

Attitudes of ranchers towards African wild dogs *Lycaon pictus*: Conservation implications on private land

Peter A. Lindsey^{a,*}, Johan T. du Toit^a, M.G.L. Mills^{a,b}

^a Mammal Research Institute, University of Pretoria, Pretoria, 0002, South Africa

^b South African National Parks and Endangered Wildlife Trust, Private Bag X402, Skukuza, 1350, South Africa

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Abstract

In South Africa, wild dogs are limited to a single viable population in Kruger National Park. Current conservation efforts aim to develop a meta-population through the reintroduction of wild dogs into fenced reserves. However, significant potential also exists for conserving naturally occurring wild dogs in situ on rangeland. This study represents an assessment of the attitudes of southern African landowners towards wild dogs to determine the scope for conserving them on private land, and to identify the conditions under which conservation efforts might succeed. Over half of ranchers interviewed indicated that they would like to have wild dogs on their property. Younger ranchers were more positive than older ranchers, suggesting that traditional prejudices against wild dogs are fading. Attitudes were generally negative where ranches are game-fenced, and where cattle or consumptive wildlife utilisation dominate land use. Negative attitudes were typically related to economic costs associated with wild dogs, and conservation initiatives aimed at reducing costs or creating benefits from the species represent the most direct way to improve attitudes. Many ranchers recognised the potential ecotourism value of wild dogs, and attitudes were most positive where ranches belong to conservancies, and where ecotourism-based land uses predominate. Similar relationships were found between ranch/rancher characteristics and attitudes towards most large carnivores. Thus, our findings have general relevance for large carnivore conservation on private land in southern Africa. Encouraging the formation of conservancies should be a priority for carnivore conservation efforts on rangeland, to reduce conflict and promote coexistence between people and predators.

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1. Introduction

The conservation needs of large carnivores (>5 kg) (e.g., large areas with sufficient prey) often conflict with human interests, creating significant challenges for their conservation (Sillero-Zubiri and Laurenson, 2001). State sponsored eradication campaigns caused the extirpation of several large carnivore species from major portions of

their natural range (Breitenmoser, 1998; Berg, 2001). Today, persecution by humans remains the greatest source of mortality for many large carnivore species occurring both outside and inside protected areas (Woodroffe and Ginsberg, 1998).

Variation in people's attitudes towards large carnivores appears to be based partly on the extent to which different species conflict with human interests, and partly on inherent human prejudices (Kellert, 1985). Wild canids in particular, seem to engender negative attitudes (Kellert, 1985; Berg, 2001). For example, African wild dogs have suffered from negative perceptions and fare poorly in the public eye relative to other species

* Corresponding author. Present address: Samburu-Laikipia Wild Dog Project, Mpala Research Centre, P.O. Box 555, Nanyuki, Kenya. Tel.: +254 62 32758; fax: +254 62 32750.

E-mail address: wilddogs@mpala.org (P.A. Lindsey).

(Fanshawe et al., 1991). A killing method sometimes used – ripping at the abdomen to disembowel prey – has resulted in wild dogs being described as ‘cruel.’ Other misconceptions include the suggestion that wild dogs regularly kill more than they need, and that they ‘terrorise’ their prey (Mills and Nel, 1993; Woodroffe and Ginsberg, 1999). Antagonism towards wild dogs was reflected in state policies, and they were killed as vermin in some protected areas until as late as 1979 (Fanshawe et al., 1997). Although state-sponsored persecution has ceased, many of the myths surrounding wild dogs persist, and promote continued persecution outside protected areas (Rasmussen, 1999).

Wild dogs are wide ranging and so packs are liable to move out of protected areas and come into conflict with humans (Mills, 1991; Woodroffe and Ginsberg, 1998), partially because they avoid areas with high densities of lions *Panthera leo* (Mills and Gorman, 1997). In addition, they are diurnal, highly visible, and relatively fearless, increasing the likelihood of lethal encounters with humans (Frank and Woodroffe, 2001). The impact of persecution is probably increased by wild dogs’ obligate cooperative breeding system, which is vulnerable to an Allee-effect at low pack sizes (<5 dogs, Courchamp and Macdonald, 2001).

Persecution by humans in conjunction with habitat destruction has been responsible for a major reduction in the distribution of wild dogs; the current population is estimated at 5750 individuals (Woodroffe et al., 2004). In South Africa, range reduction is particularly marked, and wild dogs are presently restricted to a single viable population in Kruger National Park (henceforth referred to as “Kruger”). Current conservation efforts in South Africa focus on the creation of a meta-population through the reintroduction of wild dogs into a series of isolated reserves (Mills et al., 1998). However, additional scope exists for conserving naturally occurring wild dogs in situ on ranchland.

