

Towards Improving Conservation Strategies for the Endangered Arabian Wolf, *Canis lupus arabs*

Gavin T. Bonsen^{1*} and Anton Khalilieh²

¹ Centre for Compassionate Conservation, University of Technology Sydney, Australia; ² Nature Palestine, Ramallah, West Bank, Palestine

Received: November 30, 2020; Revised: December 28, 2020; Accepted: January 5, 2021

While wolf populations are recovering globally (Chapron *et al.*, 2014; Mech 2017), the International Union for Conservation of Nature (IUCN) lists the unique desert-adapted Arabian wolf, *Canis lupus arabs*, as an endangered subspecies (Mallon and Budd 2011). Ranging across arid regions of the southern Levant and Arabian Peninsula, the Arabian wolf often relies on human resources (Shalmon 1986); this may be attributed to a severely depleted natural prey base coupled with the low productivity of arid and hyper-arid environments. Where conflict with wolves is low, such as in crop farming landscapes throughout Al Naqab and Wadi Araba, Arabian wolves have developed such an affinity with humans that they rarely venture more than 5 km from human infrastructure (Barocas *et al.*, 2018).

The population in the Al Naqab/Wadi Araba area was estimated at around 90 – 150 individuals (Cohen *et al.*, 2013); a relatively stable number for an arid to hyper-arid region of roughly 12,000 km². In contrast, the most recent population across Saudi Arabia, Yemen, Oman, and the United Arab Emirates (UAE; *potentially extinct*, Cunningham 2004), is estimated at 500 – 600 and is declining (Mech and Boitani 2004). Taking into consideration that the latter area is more than 200 times the size of the former, covering around 90 % of the Arabian wolf's range, it is crucial to understand the factors driving the Arabian wolf's demise across such a significant portion of its range, and to

develop strategies to overcome these.

Pastoralism remains a predominant form of agriculture across the vast majority of the Arabian wolf's range. Of course, when wolves' reliance on human resources leads to livestock depredation, conflicts between wolves and pastoralists are inevitable. In fact, in some pastoralist landscapes across the Arabian Peninsula where populations tenaciously persist (Cunningham and Wronski 2010a), conflict is so pronounced that the rate of encountering a persecuted wolf carcass is as high as one in every 8 km (Cunningham *et al.*, 2009)). On top of the livestock-related persecution, age-old beliefs that wolves endanger human lives (Seddon and Khoja 2010), and wolf body parts can be used for therapeutic purposes (Aloufi and Eid 2016), persist. As such, Arabian wolves continue to be hunted and persecuted, despite their low numbers (Cunningham and Wronski 2010b).

Jordan holds a critical jurisdiction for the conservation of the Arabian wolf as its location provides a stepping-stone between the stable population of Al Naqab/Wadi Araba, and the declining population of the Arabian Peninsula. The conservation status of the Arabian wolf in Jordan remains unclear, with sparse records over the last few decades: two wolves were recorded during a 2001 carnivore survey in the north-eastern Badia (Bunaian *et al.*, 2001), and wolves were recorded in 2011 (Edwards *et al.* 2017) in addition to a captured wolf being released in

*Corresponding author:

Gavin.Bonsen@student.uts.edu.au

2016 (Hamidan N., unpublished data), within the Dana Biosphere Reserve. Nonetheless, numbers appear to be negligible (Hamidan N., RSCN, personal communication). Illegal hunting remains a concern in Jordan, although this is being increasingly curbed by the efforts of the Royal Society for the Conservation of Nature (RSCN; Eid and Handal 2018). As long as hunting and direct persecution persist, the Kingdom's designated protected areas remain important strongholds for wildlife, including wolves (Amr *et al.*, 2004).

