

Emerging threats and competing land use types, the balance between development and conservation; a case of the Tsavo ecosystem

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Tsavo Conservation Area: Elephant numbers and trends

- Tsavo Conservation Area (TCA) covers an area of about 43,000Km² and it is the largest in Kenya.
- Tsavo Conservation Area is home to the largest population of elephants in Kenya.
- Aerial census conducted in the year 1962 estimated the population of elephants in TCA to be about 10,799 (Glover, 1963)

Tsavo Conservation Area: Elephant numbers and trends

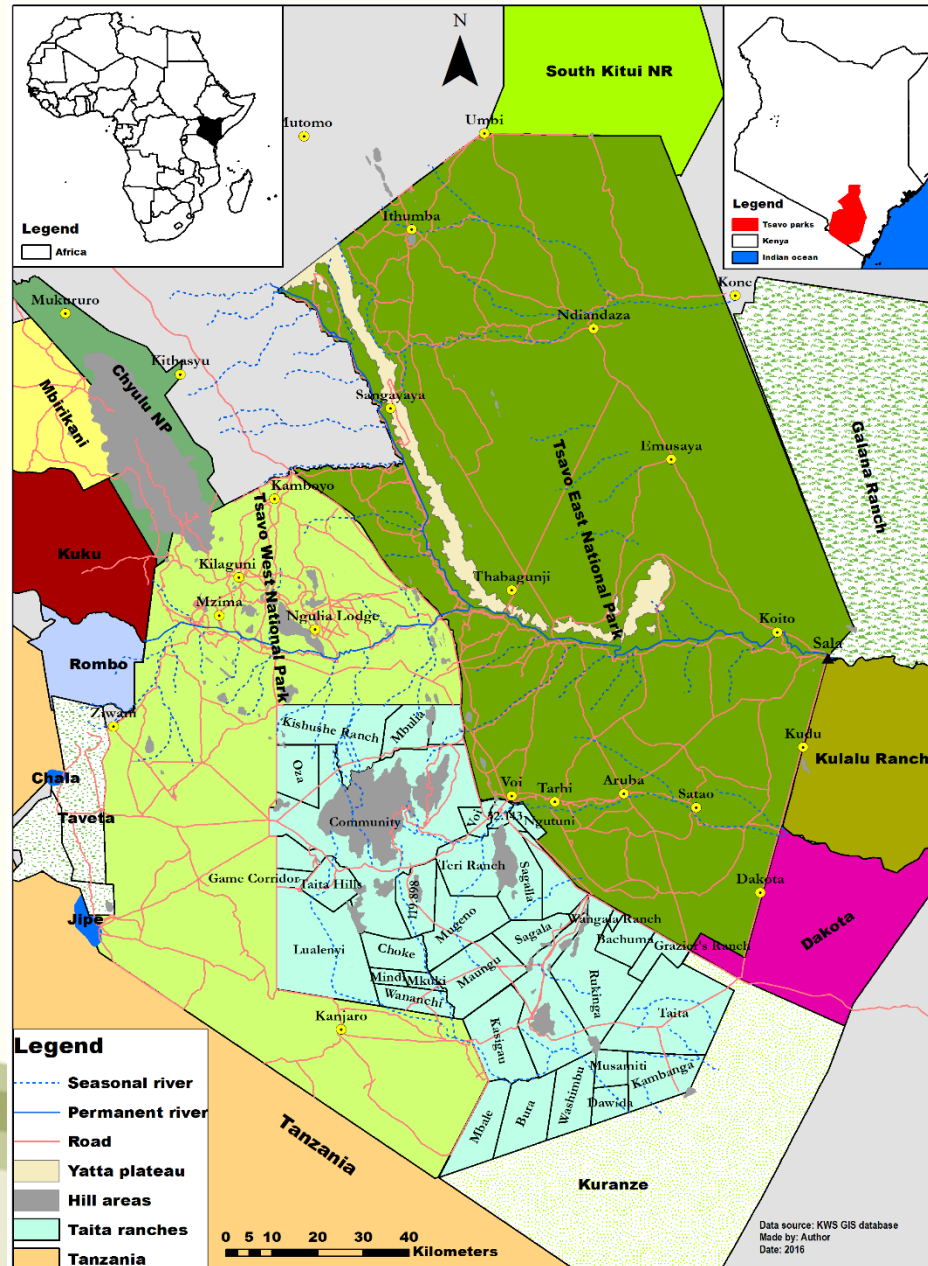
- In the year 1967 elephant population in Tsavo was estimated to be 35,000 (Laws, 1969).
- Severe drought in 1970 and 71 resulted to the death of 9,000 elephants in TCA (Corfield, 1973).
- Increased poaching after drought crushed the population to 12,000 individuals in 1981 (Ottichilo, 1981).

Tsavo Conservation Area: Elephant numbers and trends

- In the Year 1988 only 5,400 elephants remained in TCA (Olindo *et al.*, 1988).
- Establishment of Kenya Wildlife Service(KWS) in 1989 resulted to reduction in poaching and increment in elephant population.
- Aerial census conducted in 1991 estimated the population of elephants to be 6,763 (Thouless *et al.*, 2002).



