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**Arabian leopard in Yemen – an update**

**The Arabian leopard *Panthera pardus nimr* is assessed as Critically Endangered in the IUCN Red List of Threatened Species. Only limited and disjointed information is available from Yemen. However, in the last few years, several reports turned up on social media. They were mostly cases of illegal killing, but often from areas where scholars believed the leopard to be extinct, especially from the Al Dhabiyaniyah region. There was even one report of reproduction. Whilst active in situ projects remain highly unlikely due to the armed conflict, citizen science reports and social media should continually be surveyed to gather all possible information on these largely unknown populations.**

The smallest subspecies of the leopard *P. par-dus* is the Arabian leopard, which is endemicto the Arabian Peninsula and was assessed as Critically Endangered in the IUCN Red List of Threatened Species (Mallon et al. 2008). Back in 2006, Sanid Organization, Natural Conservation Sector (SONCS) Special Issue 1 presented the known information about the status of this subspecies. At that time, recent confirmed records were only reported from western and south-western Saudi Arabia, western Yemen, and southern Oman (Spalton & Al Hikmani 2006). In Yemen, there were recent records of leopards captured in the central part of the western highlands, notably around Wada’a, and verbal reports of presence or possible presence­ in other parts of the western moun-tains, southwest Yemen, central-southern Ye-men, and Al Mahra in eastern Yemen (Al Ju-maily et al. 2006). Accordingly, the newest Red List assessment (Al Hikmani et al. 2023) shows only two small patches as “Extant”, but three

more as “Possibly Extant”, underlying the con-tinuous shortage of confirmed information.

At the time, some field visits tried to gather more information on the occurrence of Arabian­ leopards in specific areas in Yemen (e.g. Mal-lon 2009). In 2009, the Foundation for the Pro-tection of the Arabian Leopard in Yemen FPALY was founded as a local NGO. FPALY undertook several field surveys within historic leopard range, conducted education and awareness­ programmes, and liaised on leopard conserva-tion with national and regional­ governments. From December 2010 to January 2011, FPALY installed 12 trail cameras in Hawf Protected Area in south-east Yemen, close to the bor-der with Oman (Pittet 2011a). On 18 January 2011, two photos of a leopard were taken, and a further­ photo on 24 February 2011 (FPALY 2011a, b). No photos have been obtained since then. It is not known if a breeding population occurred in Hawf, or whether the leopards

protection and conservation measures would be.

photographed were from the known popula­ tion in Dhofar (Oman), just across the bor-der. At that time, a partial (4 km long) border fence was in place. This fence has since been extended­ and strengthened and now forms a formidable­ barrier to wildlife, severing connec-tivity between Hawf and contiguous habitat to the east. Pittet (2011a, b) reported that only older herders were aware of leopard depreda-tion in this region and that people had gener-ally a low and rather mystical understanding of the species. It is unclear, whether leopards occasionally discovered in the Hawf reserve are resident animals or transitory individuals from the Oman population.

In late 2011, a video was posted on YouTube of a leopard captured in Lawdar. FPALY repre-sentatives met with the Director-General of Lawdar District to discuss leopard conserva-

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tion in the area (FPALY 2011c). In 2012, a photograph of an injured leopard captured in Shabwa governorate apparently in a steel-jawed trap, was posted on social media. This area was considered as “probable” leopard range in 2006 (Al Jumaily et al. 2006).

Since late 2014, Yemen has been in the grip of an ongoing civil war. Armed conflicts mostly negatively­ impact fauna and flora in the af-fected areas (Gaynor et al. 2016). It must be as-sumed that the situation of the Arabian leopard has become even more dire since 2014; but field surveys, missions by the Environment Protection Agency (EPA), and conservation ac-tivities of any kind have become extremely dif-ficult. Soon after the beginning of the civil war, it was reported that Arabian leopards held in captivity in Yemen, which would be crucial to be integrated into the conservation breeding programme, were suffering up to starvation (Bürki & Breitenmoser 2016).

