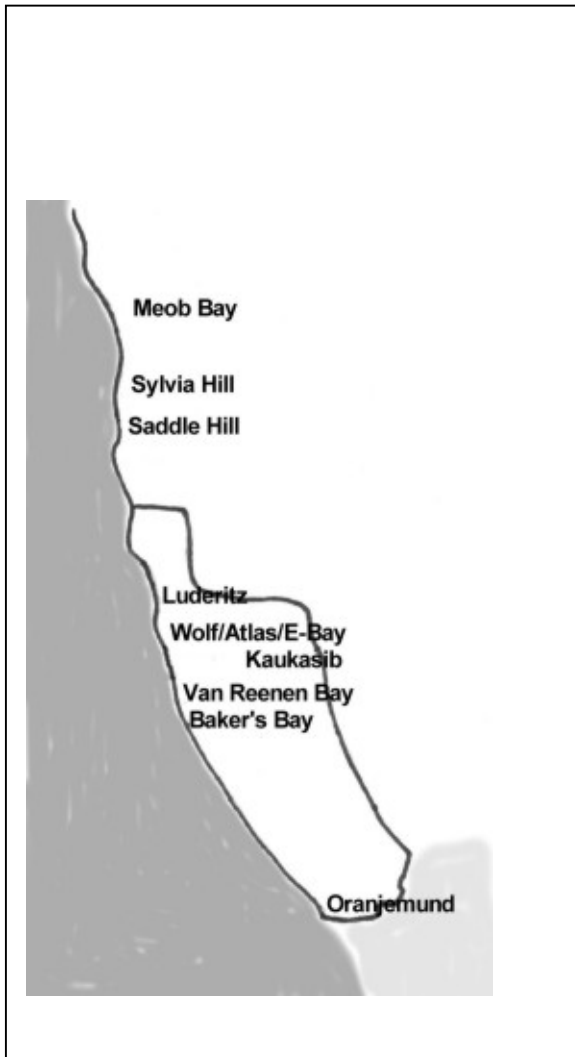


## STUDY AREAS



The main study sites of the Brown Hyena Research Project are situated in the area between the port of Luderitz and Elizabeth Bay. At the end of 2001 two additional study sites at Van Reenan Bay and Baker's Bay were included and we are going to start with extensive research and monitoring further north (Saddle Hill, Sylvia Hill, Meob Bay) and inland (Kaukasib) by the end of this year.

The long term monitoring of brown hyenas and the study of their feeding ecology will continue at the original study sites south of Luderitz. There we work closely together with the seal section of the Ministry of Fisheries and Marine Resources in Luderitz, as brown hyenas prey regularly on Cape Fur seal pups.

At Van Reenan Bay we concentrate - besides the monitoring - on the observation of the brown hyenas' hunting behaviour to combine the feeding ecology related data obtained at the original study site with behavioural data.

The monitoring programme of brown hyenas in the Baker's Bay area was recommended to and accepted by Namdeb in connection with the Environmental Impact Assessment addressing the proposed mining in this area.

The planned inland study is important to obtain a reliable population estimate for the entire Sperrgebiet. The coastal region is well studied and monitored, but no study has ever taken place further inland, where brown hyenas don't have access to seals as a food source.

The coastal areas north of Luderitz differ from the coastal southern Namib Desert. Seals are not as abundant onshore and the habitat is less suitable for brown hyenas, which might result in lower population density.

*Location of study areas*

## HYENA CLANS

### Peninsula Clan

Emma and Gypsy II are the two breeding females in this clan. Last year they successfully raised one litter each, Gypsy II raising one cub and Emma two. The total clan size is unknown, but an unknown adult brown hyena was seen at the den site on one occasion. The three sub adult animals, which were marked in November 1997 and the male hyena, which was collared in January 2000 have not been seen again. Emma's radio collar was exchanged in December 2001 and is still operational.

### Wolf Bay Clans

Members of at least three different brown hyena clans forage at the Wolf and Atlas Bay seal colonies. Clan membership is unknown, but we hope to gain more information about home range sizes and clan membership through GPS telemetry, which is planned for this year. Dollar, Jewel, Lisi and Vega were fitted with radio collars in November 2001. Unilux' collar, which was fitted in December 1999, expired last year and we have not fitted a new collar yet. Lisi died in winter last year. She was involved in a fight with another hyena and the inflicted wounds proved to be fatal. Vega died

of old age in September 2002. She lost a lot of body weight as a result of her extremely worn teeth.

