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Transboundary leopard movement between Azerbaijan and Iran in the Southern Caucasus

Understanding whether large cat populations are transboundary by nature is important for conservation planning. We here report transboundary movement by an adult male Persian leopard *Panthera pardus tulliana* (= *P. p. ciscaucasica* = *P. p. saxicolor*) in the Talysh Mountains of the Southern Caucasus. Between 12 and 13 July 2013 this leopard, named Astkhan, was photographed by camera traps at three locations inside Hirkan National Park NP, Talysh Mountains, Azerbaijan. On 7 February 2014 a local hunter killed an adult leopard in Chubar Highlands of Gilan Province, north-western Iran, approximately 30 km away from Hirkan NP (straight-line distance). Comparing photos of this poached leopard with those obtained from Hirkan NP allowed us to identify this leopard as Astkhan. This is the first hard evidence of transboundary movements by Persian leopards in the Talysh Mountains, and thus for linkages between leopard sub-populations in Azerbaijan and northern Iran. This also suggests that the transboundary Talysh Mountains are of utmost importance as a corridor between core leopard areas in the Caucasus Ecoregion, and thus for the Persian leopard conservation in general. Joint survey planning, reporting and data sharing can be a first step for transboundary cooperation in leopard conservation between the eco-regional countries.

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The critical status of the Persian leopard in the Caucasus Ecoregion urgently calls for international cooperation between the eco-regional countries (Breitenmoser et al.

2017). Leopards currently occur only in a few locations in the Caucasus, and it has been speculated that leopards in Azerbaijan and Armenia might be connected with

leopard populations in the Iranian Caucasus, or even depend on these populations as a source for dispersing individuals (Askerov et al. 2015). However, to date no confirmed evidence of leopard movements for the two proposed transboundary populations of Zangezur-Kiamaky and Talysh-Western Alborz ranges (Askerov et al. 2015) has been documented. Here, we report the first hard evidence of such a movement event between Azerbaijan and Iran in the Talysh Mountains.

Since 2011, WWF (particularly WWF-Azerbaijan Branch supported by WWF-Germany and WWF-Switzerland), together with the Ministry of Ecology and Natural Resources of Azerbaijan Republic MENR, the International Dialogue for Environmental Action IDEA and Humboldt University Berlin, has conducted camera trap surveys of leopards and their prey in Hirkan NP, Talysh Mountains, Azerbaijan (see Askerov et al. 2015; Fig. 1). Two male leopards were photo and video-captured at six sites during an unknown number of camera trap days between May 2013 and July 2014. One adult male, named Astkhan by the research team, was photographed at three sites (photo and video identification based on the right flank only; Fig. 2 & Supplementary Online Material SOM Figure F1) on 12 and 13 July 2013, approximately 2 km east and 4.5 km north of the border with Iran (straight-line distance; Fig. 1).

In May 2014, the Gilan Provincial Office of the Iranian Department of Environment DoE at Talesh County, Iran, was informed about a case of leopard poaching by a local hunter near Mohammad Yurdi, Chubar Highlands (Fig. 1). The local hunter was eventually arrested, and authorities discovered two images of him with a poached leopard in his cell phone (Fig. 3 & SOM F2). The local hunter confessed to having killed this leopard while in search for forest-dwelling ungulates. He claimed that he had sold the leopard's skin for IRR 70,000,000 (≈ US\$ 2,750 in 2014) to an undisclosed person. We identified the date of this incident from the EXIF data of the poacher's photos as 7 February 2014. The skin could not be traced by the legal authorities, but the leopard's tail was later discovered by authorities in the poacher's hideout (SOM F3) and is now in the possession of Gilan DoE. The local hunter was fined with IRR 50,000,000 (≈ US\$ 2,000) in accordance with the former revision of

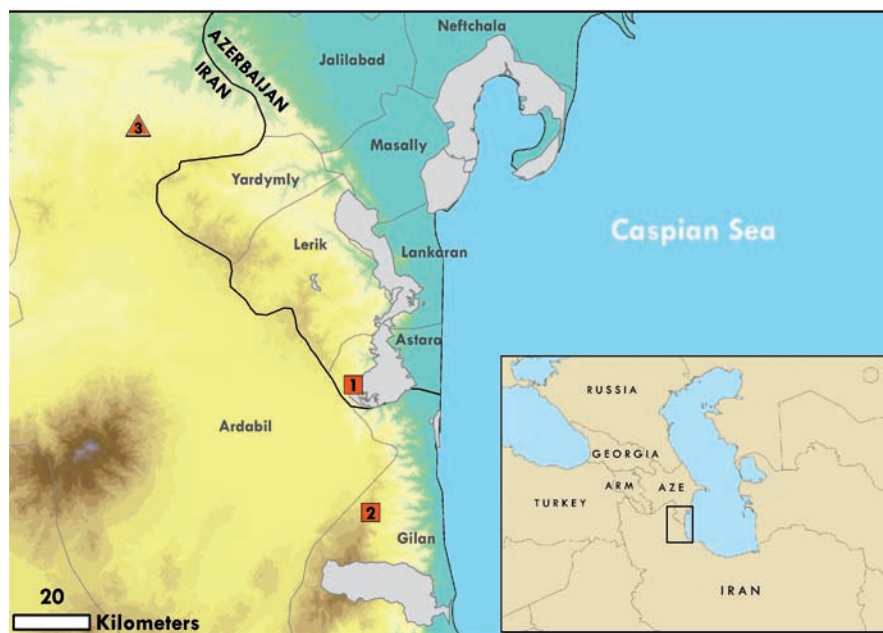


Fig. 1. Locations of camera trap photographs of a male Persian leopard, named Astkhan, inside Hirkan NP, Azerbaijan, between 12 and 13 July 2013 (red square 1), and his death in Chubar Highlands of Gilan Province, Iran on 7 February 2014 (red square 2). Another male leopard shot dead in Dizaj, Ardabil Province, Iran on 9 July 2007 (red triangle 3). Grey polygons represent protected areas.

the Iranian Hunting and Fishing Law (2014), and sentenced to 42 months in prison for leopard poaching and possession of an unregistered firearm.

