

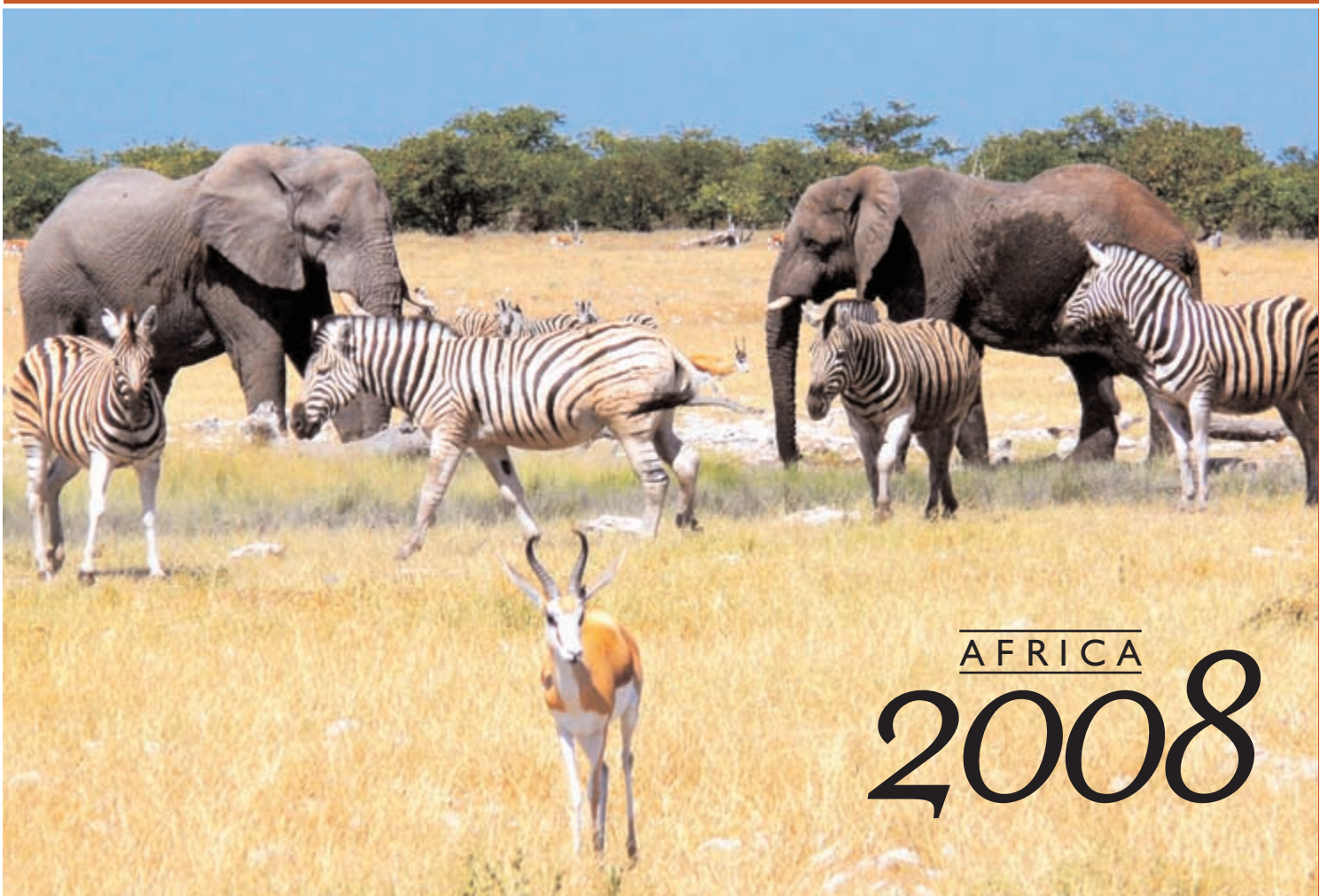
Earthwatch.

2008 EXPEDITION BRIEFING AND FORMS

Desert Elephants of Namibia

Dr. Keith Leggett

Namibian Elephant and Giraffe Trust



AFRICA
2008



Our Mission

Earthwatch Institute engages people worldwide in scientific field research and education to promote the understanding and action necessary for a sustainable environment.

We believe that achieving a sustainable future requires objective scientific data from the field – and that the scientific process must engage the general public if it is to change the world. To that end, we involve people from all walks of life directly in global field research.

We invite you to join us.

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Welcome to Earthwatch Institute!

You are just one step away from an experience that may change your life. You may travel to a land you've never seen, live with a culture you know little about, learn skills you've only imagined. All in the name of field research that leads to furthering our understanding of our natural and cultural resources.

The Expedition Briefing in your hands is your initiation to the project from the scientist's own perspective. You will learn about the inspiration that led the scientist(s) to launch the research, the objectives, goals, and even achievements of the project to date. You will get a very real sense of how your participation contributes to solving a global research question.

Your assignment is to apply your own skills and talents to the research question. Your support helps to make the project – and over 130 like it – possible. Thank you for contributing your time and money to support scientific research, providing experiential learning, and inspiring environmental responsibility and global citizenship.

Now, find a comfortable chair and prepare for a fascinating journey.

~ Earthwatch Institute Staff

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-- An international nonprofit organization founded in Boston, Massachusetts in 1971--

Dear Earthwatch Volunteer,

As the Principal Investigator of the *Desert Elephants of Namibia* project, I would like to take this opportunity to welcome you to the project.

You will soon be winging your way to Namibia to help us undertake some exciting research in one of the world's most forbidding landscapes. Namibia has been described as the land God created in anger and this is probably a pretty fair description of the environment. In the hyper-arid northwest of Namibia, where all life is dependent on the spatial distribution and availability of water, drought is a common event and can have devastating effects on the wildlife and domestic stock populations. However, throughout this unforgiving land there is the miracle of life and surprisingly, elephants adapt to the hostile environment. These animals have previously been well documented by filmmakers and photographers alike but unfortunately very little scientific research has been conducted on the desert-dwelling elephants.

This is our seventh year of involvement with Earthwatch Institute after completing a four-year study on the Hoanib River Catchment that focused on the interaction between the environment, people, domestic stock, and wildlife. One of the findings of the earlier study was that very little knowledge of large mammal population dynamics and survival strategies existed for this arid environment. This is from where the current project supported by Earthwatch evolved. The study focuses on various aspects of the desert-dwelling elephant ecology, including numbers, population structure, behavior, range distribution, adaptations, and interactions.

However, the overall aim of the project is to assist the government, other non-government agencies, and the communities who live in close association with the wildlife in better managing their resources and to contribute to the long-term sustainability of both humans and elephants.

I look forward to having you on the project and assisting with this research. Please feel free to contact me before the expedition for any further information.

Yours Sincerely,

Dr. Keith Leggett

Desert Elephants of Namibia

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GENERAL INFORMATION

PRINCIPAL INVESTIGATOR: **Keith Leggett, Ph.D.**
TITLE: Elephant Researcher
AFFILIATION: Namibian Elephant and Giraffe Trust

PROJECT TITLE: **Desert Elephants of Namibia**
RESEARCH SITE: Northwestern Namibia
EXPEDITION LENGTH: 15 days
TEAM SIZE MINIMUM/MAXIMUM: 4/6 volunteers
MINIMUM AGE OF PARTICIPATION: 18 years of age

THE EXPEDITION

1. PROJECT OVERVIEW

"The information I got from (Principal Investigator) Keith Leggett and other people I met, as well as observations I made, have caused me to reconsider the relationships between animals, ecosystems, and cultures...The issues facing sustainability of both animals and people with their sometimes conflicting needs are complex. I need to rethink my own environmental philosophies and reconsider the nature of race, ethnicity and traditional US modern approaches to life... and this is a good thing!"

~ Kay Gabriel, Earthwatch Volunteer

Northwestern Namibia is a scenically spectacular and incredibly arid area, and it seems unlikely that any living creature could persist there – let alone an animal the size of an elephant. The *Desert Elephants of Namibia* project aims to improve our understanding of desert-dwelling elephants in this region using monitoring techniques. This information will be incorporated into long-term management plans of Namibia's Ministry of Environment and Tourism (MET) and into programs monitoring elephants in conservancies.

