AWF Climate Adaptation – Beyond Virunga

David Williams, African Wildlife Foundation

Albertine Rift Climate Change Adaptation Workshop
Gashora, Rwanda; Feb 2011

Adaptation: AWF Context

- Recognize Africa as most vulnerable continent to CC.
- While our research and conservation efforts span decades, have much to learn of species and system-specific CC impacts.
- Incipient AWF CC adaptation strategy.
- Staging pilot projects to inform strategy development and generate adaptation capacity in AWF and partners.
- Virunga 1st adaptation effort…what next?

AWF Heartlands

- 7 savannah-dom. landscapes
- Share similar conservation targets (e.g., elephants, predator guilds, declining ungulate species) and proximate threats (habitat loss, fragmentation, HW conflict, limited h2o)
- What is our approach to adaptation?

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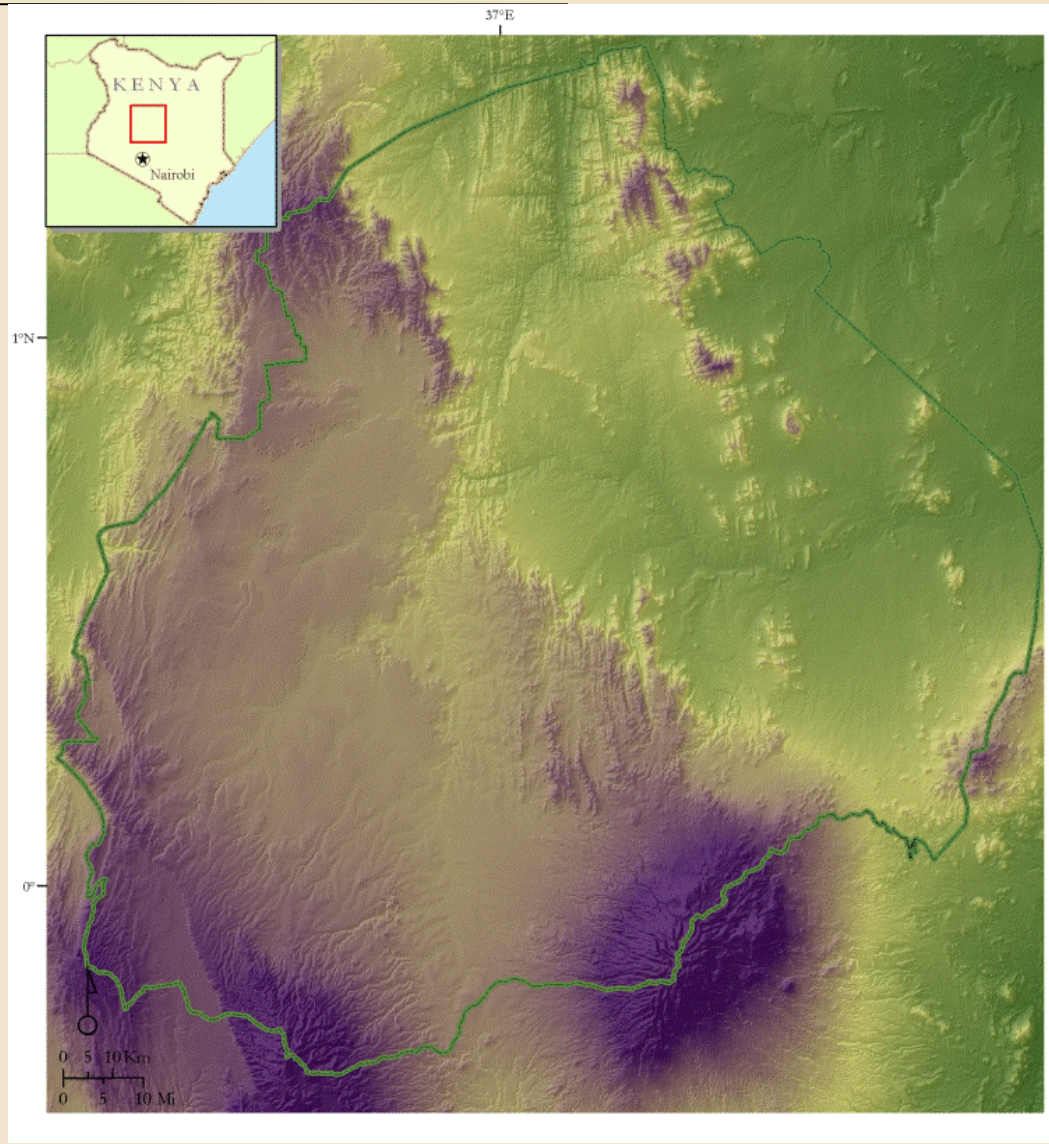
AWF Adaptation: What Next?

Considerations:

- Build on Virunga VA experience as a fine-scale modeling pilot.
- Samburu HL offers relatively rich database and field research programs to inform and explore approaches. Good biophysical and soc-economic representation of 3 E. African HLs.
- Elephants and grevy's zebra
  - ele – in all 7 LS; representativeness/umbrella/flagship values
  - grevy's – rarity

Samburu Heartland

- In rain-shadow of Mt Kenya/ Abedares range.
- Wildlife include northern specialists species (reticulated giraffe and Somali ostrich and the endangered Grevy's zebra) as well Kenya's 2nd largest elephant population.
- Wildlife numbers outside parks have steadily increased in recent years.



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Samburu Heartland Adaptation

Goals:

- Formulate CC adaptation strategy for SH focusing on two keystone species that will build adaptation capacity in landscape stakeholders.
- Develop a template and AWF capacity to replicate climate change vulnerability assessments for other arid regions of Africa.

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Samburu Heartland Adaptation

Guiding principals:

- Give the wildlife options…connectivity/space.
- Be pro-active in seeking opportunities, yet cautious.
- Explore intervention scenarios including restoration to improve resilience.
- Don't lose focus of imminent threats (Noss 2001, Hansen et al).
- Stakeholder focused. Build capacity for AWF exit.

Conceptual Framework

Vulnerability:

Exposure + sensitivity - capacity to adapt

Consider direct *and* indirect effects

EcoAdapt™
Meeting the challenges of climate change

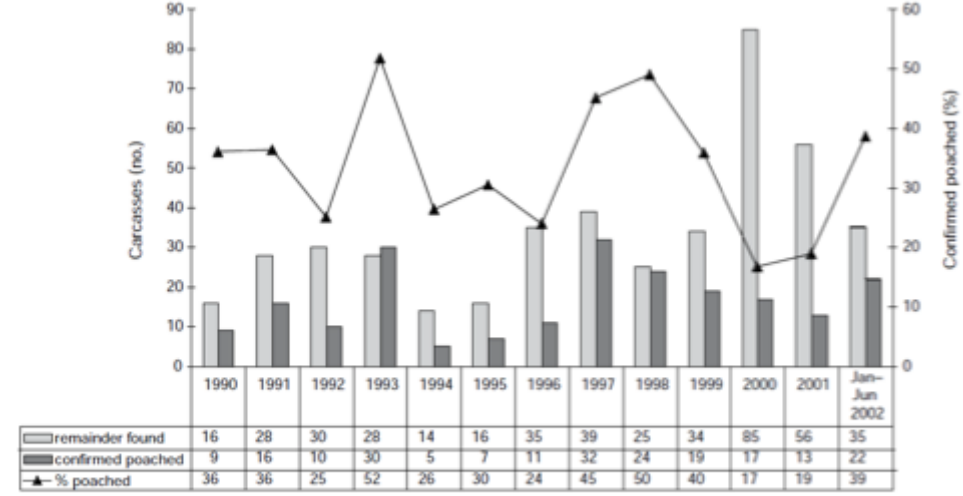
Samburu: African Elephant

Status

- Increasing population (2300 in 1990, 6365 in 2008)
- Generalist browser/grazer
- Wide latitudinal range
- Home ranges for females 100 – 5000 Km^2 (Thouless 1995).

Threats

- Human wildlife conflict/PAC
- Poaching (heavy in 70s)
- Drought, spurring HW conflict (harbinger?)



