



The Journal of Threatened Taxa (JoTT) is dedicated to building evidence for conservation globally by publishing peer-reviewed articles online every month at a reasonably rapid rate at www.threatenedtaxa.org. All articles published in JoTT are registered under [Creative Commons Attribution 4.0 International License](https://creativecommons.org/licenses/by/4.0/) unless otherwise mentioned. JoTT allows unrestricted use, reproduction, and distribution of articles in any medium by providing adequate credit to the author(s) and the source of publication.

Journal of Threatened Taxa

Building evidence for conservation globally

www.threatenedtaxa.org

ISSN 0974-7907 (Online) | ISSN 0974-7893 (Print)

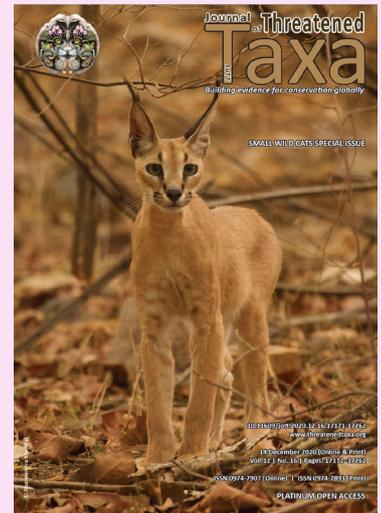
REVIEW

HISTORICAL AND CURRENT EXTENT OF OCCURRENCE OF THE CARACAL *CARACAL CARACAL* (SCHREBER, 1776) (MAMMALIA: CARNIVORA: FELIDAE) IN INDIA

Dharmendra Khandal, Ishan Dhar & Goddilla Viswanatha Reddy

14 December 2020 | Vol. 12 | No. 16 | Pages: 17173–17193

DOI: 10.11609/jott.6477.12.16.17173-17193



SMALL WILD CATS
SPECIAL ISSUE



For Focus, Scope, Aims, Policies, and Guidelines visit <https://threatenedtaxa.org/index.php/JoTT/about/editorialPolicies#custom-0>

For Article Submission Guidelines, visit <https://threatenedtaxa.org/index.php/JoTT/about/submissions#onlineSubmissions>

For Policies against Scientific Misconduct, visit <https://threatenedtaxa.org/index.php/JoTT/about/editorialPolicies#custom-2>

For reprints, contact <ravi@threatenedtaxa.org>

The opinions expressed by the authors do not reflect the views of the Journal of Threatened Taxa, Wildlife Information Liaison Development Society, Zoo Outreach Organization, or any of the partners. The journal, the publisher, the host, and the partners are not responsible for the accuracy of the political boundaries shown in the maps by the authors.

Member



Publisher & Host





Historical and current extent of occurrence of the Caracal *Caracal caracal* (Schreber, 1776) (Mammalia: Carnivora: Felidae) in India

Dharmendra Khandal¹ , Ishan Dhar² & Goddilla Viswanatha Reddy³

^{1,2}Tiger Watch, Maa Farm, Ranthambhore Road, Sawai Madhopur 322001, Rajasthan, India.

³Rajasthan Forest Department, Aranya Bhavan, Jhalana Doongri, Jaipur 302004, Rajasthan, India.

¹dharmkhandal@gmail.com, ²dhar.ishan@gmail.com (corresponding author), ³gvreddy.rajforests@gmail.com

Abstract: This article focuses on the historical and current extent of occurrence of the Caracal *Caracal caracal* in India between 1616 and April 2020. We collated 134 reports during this period. Historically, the Caracal was reported in 13 Indian states in nine out of 26 biotic provinces. Since 2001, the Caracal's presence has been reported in only three states and four biotic provinces, with only two possible viable populations. Before 1947, the Caracal was reported from an area of 793,927km². Between 1948 and 2000, the Caracal's reported extent of occurrence in India decreased by 47.99%. From 2001 to 2020, the reported extent of occurrence further decreased by 95.95%, with current presence restricted to 16,709km², less than 5% of the Caracal's reported extent of occurrence in the 1948–2000 period.

Keywords: Camera trapping, habitat reduction, historical reports, Gujarat, Madhya Pradesh, Rajasthan, small wild cat.

Editors: Angie Appel, Wild Cat Network, Bad Marienberg, Germany and Shomita Mukherjee, Salim Ali Centre for Ornithology and Natural History (SACON), Coimbatore, India.

Date of publication: 14 December 2020 (online & print)

Citation: Khandal, D., I. Dhar & G.V. Reddy (2020). Historical and current extent of occurrence of the Caracal *Caracal caracal* (Schreber, 1776) (Mammalia: Carnivora: Felidae) in India. *Journal of Threatened Taxa* 12(16): 17173–17193. <https://doi.org/10.11609/jott.6477.12.16.17173-17193>

Copyright: © Khandal et al. 2020. Creative Commons Attribution 4.0 International License. JoTT allows unrestricted use, reproduction, and distribution of this article in any medium by providing adequate credit to the author(s) and the source of publication.

Funding: None.

Competing interests: The authors declare no competing interests.

Author details: DHARMANDRA KHANDAL, Ph.D. has served as conservation biologist with Tiger Watch since 2003. His work with Tiger Watch has involved groundbreaking initiatives in proactive anti-poaching, the monitoring of wildlife & research. He has also forged new frontiers in the world of community based conservation in the Ranthambhore Tiger Reserve. ISHAN DHAR became associated with Tiger Watch when the Village Wildlife Volunteer Program commenced in 2015 and has been an active participant in Tiger Watch conservation interventions ever since. He has served on Tiger Watch's Board of Directors since 2017. He has co-authored a book on the Village Wildlife Volunteer program titled *Wildlife Warriors*. G.V. REDDY, Ph.D., PCCF (Retd.) retired as Head of Forest Forces in the Rajasthan Forest Department in October 2020. He has previously served as DCF, Ranthambhore National Park where his interventions saw the revival of tiger populations and he was also the only forest officer to accompany US President Bill Clinton in the National Park in 1999. He has also served on deputation to the Aceh Forest and Environmental Project in Indonesia.

Author contribution: Dharmendra Khandal—collation of reports, provision of photographs and preparation of text and maps. Ishan Dhar—collation of reports and preparation of text. G.V. Reddy—provision of reports, preparation of text and maps.

Acknowledgements: The authors are grateful to the following persons for generously providing meticulously documented reports of the Caracal in India: Aditya Singh, Adesh Shivkar, Balendu Singh, Bijo Joy, Bharat Singh, Gurmit Singh, H.S. Pabla, Harshvardhan Singh Mahechha, Jagat Sinh Sodha, Jugal Tiwari, K. Rungta, L.K. Chaudhary, Mahijit Singh, Margarita Steinhardt, Manoj Parashar, Nagendra Singh Johjawa, Pankaj N. Joshi, Raghunandan S. Chundawat, Raj Chauhan, Rahul Bhatnagar, Salim Ali, Sharad Agarwal, Sunil Sarkar, Subhas Sharma, Sudarshan Sharma, Sujan Bhai Raibari, Soonoo Taraporewala, Shivhadra Singh, Shyamendra Singh, Yogendra Shah, and Dinesh Sharma. We specially thank the following individuals for their tireless assistance throughout the preparation of this article and for providing their documented reports of the Caracal in India: Valmik Thapar, Divyabhanusinh Chavda for his guidance with historic literature, Harshvardhan, Asad Rahmani, M.K. Ranjitsinh, Y.K. Sahu, Jaisal Singh & Anjali Singh, Yusuf Ansari, Nirav Bhatt, Vikram Sinh Sodha, Harimohan Gurjar for their records and assistance, Wheeler Thackston for his translations of the Persian manuscript of the *Jahangirnama*, Sonia Mondal for accessing specimen reports at the ZSI, Satish Sharma for procuring numerous reports throughout Rajasthan, Ravindra Singh Tomar, & Sameer Bajar for accessing specimens in the collection of the Bombay Natural History Society museum, Y.V. Jhala, Meenu Dhakad, & Praveen Kumar for preparing maps, Giriraj Singh Kushwaha, Gobind Sagar Bhardwaj, Bharat Jethva, Deepak Goswami, & Ashok Chaudhary, the Rajasthan Forest Department, and the Village Wildlife Volunteers of Tiger Watch Ranthambhore. We thank three anonymous reviewers, Shomita Mukherjee and Angie Appel for constructive comments on the manuscript and suggesting crucial changes.



INTRODUCTION

The Caracal *Caracal caracal* is among the most widespread of small wild cats, distributed across at least 20 million km² including 42 African and 18 Asian countries (Avgan et al. 2016). The oldest report of the Caracal in the Indian subcontinent is a fossil from the Indus Valley Civilization dating to 3000–2000 BCE (Ghosh 1982). In Asia, the Caracal's historical range overlaps with small ungulate species such as Blackbuck *Antelope cervicapra* in India (Sunquist & Sunquist 2002) and Chinkara *Gazella bennettii* in Iran and India (Sunquist & Sunquist 2002; Farhadinia et al. 2007; Ghoddousi et al. 2009; Moqanaki et al. 2016). The Caracal is known to inhabit the drier parts of India (Kitchener 1991; Corbett & Hill 1992; Nowell & Jackson 1996). Knowledge of its conservation status, however, is largely outdated, especially for the Asian populations (Moqanaki et al. 2016).

