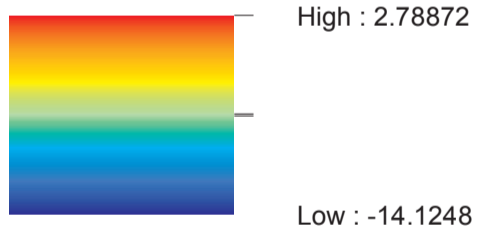


## Legend

large protected areas

## log line density within 20km

log lines per km<sup>2</sup>



map projection: Lambert Azimuth Equal Area (central meridian 20 degrees)

0 250 500 1,000 1,500 2,000 Kilometers



**METHODS:**  
 The collation of movement data on African vultures was coordinated by Corinne Kendall, Ralph Buij, Rob Davies, Ara Monadjem with assistance from Lutfor Rahman. Movement data from satellite / GPS tracking were provided for 228 tagged African vultures of eight species representing > 6 million kms travelled by African vultures. The tagged individuals comprised 69 Egyptian Vultures (2,450,833 km travelled), 53 White-backed Vultures (973,062 km), 36 Cape Vultures (1,195,490 km), 22 Rüppell's Vultures (432,175 km), 20 Hooded Vultures (324,584 km), 16 Lappet-faced Vultures (255,300 km), 10 Griffon Vultures (493,926 km), and 2 White-headed Vultures (17,045 km). These data were received as georeferenced points (latitude and longitude in decimal degrees WGS84). We projected the points into Web Mercator Auxillary Sphere projection to check against online background mapping from Bing in ArcGIS. Then all point datasets were processed into tracklogs using ArcGIS Tracking Analyst Tools extension: Make Tracking Layer and Track Intervals to Line. By comparing distance with duration of these lines we created a speed field and we were able to identify and filter out invalid travel lines for each bird (speeds > 100kph and abnormally straight flight lines over very large distances). After cleaning these data, we performed a line density analysis which for each 1 km<sup>2</sup> grid cell summed all tracklines within a 20 km radius to reveal areas of intensive use. Data were still highly concentrated for long duration recordings of birds not moving very far so we also took logarithms of the results to be able to clearly discern sporadic movements from concentration areas.

**CREDITS:** Coordination: Ralph Buij (Wageningen University & Research), Corinne Kendall (North Carolina Zoo), Ara Monadjem (University of Swaziland). Data collation: Lutfor Rahman & Lou Luddington (Habitat Info). Analysis & map production: Rob Davies (Habitat Info). Finance: The vulture surveys, data gathering and habitat and threat modeling were funded by the following organisations through Wageningen University & Research (which also contributed resources): Dutch Ministry of Economic Affairs, WWF-Netherlands, UNEP-CMS Raptors MoU, North Carolina Zoo, Fondation LePal Nature, Quagga Foundation, Stichting Vogelpark Avifauna, Stichting Koninklijke Rotterdamse Diergaarde, Detroit Zoological Society, and Stichting Wildlife. Through The Peregrine Fund this project benefited greatly from access to the ESRI Grant Scheme. Data on vultures were contributed or facilitated by the following individuals: Yilma D Abebe, Hichem Azafzaf, Laila Bahaa El Din, Neil & Liz Baker, Clive R Barlow, Keith Bildstein, Claire Bracebridge, Andy Branfield, Erik & Asaph Brohaugh, Joost Brouwer, Chris Brown, Evan Buechley, Ralph Buij & Barbara Croes, Andre Botha, Mike Cadman, Alazar Daka Rufo, Rob Davies, Maria Diekmann, Nina Farwig, Oliver Fox, Toby Galligan, Beckie Garbett, Ashwell Glasson, Roi Harel, Stratton Hatfield, Ohad Hatzofe, Joseph Heymans, Constant Hoogstad, Mawdo J Jallow, Walter Jubber, Gregory Kallenecker, Adam Kane, Chris Kelly, Alan & Meg Kemp, Corinne Kendall, Holger & Claire Kolberg, Bernard & Antje Madden, Glyn Maude, John Mendelsohn, Mike McGrady, Ara Monadjem, Campbell Murn, Ran Nathan, Karin Nelson, Stoyan Nikolov, Darcy Ogada, Steffen Oppel, Louis Phipps, Bram Plot, Thomas Rabeil, Sascha Rosner, Lizanne Roxburgh, Volker Salewski, Andrea Santangeli, Dana Schabo, Orr Spiegel, Lindy Thompson, Simon Thomsett, Dirk van Stuyvenberg, Rien van Wijk, Munir Virani, Tim Wacher, Kerri Wolter (VULPRO) and numerous other African Raptor Databank observers; and by the following organisations: AFRICAN RAPTOR DATABANK, AFRICAN IMPACT, BIRDLIFE INTERNATIONAL & NATURESERVE, BIRDLIFE BULGARIA (BSPB), BIRDLIFE TUNISIA (AAO), BOISE STATE UNIVERSITY, CITES (MIKE DATABASE), ENDANGERED WILDLIFE TRUST, HAWK CONSERVANCY TRUST, HAWK MOUNTAIN SANCTUARY, INTERNATIONAL UNION FOR CONSERVATION OF NATURE (AFRICAN ELEPHANT DATABASE & REDLIST MAPS), ISRAEL NATURE & PARKS AUTHORITY, NATURAL HISTORY MUSEUM (TRING), MOVEBANK, NIOKOLO-KOBA CITIZEN SCIENCE PROJECT, NORTH CAROLINA ZOO, RAPTOR'S BOTSWANA, RARE AND ENDANGERED SPECIES TRUST, ROYAL SOCIETY FOR THE PROTECTION OF BIRDS, TANZANIAN BIRD ATLAS, THE PEREGRINE FUND, UNIVERSITY OF UTAH, VULPRO, WEST AFRICAN BIRD DATABASE, WILDLIFE ACT AND WILDLIFE CONSERVATION SOCIETY.

