August 2018

Research and Monitoring

Tembo 2 and Tembo 4

Research and Monitoring Units in support of KWS in the Tsavo Conservation Area

Tembo 2 and Tembo 4 units operate in support of Kenya Wildlife Service (KWS) Research and Monitoring Departments within the Tsavo Conservation Area, mainly in Tsavo East National Park (TENP) and Tsavo West National Park (TWNP), but also in surrounding areas bordering the National Parks.

The main emphasis for these units is to monitor the large Tuskers as often as possible in-situ on the ground and frequently in tandem with aerial activities whereby ground deployments can be guided. In so doing a layer of "eyes and ears" at ground level is achieved to compliment the "eyes in the skies" under the aerial unit.

A combined ground and air project has proved to produce far better monitoring results and in turn provides greater security for the big Tusers. For example in September 2014 there were only 14 different observations made of Tuskers (12 known individuals) yet in 2017 there were 223 different observations made consisting of 9 iconic bulls, 18 emerging bulls and 7 iconic cow Tuskers. Within the TCA only 9 remaining big iconic Super Tuskers (those with ivory to the ground and over 45kg each tusk), a further 26 emerging bull Tuskers and 3 iconic cow Tuskers are known by Tsavo Trust to exist.



Tembo 2 ground team monitoring a cow tusker in Tsavo East National Park in 2017

A Need for Research and Monitoring in the TCA

Maintaining full time Wildlife Monitoring in the Tsavo Conservation Area

The Tembo 2 and Tembo 4 teams currently provide a unique platform available in Tsavo East NP and Tsavo West NP for meaningful field data collection to KWS and this reflects the importance of the Tembo teams to Park Management. As well as big Tusker monitoring, this on-going project also contributes valuable data on **Critically Endangered** species including Black Rhino, Hirola or Hunter's Antelope, White-backed Vulture, and Rüppell's Vulture; **Endangered** species including Ground Pangolin, Grevy's Zebra, Lappet-faced Vulture; **Vulnerable** species including African Elephant, African Wild Dog, Cheetah, Hippopotamus, Lion, Leopard, and Giraffe; **Near-threateaned** species including Striped Hyena, Beisa Oryx, Lesser Kudu, and Plains Zebra among others – thereby adding value to any investment in this project as well as an excellent example of where Government/Private conservation partnerships exist.

Through the consistent findings of the aerial unit combined with the Tembo 2 and Tembo 4 teams, Tsavo Trust maintains a database on relevant information gathered pertaining to the big Tuskers. This information has been collected since Tsavo Trust began the Big Tusker Project in January 2013.





Positive identification of Tsavo's large "Tuskers" takes place on the ground (Tembo Units) as well as from aerial reconnaissance flights, under the Tsavo Trust's "Big Tusker Project".

This photograph shows a fresh elephant carcass located from the air. Tembo 2 were directed to the location for data collection.

Tsavo Trust Research and Monitoring Units

Background to Tsavo Trust Tembo Units in the Tsavo Conservation Area

Tsavo Trust works in partnership with the Kenya Wildlife Service (KWS), through a valid Memorandum of Understanding (MOU) covering several programs and objectives across the Tsavo Conservation Area (TCA) including enhancing aerial and ground biodiversity protection operations as well as wildlife monitoring with a special emphasis on Tsavo's iconic "Big Tuskers".

The Tsavo Conservation Area (TCA) spans a massive 40,000 square kilometers (22,000 square kilometers of National Park alone) and harbour's immense biodiversity. The TCA holds the single largest population of elephants in Kenya – just over 12,866 animals at the last aerial census (February 2016) – and arguably the world's last viable population and gene pool of elephants carrying exceptionally large and long ivory.

Following the death of the iconic Tusker known as "Satao" in May 2014 (via a poachers poisoned arrow), the Tsavo Trust established the **Tembo 1** mobile anti-poaching unit in June 2014. This was followed by the Tusker monitoring unit called **Tembo 2** team in October 2014, both setup to operate in **Tsavo East**, and southern sectors of the Tsavo Conservation Area.