During the workshop on “Revision of the Strategy for the Leopard Conservation in the Caucasus and Coordinating the Monitoring of Leopard and Prey Species in the Ecoregion” in Tbilisi, Georgia held on 25 - 28 April 2017, representatives from Azerbaijan and Iran met and shared information about the leopard status on both sides of the border. Comparison of the pelage pattern of Astkhan with photos obtained from the poacher in Iran (Fig. 4) confirmed the killing of Astkhan in the Iranian part of the Talysh Mountains, approximately 30 km away from the last location where the animal was photographed inside Hirkan NP (straight-line distance; Fig. 1). This represents the first evidence of leopard transboundary movements within Talysh Mountains, as well as the first confirmed record of leopard movement between Iran and Azerbaijan. For the Iranian Caucasus, this killed individual is the only confirmed leopard occurrence in the Talysh Mountains during the past 20 years, besides a young male that was shot in Dizaj village, Ardabil Province, approximately 15 km away from the border with Azerbaijan, on 9 July 2007 (Mowlavi et al. 2009, Moqanaki et al. 2013; Fig. 1 & SOM F4).

Habitat suitability modelling and connectivity predicted the Talysh Mountains to be a critical linkage for connecting the border landscape between Iran, Azerbaijan, and Armenia to the presumed source leopard population in the Alborz Mountains in Northern Iran (Zimmermann et al. 2007, Farhadinia et al. 2015). The incident we report here supports these predictive models. The Strategy for the Conservation of the Leopard in the Caucasus Ecoregion, which has been revised in April 2017 (Caucasus Leopard Working Group 2017), stresses the need for strategic transboundary cooperation in leopard conservation between the countries in the Caucasus. Considering the still very low number of individuals in this ecoregion (13 confirmed individuals), the loss of every leopard is a major setback in efforts for safeguarding this species. Recent evidence for leopard reproduction in the Talysh Mountains from Hirkan NP (Breitenmoser et al. 2017) are encouraging news, but also highlight that joint monitoring and conservation efforts between Iran and Azerbaijan are more crucial than ever.

We propose establishing a transboundary platform for planning survey and monitoring activities and for reporting and sharing data on leopard status and occurrence. This would be a first and urgently needed step in this direction.

Acknowledgements

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Fig. 2. First footage of Astkhan, photographed by a camera trap inside Hirkan NP, Azerbaijan, on 12 July 2013 (Photo WWF-Azerbaijan).

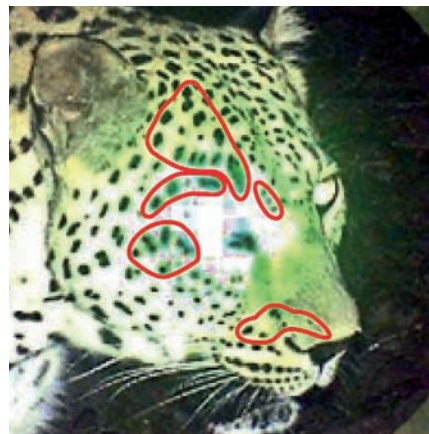


Fig. 3. A photo of Astkhan, dated 7 February 2014, discovered by authorities in a poacher’s cell phone in Chubar, Gilan Province, Iran.

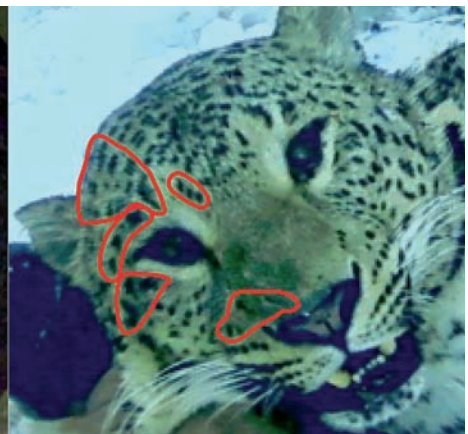


Fig. 4. Identification of Astkhan was done based on pelage pattern of his head. See SOM F1 & F2 for original photos.

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Supporting Online Material Figures F1-F4 are available at www.catsg.org.

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SOM F1. Astkhan, a male Persian leopard, was photographed by a camera trap inside Hirkan National Park, Talysh Mountains, Azerbaijan on 13 July 2013 (Photo WWF-Azerbaijan)



SOM F2. A photo of Astkhan discovered in a poacher's cell phone by legal authorities in Gilan Province, Iran. Identification of Astkhan was done by comparing the pelage pattern of his head in this photo with SOM F1 (See Fig. 4).



SOM F3. A photograph of Astkhan's tail discovered in a poacher's hideout by wildlife authorities in Chubar, Gilan Province, Iran (Photo Ali Jafari/Gilan DoE).



SOM F4. A male Persian leopard shot dead by authorities after injuring 7 villagers in Dizaj, Ardabil Province in Iran on 9 July 2007 (Photo Ardabil DoE).