands*.

Location: <http://www.une.edu.au/agronomy/pastures/teaching/units/agro321/kirbypastassess/3.htm>

Victorian Department of Sustainability and Environment (2006), *Victorian Midlands*.

Location:

<http://www.dse.vic.gov.au/dse/nrence.nsf/LinkView/C489566555FD713BCA256EEC000735661C26CB3A9ABC1C2FCA256EE700148D0B>

World Wildlife Fund (2006), *Southwestern Australia Forests and Scrub*,

Location: http://www.panda.org/about_wwf/where_we_work/ecoregions/swaustralia_forests_scrub.cfm

APPENDIX 1 – TOP 140 STUD MERINO RAM DATA

Source : Australian Stud Merino Breeders Association (ASMB) Data

Rank	Stud Name	2002	2003	2004	% Change	Average	Posctode	Region	Region ID
1	The Grange	2000	1990	1347	-33	1779	6069	Western High Rainfall	12a
2	Egelabra	1967	1249	1289	-34	1502	2824	Northern Wheat/sheep	6
3	Hazeldean	1551	1385	1496	-4	1477	2630	Eastern High Rainfall	8
4	Haddon Rig	1041	1086	1191	14	1106	2824	Northern Wheat/sheep	6
5	Merryville	1383	850	870	-37	1034	2586	Eastern Wheat/sheep	9
6	Pooginook	880	990	630	-28	833	2716	Eastern Wheat/sheep	9
7	Well Gully Poll	765	800	807	5	791	4465	Northern Wheat/sheep	6
8	Woodyarrup	781	811	753	-4	782	6318	Western Wheat/Sheep	12b
9	Uardry	591	736	773	31	700	2711	Eastern Wheat/sheep	9
10	East Bungaree	756	607	610	-19	658	5417	Southern Wheat/sheep	10a
11	Wurrook	824	632	511	-38	656	3330	South West High Rainfall	10b
12	Gum Hill Poll	617	703	635	3	652	5418	Southern Wheat/sheep	10a
13	Moorundie Park Poll	450	900	600	33	650	5471	Southern Wheat/sheep	10a
14	Mungadal	460	944	491	7	632	2711	Eastern Wheat/sheep	9
15	Roseville Park	610	650	630	3	630	2830	Eastern Wheat/sheep	9
16	Collinsville	700	596	508	-27	601	5418	Southern Wheat/sheep	10a
17	Strath Haddon	600	600	600	0	600	6318	Western Wheat/Sheep	12b
18	Lewisdale	684	586	468	-32	579	6370	Western Wheat/Sheep	12b
19	Cranmore Park	696	551	420	-40	556	6510	Western Wheat/Sheep	12b
20	Lewisdale Poll	684	548	422	-38	551	6370	Western Wheat/Sheep	12b
21	Barloo	664	540	450	-32	551	6335	Western Wheat/Sheep	12b
22	Nepowie Poll	520	590	520	0	543	6312	Western Wheat/Sheep	12b
23	Jaloran	520	532		-100	526	6395	Western Wheat/Sheep	12b
24	Billandri Poll	578	600	375	-35	518	6323	Western High Rainfall	12a
25	Cardo	502			-100	502	6513	Western Wheat/Sheep	12b
26	Mount Ascot	500	430	440	-12	457	4465	Northern Wheat/sheep	6
27	Salt Creek	625	404	320	-49	450	3272	South West High Rainfall	10b
28	Goolgumbula	460	410	476	3	449	2716	Eastern Wheat/sheep	9
29	Yarrum Valley Poll	510	480	322	-37	437	6320	Western Wheat/Sheep	12b
30	Kylie Poll	562	455	284	-49	434	6363	Western Wheat/Sheep	12b
31	Middle View	472	389	396	-16	419	2630	Eastern High Rainfall	8
32	Nyowee Poll	200	505	520	160	408	5461	Southern Wheat/sheep	10a
33	Old Cobran Poll	400	400	400	0	400	2710	Eastern Wheat/sheep	9
34	The Lagoons	440	385	360	-18	395	2584	Eastern High Rainfall	8
35	Rutherglen	418	403	302	-28	374	6372	Western Wheat/Sheep	12b
36	Angenup	365	367	380	4	371	6395	Western Wheat/Sheep	12b
37	Glanna	454	354	282	-38	363	2852	Eastern Wheat/sheep	9
38	Woolkabin	410	380	300	-27	363	6317	Western Wheat/Sheep	12b
39	Greenfields	310	387	380	23	359	5419	Southern Wheat/sheep	10a
40	Boonoke Poll	337	365	374	11	359	2710	Eastern Wheat/sheep	9
41	Woolkabin Poll	370	350	330	-11	350	6317	Western Wheat/Sheep	12b
42	Wanganella	242	400	401	66	348	2710	Eastern Wheat/sheep	9
43	Kolindale	350	420	265	-24	345	6370	Western Wheat/Sheep	12b
44	Willandra	310	375	320	3	335	2716	Eastern Wheat/sheep	9
45	East Mundalla	384	306	310	-19	333	6353	Western Wheat/Sheep	12b
46	Sims Uardry	145	530	325	124	333	2711	Eastern Wheat/sheep	9