The success of these teams in Tsavo East and the need for similar units in Tsavo West prompted Tsavo Trust to seek funding for a second protection team. **Tembo 3** protection unit was established and deployed in 2016, and **Tembo 4** research and monitoring unit which was later created and deployed in August 2017 as the only mobile ground research and monitoring team operating in **Tsavo West** National Park, and northern sectors of the Tsavo Conservation Area.



Tembo 4 monitoring Satao 2 in Tsavo East National Par,k 2014

Personnel:
Tembo 2 and Tembo 4 teams consists of 3 Tsavo Trust personnel each. Each team is led by 1 Field Officer (holding a degree in wildlife management), assisted by 1 driver and 1 Field Assistant (all of whom received elephant identification training by Save The Elephants in Northern Kenya). In addition at least 2 KWS field research staff makes up a complete Tsavo Trust Tembo Research and Monitoring team, who conduct field-monitoring patrols on a daily basis in TENP and TWNP.

Equipment:
Tembo 2 and 4 are mobile, self sufficient and able to move across Tsavo with a 4 x 4 vehicle fabricated and modified for rugged off road conditions. Other equipment includes tentage, camp beds, bedrolls, cooking utensils, camera, binoculars; GPS, mobile phone, radios, staff salary costs and food ration supplies (see budget breakdown).



Early days in 2014 - Tembo 2 team at their camp in Tsavo East

Tembo 2 - Research and Monitoring Unit

Tsavo East National Park and southern TCA sectors

Tembo 2 operates mainly in Tsavo East NP and the southern boundary areas of the Tsavo Conservation Area. The first Tsavo Trust research and monitoring unit to be established, Tembo 2 was deployed in October 2014.

Tembo 2 is based out of a tented camp at KWS Voi HQ. Research and monitoring areas of operation include Tsavo East National Park, Voi River, Satao, Buchuma, Dakota, Ndara, Aruba, Manyani, KMC, Lugards, Koitu, Emusaya, Galana River, Msa Rd., and Dida Harea. Tembo 2 use a Land Rover 110 modified for rugged conditions and are on patrol most days, typically covering over at least 2,500 km per month.



Joseph Kyalo
Tsavo Trust Field Co-ordinator, degree in Wildlife Management



Christine Mwende
Tsavo Trust Field Researcher

Tembo 2 Unit also includes 2 KWS Field Researchers. The team reports to Tsavo Trust HQ and KWS Head of Research for Tsavo East National Park.



This photos shows Tembo 2 in 2017 with a cow tusker. Positive identification of Tsavo's large "Tuskers" takes place on the ground as well as from aerial reconnaissance flights, under the Tsavo Trust's "Big Tusker Project".

TEMBO 2

Deployed since:
October 2014

Capital Setup Costs:
$80,000

Annual Running Costs:
$50,000

5 Personnel:
1 Field Coordinator, 1 Field Researcher, 1 Driver, 2 KWS Field Researchers

Area of Operations:
Tsavo East and southern TCA sectors

Tembo 4 - Research and Monitoring Unit

Tsavo West National Park and northern TCA sectors

Tembo 4 operates mainly in Tsavo West NP and the northern boundary areas of the Tsavo Conservation Area. The second Tsavo Trust research and monitoring unit to be established, Tembo 4 was deployed in August 2017

Tembo 4 is based out of a refurbished house at Kamboyo Airstrip, close to the KWS Tsavo West HQ. Research and monitoring areas of operation include Tsavo West National Park, Kamboyo, Mangalete, Kilaguni, Mzima, Shetani, Finch H, Ziwani, Kitani, Tsavo River, Rhino Valley, IPZ, NRS. Tembo 4 use a Land Cruiser pick-up modified for rugged conditions and are on patrol most days, typically covering overing at least 2,500 km per month.

Tembo 4 is co-ordinated by Kenneth Ozere, a Tsavo Trust Field Co-ordinator. KWS Researchers regularly join Tembo 4.

Tembo 4 reports to Tsavo Trust HQ and KWS head of research for Tsavo West National Park.



Tembo 4 operate mainly in Tsavo West National Park. Operations includeTusker monitoring, Rhino monitoring and capture exercises, Carnivore monitoring, Mombasa/Nairobi - Road and SGR kill surveys, Camera trap surveys, Fixed point photography.