Across much of southern Africa, game ranching has replaced cattle ranching as the dominant land use, creating large areas of potentially suitable habitat for wild dogs. In South Africa, there are an estimated 4000 game ranches, covering 80,000 km², compared to the 28,000 km² under the control of South African National Parks Board (Hearne and Mackenzie, 2000). Wild dogs have re-colonised parts of their former range in game ranching areas of both Zimbabwe and South Africa (Pole, 1999; Rasmussen, 1999; Lindsey et al., 2004). The long-term survival of these dogs and success of future conservation efforts outside state-protected areas depends on the willingness of people to tolerate their presence. In this study, the attitudes of southern African ranchers towards wild dogs are assessed to determine the conditions under which conservation initiatives might succeed, and to identify potential methods to reduce conflict.

2. Methods

During December 2000–June 2001, surveys were conducted on ranches in three areas of South Africa and Zimbabwe in which wild dogs are known to occur on private land (Childes, 1988; Skinner and Smithers, 1990; Fanshawe et al., 1997; Maddock, 1999; Pole, 1999), yielding a total sample of 209 ranchers. In South Africa, ranchers’ attitudes were sampled in (approximate central co-ordinates in parentheses): northern Kwa-Zulu Natal ($n = 26$, 27°30’S, 31°45’E); the western Kruger border ($n = 82$, 24°10’S, 30°55’E); and the Limpopo Valley ($n = 56$, 22°20’S, 29°40’E); hereafter referred to as eastern, northeastern and northern South Africa, respectively. In Zimbabwe, ranchers’ attitudes were sampled in the Save Valley Conservancy ($n = 15$, 20°05’S, 32°00’E), in the Gwayi River Conservancy ($n = 19$, 18°40’S, 27°10’E), and in the Matetsi ranching area ($n = 11$, 18°26’S, 26°07’E).

In South Africa, focal areas of wild dog activity were demarcated with the assistance of state wildlife officials. Contact details for ranchers were obtained from telephone directories. In each area, as many ranchers as possible were interviewed in a two-week period. Variation in sample sizes between sample areas reflects variation in the number of ranches lying within the demarcated focal areas of wild dog activity. Fifty-one percent of landowners were interviewed within the demarcated areas in South Africa, and 69% in Zimbabwe.

At all sample sites, ranch owners or managers (“ranchers”) were interviewed in person (by PAL), with the exception of the few cases (4.3%) where ranches were too remote for access by car, and then interviews were conducted by telephone. Respondents were informed that the University of Pretoria was conducting the project, and assured that all responses would remain anonymous. Refusal rate was 2.4%.

Respondents were interviewed with a structured questionnaire (available from PAL). Pre-testing was conducted on ranchers in Zimbabwe prior to the study, to ensure that all questions were clear, and a final version was prepared for sampling. The questionnaire consisted of three components: (1) a ‘Rancher and ranch details’ section, concerning background information on ranchers and ranch characteristics relevant to wild dogs: property size; fencing characteristics; land use; severity of poaching and whether the ranch was part of a conservancy. Conservancies in southern Africa are private nature reserves comprising multiple adjacent properties with internal fencing removed, and surrounded by a single perimeter game fence (Lambrechts, 1996); (2) a ‘Predators’ section, concerning the occurrence of, and attitudes towards six species of mammalian carnivore; (3) a ‘Wild dogs’ section concerning the occurrence of wild dogs and attitudes towards them. In this section ranchers were asked to indicate their attitudes towards

wild dogs, their reasons for these attitudes, and whether they agreed or disagreed with a number of statements pertaining to wild dogs.

The proportions of ranchers with positive and negative responses for six predator species (black backed jackals *Canis mesomelas*, cheetahs *Acinonyx jubatus*, leopards *Panthera pardus*, lions, spotted hyaenas *Crocuta crocuta* and wild dogs) were compared using chi square (JMPIN Version 4.0.2., 2000). Ranchers were asked to give a score of 0 (very negative) to 5 (very positive) to each species as an indication of how they felt towards having each species on their property. Attitudes were categorised as negative (scores 0–2) or positive (scores 3–5). Multiple logistic regression models (JMPIN Version 4.0.2., 2000) were used to assess the relationship between attitudes towards each predator species and: (a) rancher characteristics, and (b) ranch characteristics. For the rancher characteristics test, two categorical variables – rancher age (20–40 years; 41–50; 51–60; >61) and cultural group (English or Afrikaans speaking as a first language) were included. For the ranch characteristics test, four categorical variables were included: (1) geographic region – eastern, northeastern or northern South African, or Zimbabwean; (2) part or not part of a conservancy; (3) ranch size – small (0–1450 ha), medium (1451–4200 ha) or large (≥ 4201 ha); (4) land use – cattle; cattle/consumptive wildlife utilisation; consumptive wildlife utilisation alone; ecotourism (alone or with consumptive wildlife utilisation) or no priority given to maximisation of economic benefits.

