3.5. Direct human interference

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Abstract

Direct human interference was recognized as one of the potential factors influencing the decline of woylies in southwestern Australia.

Direct human interference covers a wide range of activities and factors including; trapping intensity, live harvest for translocation, trapping consequences (deaths, predations and pouch young intervention), illegal killing/harvesting, and road kills. This report focuses on trapping activities.

Despite the potential for significant impact, the results indicate that, in the Upper Warren region, human interference has not been a major contributing factor in the decline of woylie populations.

It is, however, important to continue to monitor these potential impacts through adequate and comprehensive recording of monitoring events, procedures and fates of individuals.

3.5.1. Introduction

Direct human interference was identified as one of the potential factors influencing the decline of woylies in the Upper Warren region. Direct human interference covers a wide range of activities and factors including; trapping intensity, live harvest for translocation, trapping consequences (deaths, predations and pouch young intervention), illegal killing/harvesting, and road kills.

This report focuses on trapping activities – in particular trapping intensity, pouch young intervention and live harvest events. These activities are viewed as being the most significant human factors which may affect populations, and ones which can be readily monitored and managed.

Ecotourism at Dryandra was found not to be compromising the welfare of woylies during a short-term study (Harvey 1999) Ecotourism in the Upper Warren is not as intense as that at Dryandra and is not investigated here. No data exists on illegal killing or harvesting of woylies, however it is not considered that this is an issue in the Upper Warren region.

Road kills are not considered to be a likely major contributing factor in the decline of woylies as many of the roads within the Upper Warren region are not open to the public and would receive very little use. There are no indications that traffic volume or behaviour has changed sufficiently over the past decade that could relate to the recent woylie declines. Where increased road kills have occurred in the past, it is considered to be an indication of increased population abundances rather than a contributing factor in their decline.

Foreign diseases could be introduced by humans into native fauna populations through release of animals from care, translocations, poor hygiene practices during monitoring or contact with domestic animals or introduced feral fauna. The impacts of disease and results of disease screening have been addressed in the disease section (Chapter 5).

The eleven Upper Warren Fauna Monitoring transects have been used to assess the potential impacts of direct human interference on woylie population declines, due to the existence of reasonable pre- and post-decline data for analysis.

3.5.2. Methods

Monitoring data and statistics from the eleven Upper Warren Fauna Monitoring transects (Chapter 2 UW Fauna Monitoring) were analysed to assess the potential impacts of human interference caused by monitoring and translocation activities.

To assess the potential impact of trapping intensity on woylie population declines, the number of trap nights per year was plotted against woylie capture rates (%TS) for each of the Upper Warren Fauna Monitoring transects. All cage trapping undertaken within the surrounding forest block has

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been included for the trap intensity – measured as total number of trap nights per year. The capture rates used relate to the Upper Warren Fauna Monitoring transects only (i.e. does not include other trapping that has occurred in the same forest block). In the case of three of the transects (Warrup, Winnejup and Keninup) capture rates have also been derived from historical monitoring transects which form sub-sets or super-sets of the Upper Warren Fauna Monitoring transects, in order to provide a greater case history for analysis.

Live harvest for translocation has occurred in the vicinity of only four of the Upper Warren Fauna Monitoring transects – Boyicup, Chariup, Camelar and Yackelup. The total number of woylie individuals live-harvested from a forest block has been compared with the capture rates of woylies on nearby Upper Warren Fauna Monitoring transects.

Joey intervention rates were analysed on only seven of the Upper Warren Fauna Monitoring transects due to the availability of suitably comprehensive data and/or the longevity of data.

3.5.3. Results

3.5.3.1. Trapping intensity

Six of the transects provide no substantial evidence for any relationship between the overall trap intensity within the forest block and capture rates of woylies (Figures 3.5.1, 3.5.3-4, 3.5.6-7 and 3.5.10).

Three of the forest blocks show a trend that the lowest woylie capture rates occur when trap intensity is generally highest on the transect (Figures 3.5.5, 3.5.8 and 3.5.9).

Increasing capture rates are associated with highest trap intensities on Warrup and Winnejup transects (Figures 3.5.2 and 3.5.11).

Figure 3.5.1. Relationship between trapping intensity and woylie capture rates on Keninup monitoring transect.