TEMBO 4

Deployed since:
August 2017

Capital Setup Costs:
$80,000

5 Personnel:
1 Field Coordinator, 1 Field Researcher, 1 Driver, 2 KWS Field Researchers

Area of Operations:
Tsavo West and northern TCA sectors

Annual Running Costs:
$50,000

Monitoring Data

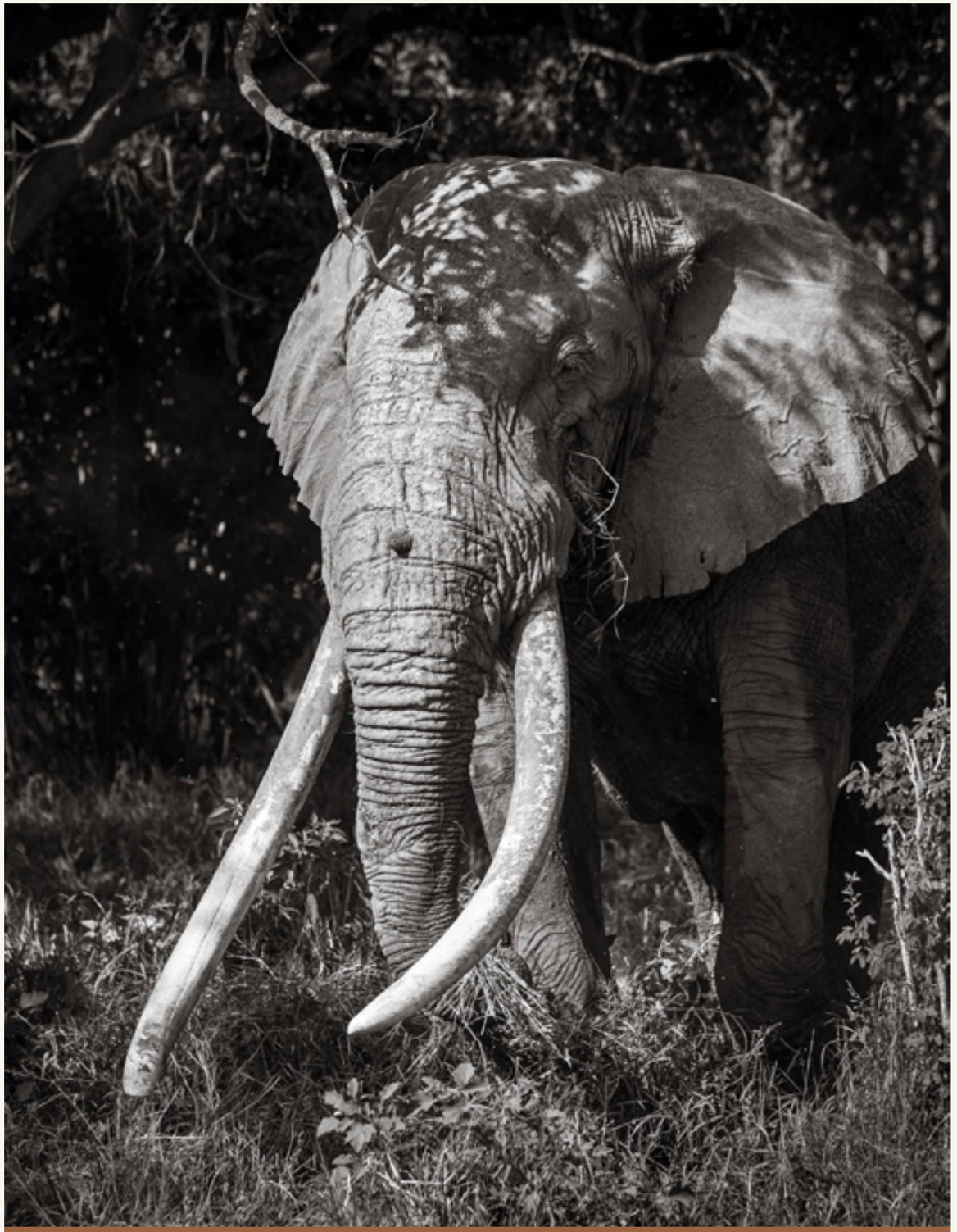
Summary of Big Tusker Project Conservation Achievements and Impacts - 2017

