First Range State Meeting of the Joint CMS-CITES African Carnivores Initiative (ACI)
5-8 November, Bonn, Germany

Survey and monitoring

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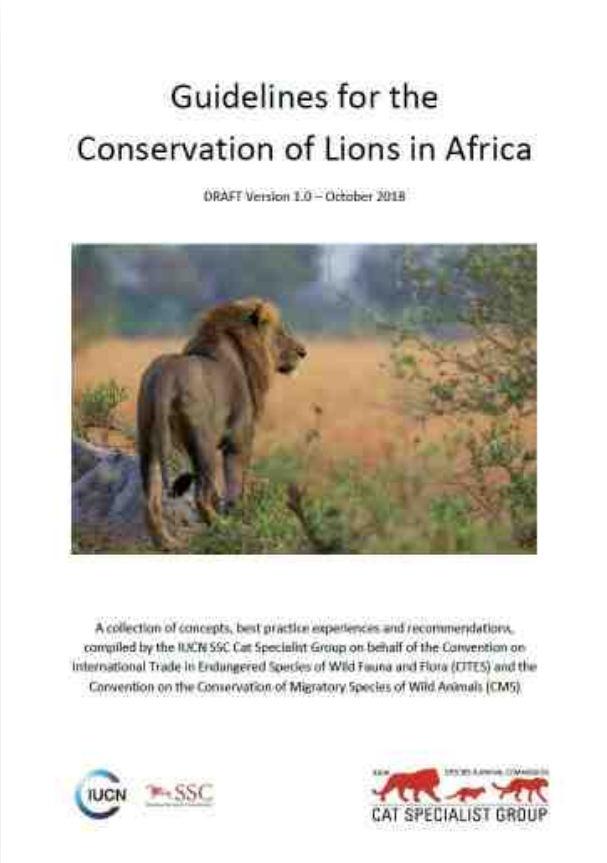
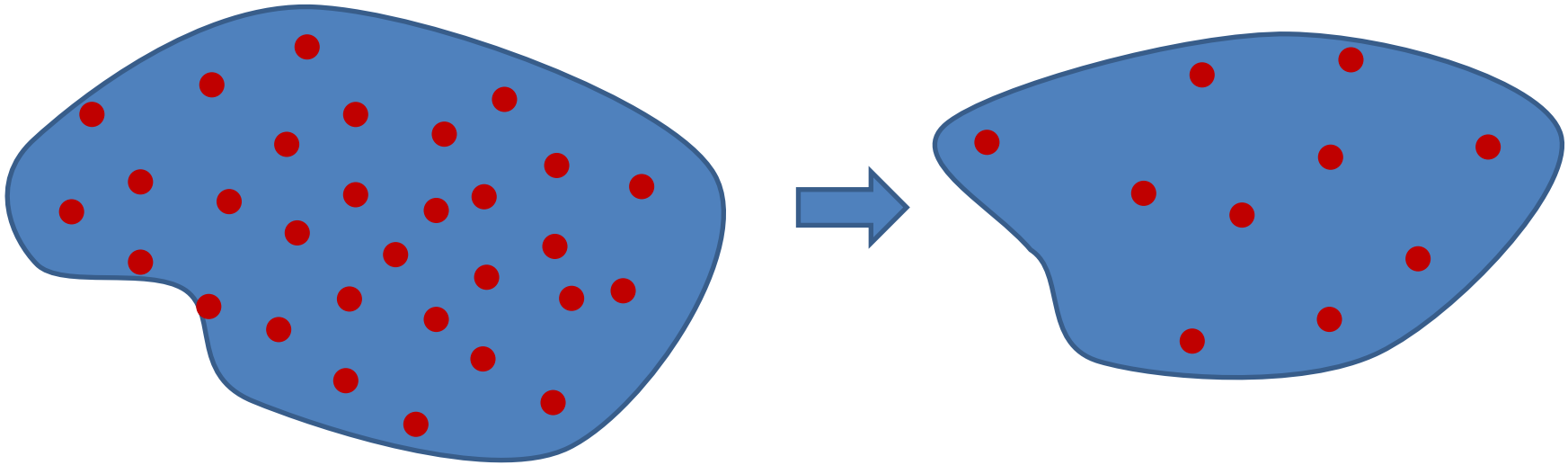


Chapter 5
Lion survey and monitoring methods

General aims for monitoring lions (and other large carnivores)

Reliably[1] assess:

- **Distribution**: areas occupied by lions, e.g. areas with/without reproduction
- **Abundance**: number of leopards per population or density in different habitats
- **Dynamic**: Changes in distribution and abundance, distinguish short-term fluctuations from long-term trends