Tsavo Conservation Area Map



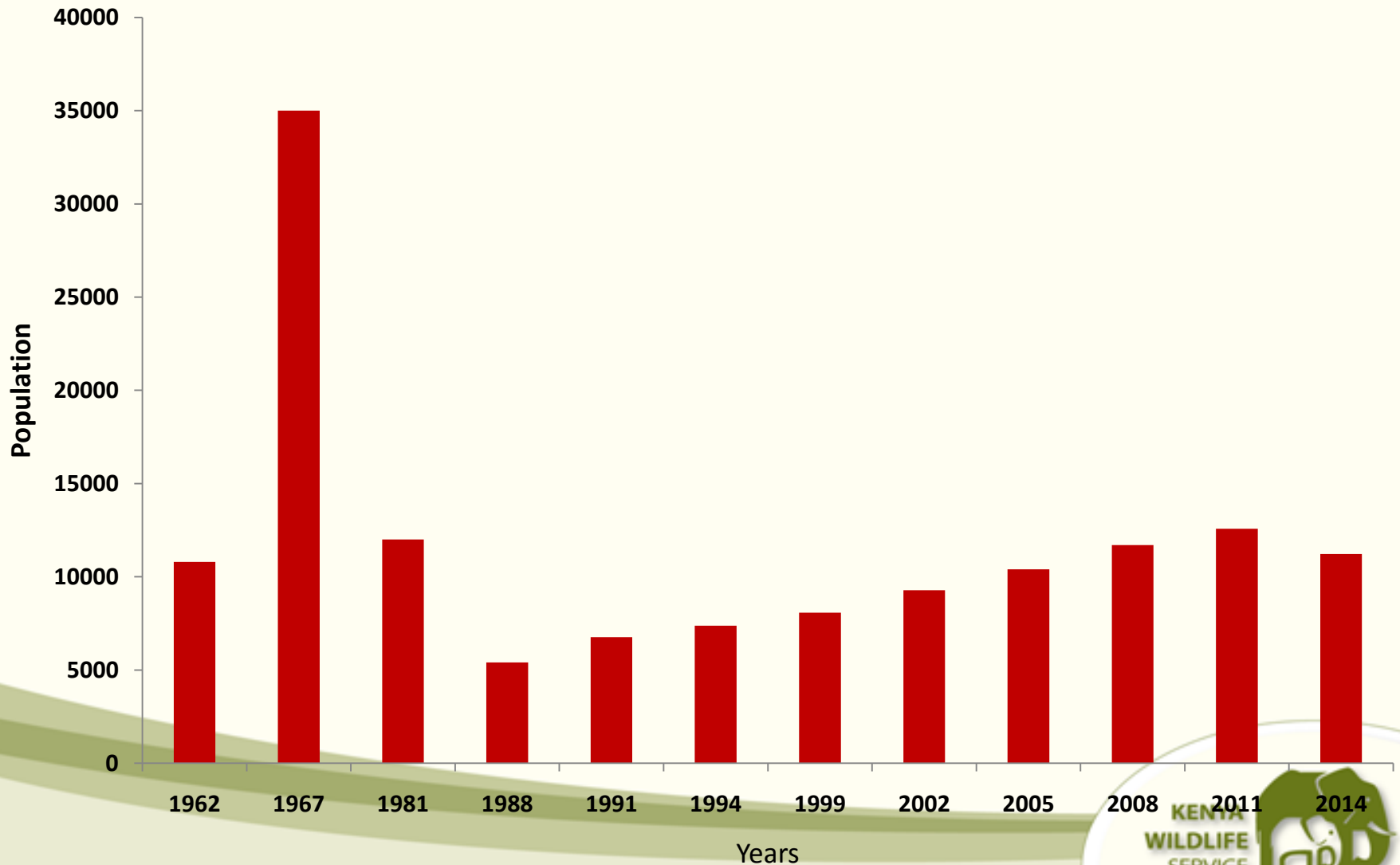
Tsavo Conservation Area: Elephant numbers and trends

- The population of elephants continued to increase in TCA as follows:
- 1994 the population was 7,371
- 1999 the population was 8,068
- 2002 the population was 9,284
- 2005 the population was 10,397
- 2008 the population was 11,696
- 2011 the population was 12,573

Tsavo Conservation Area: Elephant numbers and trends

- Aerial census conducted in the year 2014 resulted to decrease in elephant population to around 11,217 however a sample count Conducted the same year indicated that the population of elephants was between 12,000- 14,0000
- Next census is scheduled in March 2017

Tsavo Conservation Area: Elephant numbers from the year 1962 to 2014



Human Wildlife Conflict Trends

- Human wildlife conflict is a major threat facing TCA.
- Human elephant conflict ranks number one in TCA in human wildlife conflicts incidents.
- The earliest records of human-elephant conflict in Tsavo date back to 1916 when the District Commissioner of Voi asked permission from the Government administration for the local people to kill elephants which were damaging crops (Visram 1987).