Rank	Stud Name	2002	2003	2004	% Change	Average	Posctode	Region	Region ID
47	Collinsville Poll	450	297	250	-44	332	5418	Southern Wheat/sheep	10a
48	North Ashrose Poll	172	513	305	77	330	5471	Southern Wheat/sheep	10a
49	White River	305	347	327	7	326	5607	Southern Wheat/sheep	10a
50	Greenfields Poll	210	408	347	65	322	5419	Southern Wheat/sheep	10a
51	Nerstane	308	390	265	-14	321	2354	Armidale High Rainfall	7
52	North Ashrose	158	469	330	109	319	5418	Southern Wheat/sheep	10a
53	Tara Park	410	300	245	-40	318	2586	Eastern Wheat/sheep	9
54	Seven Oaks North	315	360	280	-11	318	6421	Western Wheat/Sheep	12b
55	Quailerup	520	280	149	-71	316	6315	Western Wheat/Sheep	12b
56	Shahs Poll	343	352	234	-32	310	6409	Western Wheat/Sheep	12b
57	Fleming Grove Poll	305	350	263	-14	306	6450	Western Wheat/Sheep	12b
58	Lansdowne Poll	310	337	263	-15	303	4478	Northern Wheat/sheep	6
59	Pastora Poll	250	310	350	40	303	2656	Eastern Wheat/sheep	9
60	Faraway Poll	306	298	305	0	303	5272	South West High Rainfall	10b
61	Mumblebone	411	238	248	-40	299	2820	Eastern Wheat/sheep	9
62	Barcaldine Downs	310	217	330	6	286	4725	Northern Wheat/sheep	6
63	Wallinar	283	275	248	-12	269	6318	Western Wheat/Sheep	12b
64	Willemenu Poll	260	268	273	5	267	6335	Western Wheat/Sheep	12b
65	Eungai	284	331	184	-35	266	6575	Western Wheat/Sheep	12b
66	Concordia	342	322	110	-68	258	3536	Eastern Wheat/sheep	9
67	Hyfield	290	220	264	-9	258	6395	Western Wheat/Sheep	12b
68	East Strathglen	250	260	260	4	257	6320	Western Wheat/Sheep	12b
69	Rock-Bank	258	250	260	1	256	3294	South West High Rainfall	10b
70	One Oak	270	230	260	-4	253	2716	Eastern Wheat/sheep	9
71	Woodpark	243	274	243	0	253	2716	Eastern Wheat/sheep	9
72	Severn Park	252	270	235	-7	252	2630	Eastern High Rainfall	8
73	Gunbar	250			-100	250	2652	Eastern Wheat/sheep	9
74	Shalimar Park	300	250	200	-33	250	2354	Armidale High Rainfall	7
75	Collandra North Poll	250	253	241	-4	248	5605	Southern Wheat/sheep	10a
76	Haseley Poll	262	263	210	-20	245	6566	Western Wheat/Sheep	12b
77	Barton Hill Poll	150	310	275	83	245	5417	Southern Wheat/sheep	10a
78	Sunny Valley		249	237	-5	243	6395	Western Wheat/Sheep	12b
79	Terrick Merinos	208		275	32	242	4472	Northern Wheat/sheep	6
80	Ejanding	264	225	233	-12	241	6461	Western Wheat/Sheep	12b
81	Glen Donald	250	263	202	-19	238	3418	South West High Rainfall	10b
82	Merrignee	252	251	212	-16	238	2586	Eastern Wheat/sheep	9
83	Genanegie	250	250	210	-16	237	2869	Eastern Wheat/sheep	9
84	Pemcaw	183	321	195	7	233	2844	Eastern Wheat/sheep	9
85	One Oak No 2	210	290	197	-6	232	2716	Eastern Wheat/sheep	9
86	Undabri Poll	125	145	419	235	230	4390	Northern Wheat/sheep	6
87	Windarra	263	260	162	-38	228	5271	South West High Rainfall	10b
88	Boonoke	169	240	272	61	227	2710	Eastern Wheat/sheep	9
89	Lansdowne	182	295	200	10	226	4478	Northern Wheat/sheep	6
90	Walkindyer Poll	180	252	245	36	226	6535	Western Wheat/Sheep	12b
91	Glendemar	256	210	210	-18	225	3380	South West High Rainfall	10b
92	Willigulli North Poll	234	235	206	-12	225	6535	Western Wheat/Sheep	12b



