

Conservation of African wild dogs in Namibia



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Executive Summary

Human-wildlife conflict resolution, especially when concerning the interactions between wide-ranging large carnivores and livestock farmers, is a complex and resource intensive process. Entrenched attitudes and behaviour in divergent public and private stakeholder groups are problematic to reconcile and modify. A simply applicable 'silver bullet' does not exist. Under these circumstances the varying socio-economic and ecological factors combine to necessitate a long-term integrated and adaptive management strategy at the landscape level. It is within these parameters that the future of the African wild dog in Namibia, and further throughout Africa, ultimately depends.

These are challenges that must be met if we are to achieve our Vision 2030¹ development goals while maintaining biodiversity.

In Namibia there is a framework in the National Community Based Natural Resource Management Programme that is providing the support and momentum to meet these challenges. By working with key stakeholder groups the Namibian Wild Dog Project is progressively developing an understanding of what is required to maintain a viable population of African wild dogs in Namibia, for the benefit of all Namibians.

It is becoming increasingly apparent that source-sink dynamics and associated edge effects play an important role in the long-term conservation prospects for Africa wild dogs. Yet understanding and modifying the driving mechanisms behind these dynamics is a significant challenge in a multiple-land tenure and land-use system.

During the past 12 months the Wild Dog Project has developed a secondary study site to improve opportunities for capturing and collaring free-ranging African wild dogs, to enable more effective monitoring of ranging and feeding ecology in conflict areas. In parallel, training of community members in environmental education and guiding has increased awareness of African wild dog conservation and the benefits that the species can bring at village level. Basic ecological monitoring utilising traditional skills has been promoted and it is hoped that a long-term interest in nature conservation and research can be generated and sustained.

A National Management Plan in draft format has been developed in collaboration with Predator Conservation Trust and MET Scientific Services and is to be taken forward in 2005 to the implementation stage.

¹ NPC-GRN (2004)

1.0 Defining the challenge of African wild dog conservation

1.1 Background:

The African wild dog (*Lycaon pictus*), like many charismatic carnivores, heads the food chain, need large home ranges and require careful landscape-level management. Protected areas in isolation of surrounding landscapes are rarely large enough to secure their long-term conservation. African wild dog conservation is thus, in many respects, a microcosm of biodiversity conservation as a whole². Many classic examples of conservation biology challenges are epitomised by African wild dogs. Problems of reintroductions, management, park-neighbour management and co-management, behavioural ecology and policy use can all use the African wild dog for basic test cases. If we can sort out complex African wild dog conservation, we are bound to solve problems for other taxa.

In terms of species lists and classification schemes AWDs are often classified in the following categories³:

- Indicator species that reflect critical environmental alteration;
- Umbrella species that require large home ranges, thus if protected, will protect species;
- Flagship species that are popular and attract much interest;
- Vulnerable species that are most likely to become extinct.

The documentation surrounding the African wild dogs' decline over the past three decades is extensive. Even though listed as Endangered by the World Conservation Union⁴ since 1977 and protected under law throughout most of their range the population continues to decline. Today between 3000-5000 animals remain in perhaps 14 countries from 39 once present in⁵. While protected areas represent an essential component for landscape conservation, they are commonly too small to maintain such wide-ranging carnivores in the long term, and are always surrounded by areas in which carnivores and human must share access to natural resources. Competition with humans for resources always arouses strong reactions in the communities living with these top predators. The extensive ranging ecology of African wild dogs often brings packs into contact with communities beyond the borders of parks and into land taken over for livestock farming. Thus even normally protected populations are subject to road kills, disease contracted from domestic dogs and depletion of wild prey. Like other large predators, they occasionally kill livestock under some circumstances, and have been shot, snared and poisoned in most livestock areas irrespective of legal protection. The impact of source-sink dynamics (edge effects), though poorly researched for the African wild dog, is increasingly considered to be a significant threat to the continued existence of the African wild dog.

1.2 Namibia:

Historical records indicate that the African wild dog was once present in all regions and habitats except for the far southwest and Namib Desert areas. In the past 100 years that range has been vastly reduced, correlating with the expansion of the human population and associated conversion of land use into livestock farming. Now only the isolated northeast of the country contains a population that is thought to be viable with scattered sightings of individual and small packs south into Omaheke Region and northwest to Etosha National Park.⁵

It is estimated that between 300-600⁶ individuals live in the isolated northeast of Namibia (Figure 3) where only 5% of their range is within protected areas. The African wild dog is considered to be Namibia's most endangered mammal species (M. Griffin, MET Biodiversity offices *pers comm.*) but conversely very little is known about their population status, ecology and impact of conservation threats in this vast semi-arid area of c.170,000km².

² ZSL (2002).

³ Gittleman *et al* (2001).

⁴ IUCN (2004).

⁵ Woodroffe *et al* (1997).

⁶ Hansen (2004).

2.0 Namibian Wild Dog Project and National CBNRM Programme

The Namibian Wild Dog Project (WDP) in the Otjozondjupa and Omaheke regions of Namibia has its origins in the communal cattle and small-stock farming Herero community in eastern Namibia. This area is part of the central Kalahari system, a semi-arid savanna with no perennial surface water.