The Caracal has a long and unique history with humans in Asia where it was valued for its litheness and ability to catch birds in flight (Vigne 1842; Lydekker 1907; Sunquist & Sunquist 2002). The Caracal's iconic large black ears with long tufts of hair at the tips are emphasized in its name, which originates in the Turkish word 'Karakulak', meaning 'Black Ear' (Buffon 1761). In India, it is vernacularly known as 'Siya Gosh', a Persian name meaning 'Black Ear' (Harting 1883). A Sanskrit fable accounts of a small wild cat named Dirgha-karan or 'long-eared' preying on a bird's chicks (Capeller 1891; Arnold 1893). This cat might be a Caracal. The Sanskrit name 'sas-karan' meaning 'rabbit-like ears' was proposed by Vira et al. (1953) in an attempt to establish a Sanskrit nomenclature for the fauna of India, Myanmar and Sri Lanka following the Linnaean system of classification.

In India, the Caracal was used as a coursing animal during the period of the Delhi Sultanate in the late medieval period (Divyabhanusinh 1993; Verma 1994; Thapar et al. 2013). In the 14th Century, Firuz Shah Tughlaq was thought to have established a provision called 'Siyah-Goshdar Khana' solely dedicated to the maintenance of large numbers of coursing Caracal (Verma 1994). The Third Mughal Emperor Akbar furthered the reputation of the Caracal as a coursing animal and used it extensively for coursing (Blochmann 1873). It was also represented in illustrated simplified Persian adaptations of texts sourced from Sanskrit, Turkic and Arabic literature such as Anvar-i-Suhayli, Tutinama, as well as Persian poetry and epics such as Khamsa-e-Nizami and Shahnameh (Maurice 1953), which are full of wildlife fables. The Caracal's historical use as a coursing animal might have taken it far beyond its natural range in places like the

Ladakh region in the Himalaya (Pocock 1939) along with Calcutta in West Bengal (Brandon-Jones 1997).

The Caracal in India has been considered rare in the wild since at least 1671 (Foster 1924, 1926), and several naturalists commented on its rarity (Hamilton 1727; Blyth 1842; Stoliczka 1872; Jerdon 1874; O'Malley 1909; Allen 1919; Sharma & Sankhala 1984a). We think that its rarity may be explained by the economic development of India. The country is primarily an agrarian economy, with 70% of the human population living in rural areas (Chand et al. 2017). In the 20th Century alone, India's human population grew six-fold, which along with economic growth resulted in the total forest area decreasing from 1,000,000–810,000 km² (Tian et al. 2014). Agricultural land in India increased from 1,000,000–1,200,000 km² between 1880 and 1950 (Tian et al. 2014). Approximately, 200,000km² of grassland and shrub land, along with 260,000km² of forests are estimated to have been converted for agricultural use from 1880 to 2010 (Vanak et al. 2017).

Landscapes in India have significantly been transformed by such anthropogenic factors. Against the backdrop of these large-scale changes, we consider it important to examine the change in the extent of occurrence of the Caracal in India. The prevalence of coursing Caracal historically along with the seemingly elusive behaviour of wild Caracal makes this a challenging endeavour.

We collated all credible reports of the Caracal in India from the beginning of recorded history until April 2020, mapped its historical range and assessed changes in its present extent of occurrence.

Study area

Historical sites with Caracal reports were spread across northwestern and central India to the states of Jharkand and Odisha in the east. This region contains four biogeographic zones with 10 biotic provinces (Table 1; Rodgers et al. 2002). The climate in this region is dominated by the south-west Asian monsoon with rain falling in the months of June to September (Prakash et al. 2015). During this season, the mean annual rainfall varies from 100–500 mm in the Thar Desert (Roy & Singhvi 2016) and increases eastwards to over 1,300mm (Prakash et al. 2015). Mean annual temperatures range from 3–10°C in the cold season to 45–50°C in the hot season (Roy & Singhvi 2016). It also must be stated that the international border between India and Pakistan passes through the states of Rajasthan, Gujarat, and Punjab. Permanent fencing began in the 1980s and has now almost been completed (Gupta 2018). Thus, while

Table 1. Biogeographic zones and biotic provinces in northern, western, and central parts of India described by Rodgers et al. (2002)

Biogeographic zone	Biotic provinces	Main characteristics
7: Gangetic Plain	7A: Upper Gangetic Plain in Uttar Pradesh and southern Uttarakhand 7B: Lower Gangetic Plain in Bihar and Bengal	River basin with alluvial barriers
4: Semi-arid	4A: Semi-arid Punjab Plains in Punjab, Haryana, Delhi, and a pocket of northeastern Rajasthan 4B: Semi-arid Gujarat Rajputana in Rajasthan, Gujarat and northwestern Madhya Pradesh	Discontinuous xerophytic vegetation cover with open areas of bare soil due to reduced ground and surface water
3: Desert	3A: Thar Desert in Rajasthan 3B: Kutch Desert in Gujarat	Sand dunes Salt marshes with flooded grasslands towards the coast of the Arabian Sea
6: Deccan Peninsula	6A: Central Highlands in Madhya Pradesh, southern Uttar Pradesh, pocket of southwestern Bihar, northwestern Chhattisgarh and pockets of northern Maharashtra 6D: Central Plateau in Maharashtra, northern Karnataka, Telangana, and a pocket of northern Andhra Pradesh 6B: Chotta Nagpur in Jharkhand, southern Bihar, northern Odisha, a pocket of West Bengal, and northeastern Chhattisgarh 6C: Eastern Highlands in Chhattisgarh, Odisha, and Andhra Pradesh	Tropical dry and moist deciduous forests

the border was not always an obstacle for the movement of wildlife, it has certainly evolved into a substantial obstacle.

Camera trapping was conducted in the peripheries of Ranthambhore Tiger Reserve and National Chambal Sanctuary, in Sawai Madhopur District and Dholpur Reserve Forest, all located in Rajasthan.

MATERIAL AND METHODS

Survey on literature, specimens in collections and interviews

We searched for literature about wild Caracal in India from the start of recorded history to 2020 including the writings of credible authors such as naturalists, zoologists, natural historians, historians, forest officers, gazetteers, chroniclers, erstwhile royalty, and army officers. Literature was sourced online and in the libraries of the India International Centre, Maharaja Fatehsingh Rao Gaekwad Library at the WWF-India secretariat and at the Indira Gandhi National Centre for the Arts, all in New Delhi; and in the library of University of Rajasthan in Jaipur. Literature was also provided by Valmik Thapar, Divyabhanusinh Chavda, and Satish Sharma.

We examined Caracal specimens deposited at the Bombay Natural History Society (BNHS), Zoological Survey of India (ZSI), the Natural History Museum in London, private trophy collections in India, and other museums. We also conducted open-ended interviews with forest

officers and biologists who observed the Caracal in the field and people who provided photographs.

We assessed the reliability of the information obtained and categorized reports into:

A confirmed reports based on tangible evidence like photographs, specimens including animal carcasses or body parts that can be accessed currently;

B confirmed reports based on direct sightings of live or dead individuals, specimens submitted to museums that are no longer accessible or missing, photographic reports that are no longer accessible, destroyed or missing;

C confirmed reports that indicate Caracal occurrence through species specific information which includes species description and the provision of distinct vernacular names;

D unconfirmed or questionable reports without any accompanying description, photos or erroneous description.

Reports of captive or coursing Caracal are strictly not included as their wild origins are unknown unless explicitly stated.

Camera trapping

Regular camera trapping using Cuddeback X-Change™ 1279 models was carried out in selected sites on the peripheries of Ranthambhore Tiger Reserve by the NGO Tiger Watch Ranthambhore and Rajasthan Forest Department under the Village Wildlife Volunteer Program since 2015 (Dhar & Dhakad 2018; Parashar

2020). Camera trapping is carried out each year by trained villagers for monitoring Tiger *Panthera tigris* and other wildlife outside the protected area. The average distance between camera traps is 2km, which we consider as one single complex. The camera traps are placed on forest paths, human trails and dry riverbeds where the opportunity to report wildlife was considered optimal. Camera traps were placed at a height of 45–47 cm above ground and were usually mounted on trees or tree stumps on one side of trails. Geo-coordinates of these locations were determined using Garmin GPS eTrex 10. Trained village wildlife volunteers checked the camera traps daily. Due to the movement of people, camera traps are deployed from 17.00h to 07.00h, making most of the detections nocturnal. In December 2015, 10 cameras were operational with 310 camera trap nights. Between 2016 and April 2020, 50 camera traps were active in various locations throughout the year, resulting in a total of 79,310 camera trap nights. Camera traps are fixed at 30 locations, while additional camera traps are deployed when required for situations like a Tiger moving out of the protected area or at the request of the Rajasthan Forest Department.

Extent of occurrence maps

To account for international boundary changes that have occurred in the region, we sorted the collated information into three categories. The first category entails all reports from undivided India until 1947. The second category excludes Pakistan and entails reports from 1948 to 2000. Both categories are considered historical reports. The third category comprises contemporary reports from 2001 to April 2020, a time period when camera trapping and photography of wildlife became more common and resulted in the availability of authentic information.

Coordinates of each report were plotted using ARC GIS 10.3 where possible. If it was not possible to determine coordinates, then the centre of the province, principality or state was plotted. We visited all locations in the third category to gather data on habitat types and water sources. The geotagged locations were used to build extent of occurrence maps in QGIS 3.12 Bucuresti version and are also shown on a map of the Biogeographic Classification of India by Rodgers et al. (2002).

The outermost geotagged locations on the map were connected to plot a minimum convex polygon. More than 50 locations in a protected area (PA) are comprised in a single polygon, so that the entire PA formed one geotagged polygon on the map and is represented by digits on both the table and the map. Multiple locations

within the polygon are represented by Roman numerals in tables. Geotagged locations outside PAs in the same district were marked separately on the maps.

