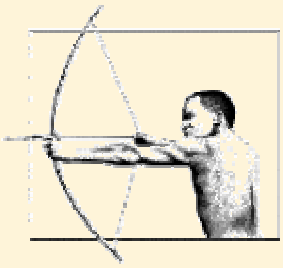
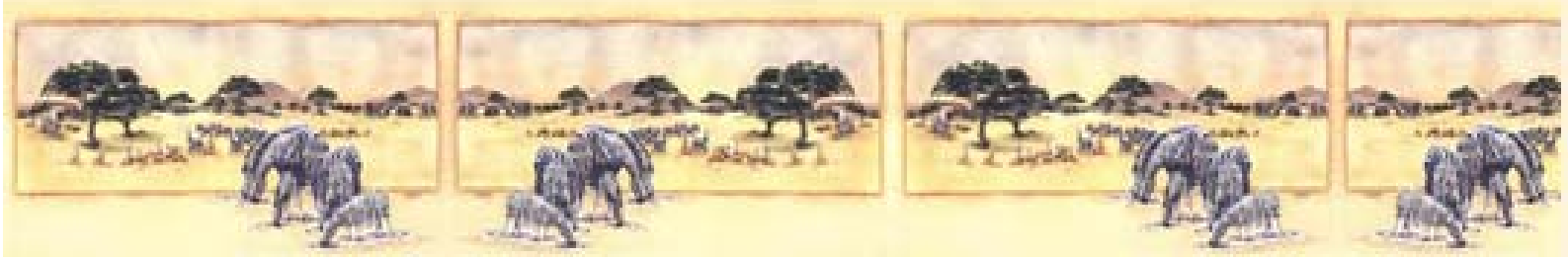
Electronic Ranger Diaries
The Kruger National Park CyberTracker Program

Sandra Mac Fadyen



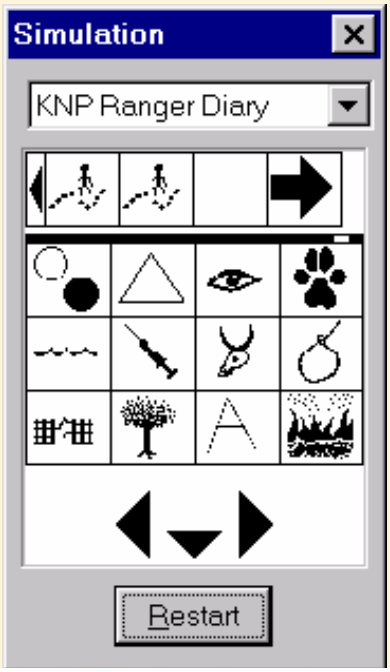
The CyberTracker (CT) System was developed for application in conservation by Louis Liebenberg, as a user-friendly interface developed for PalmOS computers. The system allows literate as well as non-literate field workers to record customised observations with latitude (lat) and longitude (long) co-ordinates (http://www.cybertracker.org). The Kruger National Park (KNP) first recognised the potential use of the CT system as an ecological data collection tool in early 2000 and assisted by the GTZ, was able to purchase 44 Palm IIIe organisers and 44 Garmin 12XL GPS units with Palm/GPS interface cables. CT was used on a trial basis for the duration of 2000 and into 2001, after which the system was reviewed and additional funding sought to improve the system.

In 2003 funds were donated from the Erna Goodwin estate towards the CyberTracker initiative in the KNP. The donation money was used to purchase 120 Handspring Visor Deluxe organisers with integrated Magellan GPS companions: 5 units for each of the 22 management sections throughout KNP, 5 units for the Conservation Services Dept. and another 5 as replacement units in the event of damage.