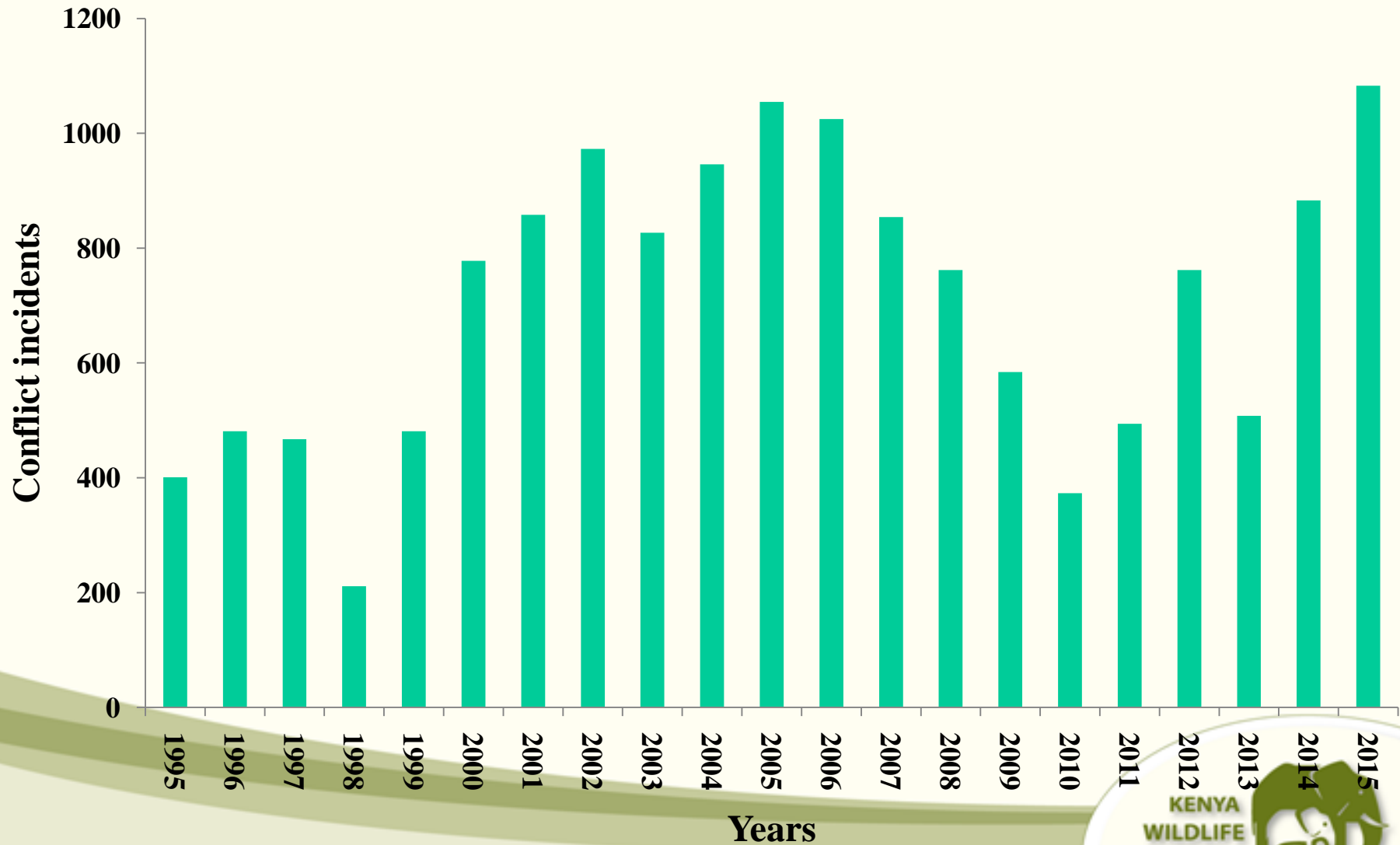
Human Wildlife Conflict in TCA

- Human elephant conflict continued to escalate in TCA until the year 1992 when KWS formed problem control unit to deal with human elephant conflict.
- Major human elephant conflicts in TCA include the following:
 - Crop damage
 - Property damage
 - Human threat , injury and death
 - Elephant death and injury

Major causes of HEC in TCA

- Increase in human population
- Changes in land-use
- Expansion in agriculture
- Increase in elephant population
- Climate change
- Infrastructure e.g Highway road, railway line and the new Standard Gauge Railway
- Urbanization
- Insufficient water supply in the park

HEC trends in TCA 1995 to 2015



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Threats in Tsavo Conservation Area

Major threats facing TCA includes the following:-

- Human wildlife conflicts
- Poaching
- Climate change
- Changes in land-use
- Invasive species
- Insufficient water supply in the parks
- Habitat fragmentation by growing national infrastructure development

Infrastructure Developments in TCA:

Construction of Standard Gauge Railway (SGR)

- SGR is a government project that will aid in achieving vision 2030.
- In the county of Taita Taveta SGR cuts through two National Parks namely Tsavo East and West.
- A total of 10.2Km² of land in Tsavo West and East has been affected by the construction of SGR.

Negative effects of SGR in the Parks

- **Blockage of wildlife migration/dispersal areas** – Construction of SGR has affected genetic movement, social and behavioral change, access to water and pasture of many large mammals especially elephants.
- **Increased road and rail kills** – SGR will be fenced and funnel wildlife in wildlife crossing, this expected to increase road and railway kills of large mammals especially elephants.

Negative effects of SGR in the Parks

- Other effects includes:
 - Habitat fragmentation and loss
 - Biodiversity loss and disturbance (Many borrow pits in the parks)
 - Possibility of increased Poaching and bush-meat incidences.
 - Invasive species spread

Measures to minimize SGR effects :

Wildlife corridors and culverts

- To allow movement of wildlife in their dispersal and migratory regions, wildlife corridors were mapped.
- Six corridor have been constructed in Bachuma, Maungu, Ndara, Manyani, Kenani and Kanga.
- Apart from the six, wildlife will also use the Tsavo bridge as the corridor.

Measures to minimize SGR effects :