Note: The points joined by dashed lines indicate data derived from Keninup1 transect monitoring and those joined by solid lines indicate data derived from Keninup2 transect monitoring.

The data presented for 2007 represents the Mar/Apr trapping session only and does not include the Oct/Nov 2007 session.

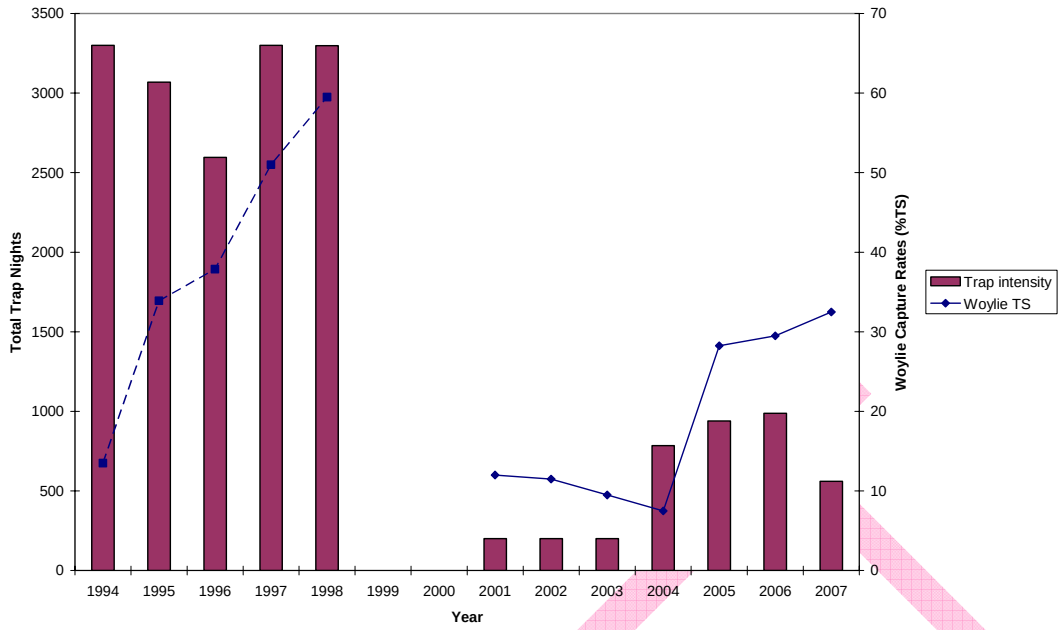

Figure 3.5.2. Relationship between trapping intensity and woylie capture rates on Warrup monitoring transect.

Note: The points joined by dashed lines indicate data derived from Warrup1 transect monitoring and those joined by solid lines indicate data derived from Warrup2 transect monitoring.

The data presented for 2007 represents the Mar/Apr trapping session only and does not include the Oct/Nov 2007 session.