	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	Jan–Jun 2002
remainder found	16	28	30	28	14	16	35	39	25	34	85	56	35
confirmed poached	9	16	10	30	5	7	11	32	24	19	17	13	22
% poached	36	36	25	52	26	30	24	45	50	40	17	19	39

Figure 7.1. Number of poached carcasses, remainder of carcasses found and proportion of all found carcasses that were poached, Samburu/Laikipia, 1990–June 2002. (Source: EMD)

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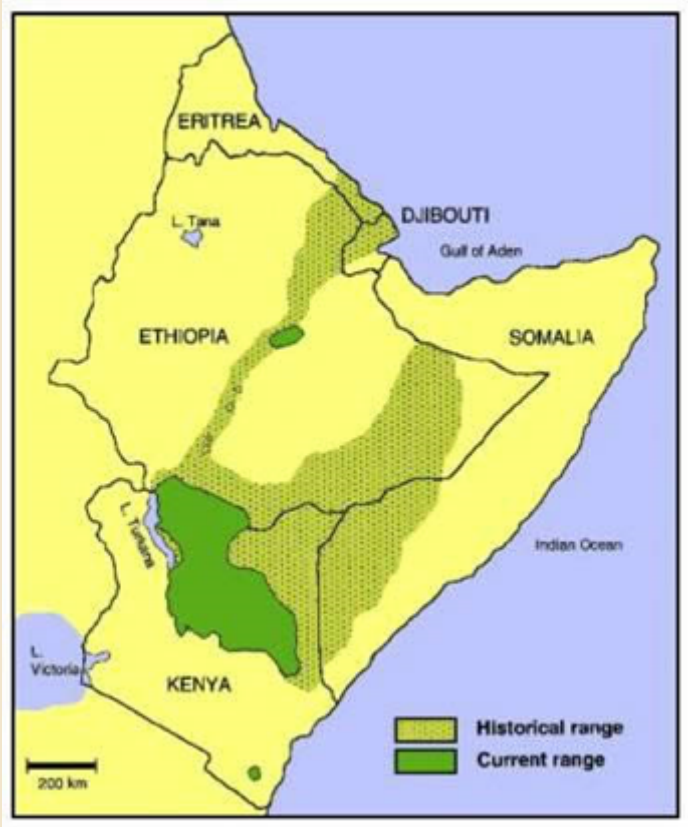
Samburu: Grevy's Zebra

Status

- Endangered by the IUCN/SSC Equid Specialist Group.
- Habitat: semi-arid scrublands/ plains
- Declined from 15,000 in the late 1970s to <3000. >2200 in Samburu where pop. is stable to increasing.

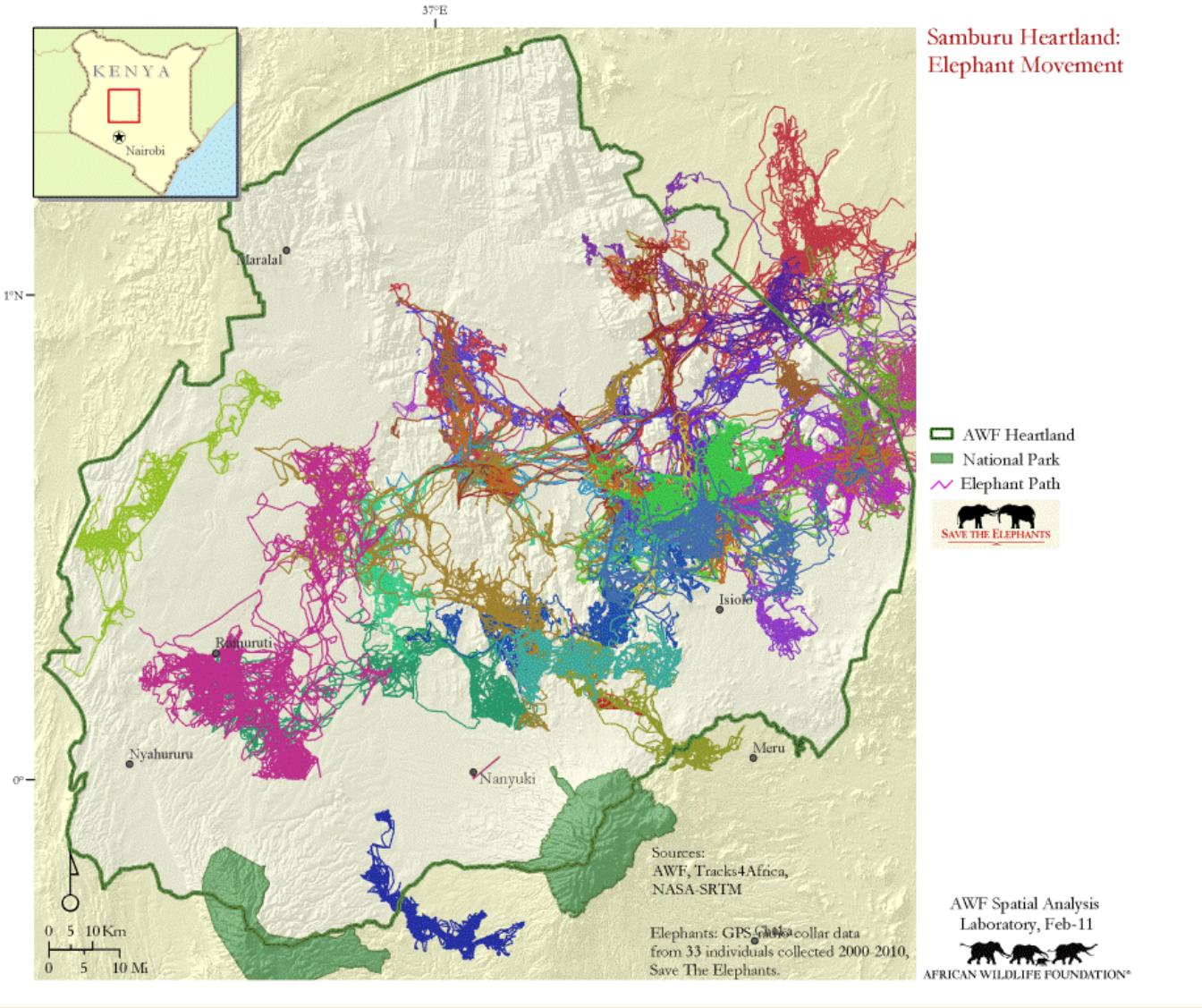
Threats

- Competition w/livestock for forage and water.
- Poaching for skins.
- Disease (anthrax)



Kingdon, 1979, 1997; Yalden et al., 1986

Data Assembly: Focal species



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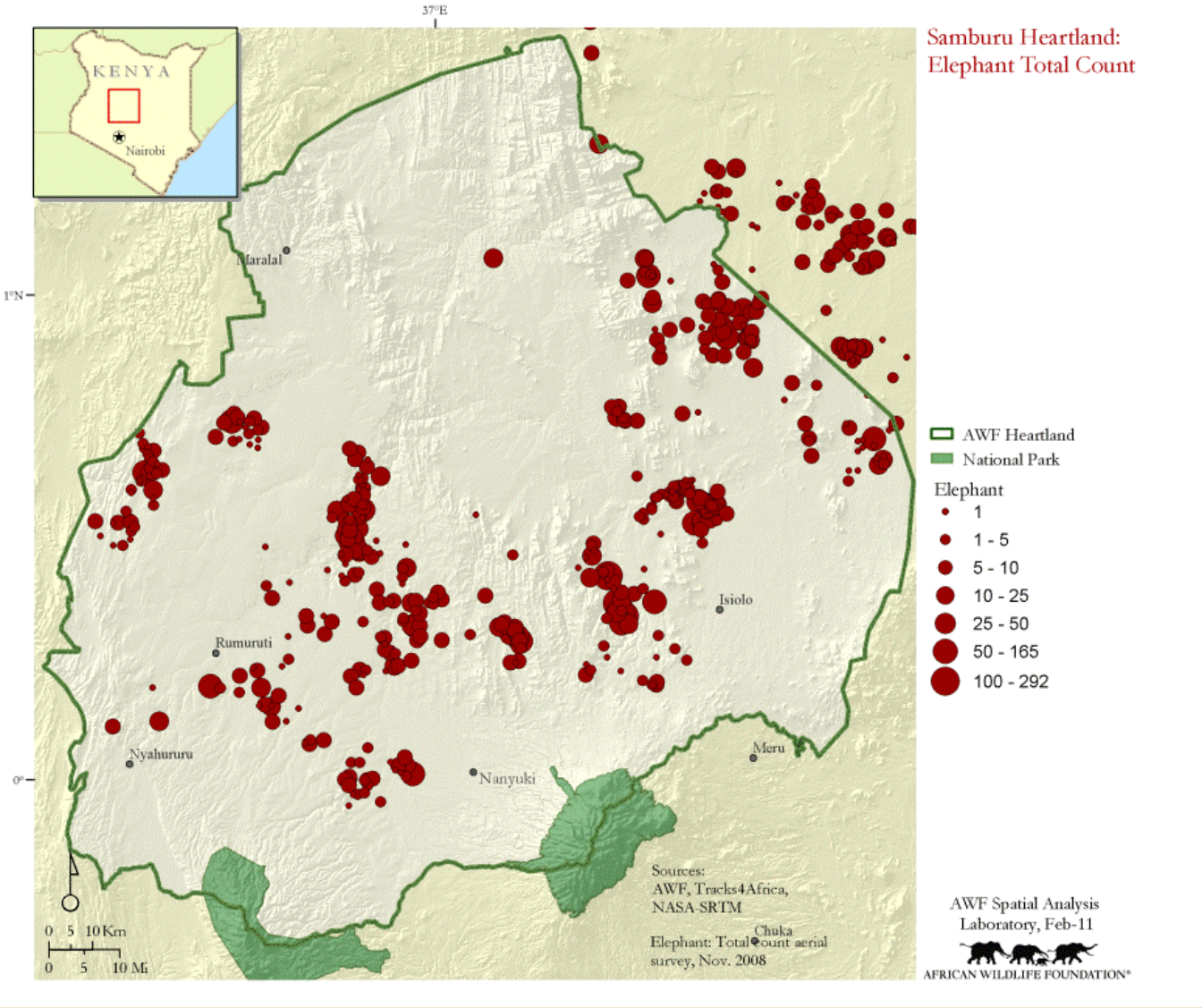
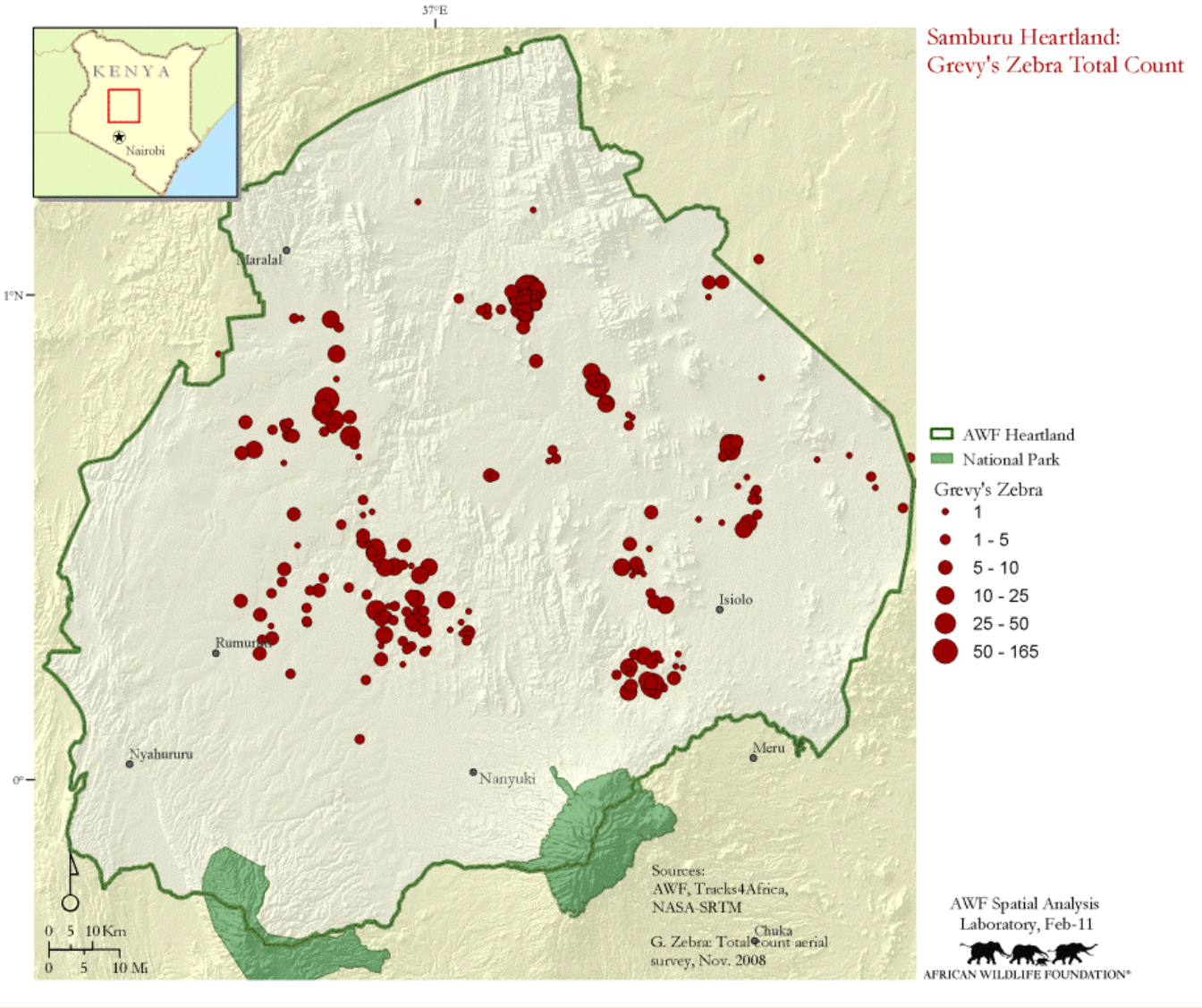