3. Results

Jackals were the most widespread large carnivore (regularly sighted on 96% of ranches), followed by leopards (84%), spotted hyaenas (66%), cheetahs (56%), wild dogs (38%) and lions (36%), and large carnivores were more prevalent on ranches in Zimbabwe than South Africa (Table 1). Ranches were larger in Zimbabwe ($11,105 \pm 1370$ ha; *mean* \pm *S.E.*) than in South Africa (3047 ± 236 ha; $U_{0.05, 156, 45} = 1261.5$; $p < 0.0001$). In South Africa, ranches were typically surrounded by perimeter game fencing (2–3 m fencing with 17–25 wire

strands c.f. 1–2 m with four strands for cattle fencing), and in eastern South Africa, fencing was frequently electrified or meshed, reducing access for wild dogs (Hofmeyr, 2000). In contrast, Zimbabwean ranches outside of conservancies were typically unfenced. The number and size of conservancies varied among sample areas: in eastern South Africa 23% of ranches ($n = 6$ of 26) were in conservancies of 4500–20,000 ha; in northeastern South Africa 48% ($n = 40$ of 82) belonged to conservancies of 2500–65,000 ha; in northern South Africa and the Matetsi ranching area there were no conservancies; in the Gwayi River 94.7% of ranches, ($n = 18$ of 19) were part of a 92,000 ha conservancy; and in the Save Valley Conservancy 100% ($n = 15$) of ranches belonged to the 360,000 ha conservancy.

Ranchers' attitudes towards the six carnivores differed among species ($\chi^2 = 44.76$, $df = 5$, $p < 0.0001$, Fig. 1). Attitudes towards all predators were polarised, most ranchers being either very positive or very negative, with little middle ground (cheetahs 18% very negative, 44% very positive; jackals 10%, 45%; leopards 14%, 62%; lions 31%, 42%; spotted hyaenas 21%, 47%; wild dogs 31%, 39%). Negative attitudes towards wild dogs

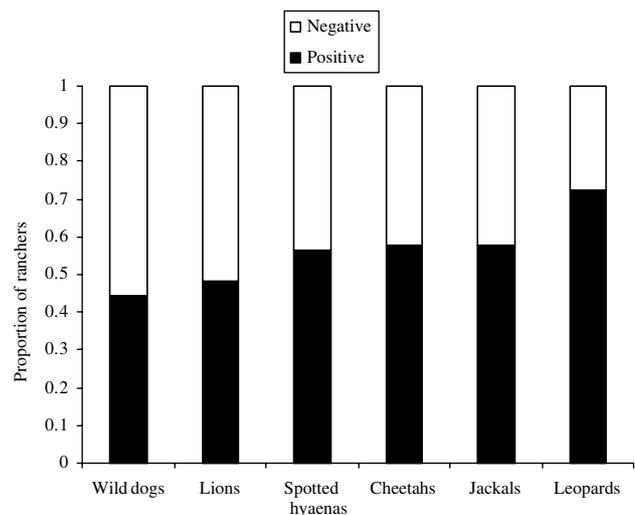


Fig. 1. Proportions of ranchers with positive and negative attitudes towards six predator species (wild dogs, $n = 209$ ranchers, lions, $n = 209$, spotted hyaena, $n = 208$, cheetah, $n = 207$, jackal, $n = 208$, leopard, $n = 209$).

Table 1
The percentage of ranches in each sample site in six predator species are regularly sighted

	ESA ^a	NESA ^b	NSA ^c	Gwayi	Matetsi	Save
Jackals	26 (100)	75 (91.5)	57 (98.3)	19 (100)	11 (100)	15 (100)
Cheetahs	4 (15.4)	48 (58.5)	33 (57.0)	9 (47.4)	9 (81.8)	14 (93.3)
Leopards	17 (65.4)	71 (86.6)	46 (79.3)	18 (94.7)	11 (100)	15 (100)
Lions	3 (11.5)	40 (48.8)	3 (5.2)	15 (78.9)	8 (72.7)	6 (40.0)
Spotted hyaenas	10 (38.5)	65 (79.3)	23 (39.7)	19 (100)	11 (100)	11 (73.3)
Wild dogs	1 (3.8)	25 (30.5)	11 (19.0)	17 (89.5)	9 (81.8)	15 (100)

^a Eastern South Africa.

