Monthly report of GPS satellite tagged Angolan giraffe (*Giraffa giraffa angolensis*) in northwest Namibia

April 2020

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In July 2019, Giraffe Conservation Foundation (GCF) and the Skeleton Coast Iona (SCIONA) project fitted seven Angolan giraffe (*Giraffa giraffa angolensis*) across northwest Namibia with solar-powered GPS satellite transmitters (ossi-units). The ossi-units were designed by Savannah Tracking Kenya with support from GCF and are attached to a giraffe ossicone. One young bull and six cows were tagged. Immobilisation of giraffe and fitting of the ossi-units were conducted by a Namibian registered veterinarian under the careful ethical consideration of GCF who have fitted more than 200 units/collars across Africa. Each unit transmits hourly location and temperature data by satellite. The data is then analysed to assess giraffe's habitat use and spatial ecology in the arid to hyper-arid Kunene Region.

This report provides information on preliminary data from 1-30 April 2020 and a brief comparison with last months findings. Only five ossi-units currently transmit data as two stopped working in January (KT IRI2016-3223) and March (Jackson IRI2016-3141), respectively. KT's unit was recovered from the field but damaged as described in the February 2020 report. Due to a countrywide lockdown no field work was conducted in April to try and find the giraffe (Jackson IRI2016-3141) or the ossi-unit. However, a collar diagnostic was conducted and described below. All other five remaining ossi-units successfully transmitted data in April 2020 without any gaps (see table 1).

Malfunctioned unit – Jackson IRI2016-3141

Jackson IRI2016-3141 unit has not been active since early March 2020. The ossi-unit had experienced erratic charging and eventually stopped functioning as a result of consistent power draw without a sufficient recharge

(see fig. 1). Prior to the ossi-unit no longer transmitting data, an update to reprogram the Iridium satellite communication was sent to the ossi-unit. If the unit gets enough of a charge it may come back online, hopefully the changed data upload schedule may reduce the effective draw on whatever power it may glean. Results for this activity shall be reported in the next report of May 2020, stay tuned!

Looking at the final GPS points of the unit in fig. 2, it's difficult to say for certain if the unit was stationary (indicating that it had fallen off), as there were a series of fixes that were very close in proximity. Hopefully, we will get further information to figure out if and why it failed.