RESULTS

Historical reports until 2000

We found a total of 89 reports of the Caracal from 1616 to 2000 during our literature review, including 36 reports until 1947 (Table 2; Figure 1) and 53 reports from 1948 until 2000 (Table 3; Figure 2). These reports are from 13 states, viz Rajasthan, Gujarat, Madhya Pradesh, Uttar Pradesh, Punjab, Haryana, Delhi, Maharashtra, Jharkhand, Chhattisgarh, Odisha, Andhra Pradesh, and Telangana. In five regions, exact locations were unclear for the period before 1947 so that we used geographic centres including locations in Kutch, Gujarat (Stoliczka 1872), Chutia (Chota) Nagpur Division (Ball 1874), Kathiawar, Gujarat (Rice 1884), Northern Circars (Jerdon 1874) and South Punjab (Rose et al. 1908).

Historical reports of the Caracal from 1616 to 1947 extend over an area of 839,398km² (Figure 1), including an area of 45,471km² in Pakistan. If we subtract the area in Pakistan, the area within India's current borders extends over 793,927km². Reports from 1948 to 2000 extend over an area of 412,877km² (Figure 2).

Caracal specimens in collections

We found 13 Caracal specimens in collections (Table 4). Six of these specimens are known to have originated in Rajasthan, Gujarat, Madhya Pradesh, and Uttar Pradesh. While the Bombay Natural History Society (BNHS) had eight Caracal specimens in its collection from 1888 to 1907, only two of them remain today (Curator, BNHS in. litt. 2019).

Records from 2001 onwards

We obtained authentic Caracal records between 2001 and 2020 in Rajasthan (Table 5), Gujarat (Table 6) and Madhya Pradesh (Table 7). These records are mapped in Figure 3.

a. The Caracal in Rajasthan: All districts with Caracal records in Rajasthan are located in the Aravalli Hill range or the Vindhyan Hill range, except one in Bharatpur. The eastern and southern parts of Rajasthan are bounded by the Vindhyan Hill range. The Caracal was reported in 10 districts, viz, Sawai Madhopur, Karauli, Dholpur, Bharatpur, Alwar, Chittorgarh, Pratapgarh, Udaipur, Pali, and Rajsamand (Figure 3). Photographs were obtained in the districts of Sawai Madhopur, Karauli, Dholpur,

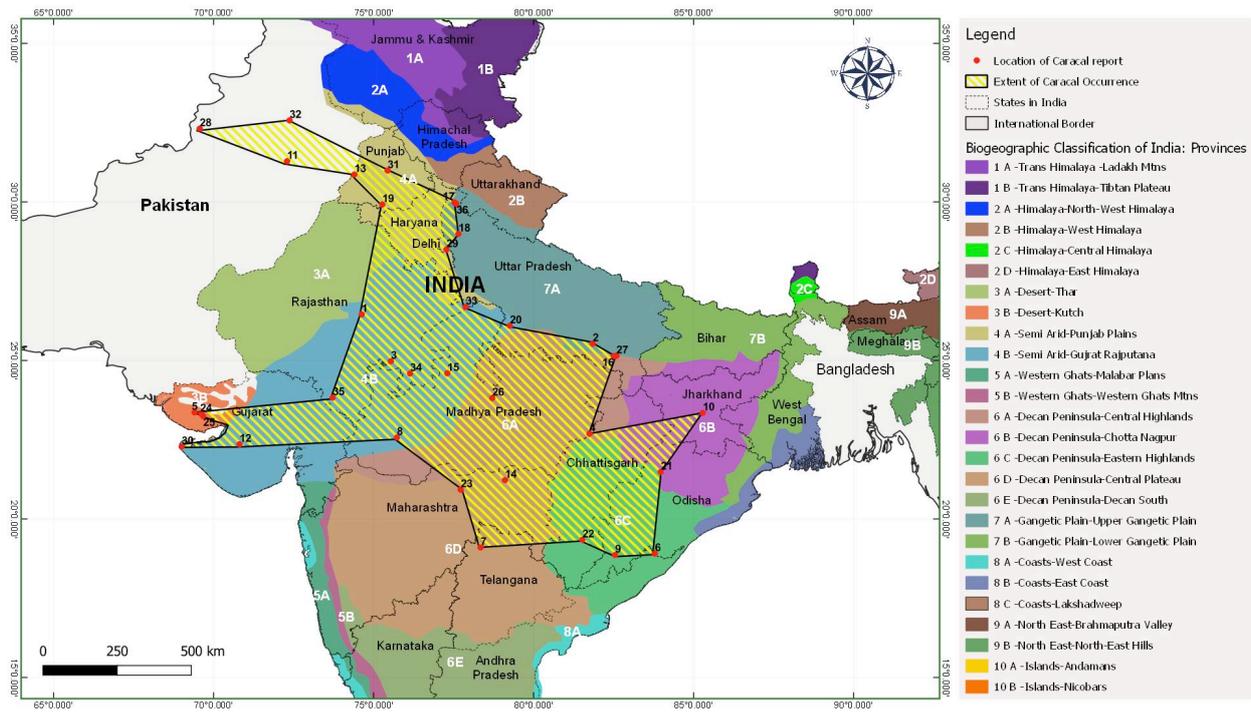


Figure 1. Caracal reports in India from 1616 to 1947.

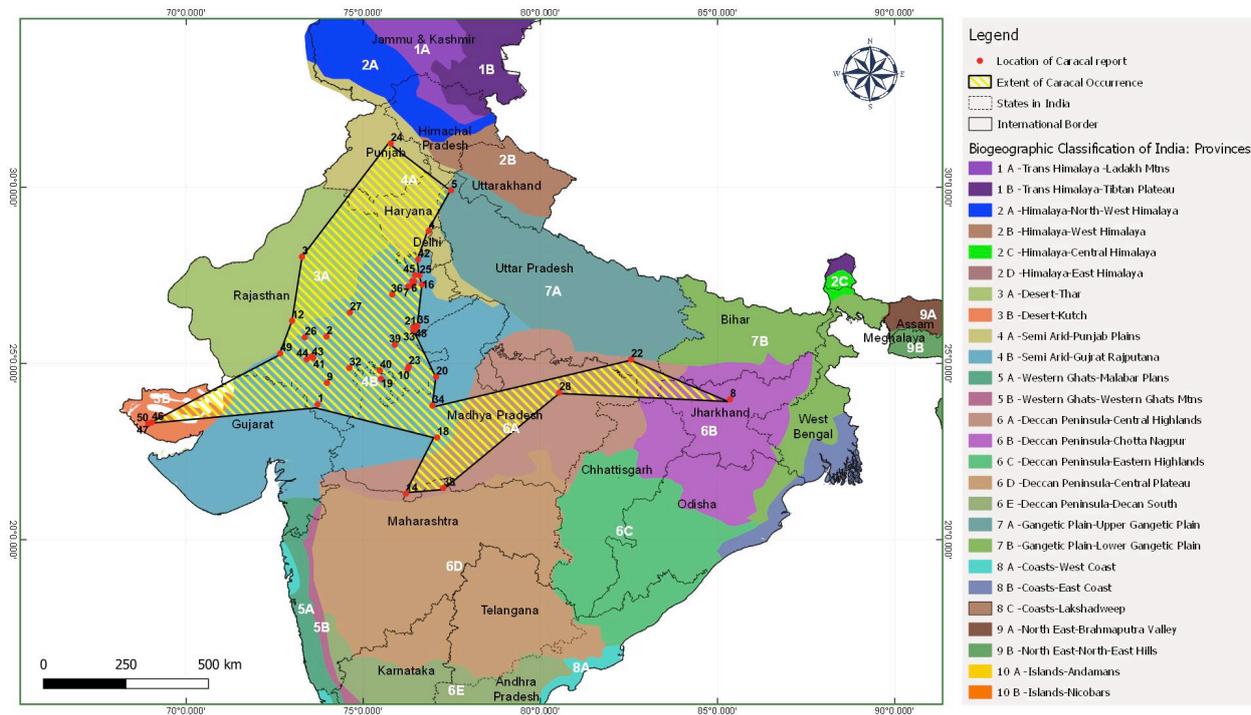


Figure 2. Caracal reports in India from 1948 to 2000.

Bharatpur, and Alwar. Outside PAs, the Caracal was reported in the districts of Sawai Madhopur, Dholpur, Udaipur, Alwar, and Pratapgarh, with most reports in

Udaipur District (Figure 3).

The village wildlife volunteers obtained 176 camera trap pictures of the Caracal between 2015 and April

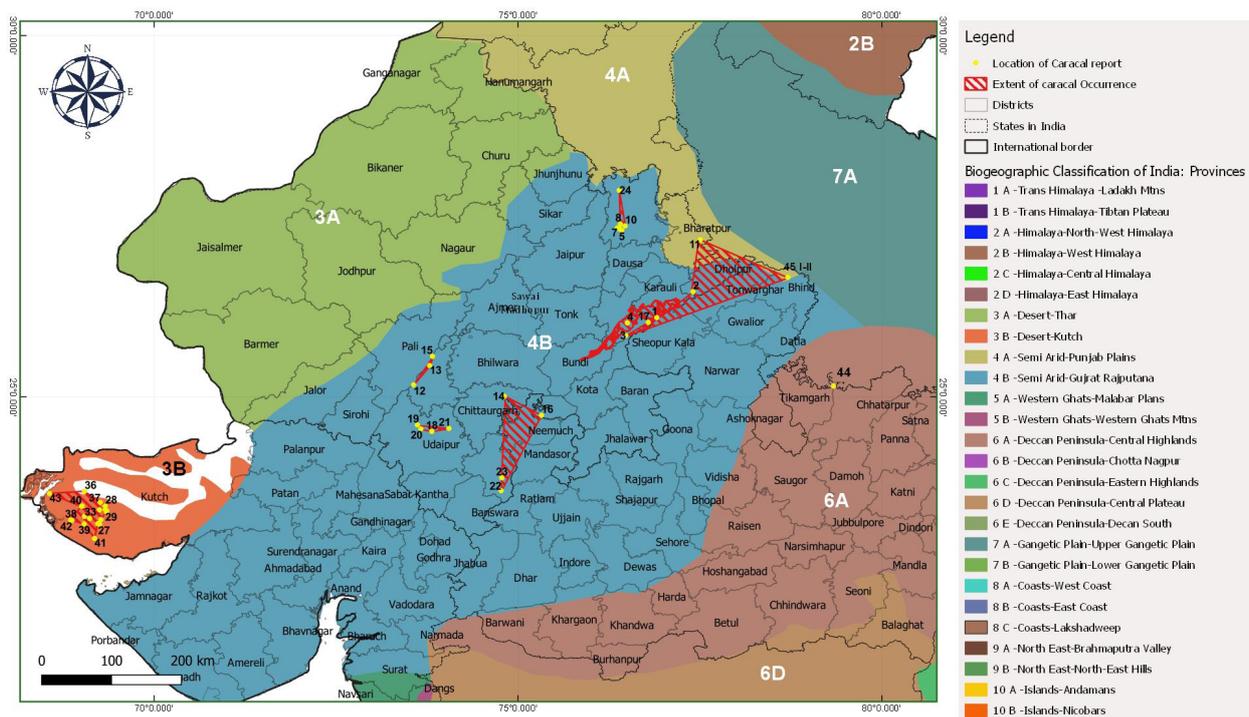


Figure 3. Caracal reports in India from 2001 to April 2020.