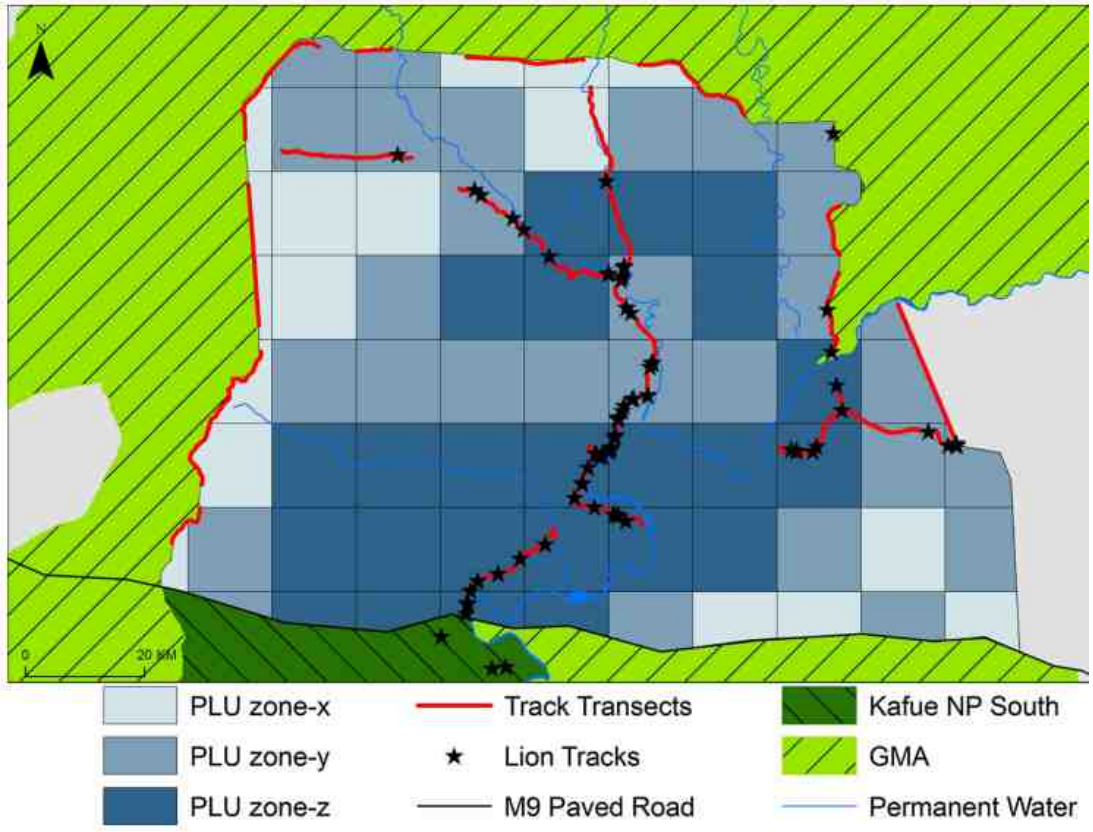
[1]By means of scientific robust methods allowing to estimate the confidence interval.

Methods presented in the GCLA

"Unlike other cats that are recognisable from their coat patterns and are thus universally best surveyed using camera trap surveys to derive spatially explicit mark recapture models, for lions there is not yet one standardised method used to estimate density or abundance. Researchers and managers have so far tended to favour approaches based on (1) individual recognition via facial features, (2) call-up or capture surveys, and (3) spoor surveys to estimate abundance, and occupancy modelling to estimate probability of occurrence" (GCLA, page 43).