Several other hyenas were marked in this area since 1997: Shalima, LHb 2, LHb 7, LHb 7B and Trouble, a young and inquisitive male brown hyena. He was fitted with a radio collar in December 1999, which he lost in the shifting sand dunes just a few weeks later. He was unfortunately killed by a vehicle last year in November, having been in his prime and in an excellent condition. He was approximately seven years old when he died.

Up to 21 adult hyenas forage at the seal colonies at Wolf and Atlas Bay. A minimum of six hyenas died since 1997 and the cub survival rate is unknown. The sex ratio of marked animals is 7 females to 3 males.



*Road kill of Trouble*



*Brown hyena at Sylvia Hill*

#### **Sylvia Hill Clan**

It is far too early to give information about the number of hyenas in this area, but on the latest site visit in March 2003 we could identify three different hyenas and also found an active den site. Judging from the amount of hyena tracks, we will also find a healthy population there.

#### **Van Reenan Bay Clan**

The monitoring programme started in November 2001. In the following three months seven individual hyenas were identified and the first population estimate is between eight and ten adult animals.

#### **Baker's Bay Clan**

For this area we've established a very good photo ID of different individuals. So far we could identify nine brown hyenas, but it seems as if there are more adult animals. One of them is completely blind. This blind hyena, named Andrea Wonder, is nevertheless in a good condition and seems to scavenge seal carcasses at the colony or from jackals and might even find food at the communal den site, where other members bring food back to complement the milk diet of the cubs.

#### **Meob Bay Clan**

So far no monitoring has taken place at Meob Bay, but three brown hyenas were marked in May 2001. These three hyenas are still in the area and are reported frequently be visitors to this area. They are very tame and visit the Angling Club Camp every night.

*Thank you to .....*

*At this point we would like to thank everybody, who supported the long term study of all these animals: Namdeb for their continuous support since 1998, the Namibia Nature Foundation for organising support for fuel (Jen and Des Bartlett Fund, Caltex), Caltex for donating fuel, Eco Challenge for providing transport and the following companies and individuals for adopting brown hyenas: Unilux South Africa, Birgitta Nolte, Riaan Laubscher, Alien Technologies, Carla Jooste, Silvia Pirngruber and Leigh Hall.*

## TELEMETRY

Since November 1997 seven brown hyenas were fitted with radio collars. Today only three collared animals remain as one collar was lost, one collar battery expired and two collared animals died. Radio telemetry proved to be very difficult as there is only a limited network of roads and off road driving is forbidden. The Ministry of Environment and Tourism carried out three aerial censuses and we were finally able to provide a local pilot with the appropriate equipment for his plane. Nevertheless brown hyenas move over vast distances and there is

often a bias in determining home range and territory sizes when only tracking during day. Therefore it is planned to fit three GPS collars on well-known hyenas during the course of this year. Our collaboration partners at Duke University, USA, sponsored these collars. The presented data obtained through radio telemetry is very preliminary and we hope to gain far more information through the use of new technologies in future.

The following table shows a comparison between different home range estimates of five different brown hyenas in km<sup>2</sup>. Home Ranges for Lisi and Vega were not calculated, as they died shortly after we fitted them with radio collars.

We have to cover 350 km per day to ensure that all areas with access through roads are included.

Hyena ID	Number of fixes	Minimum Convex Polygon	Adaptive Kernel	Harmonic Mean
Trouble	9	233,7	110,0	44,6
Emma	26	51,1	44,9	20,0
Unilux	8	8,3	9,6	2,8
Dollar	16	22,0	65,6	36,7
Jewel	13	24,4	58,7	20,1

Earlier references describe a home range size for brown hyenas in the Luderitz area of approximately 250 km<sup>2</sup>. Trouble's home range estimate is similar to this calculation, but the number of fixes is not sufficient. All other animals were only found either close to the active den site (Emma) or close to the mainland seal colonies, where they forage for food. After a night of foraging they usually rest close to the colonies and therefore the fixes gained through tracking by vehicle during day were biased. Aerial tracking will result in the same bias, but we hope that the GPS telemetry will provide more reliable data about the brown hyenas' movement patterns and core areas.

Our preliminary data is best described through the minimum convex polygon (MCP) method of calculating home range sizes, as it calculates the area between the outermost fixes.