To understand what is and is not known about northwestern Namibia's elephant population, the project collects information such as local knowledge through intensive surveys and data from previous scientific research on elephants in the area. The project aims to fill identified gaps in knowledge, including data on conservancy elephant population size, residence time, movement patterns, population age structure, social behavior, impact on forage availability and more.

With the help of Earthwatch volunteers, researchers and conservancy-designated wildlife managers will gather and disseminate this information to better enable conservancies to sustainably manage wildlife populations in partnership with MET. Wildlife is becoming an increasingly important income generator for local conservancies and more information is required to guide decision making. Revenue from wildlife-related activities has the potential to improve rural livelihoods and ensure sustainable monitoring practices.

Earthwatch volunteers work in conjunction with researchers in all aspects of the fieldwork and data processing. Volunteers assist with determining seasonal and home ranges of elephants, investigating elephant behavior, and monitoring the expansion of home ranges into areas that are now commercial farms. The elephants spend most of their time in the dry ephemeral riverbeds, where vegetation and water is more abundant. These riverbeds form an oasis where people, domestic stock and wildlife go to find food and water, particularly during the hot dry season.

Working in such an arid environment is challenging, but the results are well worth it. Already the project has established that the behavior of desert-dwelling elephants is significantly different from those in other areas of Africa, with less time spent feeding and more time socializing. There also appears to be a lack of a matriarchal herd structure. However, a longer study period is required to confirm these observations.

Note: See *Desert Elephants of Namibia: The Research* in the appendix of this briefing for information on the research objectives, methods, and results of this project.

2. RESEARCH AREA

The mountainous and arid region of northwestern Namibia is one of the most isolated and breathtaking places on the planet. It forms part of the approximately 15-million-year-old Namib Desert, one of the oldest deserts on Earth. This is an extremely arid part of the world with an annual rainfall of only 0-250 millimeters. The area has three seasons: the wet season from February to May, the cold-dry season from June to August, and the hot-dry season from September to January. During the wet season, rain usually comes in the form of violent thunderstorms that drop large volumes of water in short burst and result in very muddy conditions. Depending on the start of the first rains, temperatures can be as high as 40°C/104°F during the day and 30°C/86°F at night; however, once the rains start, temperatures fall to around 33°C/92°F during the day and 23°C/74°F at night. During the cold-dry season it is not uncommon for the overnight temperature to be below 0°C/32°F, however, the days are generally crystal clear with warm sunshine and average temperatures of 20°C/68°F. Rain is uncommon during this period, which is the best time to undertake animal observations. The hot-dry season is exactly what it implies. September can be mild (similar to conditions experienced in the cold-dry season but slightly warmer), but temperatures rise throughout October and by November and December are very high, averaging 33-40°C/92-104°F during the day and 20°C/68°F at night.

Human settlements have been part of this region's landscape for approximately 600 years. Today, there are around 7,000 people living in the research area. Most live in the eastern section of the catchment area where rainfall is highest, though some nomadic groups have used other parts of the research area seasonally.

Namibia is a politically stable country and has had the same ruling party since gaining independence. A recent general election resulted in the country's first president, Sam Nujoma, being replaced by Hifikepunya Pohamba. While all Namibians are granted the rights to freedom of speech and to participate in structured society, the country was part of South Africa for a long period and was subjected to the laws of apartheid – a controversial topic in some communities.

3. PROJECT STAFF

The Principal Investigator and research assistant expect to be present during each Earthwatch expedition. However, note that staffing schedules are subject to change.

Principal Investigator

Dr. Keith Leggett, age 47, is the project manager and principal researcher for the Northwest Namibia Elephant and Giraffe Project. He earned his B.Sc. (Honors) from the University of Sydney, Australia, and his Ph.D. from the same university. Dr. Leggett will lead the elephant research and will be onsite for all expeditions. As overall project leader, he will be responsible for coordinating logistics, lecturing and most of the administration. He has worked in southern Africa for the last 16 years and has conducted research on elephants, ecology and human/environment interactions in Zimbabwe, Botswana and Namibia. For the last nine years he has been based in northwestern Namibia, where he was initially the senior researcher on the Hoanib River Catchment Study (HRCS). One of the major conclusions to come out of the HRCS was that very little was known about the movement, ranges and general ecology of the large mammals of northwestern Namibia. As a result, Dr. Leggett began researching the region's elephants and in 2005, the Ministry of Environment and Tourism (MET) asked him to undertake a similar research

effort in the Omusati Region. In October 2005 and October 2007, in conjunction with MET officials and Uukwuluudhi conservancy members, Dr. Leggett and his team attached GPS (Global Positioning System) collars to four elephants in the first phase of this study.

Research Assistant

Mirja Heide, age 36, was born in Denmark and moved to the United States at age eight. She earned a B.Sc. in International Business with a certification in Environmental Studies from Florida Atlantic University. In 1999, she started a computer training and consulting business, where she continues to work with both Windows and Macintosh platforms. She enjoys traveling, photography, kayaking, yoga and reading.

DAILY LIFE IN THE FIELD

4. VOLUNTEER TRAINING AND ASSIGNMENTS

"I had a wonderful trip to Namibia and can't believe that I had so much fun in the name of research."

~ Allison Fulton, Earthwatch Volunteer

Earthwatch volunteers will spend 10 days in the field on each expedition. The volunteers will be split into two different research groups and will rotate between the two groups every four days. One group will work with Dr. Leggett on tasks such as long-term studies and elephant identification, while the second group will work with Mirja Heide on different aspects of the research including short-term activity budgets and dung analysis. The two groups will share the same bush camp and meet up each evening. See *Desert Elephants of Namibia: The Research* in the appendix for more information on project tasks.

Training

Before the volunteers enter the field, staff will provide one day of lecturing and practical training on the following topics:

- Background, goals and significance of the study
- Methods and techniques for carrying out the research goals
- General desert ecology and the uniqueness of the research environment
- Conservation in southern Africa*
- Possible dangers of working with large mammals in isolated environments
- Appropriate behavior in the bush, including how to camp, deal with wastes and environmentally friendly practices

* Conservation in southern Africa is significantly different from conservation in North America and Europe. The concepts of sustainable use, conservancies and the management of wildlife in modern Africa will be discussed. The role of international agreements such as CITES will also be discussed in terms of wildlife management on the ground in southern Africa. Discussions on this subject are encouraged.

Work Assignments

Earthwatch volunteers will be involved in all aspects of the field research, including observations, data recording, following animals with researchers (usually from a vehicle but possibly on foot on occasion), animal identification using photographic libraries, creating new photo-identification files when necessary, and interviewing commercial farmers.

While at the base camp, volunteers will be responsible for setting and breaking up camp, attending lectures, entering data, participating in group training, packing vehicles, cleaning camp equipment, and ensuring the camp area is environmentally friendly.

Skills that would be helpful for participation in this project include computer and observational skills and a background in environmental sciences. Essential to participation are the ability to cope with an adverse environment, a sense of humor, and an open mind.

5. TEAM ITINERARY

Note that schedules will vary depending on research needs, location of the animals, weather, etc. The itinerary depends on where the elephants are and that varies from season to season.

