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GIS APPLICATION TO RELATE MOVEMENT OF SAVANNA ANIMALS TO FORAGE PRODUCTION IN RUMA N. PARK HOMABAY COUNTY, KENYA

BY

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KENYA WILDLIFE SERVICE

CREATE

PRESENTED TO THE

Consortium for Research in East African Tropical Ecosystems

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WHAT IS GIS

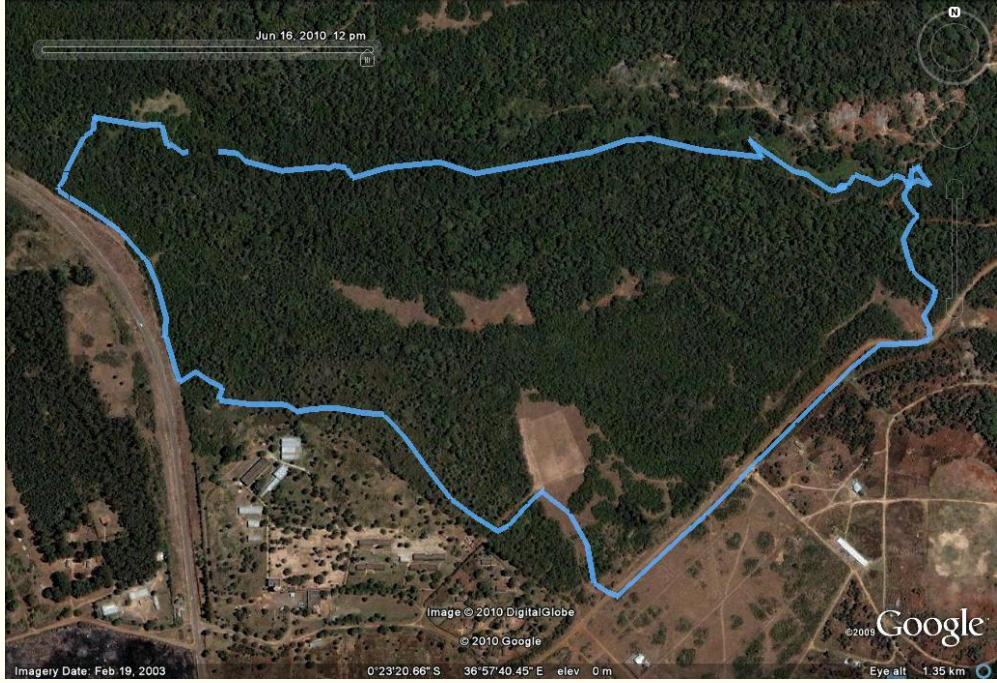
Geographic Information System:

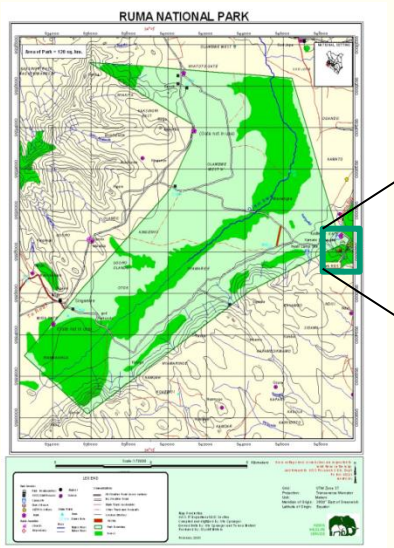
"An organized collection of computer hardware, software, geographic data, and personnel designed to efficiently capture, store, update, manipulate, analyze and display all forms of geographically referenced information."

from *Understanding GIS--The ARC/INFO Method*, ESRI, 1993

Geographic Information System:

"A set of tools for collecting, storing, retrieving at will, transforming, and displaying spatial data from the real world for a particular set of purposes."**from *Principles of Geographical Information Systems for Land Resources Assessment,* P.A. Burrough, 1986.**