→ *Described in the GCLA*

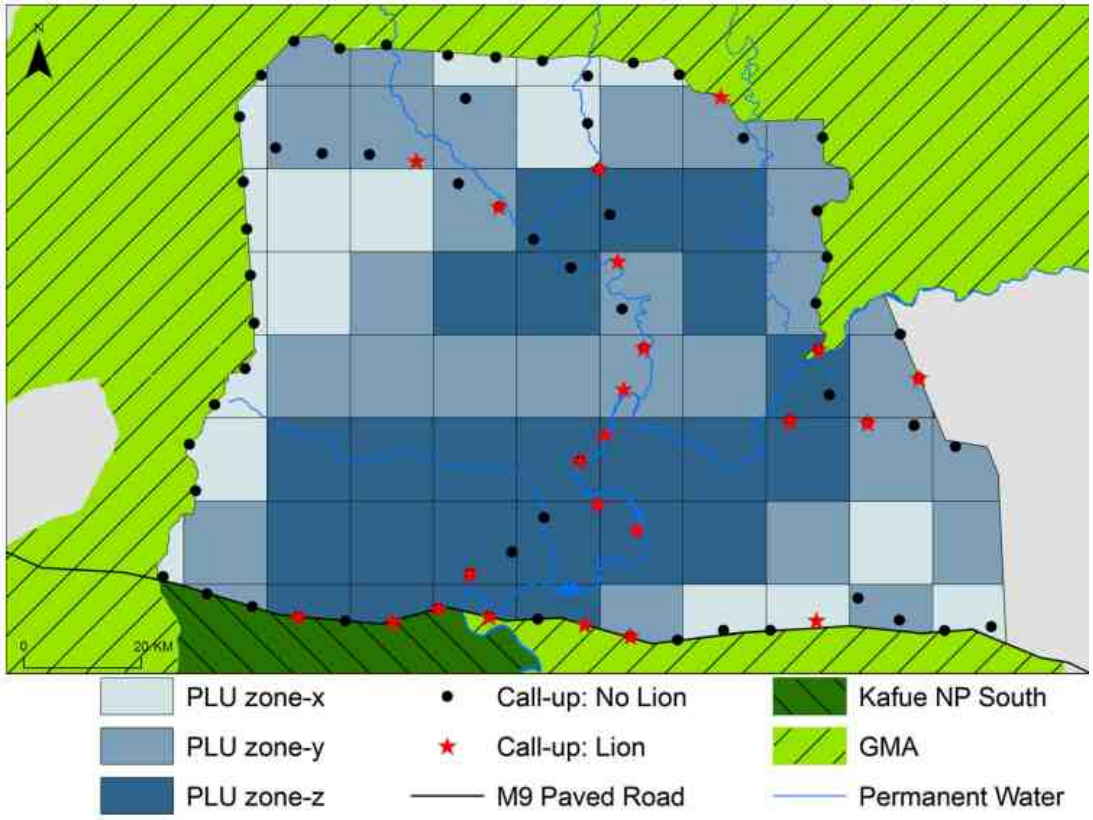
Methods presented in the GCLA – spoor survey



(Midlane et al. 2015)

- Large study area
- Divided into 15x15 km grid
- Spoor transects criteria:
  - Transect length
  - Even distribution of transects across study area
  - Dirt roads with good surface for spoor detection
  - Even representation of major habitat types
  - Even distribution across wetter and arid strata
- GPS + photo documentation of each spoor <24 h old
- Use CyberTracker of SMART
- Data analyses (e.g. “track density”) according to relevant papers

Methods presented in the GCLA – call-up survey



(Midlane et al. 2015)

- Large study area
- Calibration trial
- Call-up survey criteria:
  - Stations 10 km apart distributed across area
  - Recording of buffalo calf in distress…
  - Played at 3–4 stations/night for 1 hour per station from 18–01 h
- Record each group of lions (sex, age of each animal)
- Calculating estimates for groups with/without cubs according to relevant papers

Spatial concept for large-scale monitoring

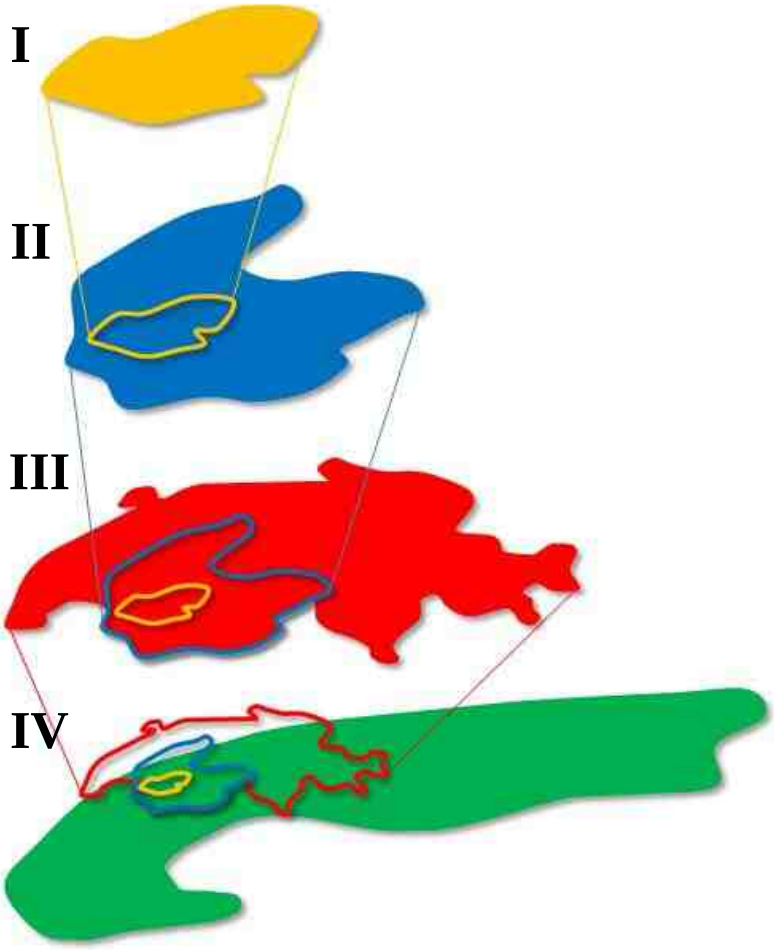
Challenges:

- Scientific robust methods are expensive and cannot be applied over entire distribution range or whole country;
- Most study areas ("reference areas") are in prime habitat and/or protected areas, hence typically in areas with best lion densities;
- Simple extrapolation (e.g. by means of habitat model) lead generally to overestimation of total population (often simplistic assumptions);

➢ Question: How can we survey/monitor very large areas (whole country) with acceptable results?

➢ "Stratified monitoring": Several spatial levels with increasingly reliable approaches (from "cheap and crude" to "scientific robust"), calibration and extrapolation.

Spatial concept for large-scale monitoring



Reference area:

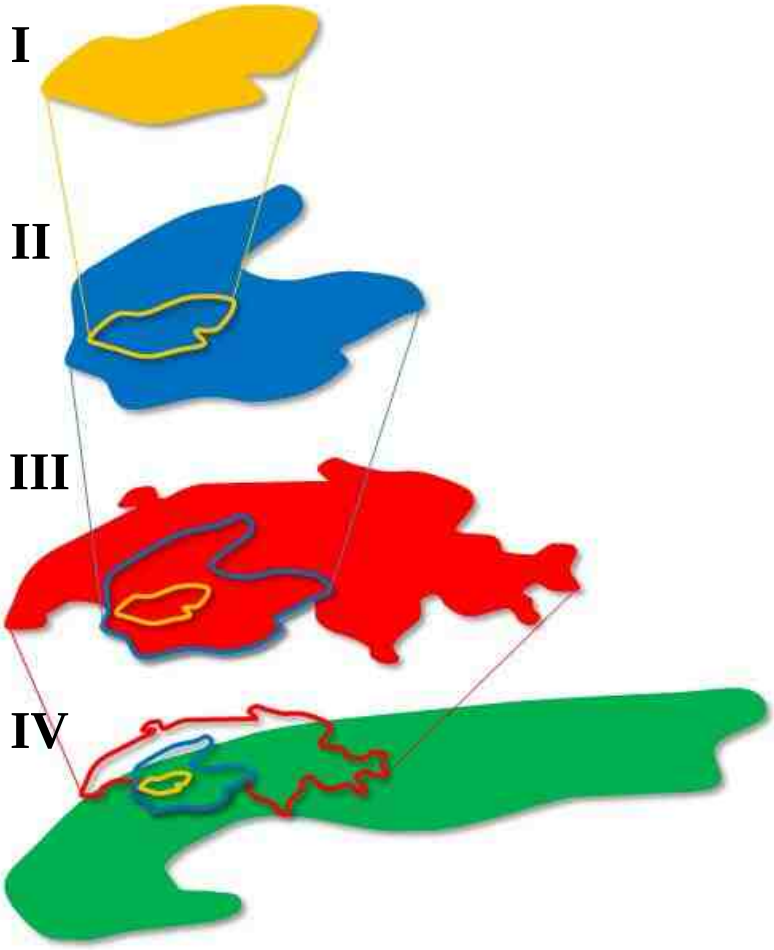
"Expensive", but reliable method to estimate abundance/density, confidence interval and (when repeated) trend.

Calibration ↓ ↑ Extrapolation

Large area (distribution range):

"Cheap", but crude method ("readily available data") that can be collected with little effort but have limited validity.

Spatial concept for large-scale monitoring



Robustness and significance

Spatial scale (% of population)

Steps towards a comprehensive monitoring of lions

1. Establish a representative number of “reference areas” in important habitats/sites (PAs, hunting concessions) in each Range country
2. Establish a system to collect “readily available” information throughout the known distribution range (reproduction, mortalities, attacks, etc.)
3. Establish a scheme to compile presence/absence information across the whole country
4. Establish a concept to join information for the entire (potential) distribution range (continent)

- Common concepts and methodology, adapted in each country to national management system
- Shared depository for information → Lion Data Base
- Standardised analysis and interpretation
- A monitoring-handbook for lions?

Thank you!