Data Assembly: Focal species



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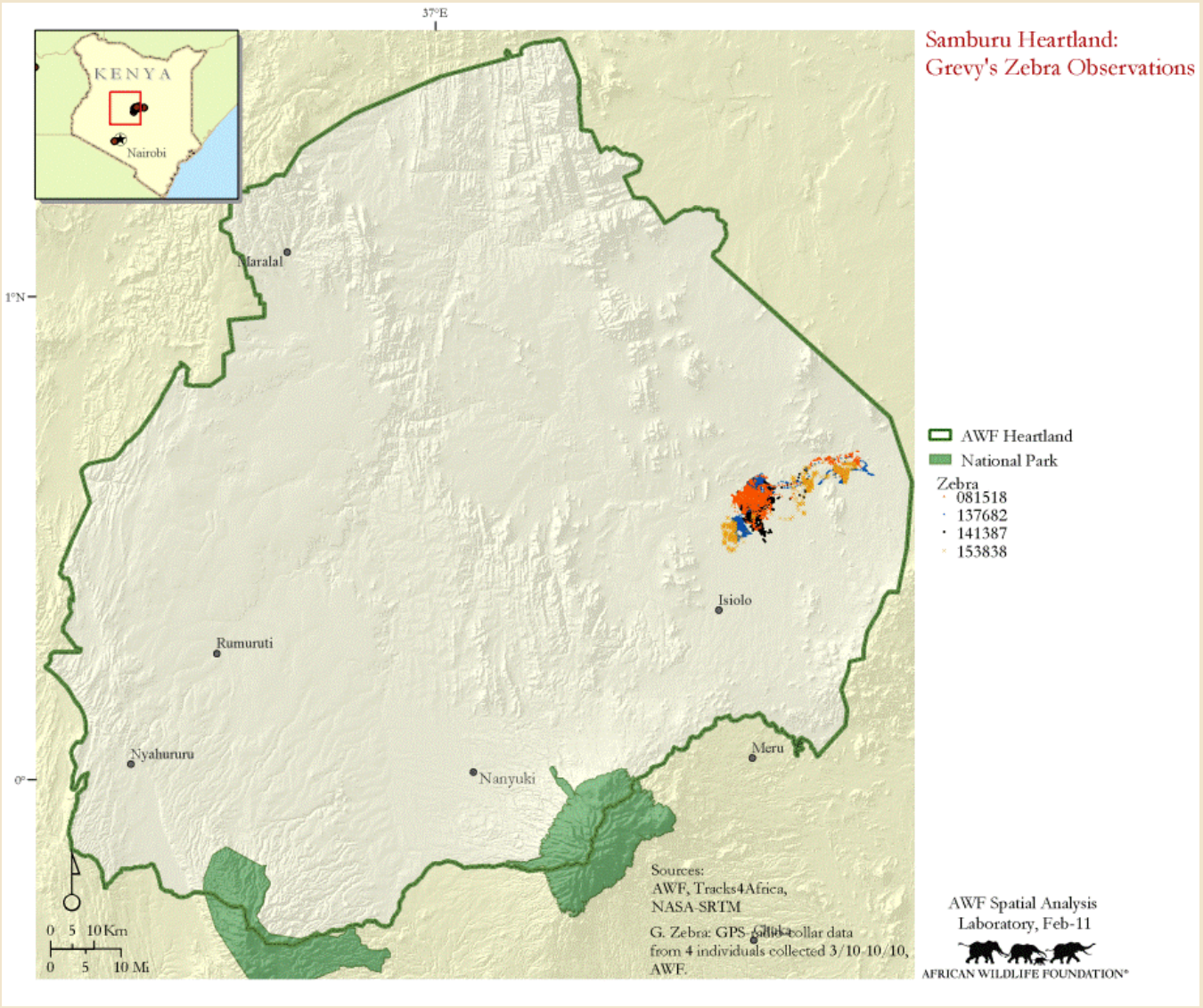
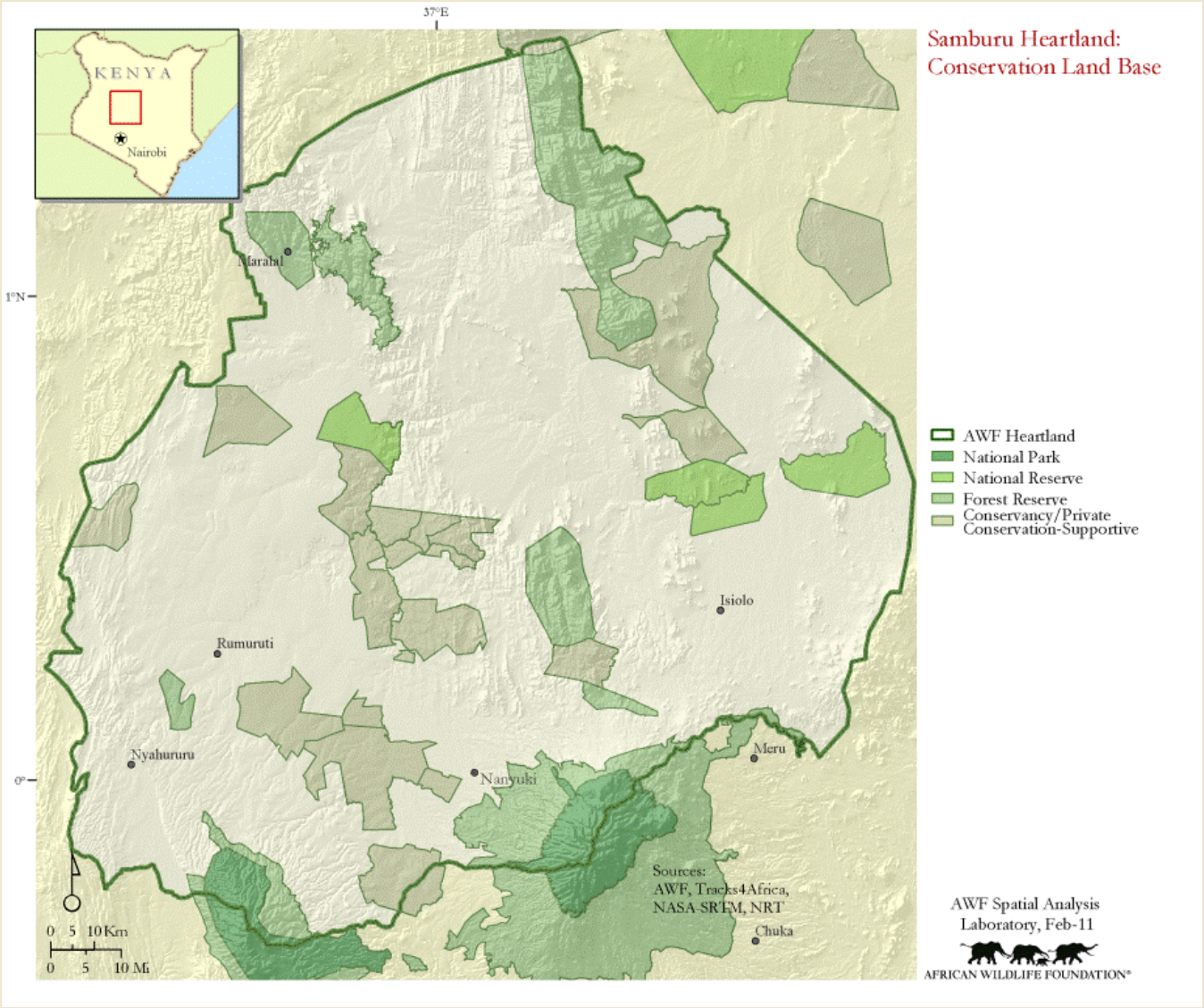