Rank	Stud Name	2002	2003	2004	% Change	Average	Postcode	Region	Region ID
93	Tamaleuca	312	138	221	-29	224	3490	Southern Wheat/sheep	10a
94	Wallaloo Park	249	182	228	-8	220	3387	Southern Wheat/sheep	10a
95	Mooramanna	190	199	267	41	219	4487	Northern Wheat/sheep	6
96	Keri Keri		205	231	13	218	2733	Eastern Wheat/sheep	9
97	Old Ashrose	216	245	187	-13	216	5419	Southern Wheat/sheep	10a
98	Bungulla	133	295	218	64	215	2346	Northern Wheat/sheep	6
99	Charinga	216	258	168	-22	214	3518	Eastern Wheat/sheep	9
100	Manunda No 2 Poll	275	210	145	-47	210	6409	Western Wheat/Sheep	12b
101	Kurra-Wirra	231	248	150	-35	210	3315	South West High Rainfall	10b
102	Cassilis Park	141	257	230	63	209	2329	Eastern High Rainfall	8
103	Old Ashrose Poll	122	318	184	51	208	5419	Southern Wheat/sheep	10a
104	Strathglen West	210	200		-100	205	6330	Western High Rainfall	12a
105	Gringegalgon	223	226	165	-26	205	3407	South West High Rainfall	10b
106	Nareeb Nareeb	267	157	188	-30	204	3293	South West High Rainfall	10b
107	Lewisdale-Corrigin Poll	200	207	205	3	204	6375	Western Wheat/Sheep	12b
108	Grathlyn	224	218	168	-25	203	2850	Eastern High Rainfall	8
109	C Lake Poll	197	261	150	-24	203	3500	Central Pastoral	3
110	Alma	210	245	150	-29	202	2711	Eastern Wheat/sheep	9
111	Seven Oaks North Poll	165	200	240	45	202	6421	Western Wheat/Sheep	12b
112	Ashrose Poll	225	205	172	-24	201	5266	South West High Rainfall	10b
113	Dongiemon	227	195	180	-21	201	6391	Western Wheat/sheep	12b
114	Towalba	300	150	150	-50	200	2869	Eastern Wheat/sheep	9
115	Kolindale Poll	227	230	142	-37	200	6370	Western Wheat/Sheep	12b
116	Cressbrook	163	269	165	1	199	2350	Armidale High Rainfall	7
117	Raby	125	291	181	45	199	2824	Northern Wheat/sheep	6
118	Petali	302	168	121	-60	197	2354	Armidale High Rainfall	7
119	Stockhill	149	244		-100	197	6383	Western Wheat/Sheep	12b
120	Springvale North Poll	178	243	167	-6	196	5417	Southern Wheat/sheep	10a
121	Lorelmo-Willalooka Poll	210	206	170	-19	195	5271	South West High Rainfall	10b
122	Umbercollie	164	225	195	19	195	4390	Northern Wheat/sheep	6
123	Avenel	202	187	192	-5	194	2710	Eastern Wheat/sheep	9
124	Mullengudger	188	281	111	-41	193	2825	Northern Wheat/sheep	6
125	Gowandale	230	190	160	-30	193	3478	Eastern Wheat/sheep	9
126	Colvin	210	184	181	-14	192	6510	Western Wheat/Sheep	12b
127	Claypans Poll	185	186	189	2	187	6375	Western Wheat/Sheep	12b
128	Wyuna	179	185	196	9	187	2827	Eastern Wheat/sheep	9
129	Wilgunya		170	200	18	185	4486	Northern Wheat/sheep	6
130	Bungaree Poll	110	202	241	119	184	5453	Southern Wheat/sheep	10a
131	Calcaling Poll	185	180	185	0	183	6479	Western Wheat/Sheep	12b
132	Leahcim Poll	190	170	190	0	183	5520	Southern Wheat/sheep	10a
133	Cramphorne	220	209	119	-46	183	6420	Western Wheat/Sheep	12b
134	Undabri	136	166	243	79	182	4390	Northern Wheat/sheep	6
135	GRASS Merinos		169	193	14	181	2830	Eastern Wheat/sheep	9
136	Glenville	179	182	181	1	181	5602	Southern Wheat/sheep	10a
137	Springvale	150	200	190	27	180	5417	Southern Wheat/sheep	10a
138	Portland Downs		78	281	260	180	4727	Northern Wheat/sheep	6
139	Kelvale Poll	126	206	203	61	178	5416	Southern Wheat/sheep	10a
140	Anro	386	100	47	-88	178	6513	Western Wheat/Sheep	12b