People and their livestock are restricted to the western areas with boreholes and pipelines, and to the few ephemeral drainage lines that flow eastwards towards the Okavango system in Botswana. Large areas in the east are uninhabited or with very low population density (mean $<0.5\text{km}^{-2}$). It is thought that this area supports a significant population of African wild dogs (AWD), but very little data is available as substantial research on African wild dogs in this area, as with the rest of the country, is deficient.

The WDPs' aim is to better understand the interactions between AWDs and humans and to find ways of mitigating the conflict while researching other threats to national AWD conservation. The WDP looks to link social and ecological approaches to conservation, working closely with people - ultimately trying to find ways of optimising benefits from African wild dogs through tourism, while understanding their ecology and conservation threats within the actual and potential conflict zone.

Mission: *The WDP, supported by the Ministry of Environment and Tourism (MET), aims to ensure, in the long-term, a viable, free-ranging and secure population of African wild dogs, as a component of wildlife based land-use through sustainable management practices, for the benefit of all Namibians.*

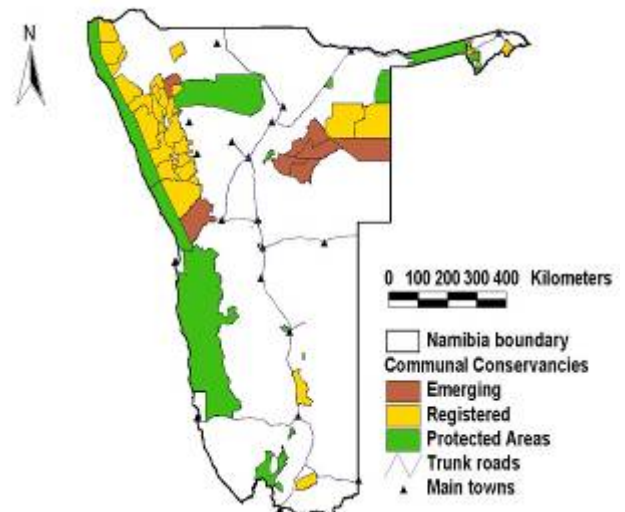
This project has been strongly requested by communal communities in Eastern Namibia. Human-wild dog conflict is amongst their top priority issues. Project support is endorsed by the emerging and registered conservancies in Otjozondjupa and will be conducted in close collaboration with, in support of, and supported by the national CBNRM programme. The communal conservancies don't only see AWDs as a problem, but an opportunity to improve people's livelihoods.

The central study area is also part of a **National Community-Based Natural Resource Management (CBNRM)** programme. This programme, through national policy and recent legislative reform, works to create incentives for communal farmers to conserve, manage and benefit from wildlife and tourism. The programme has three broad objectives:

- To rebuild and sustainably manage wildlife and other indigenous biodiversity;
- Generate income, diversify and improved livelihoods for communal farmers;
- Empower and build capacity for management and development skills, to help poor rural people break out of rural poverty and pro-actively determine their own futures.

Figure 1: Land under conservation management in Namibia.

Currently there are 29 registered communal conservancies in Namibia covering 88,000km². This represents 9% of Namibia's' surface area. In context Namibia also has 14% of its landmass under protected area status and a further 5% under freehold conservancies bring the total land surface under conservation management to 27%⁷.



⁷ NACSO (2004).

Part of the CBNRM programme involves extensive and ongoing consultations with community members, traditional authorities (chiefs and headmen), elected Councilors, government employees (e.g. MET, Ministry of Agriculture), etc. Arising from these consultations in the Otjozondjupa region, it became clear that one of the main problems being faced by communal farmers was that of predation of their stock by large predators. The most significant predator by far in this area appears to be the AWD. A review of predation records in the MET's Okakarara office together with other research data⁸ indicates almost 100 cases of stock lost attributed to AWDs during 2003/3.

⁸ Lines (2003a).

3.0 Study Area

3.1 Environmental characteristics:

Otjozondjupa Region in the northeast of Namibia is situated at the western edge of the Kalahari Basin. As such, most the area is covered by windblown sand and is generally flat – varying between 1400m ASL in the southwest to 1000m ASL in the east. Drainage lines flow east towards the Okavango Delta 200km away. Rain falls mainly in January and February varying from 350mm in the south to 450mm in the northern areas. Sporadic rainfall and high evaporation rates (upto 2,000mm annually) impact significantly on the vegetation types. Kalahari sands are dominated by woodlands, which are tall and broad-leafed in the higher rainfall areas, becoming progressively shorter and characterized more by shrubs and thorny species to the south⁹. Dominant species include *Burkea africana*, *Commiphora africana*, *Terminalia sericea* and *Grewia spp.* Greatest plant diversity is matched by that of other phylum in areas of highest rainfall. Desertification, predominantly in the form of bush encroachment to the south and west, has occurred in many areas where pressure on grazing from intensive livestock farming is high.

3.2 The human element:

The total population in 2001 was 50,600, having grown by 2.6% pa since 1991 (Appendix 1). More than a third of all people live in towns. Almost half of the population is below 15 and the population density is extremely variable, with about 89% of the region being uninhabited⁶. Approximately 7,000 San and 70,000 Herero people occupy this region.