- Spatial Databases
- Maps
- Computer
- User

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Application of GIS

Data are facts which have been recorded

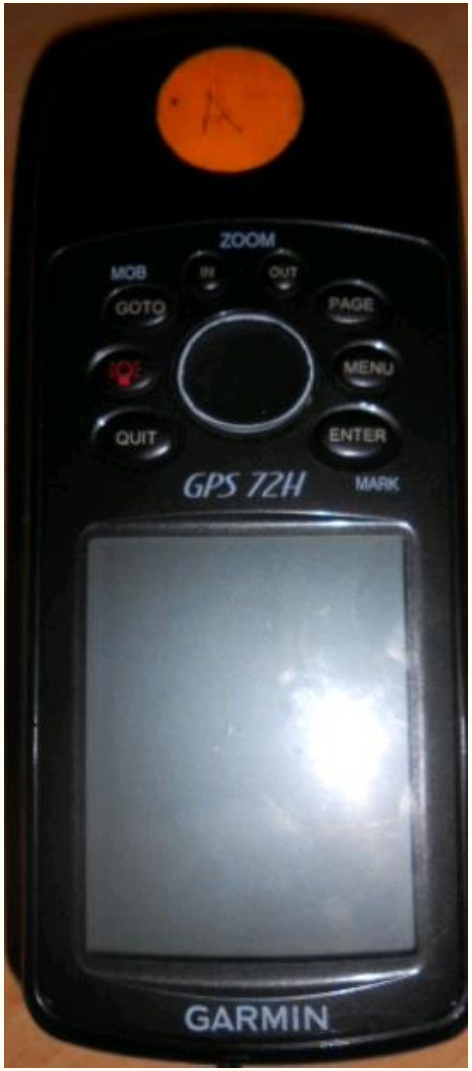
a system to convert data from internal and external sources into information and to communicate th information managers at all levels to enable them to make timely and effective decisions for planning, directing and evaluating the activities for which they are responsible