The database was customised as an icon-based interface with English and Shangaan descriptions for the collection of the following lat/long data:

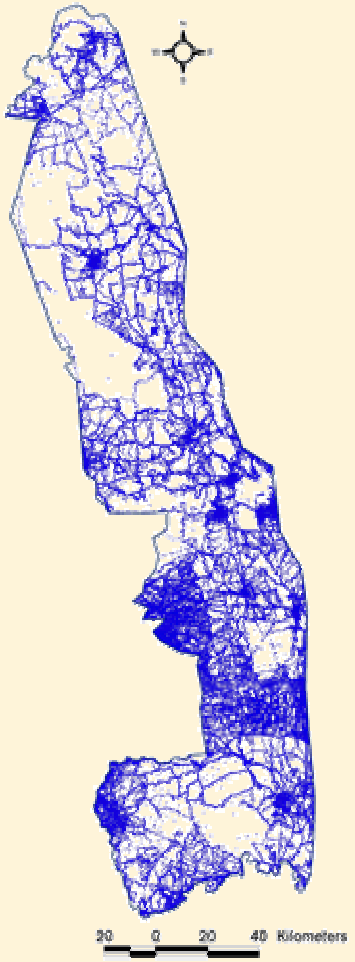
- ⇨ Daily field ranger patrol information incl. Type of patrols (foot, bicycle, vehicle), Area covered, Field observation times and Field rangers involved in the patrol.
- ⇨ Species Distribution incl. Megaherbiovores, Ungulates, Carnivores, Small mammals, Birds and Reptiles.
- ⇨ Location of various spoor incl. Illegal human activity and Rare Game.
- ⇨ Available Surface Water incl. Both natural and artificial water.
- ⇨ Location of Diseased or Injured animals and associated causes.
- ⇨ Location of game Carcass incl. possible cause of death.
- ⇨ Location of all Poaching Activities with brief description of activity.
- ⇨ Fence Line Breakages and consequent repairs thereof incl. Indication of any game movements in or out.
- ⇨ Impact of elephants on specific sensitive tree species.
- ⇨ Distribution of Invasive Species incl. Terrestrial, aquatic and riparian.
- ⇨ Fire Mapping incl. Burn Scars, Ignition Points and Active Fires.
- ⇨ Collaborative research projects incl. Location of Bee Hives for the Cape Honey Bee/Varroa Mite Project and location of Archeology Sites/Artifacts for the People and Conservation Dept.



Field rangers from each section in the KNP are deployed on a daily basis to patrol selected areas with up to 4 CT units. Observations, from the different categories stated above, are recorded throughout the patrols including the routes traveled and time taken. On the field ranger's return, the section ranger downloads the patrol data to his/her desktop CT Ranger Diary Database and reviews the observations of the day. At the end of every month each of the 22 section rangers exports their CT data for that month and emails the small .ctz file to scientific services' Geographic Information Systems (GIS) Lab in Skukuza. The data is then collated from the GIS Lab and imported into an Access database where it is cleaned, summarized and made accessible to all users through the KNP network (see figure1).

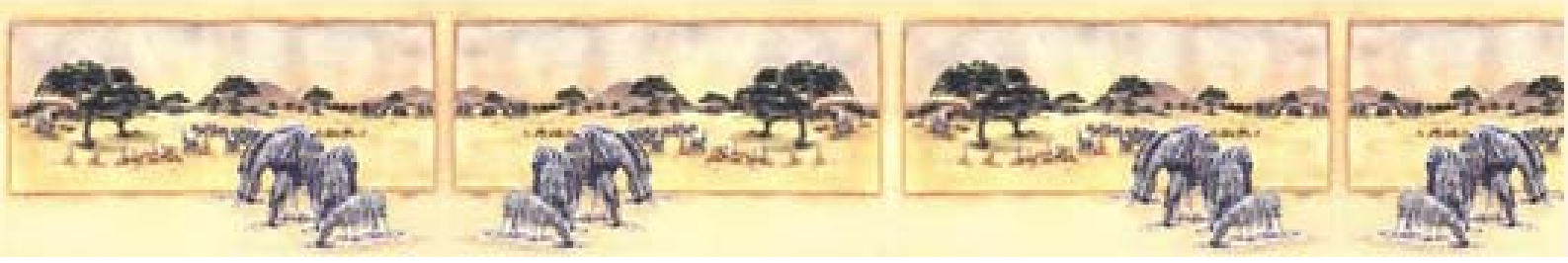
The field data collected through the CT KNP Ranger Diary system aims to benefit both the management and scientific research of KNP through: a) the planning of section patrols for area-integrity management; b) acting as an early warning system for disease outbreaks; c) identifying trends in the exit and entry points of poachers; d) managing the control of invasive species and e) reporting fence-breaks to vetenary Dept for animal health purposes. These data also feed into existing KNP projects incl. Wilddog Monitoring, Invasive species, Varroa mite/Honey Bee, Fire management system, Archaeological inventory, Establishment of rare game and carnivore distribution patterns and estimated totals etc.