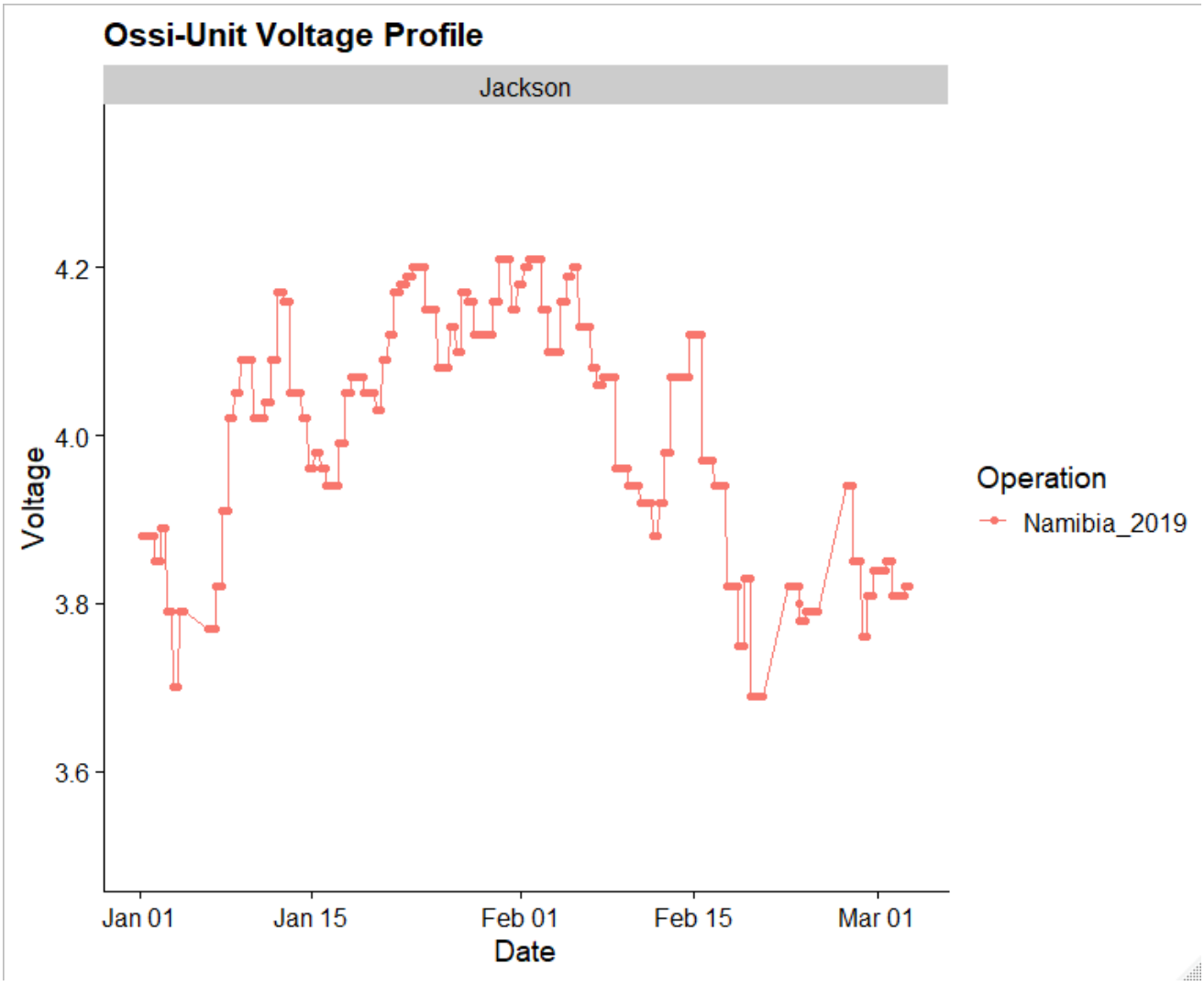


Figure 1: Ossi-Unit IRI2016-3141 (Jackson) voltage profile highlighting the erratic charginging in January and February 2020