Information is processed data

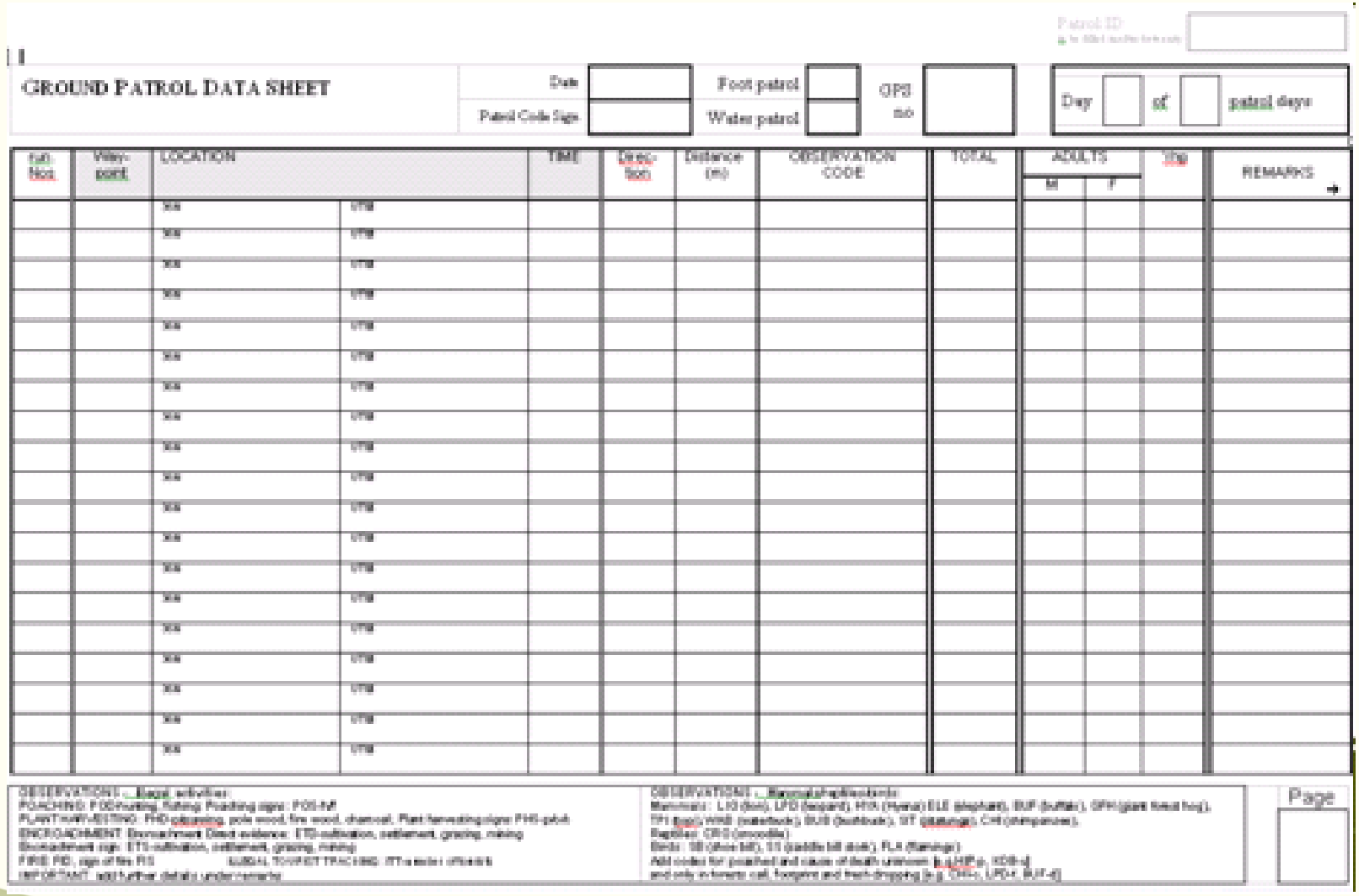
Data collection

- Only data which can be processed into information which is relevant and useful is collected and stored
- Data recording must be easy, fast and designed to minimise data collection mistakes (data entry)
- The handling of the data sheets in the field must be easy without sacrificing details required by managers
- Data recording must provide raw data for a wide range of outputs
- Standardised data collection and outputs

❑**All data are geo-referenced using GPS**



Datasheets



Patrol ID

GROUND PATROL DATA SHEET

Date | Foot patrol | GPS no | Day ___ of ___ patrol days

Patrol Code Sign | Water patrol

Patt. Nos	Way-point	LOCATION		TIME	Direc-tion	Distance (m)	OBSERVATION CODE	TOTAL	ADULTS M	ADULTS F	chp	REMARKS
		xx	UTM									
		xx	UTM									
		xx	UTM									
		xx	UTM									
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OBSERVATIONS: ... illegal activities:
POACHING: POG=hunting, fishing; P=setting signs: POI=M
PLANT HARVESTING: PHD=clearing, pole wood, fire wood, charcoal, Plant harvesting signs: PHI=pitsh
ENCROACHMENT: Encroachment Direct evidence: ETD=cultivation, settlement, grazing, mining
Encroachment sign: ETI=cultivation, settlement, grazing, mining
FIRE: FID; sign of fire FII
IMPORTANT: add further details under remarks

OBSERVATIONS: ... Mammals/reptiles/birds:
Mammals: LIO (lion), LPD (leopard), HYA (Hyena) ELE (elephant), BUF (buffalo), GPH (giant forest hog),
TPI (tree), WHB (waterbuck), BUS (bushbuck), ST (steinbuck), CHI (chimpanzee),
Reptiles: CRO (crocodile)
Birds: SB (shoe bill), TT (paddle bill stork), FLA (flamingo)
Add codes for poached and cause of death unknown (e.g. LIOP-k, ELE-u)
and only in forests: cut, footpins and trash dropping (e.g. CHI=c, LPD=t, BUF=d)

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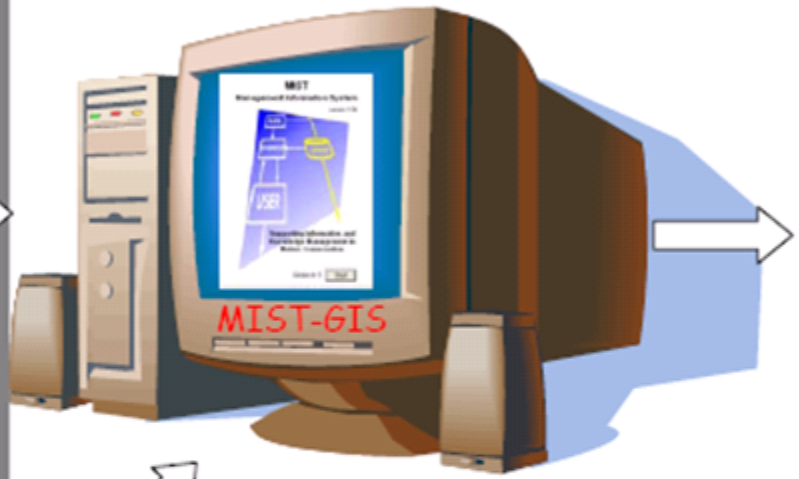
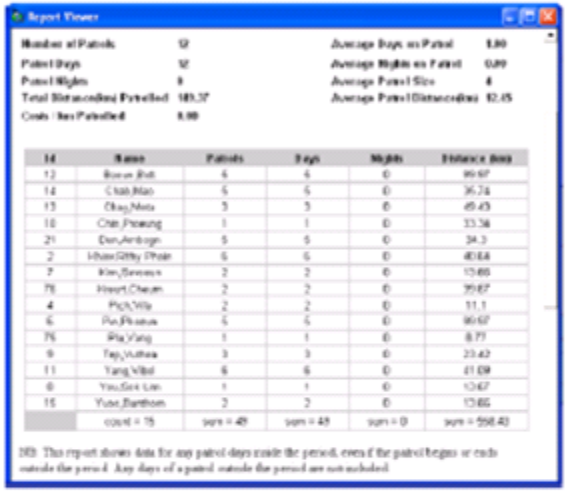
Convert Data into Information