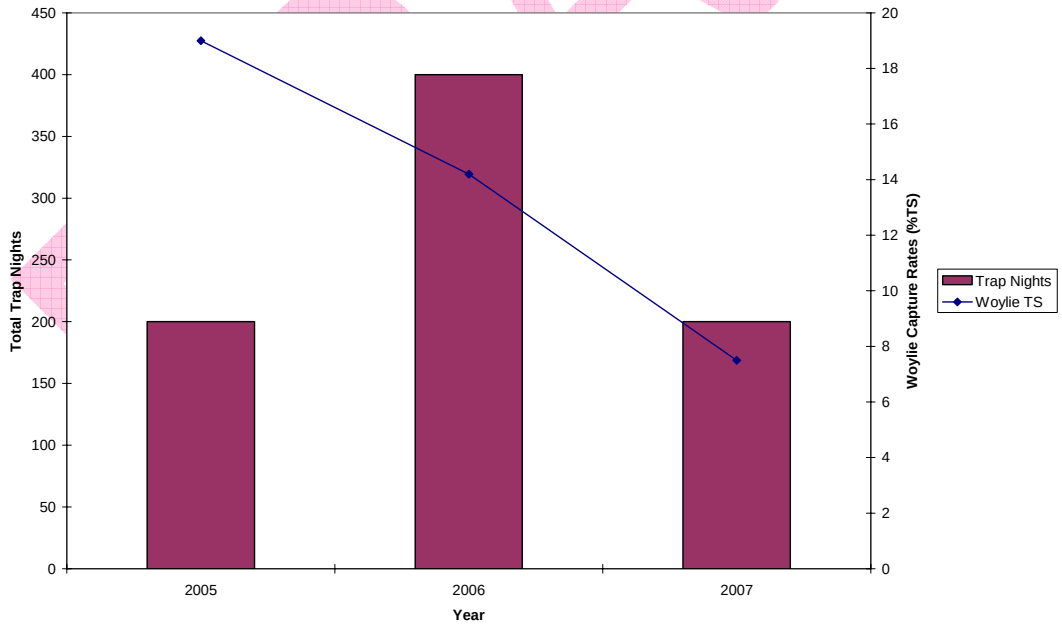

Figure 3.5.3. Relationship between trapping intensity and woylie capture rates on Corbal monitoring transect.

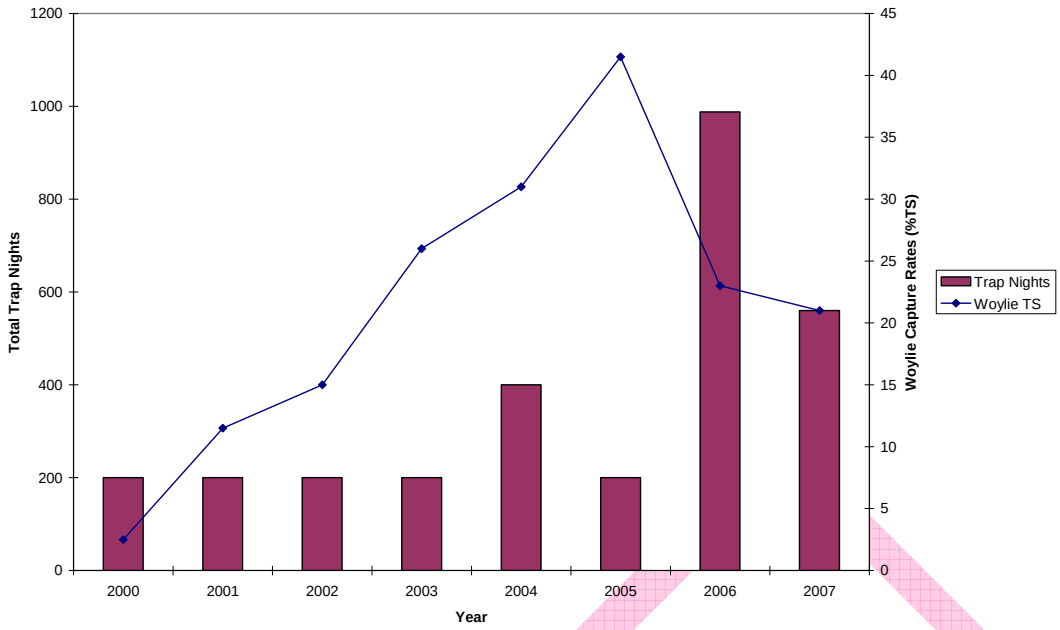

Figure 3.5.4. Relationship between trapping intensity and woylie capture rates on Balban monitoring transect.

Note: The data presented for 2007 represents the Mar/Apr trapping session only and does not include the Oct/Nov 2007 session.

Figure 3.5.5. Relationship between trapping intensity and woylie capture rates on Moopinup monitoring transect.