Data Assembly: Human Footprint



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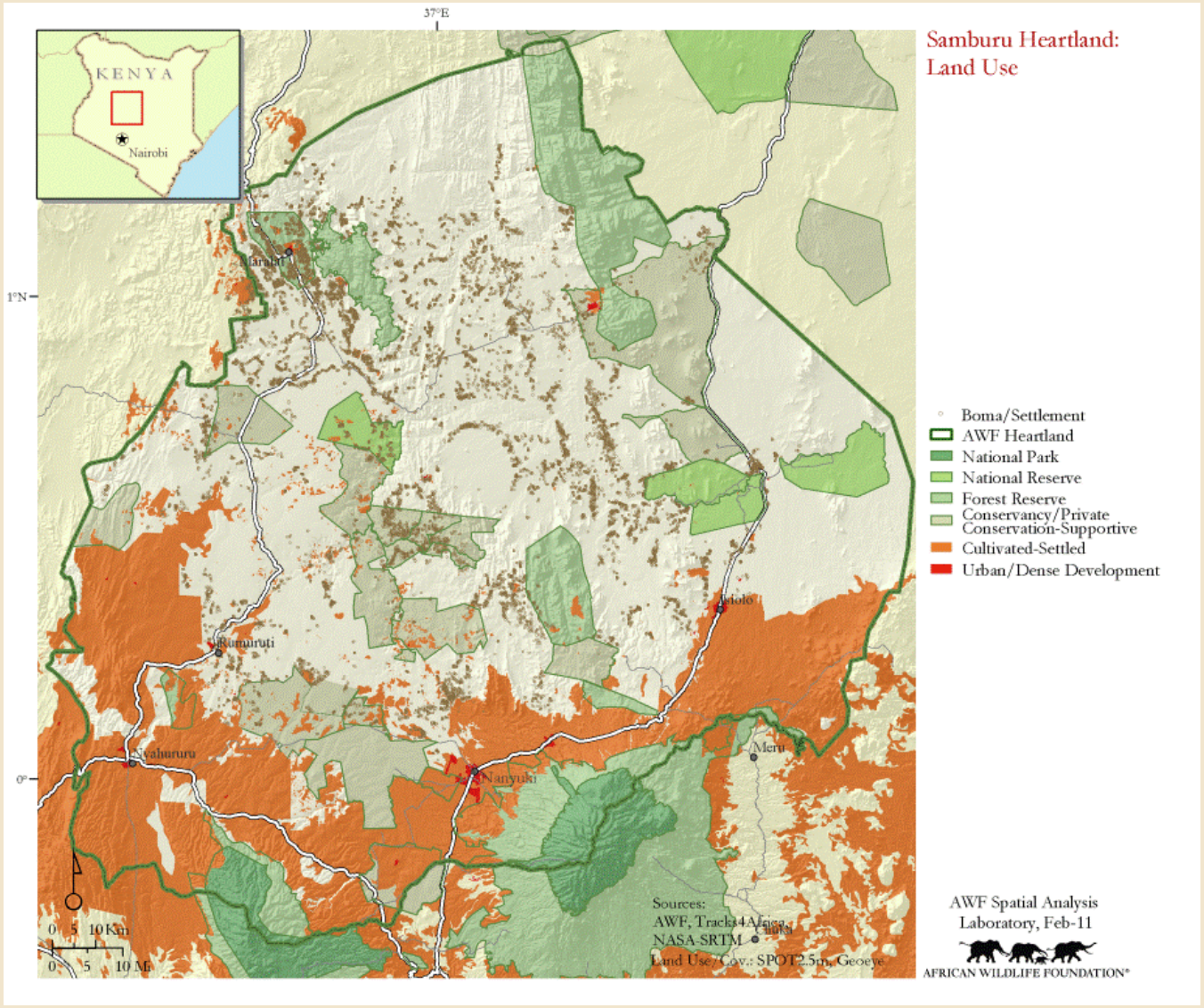
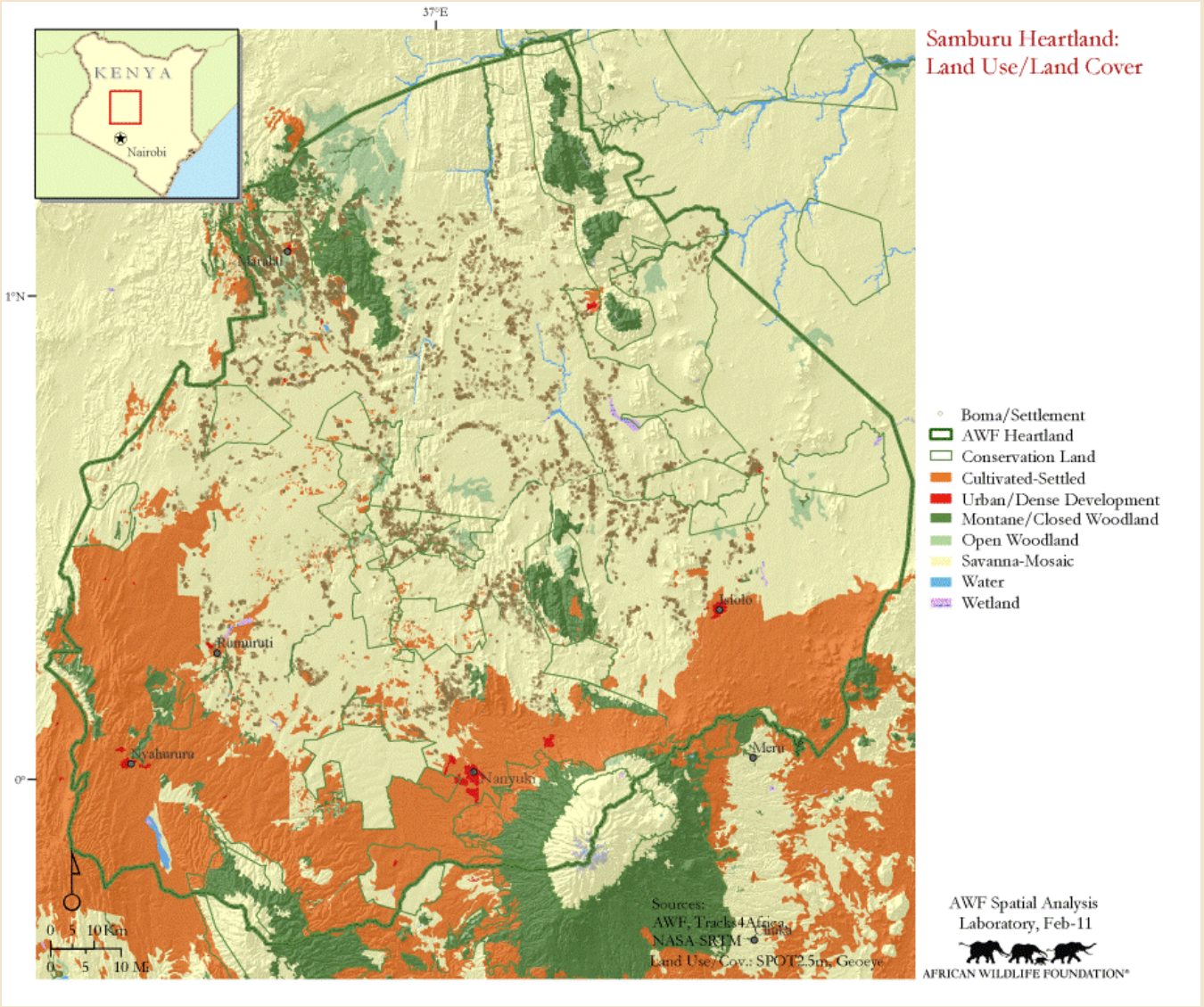
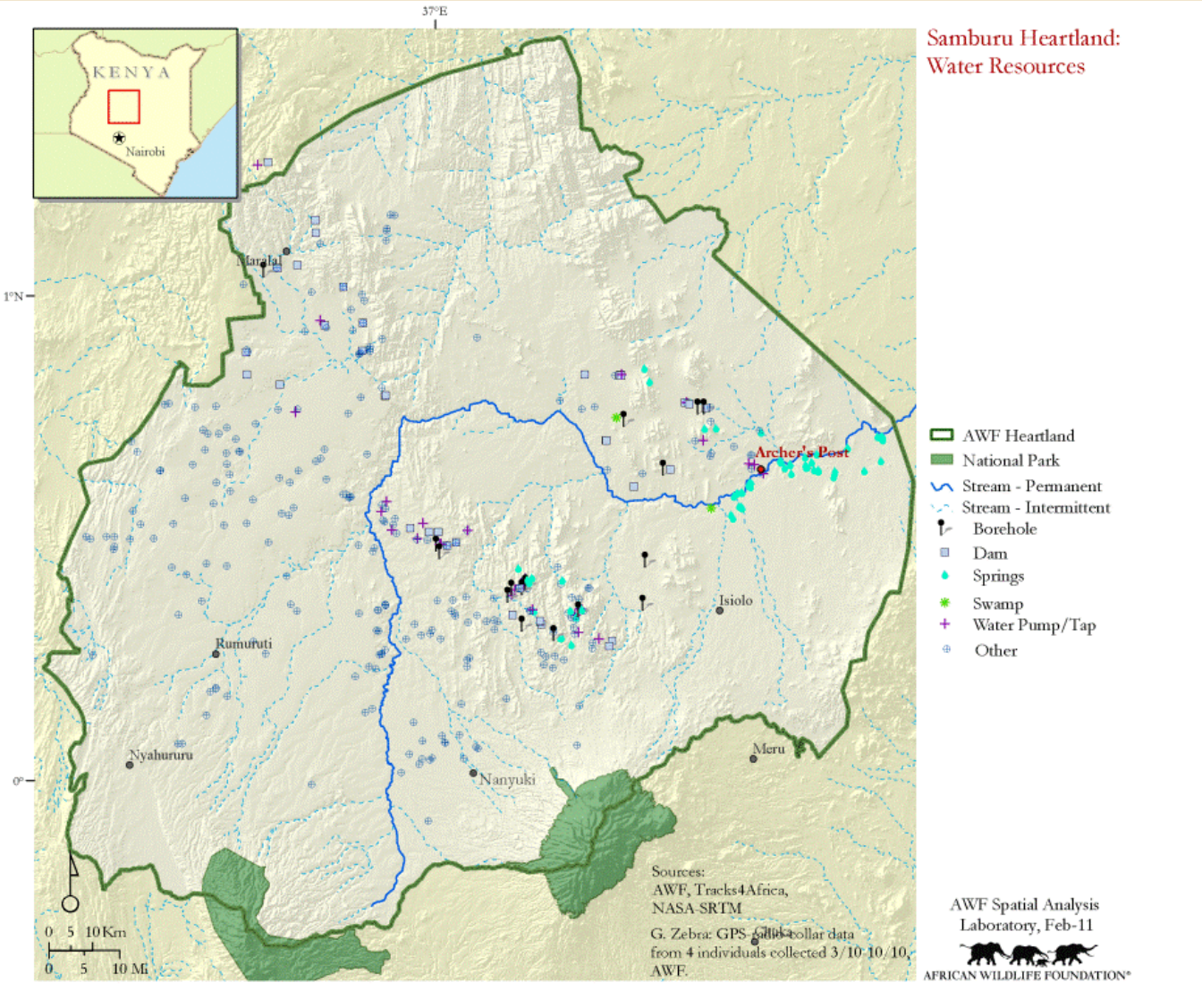