^b Northeastern south Africa.

^c Northern South Africa.

were related to their perceived impact on wild prey (Table 2). The most common reason for positive attitudes towards wild dogs was “their value for ecotourism” (22% of ranchers, Table 2), a reason also commonly given for positive attitudes towards other species (leopards, 22%; spotted hyaenas, 20%; lions, 20%; cheetahs, 16%; jackals, 14%).

Ranchers were asked to indicate whether they agreed or disagreed with a number of statements (made by the interviewer) pertaining to wild dogs: 94% of ranchers agreed that “wild dogs are a natural component of a healthy ecosystem” ($n = 207$); 12% agreed that “wild dogs regularly kill more food than they require” ($n = 208$); 61% agreed that “wild dogs cause disruption of game herds and make them more skittish” ($n = 207$); 41% agreed that “wild dogs cause damage to fencing during hunting” ($n = 202$); 51% agreed that wild dogs are “a liability to a rancher because they consume valuable wildlife but provide no economic return” ($n = 188$). Although 93% of ranchers agreed that “tourists are interested in seeing wild dogs” ($n = 207$), only 43% agreed that “sufficient money can be made from marketing ‘wild dog eco-tours’ to compensate for the losses caused by their predation” ($n = 200$). However, of ranchers who stated that they do not want to have wild dogs on their property, 59% subsequently agreed that they might change their attitudes if it could be demonstrated that a sustainable profit could be derived from wild dogs ($n = 94$).

Fifty-two percent of ranchers indicated that, given a choice, they would like to have wild dogs on their property. However, ranchers’ attitudes towards wild dogs varied significantly with rancher and ranch characteristics (Table 3), permitting identification of conditions likely to be unfavourable for wild dog conservation, those in which conservation might be possible (e.g., with public education or profits from wild dog ecotourism schemes), and those that would favour wild dog conservation (Fig. 2). Rancher and ranch characteristics also affected attitudes towards other large carnivore species (Table 3).

English speaking ranchers ($n = 97$) were more positive towards wild dogs and other carnivores (Table 3, Fig. 3) than were Afrikaans speakers ($n = 112$). Although age had little general effect on attitudes towards wild dogs (Table 3), young Afrikaans landowners (20–39 years) were more positive than were older ranchers (>40 years, $\chi^2 = 6.77$, $df = 1$, $p = 0.009$, Fig. 3). Ranchers were most positive towards wild dogs in eastern South Africa (69.2% were positive), followed by Zimbabwe (67%), northeastern (58.5%), and northern South Africa (24.1%). Attitudes towards other carnivores did not vary significantly by region (Table 3).

Ranchers belonging to a conservancy were more positive towards wild dogs and other species than were ranchers whose properties were isolated (Table 3, Fig. 4). Ten percent of negative ranchers stated that they will be positive towards wild dogs when “we form a

Table 2

The 10 most common reasons given by ranchers for negative and positive attitudes towards six carnivore species (when asked with an open-ended question why they would like to have each species on their land or not)

Reasons given for attitudes (% of ranchers)	Wild dogs	Cheetahs	Jackals	Leopards	Lions	Hyaenas
<i>Negative comments</i>						
They affect income/have no value	13.5	1.9	3.4	2.0	2.9	4.3
They kill a lot of/too much game	13.0	12.5	10.1	2.5	9.1	7.2
They kill livestock	12.0	6.3	6.3	8.7	15.1	11.5
They chase game and make it wild	10.6	1.4	0	0	0	0
The ranch is too small for them	10.1	2.4	0	1.1	9.1	1.0
They chase game into fences	6.2	0	0	0	0	1.0
I will shoot them if I see them	3.7	1.9	1.9	2.4	3.4	1.9
There are too many of them	1.0	0	0	0.5	0	1.0
I do not like them	0.5	0	0	0	0	6.3
They pose a risk to human safety	0	0	0	0.5	5.8	0
They kill for the sake of it/waste meat	0	4.8	0	0	1.1	0
<i>Positive comments</i>						
Their value for ecotourism	21.6	16.3	13.5	22.1	19.6	19.7
Their ecological role/part of the system	13.5	18.3	24.0	13.9	11.6	19.7
Because they are few/only pass through	12.5	5.3	0	4.9	0	4.8
To assist with their conservation	7.2	1.9	0.5	0	1.1	0.5
I like them/they are nice to see	5.8	10.0	2.9	7.7	6.8	4.8
They are no problem/do not kill too much	3.9	12.5	21.0	22.5	3.9	16.8
They are OK if their numbers are managed	3.8	0	9.0	2.9	3.4	0
Their value for trophy hunting	0	0	2.9	8.7	8.2	2.4
They are a valuable species	0	0	0	3.9	3.9	1.0
They make a nice sound	0	0	3.4	0	0	1.9
They clean the bush of carcasses	0	0	7.0	0	0	7.2