Wildlife corridors and culverts

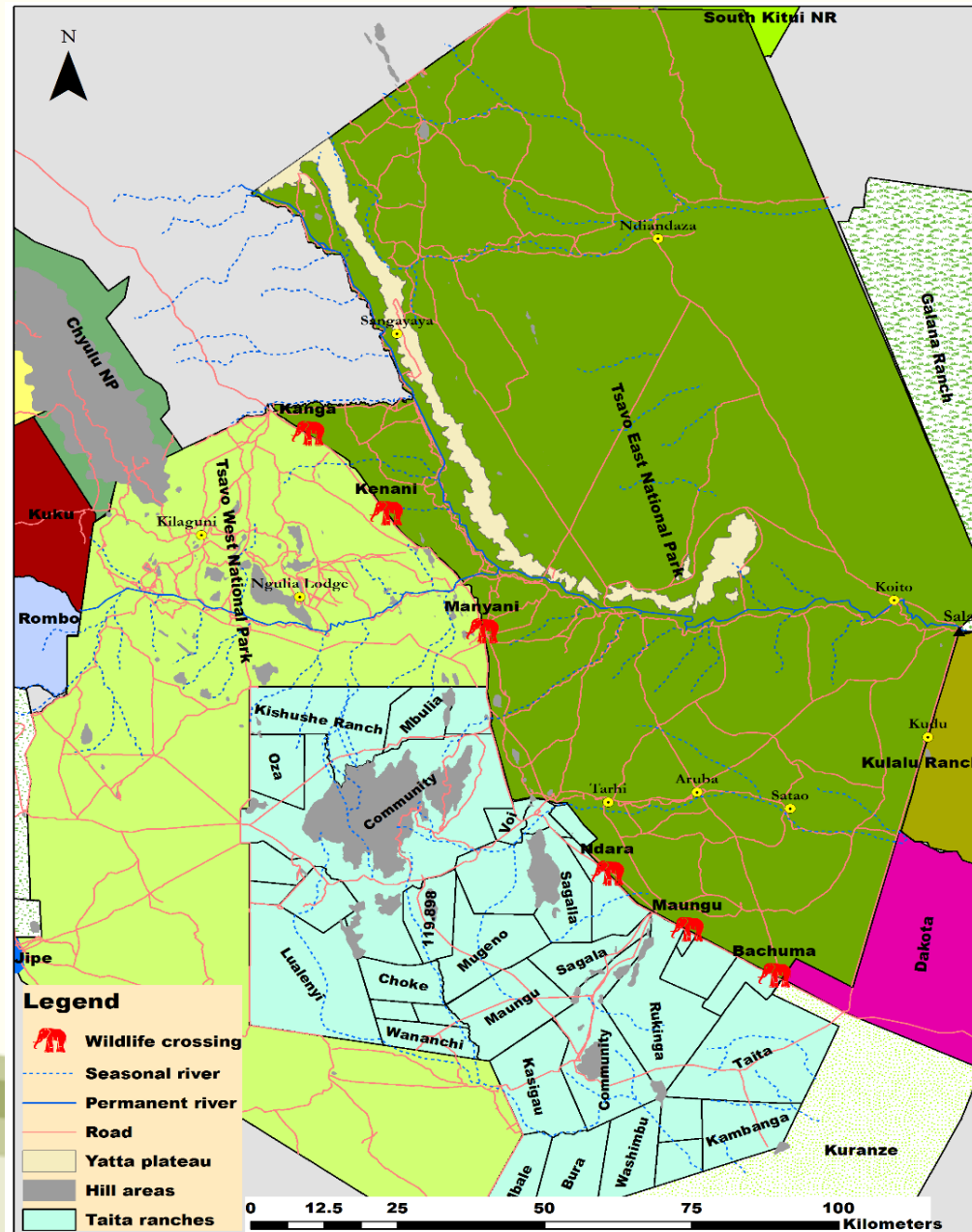
- Culverts have been constructed for the purpose of water but some are big enough to serve as wildlife crossings.
- Construction of these corridors are underway and almost complete.

Measures to minimize SGR effects :

Use of wildlife collars and camera traps

- Ten elephants have been fitted with satellite linked GPS collars along SGR from Bachuma to Mtito Andei to assess how elephants utilize the corridors and culverts.
- Camera traps will be fitted in the wildlife corridors to monitor utilization of corridors and culverts by wildlife.
- Road sign ages and bumps will be erected on the highway to warn motorists when arriving at wildlife corridors.

Wildlife corridors locations along SGR



Wildlife corridor in Kenani



Tsavo river bridge crossing



Culvert which has been constructed



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AN EXAMPLE OF ROAD SIGNAGES TO BE ERECTED ON THE HIGHWAY



EXAMPLE OF ROAD SIGNAGES TO BE ERECTED ON THE HIGHWAY

BEWARE OF WILDLIFE CROSSINGS
DO NOT LITTER, DO NOT STOP
DO NOT FEED THE ANIMALS



AN EXAMPLE OF ROAD SIGNAGES TO BE ERECTED ON THE HIGHWAY

ATTENTION



**WILDLIFE CROSSING
ZONE, 5KMS**



Infrastructure and Elephants:

Construction of Taveta-Mwatate road

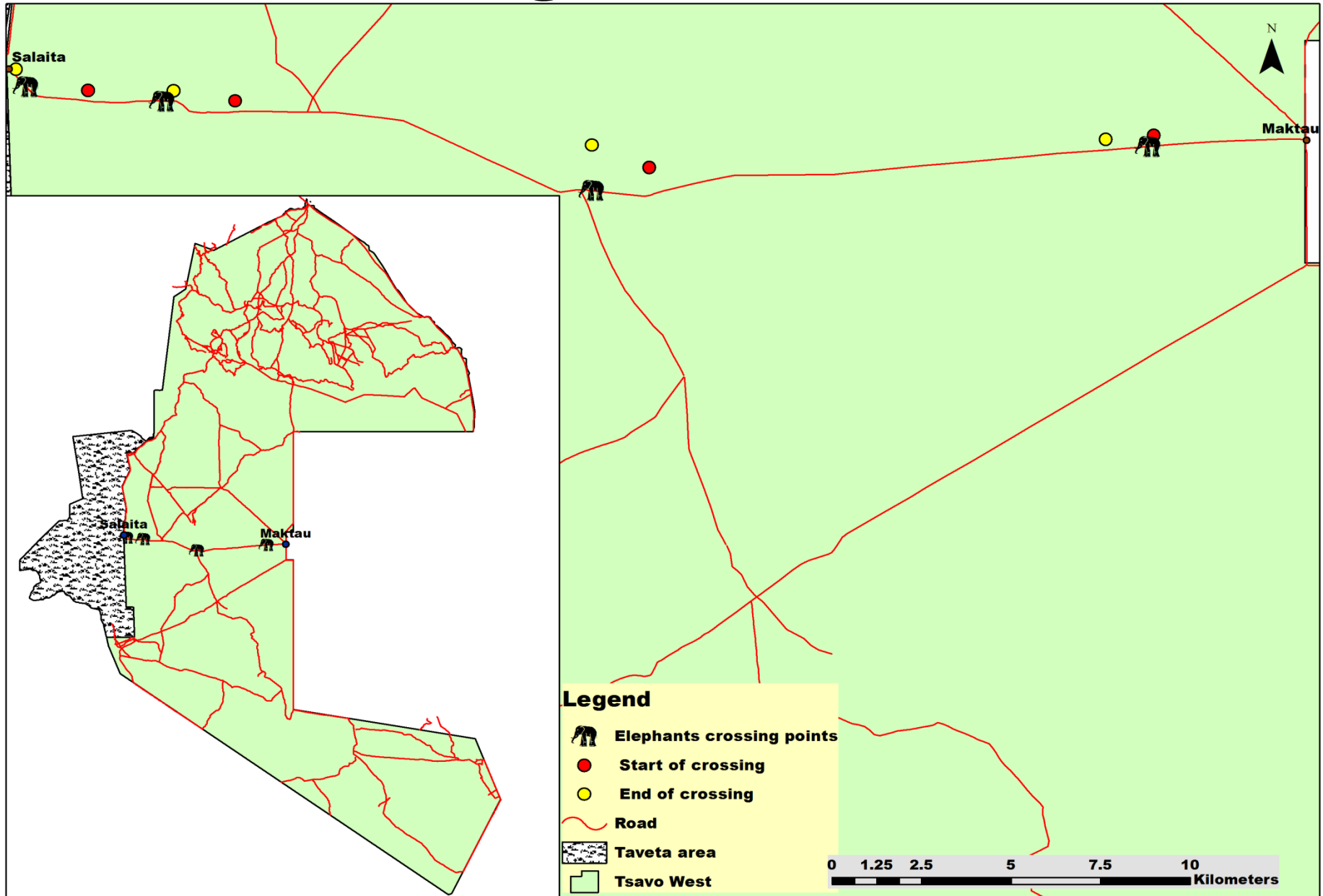
- Provision of world class cost effective infrastructure facilities is one of Kenya's Vision 2030.
- Developments comes with both negative and positive effects.
- Poor infrastructure from Taveta to Mwatate had hampered economy of Taita county and neighbouring East Africa countries

Infrastructure and Elephants:

Construction of Taveta-Mwatate road

- The negative impact of this development is that the road passes in the middle of Tsavo West National Park from Maktau to Salaita.
- The road have impacted negatively on wildlife crossings.
- Elephants have to cross the road when moving from southern to northern part of Tsavo West National Park.
- Wildlife road kills are expected to increase on this road though mitigation measures have been implemented.

Wildlife crossings on the road in Park



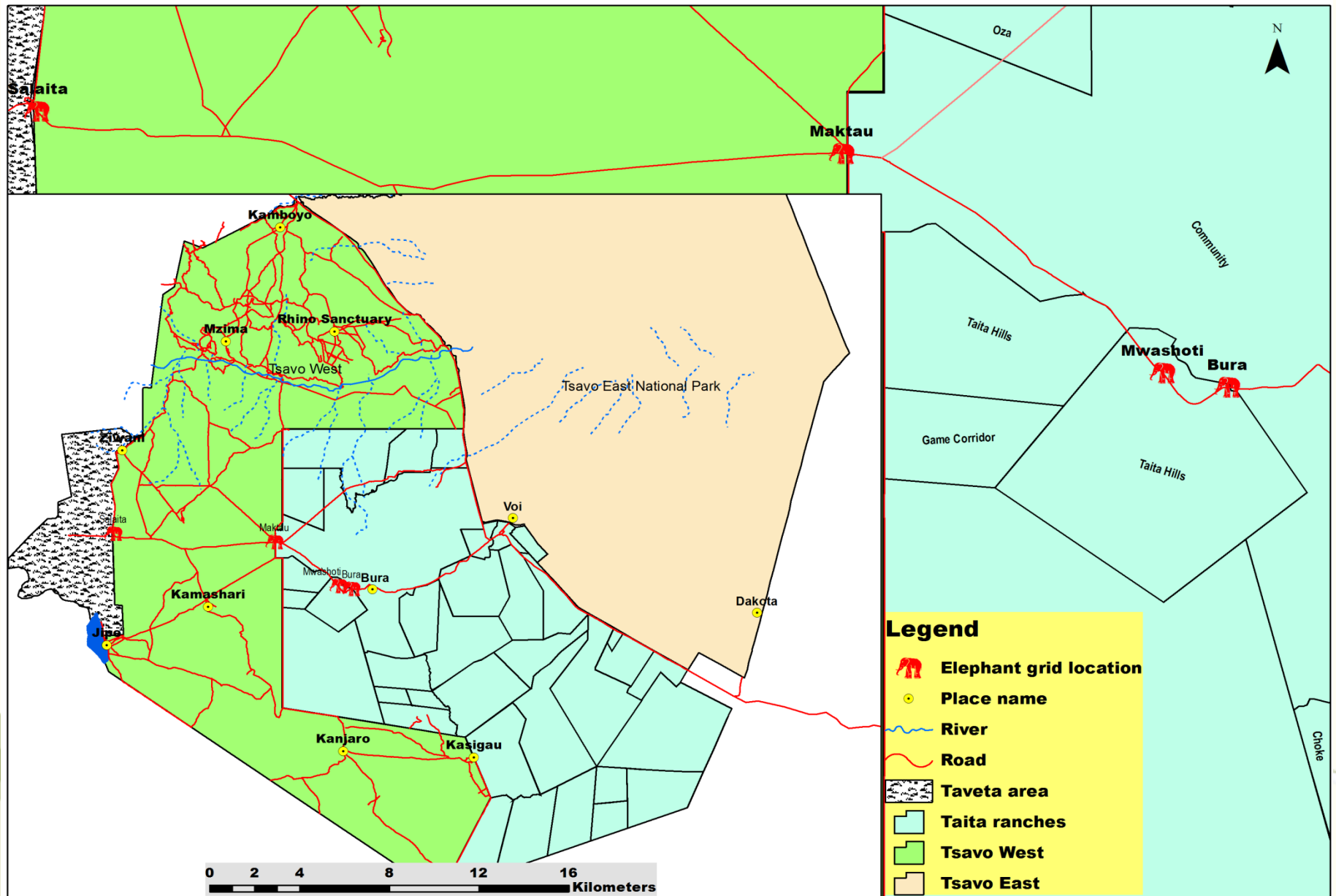




Mitigation measures to reduce road kills

- Speed bumps and rumbles have been erected on all wildlife crossing areas.
- Elephant grids have been erected in Maktau and Salaita to prevent elephants from moving out of the park.
- Signages have been erected on the road to alert motorists when entering the park.
- Signages have been erected on the corridors to alert motorists on speed limits