Data Assembly: Land Cover



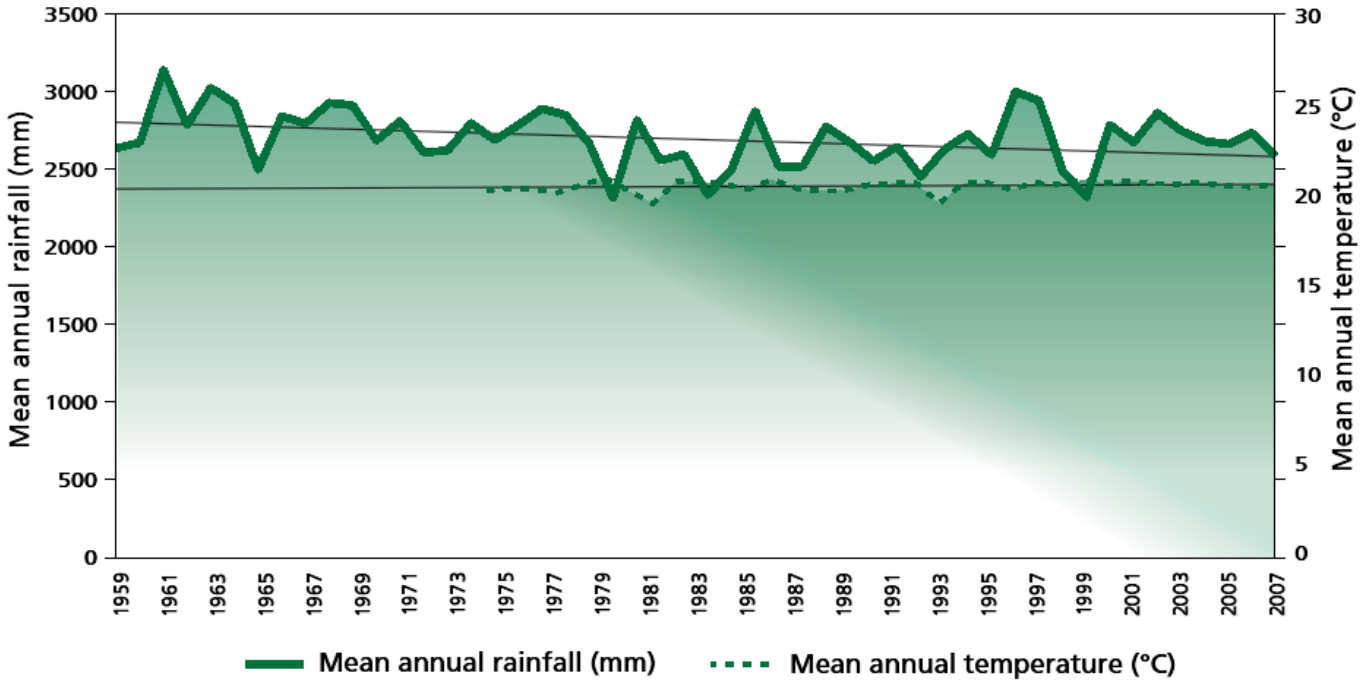
Data Assembly: Water Resources



Climatology

FIGURE 11(b)

Trends in mean annual rainfall and temperature variations in the Laikipia district between 1959 and 2007 shows a slight decline in rainfall amounts and appreciably rising temperatures.



(Ojwang' 2010)

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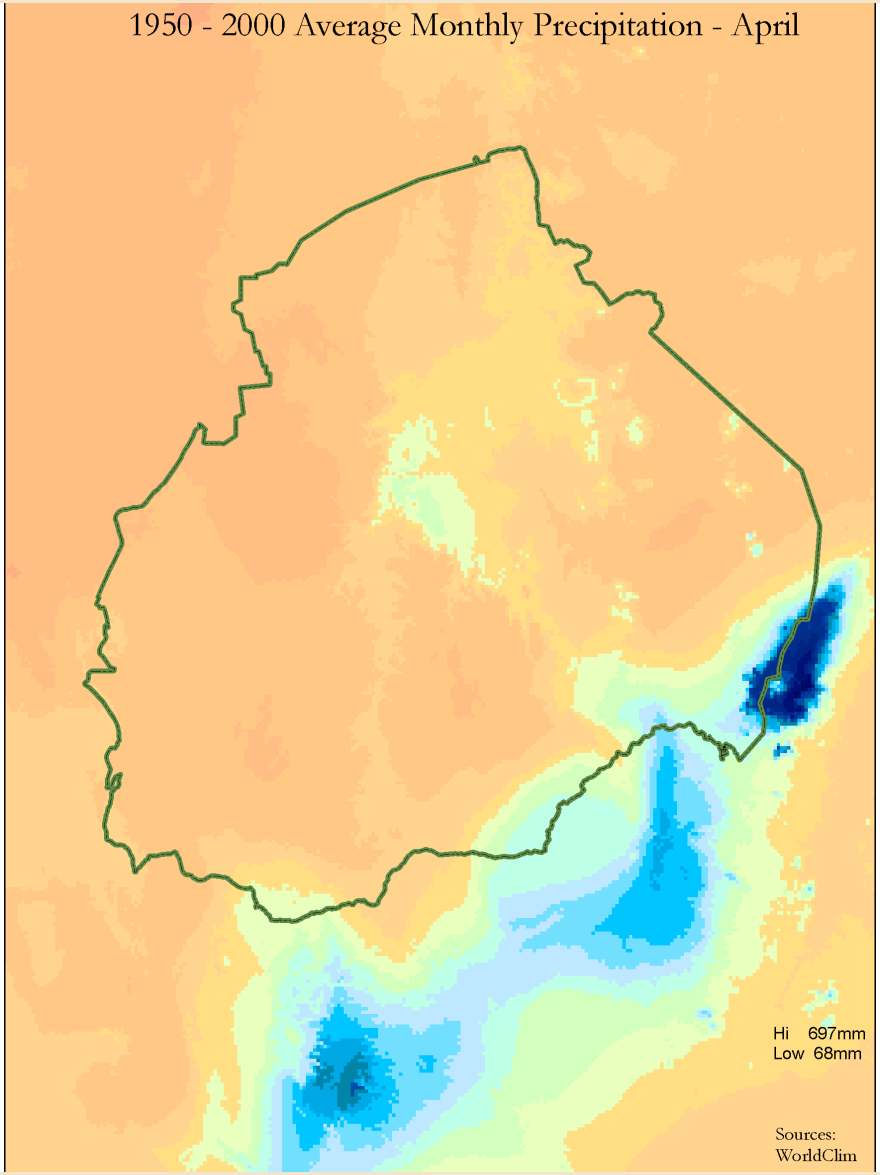
Climatology-Precipitation