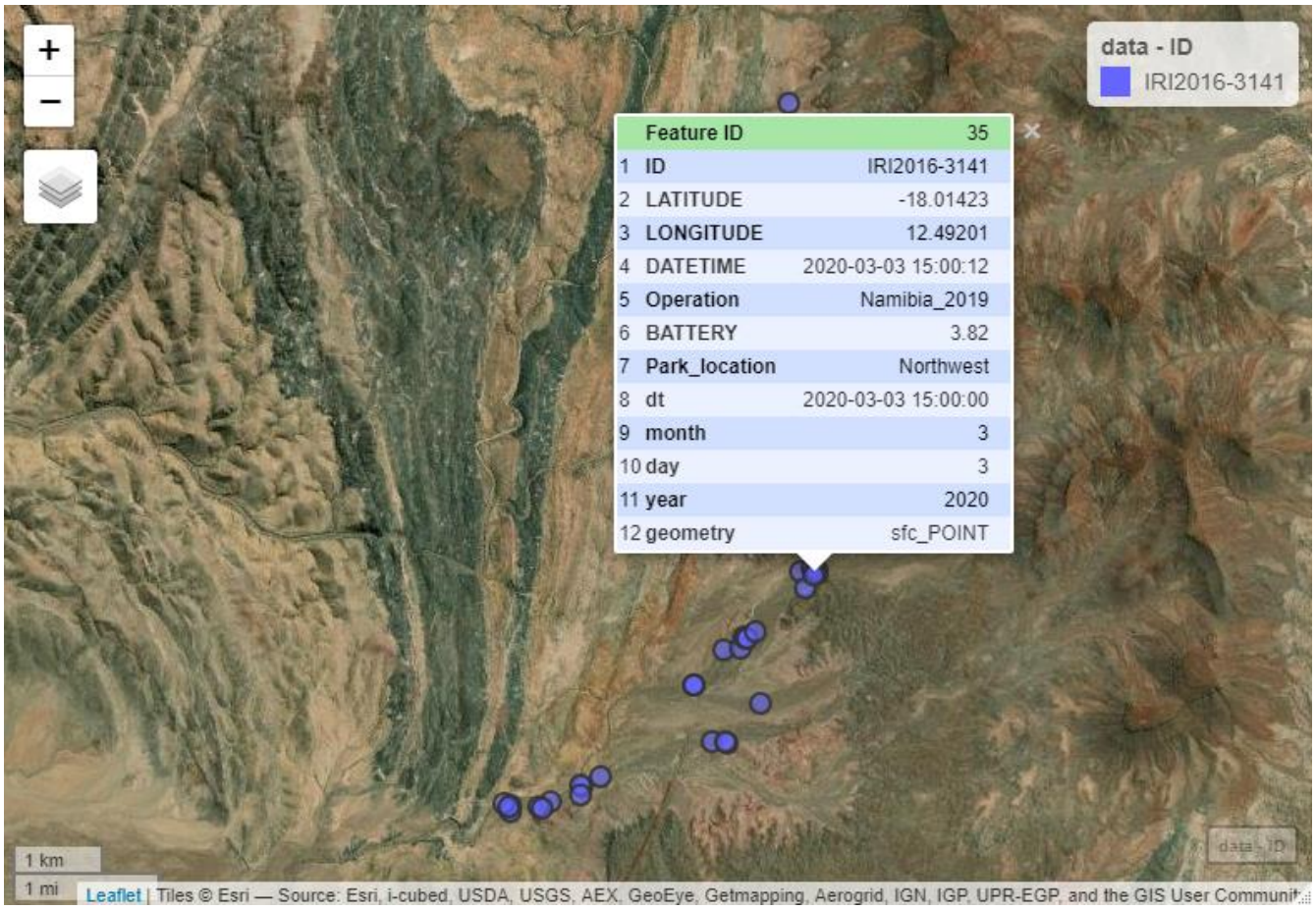


Figure 2: IRI2016-3141 point fixes in March 2020

All data analysis was conducted in QGIS 2.18.28 using the coordinate referencing system WGS84. Habitat use by all giraffe was similar to March 2020. The movement patterns from east to south and west did not change for most giraffe. Tisa (ST2010-2958) who had been foraging in a small area southeast of Onjuva moved into the Khumib River to join other tagged giraffe. Most giraffe are roaming along the Khumib River with the exception of Ceratops (ST2010-2959) who moved across the Sechomib and Munutum Rivers and into the Nadas River (see fig. 3).

Similar to last month, Ceratops (ST2010-2959) moved the furthest distance (~356.1 km), from Onjuva village and regularly between the Nadas, Munutum and Sechomib Rivers. Marble (IRI2016-3218) moved ~206.6 km from the upper to mid Khumib River jpining up with other tagged giraffe (see fig. 3). The least travelled giraffe was Tisa (ST2010-2958) with a distance of ~127.5 km, similar to last month. Generally, distances travelled in April were more or less the same with March 2020. Table 2 shows all giraffe distances travelled during March and April 2020, and for a graphical representation see fig. 6.