Volunteers may spend more time at one research site, or may need to allow extra travel time between sites. **The itinerary below is an example and should not be viewed as definitive.**

- Day 1:** *Windhoek/Outjo:* Rendezvous day. Staff will pick volunteers up from the airport and drive to Outjo. Volunteers will settle into accommodations and have the evening to relax and get to know each other. There will be time to visit the Outjo Bakery where volunteers can access the internet and check email before departing for the field.
- Day 2:** *Outjo:* Lecture day. A series of informal lectures/discussions will be given on all aspects of the research and what to expect in the field. In the evening, a *braai* (Namibian/Afrikaans word for barbeque) will be arranged followed by an evening video session about the research area.
- Day 3:** *Outjo/Research site:* The team will pack the vehicles and spend most of the day traveling to the research area and establishing field camp. Research may commence or the team may rest, depending on the research site, travel time, and how the volunteers feel. The volunteers will be split into two groups depending on personal research interests and each researcher will give a briefing on expectations.
- Days 4-6:** *Research site:* First three days of research. Volunteers will spend all day in the field and will meet up again in the evening at field camp to discuss the events of the day. Groups may need to locate the research animals and then commence studies, including monitoring elephants and other wildlife drinking at water-points. If it is possible an afternoon will be made available for volunteers to visit a local community in the area. One group may also interview commercial farmers and assess elephant damage in the research area.
- Day 7:** *Travel/Research site:* The team will travel to the next research site and, if time allows, begin data collection. The journey to the site may be approximately 250 kilometers, so the team may need to break camp early.
- Days 8-11:** *Research site:* Team members will locate known elephant populations and conduct research on them.
- Day 12:** *Travel/Outjo:* The team will pack up field camp and return to Outjo. Depending on the location of the team, this may be a very long drive. If time allows, the afternoon may be available to rest, check email, etc., and there will be a *braai* and discussion in the evening.
- Days 13-14:** *Outjo:* Data entry days. Team members will enter all results obtained in the field into computers and draw comparisons to data already obtained. The evenings will be available to relax, etc. A trip to Etosha National Park will be scheduled on one of these days if possible and would cost approximately US\$17 per person for the entry fee and US\$50 per person for vehicle hire.
- Day 15:** *Outjo/Windhoek:* Volunteers will need to pack up and will be driven to Windhoek for their departure flights. If time allows, the team will stop at a craft market for volunteers to purchase gifts.

6. DAILY SCHEDULE AND TASKS

Please be aware that schedules can and do fluctuate due to weather, research needs, etc. Your cooperation and understanding are appreciated. Below are example daily schedules.

Outjo Base Camp (First and Last Two Days of the Expedition)

7:00 am:	Wake up, eat breakfast and prepare for the day
8:00 am:	Lectures/Discussions (first two days) or data entry (last two days)
12:00 pm:	Lunch break and rest period
2:00 pm:	Lectures/Discussions (first two days) or data entry (last two days)
6:00 pm:	Prepare and eat evening meal
8:00 pm:	Rest/Recreational time
10:00 pm:	Suggested bedtime

Field Camp

7:00 am:	Wake up, eat breakfast and prepare for the day
7:30 am:	Begin conducting research
11:00 am:	Lunch break and rest period (on very hot days the team will take more time)
2:00 pm:	Continue conducting research until it is dark outside
6:00 pm:	Prepare and eat evening meal
8:00 pm:	Discussion of day's research and what will be expected the following day
8:30 pm:	Rest/Recreational time
10:00 pm:	Suggested bedtime

Recreational Time

Earthwatch has a duty of care to our participants from the rendezvous to the end of the expedition. In order to ensure you are as safe during your recreational time as you are during research time, we have put a number of measures in place.

- If there is a recreational day during the expedition, the project staff will offer either a planned team activity or a small choice of recreational activities that have been vetted and comply with Earthwatch standards. You will also have the option of remaining at the project accommodations to rest. All participants are strongly encouraged to take part in the group activity, but if you are determined to pursue other options you will be asked to sign a release before doing so, stating that Earthwatch is not responsible for your welfare.
- When there is a period of free time scheduled into a regular research day, the staff will ask you to sign out of the project (using a means which may vary by project and project location) if planning to leave the group. This will include your destination and estimated time of return. If participants do not show up to the next activity the project staff will then know where to begin a search.
- In the evenings when you can go out at night, you will again be asked to sign out of the project as above. The project staff will give you 24-hour contact information for them should assistance be needed. The sign-out is informational only and will not be used to enforce a curfew. Please be aware that project staff would not start a search until the following morning or the next scheduled activity unless contacted for help sooner.

7. ACCOMMODATIONS

Outjo Base Camp (First and Last Two Days of the Expedition)

Accommodations at the base camp will be shared with two volunteers per room sleeping in single beds. Couples may share a room, though no double beds are available. There are hot water showers, flush toilets, and refrigerators. The electricity supply is reliable and is a 220-volt system with three-prong, round UK-style plugs. Adaptors for European plugs are also available. Laptops and other devices will not work on Namibian systems, so please do not bring them. A variety of shops are within easy walking distance.

Field Camp

While in the research area only rudimentary facilities will be available, and volunteers can expect to sleep on bed rolls (provided) in a tent, with two volunteers per tent. Cooking will be done on open fires, and everyone will help with preparation and clean up. There is no electricity and therefore no laundry services or internet access. Gas lights will be used, but are not permitted in the tents. Cold showers or buckets for bathing and a pit toilet will be available at the campsites, but while in the field volunteers should expect to use the bush. Limited refrigeration is available for food only. There are no shops near the field camp.

8. FOOD

The volunteers will be expected to assist with food preparation and cleaning up while the research staff will cook. At the base camp there is access to electrical stoves and *braai* facilities. At the field camp cooking will take place on an open fire. On the last evening, a party will be held at Outjo and the project will provide a limited amount of wine and beer.

Below are examples of the foods you might expect during the expedition. Please bear in mind that variety depends on availability. This list is intended to provide a general idea of food types, but it is very important that volunteers be flexible.

Base Camp

- Breakfast:** Muesli, cereals, toast, jam, eggs, fruit
Lunch: Sandwiches with a variety of fillings, fruit
Dinner: *Braai* (barbequed red meat, fish and/or chicken), meat *potjie* (traditional stew), salad, pasta
Snacks: Fruit, *sultanas* (raisins), peanuts, biscuits with morning and afternoon tea
Beverages: Water, tea, coffee, fruit juice (additionally, volunteers may chose to purchase alcoholic beverages at any one of a number of outlets in the town of Outjo while staying at the base camp, but are requested to limit consumption)

Field Camp

- Breakfast:** Rusks (a hard biscuit)
Lunch: Bread (if available), crackers, cheese, dried meat, tinned fish, fresh fruit (if available), dried fruit, nuts
Dinner: Meat *potjie*, rice, pasta, potatoes, pumpkin and other vegetables (if available), fresh fruit (if available), dried fruit
Snacks: Fruit, *sultanas*, nuts, biscuits with morning and afternoon tea
Beverages: Water, tea, coffee (no alcoholic beverages in the bush)

Special Dietary Requirements

Please alert your Earthwatch Expedition Coordinator to any special dietary requirements as soon as possible (e.g. diabetic, lactose intolerant, etc.). It is not possible to cook separate meals for those with special diets due to availability, location and local conditions.

Special note to vegans and strict vegetarians: Please be aware that it is not possible to accommodate strict vegetarians and vegans. It is impossible to obtain meatless meals for every meal. Space is exceptionally limited, so the same pots and utensils will be used for everyone. If this poses a problem, participation on this Earthwatch expedition should be seriously reconsidered.

TRAVEL PLANNING

9. BEFORE YOU LEAVE

Note: Earthwatch Institute’s international travel insurance company, International SOS, has a wealth of useful information available at their website, including visa, passport, currency, medical, etc. information for Namibia. See www.internationalsos.com and enter Earthwatch’s member identification number: 14ACPA000075. Under “Select Resource” choose “English Country Guide,” and then select Namibia from the list. For a listing of other useful websites for passport and visa requirements, see Section 15 ‘Helpful Resources.’

Passport Information

Most volunteers traveling from outside Namibia will require a passport valid for at least six months beyond the dates of travel.

Visa Information

Upon arrival at the airport in Windhoek, Namibia, holders of passports from the US, most of the European Union, Australia and Japan should request a 90-day tourist visa, which are given free of charge at the point of entry into the country. **Do not state that you are in Namibia for any purpose other than tourism as this will result in extra paperwork and time.** Dr. Leggett’s research permits will cover the Earthwatch volunteers while working at the research site. Citizens of other countries should check with their travel agent or a visa agency for specific visa and entry requirements.