Table 3

The relationships among attitudes towards predators, ranch and rancher characteristics, expressed as odds ratios; odds of positive attitudes relative to each reference category

	Wild dogs	Lions	Hyaenas	Cheetahs	Jackals	Leopards
Rancher characteristics (df = 4)	$\chi^2 = 32.2$ $p < 0.01$	$\chi^2 = 48.4$ $p < 0.01$	$\chi^2 = 27.9$ $p < 0.01$	$\chi^2 = 20.5$ $p < 0.01$	$\chi^2 = 7.09$ $p = 0.13$	$\chi^2 = 29.1$ $p < 0.01$
Language (df = 1)						
Afrikaans	0.26 ^a	0.12 ^a	0.33 ^a	0.18 ^a	0.57	0.09 ^a
English (reference)	1	1	1	1	1	1
Age (df = 3)						
20–40	2.28	3.99 ^a	4.56 ^a	1.00	1.81	5.73 ^a
41–50	1.88	2.06 ^a	3.02 ^a	1.16	2.01	1.09 ^a
51–60	1.32	0.38 ^a	0.42 ^a	0.89	0.79	0.34 ^a
>60 (reference)	1	1	1	1	1	1
Ranch characteristics (df = 8)	$\chi^2 = 69.2$ $p < 0.01$	$\chi^2 = 94.0$ $p < 0.01$	$\chi^2 = 67.0$ $p < 0.01$	$\chi^2 = 42.6$ $p < 0.01$	$\chi^2 = 45.2$ $p < 0.01$	$\chi^2 = 62.0$ $p < 0.01$
Region (df = 3) ^b						
NSA	0.52 ^a	0.32	1.30	0.58	2.45	0.18
NESA	0.46 ^a	0.72	1.05	0.53	1.86	0.34
ESA	26.7 ^a	1.05	2.27	1.39	1.16	0.88
Zimbabwe (reference)	1	1	1	1	1	1
Land use (df = 3) ^c						
Ecotourism	17.1 ^a	13.0 ^a	20.2 ^a	13.6 ^a	45.5 ^a	19.8 ^a
CWU	0.92 ^a	5.80 ^a	3.51 ^a	0.42 ^a	1.40 ^a	3.44 ^a
CWU/cattle	0.30 ^a	0.99 ^a	0.56 ^a	0.66 ^a	0.21 ^a	0.67 ^a
Cattle (reference)	1	1	1	1	1	1
Conservancy? (df = 1)						
Yes	3.05 ^a	4.88 ^a	2.78 ^a	2.65 ^a	1.08	1.27
No (reference)	1	1	1	1	1	1
Species occur? (df = 1)						
Yes	2.68 ^a	1.74	2.23	1.38	3.28	0.82
No (reference)	1	1	1	1	1	1

^a Statistically significant relationships ($p = 0.05$).

^b NSA – Northern South Africa; NESA – Northeastern South Africa; ESA – Eastern South Africa.

^c CWU – consumptive wildlife utilisation.

conservancy with neighbours/start ecotourism operations". Attitudes towards wild dogs and other carnivores also varied with land use (Table 3, Fig. 5), but were not influenced by ranch size.

4. Discussion

Wild dog conservation on ranchland is an emotive topic, in keeping with public opinion on wolves *Canis lupus* in North America and Europe (Bangs and Fritts, 1996; Zimmerman et al., 2001). Our results indicate that wild dogs are the least popular large carnivore species among ranchers, followed by lions, hyaenas and cheetahs. The relationships between attitudes and rancher/ranch characteristics were similar for each of these four species, and permit discussion of large carnivore conservation on ranchland in general terms. In contrast, leopards are popular among ranchers due to their economic value through ecotourism and hunting, and jackals are popular due to low perceived threat.

Four percent of ranchers indicated that they would shoot wild dogs on their property regardless of the species' legal status (Lindsey, 2003). Ranchers with negative attitudes functionally compound the already fragmented habitat and potentially limit the survival of wild dogs on ranchland, as has been found for lions in Kenya (Woodruffe and Frank, in press). However, the impact of persecution on wild dogs outside of protected areas is poorly understood and should be a focus for future research.