APPENDIX 2 – NATIONAL SHEEP SALEYARD DATA

Source : National Livestock Reporting Service Data (NLRS) 2006

RANK	SALEYARD	PRIME	STORE	TOTAL	STATE	PCODE	ZONE_ID	ZONENAME
1	Wagga Wagga	1680299	0	1680299	NSW	2650	9	Eastern Wheat/sheep
2	Dubbo	1429402	0	1429402	NSW	2830	9	Eastern Wheat/sheep
3	Adelaide		0	1317233	SA	5000	10b	South West High Rainfall
4	Ballarat		0	1262140	VIC	3350	10b	South West High Rainfall
5	Bendigo		0	1236229	VIC	3550	9	Eastern Wheat/sheep
6	Katanning	557983	557983	1115966	WA	6317	12b	Western Wheat/Sheep
7	Hamilton		0	1047226	VIC	3300	10b	South West High Rainfall
8	Forbes	1005331	11672	1017003	NSW	2871	9	Eastern Wheat/sheep
9	Midland	432848	432848	865695	WA	6056	12a	Western High Rainfall
10	Naracoorte		0	652823	SA	5271	10b	South West High Rainfall
11	Horsham		0	466799	VIC	3400	10b	South West High Rainfall
12	Corowa	424268	25110	449378	NSW	2646	9	Eastern Wheat/sheep
13	Griffith	407844	0	407844	NSW	2680	9	Eastern Wheat/sheep
14	Narromine		391513	391513	NSW	2821	9	Eastern Wheat/sheep
15	Goulburn	364883	8692	373575	NSW	2580	8	Eastern High Rainfall
16	Cowra	340404	0	340404	NSW	2794	9	Eastern Wheat/sheep
17	Tamworth	291140	5640	296780	NSW	2340	6	Northern Wheat/sheep
18	Bathurst	288085	0	288085	NSW	2795	8	Eastern High Rainfall
19	Deniliquin	151342	116776	268118	NSW	2710	9	Eastern Wheat/sheep
20	Mount Gambier		0	254936	SA	5290	10b	South West High Rainfall
21	Launceston		0	200000	TAS	7250	11	Tasmania
22	Swan hill		0	196431	VIC	3585	10a	Southern Wheat/sheep
23	Inverell	167522	9438	176960	NSW	2360	6	Northern Wheat/sheep
24	Ouyen		0	165217	VIC	3490	10a	Southern Wheat/sheep
25	Dunedoo	103550	31550	135100	NSW	2844	9	Eastern Wheat/sheep
26	Glen innes	133533	0	133533	NSW	2370	7	Armidale High Rainfall
27	Geelong		0	129812	VIC	3220	10b	South West High Rainfall
28	Cooma	30465	90902	121367	NSW	2630	8	Eastern High Rainfall
29	Wycheproof		0	114478	VIC	3527	10a	Southern Wheat/sheep
30	Jerilderie		109924	109924	NSW	2716	9	Eastern Wheat/sheep
31	Warracknabeal		0	104300	VIC	3393	10b	South West High Rainfall
32	Young	102522	0	102522	NSW	2594	9	Eastern Wheat/sheep
33	Cootamundra	99419	0	99419	NSW	2590	9	Eastern Wheat/sheep
34	Armidale	99404	0	99404	NSW	2350	7	Armidale High Rainfall
35	Warwick	97871	0	97871	QLD	4370	6	Northern Wheat/sheep
36	Blayney	94118	0	94118	NSW	2799	8	Eastern High Rainfall
37	Yarrawonga		0	88231	VIC	3730	9	Eastern Wheat/sheep
38	West Wyalong		79529	79529	NSW	2671	9	Eastern Wheat/sheep
39	Guyra	73689	2230	75919	NSW	2365	7	Armidale High Rainfall
40	Kerang		0	74900	VIC	3579	10a	Southern Wheat/sheep
41	Orange	69655	0	69655	NSW	2800	8	Eastern High Rainfall
42	Finley	67191	0	67191	NSW	2713	9	Eastern Wheat/sheep
43	Dalby	53000	7314	60314	QLD	4405	6	Northern Wheat/sheep
44	Bairnsdale		0	58117	VIC	3875	8	Eastern High Rainfall
45	Temora	57342	0	57342	NSW	2666	9	Eastern Wheat/sheep
46	Millicent		0	57104	SA	5280	10b	South West High Rainfall
47	Warrnambool		0	49325	VIC	3280	10b	South West High Rainfall
48	Balranald		40298	40298	NSW	2715	3	Central Pastoral
49	Sale		0	38000	VIC	3850	8	Eastern High Rainfall
50	Casterton		0	36818	VIC	3311	10b	South West High Rainfall
51	Northam		36687	36687	WA	6401	12b	Western Wheat/Sheep

RANK	SALEYARD	PRIME	STORE	TOTAL	STATE	PCODE	ZONE_ID	ZONENAME
52	Nhill		0	36266	VIC	3418	10b	South West High Rainfall
53	Moora		30716	30716	WA	6510	12b	Western Wheat/Sheep
54	Walcha	27971	0	27971	NSW	2354	7	Armidale High Rainfall
55	Narrogin		26306	26306	WA	6312	12b	Western Wheat/Sheep
56	Urana		25000	25000	NSW	2645	9	Eastern Wheat/sheep
57	Kojonup		22751	22751	WA	6395	12b	Western Wheat/Sheep
58	Coonamble		22560	22560	NSW	2829	6	Northern Wheat/sheep
59	Narrandera		21000	21000	NSW	2700	9	Eastern Wheat/sheep
60	Wangaratta		0	19734	VIC	3678	9	Eastern Wheat/sheep
61	Kyneton		0	17144	VIC	3444	10b	South West High Rainfall
62	Quairading		15812	15812	WA	6383	12b	Western Wheat/Sheep
63	Wickepin		15812	15812	WA	6370	12b	Western Wheat/Sheep
64	Hillston		15000	15000	NSW	2675	9	Eastern Wheat/sheep
65	Narngulu		13200	13200	WA	6532	12b	Western Wheat/Sheep
66	Lake Grace		11420	11420	WA	6353	12b	Western Wheat/Sheep
67	Boyup brook		10187	10187	WA	6244	12a	Western High Rainfall
68	Kondinin		10000	10000	WA	6367	12b	Western Wheat/Sheep
69	Mudgee	7455	2321	9776	NSW	2850	8	Eastern High Rainfall
70	Walgett	9651	0	9651	NSW	2832	6	Northern Wheat/sheep
71	Wodonga		0	9411	VIC	3690	8	Eastern High Rainfall
72	Jerramungup		8000	8000	WA	6337	12b	Western Wheat/Sheep
73	Merredin		6500	6500	WA	6415	12b	Western Wheat/Sheep
74	Mingenew		6500	6500	WA	6522	12b	Western Wheat/Sheep
75	Coleraine		0	5631	VIC	3315	10b	South West High Rainfall
76	Brookton		5500	5500	WA	6306	12b	Western Wheat/Sheep
77	Barraba		5460	5460	NSW	2347	6	Northern Wheat/sheep
78	Camden	4875	0	4875	NSW	2570	8	Eastern High Rainfall
79	Toowoomba	4401	0	4401	QLD	4350	6	Northern Wheat/sheep
80	Bruce Rock		4300	4300	WA	6418	12b	Western Wheat/Sheep
81	Crookwell		4163	4163	NSW	2583	8	Eastern High Rainfall
82	Windsor		3840	3840	NSW	2756	8	Eastern High Rainfall
83	Gunnedah		3363	3363	NSW	2380	6	Northern Wheat/sheep
84	Lismore	1101	1632	2733	NSW	2480	5	North East High Rainfall
85	Corrigin		2700	2700	WA	6375	12b	Western Wheat/Sheep
86	Narrabri	1471	0	1471	NSW	2390	6	Northern Wheat/sheep
87	Dowerin		1347	1347	WA	6461	12b	Western Wheat/Sheep
88	Bombala	806	482	1288	NSW	2632	8	Eastern High Rainfall
89	Moss vale	986	0	986	NSW	2577	8	Eastern High Rainfall
90	Gloucester	794	0	794	NSW	2422	8	Eastern High Rainfall
91	Condobolin		770	770	NSW	2877	3	Central Pastoral
92	Denman		650	650	NSW	2328	8	Eastern High Rainfall
93	Oakey	442	0	442	QLD	4401	6	Northern Wheat/sheep
94	Colac		0	287	VIC	3250	10b	South West High Rainfall
95	Gatton	120	40	160	QLD	4343	5	North East High Rainfall
96	Beaudesert		120	120	QLD	4285	5	North East High Rainfall
97	Taree	66	0	66	NSW	2430	8	Eastern High Rainfall
98	Bega	40	0	40	NSW	2550	8	Eastern High Rainfall
99	Nabiac		24	24	NSW	2312	8	Eastern High Rainfall
100	Narembeen		10	10	WA	6369	12b	Western Wheat/Sheep
101	Wongan hills		10	10	WA	6603	12b	Western Wheat/Sheep
102	Coolah	7	0	7	NSW	2843	9	Eastern Wheat/sheep