During the summer of 2019, the researchers sampled an area of approximately 1,800 km² in Wadi Araba, and the adjacent Dana Biosphere Reserve, using camera-traps and passive tracking surveys (searching for wolf tracks – i.e. pugmarks) to assess wolf activity and determine the importance of this region for Arabian wolf conservation. Extending north to cover the Fifa Nature Reserve, the current study area included two protected areas governed by the RSCN, as well as vast agricultural landscapes predominantly used by Bedouin pastoralists. To increase the probability of detection, camera-trapping primarily focussed on permanent water points (i.e., springs and artificial water sources), while tracking surveys were conducted in areas where there was enough suitable substrate that could be cleared daily and searched for fresh tracks (i.e., 500 m transects).

Both camera-traps and tracking confirmed that the area surrounding the Dana Biosphere Reserve is an important region for the Arabian wolf (Figure 1). The researchers recorded most wolf activity in the lower (western) reaches of the Dana Reserve (e.g., Ein Salamani; Figure 2), and the adjacent agricultural fields northeast of the reserve's boundary. A young wolf was confirmed by camera-traps at Ein Ibn Thicker in the Fifa Nature Reserve; however, no wolf tracks were recorded within the Fifa Reserve. Camera-traps confirmed a single wolf in the upper part of the Dana Reserve close to Rumana Camp, and the researchers were provided with anecdotal reports of

wolf sightings and vocalisations around the same area. An interesting point worth mentioning was that the locals and rangers interviewed within the Reserve did not have any outspoken issue with wolves, nor were there reports of wolves approaching tourists or behaving in an aggressive manner.

On the other hand, while conducting tracking surveys in agricultural lands to the northeast of the reserve's boundaries, a Bedouin farmer approached the researchers one morning to inform them that he had lost a young goat the previous night, presumably to a wolf. While this individual did not advocate retaliation or lethal control of wolves, he understandably hoped that more could be done to prevent future livestock losses. Our tracking surveys revealed that wolf activity was higher in close proximity to human resources, suggesting an urgency to develop strategies towards human-wolf coexistence within these pastoralist landscapes.

Acknowledgements

There are several members of the RSCN to which the researchers wish to extend their sincerest gratitude. Many thanks go to Dr Nashat Hamidan and Thabit Alshare for allowing this research to take place and for organising the logistics. The researchers are utterly appreciative of the time that Abdullah Al'Oshoush and Yahya Al'Muhafazah spent with them in the field, organising and assisting with fieldwork locally. Many thanks go to Ibrahim Mahasneh and the staff at the Fifa Nature Reserve for their hospitality in the field. Lastly, thanks are also extended to the rangers – Ibrahim, Abdalrahman, and Faraj – as well as Malik Nananah and the rangers at the Dana Biosphere Reserve for their guidance, knowledge, and assistance in the field. Sincere thanks also go to Peter C. and Nashat H. for their helpful comments and guidance leading to the publication of this manuscript.