Costs due to wildlife typically result in negative local attitudes towards conservation (Infield and Namara, 2001; Walpole et al., 2001), and most reasons for negativity among ranchers towards predators are based on perceived economic costs (e.g., attitudes of communal farmers towards wild dogs in Zimbabwe; Davies and du Toit, 2004). The extent to which predators impose costs is affected by land use, and this, in turn, affects attitudes towards all carnivores. For example, cattle ranchers often complain that predators harass and/or kill livestock, while many game ranchers complain that predators kill ungulates that could be used for hunting.

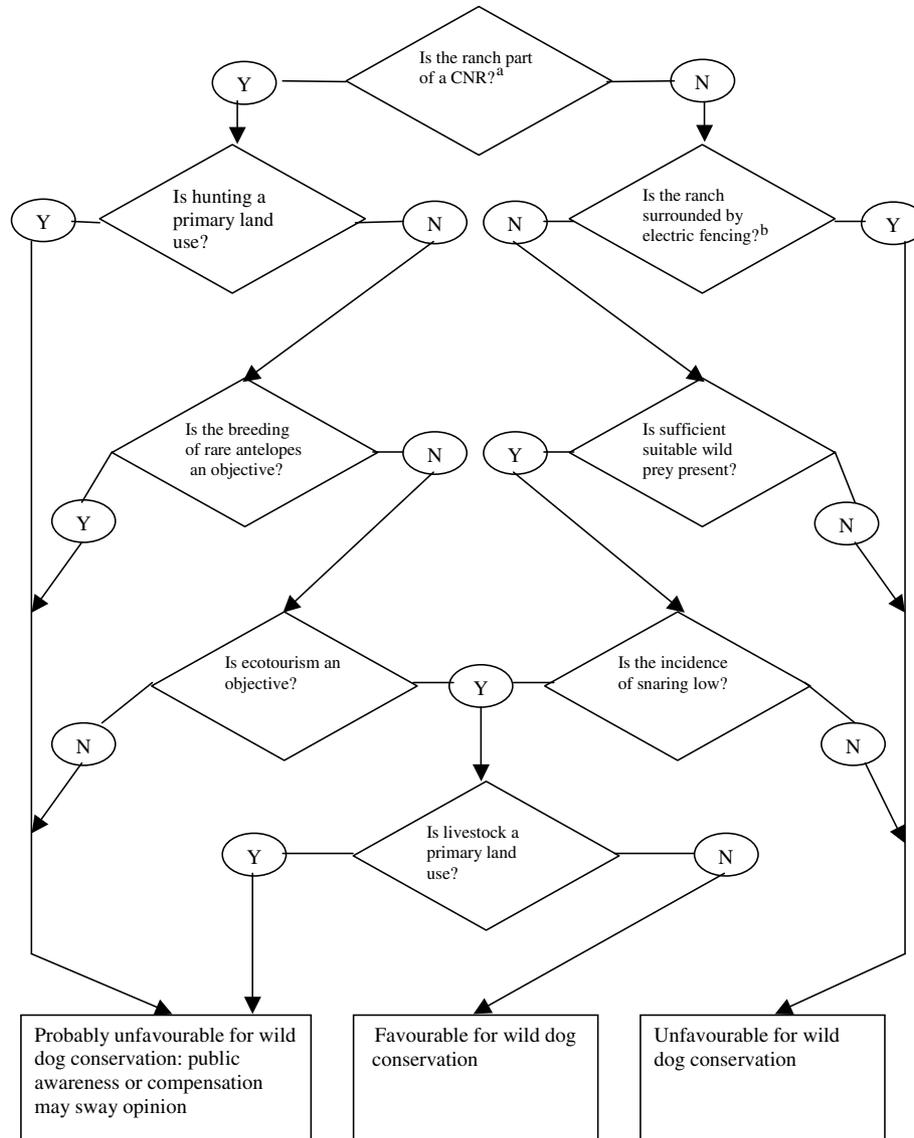


Fig. 2. The factors that determine whether wild dog conservation on private land is likely to succeed. ^a Collaborative nature reserve or conservancy. ^b Where fencing prevents wild dogs from accessing a property.

In southern Africa wildlife is the property of the landowner, in contrast to the situation in Kenya and North America (Cumming, 1991). This has placed high market values on wild ungulates and consequently, losses of wild prey to carnivores represent direct economic losses. This conflict is greatest in isolated fenced ranches. Although wild dogs are able to pass through standard game fencing, they use the fencing as a tool during hunting, which permits the capture of larger than usual prey, and potentially results in damage to fences and the loss of prey through fencing (Hofmeyr, 1997; van Dyk and Slotow, 2003). In addition, the division of large areas of ranchland into small game-fenced blocks is conducive to land uses based on intensive consumptive wildlife utilisation, thus promoting carnivore–human conflict, which limits the scope for carnivore conservation.