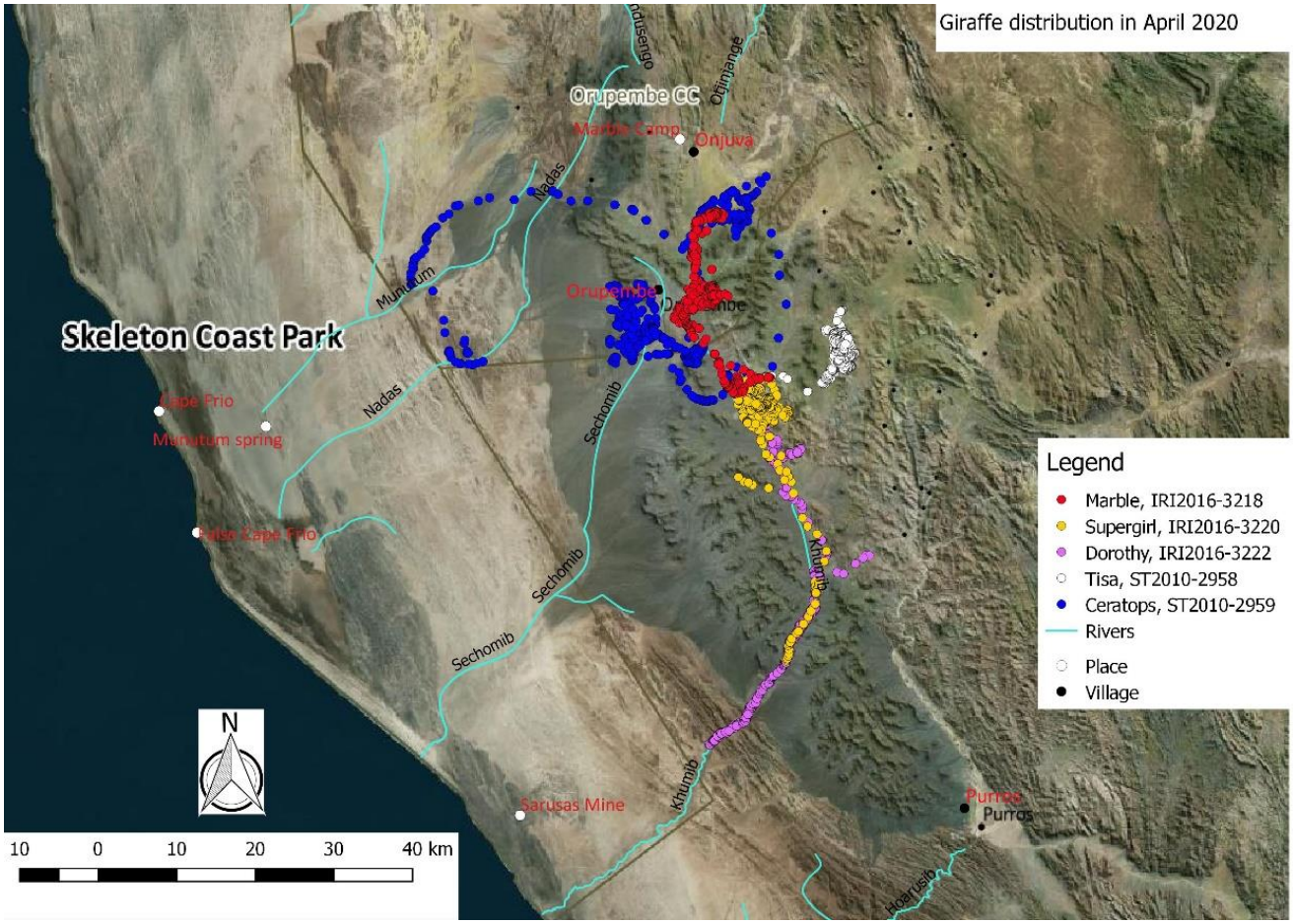


Figure 3: GPS satellite tagged giraffe movements in northwest Namibia during April 2020

Home Range (HR) preliminary results were estimated using the Animove plugin in QGIS to determine HR at 50% and 95% Minimum Convex Polygon (MCP) for each individual as well as the total population. The 50% MCP provides standard deviation core HR, while 95% provides the average HR. Ceratops (ST2010-2959) 95% MCP in April 2020 was estimated at 1,050.6 km^2 followed by Dorothy IRI2016-3222 at 339.4 km^2, whilst Tisa (ST2010-2958) had the smallest at ~20.1 km^2. HR overlaps were observed between almost all giraffe in the Khumib River. It was only Tisa who showed an isolated home range southeast of Onjuva village (see fig. 4). All giraffe combined had an average core home range of 419.1 km^2 calculated at 50%, and 2,370 km^2 at 95% MCP (fig. 5) – this is reasonable in such a large and arid environment with patchy vegetation. For the rest of the HR records see fig. 6 and table 2. Home range sizes of giraffe in April were generally larger than in March 2020. Individual HR were not related to distance travelled and vice versa (see fig. 6).