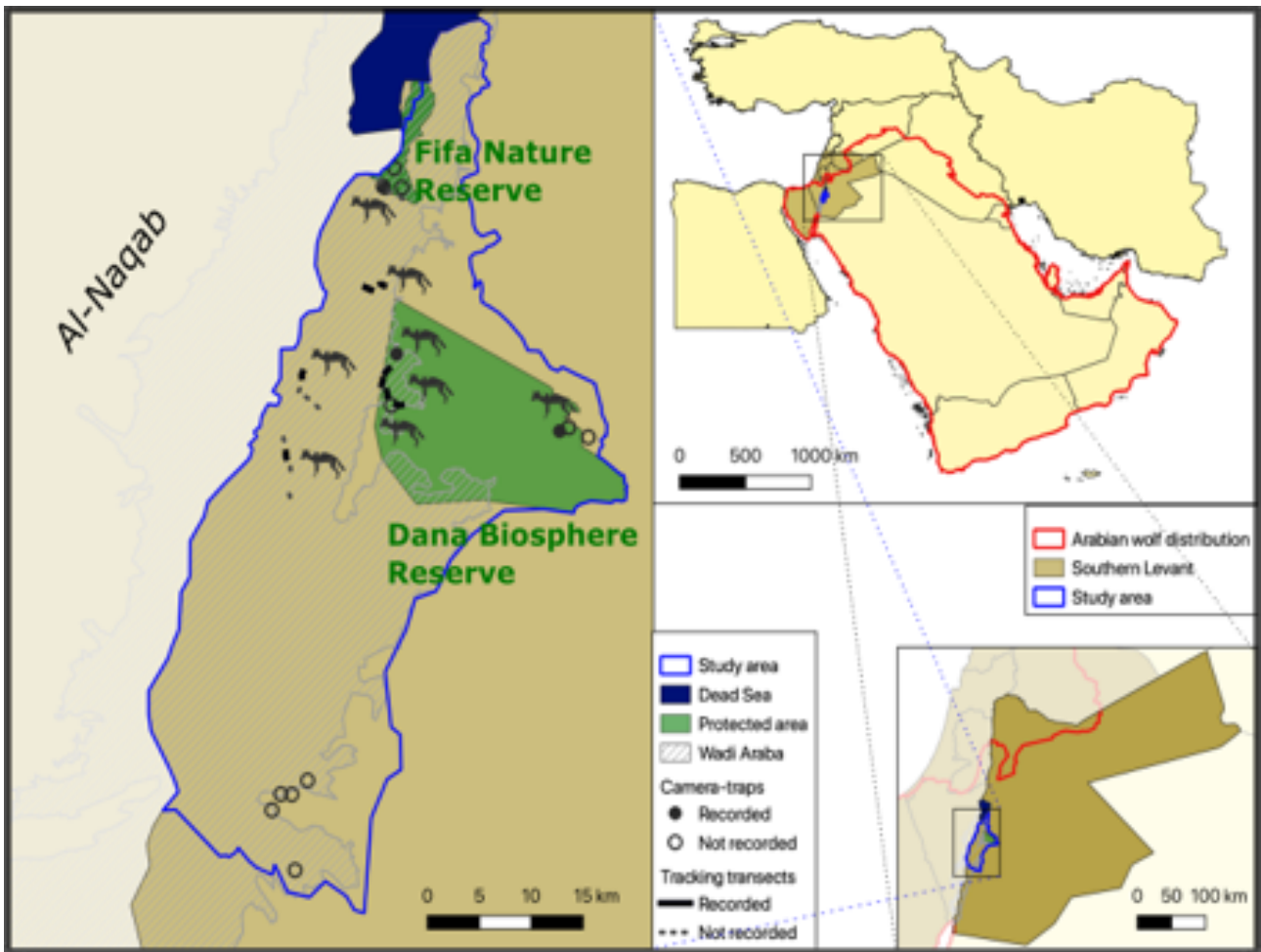


Figure 1. Location of the study area (a), illustrating the important region for wolves around the Dana Biosphere Reserve (wolf images correspond to where Arabian wolves were recorded in this study's surveys); the study area's location within Jordan (b); and the Arabian wolf's range across the Middle East (c).



Figure 2. Camera trap image of an Arabian wolf at a protected spring (Ein Salamani) in the western reaches of the Dana Biosphere Reserve.