DATA → **INFORMATION**

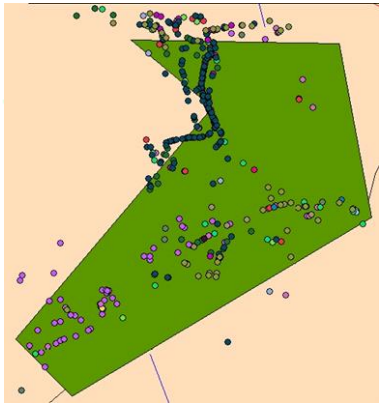
GPS





Reports

Datasheets



Maps

Example of information produced from the data:

- Where illegal activities occur
- Trend in illegal activities
- Which species are in the park
- Distribution and dynamic of these species

But also:

- How good is your coverage of the PA
- Where you should concentrate your effort

Standard outputs from the database

Reports

- Spatial distribution of wildlife depending on the ecological factors
- Information on patrols (time and distance patrolled etc.)
- Illegal activities (indices and numbers)
- Key wildlife species (indices, numbers and population structure)
- PAC Data
  - **Crop destruction**
  - **Predation**
  - **Human threat**
  - **Human injury**
  - **Human death**

Report output

General information on Patrols

Information for each staff participating in patrols

Report Viewer

Number of Patrols	12	Average Days on Patrol	1.00
Patrol Days	12	Average Nights on Patrol	0.00
Patrol Nights	0	Average Patrol Size	4
Total Distance(km) Patrolled	149.37	Average Patrol Distance(km)	12.45

Id	Name	Patrols	Days	Nights	Distance (km)
12	Boeun,Bott	5	5	0	99.97
14	Chab,Mao	5	5	0	35.74
13	Chay,Meta	3	3	0	49.43
10	Chin,Proeung	1	1	0	33.34
21	Den,Ambogn	5	5	0	34.3
2	Khiev,Rithy Phoin	6	6	0	40.64
7	Kim,Savoeun	2	2	0	13.65
76	Kreurt,Cheurn	2	2	0	39.67
4	Pich,Vila	2	2	0	11.1
6	Pin,Phoeun	5	5	0	99.97
75	Plu,Yang	1	1	0	8.77
9	Tep,Vuthea	3	3	0	23.42
11	Yang,Vibol	6	6	0	41.09
8	You,Sok Lim	1	1	0	13.67
15	Yuos,Bunthorn	2	2	0	13.66
	count = 15	sum = 49	sum = 49	sum = 0	sum = 558.43

NB: This report shows data for any patrol days inside the period, even if the patrol begins or ends outside the period. Any days of a patrol outside the period are not included.