Figure 2: Historical & Current Distribution of AWDs¹⁰

Figure 3: Current Density/Distribution in Namibia¹¹

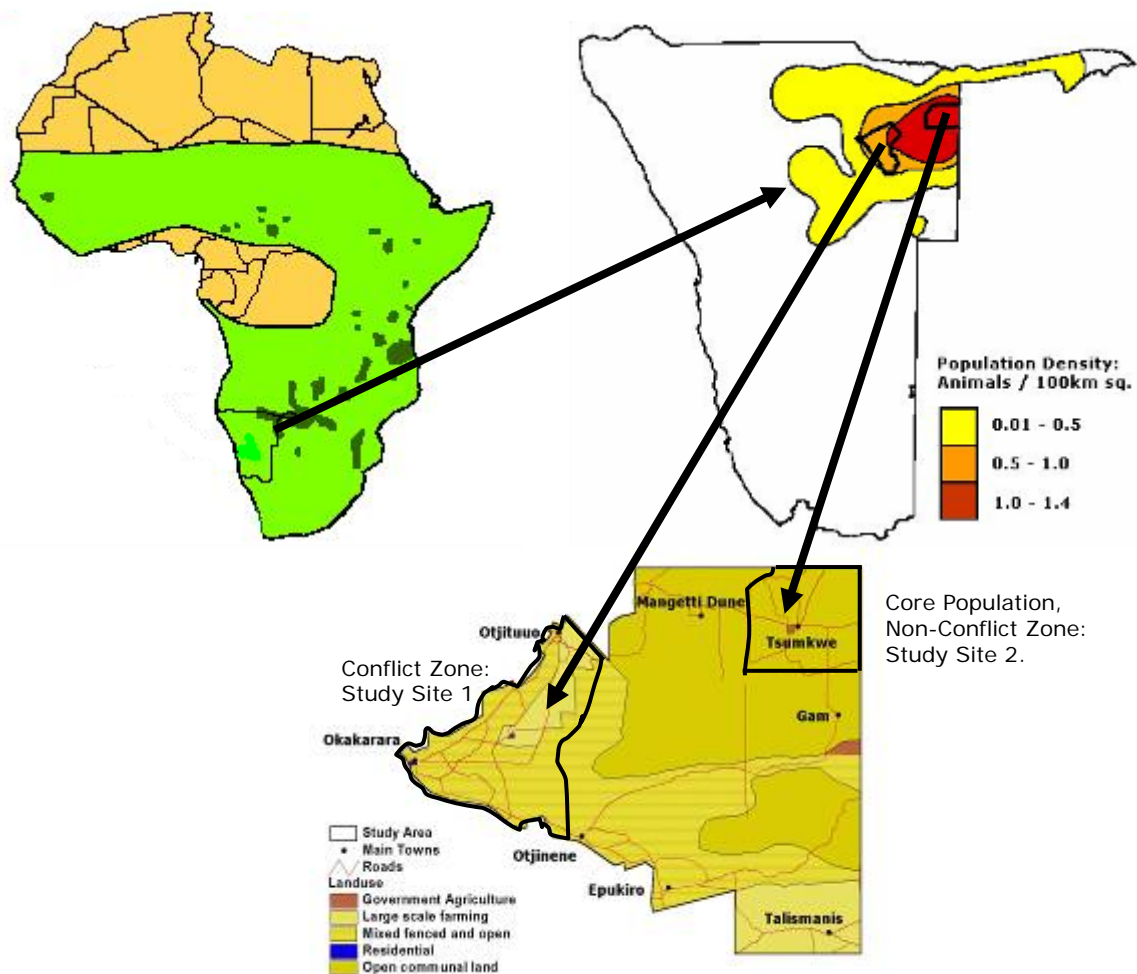


Figure 4: Eastern Communal Lands⁸

⁹ Mendelsohn & Obeid (2002).

¹⁰ Woodroffe *et al* (1997).

¹¹ Hansen (2004).

3.3 Land and economy:

Land uses and the regions economy are dominated by farming, especially Herero cattle ranching where very large areas are fenced off as exclusive farms. Crop farming is seldom productive, and subsistence farming difficult. Livestock numbers consist of approximately 300,000 cattle and 180,000 sheep and goats combined⁶. These livestock are restricted to areas where water is available (Appendix 2). Livestock farming in the San areas (Tsumkwe District) is minimal with many of the inhabitants still relying on the vestiges of their hunter-gathering heritage together with seasonally available food aid. Income generated from wildlife dominates these areas but many of Namibia's poorest people live here.

3.4 Okakarara District study site:

Okakarara District (E17.5⁰-19⁰, S20⁰-21.5⁰) covers an area of 18,951km² and contains a population of c.21, 000 people dominated by the livestock farming Herero communities. Language is uniform within this Herero community. The area is bordered to the northwest, west and southwest by fenced commercial land, both game and livestock farming. Conflict with predators is believed to be a significant factor affecting the viability of the AWD population in this and adjacent area. This site is also part of the National CBNRM programme and there are 4 emerging communal conservancies within the boundaries of the district. Tourism is very low in this area and the vast majority of income is generated from live sales of cattle. Wildlife numbers and low in areas close to human habitation.