References

- Aloufi, A and Eid, E. 2016. Zootherapy: A study from the Northwestern region of the Kingdom of Saudi Arabia and the Hashemite Kingdom of Jordan. *Indian Journal of Traditional Knowledge*, **15** (4): 561–569.
- Amr, ZS, Hamidan, N and Quatrameez, M. 2004. Nature Conservation in Jordan. *Biologiezentrum*. **2**: 467–477.
- Barocas, A, Hefner, R, Ucko, M, Merkle, JA and Geffen, E. 2018. Behavioral adaptations of a large carnivore to human activity in an extremely arid landscape. *Animal Conservation* **21** : 433–443.
- Bunaian, F, Hatough, A, Ababaneh, D, Mashaqbeh, S, Yousef, M and Amr, Z. 2001. The Carnivores of the Northeastern Badia, Jordan. *Turkish Journal of Zoology*, **25**: 19–25.
- Chapron, G, Kaczensky, P, Linnell, JDC, von Arx, M, Huber, D, Andr n, H, L pez-Bao, JV, Adamec, M,  lvares, F, Anders, O, Balciauskas, L, Balys, V, Bedo, P, Bego, F, Blanco, JC, Breitenmoser, U, Br seth, H, Bufka, L, Bunikyte, R, Ciucci, P, Dutsov, A, Engleder, T, Fuxj ger, C, Groff, C, Holmala, K, Hoxha, B, Iliopoulos, Y, Ionescu, O, Jeremic, J, Jerina, K, Kluth, G, Knauer, F, Kojola, I, Kos, I, Krofel, M, Kubala, J, Kunovac, S, Kusak, J, Kutal, M, Liberg, O, Majic, A, M nnil, P, Manz, R, Marboutin, E, Marucco, F, Melovski, D, Mersini, K, Mertzanis, Y, Myslajek, RW, Nowak, S, Odden, J, Ozolins, J, Palomero, G, Paunovic, M, Persson, J, Potocnik, H, Quenette, P-Y, Rauer, G, Reinhardt, I, Rigg, R, Ryser, A, Salvatori, V, Skrbinek, T, Stojanov, A, Swenson, JE, Szemethy, L, Traj ce, A, Tsingarska-Sedefcheva, E, V na, M, Veeroja, R, Wabakken, P, W lfl, M, W lfl, S, Zimmermann, F, Zlatanova, D and Boitani, L. 2014. Recovery of large carnivores in Europe's modern human-dominated landscapes. *Science*, **346**: 1517–1519.
- Cohen, O, Barocas, A and Geffen, E. 2013. Conflicting management policies for the Arabian wolf *Canis lupus arabs* in the Negev Desert: is this justified? *Oryx*, **47**: 228–236.
- Cunningham, PL. 2004. Checklist and status of the terrestrial mammals from the United Arab Emirates. *Zoology in the Middle East*, **33**: 7–20.
- Cunningham, P, Wronski, T and Al Aqeel, K. 2009. Predators persecuted in the Asir Region, western Saudi Arabia. *Wildlife Middle East*, **4** (1): 6
- Cunningham, PL and Wronski, T. 2010a. Distribution update of the Arabian wolf (*Canis lupus pallipes*) from Saudi Arabia. *Wildlife Middle East*, **5** (3): 4
- Cunningham, P and Wronski, T. 2010b. Arabian wolf distribution update from Saudi Arabia. *Canid News*, **13**: 1–6.
- Edwards, S, Al Awaji, M, Eid, E and Attum, O. 2017. Mammalian activity at artificial water sources in Dana Biosphere Reserve, southern Jordan. *Journal of Arid Environments*, **141**: 52–55.
- Eid, E and Handal, R. 2018. Illegal hunting in Jordan: Using social media to assess impacts on wildlife. *Oryx*, **52**: 730–735.
- Mallon, D and Budd, K. 2011. **Regional Red List Status of Carnivores in the Arabian Peninsula**. IUCN, Sharjah, UAE.
- Mech, LD. 2017. Where can wolves live and how can we live with them? *Biological Conservation*, **210**: 310–317.
- Mech, LD and Boitani, L. 2004. Grey wolf. In: Sillero-Zubiri, C, Hoffmann, M and Macdonald, DW.(Eds), **Canids: Foxes, Wolves, Jackals and Dogs. Status Survey and Conservation Action Plan**. IUCN/SSC Canid Specialist Group, Gland, Switzerland and Cambridge, UK, Pp.124-129.
- Seddon, PJ and Khoja, AR. 2003. Youth attitudes to wildlife, protected areas and outdoor recreation in the Kingdom of Saudi Arabia. *Journal of Ecotourism*, **2**: 67–75.
- Shalmon, B. 1986. Wolves in the southern Arava. *Re'em*, **5**:60-74.