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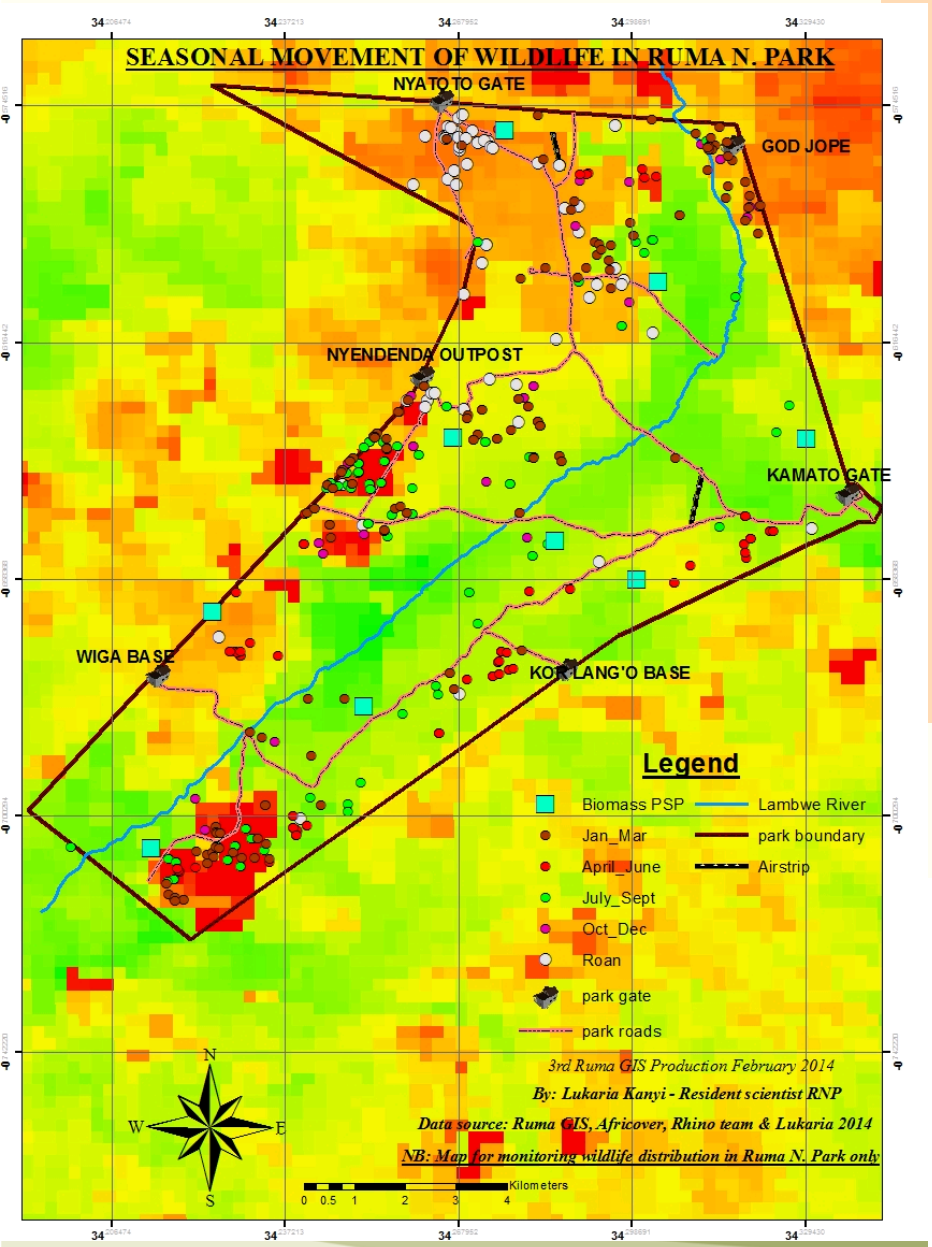
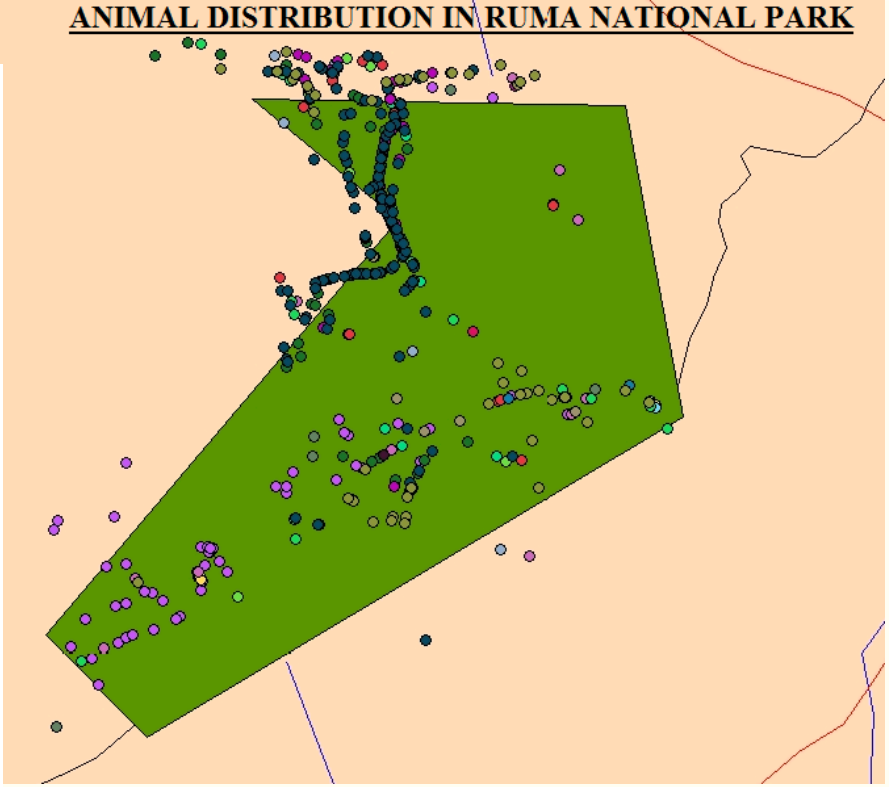