*Brown hyenas with radio collar*

*Thank you to.....*

*Caltex for donating fuel for this part of the project. Long distances have to be driven to radio track brown hyenas from a vehicle. Siemens sponsored a Laptop Computer to download data from the GPS collars in the field, which will improve the success of this data collection.*

## MAPPING

All study sites are mapped systematically for brown hyena signs such as dens, latrines, resting sites, feeding sites, paste marks and well used tracks. This project already started in 1995 and is carried out in collaboration with Raleigh International since the year 2000. Last year we mapped areas around Agate Beach in Luderitz and the remaining areas around the Wolf and Atlas Bay seal colonies.

Mapping will provide us with information about habitats, which are suitable and important for brown hyenas but it will also help us to determine home range and territory sizes. Brown hyenas drop faeces in latrines, which are found throughout their territory, but concentrations occur near territory boundaries and important areas such as around food sources and den sites. We will feed brown hyenas of one clan, preferably at a den site, with bait spiked with coloured plastic markers, which are indigestible. With the help of Raleigh International venturers, we will examine the content of latrines for marked faeces. Ideally only one coloured marker should be found within the territory of the clan and in border areas we should find at least two different colors. This should enable us to combine the radio tracking data with this bait marking information to obtain reliable home range size estimates. This project was already planned for the end of last year, but so far the hyenas of the Peninsula Clan don't have a litter, hence no den site, where they socialize. Therefore we can only wait and continue to map the remaining areas, as it is important to find as many latrine positions as possible.



*Collecting faeces out of a latrine (photo Jessica Kemper)*

The reason that the Peninsula Clan is long overdue with their new litter could be the recent outbreak of distemper and rabies in the Luderitz dog population. Brown hyenas of the Peninsula Clan are regularly seen in and around town and are definitely in contact with stray domestic animals. It is known that hyenas can suffer from distemper, but it usually only affects young animals and cubs. It is therefore possible that the last litter of the Peninsula Clan was lost due to the diseases. Nevertheless, Emma is in an excellent condition and did not suffer from the diseases herself. As Gypsy II has no radio collar, we were not able to find her yet.

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*Thank you to.....*

*Raleigh International for their collaboration with the mapping and bait-marking programme.*

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## BROWN HYENA MORTALITY

Three brown hyenas died of natural causes in the study area between Luderitz and Elisabeth Bay last year. Only one road kill was reported, which is far less than in the previous years. Nevertheless, this does not necessarily mean that fewer hyenas are killed on the roads. Sometimes the information is passed on too late, so that predators have already scavenged the hyena, or other people collect the dead animal as hyenas are still used as "muti". We transport dead brown hyenas to the lab and perform a necropsy. Several organs are preserved for our collaboration partners overseas and the stomach content is analysed. Afterwards the hyenas are buried for approximately one year to retrieve the skeleton later. We will try to mount the skeletons for future display in connection with the plans regarding the Sperrgebiet.

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*Thank you to.....*

*all the people, who reported road kills and especially to all the people, who drove cautiously.*

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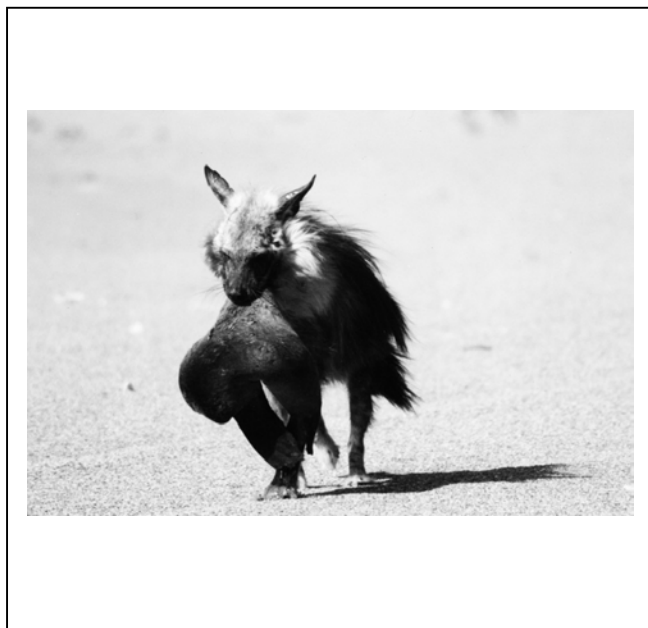
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## BROWN HYENA PREDATION

Data concerning the feeding ecology of brown hyenas at Cape Fur seal mainland breeding colonies was collected during the seal breeding season in November and December 2002. Despite declining seal numbers, hyena predation stayed constant in comparison to previous years. Brown hyenas prey on seal pups throughout the year and hardly supplement their diet with other food items along the coastal southern Namib Desert.