APPENDIX 3 – LIVE SHEEP EXPORT DATA

Source : ABS Data 2006

PORT	Annual exports by port - 9 years average data ABS				
	AUTUMN	SUMMER	SPRING	WINTER	TOTAL
Fremantle	1,029,088	1,287,255	1,334,036	946,101	4,596,479
Portland	253,957	284,999	162,620	226,938	928,514
Port Adelaide	183,718	168,248	210,973	206,481	769,421
Devonport	8,097	50,125	0	0	58,222
Gladstone	0	0	7,709	2,827	10,536
Geraldton	2,174	3,307	4,053	261	9,794
Broome	1,084	285	2,499	3,611	7,480
Perth Airpor	1,737	1,959	1,700	1,894	7,291
Esperance	0	5,605	0	0	5,605
Port Hedland	171	0	2,010	142	2,324
Darwin	130	0	459	937	1,527
Melbourne	5	120	585	209	919
Bunbury	748	0	0	0	748
Perth	384	68	143	139	734
Other Ports	0	0	643	0	643
Adelaide	130	0	53	332	515
Townsville	200	189	0	0	389
Adelaide Air	70	78	69	165	382
Wyndham	0	0	0	286	286
Karumba	0	0	0	221	221
Weipa	0	0	133	52	185
Mascot Airpo	44	2	63	18	127
Brisbane Air	0	0	1	0	0

PORT	PCODE	ZONE_ID
Adelaide	5000	10b
Adelaide Air	5950	10b
Brisbane Air	4000	5
Broome	6725	124
Bunbury	5266	10b
Darwin	0800	124
Devonport	7310	11
Esperance	6450	12b
Fremantle	6160	12a
Geraldton	6530	12b
Gladstone	7264	11
Karumba	4891	124
Mascot Airpo	2000	8
Melbourne	3000	10b
Other Ports	5000	10b
Perth	6000	12a
Perth Airpor	6105	12a
Port Adelaide	5000	10b
Port Hedland	6721	3
Portland	2847	10b
Townsville	4810	5
Weipa	4874	124
Wyndham	6740	124