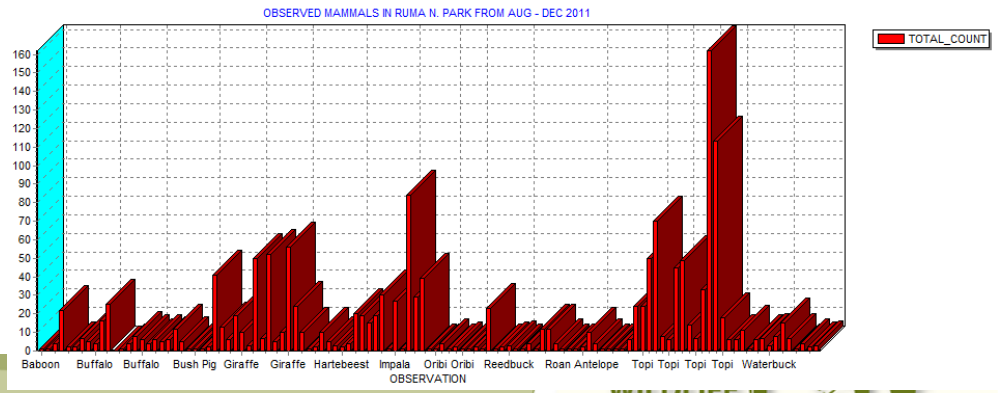
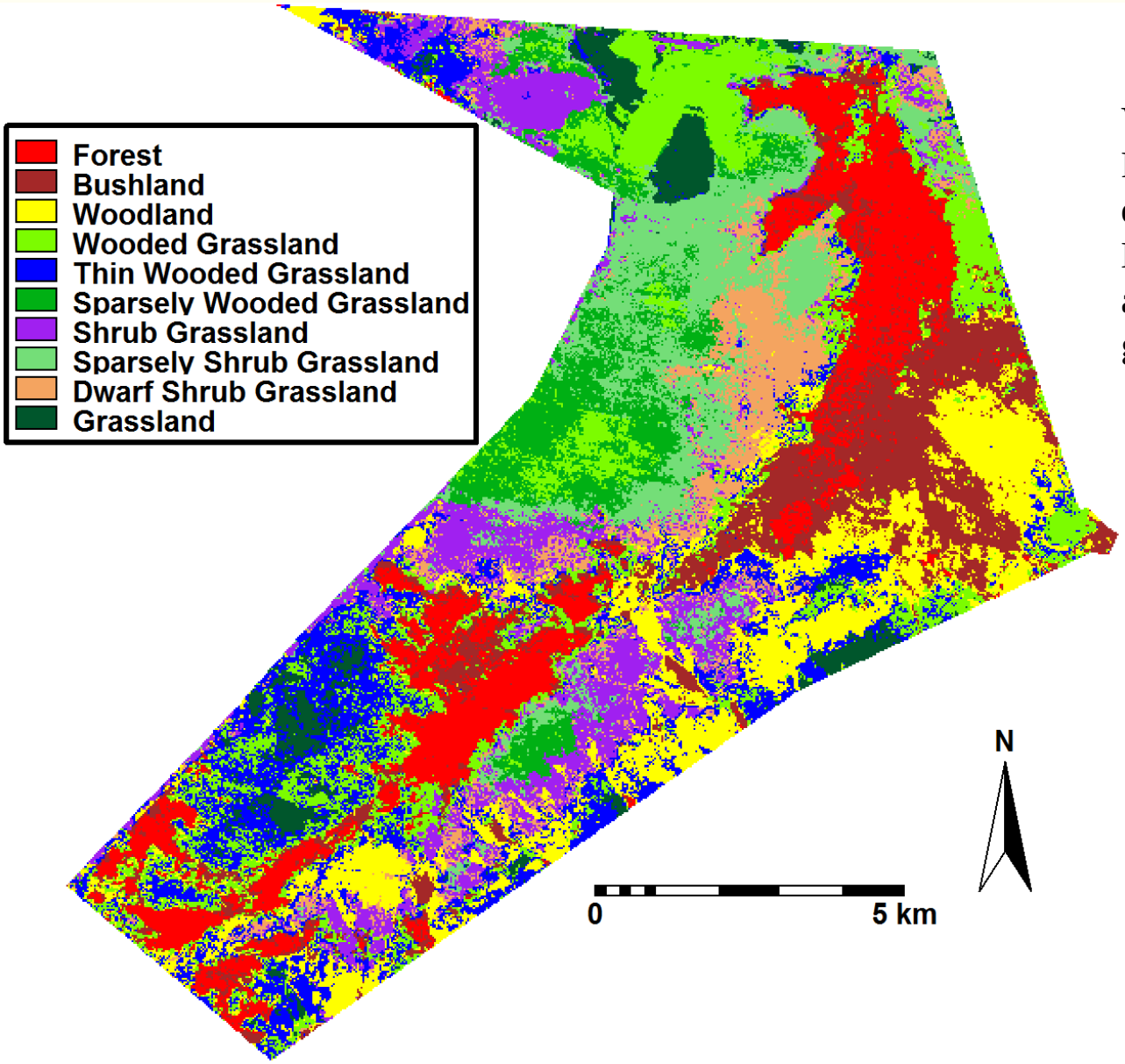
Application output









