Application of mobile data capture technology to gorilla, elephant and primate conservation in West Africa


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Field Conservation at the North Carolina Zoo

- “Hands-on” projects that involve the zoo directly in field work and conservation action.
- Projects in North Carolina and Africa.

Collection, analysis and application of conservation-relevant data

- Cross River gorillas
- Nigeria’s largest elephant population
- Endangered primates of Bioko island

The Cross River Gorilla (*Gorilla gorilla diehli*): endemic to the forests of Nigeria-Cameroon border.

- The most endangered gorilla subspecies, more so than even the mountain gorillas. Only about 300 left.
- Poorly studied. Even their distribution and total population size is not fully understood.

Challenging environment for conservation

High rates of forest loss and fragmentation

Challenging environment for conservation

Bushmeat a significant source of food

Challenges to conservation planning and action

Many conservation projects were ongoing, but…

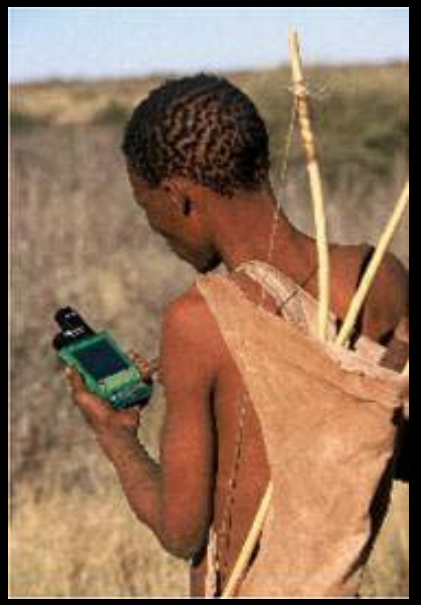
- Little quantitative data available to inform conservation planning.
  - Gorilla distribution.
  - Areas where illegal activities most intense.
  - Patrol effort and monitoring.
- All field data recorded by rangers and researchers manually (i.e., on paper), and often without GPS coordinates.
- Lots of different organizations (state and federal government, two different countries, several different NGOs): no standardized system for recording data.
- Technical capacity and education level of staff limited.
- Environment hostile to electronics.
- When data were collected, they were difficult for anyone but senior (often expatriate) staff analyze and apply to conservation action.

Development of a data collection and monitoring system for Cross River gorillas and other wildlife

- Goals:
  - Make data collection in the field standardized, easier and more consistent.
  - Incorporate spatial data, i.e,. GPS location.
  - Provide a tool to monitor both wildlife and ranger patrols.
  - Ensure long-term sustainability of the system.
  - Allow data analysis to be relevant for conservation and management and to be conducted by staff on the ground with limited or no technical capacity.

Cybertracker

- Originally designed for use by non-literate trackers in South Africa to allow them to record biological data with a spatial component.
- Two main components:
  - Touch-screen, icon or text-based interface on mobile device.
  - Database for data storage and analysis.
- Very user friendly once set up: almost anyone can collect data and individuals with only basic computer skills can conduct analysis.
- Free! (www.cybertracker.co.za)



CyberTracker

Standardized and consistent monitoring data plus automatic collection of GPS coordinates, e.g. gorilla evidence.

Touch-screen interface

Observation
Animal
Human Activity
Human Settlement
Road or Trail
Protected Area Boundary
Landmark
Begin Field Work
End Field Work

Observation type

Animal
Gorilla
Chimpanzee
Monkey
Other Mammal
Other

Animal type

Type of Sign-Ape
Nest site
Track
Dung
Sighting
Feeding sign
Heard

Evidence type

Nest Site Age
1 day
2-4 days
4-7 days
1 week
2 weeks
3 weeks
1 month
2 months
3 months
4 months or more

Evidence age

Number of Nests	
Ground	0 0 2
up to 1m	0 0 4
1-5m	0 0 0
5-10m	0 0 3
10-20m	0 0 0
20m+	0 0 0
total number of nests	0 0 0

Number of nests

Note
Tap to Edit

Notes

Take GPS position and save record

Developing the system: creation and initial testing of a “beta” version

Developing the system: extensive field tests of different hardware platforms and data collection interface

Developing the system: consultation with end users to fine tune both what data to collect and what analyses were important

Developing the system: unit production, funding and training workshops

- Training workshops conducted in Nigeria and Cameroon for field and office staff of both government and NGOs.
  - Data collection in the field.
  - Data analysis and interpretation.