The objectives of the CT system are therefore, not only to provide all section rangers with a tool for area-integrity-management but also to help provide answers to the various research questions, outlined as objectives and associated Threshold of Potential Concern (TPC) in the new KNP Management Plan (http://www.parks-sa.co.za/conservation/scientific_services/ss_mp.html).



SECTION	HA AREA	HA COVERED	%COVER
Crocodile Bridge	81800	16308	20
Houtboschrand	115592	30232	26
Kingfisher Spruit	76768	60296	79
Letaba	55772	21488	39
Lower Sabie	80072	31512	39
Mahlangeni	116016	7564	7
Malelane	53076	26904	51
Mooiplaas	103276	37960	37
Nwanetsi	91416	28760	31
Olifants	69856	32708	47
Pafuri	74256	21484	29
Phalaborwa	103260	35272	34
Pretoriuskop	52400	30868	59
Punda Maria	78972	19312	24
Satara	93644	43312	46
Shangoni	82044	3852	5
Shingwedzi	77232	21640	28
Skukuza	84312	15672	19
Stolsnek	67636	16104	24
Tshokwane	117236	83840	72
Vlakteplaas	109812	14532	13
Woodlands	114116	25832	23
KNP WIDE	**1898564**	**625452**	**33**

Figure1: Distribution of CT data collection throughout the KNP with associated areas covered in hectares (ha) during the period January – September 2004.



In the near future we hope to enable our many visitors to benefit from the CT species distribution data in the form of downloadable sightings maps and GPS waypoints from our website incl. Big Five – Mammals and Birds, Rare species etc.

The extent of the use of CT in KNP is not only limited to the Ranger Diary system but includes a range of customised systems, which range from vegetation surveys to elephant behaviour studies. Some of the other systems include:

- ⇨ Customized vegetation surveys for long-term ecological monitoring within fixed exclosures as well as vegetation surveys conducted within the Associated Private Nature Reserves (APNR) by the Agricultural Research Council (ARC).
- ⇨ Annual veld condition assessments (VCA), which not only emphases on the evaluation of grazing quality and quantity and fuel for burning also the broader evaluation of vegetation as a whole.
- ⇨ Invasive species monitoring, including all aspects of the clearing of alien plants from staff gardens; camps; rivers and elsewhere and the monitoring of various aquatic species (e.g. Water Hyacinth) on a regular basis.

- ⇨ Biodiversity/Habitat surrogacy surveys, which aims to predict the presence of certain species based on available habitat.
- ⇨ Elephant translocation study conducted by the University of Pretoria (TUKS) in association with KNP. The elephant herds are followed and various aspects about their behaviour, vegetation utilization and feeding methods are recorded.

- ⇨ KNP archeological sites and associated artifact inventory by the Dept. of People and Conservation, who aim to record the location and condition of as many sites of archeological significance as possible.
- ⇨ Small mammal mark-capture and release studies by TUKS, who capture and identify different species and attempt to associate them with different veld management practices and vegetation types.
- ⇨ Fire behaviour surveys on the long-term Experimental Burn Plots (EBP), which record information like wind direction and velocity during the fire, ambient temperature and relatively humidity, time taken to burn and the effect on the vegetation.

The CyberTracker system has proven to be an indispensable tool for field data collection in the Kruger National Park. The easy-to-use icon-based interface has the potential to all but eliminate the time consuming practice of data capture, allowing more time for scientific research. This research, which is fed into the KNP's adaptive management practises and policies, leads to a better understanding by KNP managers and scientists of the facets and fluxes of the diverse ecosystems of our National Park.