2020 at 23 locations, clubbed into six different areas in and around Ranthambhore Tiger Reserve (Table 5).

b. The Caracal in Gujarat: We found 19 reports of the Caracal in the state of Gujarat, all in the Kutch District. Nine of these reports are authenticated by photographs (Table 6).

c. The Caracal in Madhya Pradesh: We traced three Caracal reports in Madhya Pradesh at two locations (Table 7). Since none of these reports are supported by photographic evidence, they are category **B** accounts.

DISCUSSION

Our collation of literature revealed that knowledge of the Caracal’s presence in India until the end of the 19th century was based on just 17 locality reports. The locations of these reports are scattered over the states of Rajasthan, Delhi, Haryana, Punjab, Gujarat, Madhya Pradesh, Uttar Pradesh, Maharashtra, Andhra Pradesh, Telangana, Odisha, Jharkhand, and Chhattisgarh. It is possible that the rarity of reports was the reason for early naturalists assuming that the Caracal is rare in India. The Caracal’s historic range in India is very putative, as many reports are not supported by photographic evidence and can, therefore, neither be corroborated nor used to draw inferences. Although

Jerdon (1874) reported to have obtained specimens in Odisha and northern Andhra Pradesh, Blanford (1888–91) and Lydekker (1907) assumed that its presence is limited to northwestern and central India. Examination of literature on rock painting sites in Rajasthan, Gujarat, Madhya Pradesh and Uttar Pradesh revealed no clues on the Caracal, and hence there is no pre-historic report (Chakravarty & Bednarik 1997; Wakankar 2005, 2008; Saleem 2014; Sharma 2014; Gupta 2019).

Reports of the Caracal until the end of the 20th Century increased four-fold, indicating that the extent of the Caracal’s occurrence putatively stretched over an area of 1,040,598km² in 13 states and nine biotic provinces. After 2001, its presence has been documented in just three states until April 2020.

According to Mukherjee (1998), the Caracal occurred in five biotic provinces in India, viz, 3A: Thar Desert, 3B: Kutch Desert, 4B: Semi-arid Gujarat Rajputana, 6A: Central Highlands and 6D: Central Plateau of the Deccan Peninsula. From our collation of reports starting in 1616, the Caracal was reported from four more biotic provinces in addition to those listed by Mukherjee (1998). These are 4A: Semi-arid Punjab Plains, 7A: Upper Gangetic Plain, 6B: Chotta Nagpur and 6C: Eastern Highlands in the Deccan Peninsula.

Authenticated reports supported by specimens and photographs are from 4B: Semi-arid Gujarat Rajputana,

Table 2. Chronology of Caracal reports in India until 1947.

No. on map	Date	Location	Report details	Source
1	1616	Ajmer, Rajasthan	Mughal Emperor Jahangir hunted a Caracal	B Thackston (1999); Thackston pers. comm. 2019
2	14.xi.1831	Phaphamau satellite township of Prayagraj, Uttar Pradesh	Caracal caught on the grounds of the circuit bungalow, a rest house. Parks (1850) was also acquainted with a captive Caracal owned by William Gardner.	B Parks (1850)
3	15.iv.1852	Bhainsrorgarh, Rajasthan	Saw a large Lynx (Caracal)	B Rice(1857)
4	1862–1864	Amarkantak, Madhya Pradesh	Hunted a Caracal. The Caracal was shot down from a tree at night and severely injured Forsyth's pack of hunting dogs, making it unlikely to be a case of mistaken identity with a Jungle Cat, which Forsyth (1889) separately identified.	B Forsyth (1889)
5	~1872	Kutch, Gujarat	Observed the Rao of Kutch hunting a Caracal	B Stoliczka (1872)
6	~1874	Northern Circars, Andhra Pradesh and Odisha	Caracal sighted or collected	B Jerdon (1874)
7	~1874	Neermul Jungle, Telangana	Caracal sighted or collected	B Jerdon (1874)
8	~1874	Mhow, Madhya Pradesh	Caracal sighted or collected	B Jerdon (1874)
9	~1874	Jeypore – Koraput, Odisha	Caracal collected and sent to Edward Blyth	B Jerdon (1874)
10	~1874	Chutia (Chota) Nagpur Division	Seen a Caracal	B Ball (1874)
11	~1883–1884	Jhang, Punjab, Pakistan	Detailed description of presence in the region. Vernacular name <i>bar billa</i> provided.	B Punjab Government (1884)
12	~1884	Kathiawar, Gujarat	Wild Caracals observed hunting hares by William Rice. Almost a century later, Dharmakumarsinhji (1978) only mentioned coursing Caracals in an article on Kathiawar. Dharmakumarsinhji's omission of wild Caracals presumably caused natural historians like Ranjitsinh (2017) to report that the Caracal in Gujarat was found only in the Kutch region.	B Rice (1884)
13	~1887	Mumdot, Ferozpur, Punjab	Missed a shot on a Caracal	B Newall (1887)
14	1888	Central Province, Maharashtra	Baker(1890) hunted a Caracal	B Baker (1890)
15	vii.1891	Goona (Guna), Madhya Pradesh	Caracal skull deposited by G.E. Money, Reg. no. 6056	A Sameer Bajar, Assistant Curator, BNHS collection in litt. 2019; Phipson (1891)
16	1892	Mirzapur, Uttar Pradesh	Caracal attacked a worker; Caracal was killed and its skeleton submitted to BNHS. First report of a Caracal attacking a human in India	B Drake-Brockman (1892); MacDonald (1893)
17	Early 20 th century	Saharanpur, Uttar Pradesh	Three Caracals shot in 20–30 years by J.C. Taylor and his brother. Taylor (1961) shot a Caracal that attacked him when he was 12 years old. Second report of an attack in India after Drake-Brockman (1892)	B Taylor (1961)
18	18.ii.1905	Khadir of Meerut, Uttar Pradesh	Smith and Parsons killed a Caracal	B Wardrop (1914)
19	~1908	South Punjab	Detailed description of presence in the region.	C Rose et al. (1908)
20	ix.1908	Jalaun District, Central Province, Uttar Pradesh	Caracal skin deposited at BNHS by L.R. Clarke	B Millard (1908)
21	~1909	Sambalpur, Odisha	Dogs killed a Caracal.	B O'Malley (1909)
22	~1909	Northwest Bastar, Chhattisgarh	Detailed description of presence in the region. Tribal people include the Caracal in their diet because they do not consider it to be a cat. First report of a Caracal being a food source for humans in India.	C De Brett (1909)

No. on map	Date	Location	Report details	Source
23	~1911	Amravati, Maharashtra	Detailed description of presence in the region. Vernacular name, <i>jhua</i> or <i>jhuva</i> distinct from that of the Jungle Cat provided.	C Fitzgerald & Nelson (1911)
24	~1912	Dhondsa, Kutch, Gujarat	Male Caracal skin	B Wroughton (1912)
25	~1912	Bhuj, Kutch, Gujarat	Female Caracal skin	B Wroughton (1912)
26	Christmas 1912	Sagar, Madhya Pradesh	A Caracal is hunted	B Maxwell (1914)
27	28.xii.1912	Mirzapur, Uttar Pradesh	Hunted a Caracal	B Allen (1919)
28	8.iv.1914	Wano, Waziristan, Pakistan	Caracal skin deposited at BNHS by F.L. Hughes, Reg. no. 6054	A Sameer Bajar, Assistant Curator, BNHS collection in litt. 2019
29	~1920	Tughlakabad, Delhi	Burke (1920) noted that he received the measurement details of a Caracal hunted by Lieut. Watson in Tughlakabad	B Burke (1920)
30	~1923	Okha, Devbhumi Dwarka, Gujarat	Detailed description of presence in the region	C Desai & Clarke (1923)
31	~1923	Punjab	A male Caracal hunted	B Ward (1923)
32	~1928	Punjab Salt range, Pakistan	Shot a Caracal	B Stockley (1928)
33	1932–1933	Dholpur, Rajasthan	Seen a Caracal	B Waddington (1933)
34	1920–1930	Lotiya Jheer Jhalawar, Rajasthan	Head mount of a subadult Caracal in Prithivi Vilas Palace, Jhalawar, Rajasthan	A Mahijit Singh pers. comm. 2019
35	1935	Nara Magra hillock, very close to Udai Vilas Palace, Dungarpur, Rajasthan	One Caracal head mount displayed in the dining hall of Udai Vilas Palace, Dungarpur, Rajasthan	A Image 3
36	1940s–1950s	Saharanpur, Uttar Pradesh	Shot three Caracals in 20 years. Holdsworth (1960) shot a Caracal in Saharanpur while hunting junglefowl <i>Gallus</i> and was not aware of the identity of the killed cat. Later, in 1962 Holdsworth shot two cats on junglefowl beats, which he identified as Caracal using the book by Brander (1923).	B Holdsworth (1960, 1962)

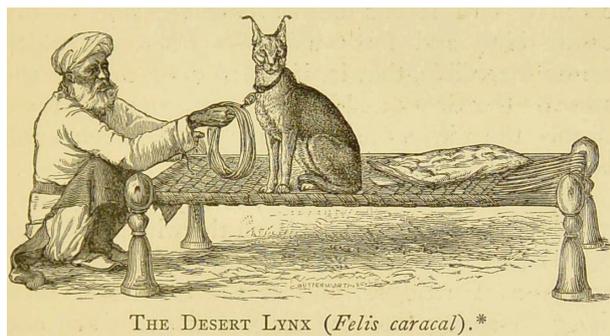


Image 1. A coursing Caracal with its keeper on a bedstead. A sketch depicted in an ‘Essay on Sport & Natural History’ by Harting (1883).