3.5 Tsumkwe District study site:

The second site centers around Nyae Nyae conservancy in the east of Tsumkwe District (E19⁰-21⁰, S19⁰-20⁰) covering an area of 8,900km² and containing a population of c.3,000 predominantly San bushmen of the Ju/Hoansi group. Traditional hunter-gathering remains the mainstay of local livelihoods with limited tourism income from sales of locally produced jewelry and camping fees. Significant revenue from safari hunting provides the community with means to fund small-scale development projects through the conservancy management with the assistance of external NGOs. Wildlife utilisation is seen as the best option for long-term development. Livestock farming is on the increase but stocking rates remain low and centered around approximately 20 of 34 semi-permanent villages. Game populations have stabilized in recent years and are now on the increase with good numbers of kudu, wildebeest, springbok, duiker and steenbok – all considered suitable prey species for AWDs (Appendix 3).

4.0 Project Progress

4.1 Research human-wild dog conflict in farming communities:

In 2002/3 the WDP conducted a communal farm survey in **Okakarara District**. Results indicated deep-rooted animosity towards AWDs, over and above the widespread dislike for all other large predators. This was based on the real or perceived threat to livestock these predators pose. Although accurate identification of livestock losses and reliable record keeping was poor in both private and public sectors it was nevertheless apparent that AWDs (and other predators) occasionally killed livestock, sometimes in significant numbers, and thus negatively impacted on livelihoods mainly dependent on livestock for meat and sales.

But, to put the impact of AWDs in context, the major causes of livestock losses were stock theft (30%) followed by disease (18%) and birthing problems (17%). Predators accounted for 16% of cattle losses from which AWDs account for approximately 1 in every 6 of predator kills. If we compare the impact of stock theft on cattle with that of AWDs we can calculate that for every cow killed by AWD, 30 are stolen. Much of these livestock losses are preventable by improved livestock husbandry - shown to be very effective in other rural farming areas containing large carnivores¹² but which is largely absent in this rural community. Interestingly there were very few records of AWDs killing small stock suggesting the need for further research into the probable effects of varying husbandry methods.

While very hard to verify the level of human-induced depredation on AWDs in this area (and associated impact on population viability), it was nevertheless clear that poisoning, road collisions and disturbances at den sites were threats. Reports from farmers indicated regular sanctioning of, and collaboration in persecution by public authorities unable or unwilling to offer any other support to the farming community. The absence of good transport, communication and firearms in these areas undoubtedly reduces the effective depredation rates. Nevertheless these communities represent **conflict settlements**.

During the same period evidence of human-induced depredation on AWDs from **adjacent commercial farming areas** indicated few if any of AWDs crossing into these areas from the communal areas survived to breed. One pack of 13 AWDs was reduced to 2 over a period of 3 months (2 drowned in the local open canal and a further 9 were shot). From 5 recorded dispersing units totalling 9 individuals just 2 remained (2 drowned & 5 shot) at last contact before vanishing deep into the farmlands to the south. The commercial farming areas are characterised by management with good transport, communications and abundant firearms and appear very effective at eradicating any AWDs ranging into these areas, either as established packs or dispersal units. No reports of AWDs denning in commercial farmland has been collected. These communities represent **conflict settlements**.

During the past 6 months of research in **Nyae Nyae conservancy** analysis of historical records, together with semi-structured interviews (conducted at 28/34 villages in the local community and with MET staff) indicates that AWDs have had almost zero impact on livestock in perhaps 10 years since livestock was first introduced in the area. Since lion became locally rare in the last decade leopard and hyena have been the major threat to livestock. The only record of human-induced depredation on AWDs is 3 pups run down on the main high-speed gravel road travelling through the area. Dens are occasionally dug up by the San while hunting porcupine but this invariably occurs outside the denning period. The impact of this practice on the breeding success of AWDs is as yet unquantifiable.

This area contains **non-conflict settlements**.

¹² Ogada, M.O. (2001).

By mapping these conflict/non-conflict settlements across land use, in relation to the latest data available from the Carnivore Atlas¹³ on AWD density/distribution, it is clear that a close correlation exists. Large areas to the east of Okakarara District have very low conflict settlement density and therefore potentially provide suitable habitat for AWDs beyond their core area in Tsumkwe District. But detailed ecological data in these isolated areas is deficient.

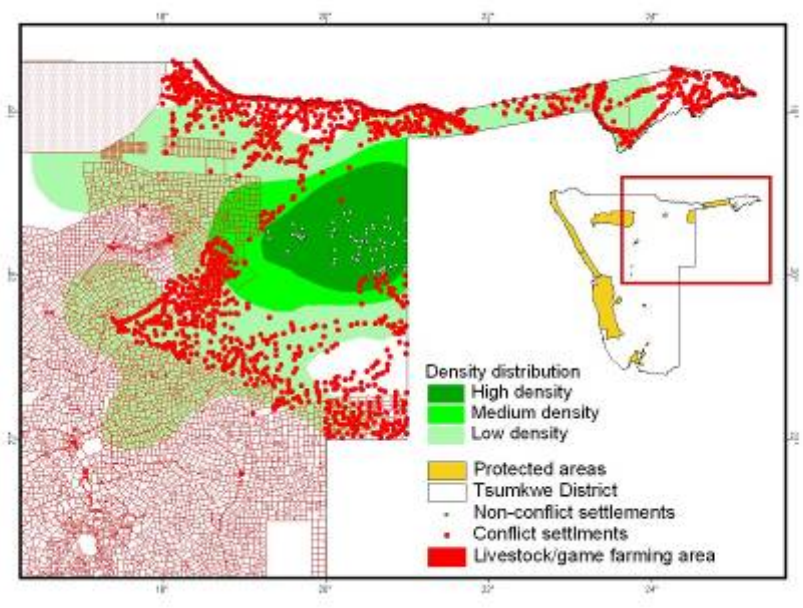


Figure 5: Communal farming settlements in relation to AWD density/distribution.