Faeces samples were collected in coastal and inland areas and will be compared regarding their composition.

The brown hyenas' hunting behaviour was observed at Van Reenan Bay between November 2001 and January 2002. The first ethogramme was established and future studies will concentrate on specific aspects of their hunting strategy.



*Brown hyena carrying a killed seal pup*

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*Thank you to.....*

*Raleigh International and Namdeb for their contribution to build the observation hut for the Brown Hyena Research Project at Van Reenan Bay.*

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## ENVIRONMENTAL IMPACT ASSESSMENTS

The Brown Hyena Research Project participated in two Environmental Impact Assessments during 2002 and registered as an Interested and Affected Party for several other EIA's.

### Elisabeth Bay Mining Extension

Data obtained during the long-term study of the original study area could be used for recommendations regarding Namdeb's mining extension plans of the Elisabeth Bay mine. The future mining plans will hardly affect brown hyenas and only a few concerns were raised.

### Pocket Beach Mining

This new mining project will possibly have major impacts on brown hyena ecology and behaviour and therefore a baseline study was initiated in June 2002. During this baseline study we established brown hyena core areas, activity patterns and population size to recommend mitigation strategies. As the mining project was postponed for another year, we will continue to collect preliminary data before starting the follow-up study next year.

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*Thank you to.....*

*EnviroScience for suggesting the baseline study at Baker's Bay in their EIA and for Namdeb to support this important pre-/post impact study.*

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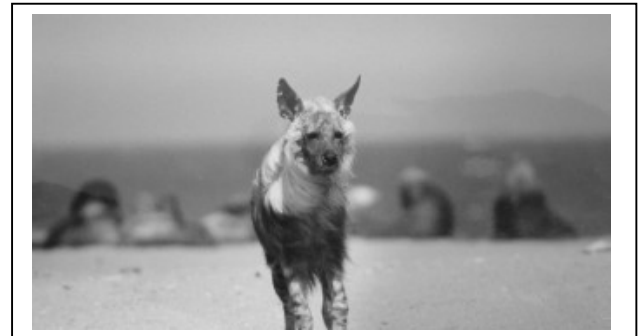
## PLANS FOR 2003



*Sedated brown hyena (photo Christine Drea)*

- Extend the brown hyena monitoring inland and into northern coastal areas.
- Observation of specific behavioural hunting patterns.
- Data collection concerning the brown hyenas' feeding ecology at the mainland seal colonies and through faeces analysis.

- Trapping of brown hyenas at the original study site and at Baker's Bay to fit them with radio, GPS and visual collars. Eight radio collars, three GPS collars and more than twenty visual collars are available.
- Radio and GPS telemetry from a vehicle and from the air.
- Mapping of the remaining areas at the original study site and of new study sites along the coast and further inland.
- Use the method of bait marking to obtain additional data concerning brown hyena home range and territory size.
- Continue with the Baker's Bay monitoring project.



*Brown hyena at Baker's Bay*

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### THE BROWN HYENA RESEARCH PROJECT WOULD LIKE TO THANK THE FOLLOWING PEOPLE AND COMPANIES FOR THEIR HELP AND SUPPORT:

- |  |                       |
|--|-----------------------|
| • Namdeb                                     | • Schalk Hugo         |
| • Caltex                                     | • Volker Jahnke       |
| • Siemens                                    | • Birgitta Nolte      |
| • BHP Billiton                               | • Carla Jooste        |
| • Alien Technologies                         | • Dairen Simpson      |
| • Unilux                                     | • George Shimaneni    |
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| • Africat Foundation                         | • Ingrid Morgan       |
| • Eco-Challenge                              | • Jessica Kemper      |
| • Ministry of Fisheries and Marine Resources | • René Rossler        |
| • Ministry of Environment and Tourism        | • Riaan Laubscher     |
| • Trygve Cooper                              | • Ronel van der Merwe |
| • Jean-Paul Roux                             | • Silvia Pirngruber   |
|  | • Steve Appleton      |
|  | • Christine Drea      |
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