Essential Information for Those Volunteers Requiring Visas

Type of Visa	You must get a TOURIST VISA .
Where to Get a Visa	You may be able to obtain a 90-day tourist visa at the airport in Windhoek (see above). Otherwise, contact the nearest Namibian embassy or consulate to find out how to apply for your visa. Please note that this process can take weeks or more. If you have less than six weeks or wish to save yourself trouble, we strongly recommend using a visa agency , which can both expedite and simplify the process.
Required Information	If you cannot obtain a visa at the airport, you will need to send your passport (valid for at least six months beyond your stay), a Visa Application and Immigration Form, 2-4 passport-size photos plus payment to the embassy or visa agency (if applicable). Please be sure that your passport is valid for at least six months beyond your stay.
Contact Information	You may be required to list the following contact information on your Visa Application and Immigration Form: Southern Cross Consultants and Safaris No. 2 Meesterlaan St. Outjo, Namibia Tel: +264-67-313701
Cost of a Visa	Generally between US\$40-100, but varies from country to country and can potentially cost up to US\$180 . A visa agency will charge an additional fee, which you can inquire about directly.

Travel Medical Insurance

Travel medical and evacuation insurance is mandatory for Earthwatch volunteers while on an Earthwatch expedition anywhere in the world. The cost of this insurance is included in your volunteer contribution. It covers volunteer travel medical risk, including medical expenses and medical evacuation, while traveling with Earthwatch overseas or on an expedition within your home country. Without insurance, the costs of such measures can range from US\$20,000 to \$50,000.

The emergency medical and evacuation assistance provider for Earthwatch is On Call International. On Call is a 24-hour international operation which provides medical assistance and evacuation, a 24-hour nurse help line and other travel assistance services such as lost baggage and lost document assistance.

Basic coverage is valid in the country of your Earthwatch expedition and during international travel to and from your expedition. If the expedition takes place in your home country, coverage begins when your group forms for the expedition and ends when the group disbands, and is incremental to your existing health insurance. Options are available for volunteers who would like to extend the period of coverage, increase insurance amounts or purchase additional cancellation or baggage insurance. Application forms for additional coverage are included in your volunteer packet.

A detailed description of the Volunteer Medical and Evacuation Insurance Program policy, including the optional coverage increases, will be sent with this briefing. **Please note that policies are specific to each Earthwatch office.**

To contact On Call International in the event of an emergency, dial:

- 1-866-509-7715 from within the US
- +1-603-898-9159 from outside the US

State that you are on an Earthwatch expedition. The Earthwatch policy number is #US008020.

Cancellation Insurance

Trip cancellation insurance is highly recommended for Earthwatch volunteers. Depending on the level of coverage you purchase, cancellation insurance will help cover your airfare and Earthwatch contribution if you need to cancel your expedition due to medical or other covered reasons. Earthwatch Institute does not reimburse airfare or costs associated with cancelled flights or expeditions. Levels of reimbursement for cancelled airline tickets or ticket change fees will vary depending on what type of trip cancellation policy you purchase. You are strongly advised to buy flexible or refundable plane tickets. Note that volunteers with preexisting medical conditions are encouraged to explore their coverage options.

For US and Canadian Volunteers

Earthwatch is offering comprehensive optional travel insurance through CSA Travel Protection as a service to our US and Canadian volunteers. While our inclusive insurance covers your emergency medical needs while in the field, this optional policy covers trip cancellation insurance due to medical emergencies, lost luggage, travel delays, etc. For more information on the insurance policy, call Earthwatch at 1-800-776-0188 or visit www.csatravelprotection.com. Please note that some coverage is dependent on purchasing insurance within 24 hours of paying in full for your expedition. Should you decide to take out our optional insurance, please use the following producer code to indicate your affiliation with Earthwatch: 83534816.

For Volunteers Signing Up through Earthwatch Europe

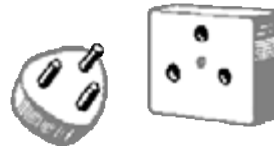
Earthwatch Europe volunteers can purchase travel insurance from Earthwatch that is underwritten by Endsleigh and includes Additional Cancellation Cover. Additional Cancellation Cover insurance includes cover for non-refundable travel expenses should your expedition be cancelled. Alternatively, if Earthwatch Europe volunteers hold their own travel insurance they may be able to purchase Additional Cancellation Cover through their existing insurer.

Travel Agencies

Contact your local travel agent or use the web to find the lowest rates to make your travel arrangements. A list of suggested travel agents can be found in Section 15 'Helpful Resources.' Be sure to give your rendezvous details to your travel agent as soon as possible so they can plan your trip accordingly.

Other Advice / Information

- *Time zone:* GMT + 1
- *Electricity:* 220 volts, 50 Hz, plugs with three round pins
- *Telephone codes:* Namibia's country code is '264.' Windhoek's city code is '61.' Please note that when calling a Namibian mobile phone from within the country, you must dial '0' and then the number. When calling from outside the country, first dial the international direct dial number, then the country code and city code, but drop the '0' (only if calling a mobile phone) and then dial the number.
- *Local currency:* Namibia uses both the Namibian dollar and South African rand. These are equivalent currencies and are readily exchangeable within the country, though Namibian dollars can't be spent outside of Namibia. See the International SOS website (above) and www.xe.com/ucc for currency information and exchange rates.
- *Personal funds:* The US dollar is a valuable currency in this part of Africa and can be exchanged for either South African rand or Namibian dollars in any bank or at the airport. There are also a number of private exchange (*bureau de change*) facilities around Windhoek. Do not change on the black market; it is illegal, and there is absolutely no benefit to doing it. Some ATMs in Windhoek will take international credit cards (MasterCard or Visa). Outside of the capital, this service is limited. There aren't many opportunities to spend money in the field though you may wish to bring some cash for the occasional soda or local handicrafts. When in Outjo or Windhoek, there are more opportunities for "shopping." In the field US\$20-30 would be more than enough. The excursion to Etosha National Park on the recreational day will cost approximately US\$15 per person for the entry fee and US\$30 per person for vehicle hire.
- *Tipping:* There is no custom for tipping in Namibia. Please do not tip the workers in order to avoid setting expectations in the future.
- *Checking luggage:* Please note that if you will be taking an international flight that has one or more connections within Namibia, it will be necessary to collect any checked bags at the airport where you first arrive in the country. After proceeding through Customs, you will have to recheck your luggage before flying on to your final destination.



10. PROJECT CONDITIONS

Please show this section to your physician when he/she is completing your health statement. Be sure to discuss inoculation requirements with your physician well in advance of your departure date. See Section 11 'Health Information' for inoculation information.

To the examining physician:

Your patient has volunteered to join a field research team that has specific physical demands of which you and your patient should be aware. **We need your accurate evaluation of your patient's ability to meet the conditions detailed below in order to safeguard his/her health and safety and ensure that he/she can participate fully and effectively.**

General Conditions of the Research Site

The expeditions take place during the mildest time of the year, with warm days and cool to cold nights. During the day temperatures will likely reach a maximum of between 25°C/77°F (May to August) and 45°C/105°F (September), and the nights may get as low as -5°C/23°F. The area is also subject to thick morning and evening fogs during the cold-dry season making it rather chilly and damp. Rain is not expected at this time of year but has occasionally been recorded.

May-August Conditions			
Humidity	10%	to	15%
Temperature range	0°C/32°F	to	35°C/90°F
Altitude	Sea level	to	1,200 m/3,937 ft
Rainfall	Less than 13 cm/5 in	per	year

Physical Demands

The terrain is very harsh and while hiking is not part of the study the volunteers will on occasion be required to walk up to two kilometers in soft sand following elephants. Most surveys will be conducted from vehicles and the volunteers will be driven to and from the campsites. While the project tasks are not physically demanding, the environmental conditions are extremely harsh. Volunteers must be able to withstand the sometimes hot and dry conditions of the research area.

Below are the expected demands of the project, but please keep in mind that conditions may change and the project could potentially be more or less strenuous than the chart indicates.