Final wildlife monitoring data collection system

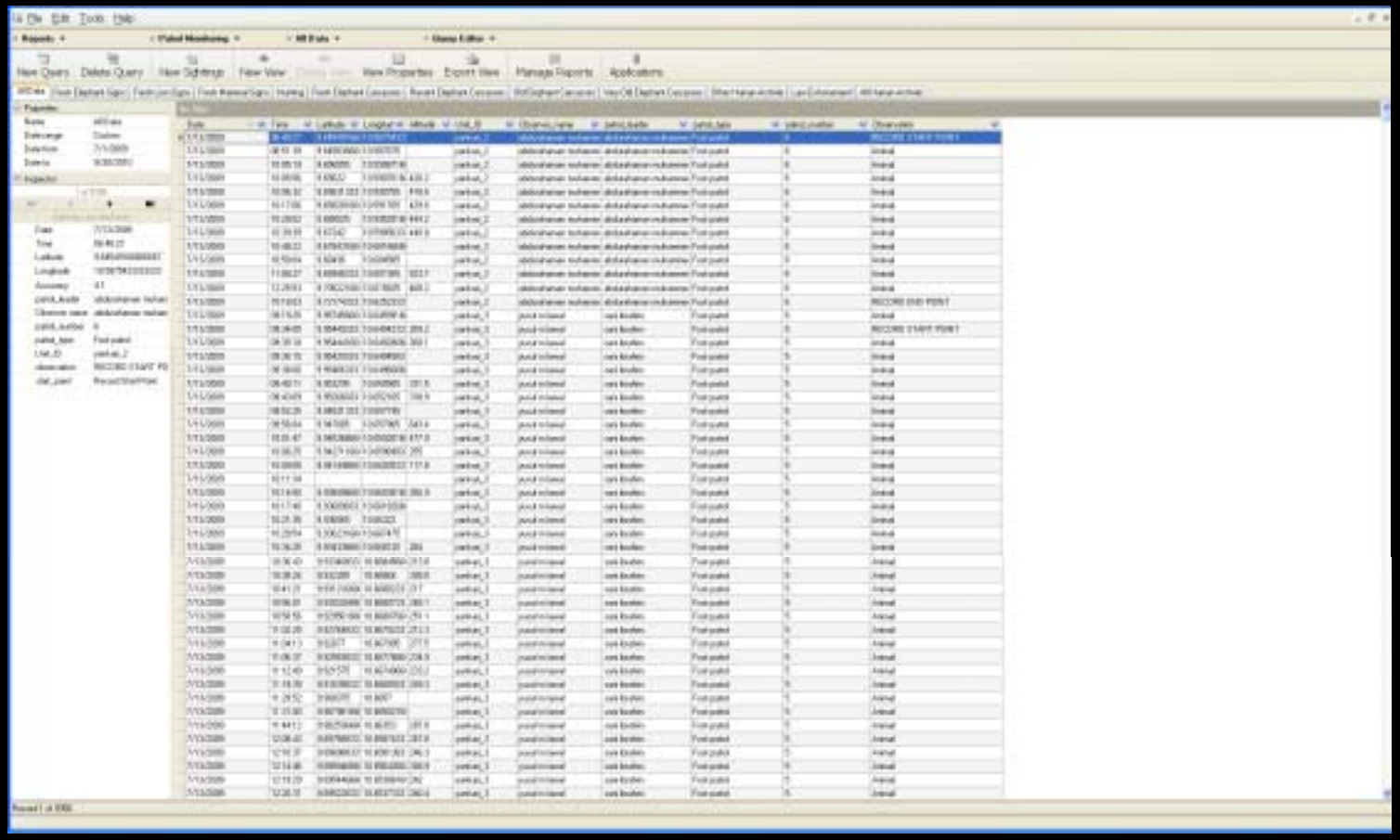
- Allows data collection on:
  - Gorilla movements and biology
  - All other wildlife in the forest
  - Evidence of human activity
  - Law enforcement activity, including adherence of staff to assigned duties through automated track log
  - Administrative boundaries, landmarks and other physical features