Image 2. The turquoise eyed Caracal of Juna Mahal, Dungarpur, a fresco commissioned ca. 1808–1845 during the reign of Maharawal Jaswant Singh II. The Caracal is represented with accuracy with the exception of its lion-like tail. Note the tufted black ears and turquoise eyes. © Dharmendra Khandal

4A: Semi-arid Punjab Plains, 3B: Kutch Desert and 6A: Deccan Peninsula Central Highlands. As many of the historical records are without specimens or photographs, mistaken identification with the Jungle Cat is possible. Such misidentifications are common even today, with

some faulty reports being perpetuated only because they are published, e.g., Gogate (1998).

Table 3. Chronology of Caracal reports from 1948 to 2000 in Indian national parks (NP), tiger reserves (TR), wildlife sanctuaries (WS) and outside protected areas (Figure 2).

No. on map	Date	Location	Report Details	Source
1	1948	Dungarpur, Rajasthan	Census carried out by Maharawal Lakshman Singh reported 38 Caracals	C Ranjitsinh (2017)
2	1–5.iii.1951	Satukhera (Satookhera) Block, Todgarh-Raoli Forest, Rajasthan	Keshav Sen Khaarwa hunted a Caracal	B Sharma (2015)
3	1954	Bikaner, Rajasthan	Saw a Caracal skin with a <i>Sansi</i> hunter who killed it in Bikaner and refused to sell the skin	B Prakash (1960)
4	1954–1958	Between Delhi and Rohtak, Harayana	Geoffrey C. Ward hunted a Caracal	B Ward & Ward (1993); Geoffrey C. Ward in litt. 2019
5	v.1955	Saharanpur, Uttar Pradesh	Caracal hunted by forest officer Srivastava.	B Srivastava (1959)
6	xii. 1956	Tamba Kan, Sariska TR, Rajasthan	Caracal cubs no older than 6-7 days captured; they died and their skins were identified by the ZSI in Calcutta	B Sharma & Sankhala (1984b)
7	xii.1956	Ajabgarh, Alwar, Rajasthan	Caracal spotted in grassy scrub land	B Sharma & Sankhala (1984a)
8	xii.1957	Hazaribagh NP, Jharkhand	Caracal seen	B Sen (1959)
9	1960	Kurabad, Udaipur	A Caracal shot by Raza Tehsin	B Satish Sharma in litt. 2020
10	30.i.1962	Amritkua Baran, Rajasthan	Caracal head mount	A Displayed in the Billiards Room of Umed Bhawan Palace Hotel, Kota, Rajasthan
11	v.1962	Sariska TR, Rajasthan	K. Rungta collected two Caracal cubs and raised them in Jaipur.	A Rungta (2017)
12	xi.1962	Jodhpur, Rajasthan	A ZSI scientist found a Caracal skin in a tanner shop in Jodhpur. The tanner told him it was killed by a <i>Bawri</i> hunter around Jodhpur in November 1962.	B Prakash (1994a)
13	1962–1963	Ajabgarh, Sariska TR, Rajasthan	Hunted a Caracal and photographed it	A Rungta pers. comm. 2019
14	1964	Burhanpur, Madhya Pradesh	Caracal sighted	B Ranjitsinh (2017)
15	1967	Sariska TR, Rajasthan	Seen a Caracal	B David (1967)
16	1967	Machedi Village, Alwar, Rajasthan	A mother Caracal with a cub seen by forest officer V.S. Saxena	B Satish Sharma in litt. 2020
17	1967	Kalighati, Sariska, Alwar, Rajasthan	A Caracal seen by forest officer V.S. Saxena	B Satish Sharma in litt. 2020
18	1970–1973	Ichhawar Range, Sehore District, Madhya Pradesh	Biologist Raghunandan S. Chundawat saw a Caracal cross the road and go into a teak forest	B Raghunandan S. Chundawat pers. comm. 2020
19	1970–1973	Gandhisagar WS, Madhya Pradesh	Biologist Raghunandan S. Chundawat saw a Caracal on foot, they flushed the Caracal from <i>Acacia</i> bushes in an overgrazed area. The Caracal ran away.	B Raghunandan S. Chundawat pers. comm. 2020
20	Unknown, before 1972	Teetarkheri Jhalawar, Rajasthan	A Caracal head mount in the possession of Vartol Jagirdar, Sabarkantha, Gujarat	A Satish Sharma pers. comm. 2019
21	1973	Ranthambhore TR, Rajasthan	A Caracal seen by forest officer V.S. Saxena	B Satish Sharma in litt. 2020
22	l.1975	Mirzapur, Uttar Pradesh	Two Caracal cubs collected and photographed by forest officer Ashok Singh. The photo of one of the cubs adorned the cover of <i>Cheetal</i> . Possibly the only photo of a Caracal from Uttar Pradesh.	A (Singh 1975)
23	~1975	Sangod Baran, Rajasthan	Caracal sighted	B Bharat Singh pers. comm. 2019
24	~1977–1979	Phagwara, Punjab	Caracal rescued from villagers who tried to beat it to death.	B Gurmit Singh pers. comm. 2019
25	v.1979	Buja, Sariska TR, Rajasthan	Caracal spotted in grassy plain in search light	B Sharma & Sankhala (1984a)
26	1980	Pali, Rajasthan	Five skins recovered thought to have been killed in Pali for skin trade	B Sharma & Sankhala (1984a)

No. on map	Date	Location	Report Details	Source
27	Unknown	Ajmer, Rajasthan	A Caracal killed by Daud Khan	B Sharma & Sankhala (1984a)
28	iii.1981	Shyamgiri Kalda Plateau, Madhya Pradesh	Skin of a Caracal poached by local people	B H.S. Pabla in litt. 2019; Shyamendra Singh pers. comm. 2019
29	ix.1981	Sariska TR, Rajasthan	Caracal seen by zoologist J.H. Reichhoff	B Stuart (1984)
30	~1982	Padam Talab, Ranthambhore TR, Rajasthan	Seen and photographed a Caracal	A Valmik Thapar in litt. 2020
31	xii.1982	Tehla, Sariska TR, Rajasthan	A dead Caracal collected by a forest officer	B Sharma & Sankhala (1984a)
32	Winter 1982	Chittorgarh, Rajasthan	Caracal caught and sent to Jaipur Zoo	B (Rungta 2017)
33	v.1983	Bodal Ranthambhore, Rajasthan	Caracal run over by a vehicle	B Sharma & Sankhala (1984a)
34	1982–1983	Road from Rajgarh to Narsingharh, 50–58 km distance, Rajgarh District, Madhya Pradesh	A Caracal road kill seen by biologist Raghunandan S. Chundawat.	B Raghunandan S. Chundawat pers. comm. 2020
35	11.iii.1984	Semli, Ranthambhore TR, Rajasthan	Caracal sighted by forest officer Fateh Singh Rathore	B Sharma & Sankhala (1984a)
36	1985	Ramsagar Talab, Nahargarh, Jaipur, Rajasthan	A Caracal poached for bushmeat (personal consumption) by a local poacher named Sultan Khan Second report of Caracals being consumed by humans in India after De Brett (1909).	B Raj Chauhan pers. comm. 2019
37	24.iv.1986	Between Sariska NP gate and Kalighati, Rajasthan	Caracal sighted	B Divyabhanusinh (1987)
38	1986	Melghat, Maharashtra	Caracal sighted	B Ranjitsinh (2017)
39	vi.1987	Luharpur Pipliya Manak Chok, Ramgarh Vishdhari WS, Bundi, Rajasthan	A Caracal sighted by forest officer P.K. Jain	B Satish Sharma in litt. 2020
40	1991	Jawda Nimdi, Chittorgarh, Rajasthan	A Caracal sighted by Shyam Singh Mahechha	B Harshvardhan Singh Mahechha pers. comm. 2020
41	1993	Modia, Kumbhalgarh WS, Rajasthan	Two adult Caracals seen by forest officer Parbat Singh	B Satish Sharma in litt. 2020
42	1994	Sironth Kalan, Alwar, Rajasthan	A Caracal rescued from a well by forest officer B.M. Sharma	B Satish Sharma in litt. 2020
43	1994	Ghanerao, Desuri, Pali District, Rajasthan	Two adult Caracals seen by forest officer Parbat Singh	B Satish Sharma in litt. 2020
44	1994	Sadri Latada, Kumbhalgarh WS, Rajasthan	A single Caracal sighted multiple times by forest officer Parbat Singh	B Satish Sharma in litt. 2020
45	vii.1995	Sariska TR, Rajasthan	Observed a Caracal plucking feathers off a dead Peacock <i>Pavo cristatus</i>	B Shomita Mukherjee in litt. 2020
46	1996	Near Pat and Khanay Village, Naliya side, Kutch, Gujarat	A Caracal sighted by Dinesh Sharma and Bharat Jethva	B Bharat Jethva pers. comm. 2019
47	1997	Tera Village, Kutch, Gujarat	Seen a Caracal	B Bharat Jethva pers. comm. 2019
48	vi.1998	Malik Talab to Lakarda Road, Ranthambhore TR, Rajasthan	Observed a Caracal crossing the road	B G.V. Reddy pers. obs.
49	ii.1998	Takhatpura, tehsil and district Jalore, Rajasthan	Caracal sighted by Pradeep Singh	B Ranjitsinh (1999)
50	1998	Tera Village, Kutch, Gujarat	A Caracal feeding on a Cattle Egret <i>Bubulcus ibis</i> , photographed	A Dinesh Sharma in litt. 2020
51	1999	Ganeshdham, Ranthambhore TR, Sawai Madhopur, Rajasthan	Seen a Caracal crossing road at 21.00h	B Aditya Singh pers. comm. 2020
52	1999	Dhopchok, Ranthambhore TR, Sawai Madhopur, Rajasthan	Seen a Caracal	B Aditya Singh pers. comm. 2020
53	xi.1999	Guda-Lahpur road, Ranthambhore TR, Rajasthan	Caracal seen crossing road	B G.V. Reddy pers. obs.