Activity	Workload/Intensity
Sitting	4 hours per day in the vehicles
Standing	3 hours per day
Walking	2 km/1.2 mi in soft sand
Carrying	Personal kit with water, sunscreen, camera, and binoculars (5 kg/11 lbs total) for 1 hour per day while walking in the field
Lifting	25 kg/55 lbs while loading project vehicle (0.5 hours per day)

Potential Hazards

Hazard Type	Associated Risks and Precautions
Transport	While urban roads in Namibia are well maintained, rural roads are gravel/ dirt and affected by adverse weather conditions and lack of maintenance. While in the research areas, vehicles will usually be off-road. Driving is done on the left side of the road. Wildlife can present a serious driving hazard especially at night. Volunteers will not be permitted to drive.
Terrain	Generally the terrain is very rough, with mostly rocks and sand. The biggest problem will be poorly worn-in boots or shoes. Volunteers should take care to properly break in their boots and shoes prior to the trip.
Animals	As the team will be based in a wilderness area, many large and potentially dangerous species range free. Elephants are common and can be aggressive, so a policy of avoidance is always best. While incidents and close encounters are rare, they have been known to occur. With this in mind you will be fully briefed at Outjo before being taken into the field. However, it must be said that encounters with other dangerous species (namely lions and hyenas) are very rare and have only occurred on a handful of occasions over the last nine years. Risks are mitigated by following instructions given by the staff. Volunteers must adhere to these instructions at all times.
Plants	There is vegetation with sharp thorns and you must be careful to avoid touching these plants. Staff can teach volunteers how to recognize dangerous species.
Climate/ Weather	Volunteers will be exposed to strong sun. Appropriate precautions must be taken against dehydration and sunburn. Drink plenty of water, wear protective clothing (including hat) and apply sunscreen, even when spending the day in the vehicle.
Personal security	Personal security should not be an issue in the remote research areas, but those traveling before or after the expedition should take appropriate precautions. While cases of violence involving tourists are rare, petty theft is a problem and you should always be mindful of this when walking in and around towns.
Disease	A number of diseases are present in southern Africa. See Section 11 'Health Information' for information on diseases, precautions and inoculations.

Medical Conditions of Special Concern

Condition	Concerns/Precautions
Fear of open/ remote spaces	Be aware that all fieldwork is conducted in the outdoors in the middle of a wilderness area. If this will be a problem, please reconsider participation.
Hay fever allergies	There should not be any problems with hay fever allergies during the expedition months, but hay fever sufferers should bring precautionary medicines in case the wet season ends late.
Conditions that may require immediate care	Immediate medical care will not be possible. The nearest hospital is up to two days away by vehicle or five hours by helicopter. Volunteers with conditions such as kidney problems, diabetes, serious heart problems, etc. should reconsider participation.

11. HEALTH INFORMATION

See www.internationalsos.com for information on the current health conditions in Namibia. At the homepage, enter Earthwatch's member identification number: 14ACPA000075. Under "Select Resource" choose "English Country Guide," and then select Namibia from the list.

Routine Immunizations

All volunteers should make sure to have the following up-to-date immunizations: DPT (diphtheria, pertussis, tetanus), polio, MMR (measles, mumps, rubella) and varicella (if you have not already had chicken pox). Please be sure your tetanus shot is current.

Project Inoculations

The following are recommendations only. Medical decisions are the responsibility of each volunteer. Note that health conditions around the world are constantly changing, so keep informed and consult your physician, a local travel health clinic, the US Center for Disease Control (www.cdc.gov), the World Health Organization (www.who.int), International SOS (see above), and/or the resources in Section 15 'Helpful Resources' for the latest health information for travelers. Consult your physician if you intend to travel to other parts of Namibia.

Typhoid	These inoculations are recommended for health reasons.
Hepatitis A	
Yellow Fever	There is no risk of yellow fever in southern Africa, but if you are traveling from a country or region where it is endemic, a Certificate of Vaccination is required.

Other Advice / Information

- *Malaria*: There is no malaria in the research area, but chloroquine resistant malaria can be found elsewhere in Namibia, including Etosha. Talk to your physician about anti-malarial medication if you intend to travel in other areas. Get checked out if you feel ill or feverish.
- *Other insect-borne diseases*: Dengue, filariasis, leishmaniasis, onchocerciasis (river blindness), African tick bite fever, and African trypanosomiasis (sleeping sickness) all occur in southern African countries, mostly in rural areas. Protect yourself against insect bites by using repellent and wearing long-sleeved shirts, long pants, and a hat when outdoors.
- *Schistosomiasis*: This parasitic infection is found in fresh water in southern African countries. Do not swim in fresh water. Well-chlorinated swimming pools are safe for swimming.
- *Polio*: Polio was reported in 2006 in Namibia. Cases imported from neighboring countries have occasionally occurred.
- *Tuberculosis*: The WHO estimates that one-third of the world's population is infected with the bacterium (*M.tuberculosis*) that causes tuberculosis (TB). Incidence of tuberculosis is higher in developing countries, particularly in Asia, Africa, the Caribbean and Latin America. In general, approximately 10% of persons infected with *M. tuberculosis* are at risk for developing active TB during their lifetimes. TB is considered highly treatable with medications that are of relatively low toxicity and cost. Volunteers returning from developing countries are encouraged to have a (PPD)-tuberculin skin-test to screen for potential infection.
- *Rabies*: Exposure to rabies is very unlikely in the research area, but you are advised to avoid contact with dogs and cats in general.
- *HIV and hepatitis B*: These are both blood-borne pathogens that are spread via intimate contact with another individual, through the blood supply, or could be contracted by health care workers. There is a vaccine for Hepatitis B. Speak with your physician about whether it is appropriate for you based on your activities or duration of travel.

12. PACKING CONSIDERATIONS

PLEASE SEE THE PACKING CHECKLIST AT THE BACK OF THIS BRIEFING AND REMEMBER TO TAKE YOUR BRIEFING WITH YOU ON YOUR EXPEDITION.

General Considerations

Do not bring more luggage than you can carry and handle on your own. There will be very little excess room in the vehicles after the equipment has been loaded; the researchers reserve the right to exclude any luggage that is too bulky and cannot easily be packed. Many past volunteers who intended to continue traveling after their Earthwatch expedition brought far too much luggage with them. Any luggage that is not needed for the field can be stored at the research center in Outjo. In the field, volunteers will need very little in the way of clothing; usually one or two changes are all that is required. Personal toiletries should also be kept to a minimum. Bedding should be warm and comfortable.

You are advised to pack a carry-on bag with an extra set of field clothing and personal essentials in the event that your luggage is lost and/or takes several days to catch up with you.

Weather Considerations

Please take weather conditions into consideration when packing for your expedition. At the time of the expeditions no extreme weather is expected, though there are large temperature differences between day and night. It may be as cool as 12°C/54°F during the day and foggy. A more likely extreme is maximum temperatures up to 45°C/105°F during the middle of the day in September and a howling easterly wind. The coldest it gets at night is -5°C/23°F with occasional fog making everything very damp in the late evenings and early mornings. There is very little chance of rain so wet weather clothing is not advised, but a warm fleece or similar is essential.

Cultural Considerations

When visiting rural Namibian communities, it is considered polite for women to dress conservatively (e.g. long skirts are preferable, no tops without sleeves, nothing very tight or revealing). Men are not subject to the same limitations but long trousers are advisable if visiting rural communities, especially in formal situations. In urban environments, there is no strict dress code, but the society is still fairly conservative. However, it should also be noted that the communities in the northwest have been exposed to tourism for a long period of time and are no longer shocked by Western dress.

Essential Items

Make sure to bring your Earthwatch Expedition Briefing with you! It includes essential information to which you may need to refer during your expedition, as well as during your journey to and from the project site. Other essential items include light cold weather clothing (temperatures can be as low as -5°C/23°F at night), a good quality sleeping bag, comfortable shoes but not necessarily walking boots, minimum personal toiletries (toothpaste, soap, biodegradable shampoo, moisturizer, moist towelettes), comfortable warm weather clothing, sandals (to wear during daylight hours), and leisure reading materials.