Operation of the system: the vast majority of the Cross River gorillas' range is now covered by Cybertracker monitoring

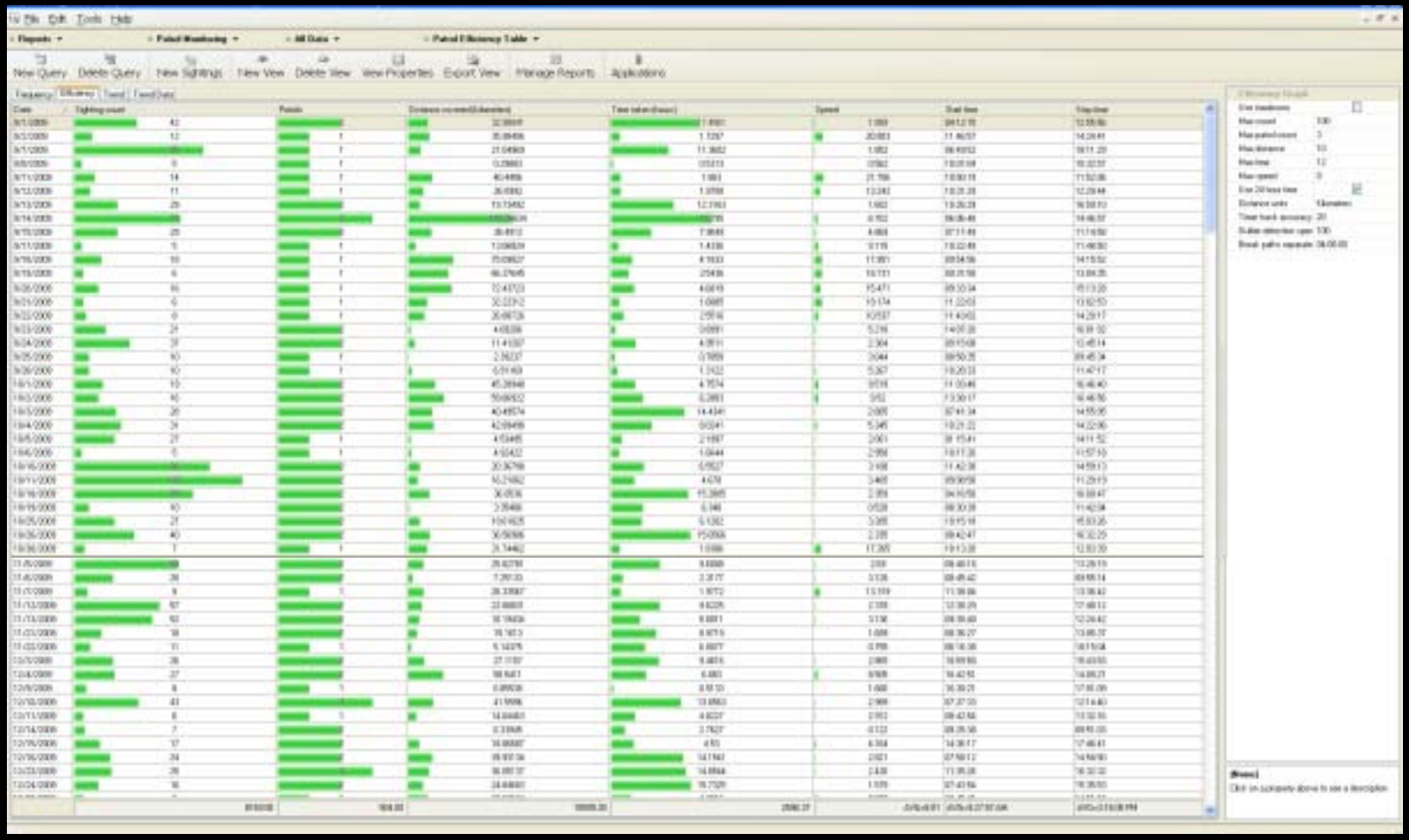
- Over 120 field staff trained in data collection and 20 supervisory staff trained in data analysis.
  - "Training trainers": senior staff capable of training new users of the system.
- Deployment
  - Two national parks, a wildlife sanctuary and a community reserve.
  - All field surveys by WCS research staff.
  - Exploring options for expanding to an additional wildlife sanctuary and a community ranger program.

