Cross boundary migration corridors and habitat suitability for white eared kob in the Ethiopian-South Sudan landscape

Cherie Enawgaw, University of Oslo

Progress Report

Executive Summary

Migratory mammals provide unique eyeglasses of cultural, ecological, and economic importance in the world. However, their population status has been sharply declining in number and range during the last few decades due to poaching, habitat destruction and civil war. Over a million white eared Kobs migrates between Ethiopia and Southern Sudan border and this is now the world's second largest migration next to the famous wildebeest migration in the Serengeti-Maasai Mara landscape. However, the expanding adverse human activities, like settlement, deforestation, mechanized farming, bushmeat hunting and infrastructure can potentially disrupt this unique migration. This project will investigate the impact of bushmeat hunting, migration corridors, habitat requirements and driving environmental and anthropogenic variables that urge the annual migrations of white eared Kob with the aim of recommending scientifically based management intervention for long lasting survival of the great migration in the landscape. Migration pattern and corridors will be determined from 45 individuals fitted with satellite collars in March 2013 and further ground truthing activities based on ground truthing of randomly selected and accessible ranges of both species. From the GPS fixes of all individuals the minimum convex polygon so far is about 114,434 km2.

Major Achievements

Objectives	Progress	Next plan
To know movement pattern and migration routes from satellite collars	• Ground data on preferred migration route of the animals collected • 45 satellite collars (20 owned by EWCA and 25 by HoAREC/N), GPS locations was downloaded and analyzed to identify core areas for ground truthing. • We used GPS coordinates in determining the distance moved in a given time to understand the daily and seasonal patterns of movement in relation to various bioclimatic variables.	• Compile data from ground trothing work • Satellite image analysis • manuscript on migration pattern of the kobs in relation to environmental factors
To know habitat preference of white eared kob and breeding ground	• Lek sites identified and recorded • Core habitat were identified based GPS recordings downloaded from collard animals • For satellite image interpretations, habitat classes were sampled and recorded by GPS and pictures of representative habitat was taken • We assessed habitat preference of white eared kob based on data from ground survey to document seasonal trends of white eared kob migration, breeding behavior and direct information on habitat preference for larger sample size. • Whenever we encounter groups of animals we focus on the first 15 animals for the type of habitat, Lek group, age and sex of the animal to better understand the breeding ecology.	• Continue data collection • Develop habitat suitability map • analyze core area from GPS readings images and pictures of representative habitat
Ground truthing on identified corridors	• Key migration corridors identified based on GPS readings • Ground truthing conducted for accessible migration routes • Additional data collected from local residents	Continues socioeconomic data collection in relation to migration and factors influencing them
To know Environmental factors driving the long distance migration	• Variables develop habitat models downloaded and collected.	Data analysis and develop habitat models
Habitat suitability modelling	• GPS locations from the collared animals and a set of random locations were collected to reflect habitat availability • Dry season data collected based on transect sample • Lek site and feeding activities recorded. However monthly data collection was not possible due to security problems,	• Continue seasonal data collection • Develop the habitat suitability map by using generalised logistic mixed models. • Transfer the model to a map using ArcGIS 10 Spatial analyst raster calculator.

|		• Establish potential corridors in between fragmented populations from source populations by using spatial analyst tool from cost values derived from habitat suitability models
Vegetation mapping and land-use cover change	• Data on current landuse collected as an input for developing habitat suitability maps. • \for satellite image interpretations, habitat classes were sampled and recorded by GPS.	• by using maximum likelihood classification algorithm in ERDAS Imagine from 2 meter resolution SPOT satellite image retrieved in 2013 • Drive the degree of slope and elevation using Surface analysis of GIS from Digital Elevation Model (DEM) in ArcGIS 10 Spatial Analyst.
To understand the extent and trend of bushmeat hunting in Gambella **(Recently added objective)**	• Bushmeat hunting questionnaires modified based on preliminary socioeconomic survey findings because UCT tested but did not work become of difficulty to count activities from pictures • Focus group discussion was conducted with 15 village representatives • 120 individuals were interviewed following predetermined questioners • Checklist for focus group discussion conducted local interviewer hired and trained • Focus group discussion was followed by community mapping to clearly understand sites for HWC, wildlife corridors, different resource use area around Gambella National park. • To publish research findings Data analysis and writing scientific articles	• Continue focus group discussion and interview • Data analysis and publication

Note:
- From the 41 collared individuals of White eared kob, 23 of them were migratory (16 females and 7 males), 14 were resident animals (7 females and 7 males) and 5 unknown individuals stayed only for days between 18 and 66 days under surveillance. GPS were programed to take fixes every 4 hrs. For some individuals and 8 hrs. for the rest. Considering GPS fixes of all individuals, the minimum convex polygon is about 114,434 km2 areas, a study area with 20km buffer zone on this MCP will be around 140,857 km2 area (Fig 1). The area is too big to get a high resolution satellite image to do a vegetation analysis, though we may try to find it in the future.