Please see the Expedition Packing Checklist for a complete list of what you will need to take with you. You are encouraged to go through the list and mark off each required item right before you leave for your expedition.

13. RECOMMENDED READING

Please read *Desert Elephants of Namibia: The Research in the appendix of this briefing*. This document was prepared by the Principal Investigator and Earthwatch and explains the research conducted through this project as well as some results to date. Below are additional materials for those interested in further preparing for the expedition. Many can be purchased online through popular vendors. See Section 15 'Helpful Resources' for suggested vendor websites.

Scientific Books

- *Namib Ecology*, edited by M.K. Seely, 1990
- *Ephemeral Rivers and their Catchments* by Peter and Kathy Jacobson and Mary Seely, 1995
- *The Natural History of an African Elephant* by Sylvia Sikes, 1971 (out of print, but if you find one, the researchers would love a copy as well!)

Popular Books/Magazines

- Anything on African elephants by Iain Douglas-Hamilton, John Hanks, Katie Payne, Joyce Pool, Cynthia Moss or Keith Eltringham
- Travel guidebook such as Lonely Planet, Bradt, etc.
- Any article on African elephants from *African Geographic Magazine* or *National Geographic Magazine*

Field Guides

- *The Safari Companion: A Guide to Watching African Mammals Including Hoofed Mammals, Carnivores, and Primates* by Richard D. Estes and Daniel Otte, 1999
- *Land Mammals of Southern Africa* by Reay Smithers, 1993
- *Roberts Birds of Southern Africa* by Gordon L. MacLean and Austin Roberts
- Any other African field guide of your choice

Films

- *Survivors of the Skeleton Coast*, Des and Jan Bartlett, National Geographic Films
- *Elephants of the Sand River*, Martin Colbeck, Partridge Films for the BBC
- *Ultimate Elephants*, Martin Colbeck, Partridge Films for the BBC
- *Ephemeral Rivers of Namibia*, Desert Research Foundation of Namibia, Windhoek, Namibia

Project Field Report

Each Earthwatch Institute-supported project submits a report on the past year's research and results to Earthwatch, generally on an annual basis. The most recent field report for this project may be available online through www.earthwatch.org/expeditions/leggett.html. Note that reports are not available for all projects.

14. EMERGENCIES IN THE FIELD

The nearest hospital is in Otjiwarongo (450 kilometers away) but should an emergency arise, Medrescue (a flying doctor service) is available to fly the affected party to Windhoek or Johannesburg. Medrescue can guarantee extraction from Sesfontein to Windhoek within five hours of being called. It will take approximately two hours to get from anywhere in the research area to Sesfontein for extraction. Each of the project vehicles will have an HF radio that will be capable of communicating directly with an emergency agency.

It is extremely difficult for a volunteer to leave the project early as it is a four-hour drive to Windhoek from Outjo and up to 12 hours from the research area. However, in the event of an emergency requiring early departure, the volunteer will have to be driven to the airport by research staff. The volunteer will be responsible for the cost of driving to the airport as it not only takes a full day to get the volunteer out of the research area, but it also takes extra fuel that has not been budgeted for.

Proximity to Medical Care

Safety Training	Dr. Leggett has CPR and St. Johns Ambulance training
Nearest Clinic	The nearest clinic is in Sesfontien but it would be in an absolute emergency that this clinic would be used and then only to arrange an air evacuation.
Nearest Hospital	Otjiwarongo Mediclinic Sam Najoma St, Otjiwarongo Tel: +264-(0)67 -303734
Distance	From Outjo: 70 km/43 miles (45 minutes) From eastern research area: 250 km/155 mi (5 hours) From western research area: 450 km/280 mi (12 hours)

15. HELPFUL RESOURCES

Project-related Website

- Desert Research Foundation of Namibia: <http://www.drfn.org.na>

Passport and Visa Information

- Embassies around the world: <http://www.embassyworld.com>
- For Japanese citizens: http://www.rainbowt.jp/travel/visa_top.html
- For Australian citizens: <https://www.passports.gov.au> and <http://www.dfat.gov.au/visas/index.html>
- Passport Visa Express (for US citizens): www.passportvisasexpress.com
- The Visaservice: <http://www.visaservice.co.uk>
- Thames Consular Services Ltd: <http://www.visapassport.com>

Travel Guidebooks and Booksellers

- Lonely Planet: <http://www.lonelyplanet.com>
- Rough Guide: <http://travel.roughguides.com>
- Amazon: <http://www.amazon.com>
- Barnes and Noble: <http://www.bn.com>

Travel Agencies and Advice

- World Travel Guide: <http://www.worldtravelguide.com>
- UK Foreign Office travel advice: <http://www.fco.gov.uk/travel>
- Third World Traveler: http://www.thirdworldtraveler.com/Travel/Travel_Links.html
- Esplanade Tours (specializes in southern Africa): <http://esplanadetours.com>
160 Commonwealth Ave Suite L3
Boston, MA 02116 USA
Tel: 617-266-7465
Toll free in the US: 1-800-426-5492 or 1-800-628-4893
Fax: 617-262-9829
Email: info@esplanadetours.com
- STA Travel (contact Angie Kurtz or Chris Chappell and mention that you will be going on an Earthwatch Expedition): <http://www.statravel.com>
36 Geary Street
San Francisco, CA 94108
Tel: +1 415 391-8407
Email: sfo@statravel.com
- STA Travel (UK): <http://www.statravel.co.uk>
Tel: +44 (0) 1865 792800
Fax: +44 (0) 1865 792911
Email: manager.oxford@statravel.co.uk
Quote code: EWE01/02
- Wexas International (Europe): <http://www.wexas.com>
Tel: +44 (0) 20 7581 8761
Fax: +44 (0) 20 7581 7679
Email: southern@wexas.com
Quote code: EWE01/02
- Democracy Travel (contact Jean S. West, Assistant Manager)
4818 MacArthur Blvd NW
Washington DC 20007

Tel: 202 965 7200 or 866-557-9968 (toll free US and Canada)

Fax: 202 342 0471

Email: jean@democracytravel.com

Airline/Airport Resources

- Flight comparison tools: <http://www.bookingbuddy.com> and <http://www.1800-fly.com>
- Airport codes worldwide: <http://www.logisticsworld.com/airports.asp>

Country Information

- Country information from around the world: <http://www.countryreports.org>
- National Geographic Map Machine: <http://plasma.nationalgeographic.com/mapmachine>
- US State Department: <http://www.state.gov>
- Time worldwide with GMT/UTC: <http://www.worldtimeserver.com>
- Currency converter: <http://www.xe.com>
- Electrical current converter: <http://kropla.com/electric2.htm>
- Telephone dialing codes: <http://kropla.com/dialcode.htm>
- Online unit conversions: <http://www.onlineconversion.com>
- Worldwide weather: <http://www.wunderground.com> or <http://www.tutiempo.net/en>
- ATM locator: <http://visa.via.infonow.net/locator/global/jsp/SearchPage.jsp> or <http://www.mastercard.com/atmlocator/index.jsp>

Health Information

- Travel health website: <http://www.mdtravelhealth.com>
- Center for Disease Control: <http://www.cdc.gov>
Tel: +1 800 311-3435 or +1 888 232-3228
- World Health Organization: <http://www.who.int>
- The Travel Doctor: <http://www.tmvc.com.au>
- Disease outbreaks: <http://www.who.int/csr/don/en>
- Hospital for Tropical Diseases: <http://www.thehtd.org>
- Travellers Healthline Advisory Service
Tel: 020 7950 7799
- MASTA Travelers' Healthline (UK)
Tel: 0906 8 224100 (within UK)

APPENDIX

DESERT ELEPHANTS OF NAMIBIA: THE RESEARCH

The following information was taken from the research proposal submitted by the Principal Investigator to Earthwatch Institute. Included is a description of the research conducted through this project, some results to date, and other information regarding the accomplishments of the project and the staff. Specific details regarding research sites, methods, etc. is subject to change slightly from year to year and such changes may not be incorporated into this document.