APPENDIX 4 – ABATTOIR THROUGHPUT DATA

Source : Australian Meat Processors Corporation Data 2006

ABATTOIR	LOCATION	STATE	POSTCODE	SIZE	ZONENAME	ZONE_ID
Bunganbah Meat Company	Coonabarabran	NSW	2357	C	Eastern Wheat/sheep	9
Burrangong Meat Processor	Young	NSW	2594	C	Eastern Wheat/sheep	9
Cowra Abattoir Pty Limite	Cowra	NSW	2794	B	Eastern Wheat/sheep	9
D A Holdings Pty Ltd	Moruya	NSW	2537	C	Eastern High Rainfall	8
Fletcher International Ex	Dubbo	NSW	2830	A	Eastern Wheat/sheep	9
G M Scott Pty Ltd	Cootamundra	NSW	2590	B	Eastern Wheat/sheep	9
Hirino Pty Ltd	Gundagai	NSW	2722	B	Eastern Wheat/sheep	9
J R Burnett Pty Ltd	Kurri Kurri	NSW	2327	C	Eastern High Rainfall	8
Narasell Pty Ltd	Junee	NSW	2663	B	Eastern Wheat/sheep	9
Peel Valley Exporters Pty	Armidale	NSW	2350	B	Armidale High Rainfall	7
Southern Meats Pty Ltd	Goulburn	NSW	2580	A	Eastern High Rainfall	8
Tolsat Pty Ltd	Frederickton	NSW	2440	C	Eastern High Rainfall	8
Wandean Pastoral Co	Ulladulla	NSW	2539	C	Eastern High Rainfall	8
Wollondilly Abattoirs Pty	Picton	NSW	2571	C	Eastern High Rainfall	8
Woodbrae Holdings Pty Ltd	Harden	NSW	2587	B	Eastern Wheat/sheep	9
Ballyhigh Pty Ltd	Warwick	QLD	4370	C	Northern Wheat/sheep	6
Barcoo Butchery	Blackall	QLD	4472	C	Northern Wheat/sheep	6
Brisbane Valley Meats	ESK	QLD	4312	C	North East High Rainfall	5
Chaplain Abattoirs	Miles	QLD	4415	C	Northern Wheat/sheep	6
D R Plant AFT Plant Famil	Charters Towers	QLD	4820	C	Northern High Rainfall	124
Flinders Butchery	Hughenden	QLD	4821	C	Northern High Rainfall	124
Frazer's Butchery	Augathella	QLD	4477	C	Northern Wheat/sheep	6
Goondiwindi Meats Pty Ltd	Goondiwindi	QLD	4390	C	Northern Wheat/sheep	6
Gordon's Meats	Bell	QLD	4408	C	Northern Wheat/sheep	6
H F Gray	Eumundi	QLD	4562	C	North East High Rainfall	5
Halifax Butchery	Halifax	QLD	4850	C	North East High Rainfall	5
Highchester Pty Ltd	Beaudesert	QLD	4285	C	North East High Rainfall	5
J D & J I Allen Pty Ltd	Stanthorpe	QLD	4380	C	Northern Wheat/sheep	6
Jimbour Butchery	Jimbour	QLD	4406	C	Northern Wheat/sheep	6
Kemp Grazing Pty Ltd	Sarina	QLD	4737	C	North East High Rainfall	5
Killarney Abattoir	Killarney	QLD	4373	C	Northern Wheat/sheep	6
Maclagan Meats	Maclagan	QLD	5352	C	Southern Wheat/sheep	10a
Millmerran Meat Holdings	Millmerran	QLD	4357	C	Northern Wheat/sheep	6
Nelson Family Meats	Jandowae	QLD	4410	C	Northern Wheat/sheep	6
Quilpie Butchery Pty Ltd	Quilpie	QLD	4480	C	Central Pastoral	3
Rentport Pty Ltd	Mundubbera	QLD	4626	C	North East High Rainfall	5
RS & DJ Mitchell	Monto	QLD	4630	C	Northern Wheat/sheep	6
Southern Queensland Expor	Armidale	QLD	4383	B	Northern Wheat/sheep	6
Vitellin Pty Ltd	Mount Morgan	QLD	4714	C	Northern Wheat/sheep	6
B & G Pedler Nominees Pty	Millicent	SA	5280	C	South West High Rainfall	10b
Conroys Port Pirie Abatto	Port Pirie	SA	5270	A	South West High Rainfall	10b
Dalriada Meat Pty Ltd	Keith	SA	5267	C	South West High Rainfall	10b
Handke Bros	Eudunda	SA	5374	C	Southern Wheat/sheep	10a
Lindner Meats	Renmark	SA	5341	C	Central Pastoral	3
Lobethal Abattoir	Lobethal	SA	5241	B	South West High Rainfall	10b
Loxton Abattoir	Loxton	SA	5333	C	Southern Wheat/sheep	10a
Normanville Meatworks Uni	Yankalilla	SA	5203	C	South West High Rainfall	10b
Pinkertons Butchers	Kingston	SA	5272	C	South West High Rainfall	10b

Note: A = >1,000,000 B = >370,000 <1,000,000 C = <370,000

ABATTOIR	LOCATION	STATE	POSTCODE	SIZE	ZONENAME	ZONE_ID
Prime Valley Pastoral Co.	Two Wells	SA	5501	C	Southern Wheat/sheep	10a
Strath Meats Pty Ltd	Strathalbyn	SA	5255	C	South West High Rainfall	10b
T&R Pastoral Pty Ltd	Murray Bridge	SA	5253	A	Southern Wheat/sheep	10a
Tatiara Meat Company Pty	Bordertown	SA	5268	A	South West High Rainfall	10b
The Mallee Meat Company L	Karoonda	SA	5307	C	Southern Wheat/sheep	10a
Devonport City Abattoir P	Quoiba	TAS	7310	B	Tasmania	11
Longford Meat Company	Longford	TAS	7301	B	Tasmania	11
Taylor Bros	Elderslie	TAS	7330	C	Tasmania	11
A J & R J Starr Pty Ltd	Inglewood	VIC	3517	C	Eastern Wheat/sheep	9
Ashton Pty Ltd	Swan Hill	VIC	3585	B	Southern Wheat/sheep	10a
Cadopen Pty Ltd	Tallangatta	VIC	3740	C	Eastern High Rainfall	8
Castricum Bros Pty Ltd	Dandenong	VIC	3175	B	Eastern High Rainfall	8
CRF (Colac Otway) Pty Ltd	Colac	VIC	3250	B	South West High Rainfall	10b
Fresh Packed Pty Ltd	Patterson	VIC	3197	B	Eastern High Rainfall	8
Frewstal Pty Ltd	Stawell	VIC	3380	B	South West High Rainfall	10b
G & G McGillivray	Gunbower	VIC	3566	C	Eastern Wheat/sheep	9
G A Gathercole Pty Ltd	Wangaratta	VIC	3677	B	Eastern Wheat/sheep	9
G A Gathercole Pty Ltd	Tatura	VIC	3616	B	Eastern Wheat/sheep	9
Gordyn's Pty Ltd	Sale	VIC	3850	C	Eastern High Rainfall	8
Hardwicks Meat Works Pty	Kyneton	VIC	3444	B	South West High Rainfall	10b
L & G Meat Pty Ltd	Bacchus Marsh	VIC	3340	C	South West High Rainfall	10b
L E Giles & Sons	Trafalgar	VIC	3824	C	Eastern High Rainfall	8
M C Herd Pty Ltd	North Geelong	VIC	3215	A	South West High Rainfall	10b
Midfield Meat Internation	Warrnambool	VIC	3280	A	South West High Rainfall	10b
Ninety Second Vilmar Pty	Orbost	VIC	3888	C	Eastern High Rainfall	8
Norvic Food Processing Pt	Wodonga	VIC	3690	A	Eastern High Rainfall	8
Ovens River Pty Ltd	Yarrawonga	VIC	3025	B	South West High Rainfall	10b
R Radford & Sons Pty Ltd	Warragul	VIC	3820	C	Eastern High Rainfall	8
Ralph's Meat Company	Cranbourne	VIC	3977	C	Eastern High Rainfall	8
Riverside Meats	Echuca	VIC	3564	C	Eastern Wheat/sheep	9
St Clair Abattoirs	Wonthaggi	VIC	3995	C	Eastern High Rainfall	8
Tasman Group Services Pty	Altona North	VIC	3025	B	South West High Rainfall	10b
W Ryan Abattoirs Pty Ltd	Nathalia	VIC	3638	C	Eastern Wheat/sheep	9
Beaufort River Meats (W/s	Kojonup	WA	6395	C	Western Wheat/Sheep	12b
Dardanup Butchering Co	Bunbury	WA	6231	C	Western High Rainfall	12a
Elderstone Nominees	Narrogin	WA	6312	C	Western Wheat/Sheep	12b
Fletcher International Ex	Albany	WA	6331	A	Western High Rainfall	12a
Geraldton Meat Exports Pt	Geraldton	WA	6531	C	Western Wheat/Sheep	12b
Goodchild Abattoir	Australind	WA	6233	C	Western High Rainfall	12a
Hagan Bros Abattoir	Geraldton.	WA	6530	C	Western Wheat/Sheep	12b
K Grieves & R Read & Co	Esperance	WA	6450	C	Western Wheat/Sheep	12b
V & V Walsh	Bunbury	WA	6230	A	Western High Rainfall	12a
WAMMCO International	Victoria Park	WA	6979	B	Western High Rainfall	12a