Table shows activities carried out by Tembo 2 and 4 teams – research and monitoring in 2017:

Monitoring Teamw	Field Days	Actvities	Endangered species records / sightings	Operating locations	Kms
Tembo 2 3 TT staff 2 KWS	249	• Tusker monitoring • Hirola monitoring • Grevy's Zebra monitoring • Carnivore monitoring • Mombasa/Nairobi - Road & SGR kill surveys • Camera trap surveys • Fixed point photos • Elephant collaring	• Tuskers – 141 sightings • Hirola –66 sightings • Grevy's Zebra – 41 sightings • Large carnivores – 152 • Road & rail kills – 20 • Elephant carcasses – 4 • Rain gauge readings • Elephant collaring – took part in the KWS / STE / TT collaring of 20 elephants 29 to 4 Feb	TENP, Voi River, Satao, Buchuma, Dakota, Ndara, Aruba, Manyani, KMC, Lugards, Koitu, Emusaya, Galana River, Msa Rd., Dida Harea	45,118
Tembo 4 2 TT staff 2 KWS	110	• Tusker monitoring • Rhino monitoring in IPZ • Carnivore monitoring • Mombasa/Nairobi - Road & SGR kill surveys • Rainfall data collection • Camera trap surveys • Fixed point photos • Elephant collaring	• Tuskers – 50 sightings • Rhino monitoring IPZ • Large carnivores – 31 • Road & rail kills – 2 • Elephant carcasses - Nil • Rain gauge readings	TWNP, Kamboyo, Mangalete, Kilaguni, Mzima, Shetani, Finch H, Ziwani, Kitani, Tsavo River, Rhino Valley, IPZ, NRS	12,952
Total 2017	**359**				**58,070**



Positive identification of Tsavo's large "Tuskers" takes place on the ground (Tembo 2) as well as from aerial reconnaissance flights, under the Tsavo Trust's "Big Tusker Project".



Big Tusker, coded as LU1 in Tsavo West National Park. Photo by Will Burrard-Lucas

Development of Conservation Partnerships

Encouraging Development of Conservation Partnerships in the Tsavo's and assisting with field project implementation.

In 2017 Tsavo Trust partnered with a number of like-minded conservation organisations, whereby Tsavo Trust provided field-based expertise to implement and support projects alongside KWS.

Tsavo Trust recognise the importance of partnerships in maximising delivery of conservation actions and strives to work collaboratively to achieve shared objectives with partner organisations, such as Save The Elephants, Zoological Society of London, and IFAW among others in supporting KWS and of growing wildlife populations in and around the Tsavo Conservation Area.

With Tsavo Trust's established field base, we are well placed to partner with other organisations carrying out effective operations and program implementation. In addition to these conservation efforts, Tsavo Trust also actively encourages and advises high end tourism operators back to the Tsavos.

The **Tsavo Conservation Area** is home to numerous species that are included in **IUCN Red List** threatened categories of Critically Endangered, Endangered, Vulnerable, and Near Threatened, some of which are shown below.

Critically Endangered - Black Rhino, Hirola, White-backed Vulture, Rüppell's Vulture





Endangered - Ground Pangolin, Grevy's Zebra, Lappet-faced Vulture





Vulnerable - Wild Dog, Cheetah, Lion, Leopard, African Elephant, Giraffe, Hippopotamus













Near Threatened - Striped Hyena, Lesser Kudu, Plain's Zebra, Beisa Oryx







Appeal for funds for ongoing operations of Tembo 2 and Tembo 4, and the establishment of third research and monitoring Unit called 'Tembo 6'

With additional funding support the Tsavo Trust plans to establish and deploy a further mobile field based monitoring team, for the reasons shown above this is a vital extra component in order to tackle the ever-growing pressure on elephant populations but also essential if the big Super Tuskers of Tsavo are to survive and pass on their unique and rare ivory genes to further generations.

Tembo 6 team: To relieve some of the pressure on the Tembo 2 team who attempts to cover TENP (12,000 square kilometers), it is envisaged to deploy a second Tembo monitoring team to TENP on exactly the same basis as Tembo 2. The second TENP team will be called Tembo 6.