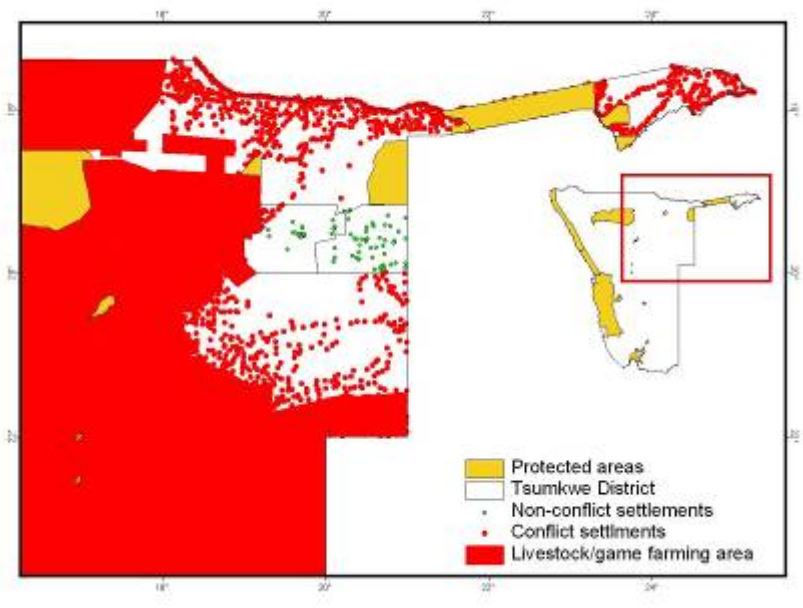


Figure 6: All farming settlements in relation to AWD density/distribution.

Tracking and capturing free-ranging AWDs through fenced farmlands, both communal and commercial, has proved a near impossible task with the available resources and local infrastructure. Thus to gain a better understanding of conflict in these areas, the level of human-induced depredation and impact on population viability, it will be necessary to collar and monitor packs from unfenced, non-conflict areas that range into the conflict areas.

¹³ Hansen (2004)

4.2 Collect baseline data on other factors affecting African wild dog conservation.

4.2.1 AWD Sightings and Ranging Ecology:

In response to the difficulty in finding AWDs in Okakarara District a decision was made to develop a secondary study site to the northeast in Tsumkwe District – closer to where indicators suggest is core AWD range in Namibia. From this area collaring and tracking AWDs into adjacent livestock/game farming areas was considered more achievable and productive.

Six months research in this area has proved very encouraging with a minimum of 5-6 packs and a further 3-5 dispersing units identified in the 8,900km² Nyae Nyae conservancy. Photographic identification records cover individuals from 3 packs and the images have been imputed into a digital database used in conjunction with researchers in Botswana to monitor transboundary movement.

Collaring attempts have been hindered by a combination of severe and widespread bush fires, lack of veterinary support and transboundary movement of packs identified for collaring. Full-time veterinary support is being arranged for the duration of the denning period. This is a key element for successful collaring in 2005 due to new veterinary legislation regarding use of anaesthetics on wild animals.

Previous research in Tsumkwe¹⁴ indicated ranging ecology far in excess of any data yet presented from other study populations (mean >3000km²; range=1800-4200km²; n=4 packs). This suggests the impact of source-sink dynamics and edge effects on the core population could be very severe.

4.2.2 Diet and availability of wild prey:

Over 100 scats have been collected in Nyae Nyae conservancy in the past 6 months and are to be analysed by Namibian students in early February. This component is part of a broader collaboration between the WDP, Cheetah Conservation Fund and students from the Namibian Polytechnic looking at feeding ecology of predators.

Baseline presence/absence and relative abundance data on a suite of game species was collected in **Okakarara District** during the 2002/3 Communal Farm Survey. Indicators suggest a significant reduction in all game species adjacent to human habitation, with the notable exclusion of steenbok that can be considered locally common. This data is being used by the CBNRM programme facilitators in Okakarara District to further develop a monitoring system for wildlife in the emerging communal conservancies.

A long-term ariel monitoring programme of game density and distribution in **Nyae Nyae conservancy** has revealed steadily increasing populations of ungulate species for the past 8 years, augmented by introductions of kudu, oryx, hartebeest, wildebeest and springbok. Data for the latest survey¹⁵ is provided in Appendix 3. A road strip count of duiker and steenbok is conducted in collaboration with MET staff and students from the Polytechnic later in 2005.