Elephant grids locations



Infrastructure and Elephants:

Construction of Oil pipeline

- Construction of new oil pipeline is on going from Mombasa to Nairobi.
- In the county of Taita Taveta the pipeline cuts through Tsavo East and West National Park.
- Construction of the pipeline has impacted negatively on wildlife.
- Connection of the pipes are being done on the surface and most have not been buried.

Infrastructure and Elephants:

Construction of Oil pipeline

- Unburied pipes are obstructing wildlife movements.
- In some regions of the park deep trenches dug to bury the pipes are left open making the trenches very dangerous to wildlife.
- Park management has instructed the contractor to connect and bury the pipes as soon as possible.

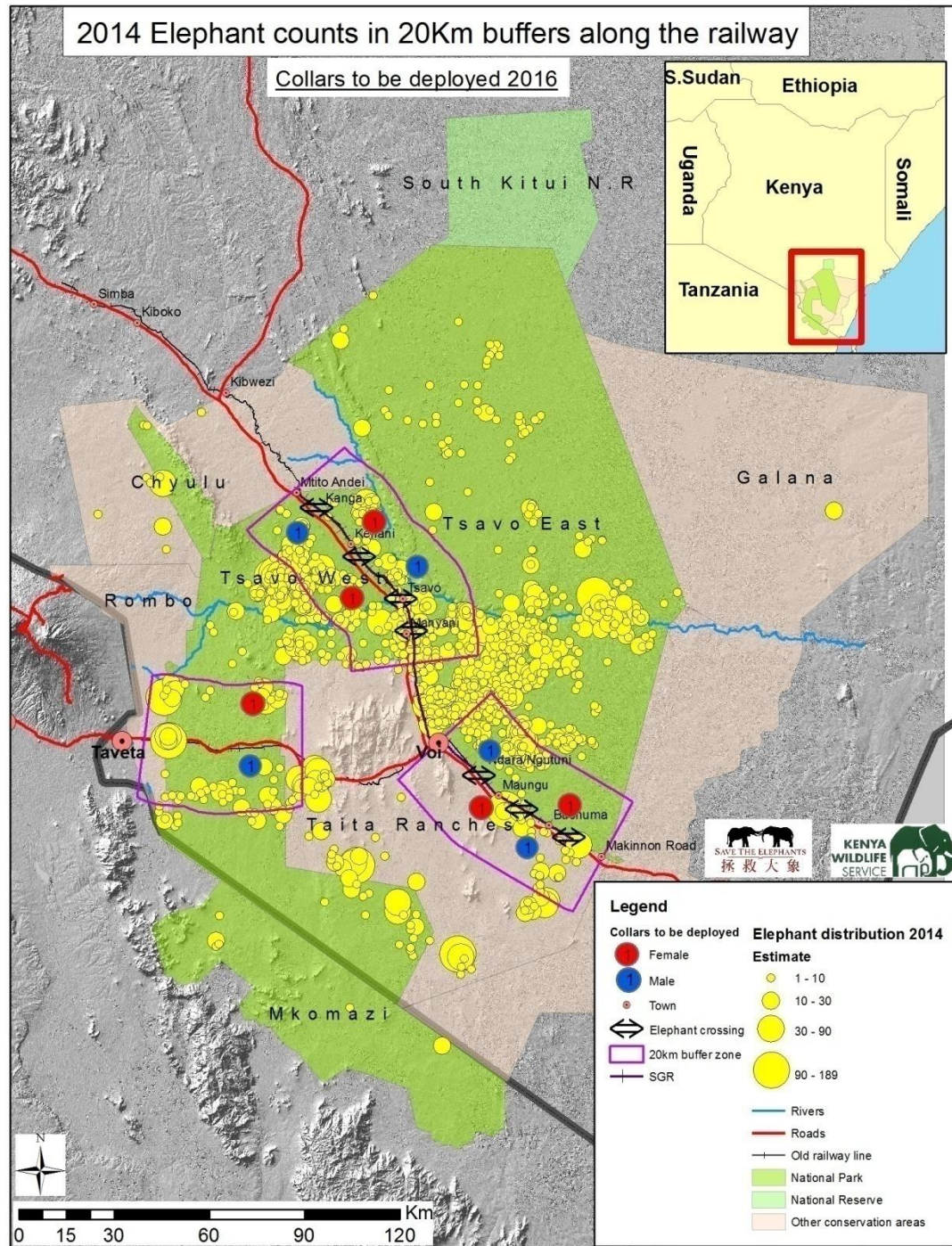
Pipes and the trench left unattended





2014 Elephant counts in 20Km buffers along the railway

Collars to be deployed 2016



Legend

Collars to be deployed

Female

Male

Town

Elephant crossing

20km buffer zone

SGR

Elephant distribution 2014

Estimate

1 - 10

10 - 30

30 - 90

90 - 189

Rivers

Roads

Old railway line

National Park

National Reserve

Other conservation areas

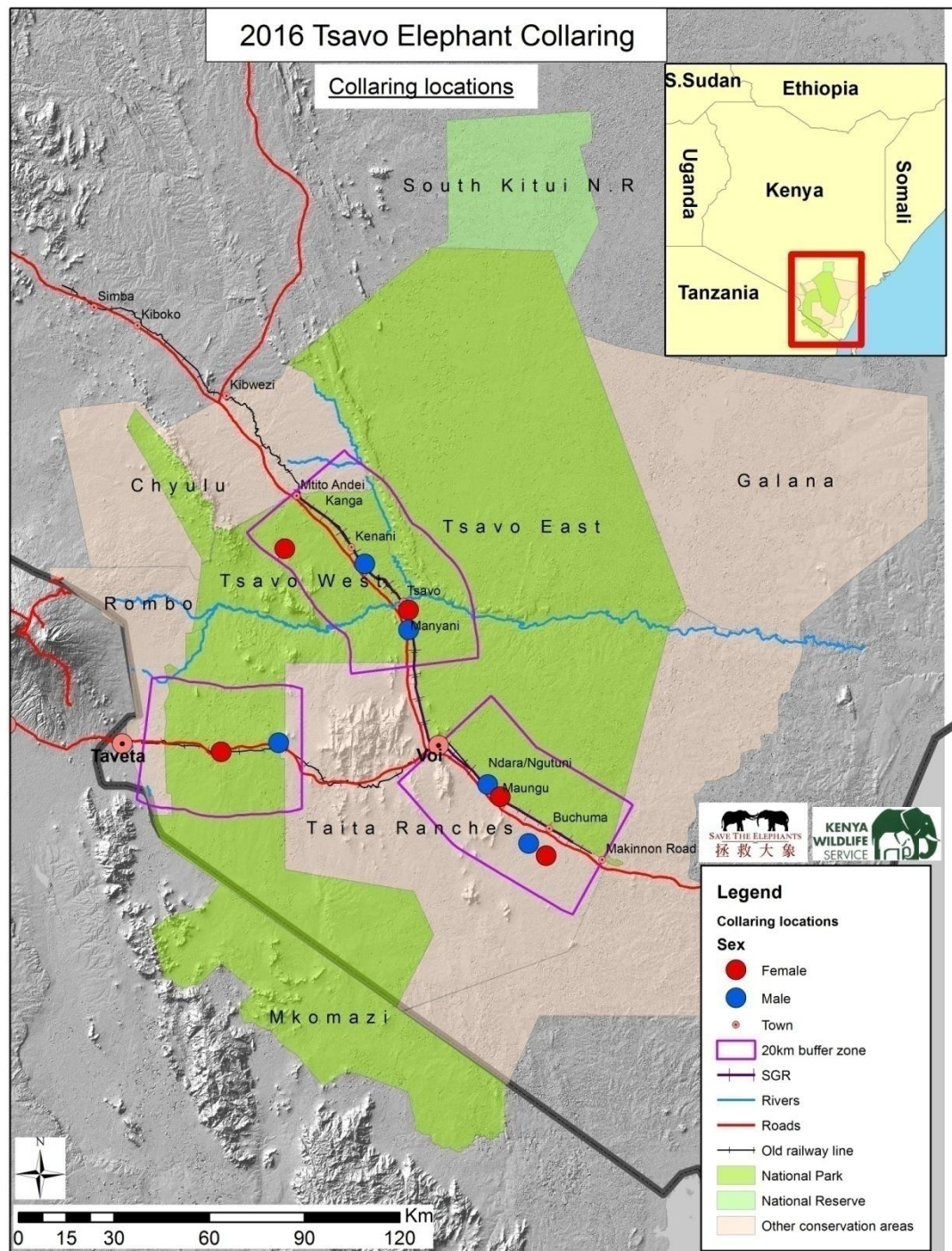
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2016 Tsavo Elephant Collaring