Unconfirmed records of the Caracal

We found 33 reports that we categorised as unconfirmed.

Two originate in the Ladakh region of Jammu & Kashmir. The first is based on a drawing of a captive Caracal in Baltistan (Blyth 1842), and the second on a skin seen in a Srinagar shop by Ward (1923). Stockley (1928) and Pocock (1939) held the view that neither one is evidence for the Caracal's occurrence in the erstwhile state.

Ward (1923) also accounted of shooting a Caracal in western Dun, Uttarakhand. In a map showing the extent of occurrence of the Felidae in the western Himalaya, Sinha (1995) included the Caracal in Dehradun without providing any related information. This location matches with the account by Ward (1923). In view of Ward's earlier claim from Ladakh, we doubt the credibility of this account.

The British army officer Osborn claimed that a Caracal was sighted in the Kangra District of Himachal Pradesh in 1904 (Government of Punjab 1904; Dodsworth 1913). A purported specimen was submitted by Osborn to the museum of the BNHS in 1907 (Bell 1907). Considering that Osborn provided neither details of the sighting nor of the submitted specimen, it is possible that this could have occurred in an area either in or bordering modern day Punjab.

Two publications refer to the rarity of the Caracal in the erstwhile Madras Presidency. McMaster (1871) accounted of a Caracal presented by the Rajah of Karvetinagar to the people's park of Madras in September 1868, but did not clarify from where the Caracal originated. Thurston (1913) wrote that the Caracal or Red Lynx had become rare, but without providing information whether and where it was ever sighted or hunted in the region.

Briggs (1861) wrote about the presence of the Caracal in Surroo Nagar, currently in Telangana, but merely mentioned Lynx along with a host of other wildlife. The word 'Lynx' was at times also used for the Jungle Cat. Briggs (1861) neither provided a description nor information about a sighting.

Behura & Guru (1969) reported the occurrence of the Caracal in Mayurbhanj District on the basis of a newspaper article dating to 18 April 1962 (Acharjyo 1998). This report was further included in a ZSI publication by Das et al. (1993). Acharjyo (1998), however, conceded that no other reports of its occurrence in the state were known at the time, nor had the Nandankanan Zoo received a wild-caught individual from any part of Odisha.

Two reports of Caracals around the Ludhiana area of

Punjab in 1977–79 are unconfirmed (Gurmit Singh pers. comm. 2019).

Parihar (1989) reported seeing a Caracal on the night of 16 March 1987 aided by a searchlight in the forests of Panna District in Madhya Pradesh. He acknowledged that the Jungle Cat is common there, but was certain that he saw the front and rear of a Caracal, although he "could not see the ear tuft" and described the tip of the tail being about 10cm long and darker than the rest of the tail. This description raises doubts, as Caracal tail length in India has been reported ranging from 17.5 to 29.9 cm (Blyth 1842; Jerdon 1874; Sterndale 1884; Allen 1919; Ward 1923; Prater 1948; Dharmendra Khandal pers. obs. 2019; Sonia Mondal in. litt. 2019). The tip of the tail measures approximately 1–2 cm with hair that is darker than the rest of the tail, but such hair is not present on the tails of all Caracals (Dharmendra Khandal pers. obs. 2019).

Parihar (1989) accounted of Ajit Sonakia, then

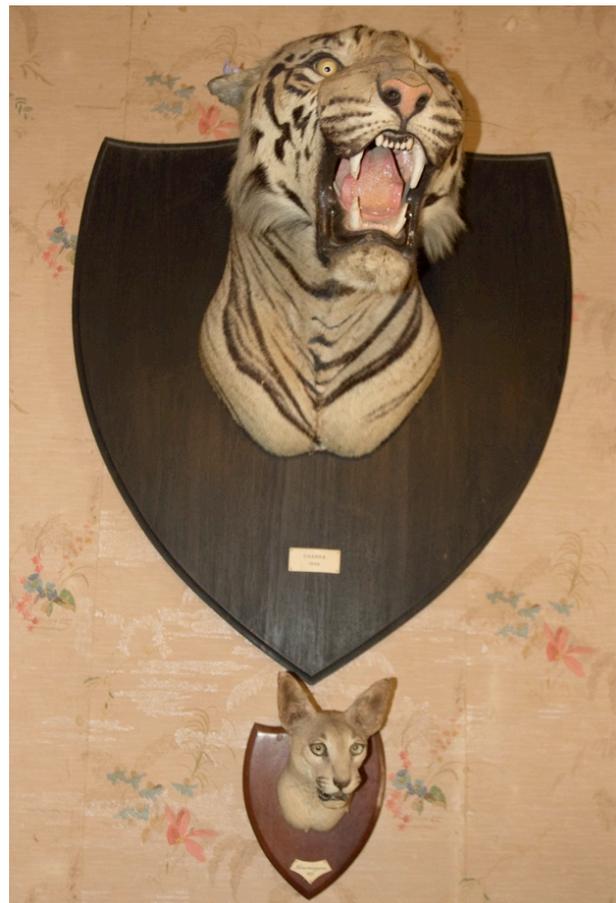


Image 3. Trophies of Indian wildlife are exhibited in the dining hall of the Udai Vilas palace in Dungarpur, including a head mount of a Caracal that was shot in 1935 on a hillock called Nara Magra very close to the palace. © Dharmendra Khandal

Director of Sanjay National Park having seen a Caracal near Raisen while driving at night from Bhopal to Sagar in Madhya Pradesh. Since this is not a first-person account and lacking specific details, it remains unconfirmed.

Desai (1974) included the Caracal in the list of animals in Gir National Park, and Singh (1998) claimed a sighting of a Caracal in tall grass in Saurashtra, Gujarat. Evidence of occurrence in both areas does not exist, despite regular camera trapping surveys today, and so we consider both reports unconfirmed. Chakraborty & Agarwal (2000) referred to 10 individual Caracals in Narayan Sarovar Chinkara Sanctuary listed in a report by Forest Department of Gujarat. This report is based on the annual waterhole census method for wild animals, which has serious limitations (Karanth & Ramaswamy 2006).

Two separate Caracal sightings were reported in the Dhakana and Gatang ranges of Melghat Tiger Reserve in Maharashtra (Gogate 1998). These were later proven to be Jungle Cats upon examination of photographic evidence (Shomita Mukherjee pers. comm. 2020).

Singh & Soni (1999) mentioned the presence of the Caracal in the salt pans of Wild Ass Sanctuary located in Little Rann of Kutch, Gujarat, based on local people's accounts. Singh & Soni (1999), however, stated to not have sighted a Caracal themselves. It must be added that the salt pans are a highly improbable habitat for the Caracal.

Kolipaka (2011) listed 11 sightings of the Caracal across India along with their purported GPS coordinates. The sources of these reports are not provided. Nine of the reports are verifiably non-specific. The errors in the locations listed and associated coordinates provided are significant, such as two different locations being presented as one, e.g., "Ranthambhore & Sariska" and "Sasaipura, Bhind". These errors make it impossible to verify the alleged sightings.

In 2015, whilst conducting a field survey in the Bagpat Reserve in the taluka of Nakhatrana in Kutch to assess the "Status and Distribution of Caracal in Gujarat", a team from the Gujarat Institute of Desert Ecology (GUIDE) claimed to have sighted a Caracal hiding 70–75 m away in a bush. The animal escaped before it could be photographed. The team, however, claimed that the animal left 'clear pugmarks for our confirmation' and provided a photograph of the pugmark with a pen placed next to it for size reference. They also surveyed the area for 10 more days but could not find the animal (Joshi et al. 2015). The length of the pen appeared to be 12–13 cm long, the average length of a pen. By comparison, the pugmark appeared to be 8–9 cm long,

which is far too large for a Caracal. In an earlier update on the same survey, GUIDE provided the lengths of the right front pugmark and the right hind pugmark of a Caracal, presumably obtained in their survey, and these measured 4.7cm and 5.5cm respectively (Asrari et al. 2013–14). Skinner & Chimimba (2005) provide 5cm as the upper limit for the lengths of the right fore footprint and right hind footprint for southern African Caracals. We are, thus, of the opinion that the pugmark report is erroneous, and that the pugmark photographed was that of a Leopard.

