Occupancy modeling for mapping the distribution of the Persian leopard and its prey in the northern Zagros Mountains

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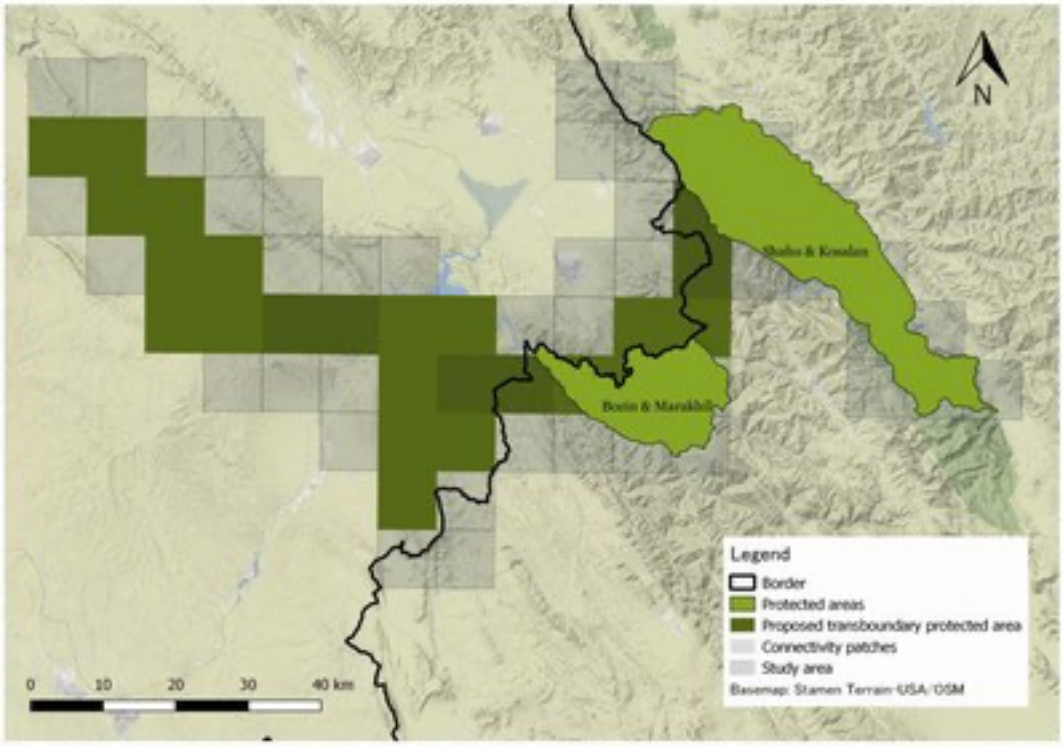
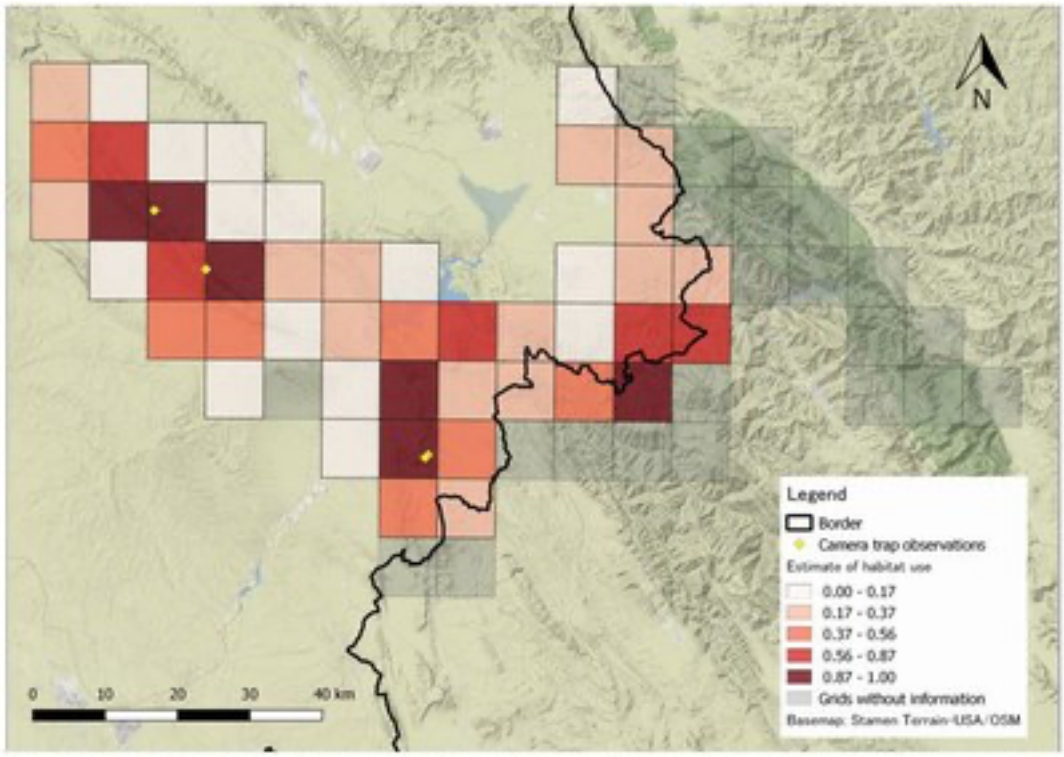
Abstract

Transboundary protected areas represent an opportunity for securing species survival in border regions. Artificial boundaries such as country borders often cross wildlife habitat, possibly separating populations and impeding migratory movement. At the Iraqi-Iranian border in the northern Zagros mountains, wildlife faces numerous threats such as poaching, habitat fragmentation and destruction as well as prey depletion. The latter is particularly threatening for the Persian leopard (Panthera pardus saxicolor) as it is listed as 'Endangered' on The IUCN Red List of Threatened Species. This thesis analyses the distribution of abundance of ungulate species Mouflon (Ovis orientalis gmelinii) and Bezoar goat (Capra aegagrus) as well as habitat use of Persian leopard. Analysis is based on both interview survey and camera trap data. A total of 190 interview surveys were conducted with local people by the NGO Nature Iraq between December 2017 and March 2018. The entire study site comprises 68 sampling units of 8km x 8km, which for 46 sampling units data was collected. Leopard habitat use is estimated through occupancy modeling substituting 'psi' with 'habitat use' as using interview survey violates some assumptions of the occupancy modeling approach. The analysis implements both detection methods and accounts for false positives. Leopard habitat use showed to be dependent on prey abundance as well as oak forests. High habitat use estimates were used to identify a potential transboundary protected area that matches leopard core habitat. The proposed transboundary area connects both Bozin & Marakhil and Shaho & Kosalan protected areas on the Iranian side with identified leopard core habitat on the Iraqi side encompassing a total area of 2.219 km².



Map 5: A proposed potential transboundary protected area based on leopard habitat use. The proposed area connects important habitat patches on the Iraqi side with two already established protected areas on the Iranian side of the border.



Map 3: Estimated probabilities of habitat use of Persian leopard in study region. Grid cell that hold no information encompass cells where no interview surveys were conducted.