4.1. Strategies for reducing human–predator conflict and improving ranchers' attitudes

Education programmes aimed at increasing landowner tolerance (Ogada et al., 2003), and decreasing misconceptions are an important strategy for promoting carnivore conservation on ranchland. Contrary to the beliefs of many cattle ranchers, the impacts of livestock depredation in Africa appear to be small relative to other sources (Mizutani, 1993; Rasmussen, 1999). Furthermore, appropriate livestock husbandry can significantly reduce livestock losses (Rasmussen, 1999; Ogada et al., 2003). Research is required to improve understanding of the economic impact of carnivores (both positive and negative) on game ranch profits. The costs of predation by wild dogs (and other species)

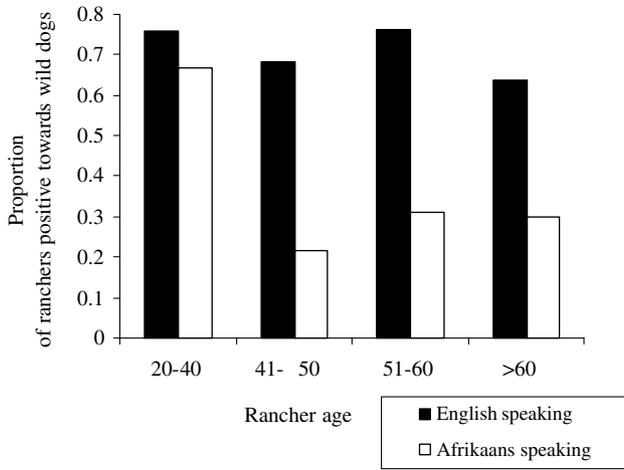


Fig. 3. The effects of ranchers' age and language on attitudes towards wild dogs (data on age of ranchers were available for 159 of 209 ranchers interviewed).

on game ranches are potentially high (Lindsey et al., 2005), and more difficult to reduce than livestock losses. Conversely, predation by large carnivores may confer ecological and economic benefits under game ranching conditions. For example, wild dogs select the least fit animals and a proportion of their predation removes sick animals and those that would have died anyway (Pole et al., 2004).

Encouraging the formation of conservancies should be a priority to facilitate coexistence between landowners and predators. Conservancies typically aim to reconstruct intact wildlife communities including predators (Lambrechts, 1996) and many of the perceived problems associated with carnivores on ranchland are reduced, due to larger prey populations, the absence of internal

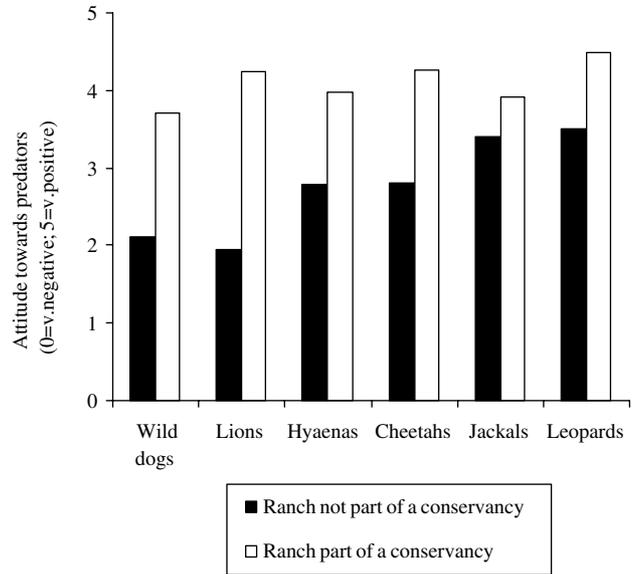


Fig. 4. The effect of whether or not a ranch belongs to a conservancy on ranchers' attitudes towards predators (data on whether ranches belong to a conservancy were available for 207 of 209 ranchers interviewed, $n = 129$ ranches not part of a conservancy, $n = 78$ part of a conservancy).

fencing and economic conditions conducive to ecotourism (Barnes and De jager, 1996). Ranchers within conservancies tend to view wildlife as a communal resource and are less concerned by the loss of wild ungulates to predators. The increasing number of conservancies in southern Africa is creating sites suitable for reintroduction and natural re-colonisation by large carnivores. Save Valley Conservancy in Zimbabwe for example, was re-colonised by wild dogs in the early 1990s, and now has an estimated population of 190