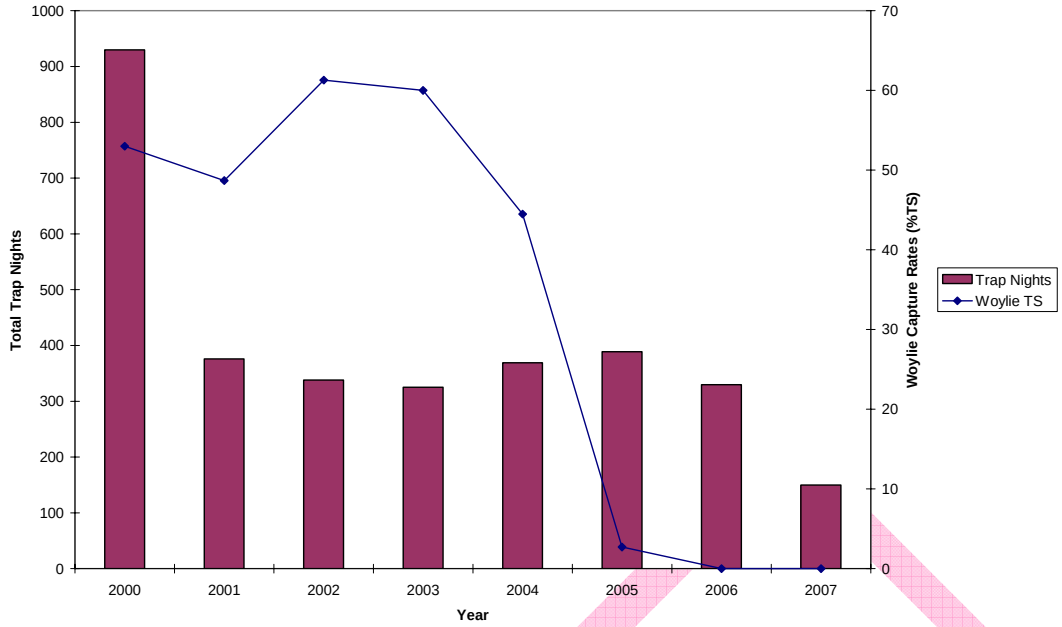

Figure 3.5.6. Relationship between trapping intensity and woylie capture rates on Yackelup monitoring transect.

Note: The data presented for 2007 represents the Mar/Apr trapping session only and does not include the Oct/Nov 2007 session.

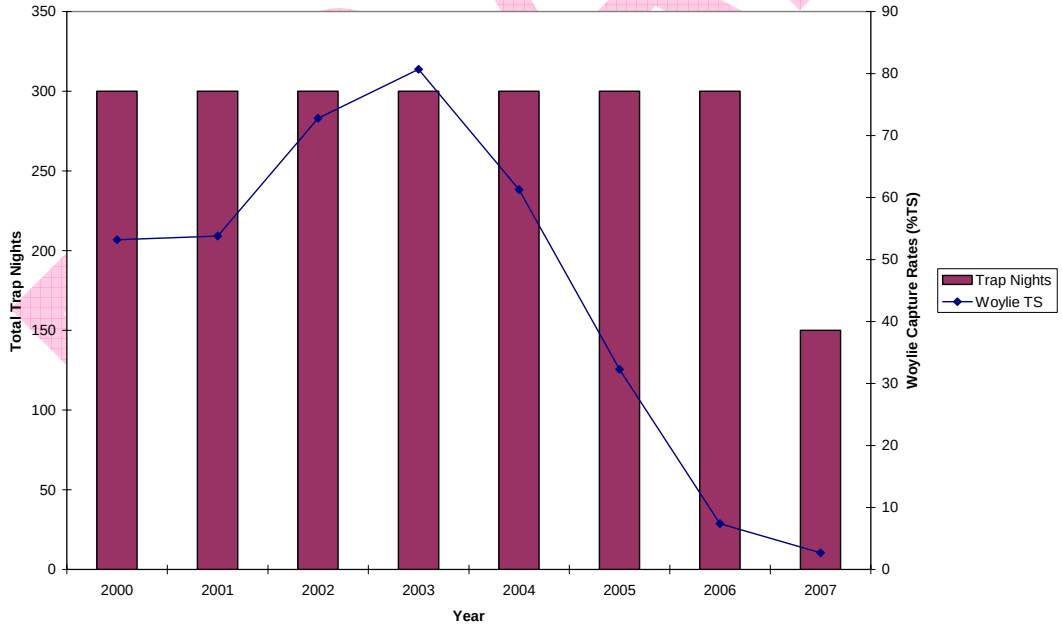

Figure 3.5.7. Relationship between trapping intensity and woylie capture rates on Yendicup monitoring transect.

Note: The data presented for 2007 represents the Mar/Apr trapping session only and does not include the Oct/Nov 2007 session.