Kazmi (2020) interpreted Sterndale (1884) to have reported "raising a young Caracal cub he had caught from the wild" in Seoni, Madhya Pradesh. In fact, Sterndale (1884) merely wrote that "They are easily tamed. I had a young one at Seonee and the natives of some parts are said to train them for sporting purposes in the manner in which the hunting leopard (read Cheetah) is trained". He did not explicitly state that this cub was 'caught from the wild' in Seoni itself. We are, therefore, of the opinion that the information by Sterndale (1884) is insufficient to draw a conclusion of the cub's origin.

Contemporary reports

Since 2001, the Caracal was reported in only four biotic provinces, namely 3B: Kutch Desert, 4B: Semi-arid Gujarat Rajputana, 4A: Semi-arid Punjab Plains, and 6A: Central Highlands in the Deccan Peninsula (Figure 3). Judging by historical and contemporary reports, 4B: Semi-arid Gujarat Rajputana seems to be the stronghold for the Caracal. The biotic province 3B: Kutch Desert has more numerous reports in the current period than in the historical period. This is likely due to greater accessibility of this biotic province today than in the past. Very few historical records are known in 3A: Thar Desert, and no contemporary reports are known despite far greater access to this region today. Prakash (1994b) considered the Caracal to have been 'very common' in the Thar Desert in the beginning of the 20th Century. He, however, does not provide any evidence to validate this statement. The report from 4A: Semi-arid Punjab Plains is very close to the border with 4B: Semi-arid Gujarat Rajputana, and the report in 6A: Central Highlands is a stand-alone report with no photographic documentation. Therefore, it appears that Caracal populations existing in 4B: Semi-arid Gujarat Rajputana and 3B: Kutch Desert could be the only viable populations in India today. Nevertheless, more targeted surveys are needed in addition to the intensive camera trapping targeting the Tiger in 4B: Semi-arid Gujarat Rajputana. It must, however, be noted that the multiple

Table 4. Caracal specimens and trophy reports in private collections and museums.

Date	Location	Specimen details	Source
In private collections			
1920–1930	Lotiya Jheer Jhalawar, Rajasthan	Head mount of a subadult Caracal in the Prithivi Palace of Jhalawar, Rajasthan	Mahijit Singh pers. comm. 2019
1935	<i>Nara Magra</i> hillock, very close to Udai Vilas Palace, Dungarpur, Rajasthan	One Caracal head mount displayed in the dining hall of the Udai Vilas Palace, Dungarpur, Rajasthan	Dharmendra Khandal pers. obs. 14 November 2019 (Image 3)
Unknown, before 1972	Teetarkheri, Jhalawar, Rajasthan	Caracal head mount in the possession of Vartol Jagirdar, Sabarkantha, Gujarat	Satish Sharma pers. comm. 2019
Unknown	Possibly from Kota Baran area, Rajasthan	Two Caracal head mounts displayed in the billiard room of Umed Bhawan Palace Hotel, Kota, Rajasthan	Ravindra Singh Tomar pers. comm. 2019
30.i.1962	Amrit Kua, Baran, Rajasthan	One Caracal head mount displayed in the billiard room of Umed Bhawan Palace Hotel, Kota, Rajasthan	Ravindra Singh Tomar pers. comm. 2019
In the museum of BNHS			
vii.1891	Goona (Guna), Madhya Pradesh	One Caracal skull deposited by G.E. Money, Reg. no. 6056	Sameer Bajar, Assistant Curator, BNHS collection in litt. 2019; Phipson (1891)
8.iv.1914	Wano, Waziristan, Pakistan	A Caracal skin deposited by Capt. F.L. Hughes, Reg. no. 6054	Sameer Bajar, Assistant Curator, BNHS collection in litt. 2019
In the museum of Zoological Survey of India			
20.i.1876	Unknown	Caracal skull deposited by W. Rutledge, Reg. No. 133	Chakraborty (2004)
Unknown	Unknown	Preserved body of a female Caracal given by Zoological Garden Alipore to ZSI, Catalogue no. KS 3120	Sonia Mondal, ZSI, in litt. 2019
Unknown	Unknown	Full body of a female Caracal, Catalogue no. (10) 3372	Sonia Mondal, ZSI, in litt. 2019
Unknown	Unknown	Full body of a male Caracal, Reg. no. 7140	Sonia Mondal, ZSI, in litt. 2019
Unknown	Unknown	Skin of a Caracal deposited by W. Rutledge, catalogue no. 4137	Sonia Mondal, ZSI, in litt. 2019
In the Museum of Jaipur Zoo, Rajasthan			
Unknown	Unknown	Full body mount of a Caracal	Sudarshan Sharma in litt. 2019
Deposited in the museum of the BNHS but currently not in the possession of the museum			
May–June 1888	Unknown	One live Caracal deposited by F.D. Alexander	Phipson (1888)
March–April 1889	Unknown	One Caracal skin deposited by A. Spitteler	Phipson (1889)
1892	Mirzapur, Uttar Pradesh	Caracal skeleton deposited by H.E. Drake-Brockman	MacDonald (1893)
March 1893	Unknown	One live Caracal deposited by H. Parry	MacDonald (1893)
May 1907	Kangra Hills, Himachal Pradesh	One Caracal skin and skull deposited by Gen. W. Osborn	Bell (1907)
September 1908	Jalaun District, Uttar Pradesh	Caracal skin deposited by L.R. Clarke	Millard (1908)

Table 5A. Camera trap pictures of the Caracal in Rajasthan between 2015 and 2020 by village wildlife volunteers in ravine habitat (RH), Hilly Dhonk forest (HDF), Prosopis juliflora thickets (PJT), scrubland (SL), grassland (GL), Teak forest (TF), agricultural land (A), river (R), seasonal stream (SN), seasonal pond (SP), canal (C), lake (L), perennial stream (PN), perennial waterhole (PWH).

No. on map	Habitat type	Water source	2015	2016	2017	2018	2019	2020
1	RH	R	-	-	1	-	-	-
2	HDF	SN	-	-	-	-	-	4
3	RH	SN	-	-	-	-	3	-

A

Table 5B. Records around Ranthambhore Tiger Reserve, all A, including 12 locations near Ranthambhore National Park (4 I), five locations around Sawai Mansingh Sanctuary (4 II) and three locations around Kailadevi Wildlife Sanctuary (4 III)

4 I	RH, HDF	R, L, SN, PN	6	33	41	23	33	8
4 II	HDF	R, L, SN, PN	-	-	-	1	3	2
4 III	HDF	R, L, SN, PN	-	1	5	-	9	3
	Total		6	34	47	24	48	17

A

Table 5C. Observations of the Caracal in Ranthambhore Tiger Reserve.

No.	Date	Location	Habitat type	Water source	Type of report	Source
IV	27.v.2014	Kundal	SL/HDF	SN	Seen and photographed a Caracal	A Sunil Sarkar Game watcher Manas pers. comm. 2014
V	21.i.2014	Indala tiraya	HDF	SN	A male Caracal was feeding on a Chinkara, photographed	A Balendu Singh in litt. 2019
VI	05.v.2013	Indala	HDF	SN	A Caracal observed leaping towards a flock of doves, photographed	A Dharmendra Khandal pers. obs.
VII	2.i.2010	Padam Talab	HDF	L	Seen a Caracal, photographed	A Balendu Singh pers. comm. 2019
VIII	17.i.2010	Padam Talab to Rajbagh	HDF	L	A Caracal was seen and photographed	A Balendu Singh, Gobind Sagar Bhardwaj & Subhas Sharma in litt. 2019
IX	xi.2009	Berda	HDF	SN	A Caracal on a tree, photographed	A Soonoo Taraporewala in litt. 2019
X	xi.2009	Rajbagh	HDF	L	Few glimpses of a Caracal hiding in <i>Justicia adhatoda</i> bushes near the lake	A Dharmendra Khandal pers. obs. Photographed by Rahul Rao
XI	2.xii.2009	Bhoot Khora	HDF	SN	A Caracal photographed	A Salim Ali in litt. 2019
XII	16.vi.2009	Kachida	HDF	SN	A female Caracal with two subadult cubs observed for ~ 45–50 minutes feeding on a monitor lizard, photographed	A Dharmendra Khandal pers. obs.
XIII	29.i.2009	Bhoot Khora	HDF	SN	A female Caracal with cubs photographed	A Balendu Singh pers. comm. 2019
XIV	2009	Ranthambhore TR	HDF	L	Photographed a Caracal	A Singh et al. (2011)
XV	8.iii.2008	Rajbagh – Malik Talab Road	HDF	L	Caracal seen on a tree, photographed	A Aditya Singh in litt. 2020
XVI	xii.2006–xii.2009	Various locations in Ranthambhore Division of Ranthambhore Tiger Reserve	HDF	SN	Forest Department and WII team got 37 camera trap pictures in three years	A Singh et al. (2014)
XVII	6.vii.2004	Berda	HDF	SN	A female Caracal with two sub adult cubs photographed	A Margarita Steinhartd in litt. 2019
XVIII	vi.2001	Lahpur	HDF	SN	A Caracal was observed crossing the road	B G.V. Reddy pers. obs.
Kailadevi Wildlife Sanctuary, Karauli, part of Ranthambhore Tiger Reserve						
XIX	16.x.2016	Balaji Telai, Dangda	HDF	SP	A Caracal was observed	B Dharmendra Khandal pers. obs.
XX	15.x.2016	Balaji Telai Dangda	HDF	SN	Photographed a Caracal	A Dharmendra Khandal pers. obs.

photographic reports in the Kutch Desert are not from camera trapping efforts. Regular intensive camera trapping in other parts of the Caracal's historical range such as Panna Tiger Reserve and Kuno Wildlife Sanctuary did not yield any record of the Caracal (Y.V. Jhala pers. comm. 2019). The same holds true for the forests of Mirzapur (Sinha & Chaudhary 2019).