Photos of leopards killed or captured have continued to be posted on social media. Since­ 2016, one of the authors (AAF) has collat­ ed online posts. Many of the online reports originate­ from the Al Dhabiyaniyah region of southern Yemen, and more recently from Al

12 Dhale’ Governorate, with some from other lo-cations in southern Yemen (Table 1). At least

10 leopards were estimated to have been killed or caught in Al Dhabiyaniyah from 2015 to 2021 and the EPA has investigated at least 18 cases of capture or killing in this region. In September 2021, OB received reports of “sev-eral cases of killing” of leopards including a recent case in Al Dhabiyaniyah.

In March 2022, a report by the Sanid Organi-sation for Relief and Development SORD men-tions 22 illegally hunted leopards since the be-ginning of the armed conflict (SORD 2022). The Sanid Organization for Nature Conservation SONC sent a report to the IUCN SSC Cat Spe-cialist Group in May 2022 listing 21 cases of leopards (including 4 cubs) illegally killed since 2014 (SOM 1). These included many of the re-ports referred to above from Al Dhabiyaniyah, with others from Lawdar and Hawf (Fig. 1).

Al Dhabiyaniyah is a remote mountain re-gion situated where the borders of the three governorates of Al Dalie’, Al Bayda and La-hej meet. AAF has visited Al Dhabiyaniyah to raise awareness of the persecution and the importance of this leopard population, and met with local leaders and negotiated agreements between them on behalf of the Environmental Protection Agency EPA to stop the persecution. The number of posts and photos of leopards captured or killed in this

region since 2014, plus the verbal reports of presence and depredation given to AAF dur-ing his visits strongly suggests that the region harbours a leopard population of unknown size – but one that is clearly in great­ peril from the ongoing persecution. A short video sequence of a leopard was obtained recent-ly in Al Dhabiyaniyah. It is unclear whether these reports represent a single popula­tion, several nuclei, and/or animals moving­ be-tween them. The approximate location of the recent leopard incidents and main locations in Al Dhabiyaniyah are shown in Fig. 2. There are very old records of leopards from Al Bay-da, and some more recent unconfirmed re-ports of presence in this general area, but the occurrence of a breeding population here has been overlooked until very recently, including the latest review (Jumaily et al. 2006). In late 2023, the office of the Prime Minister issued a draft decree declaring an Arabian Leopard Reserve in Al Dhabiyaniyah covering approx-imately 6,765 km2 (two core area totalling 1,067 km2; buffer zone 1,857 km2; utilisation zone 2,940 km2).

The precise location of most of the other inci-dences of killing and capture listed in Table 1 is not known, and the map (Fig. 1) is therefore not very accurate.

**Table 1.** Records of illegally killed leopard in Yemen in recent years. ID: locations with coordinates are designated by numbers, locations

where only a place name is given are designated by letters (see Fig. 1). Ind.: number and (where known) sex of killed individuals.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **ID** | **Date** | **Location** | **Ind.** | **Source** |
| a | 2011 | Hawf Protected Area, Al Maharah | 1M-2 | FPALY 2011a, b |
| b | 2011 | Lawdar (Video on Youtube) | 1 | FPALY 2011c |
| c | 2012 | Shabwa | 1 | (D. Mallon, pers. comm.) |
| d | 2015–20 | Al Dhabiyaniya | 10 | AAF |
|  | thereof | Al-Shuaib | 2\* | AAF |
|  |  | Al-Jouben district | 1 | AAF |
|  |  | Khabah village, Al-Qwaim subdistrict | 1 | AAF |
| e | Jul 2019 | Kur Al Awalik mountains, Shabwa | 1\*\* | AAF |
| f | recently | Al Dhale’ | 1 | OB |
| g | 2015-22 | Various | 22 | SORD |
| h | 6 Jul 2014 | Al Shuaib, Al Dhale’ | 3 | SONC |
| i | 22 Oct 2014 | Hudub area, Hawf Protected Area, Al-Mahra | 2 | SONC |
| 1 | 5 Dec 2014 | Lab’ous Hateeb, Yafa’ district, Lahej | 1 | SONC |
| 2 | 5 Nov 2016 | Juban area, Al-Dhale’ | 1 | SONC |
| j | 22 Feb 2017 | Hallak mountains, Mudiyah district, Abyan | 1 | SONC |
| 3 | 22 Dec 2017 | Juban area, Al Dhale’ | 1 | SONC |
| 4 | 21 May 2018 | Al Shuaib area, Al Dhale’ | 2 | SONC |
| 5 | 9 Jan 2020 | Hadd area, Yafa’ district, Lahej | 1 | SONC |
| 6 | 5 Apr 2021 | Wadi Shi’b Al-Dhabi, Al-Hawzn area, Lawdar district, Abyan | 1F\*\*\* | SONC |
| 7 | 2 Jul 2021 | Shi’b Al-Dhabi, near Jabal Thara, Abyan | 2 | SONC |
| k | Apr 2022 | Aqtan area, Wadi Bana, Halaymin district, Lahej | 1 | SONC |
| l | Apr 2022 | Al-Dhabiyaniyah, Abyan | 1F + 4juv | SONC |