Operation of the system: Automated data basing and organization of data

- Data from the field are automatically sorted into appropriate report tables (e.g., gorilla evidence, hunting signs, law enforcement action, etc.)



Operation of the system: automated calculation of patrol statistics on a daily basis

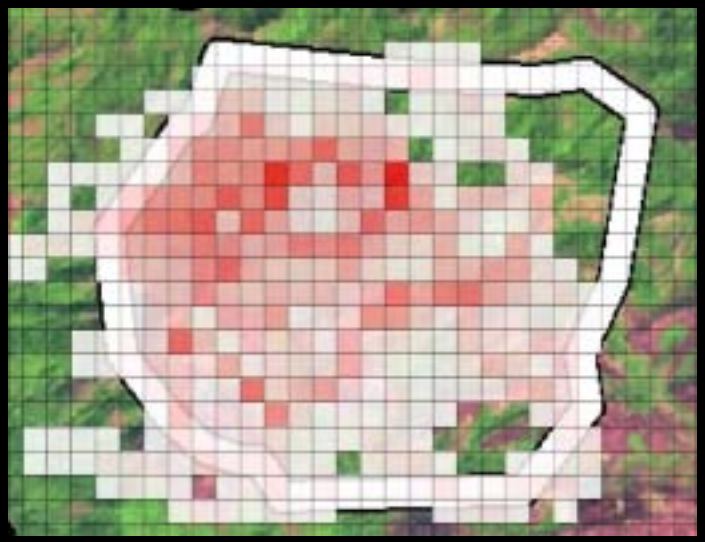


Operation of the system: automated mapping and data visualization

- Once maps are set up, new data are automatically filtered and plotted as soon as they are downloaded (e.g., all wildlife sightings)
- Individual patrol monitoring
- Grid function to visualize relative frequency of phenomena.

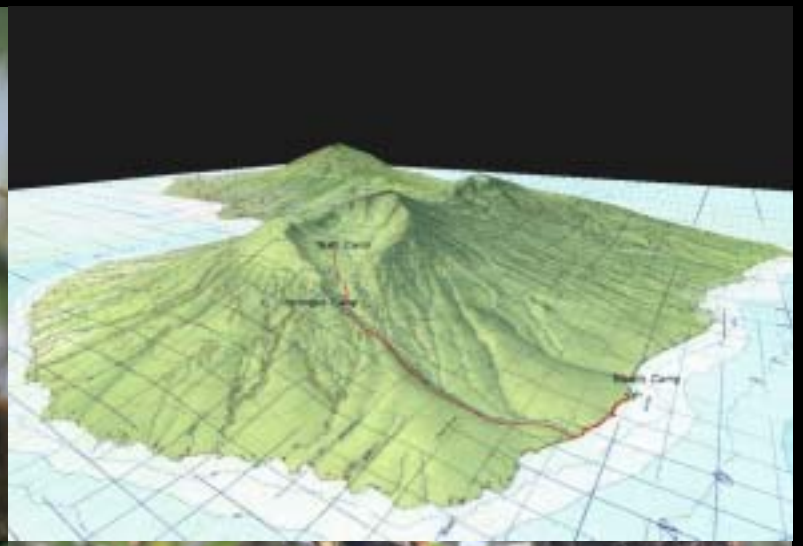
Current status of Cybertracker-based monitoring

- All field data are now collected systematically, with GPS location, and share a common format.
- Reports are automatically generated after each patrol.
- Monthly, quarterly and annual reports are now produced to monitor progress over time.
- Managers can now better monitor wildlife, illegal activity and ranger/research activities.
- An unanticipated benefit: increased motivation on the part of both field and supervisory staff.



Adapting gorilla monitoring system to other conservation projects: Elephants in Yankari Game Reserve

Adapting gorilla monitoring system to other conservation projects: Endangered primates of Bioko island



Summary

- Highly flexible and easy to customize: can be adapted to collect almost any kind of data by users without programming knowledge.
- Provides accountability and data necessary for project and protected area monitoring.
- Allows users with limited technical ability to access and analyze data quickly and makes these data useful to wildlife managers.
- Though the various systems originally focused on target species, the benefits provided aid the conservation of all species in the region and the area they inhabit.

Please attend the roundtable discussion later today for more information

Acknowledgements