During an aerial recce, this elephant carcass was spotted, with ivory intact in May 2016. The joint KWS / Tsavo Trust Tembo 2 ground team later recovered both tusks.

Working in tandem – aerial and ground teams has proved to be most effective in both monitoring and biodiversity protection activities.

Conclusion

Tsavo Trust hopes to maintain current research and monitoring operations in 2018, and should funds and support be available, to increase the research and monitoring capacity and coverage in the Tsavo Conservation Area through an additional Tembo Unit.

Further scope for development includes establishing a research base in the Kamungi Consevancy on the boundary of Tsavo East National Park, partnering with research organisations such as Universities, ongoing training of staff in evolving technologies such as GIS mapping and systems technology, and collaborating with partner organisations to strengthen research and conservation efforts in Tsavo.

A greater understanding of the Tsavo Conservation Area biodiversity through consistent scientific research, monitoring and data analysis will provide valuable information to aid in security operations, policy making, and the management of natural resources in the Tsavo Conservation Area.

Tsavo Trust would like to thank the following organisations and individuals for their generous support to Tembo 2 and Tembo 4, without which these operations would not be possibe:

US Fish and Wildlife Service, USAID, Nick Southgate, Tusk Trust (UK), Tusk USA, ZSL, International Elephant Foundation, Origins Safaris, Satao Camp, On Safari Kenya, and may other generous supporters.

TSAVO TRUST
a culture of conservation

Research and Monitoring Unit - Direct Costs

Capital expenditure and running costs to set up and maintain a biodiversity protection team:

Cost Description	Units	Cost Unit US$	Total Cost US$
One off setup Capex Costs (US$) - in bold below			**81,355**
Annual Running Costs			**53, 702**
Itemized Costs:			
4x4 Vehicle, Trailer/Bowser and Running Costs			
1 new 4x4 vehicle (Toyota Land Cruiser p/up)	**1**	**60,000 (one off cost)**	**60,000**
Steel fabrication, canvas cover, seating, suspension upgrade of vehicle for rugged off road conditions	**1**	**10,000 (one-off cost)**	**10,000**
1 year's vehicle running costs, incl fuel and maintenance (AA rates)	1	$1 /km, 2,500 km / month	30,000
Vehicle tracking system	12	50	600
1 set new vehicle tires	6	216	1,296
1 year's fully comprensive vehilce insurance	1	1,800	1,800
Staff Salaries, Uniforms, Rations, Insurance, Medical			
Salary - Field Officer, gross	1	$600 / month	7,200
Salary - Driver, gross	1	$300 / month	3,600
Salary - 1 Research Assistant, gross	1	$200 / month	2,400
Uniforms	3	$212 pp	636
1 year's food rations (dry and fresh), 3 personnel	3	$40 / month each	1,440
Workman's compensation/insurance/liability cover (WIBA)	3	$150 / person / year	450
Medical insurance for whole team		Covered by NHIF	
Field Equipment			
2 x 10 ftx10ft Heavy Duty canvas tenst	**2**	**$1,800 (one off)**	**3,600**
Camp equipment, camp stools, x 6, 2 tables, cooking equip.	**Misc**	**Misc. (one off)**	**500**
3 bed rolls	**3**	**$85**	**255**
Radios - 1 base set in vehicle	**1**	**$600**	**600**
Radios - 2 hand held sets plus solar charging panels	**2**	**$500**	**1,000**
GPS	**1**	**$600**	**600**
Binoculars	**2**	**$500**	**1,000**
Waterproof and Shokproof Digital camera	**1**	**$500**	**500**
Smartphone - Waterproof and shockproof	**2**	**$400**	**800**
Laptop Computer	**1**	**$1,000**	**1000**
Operating Costs			
KWS Ranger Field Allowances (daily at $3) for 2 KWS Rangers	2	$90 / month x 12	2,160
Smartphone airtime and data	2	$20 per month	480
GIS Software - subsidised annual license	1	140	140
Misc costs			300
KWS Vehicle Fuel		Occasional requirements	1,200
Activity Costs			
Tech and Systems Training	**1**	**$1,000 pp**	**1,000**
Total Capital setup costs and Annual Direct Running Costs			**$135,057**