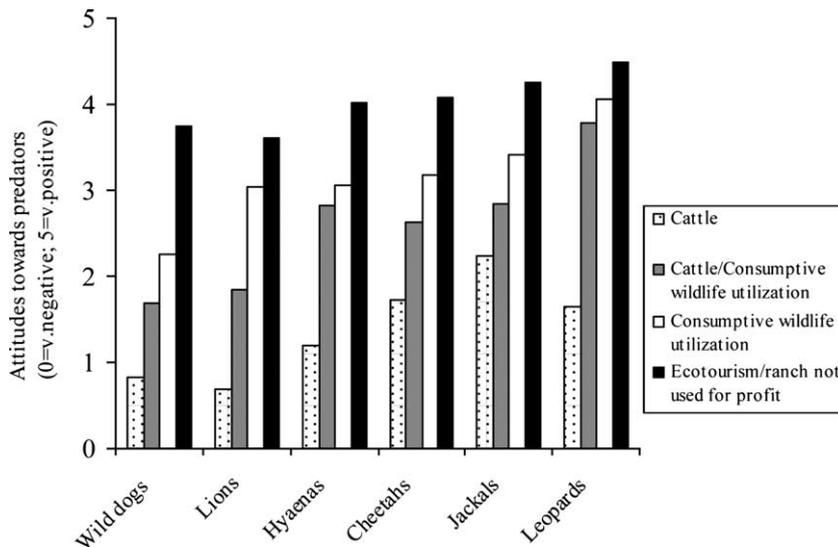


Fig. 5. The effect of land use on ranchers' attitudes towards predators (data on land use were available for 205 of 209 ranchers interviewed, $n = 24$ ranches used for cattle, $n = 30$ used for cattle and consumptive wildlife utilisation, $n = 48$ used for consumptive wildlife utilisation, $n = 103$ used for ecotourism or where ranch is not used for profit).

individuals (A. Pole, pers. comm.). Wild dogs have also successfully re-colonised the Laikipia district of Kenya, where most ranches are unfenced, and ecotourism/cattle ranching dominate land use (Woodroffe et al., in press).

Generating benefits from carnivore conservation is another way in which attitudes might be improved. Wild dogs and other large carnivores are popular among tourists (Fanshawe et al., 1991; Davies and du Toit, 2004) and the financial benefits of wild dog-based ecotourism are potentially sufficient to offset the costs of their conservation under most game ranching conditions, and particularly where wildlife is not utilised consumptively (Lindsey et al., 2005). Conservation efforts involving wild dogs on rangeland should include assisting landowners to establish wild dog-based ecotourism.

There is an increasing awareness that working with people is part of the solution to conservation problems in Africa (du Toit, 2002), and our results suggest that land owners in southern Africa have the potential to be important facilitators in wild dog conservation. Over half of ranchers want wild dogs on their properties, and younger ranchers are more positive than older ranchers, suggesting that tolerance will increase with time. Some ranchers expressed a keenness to actively assist in conservation efforts through monitoring, and in helping to prevent wild dog persecution by other ranchers. Attitudes were more positive among ranchers with wild dogs on their properties, suggesting that tolerance may increase with exposure to the species, and that negative stereotypes involving wild dogs may be more perceived than real. An alternative explanation for this is that negative ranchers have eradicated wild dogs from their properties, but this is unlikely because ranches are typically small relative to wild dog home ranges and because in most areas negative and positive ranchers are interspersed.

At present, only 76 wild dogs occur on rangeland in South Africa, and inhabit at most 22% of potentially suitable habitat (Lindsey et al., 2004). Other large carnivores are also limited in distribution (Friedmann et al., 2002). If wild dogs were adequately protected on game ranches, given the lowest density (8.3 dogs/1000 km²) observed in Kruger (Davies, 2000), the 80,000 km² of game ranching in South Africa (Hearne and Mackenzie, 2000) would be potentially capable of supporting ~664 wild dogs (~66 packs), which would be >10% of the world's population (Woodroffe et al., 2004). Given this potential, conservation efforts aimed at increasing landowner tolerance and reducing persecution of wild dogs by a minority of negative ranchers should be a priority.

In conclusion, although much needs to be done to improve the attitudes of ranchers who persecute wild dogs, significant potential exists for conserving wild dogs on rangeland in southern Africa. Similar relationships exist between ranch/rancher characteristics and attitudes to most large carnivores, and the findings of this study

are of general applicability for predator conservation in southern Africa.

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