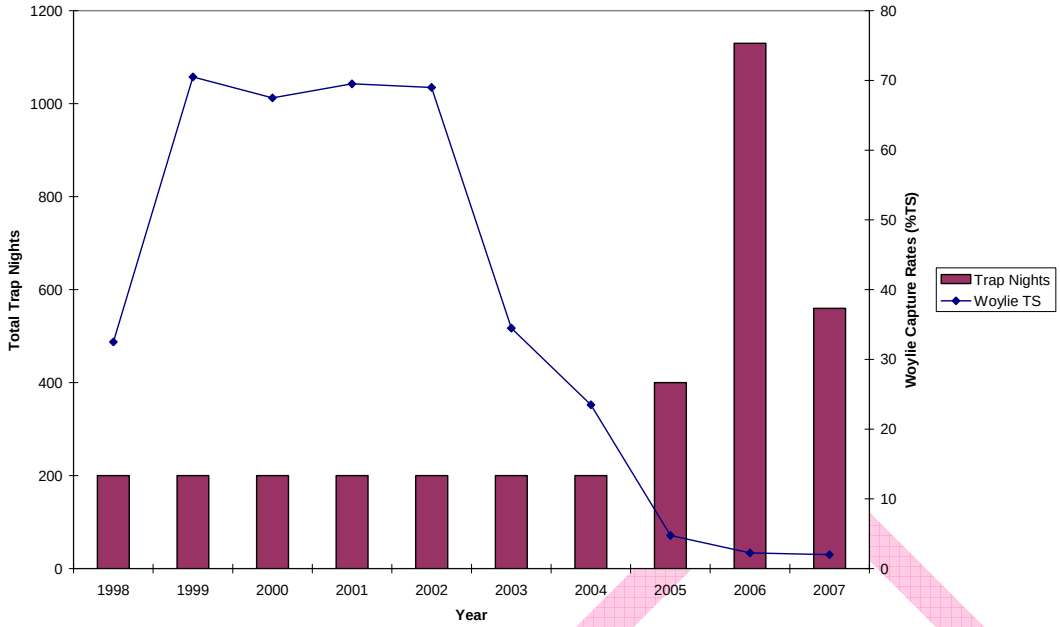

Figure 3.5.8. Relationship between trapping intensity and woylie capture rates on Boyicup monitoring transect.

Figure 3.5.9. Relationship between trapping intensity and woylie capture rates on Chariup monitoring transect.

Note: The dashed lines are indicative trends during the intervening periods between trapping events in non-successive years

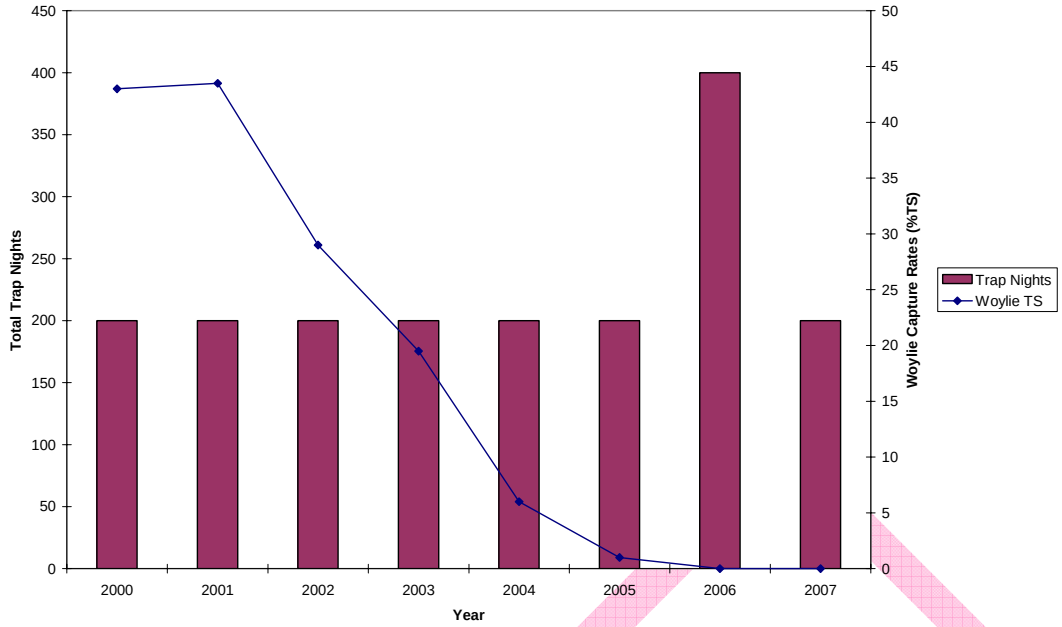

Figure 3.5.10. Relationship between trapping intensity and woylie capture rates on Camelar monitoring transect.