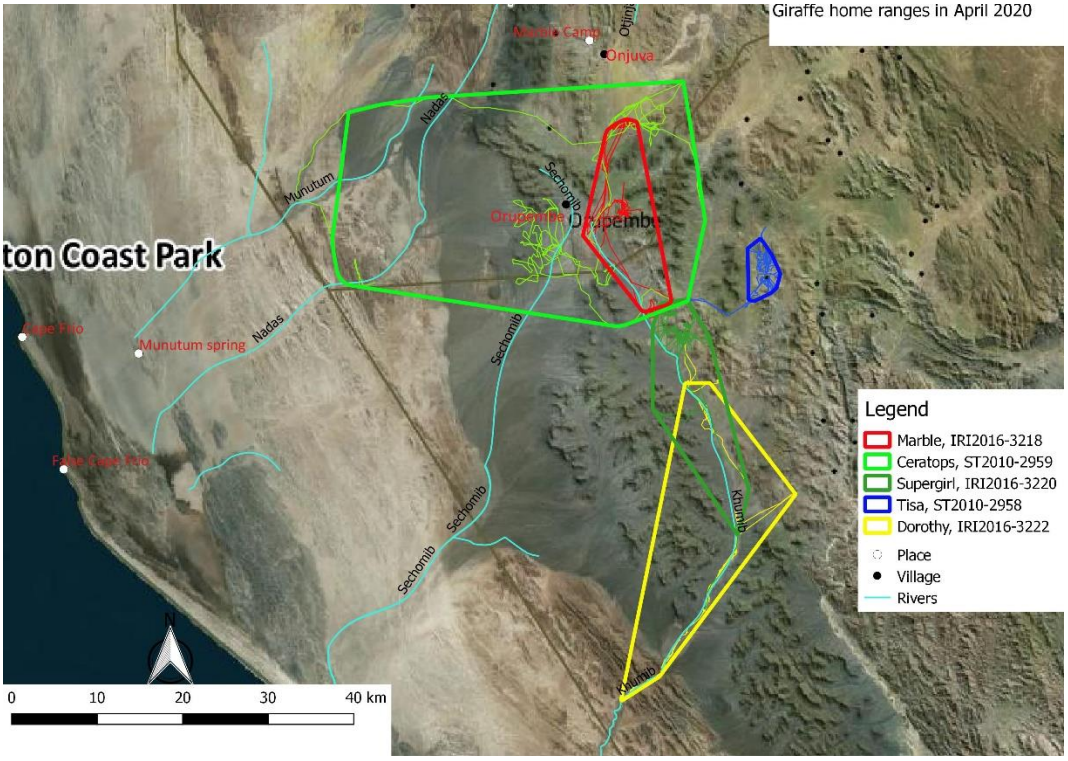


Figure 4: GPS satellite tagged giraffe´s individual Home Range using 95% MCP in