4.2.3 Competition with other large carnivores:

Lion have been largely exterminated from large areas of Otjozondjupa region with only 3 anecdotal sightings of lone males recorded in the past 2 years. In six months of tracking in Nyae Nyae conservancy no lion spoor has been picked up even though there is a healthy lion population in the adjacent and unfenced Kaudom National Park to the north which can be expected to recolonise Nyae Nyae conservancy in the future.

Accurate figures for hyena numbers in Okakarara District are unavailable as the local community was unwilling to support acoustic sampling methods they believed would draw in lion to the farming areas. Nevertheless interviews with the farming communities indicated low densities of hyena. No incidents of farmers killing hyena were recorded.

¹⁴ Stander (1997)

¹⁵ Stander (2004)

In Nyae Nyae conservancy hyena spoor is encountered daily in all areas. Sightings are common but census data is lacking. Acoustic sampling methods are to be locally refined and utilised to establish density in the dry season.

4.2.4 Disease prevalence:

Disease has been responsible for severe declines and even localised extinctions of AWD populations but controversy exists as to the best way, if any, of managing disease threats to AWDs. Serological research indicates that AWDs have and can develop a natural immunity to otherwise fatal pathogens such as canine distemper, canine parvovirus and rabies. During the recent IUCN workshop¹⁶ a collaborative research programme (managed by Davis University, California) was established to further investigate disease dynamics in AWDs. The Namibian WDP has signed up to this initiative and will be contributing samples as collected in captive and free-ranging AWDs.

Nevertheless disease prevalence in domestic stock is not just a threat to AWDs and other wildlife, humans also being susceptible. It is therefore prudent to monitor these threats by conducting serological testing on the main vectors of disease – domestic/feral dogs. This is to be conducted in parallel with the serological testing of AWDs. Both to be conducted in 2005 with veterinary assistance.

4.3 Develop & implement education / awareness projects to reduce conflict.

In early 2004 the WDP arranged for 4 members of the emerging communal conservancies in **Okakarara District** to attend a 5-day environmental education workshop held in collaboration with the Smithsonian National Zoological Institute at Cheetah Conservation Fund. The conservancy members are now involved with developing school nature clubs in each emerging conservancy area. The WDP holds a fund specifically for supporting school nature club initiatives, focusing on AWD conservation and more generally *integrated predator and livestock management*. Teaching aids are under development to provide additional support in the area. This theme is being carried forward in February 2005 with two additional week-long training workshops for 60 key stakeholders in Okakarara District (traditional authorities, farmers association and conservancy members, staff from the ministries of agriculture and environment and local influential farmers). Following these workshops 3 paid positions will be offered to further disseminate information on AWD conservation and *integrated predator and livestock management* throughout Okakarara District. Thematic reports, booklets, leaflets and posters are accompanying these initiatives and continue to be distributed throughout the conservancy and at all workshops and meetings.

A weekly environmental education radio programme in the local language is also promoting these initiatives.

Since developing the new study site in mid 2004 work has been completed on **Klein Dobe Environmental Education (EE) Centre**, 20km north of Tsumkwe town. The WDP, now based out of this facility, is working with local educators from the Ministry of Basic Education and managers of local youth groups to initiate an EE awareness programme. Given the wildlife dominated economy in the region course syllabus will focus on developing incomes from sustainable natural resource management with less focus on integrated predator and livestock management. Local radio broadcasts in the area have also drawn attention to the WDP and have been promoting AWD conservation in Nyae Nyae conservancy.

4.4 Develop & implement incentive-driven initiatives (tourism) for AWDs.

Low game numbers, poor infrastructure and a homogenous livestock dominated (largely fenced) farming landscape precludes much opportunity for wildlife/AWD tourism in Okakarara District.

In contrast there is vast scope for low impact/high income tourism enterprises in Nyae Nyae conservancy. Since June 2004 the WDP has hosted 3 tourist groups at Klein Dobe EE Centre,

¹⁶ IUCN (2004).