Vegetation map of Ruma National Park derived from 2005 ETM+ Landsat Image and updated with ground truth of 2008

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Acknowledgement

1. Kenya Wildlife Service Ruma National Park
2. Prof. Dr. Onyango J. C. – Maseno University Botanic Gardens
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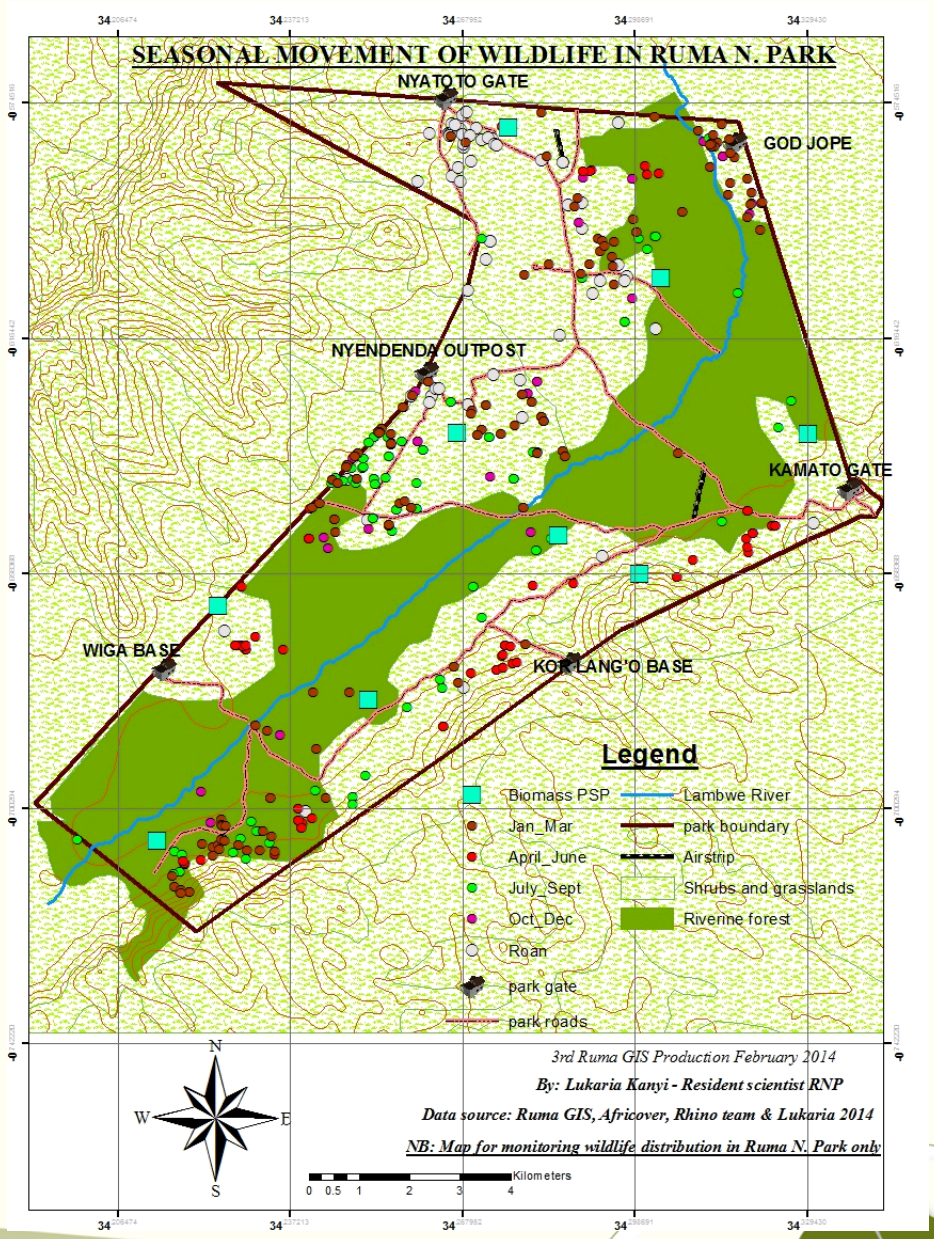
9. Mr. Dickson Ritan – Senior Warden KWS Ruma National Park
10. Ruma National Park Monitoring team