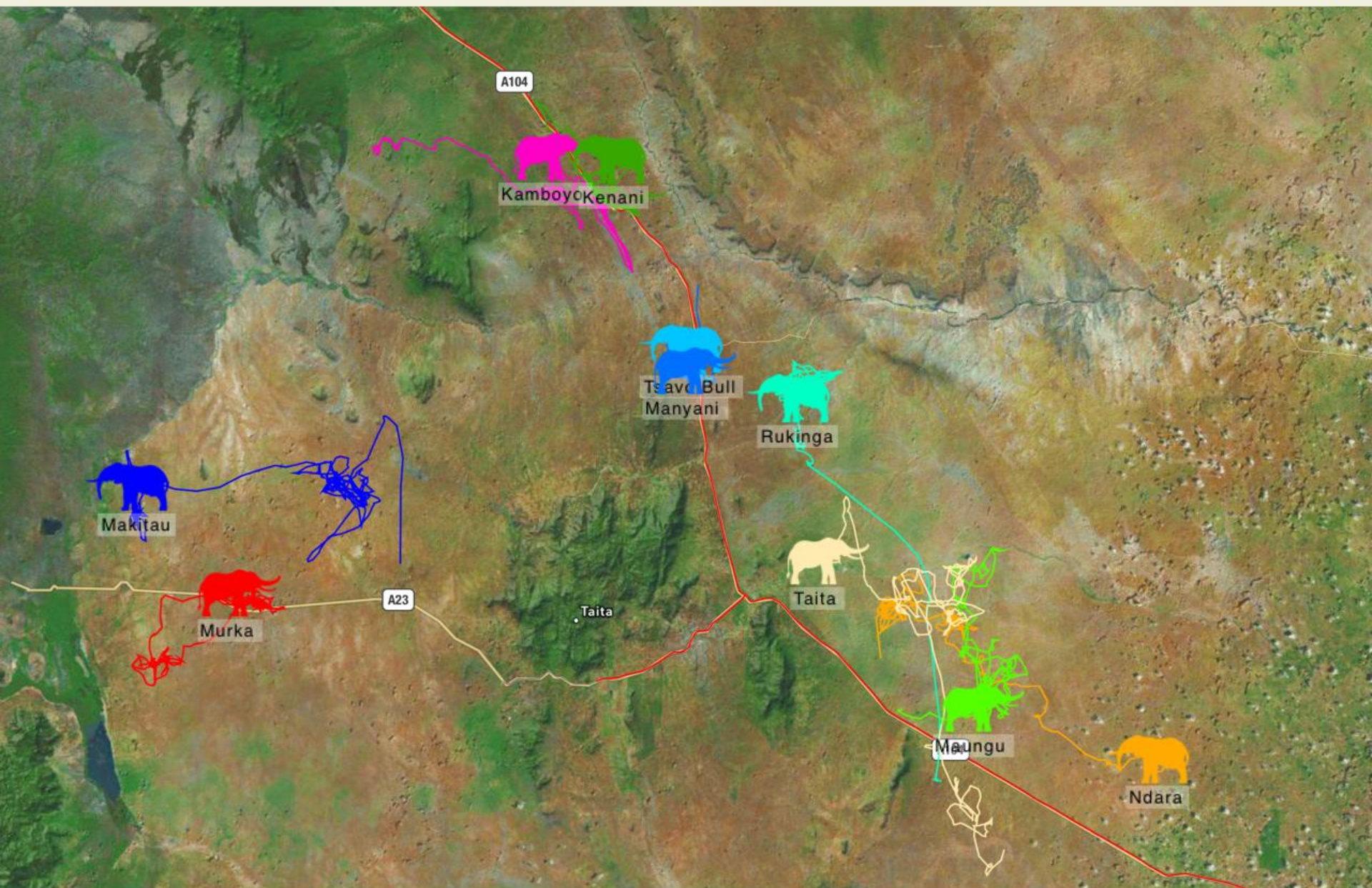


Tsavo Standard Gauge Railway crossings and Elephant tracking

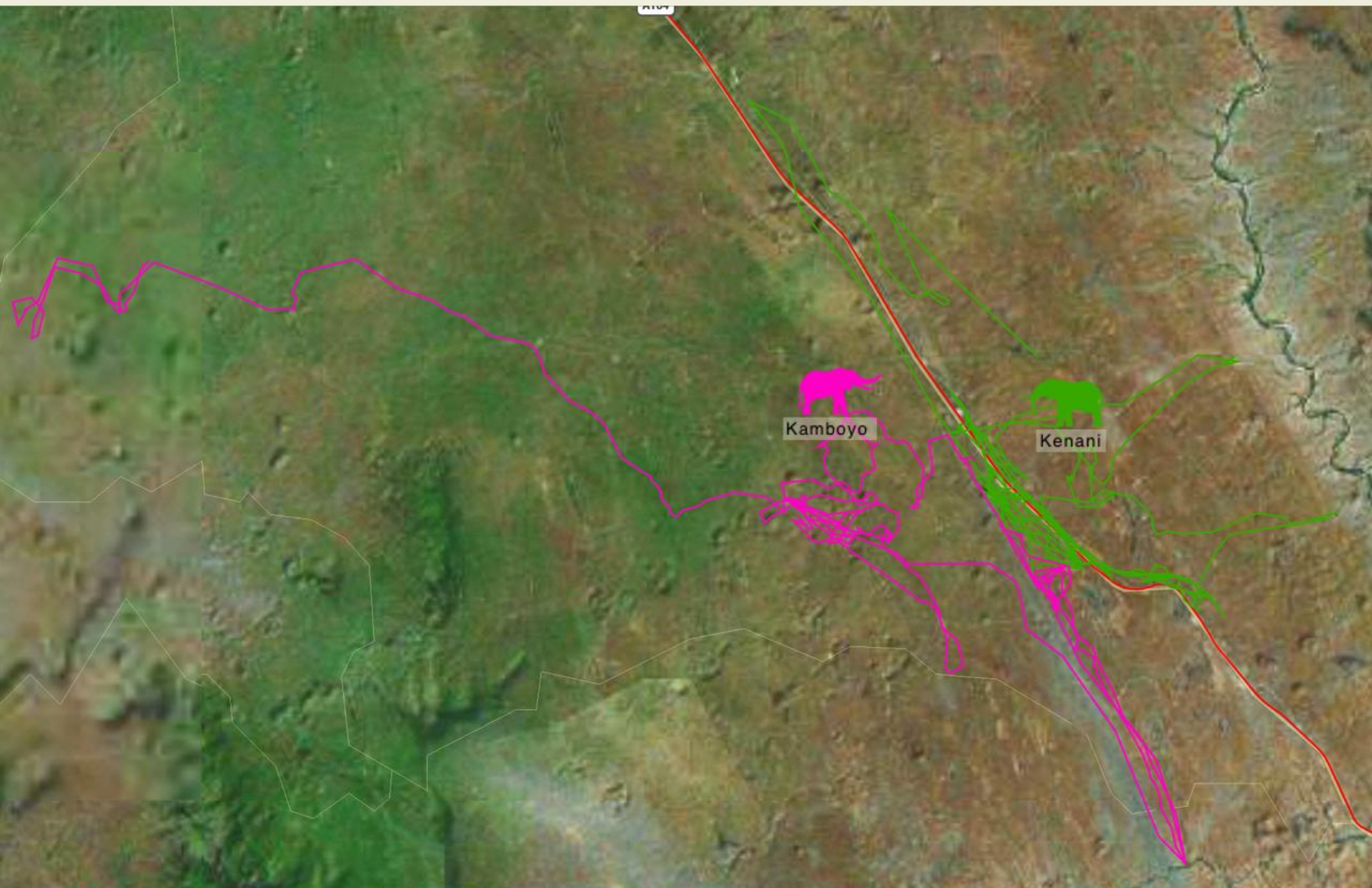




SAVE THE ELEPHANTS

[Zoom To Fit](#)

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