northwest Namibia during April 2020

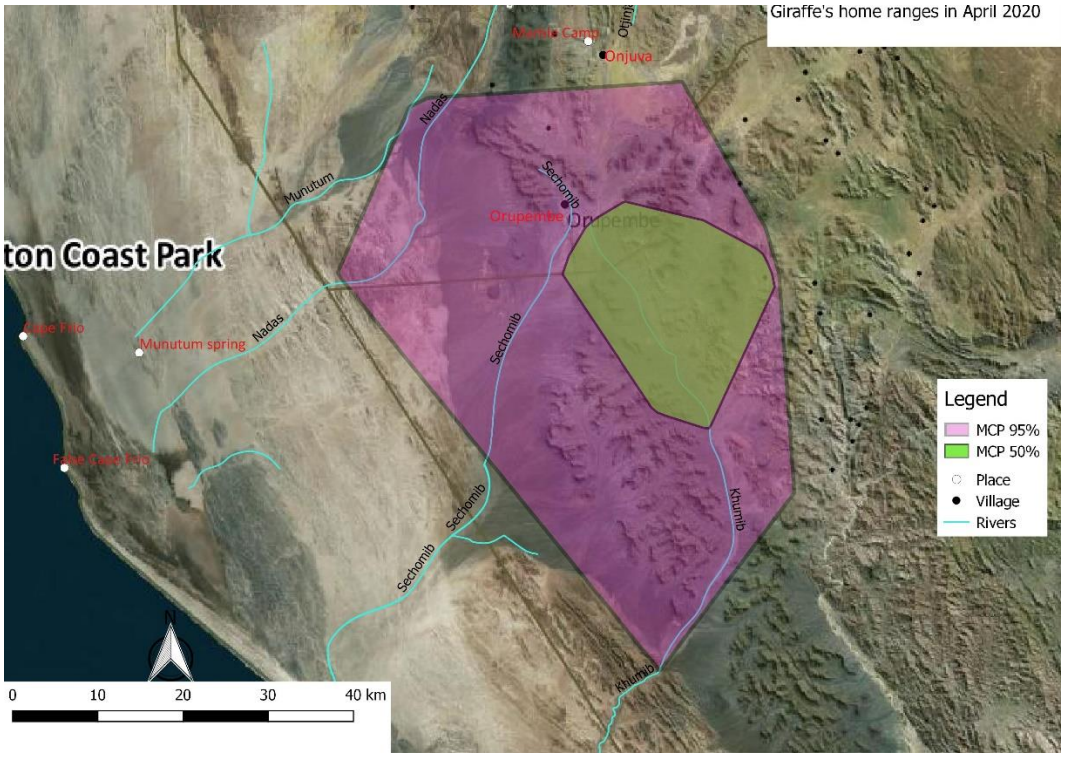
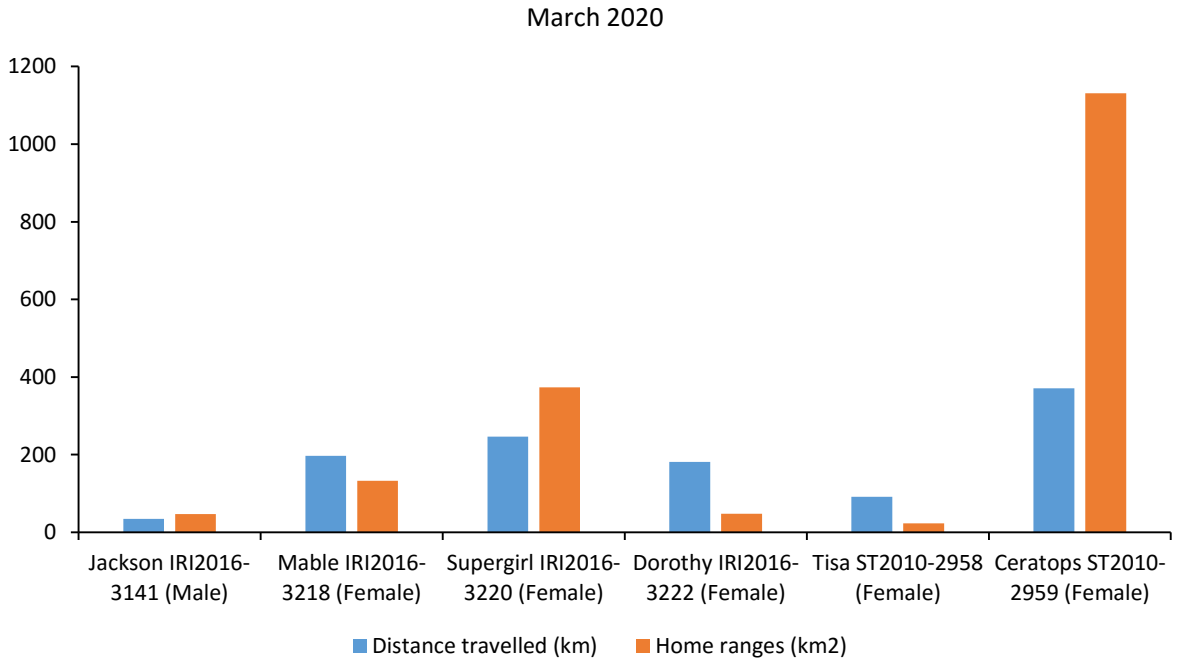