BACKGROUND, OBJECTIVES, AND METHODS

Background

The western flowing ephemeral rivers of Namibia are closely tied to the economy of the local human population as well as being essential for the ecology of the animals living in the arid northwestern area (Jacobson *et al.* 1995, Leggett *et al.* 2002). All 12 of these rivers flow into the Atlantic Ocean or end in the Namib Sand Sea. Many originate in commercial farmlands, flow through communal farming areas and, near their mouths, traverse a protected conservation area. This study was initially focused around the Hoanib River catchment, one of 12 major ephemeral river catchments that occupy the semi-arid areas of northwestern Namibia. The Hoanib catchment in particular occupies an area of 17,200 km², 3% of which lies in private farm lands, 91% in communal farm lands, and 6% is protected in Etosha National Park and Skeleton Coast Park (Jacobson *et al.* 1995).

The Hoanib River constitutes the boundary between the former Damaraland and Kaokoland. Since Namibia gained independence in 1990 these two areas have been incorporated into the Kunene and Erongo Regions. The catchment area of the Hoanib can be divided into three broad geographic sections. The eastern section (east of the Khowarib Schlucht) is relatively densely vegetated with mopane woodland (*Colophospermum mopane*) being dominant. The middle section of the Hoanib (from the Khowarib Schlucht to Skeleton Coast Park eastern boundary) is sparsely vegetated. In the western section of the river (from the park boundary to the coast) virtually no vegetation exists outside of the river course. A broad flood plain (some 70 km²) before the moving dunes of the coast offers substantial grazing for wildlife after flood events during the wet season.

The ephemeral rivers form a “linear oasis” where the wetlands formed by the river are the most important biological and socio-economic areas in the catchment. They provide surface water for domestic stock and wildlife as well as providing a readily available source of water for communities living in the area. The water is being increasingly used in garden and irrigation projects as well as for the expanding tourism industry. The biophysical nature of wetlands and other water sources varies over time and is dependent on rainfall and water extraction.

The elephants involved in this study are typically resident outside of protected areas and within the communal areas. As populations of both humans and elephants are increasing, the chances of increased confrontations are inevitable. Opportunities do exist for the mitigation of this conflict to the benefit of the local population, the environment and wildlife populations. The conservancy approach in Namibia provides the vehicle for solutions to some of these problems, and the communities’ rights of use over wildlife have resulted in a far more positive attitude towards elephants. Elephants are now potential assets to rural populations and benefits are being generated through consumptive and non-consumptive use of wildlife. This broadens livelihood

options, increases rural job creation and skills and provides communities with local development funds.

The project has focused primarily on the elephant research in the eastern section of the research area. In 2006, the project expanded to include Hobatere Game Park (HGP), the Huab River catchment and the southern Omusati Region.

Historical Perspective

Historically there were probably between 2,500 and 3,500 elephants in the Kunene region of northwestern Namibia. This population was hunted extensively by Boer hunters in the latter part of the 19th century without ever really decreasing their numbers (Viljoen 1987). By the 1960s, the number of elephants in the north was estimated to be between 600 and 800 (Owen-Smith 1970). This number was further reduced by war and drought to approximately 357 individuals by 1983 (Viljoen 1987). Since that time, it is believed that elephant numbers have recovered to the 1960s levels.

There have been two previous studies on these elephants (Viljoen 1988, Lindeque and Lindeque 1991); however these studies were undertaken either during or very soon after a war (1975-1990). The disturbance caused by large numbers of troops driving around the Kunene district have no doubt impacted the elephants' movement and social behavior. The area has since entered a relatively peaceful period with only the occasional poaching or problem-animal incident (one elephant was shot at Omarumba in 1997). Disease is still a problem with one animal dying of anthrax in 1991/2 prompting the MET to immunize all other animals in the area. In light of the expansion of elephant numbers and relative stability of the area, movement and behavior patterns need to be re-addressed.

The historical numbers of elephants in the Omusati region is unknown, and elephants have always moved into and out of the area. This is the first time that identification and movement studies have been attempted in Omusati.

Research Objectives

The objectives of this project in which Earthwatch volunteers will be involved are to:

- Determine the seasonal and home ranges of elephants
- Investigate the behavior of elephants in research areas
- Monitor the expansion of home ranges into areas that are now commercial farms but previously constituted elephant home ranges

Additional project objectives are to:

- Establish an appropriate elephant monitoring system at a local level
- Develop a locally appropriate monitoring and information flow system from community structures to MET
- Understand the effects of environmental fluctuations on increasing elephant populations
- Understand the effect of increasing domestic stock and human movements on increasing elephant populations
- Study the effect of the increase in boreholes being drilled and less human inhabitants at some of the formerly occupied natural springs

The collection and processing of these data will be an ongoing part of the study and will continue throughout the project. Conservancies will be consulted individually to ensure their support of the study, to obtain their commitment to participation and to ensure they allocate their field managers' time and resources to the project.

Methods

Determining the Seasonal and Home Ranges of Elephants

Over the last four years, 10 elephants (all males) in the research area have been GPS collared. It is possible to track the GPS collared individuals by radio telemetry equipment. By tracking these individuals over a period of time it will be possible to establish seasonal and home ranges of individuals. Volunteers will assist in the tracking of collared individuals. The collared elephants associate with family units and other males in the research area; therefore, by identification and long-term monitoring of the family units and free ranging males it is possible to establish residency times, movements and home ranges of residential elephants. As many of the elephants in the research area are yet to be identified, identification of individual elephants will also be a focus of the study.

It is possible to identify individual elephants by identifying the following characteristics (based on Laws 1966):

- Sex
- Tusks
- Ears
- Tail
- Footprint patterns

This information will be collected into photographic libraries housed in the conservancies and/or support agencies as appropriate. At the same time as the photographic library is being collated, the following aspects of population dynamics will also be studied:

- Social behavior, not only between members of the herd but also interaction with other family units
- Population structure and age distribution within the herds
- Activity behavior (i.e. feeding, sleeping, social interactions)

Results collected from these observations will be transferred to a database specially designed for this study.

Investigating the Behavior of Elephants in Research Area

The behavior of elephants in the western section of the research area has been monitored for the last seven years. This has established that the behavior of the desert-dwelling elephants is significantly different from other areas in Africa, with less time spent feeding and more time socializing. There also appears to be a lack of a matriarchal herd structure. However, a longer study period is required to confirm this observation.

Elephant behavior is recorded in a similar manner to that described by Lee (1996) and Guy (1976). Twice a month the first adult elephant (over 10 years of age) encountered will be subject to activity budget analysis. To avoid biasing the study to those individuals that are easily found, if the first individual encountered had been observed in the previous month, observations are abandoned and another elephant sought. A series of behavioral studies and activity budgets are undertaken for either 30 minutes or a period of 2-8 hours. When undertaking short-term studies it will be possible to observe up to four elephants a day, but this number will be greatly reduced when longer-term studies are undertaken.

For the purposes of this study the basic family unit is defined as the maximum number of individuals that form close associations, especially during times of stress (e.g. the dry seasons). They usually coordinate their movements and geographical range. While the Hoanib River

catchment constitutes a small section of the total range of these elephants, it represents an important core area for elephants in the Kunene region.

Monitoring the Expansion of Home Ranges

The project intends to monitor the expansion of home ranges into areas that are now commercial farms but previously constituted elephant home ranges. This objective will primarily be undertaken in the Huab River catchment where the elephants will be monitored for movements into the commercial farms. In addition, the commercial farmers in the areas where elephants are commonly in residence will be surveyed to assess elephant damage. The assessment will be undertaken in the form of a participatory survey in an attempt to establish a quantitative measure of elephant damage on commercial farms. The Ministry of Environment and Tourism (MET) is particularly interested in this aspect of the research.

Geographical Information Systems

Distribution patterns of large mammals are strongly influenced by environmental parameters, human persecutions and other human activities. Their distribution can be regulated by extrinsic factors such as weather conditions, food supply, vegetation and human disturbance of the landscape. All data obtained during the study will be transferred to a GIS system for easy visualization of results.