* Animals believed to have left the breeding area on search for food
* Does not refer to an illegal killing, but to leopard vocalisation and attack on livestock.
* Unclear whether the animal caught in a trap for hyenas was killed or survived.

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**Fig. 1.** Map of the approximate locations of the Arabian leopard re-cords from Yemen according to Table 1 (dark blue circles, numbers and letters). The polygons indicate where the Arabian leopard is believed to be Extant (red) and Possibly Extant (orange; Al Hikmani et al. 2023).

**Fig. 2.** Location of recent Arabian leopard reports in the Al Dhabiyani-yah region (map prepared by Eng. Abdullah A. H. Aboalfotooh, EPA).

An additional Facebook post sent to AAF came from a local biologist in Shabwa gover­ norate, farther to the east, who said local Bedu reported hearing leopard vocalisations and recorded depredated livestock in the Kur al Awaliq mountains.

It is believed that leopards once occurred all along the mountains of western Yemen (Al Jumaily et al. 2006). The latest confirmed evidence is leopards captured in the Wada’a area of Amran governorate in the late 1990s/ early 2000s. No social media posts referring to western Yemen have been reported so far. Whether leopards survive in any part of west-ern Yemen is not known, though there have been local reports of presence at several sites in the last 10 years.

It is impossible to establish the exact number of different events from the various sources, but indeed, only two pictures were present­ ed by both, AAF and SONC. We assume that there is some overlap between the different­ sources, but each report also contained events not listed in the other one. At least 20 leopards – mostly killed animals – have been recorded from areas with few or no former records. The fact that Arabian leopards in Yemen are readily killed is worrying, but the extent of the cases seems to indicate that the distribution of the leopard in Yemen may still be larger than previously assumed. Sex and age of the animals killed was mostly not reported or not visible from many of the pho-tos; we cannot assess how many of the dead leopards might have been dispersing males outside the permanently occupied areas. One case of the killed female in Al-Dhabiyaniyah area, Abyan governorate, with its four “less-than-a-month” old juveniles (see SOM 1, Pic-ture 11), proves reproduction in this area.

Al Hikmani et al. (2023) estimate the Arabian

leopard population in Yemen to be fewer than 50 individuals, but this is highly speculative. They assume that the leopard may still exist in five sites, namely the northern part of the west-ern highlands (between Sa’dah and the Saudi border), the central-western highlands (Jebel Bura’a), southwest Yemen (between Taizz and Ad Dale), southeast Yemen (Lawdar area in Abyan governorate) and Hawf in Al Mahra, as already suggested by Al Jumaily et al. (2006). It is unrealistic to expect reliable density esti-mations in Yemen in the near future, but con-sistent collection of citizen science data may shed some light on the extant distribution. Social media seems to be a promising source of leopard records from Yemen. We encourage all who have access to social media and any other sources to collect as much information on leopards in Yemen as possible and to share it with the conservation community.

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Supporting Online Material SOM Figures F1–F11 are available at [www.catsg.org.](http://www.catsg.org)

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