Note: The data presented for 2007 represents the Mar/Apr trapping session only and does not include the Oct/Nov 2007 session.

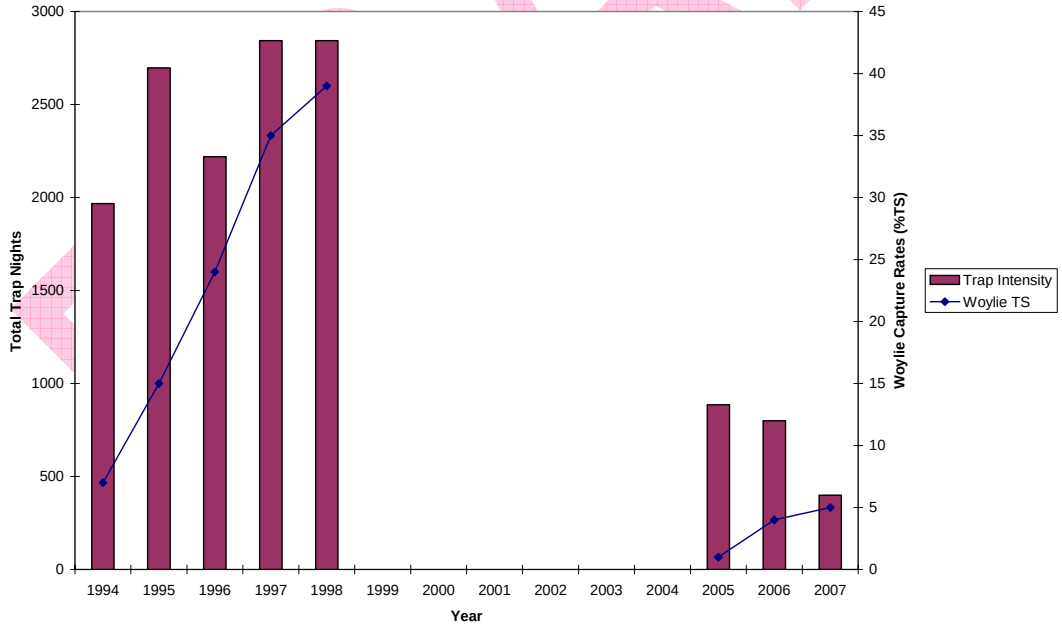

Figure 3.5.11. Relationship between trapping intensity and woylie capture rates on Winnejup monitoring transect.

3.5.3.2. Live harvest for translocation

Live-harvest of woylies for translocation occurred within Yackelup, Chariup and Boyicup forest blocks within the Upper Warren region. In 1998, 41 woylies were live-harvested from Chariup forest block, and 46 from Boyicup forest block. In 2000, 40 woylies were live-harvested from

Yackelup forest block. In 2002, 117 woylies were live-harvested from Yackelup forest block, and 35 from Chariup forest block.

Four transects (Yackelup, Camelar, Boyicup and Chariup) are located 2-5 km from the harvest sites. The woylie capture rates began to decline on these transects in 2004, 2002, 2003 and 2004 respectively.

No apparent relationships exist between; the number of individuals involved in, or timing of, live-harvest events and the commencement of woylie decline on nearby transects.

3.5.3.3. Other trapping-related impacts

Joey Intervention

The percentage of recorded woylie pouch young undergoing some form of human intervention (taping, bagging, ejections) varied considerably between years and transects, with no obvious patterns emerging (Table 3.5.1). The overall average annual joey intervention rate was 31.6 % (range – 20.6 to 47.1 %).

Table 3.5.1. Percentage and sample size (n) of recorded woylie pouch young with human intervention on seven of the Upper Warren Fauna Monitoring transects by year and averaged.