Figure 5: All GPS satellite tagged giraffe´s combined Home Range using 50% and 95% MCP in northwest Namibia during April 2020



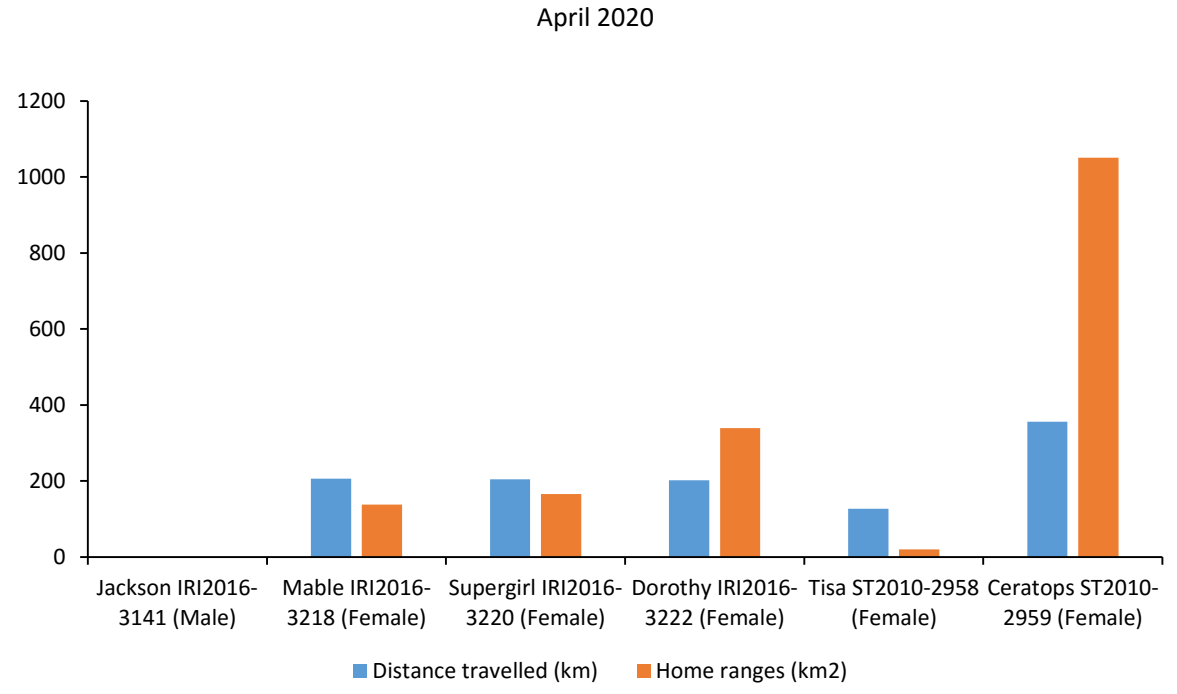


Figure 6: Comparison of HRs with distance travelled by individual giraffe in March and April 2020

Table 1: Data transmission of GPS satellite tagged giraffe in northwest Namibia during April 2020

ID/Date	1	2	3	4	5	6	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Mable IRI2016-3218 (Female)	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Supergirl IRI2016-3220 (Female)	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Dorothy IRI2016-3222 (Female)	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Tisa ST2010-2958 (Female)	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Ceratops ST2010-2959 (Female)	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√

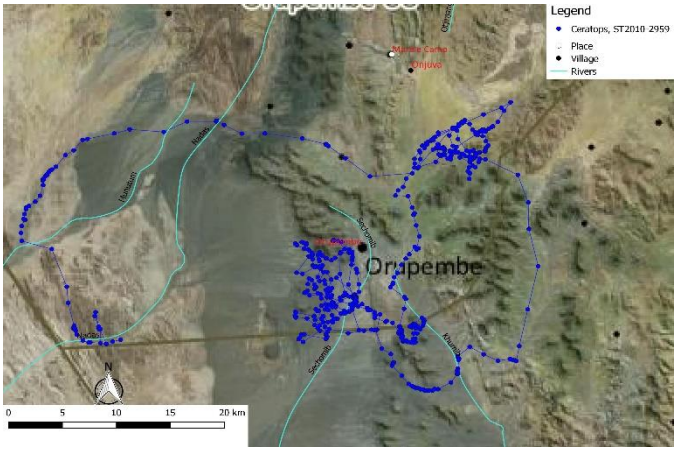
Table 2: Distance travelled by each GPS satellite tagged giraffe in March & April 2020

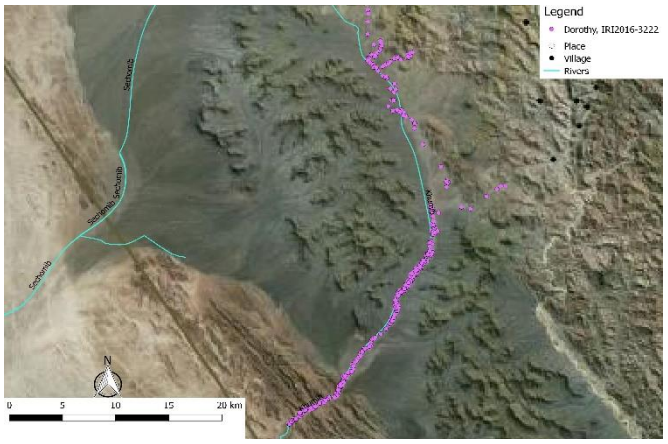
	March 2020		April 2020	
ID/Date	Distance travelled (km)	Home ranges (km^2)	Distance travelled (km)	Home ranges (km^2)
Mable IRI2016-3218 (Female)	197.1	132.6	206.6	137.7
Supergirl IRI2016-3220 (Female)	246.7	373.6	204.3	166.0
Dorothy IRI2016-3222 (Female)	181.5	48.2	202.1	339.4
Tisa ST2010-2958 (Female)	91.4	23.4	127.5	20.1
Ceratops ST2010-2959 (Female)	370.7	1130.9	356.1	1050.6