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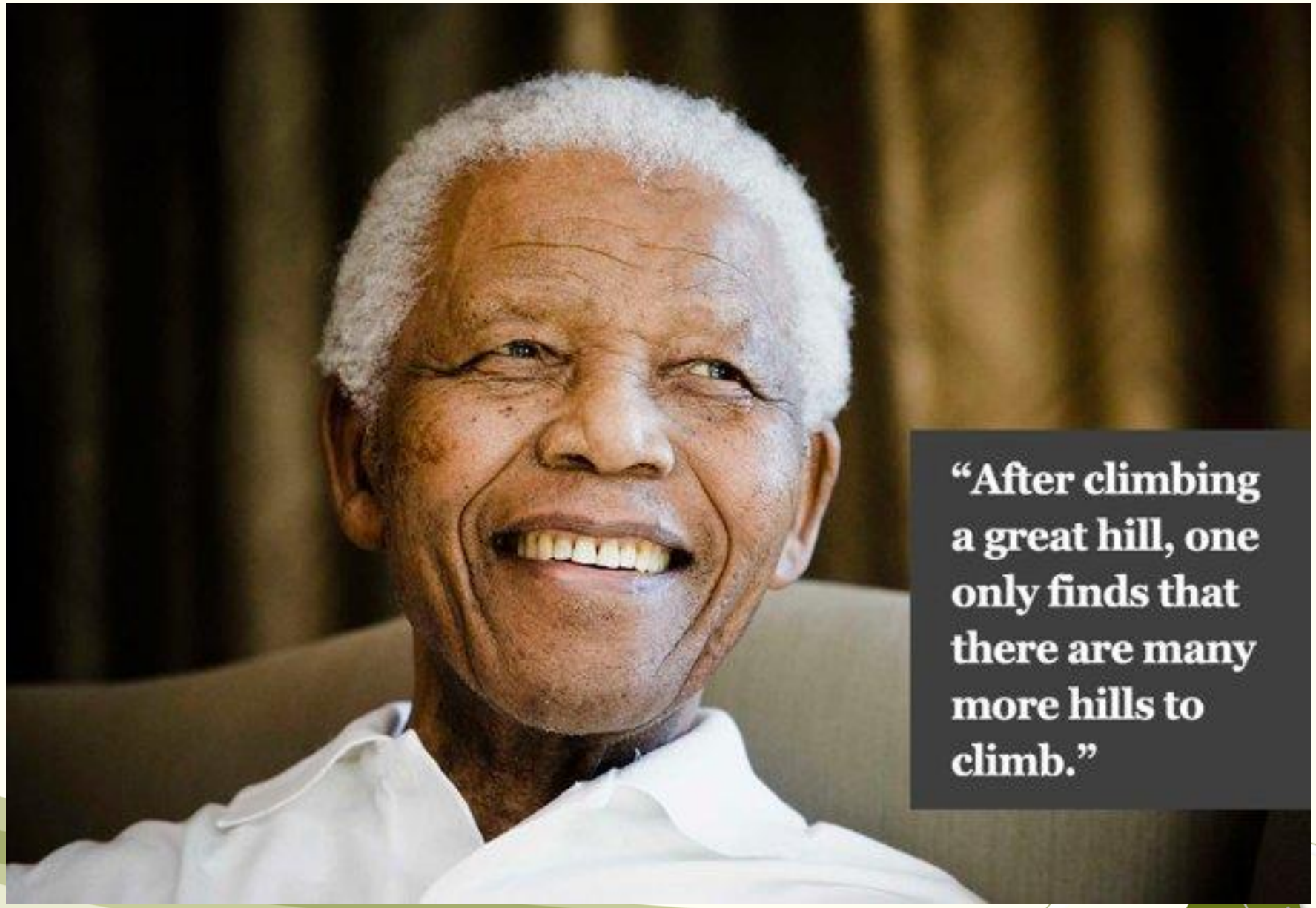

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THANK YOU

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