Year	Moopinup	Chariup	Boyicup2	Warrup2	Balban	Camelar	Keninup
1998	18.2 (11)	0 (13)	14.3 (21)	-	-	-	-
1999	3.8 (26)	10.3 (29)	12 (50)	-	-	-	-
2000	23.5 (17)	0 (9)	40 (5)	-	66.7 (3)	41.2 (17)	-
2001	71.4 (7)	64.3 (14)	77.8 (9)	-	11.1 (9)	22.2 (18)	-
2002	12.5 (8)	-	40 (15)	20 (5)	14.3 (14)	28.6 (7)	-
2003	57.1 (7)	26.7 (15)	14.3 (14)	66.7 (3)	18.8 (16)	33.3 (3)	-
2004	25 (8)	-	20 (5)	100 (2)	40 (15)	0 (2)	-
2005	100 (1)	15.8 (19)	75 (4)	33.3 (27)	16.7 (24)	-	12.5 (16)
2006	-	20 (5)	0 (2)	31.3 (32)	57.1 (14)	-	26.4 (72)
2007	100 (3)	27.3 (11)	0 (1)	31 (42)	31.3 (16)	-	24.7 (89)
Average	**45.7 (88)**	**20.6 (115)**	**29.3 (126)**	**47.1 (111)**	**32 (111)**	**25.1 (47)**	**21.2(177)**

3.5.4. Discussion

3.5.4.1. Trapping intensity

Varying associations can be identified between the trap intensity and capture rates of woylies in each of the 11 Upper Warren forest blocks examined (Figures 3.5.1-11).

Three of the forest blocks show lower woylie capture rates associated with higher trap intensities (Figures 3.5.5, 3.5.8-9). In each case the decline in woylie capture rates commenced two to three years prior to any increase in trapping intensity within the forest block (2005). In 2005 the possible decline in woylie populations was first noted which resulted in a response by Science Division and Donnelly District to conduct additional monitoring to substantiate and quantify the extent of the declines. After the declines were substantiated in 2005, the Woylie Conservation Research Project (WCRP) was established in 2006, involving increased monitoring across 11 key transects in the Upper Warren region (The Upper Warren Fauna Monitoring transects). The increased trapping intensity during this period is therefore a result of the response to the declines in woylie populations rather than a contributing cause of them.

Prior to 2005, there appears to be no relationship between the woylie capture rates and the trapping intensities within any of the 11 blocks examined. In most cases, the trapping intensity has remained relatively constant since the establishment of the monitoring transect, whilst capture rates have changed considerably over this period (Figures 3.5.1-11).

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Of the eleven forest blocks, two have not undergone significant declines since 2004 despite the increased trapping intensity (Figures 3.5.1-2), and five of the forest blocks have undergone decline in woylie capture rates despite having had no significant change to the trapping intensity in recent years (Figures 3.5.5-8 and 3.5.10).

The combination of all of these factors mentioned above indicate that, throughout the Upper Warren region, there is no relationship between the trapping intensity and the decline in capture rates of woylies.

It should also be noted that the Karakamia woylie population experiences similar trap intensities, whilst maintaining very high population density, and displaying no signs of a decline (Section 4.2 Demographics). Similarly, live harvests and joey interventions (see below) have taken place at Karakamia without any apparent significant impact on the population (J Richards pers. comm.).

3.5.4.2. Live-harvest for translocation

A total of 279 woylies have been live-harvested over a seven year period (1998-2004) from an estimated pre-decline (2001) Upper Warren population of about 20,000 individuals (Adrian Wayne, pers. comm.). The live-harvested animals came from three localised areas within high density populations and constitute about 1% of the total estimated population. On this basis alone the live-harvest events can not be considered as a significant contributing factor in the rapid, substantial and widespread woylie declines in the Upper Warren region.

It is important to note that the woylie translocation harvesting sites were intentionally located away from long-term monitoring sites. Similarly, only un-tagged individuals were live-harvested for translocation, again, to minimize the impact on monitoring and research within the region. Therefore, the woylie capture rates for the Upper Warren Fauna Monitoring transects can not be used to directly monitor the impacts of live-harvest on the local populations. Nevertheless, there is no temporal relationship between the live-harvesting events and timing of the declines along the four Upper Warren Fauna Monitoring transects (Yackelup, Camelar, Boyicup and Chariup) located within moderate proximity (2-5 km) to the live-harvest sites. Furthermore, the declines on these four transects are characteristically similar to the declines that have occurred on other transects located significant distances from the live-harvest sites.