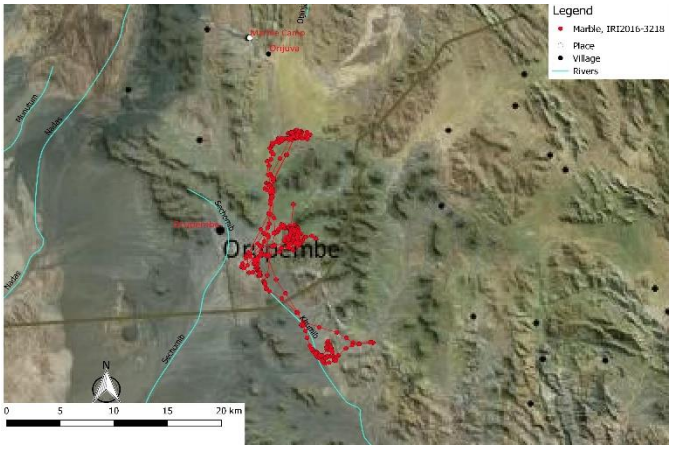
Acknowledgements

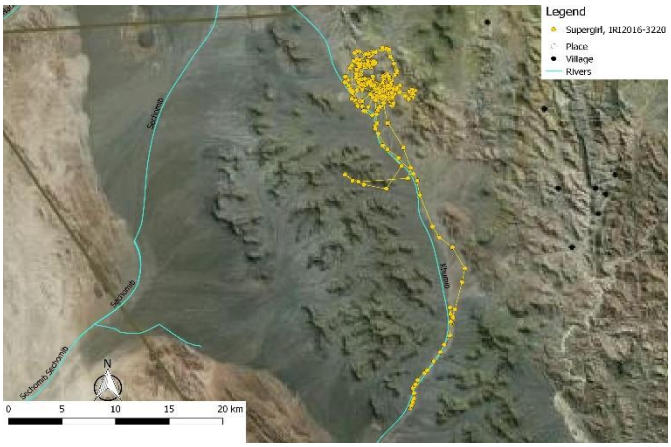
We would like to acknowledge the Giraffe Conservation Foundation (GCF) and SCIONA project for their technical and financial supports. We also express our special appreciation to game guard colleagues in the Orupembe Conservancy. Thanks to Dr Michael Brown (GCF-SCBI) for collar diagnostics updates.

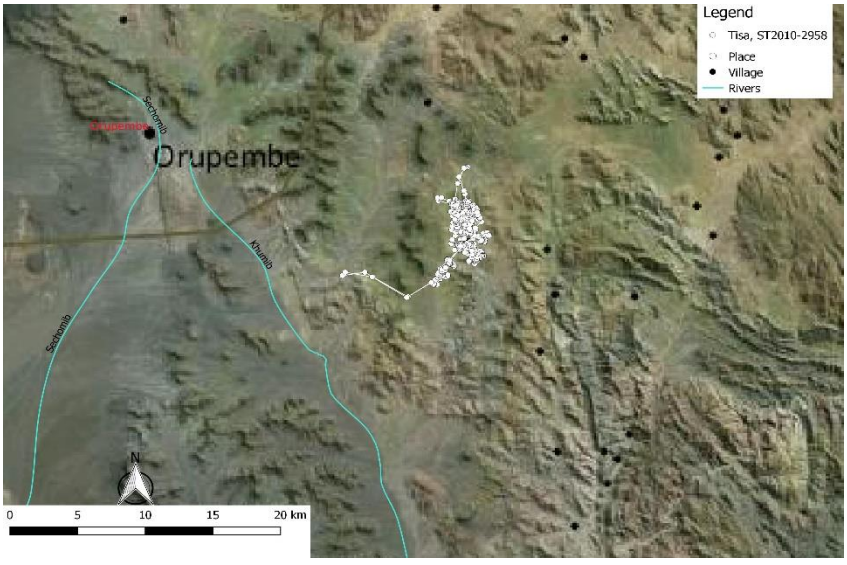
Appendix


Legend
Geratops, ST2010-2959
Place
Village
Rivers
Drupembe
Sechomb
Khumib
0 5 10 15 20 km


Legend
Dorothy, IRI2016-3222
Place
Village
Rivers
Sechomb
Khumib
0 5 10 15 20 km


Legend
Marble, IRI2016-3218
Place
Village
Rivers
Drupembe
Sechomb
Khumib
0 5 10 15 20 km


Legend
Supergirl, IRI2016-3220
Place
Village
Rivers
Sechomb
Khumib
0 5 10 15 20 km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