Earthwatch Volunteer Participation

Earthwatch volunteers will be involved in identifying individual elephants, characterizing and investigating their social behavior and collation of this data onto a database. Volunteers will also assist in tracking elephants with the telemetry units and GPS, and will be involved in the gathering and interpretation of field data.

RESULTS AND OPPORTUNITIES

Beneficiaries of the Research

The principal beneficiaries will be the conservancy committees and members and MET who will receive updates and copies of all data collected, as well as regular training and feedback as to where elephants seasonally move and in turn, which areas the animals use. The conservancies and MET are the primary recipients because they are the most important groups as far as decision-makers are concerned. However, the project will also disseminate information to other local, regional and national level decision-makers. Furthermore, the greater scientific community and public will benefit from the results obtained, increasing the knowledge base of such uniquely adapted species of which, to date, only a limited understanding has been obtained.

Contributions to the Formulation of Public Policy

Dr. Leggett is a member of the MET-coordinated Elephant Liaison Group, which meets regularly to discuss elephant research, policy and management issues throughout Namibia. This group will review all data gathered from the research and it forms the basis for elephant policy and management decisions throughout the country, thus acting as the appropriate springboard from which this study can contribute to all levels of management. A greater understanding of elephant population numbers, densities and movements will help provide a better idea of when, where, how and why elephants function, with particular reference to recruitment rates and possible dispersion or re-expansion areas. These findings in turn will be integral in the establishment of the proposed World Heritage sites and peace parks, which has been forwarded to ministerial level and international bodies for recommendation.

Benefit to the Educational and Business Communities

Students from the Polytechnic of Namibia and other educational institutions will be encouraged to participate in the project. The rural conservancy and community members will be involved in training aspects of the project which will increase their personal awareness as well as support the greater community-based natural resource management program. The business community, in particular the safari industry, will be consulted and encouraged to cooperate throughout the project. Feedback to appropriate companies and tourists will help benefit the relationship between the two, as well as promote international awareness on the plight of elephants and other desert-adapted species.

Contributions toward the Goal of Sustainability

The project is based around the sustainable use of natural resources and the community participation in management. It dovetails with the current community-based natural resource management program (conservancies) promoted by the government and local and international NGOs. The information obtained will be made available for the greater program to assist specific components of the goals and objectives, such as wildlife monitoring and evaluation, census data of species, seasonal movements and density distribution.

Highlights of 2007 season

During the 2007 season, elephant research concentrated on activity budgets, identification and monitoring, with the aim of improving the understanding of elephants in the target area. This information will be incorporated into long-term Ministry of Environment and Tourism (MET) and conservancy elephant monitoring programs.

Information collected during this Earthwatch season will be combined with previous collected data to develop a sustainable management plan for elephants in northwestern Namibia. The data collected will be added to eight previous seasons' data which probably constitutes one of the most continual long-term databases on elephants in southern Africa.

During the six Earthwatch expedition seasons, scientists and volunteers collected data on previously identified elephants and collected over 75 hours of activity budgets and social interaction studies. In addition, the study launched last season on defecation rates and seed composition in the dung of elephants has continued.

These studies helped in the understanding of numbers, social interactions, daily activities, feeding regimes and movement of both elephants and giraffe in northwestern Namibia. The dung studies will eventually give information about the amount of vegetation consumed by elephants and their protein (seed) intake. Also the dung study will provide information about the distribution of seed by examining the numbers and seasonality of whole seeds in the dung. Three different observation methods for analyzing elephant behavior were compared and contrasted.

Dissemination of the Research Results

Scientific Journal Articles Published on the Research

- Leggett, K.E.A. 2004. Coprophagy and unusual thermoregulatory behaviour in desert-dwelling elephants of north-western Namibia. *Pachyderm*, 36, 113-115.

- Leggett, K.E.A. 2005. Home ranges and seasonal movements of the desert-dwelling elephants of Northwestern Namibia. *Roan News*, Wildlife Society of Namibia, 39(1):17-21.
- Leggett, K.E.A. 2005. Why GPS collar elephants? Answers to 10 commonly asked questions. *Roan News*, Wildlife Society of Namibia, 39 (2): 1-4.
- Leggett, K.E.A. 2006. Home range and seasonal movement of elephants in the Kunene Region, Northwest Namibia. *Journal of African Zoology*, 41:17-36.
- Leggett, K.E.A. 2006. The effect of artificial water points on the movement and behaviour of desert-dwelling elephants of northwestern Namibia. *Pachyderm*, 40:24-34.
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Popular Journal Article on the Research

- Kock, M.D. 2003. Collared. *African Geographic*, June issue, 74-79.

Pending Publications

- Leggett, K.E.A. 2008. Diurnal Activity of Desert-dwelling Elephants in Northwest Namibia, *Journal of Arid Environments* (*in review*).
- Leggett, K.E.A. 2008. Daily Movement of GPS Collared Elephants in Northwest Namibia, *Journal of Arid Environments* (*accepted for publication*).

Presentations/Lectures on the Elephants of Northwestern Namibia

- 2003 US Lecture Series: Lectures in Denver, Reno, Chicago, Washington and New York
- Posters given at 2001, 2002, 2003 and 2005 Earthwatch Conferences, Boston

Television and Film

- BBC natural history film, 2002
- National Geographic film on Africa Megatransect II with Dr. Michael Fay, September 2005

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EXPEDITION PACKING CHECKLIST

Essential Items

- This Expedition Briefing (contains contact information and instructions on how to get to the project site if you are delayed to your rendezvous)
- Photocopies of your passport, flight itinerary and credit cards in case the originals are lost or stolen; the copies should be packed separately from the original documents
- Visa and/or passport (if necessary)
- Certification of inoculation (if necessary for entry into Namibia)

Required Items

Clothing/Footwear for Fieldwork

- Lightweight long-sleeved shirts
- Lightweight pants/trousers
- Well worn-in and comfortable walking shoes or hiking boots
- Windproof jacket for chilly mornings
- T-shirts to wear during the day
- Shorts to wear during the day
- Sandals to wear during the day
- Socks
- Hat with wide brim

Clothing/Footwear for Leisure

- Set of clothing to keep clean for end of expedition, flight home, etc.
- Warm outer layer (e.g. sweater/jumper, fleece jacket, etc.) for the evening
- Comfortable long pants/trousers for the evening

Field Supplies

- Small daypack/rucksack
- Drybag or plastic sealable bags (e.g. Ziploc brand) for protecting equipment such as camera from dust, humidity and water
- Insect repellent spray
- Sunscreen lotion with SPF 30 or higher
- Water bottle(s) able to hold at least one liter
- Binoculars

Bedding and Bathing

Note: Bed rolls (mattresses) will be provided.

- Towel
- Personal sleeping bag

Miscellaneous

- Camera, film or memory cards, extra camera battery
- Flashlight or headlamp with extra batteries and extra bulb

Recommended Items

Personal Supplies

- Personal toiletries (biodegradable soaps and shampoos are encouraged)
- Antibacterial lotion
- Wet wipes or baby wipes to help you stay clean in the field
- Personal First Aid kit (e.g. anti-diarrhea pills, antibiotics, antiseptic, itch-relief, pain reliever, bandages, blister covers, etc.) and personal medications
- Moisturizers to help your skin deal with heat and hot winds

Miscellaneous

- Swimsuit
- Bandanna, large handkerchief or similar (serves multiple purposes, such as holding hair back in high wind, protecting neck from sun, wiping away dust, etc.)
- Books, journal, etc. for leisure time
- Favorite snack foods (the researchers are open to bribery by treats!), dried fruit, tea, etc.
- Sunglasses
- Spending money (see *Other Advice / Information* in Section 9 'Before You Leave')
- Earplugs for light sleepers
- Pocket knife (remember to pack in checked luggage)
- Sports bra for riding on long bumpy roads
- Gloves and hat if you get cold at night
- The researchers would also appreciate a copy of any recent articles as they do not have access to current literature in Namibia