Therefore, given the extent and pattern of the declines in woylie populations within the Upper Warren region, the limited extent and locations of the woylie live-harvests and the lack of evidence of associated population change on the nearby transects; there is no evidence to suggest that live-harvest of woylies has been a significant contributing factor in the recent decline in woylie populations.

Nonetheless, harvesting of animals for translocations has the potential for significant but localized impacts on populations if not managed appropriately. Local management practices for wild translocations aim to ensure that live-harvesting is sustainable. To ensure this, monitoring of both the translocated and source populations should be undertaken to monitor success and impacts of translocations.

3.5.4.3. Other trapping related impacts

Trapping intensity directly influences the amount of exposure of woylies to human related impacts (such as joey pouch ejections, ‘tapings’, ‘baggings’ and risk of predation through day-time release). The lack of evidence for trapping intensity affecting woylie numbers would suggest a similar lack of evidence for these other potential human impacts on woylies.

Joey Intervention

There is no obvious pattern in the average pouch young intervention rates, relative to the extent of woylie population decline, across transects (Table 3.5.1). Camelar, which has one of the lower average intervention rates, has undergone a 100% decline in capture rates of woylies since 2001 (Figure 3.5.10). Warrup2, which has the highest average intervention rate, remains at moderate densities of woylies (Figure 3.5.2). It should also be noted that the average intervention rate for Keninup2 transect, where woylie numbers are high and decline has yet to commence, is 21.2%, which is within the range of the other transects analysed. From this it would appear that there is little evidence to suggest that a relationship exists between joey intervention rates and woylie population declines.

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Joey intervention rates were high, with an overall average of 31.6% of all recorded joeys having some form of significant human intervention (ejections leading to tapings and baggings). This has the potential to have significant impacts on populations if these interventions are unsuccessful, particularly if trapping frequency and/or intensity is high.

It is therefore recommended that more comprehensive documentation of the results of interventions and fates of individuals be completed during monitoring sessions to enable review of current intervention procedures and monitoring protocols.

Woylie reproduction will be analysed further in Chapter 4 Population Comparison Study and Section 4.2 Demographics.

3.5.5. Future work

All future fauna monitoring, surveys and translocations involving capture of woylies will continue to observe strict adherence to the monitoring protocols set out in the 'Department of Conservation and Land Management Animal Ethics Standard Operating Procedures' (CALM, 2005) and the 'WCRP Operations Handbook' (Volume 3), as well as hygiene standards and protocols described in the 'Minimising Disease Risk in Wildlife Management' (Chapman *et al*., 2005). This will ensure that potential human impacts are managed and minimised where possible.

Future monitoring will also involve comprehensive recording of the fates of all individuals captured, including pouch young (both those which have been directly intervened with through handling, taping and bagging; and those which have been passively affected through the capture and handling of the mother. Improved recording and monitoring will lead to improved handling and management techniques and protocols being developed, which can subsequently be incorporated into improved corporate standards. In the first instance, these points will be raised with the *Western Shield* Operations and Research Committee and the DEC Animal Ethics Committee.

It is important to ensure that monitoring efforts that aim to provide valuable information to assist in the conservation of threatened fauna species, do not in the process, detrimentally affect those species.

3.5.6. Conclusion

Given that human activities may impact on woylie populations it is important to monitor these potential impacts through adequate recording of monitoring events, procedures and fates of individuals. Likewise, it is important that adequate monitoring of both translocated and source populations be undertaken to monitor success and impacts of translocations.

Despite the potential for significant impact, there is no evidence in the Upper Warren region that trapping activities or live-harvesting for translocations have been a major contributing factor in the decline of woylie populations.

3.5.7. References

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Chapman, T., Sims, C., Mawson, P., 2005. Minimising Disease Risk in Wildlife Management. Standard operating procedures for fauna translocation, monitoring and euthanasia in the field. Department of Conservation and Land Management, Perth.

Harvey, N. 1999. The impact of ecotourism upon the wellbeing of woylies at Dryandra Woodland village. Honours Thesis. University of Western Australia.

Wayne, A.F., Wilson, I., Northin, J., Barton, B., Gillard, J., Morris, K., Orell, P., and Richarson, J., 2006. Situation report and project proposal: identifying the cause(s) for the recent declines of woylies in southwestern Australia. A report to the Department of Conservation and Land Management Corporate Executive. CALM, Perth, Western Australia.

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