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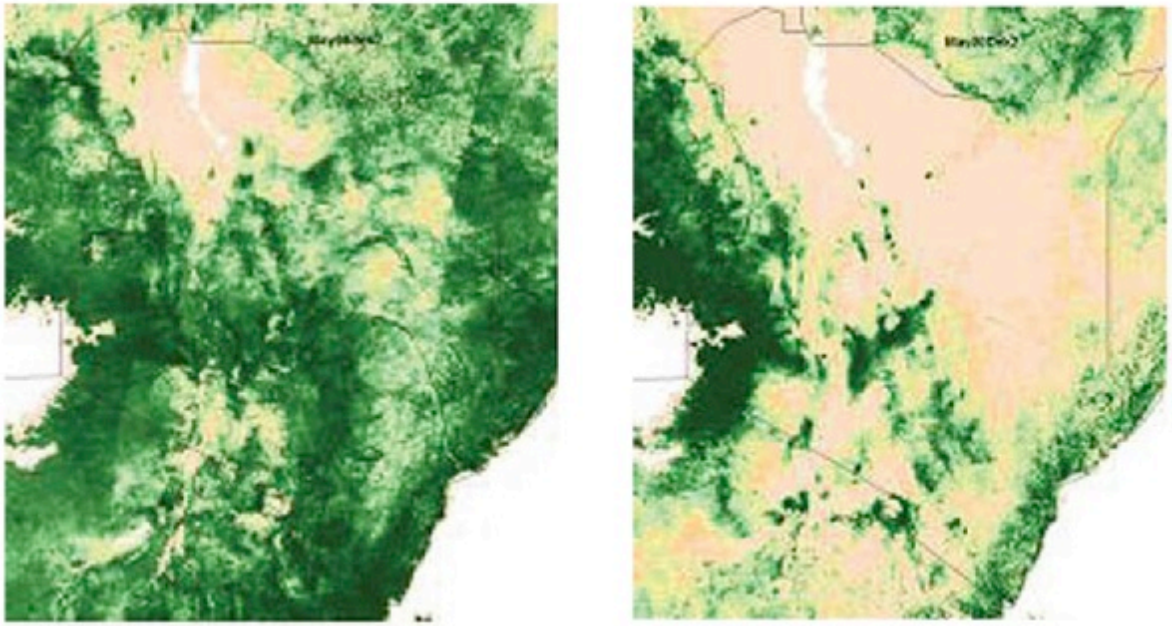
Climatology-Precipitation

FIGURE 2

Seasonal variability of climatic condition in Kenya, showing a drastic environmental change over the same period (May) of interval of two years (1998 - El Niño) [Left]) and 2000 drought) [Right]. *[Source: DRSRS NDVI dekadal plant biomass productivity analysis]*



(Ojwang' 2010)

Led to food extensive insecurity, conflict, famine.

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Climatology-Runoff

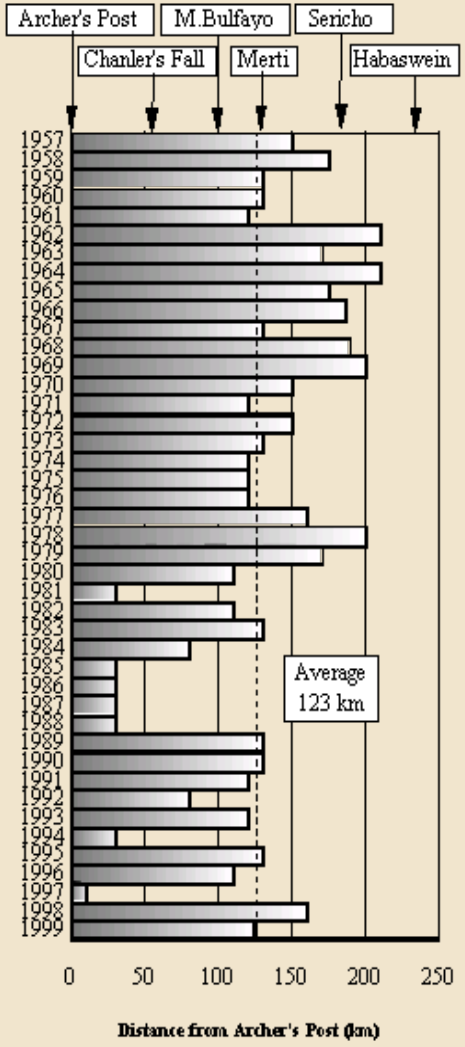

Figure 10.1 Dry-up Point of Ewaso Ng'iro North River

- **Declining flow since ‘70s**
  - **Dried up above Archers Post several times in ‘00s.**
  - **Abstraction. Predicted to rise over 200% to 2025.**