Note: A = >1,000,000 B = >370,000 <1,000,000 C = <370,000



APPENDIX 5 - GLOSSARY

Abattoir: A plant or factory where sheep are slaughtered for food (also known as a processing plant, slaughterhouse, or meatworks).

Agent: Sells and buys sheep on behalf of clients.

AuctionsPlus: An internet based livestock auction system (see www.auctionsplus.com.au).

Border Leicester: A British breed of sheep that is used to cross with Merino to produce a prime lamb. The ewe lamb that is produced in this cross is then crossed with another meat sheep breed to produce second cross lambs that are used as a meat sheep.

B-Doubles: An articulated transport vehicle somewhere in between the size of a standard semi trailer and a road train. These vehicles are allowed in areas where road trains are not permitted and so have decreased costs to move sheep in these areas by increased efficiency.

Classing: Grouping together animals of similar types. These grouping are based on wool type or carcass structure. It is a way of removing inferior animals from flock.

Crossbred: The result of crossing two breeds, lines or strains.

F1 The first filial (daughter) generation or first cross.

F2 x F3, etc. Subsequent filial generations or crosses after the F1 or first cross.

Crossbreeding: Mating animals from different breeds to utilise hybrid vigour (heterosis), breed complimentary and characteristics.

Cull for Age (CFA): To reject an animal from a breeding and/or production herd or flock, on the basis of age.

Culls: Sheep that are to be sold as they have been rejected from the breeding or production flock.

Cwt: Carcass weight – the weight of an animal's carcass. Generally refers to price quotes (e.g.: ¢/kg cwt – cents per kilogram carcass weight)

where the price for the animal is quoted per kilogram for the animal's carcass.

Damara: New breed in Australia, having been introduced to Australia in 1996. Damara are a hardy breed grown for their meat and hides. The main target market for this breed is the live sheep trade (Middle East), Asia and to a limited degree for the domestic market. These sheep have hair instead of wool so therefore they do not need to be shorn or crutched and don't suffer from blowfly attacks. This makes them much less expensive to run.

Dentition: Number of permanent incisor teeth an animal has; relates to age.

Direct sale: The sale of sheep on property, direct to a lotfeeder, processor, backgrounder or restocker.

Dohne: A dual-purpose breed that allows the commercial producer to market both a quality heavy weight slaughter lamb and fine-medium white wool.

Dorper: Bred by South African Department of Agriculture in the 1930's the Dorper is a cross of Dorset and Blackhead Persian with good lambing percentages and producing a high quality carcass. These sheep have hair instead of wool so therefore they do not need to be shorn or crutched and don't suffer from blowfly attacks. This makes them less expensive to run. They are also highly fertile and perform well under rangeland conditions.

Dorset: The Dorset is recorded as being among the first of the oldest and purest breeds of sheep from England. They were first imported to Australia in 1895. The breed was enormously popular and did well in Australia. The Dorset excel in fecundity and early maturity. They produce quick maturing lambs with lean carcasses and are able to remain 'fresh' under harsh conditions.

Drafts: Term applied to a group of lambs marketed by a producer.

Drought: Below average rainfall for an extended period of time.

Dry Sheep Equivalent (DSE): Is a measure based on the feed requirement of grazing animals, hence can be used to assess the

capacity of land to carry livestock. The standard unit is represented by the ability to maintain a 45 kg wether at constant body weight from one year to the next. Other animals are rated in relation to this.

Ewe: A female sheep with more than two permanent teeth.