Annexes

Annex 1. List of collars, GPS fixes and migration

Table 1 id	GPS fixes_Ethiopia	GPS fixes_sudan	GPS fixes total	sex	Migration behaviour
SAT689	219	665	884	f	mig
SAT699	119	920	1039	m	mig
SAT694	333	718	1051	f	mig
SAT702	226	872	1098	m	mig
SAT693	337	779	1116	f	mig
SAT692	234	921	1155	f	mig
SAT698	222	935	1157	m	mig
SAT691	239	964	1203	f	mig
SAT687	157	1140	1297	f	mig
SAT695	242	1144	1386	m	mig
SAT690	310	1279	1589	f	mig
SAT737	63	995	1058	m	mig
SAT735	59	1041	1100	m	mig
SAT727	236	961	1197	f	mig
SAT722	160	1436	1596	f	mig
SAT709	156	1574	1730	f	mig
SAT712	150	1654	1804	f	mig
SAT734	670	1395	2065	m	mig
SAT728	357	1759	2116	f	mig

Annex 2. Maps showing study area, core distribution area,
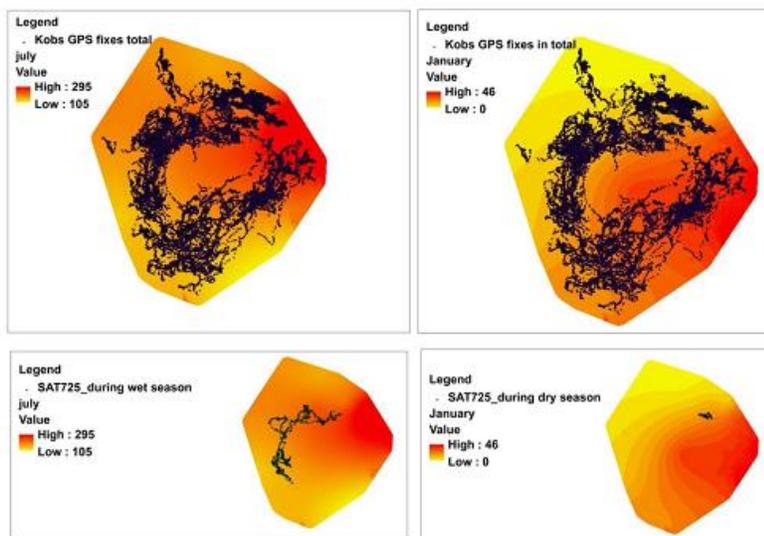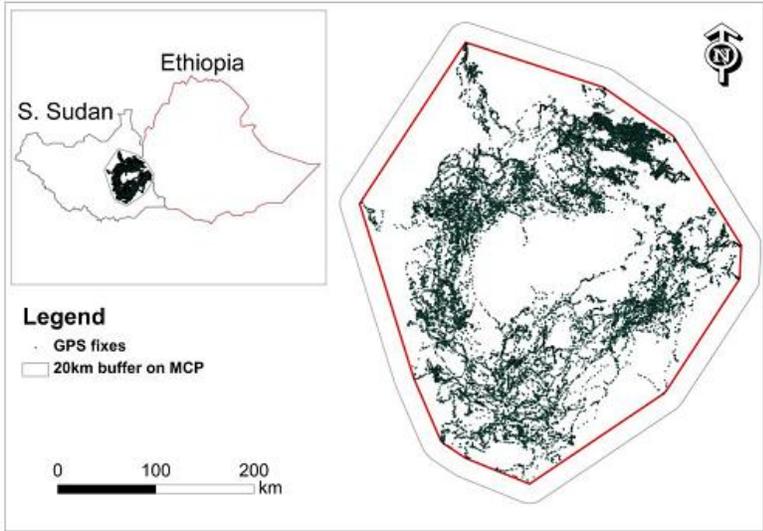
Annex 3. Some pictures taken in the field

Kod dry season range but over flooded in wet season

Cooking wildlife meet, Gir village

Community mapping drawing HWC area, corridors and other landus

Focus group Discussion

Livestock grazing around the corridor

The way to dry the skin

Kob skin and other wildlife products were common all villages

Felata pastoralist. A new challenge for the park

Fishing one of the main source of meet

Kobs become very cautious because of horrible poaching.

Ethiopia/South Sudan border Kob meet was common