Source: ENNDA

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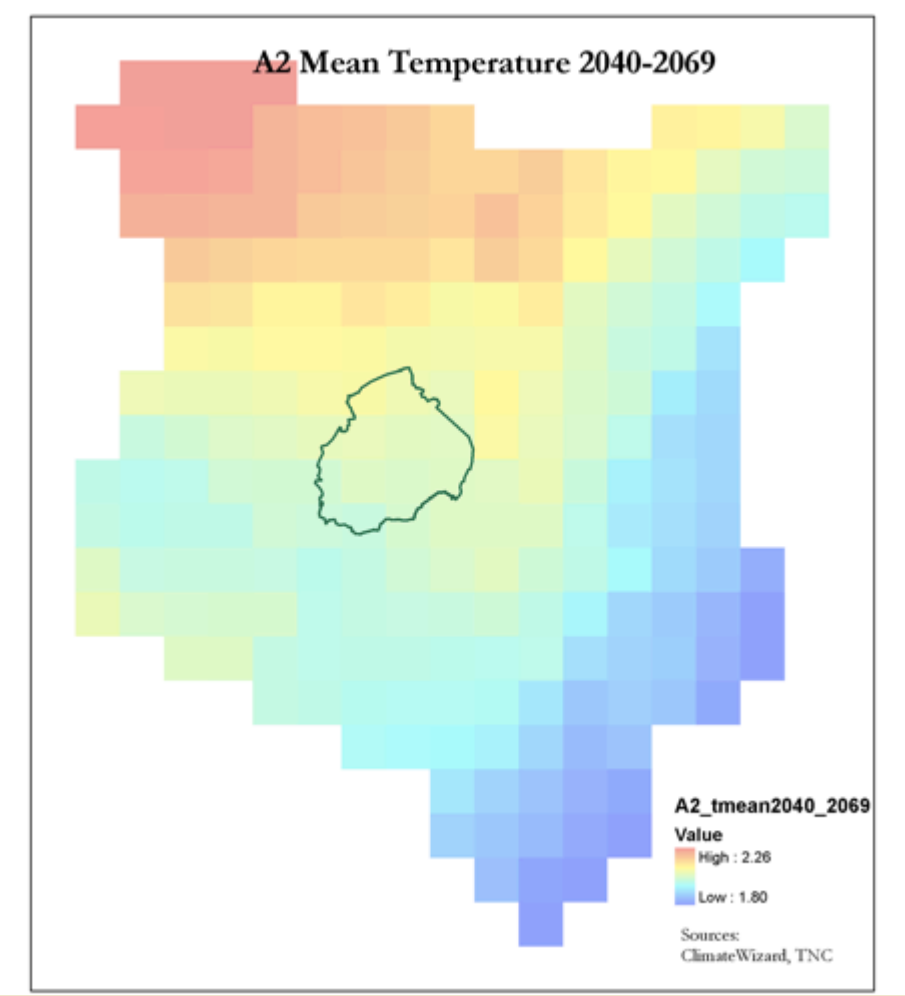
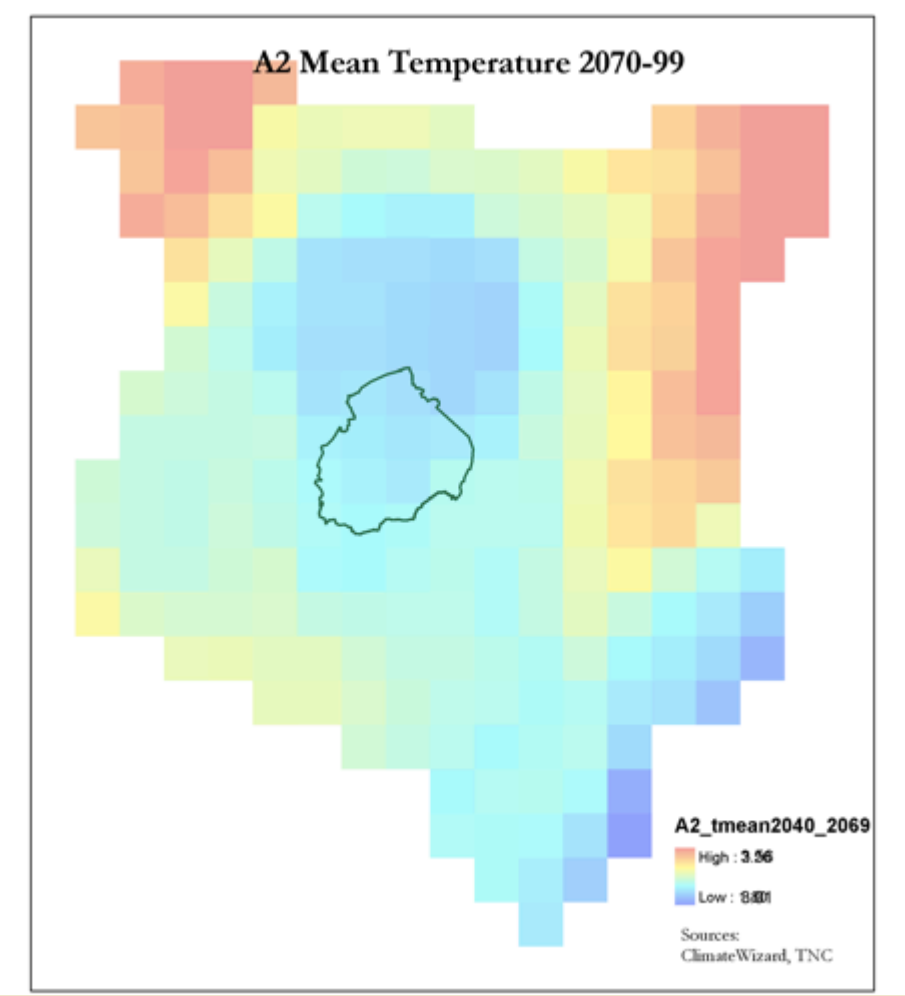
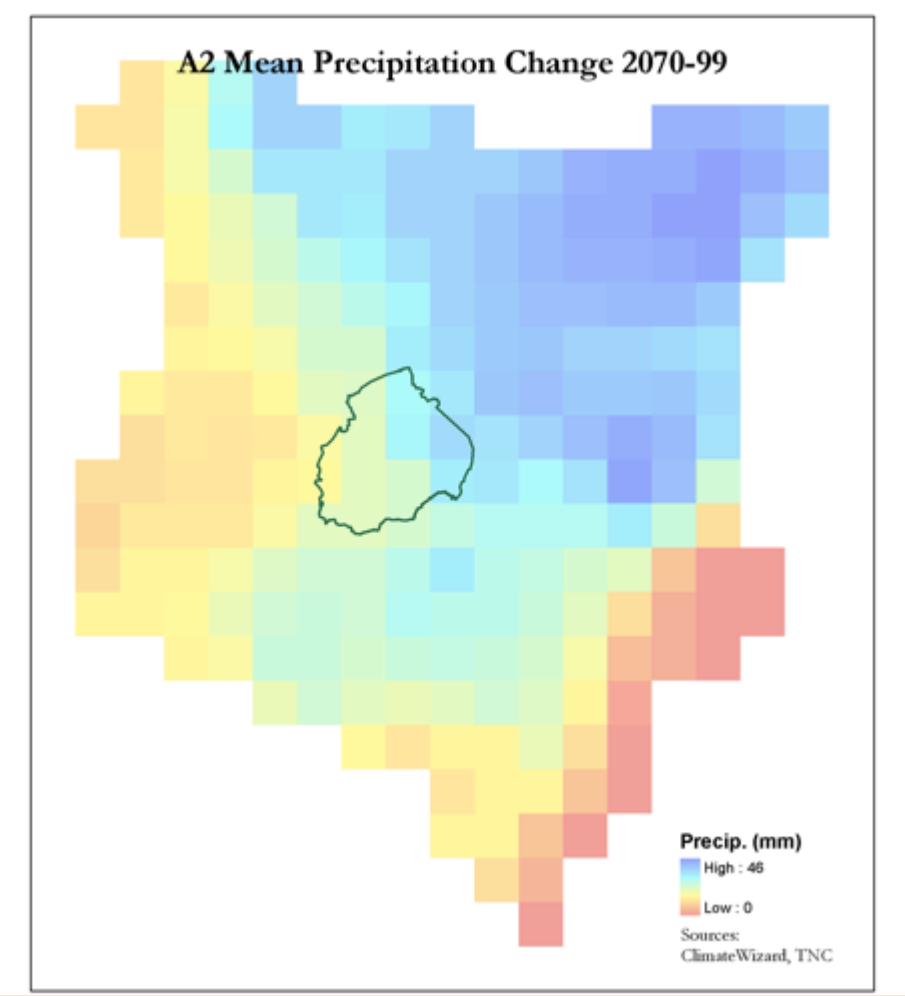
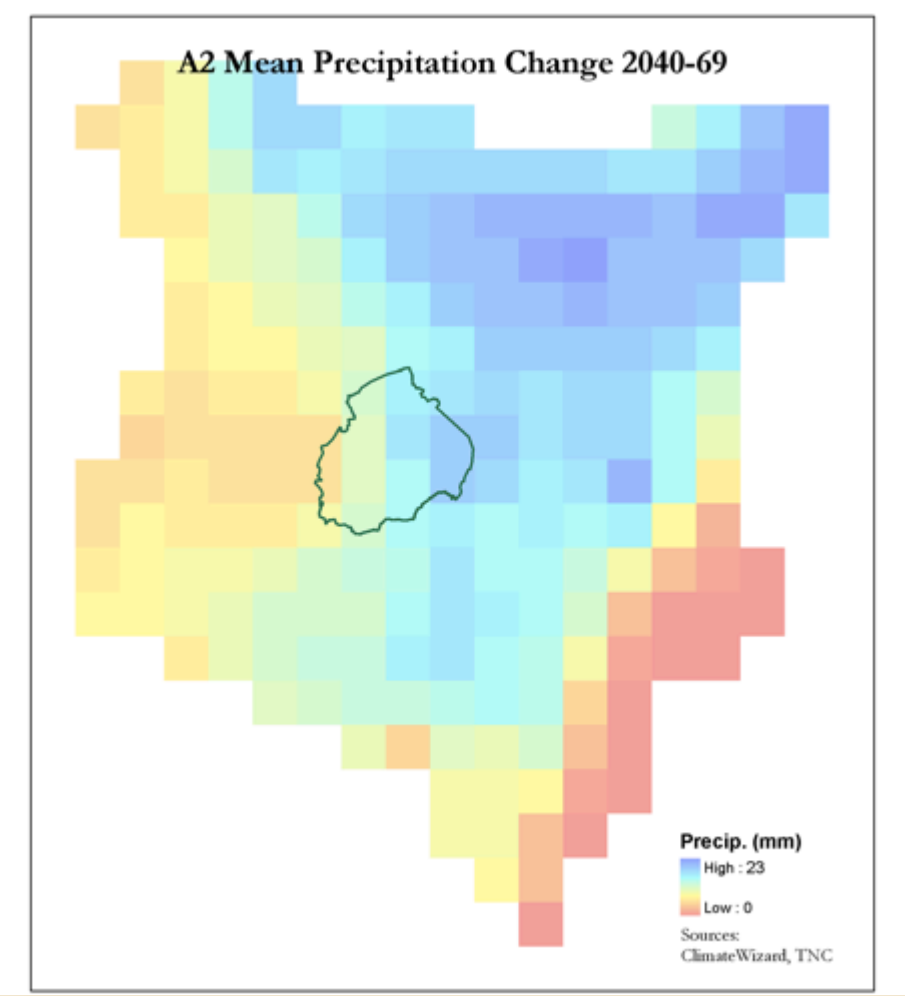
Climate Prediction: Temperature





Climate Prediction: Precipitation

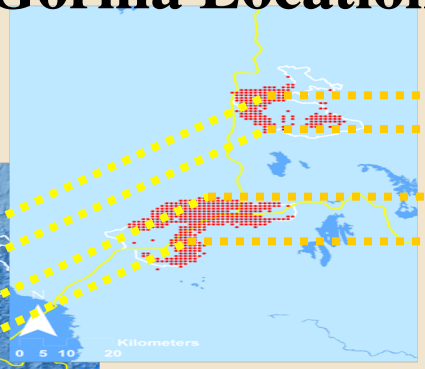




Samburu: Modeling Approach

- Dr. Jim Thorne, UC Davis providing guidance.
- Will use a similar SDM approach exploring a range of climate scenarios.
- Possibly simulate impact of management actions (e.g., water resources).