Feeders: Lambs that are bought by graziers to be fed with grain and/or some other type of supplementary feeding.

First-cross: Type of lamb developed by mating a British bred ram, usually carpet wool (i.e. Border Leicester), with a Merino ewe.

FMD: Foot and mouth disease – a highly contagious disease that does not affect humans. FMD causes severe blistering in the mouth and inflammation of the hoof of the infected animal.

Footrot: A disease which causes severe economic loss, suffering due to lameness and disruption to normal farm operations. The economic losses result from reduced body weight and growth, decreased wool production and restrictions to marketing opportunities.

Fresh: Term used to describe the appearance of young, clean and sappy lambs.

Grassfed: An animal which has been fed on pasture (grass). Also used to describe the carcass when it is being sold.

Grazier: A farmer which raises livestock such as sheep or cattle. Also known as a producer or pastoralist.

Hogget: Castrated male and female sheep with no 'ram like' characteristics and up to two permanent teeth.

Husbandry: on sheep properties some or all of the following husbandry practices will be practiced:

- (a) joining
- (b) pregnancy diagnosis
- (c) lambing
- (d) lamb marking/mulesing
- (e) weaning
- (f) culling breeders and
- (g) classing ewe hoggets.

Joining or Joined: Placing male animals with female animals with the intention of their mating.

Lambs: A young sheep still with its mother, or up to about five months of age.

Live export: Stock that are bought for the purpose of a live export shipment.

Lotfed: An animal fed in a feedlot.

Lotfeeding: The process of feeding cattle/sheep/lambs on grain in a feedlot.

Marking: To castrate (a lamb) usually associated with other procedures such as docking, ear-marking and drenching.

Merino: Primarily grown for wool production, although improved carcass quality gives this breed a dual purpose.

Mulesing: The removal of skin from around the anus of sheep to prevent the growth of wool. This is a practice which successfully controls blowfly strike. The Radical Mules operation removes even more skin, including a strip from the top of the tail.

Mutton: The flesh of fully grown sheep.

New season lambs: Another term for young lambs.

NLIS: National Livestock Identification System.

NLRS: National Livestock Reporting Service.

Ovine Johne's Disease (OJD): A disease that spreads slowly, is difficult to detect early on, causes lowered weight gain and wool production and can kill about 10% of adult sheep each year if left unmanaged.

Pastoralist: A cattle or sheep farmer in northern and western regions of Australia.

Producer: A sheep or cattle farmer.

Ram: Mature entire male sheep. *Flock ram*: A non-pedigree ram used in a commercial flock. *Stud ram*: A pedigree (registered) ram.

Restocker: A producer or agent who purchases cattle/sheep/lambs and returns them to the farm.

Saleyard: A physical auction market where buyers and sellers trade cattle/sheep/lambs. Physical and store markets are conducted at a saleyard.



Self-Replacing Ewe Breeder Flocks: Flocks of sheep in which ewes breed their own replacements to maintain flock structure.

South African Mutton Merino (SAMM): This unique South African white woolled mutton sheep breed is considered to be a dual purpose breed

Second-cross (2X): The breed developed by mating a meat breed ram with a first-cross ewe.

Stocking density: Refers to the number of cattle/sheep/lambs a property or feedlot can or will run per area of land (e.g. DSE).

Store condition: An animal that is not in prime marketable condition.

Store sheep sale: A physical auction where normally store sheep and lambs are bought and sold. Most of the stock offered is for breeding or future finishing.

Supermarket: Large domestic processors buying stock for domestic supermarkets like Coles and Woolworths.

Supplementary fed: Sheep that have been mainly grazed on pasture, but also have access to a feed bin containing grain or hay or both.

Supply area: The region within which the yarding has been drawn from.

Traders: These are farmers who buy and sell sheep regularly. They don't generally breed from any of their stock rather take stock in store condition and fatten them for market specifications.

Unfinished: Lambs that are lacking fat cover and have an appearance which suggest they could use some more feeding.

Weaner: A young animal that has been weaned from its mother's milk to live completely on pasture.

Weaning: Separating lambs from their dams so that the offspring can no longer suckle.

Well conditioned: When a lamb or sheep has an adequate fat covering on the ribs and hips.

Wether: A male sheep that has been castrated as a lamb.

White Suffolk: The White Suffolk is an Australian breed developed for Australian conditions. It was

developed from breeding programs involving the Suffolk breed, initially, crossed with a white breed (mainly Poll Dorsets). The white Suffolk is proving to be the ideal prime lamb terminal sire in wide-ranging areas and environments of Australia. It is giving outstanding results in the dry, arid, pastoral regions; all types of agricultural, mixed farming areas; and also in higher rainfall districts.

Yardings: Refers to the number of sheep and lambs penned at an auction sale.

Young lamb: Male and female lambs with no 'ram like' characteristics. Generally suckers, unshorn.

General comments

1. Can we get the underlying spatial data for each of the figures in the text?
2. Need some data on the number, location and throughput of live export ports if possible.
3. Need some comment and detail on the size of the sheep feedlot industry and its location. Also, do sheep from feedlots go straight to abattoirs or back to saleyards?
4. Expansion and clarification of the impact of footrot on the movement of sheep
5. Does the presence of drench resistant worms impact of sheep movement patterns?
6. some comment if available on the fate of sheep sold at saleyards. If there are few stores sales, are the majority of sheep sold at saleyards bought by abattoirs?
7. A standard introduction for each region describing the geography, climate and pasture. Also list the number/location of major saleyards and abattoirs in the region