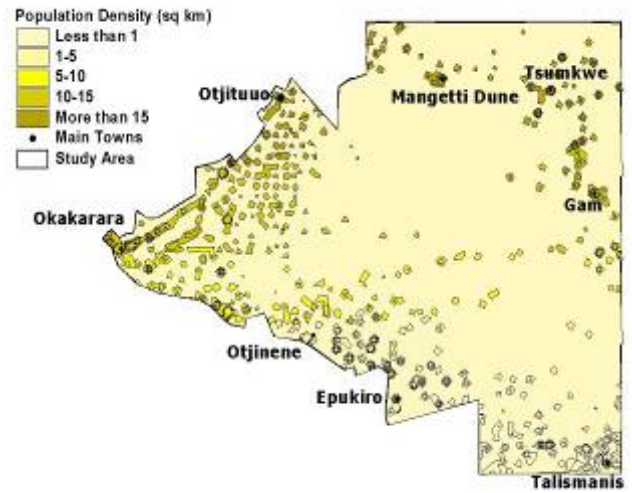
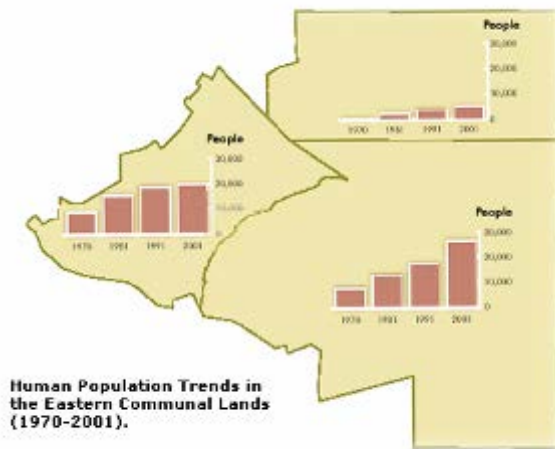
trialing various tour packages with a focus on interpretive hunting / gathering walks with the local San community, photographic trips and AWD tracking. Traditional skills are being promoted and training offered to community members. Wild Dog Safaris, an accredited national tour operator, is organising additional tour groups for 2005. Fees are paid into a dedicated fund at the Namibian Nature Foundation and cover EE initiatives in the area, running costs of the WDP for the duration of the tour, while providing funds for the maintenance and upkeep of Klein Dobe EE Centre. The fund also ensures that Nyae Nyae conservancy receive their tourist entrance fees. Attempts to introduce AWDs into large fenced reserves to promote their economic value to the private sector are awaiting support from MET and still under review pending completion of the National AWD Management Plan.

4.5 Development of a National Management Plan.

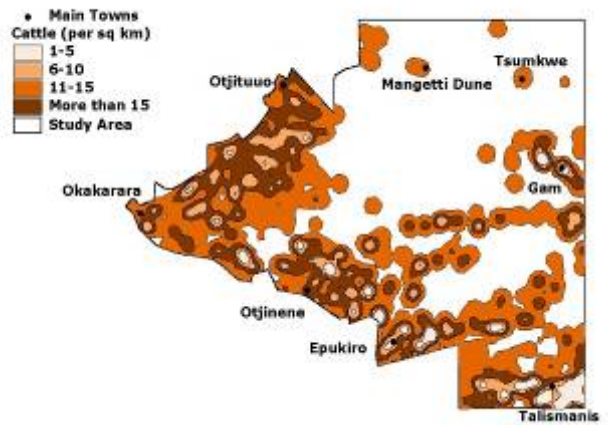
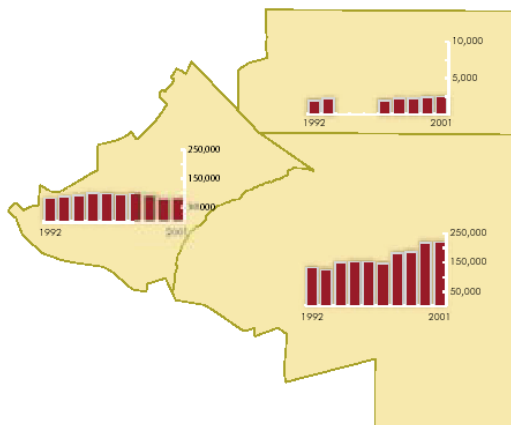
Further discussions to develop a National Management Plan for the AWD (with key MET and Predator Conservation Trust staff) have resulted in broad agreement on many of the components promoted in the draft management plan (Appendix 4). Fundamental to the National Management Plan is the imperative to develop models promoting the earning potential of AWDs from tourism. It is foreseen that this is best implemented on well resourced and managed private fenced reserves, perhaps under a similar custodian ownership scheme as with the national black rhino population. Discussions continue with key stakeholders.

APPENDICES

Appendix 1: Human population trends (1971-2001) and density/distribution for 2001.¹⁷



Appendix 2: Cattle population trends (1992-2001) and density/distribution for 2001.¹¹



¹¹ Mendelsohn & Obeid (2002).

Appendix 3: Summary of numbers counted and population estimates of the major Wildlife species in the Nyae Nyae Conservancy during September 2004. ¹⁸