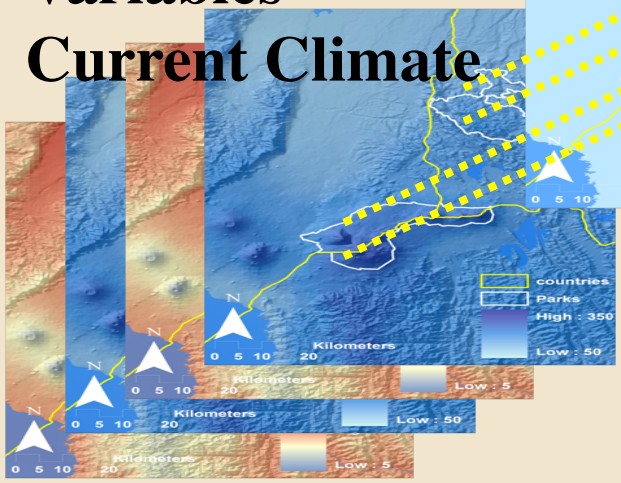
Gorilla Location



Model Input Data

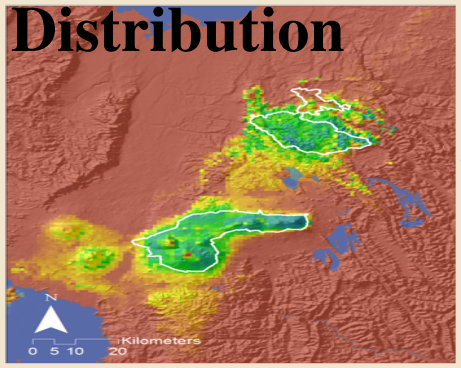
ID	X	Y	P1	P2	P3	…
1						
2						
3						
4						
…						

Predictor Variables Current Climate

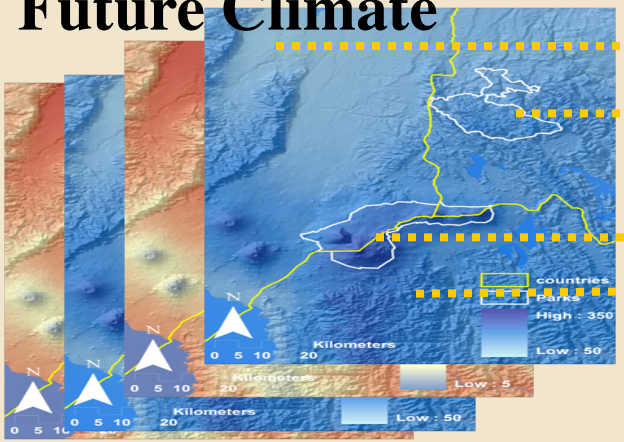


Species Distribution Modeling

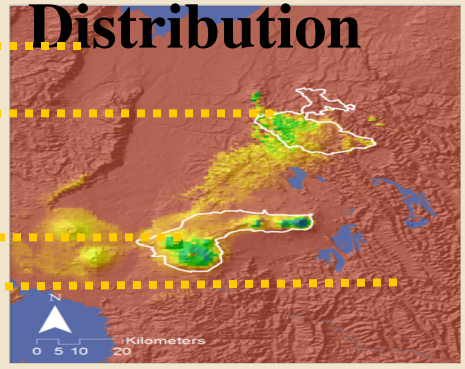
Current Distribution



Predictor Variables Future Climate

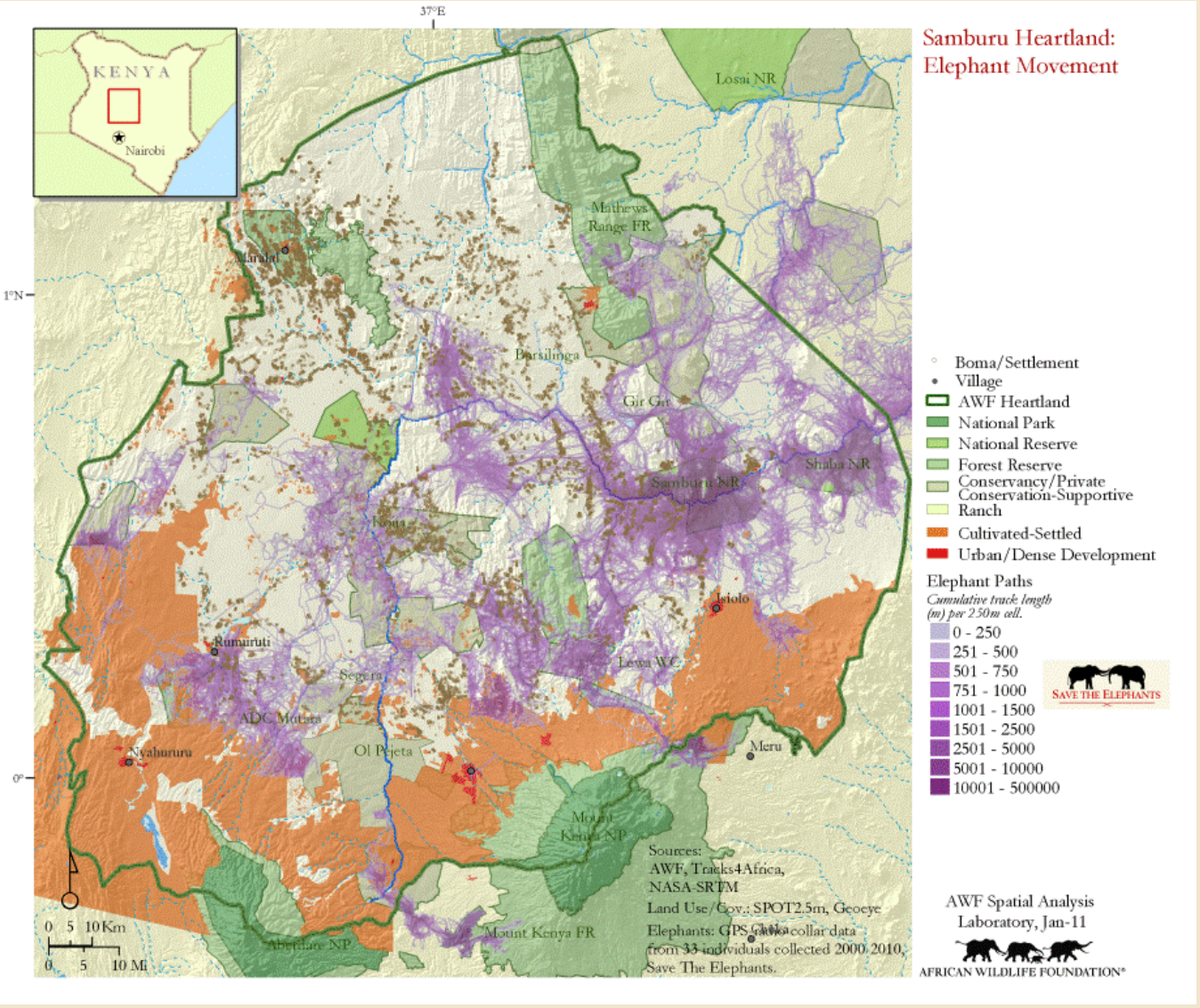


Future Distribution



Jim Thorne, UC Davis

Analysis: Corridors



1. Isolate core use areas
2. Model links using independent variables (topo, proximity to h2o)
3. Evaluate vs. mapped corridors
4. If effective model and climate-related variables are Significant>>model corridors future CC scenarios.

Samburu: Modeling Outcome

Next workshop!

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Research Questions

Biogeography of the focal species and threats

- Can identify fundamental controls on current focal species movement patterns, distribution, and density through GIS layers? If yes, and climate-related variables are significant, scenario SDMs could be valuable.

Climate change impact

- How might species respond to range of future climates scenarios?
- What climate related factors contribute (e.g., spatiotemporal water availability)?

Research Questions

Management implications

- How expand/reconfigure conservation land base for corridors/habitat protection to bolster resilience of focal species?
- Where can we improve ecosystem function/alter resource availability to boost resilience? Water storage?
- How will pastoralists/rangelands be affected?
- What should we monitor to guide CC-informed adaptive management?

Future Directions

- Landscape stakeholder meeting to interpret utility of analyses. Range from conservation community to water authorities.
- Consider climate impact on grazing resources/viability of pastoralist.
- Harness traditional knowledge on climate adaptations.
- Project future land use, population change. How might intersect with climate impacts?

Beyond Samburu?

Create vulnerability analysis/adaptation strategy development template using Samburu/Virunga experience for application in other landscapes.

Given lack of resources/data to conduct SDM based VA for every species/ landscape…need a light assessment framework.

- Expert-driven "trait" approach seems most viable option (e.g., Chin 2010). Conducted by landscape research/conservation community.
- Would rank species as high/moderate/low vulnerability…triage.
- High vulnerability species could be considered for more SDM VA.
- Trait assessment would inform monitoring programs.

Closing remarks

1. Use REDD+ to compliment adaptation strategy…find win-wins.
2. Tap traditional knowledge.

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THANK YOU!