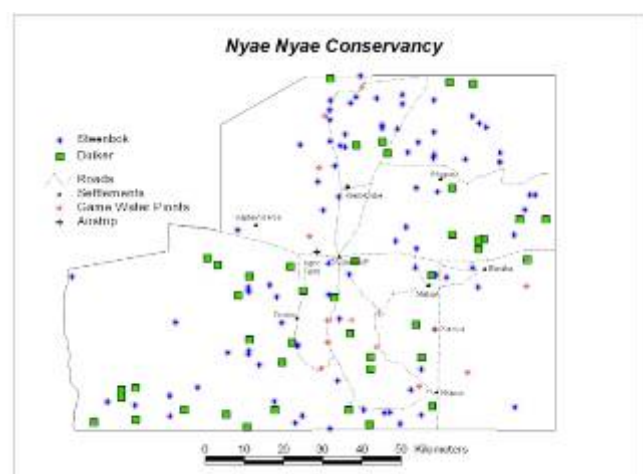
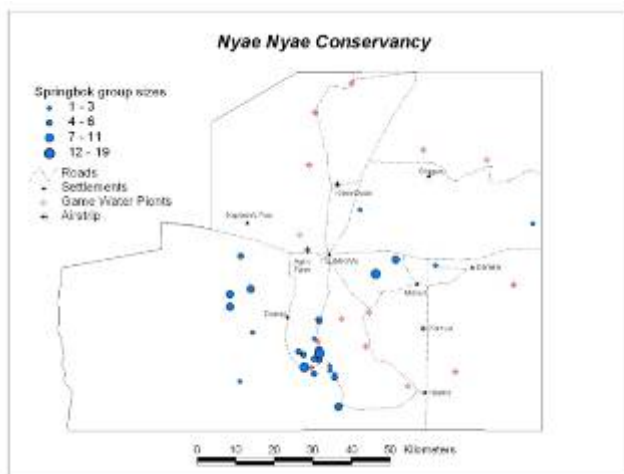
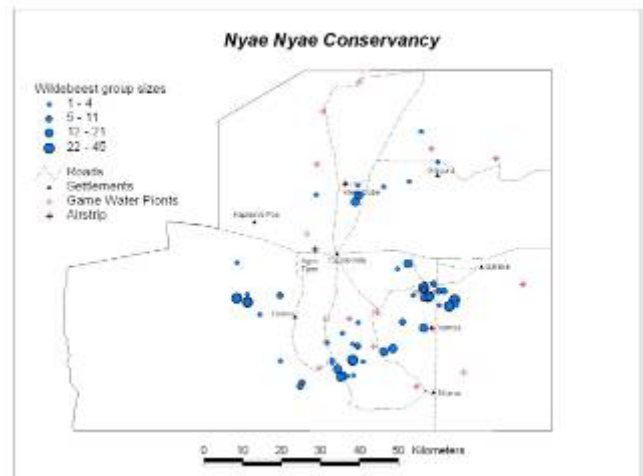
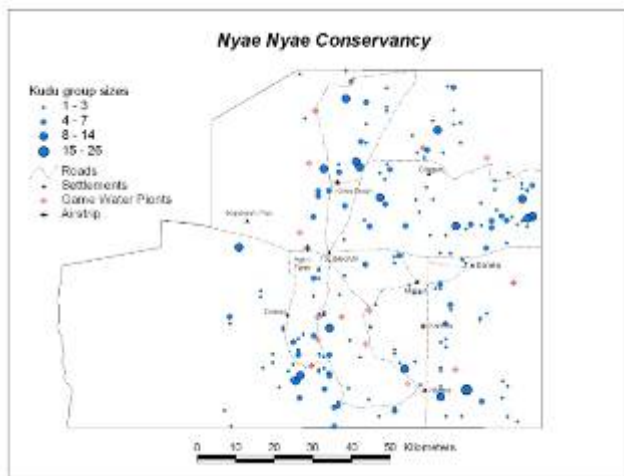
Species	Number seen	Population estimate	Confidence Range (95%)
<i>Kudu</i>	600	1502	1190 - 1815
Gemsbok	389	1196	782 - 1611
<i>Wildebeest</i>	371	1037	518 - 1595
Elephant	392	967	636 - 1448
Cattle	229	595	266 - 923
Shoats *	220	511	220 - 1042
<i>Springbok</i>	144	421	167 - 675
Ostrich	148	412	306 - 518
Hartebeest	108	282	145 - 420
<i>Steenbok</i>	88	259	177 - 342
Warthog	63	149	103 - 195
<i>Duiker</i>	47	137	93 - 181
Eland	35	97	35 - 222
Giraffe	19	89	23 - 211
Horse	29	66	38 - 95
Donkey	22	51	22 - 84
Roan	19	44	19 - 70

*Shoats = sheep & goats

Highlights indicate probable key prey species for AWDs.

N.B. Ariel counts for both steenbok and duiker underestimate true density.

Distribution of likely key prey species for AWDs in Nyae Nyae.



¹⁸ Stander (2004)

Appendix 4: Development of AWD National Management Plan.

Objectives:

1. Maintain and expand the range of AWDs in large continuous tracks of land, managed for wildlife;
2. Improve the image of AWDs through an awareness campaign and dissemination of factual information;
3. Establish meta-populations in smaller areas to develop and promote an economic value for AWDs;
4. Improve and standardize conflict mitigation measures.

Strategy:

- 1.1 Maintain the integrity of large existing protected areas with viable AWD populations;
- 1.2 Reintroduce AWDs to protected areas, within their former range e.g. Etosha NP;
- 1.3 Foster co-operation of AWD management in trans-boundary / cross border areas;
- 1.4 Assess the economics of AWDs through cost/benefit analysis.

- 2.1 Research the actual impact of AWDs in areas of conflict with livestock farmers;
- 2.2 Embark on an intensive public relations campaign to combat the negative image and perception of AWDs;
- 2.3 Establish and promote effective livestock management practices to reduce conflict.

- 3.1 Identify areas, including freehold land, suitable to reintroducing AWDs;
- 3.2 Develop guidelines for reintroduction of AWDs and a meta-population management plan;
- 3.3 Through a "custodianship" scheme, make AWDs available to suitable areas;
- 3.4 Develop and promote specific AWD-based tourism needs.

- 4.1 Develop a Reaction Plan;
- 4.2 Develop a Conflict Resolution Manual;
- 4.3 Investigate options for a Wildlife Damage 'Compensation/Reparation' Scheme.

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