The putative extent of occurrence of the Caracal decreased by 47.99% in the period before 1947 to the period between 1947 and 2000, and the putative extent of occurrence area of the latter period accounted for 52% of the period until 1947.

The locations with verifiable reports from 2001 onwards are within a total area of 16,709km², which is

Table 5D. Observations of the Caracal in other protected areas in Rajasthan

No. on map	Date	Location	Habitat type	Water source	Type of report	Source
5	2015	Kalighati to Bana Road, Sariska Tiger Reserve, Alwar	HDF	SN	Seen by forest officer Y.K Duck, no photograph	B Manoj Parashar pers. comm. 2019
6	2014	Karna Ka Bas, Sariska Tiger Reserve, Alwar	HDF	SN	Seen by Ambassador of the Czech Republic, no photograph	B Manoj Parashar pers. comm. 2019
7	2006	Sariska gate to Kankwadi, Sariska Tiger Reserve, Alwar	HDF	SN	Five Caracals seen in two different locations by forest officers Manoj Parashar and Ramkaran Khierwa, no photograph	B Manoj Parashar pers. comm. 2019
8	2004	Near Bharthari, Sariska Tiger Reserve, Alwar	HDF	SN	Seen a Caracal vocalising as it walked 1km seen by a forest officer Udayram Chaudhary	B Satish Sharma in litt. 2020
9	2004	Karna Ka bas, Sariska Tiger Reserve, Alwar	HDF	SN	Caracal seen by forest officer Udayram Chaudhary	B Satish Sharma in litt. 2020
10	23.vii.2004	Sariska Tiger Reserve, Alwar	--	--	A Caracal photographed	A Heerden (2004)
11	18.iv.2017	Keoladeo National Park, Bharatpur	SL	L	Forest Department camera trapped a Caracal	A Bijo Joy pers. comm. 2017
12	2008	Between Areth to Thandi Beri, Kumbhalgarh Wildlife Sanctuary, Rajsamand	HDF	SN	A Caracal seen multiple times by forest officer Bhanwar Singh Chauhan	B Satish Sharma in litt. 2020
13	2003	Dhana forest Block, 2km after the main gate of Kumbhalgarh Wildlife Sanctuary	HDF	SN	A Caracal sighted by two forest officers Rahul Bhatnagar and Raghuvir Singh Shekhawat	B Rahul Bhatnagar pers. comm. 2020
14	2010	Grassland area of Bassi dam and Orai Dam. Bassi Wildlife Sanctuary, Chittorgarh	HDF	L	A Caracal seen by forest officer Manoj Parashar, no photograph	B Manoj Parashar pers. comm. 2019
15	~xii.2016–i.2017	5–6 km away from Johjawa village, Kamli Ghat, Todgarh Raoli Wildlife Sanctuary, Pali	HDF	SN	A Caracal seen by Nagendra Singh Johjawa, no photograph	B Nagendra Singh Johjawa pers. comm. 2019
16	x. 2006	Devriya Farm, Jawda Nimdi Bhainsrorgarh Wildlife Sanctuary, Chittorgarh	HDF	R	Caracal seen crossing road, no photograph	B Harshwardhan Singh Mahechha pers. comm. 2020

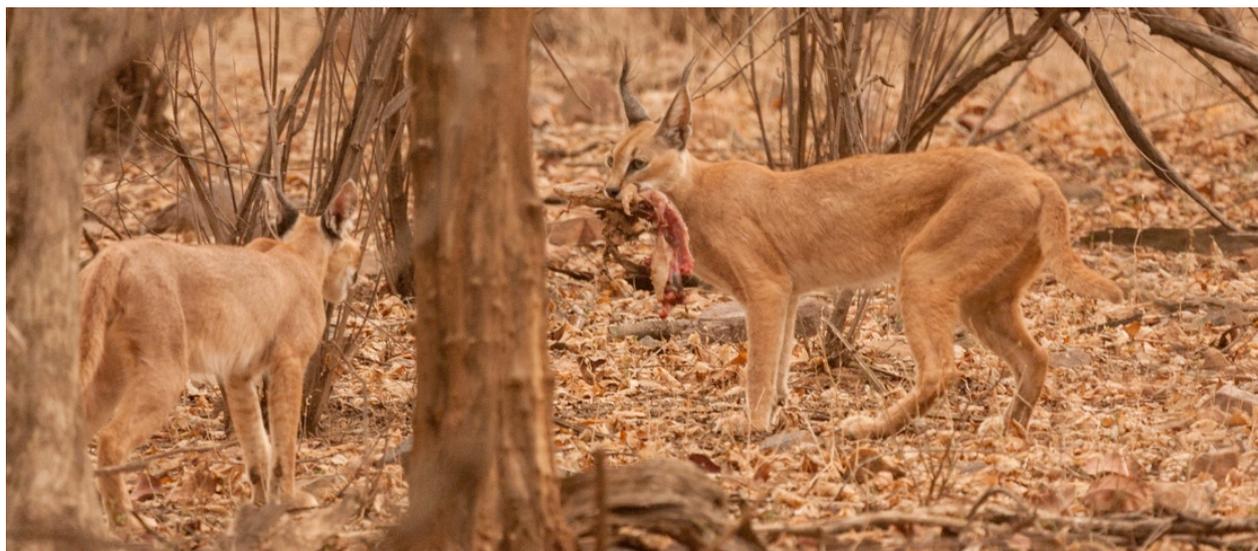


Image 4. A female Caracal with her cub while gripping a monitor lizard. Photographed in the Kachida Valley, Ranthambhore National Park on 16 June 2009. © Dharmendra Khandal

Table 5E. Observations of the Caracal outside protected areas in Rajasthan

Sawai Madhopur District						
17	06.iv.2017	Kosra Village, Sawai Madhopur	R	R	A sub adult male Caracal fell in a well and was rescued by Forest Department staff.	A Dharmendra Khandal pers. obs. Photographed
Udaipur District						
18	30.iv.2013	Baghdarrah	SL	L	Forest officer Satish Sharma seen a Caracal crossing Badar road	B Satish Sharma in litt. 2020
19	24.ii.2010	Badi Talab adjacent to Sajjangarh Wildlife Sanctuary, Kaler Forest	OMJ	L	Caracal seen by Raza Tehsin	B Satish Sharma in litt. 2020
20	v.2009	Near Banki Forest area	HDF	SN	Seen a Caracal, no photograph	B Sharad Agarwal pers. comm. 2019
21	2004	Kheroda	SL	SN	Flying squad of Forest Department rescued a Caracal from an open well	B Satish Sharma pers. comm. 2020
Pratapgarh District						
22	22.iv.2008	Salamgarh, Arnod, Pratapgarh	OTF	SN	A subadult Caracal caught by forester Chhotul Meena near village and later released there	B Satish Sharma in litt. 2020
23	12.xii.2006	Near Arnod, south of Pratapgarh	TF	PN	Rescued an abandoned Caracal cub and sent to Gulab Bagh Zoo, Udaipur	B Satish Sharma pers. comm. 2020
Alwar District						
24	Winter 2004	Badodh Roondh	RH	SN	A female Caracal with two cubs seen by forest officer Udayram Chaudhary	B Satish Sharma in litt. 2020

just 2.10% of the area of the Caracal’s estimated historic range in India before 1947, and 4.04% of the area in the 1948–2000 period. Therefore, there has possibly been a further 95.95% decrease in the Caracal’s range, which is highly fragmented today. In Rajasthan, Caracal populations are present in Ranthambhore Tiger Reserve and contiguous areas including Dholpur, the region of Kumbalgarh-Todgarh-Raoli in Udaipur, particularly at the junction of Kumbhalgarh-Todgarh-Raoli, and an isolated population in the Chittorgarh-Pratapgarh region. Outside Rajasthan, the only authentic post-2000 reports are in the Kutch region of Gujarat. There, however, have been practically no attempts to survey the Caracal in most regions of its past reported range and the much higher effort put into camera-trapping and photographing in and around Ranthambhore and Kutch could be a reason for the higher numbers reported. Physical connectivity between these four landscapes is highly fragmented with potential impact on gene flow and population connectivity for the Caracal.

This range encompasses Sariska Tiger Reserve, Ranthambhore Tiger Reserve, the districts of Udaipur and Chittorgarh in Rajasthan, the Kutch region in Gujarat and the Chambal ravine area in Madhya Pradesh.

No focused surveys for the Caracal were carried out

in Maharashtra, Madhya Pradesh, Uttar Pradesh and in eastern parts of India. It may be possible that it is present there but under-reported. In that case, the putative reduction of its range needs to be verified and adjusted based on robust data.

The common feature of these areas is dry deciduous thorn forest with waterbodies. If a river is present, the ground cover is usually sparse along severely eroded riverbanks and adjacent ravine habitat, while evergreen riparian vegetation is completely absent. While both the Kutch Desert and Ranthambhore Tiger Reserve exhibit dry habitats, 97 small rivers originate in the former and the latter has many rivers and rivulets that criss-cross the landscape and meet the Chambal river (Khandal & Khandal 2017).

Our findings indicate that the Caracal is indeed present in dry open habitats with some vegetation but is absent in ‘true’ desert as described by Sunquist & Sunquist (2002). This habitat use is consistent with records obtained in arid and semi-arid mountains and hilly terrain in Iran (Farhadinia et al. 2007; Ghoddousi et al. 2009; Moqanaki et al. 2016) and in Uzbekistan (Gritsina 2019).

With the exception of field work carried out by Mukherjee et al. (2004) on diet and habitat use and

Table 6. Reports of the Caracal in Gujarat from 2001 onwards (Figure 3).

No. on map	Date	Location	Habitat type	Water source	Type of report	Source
Kutch District						
25	25.x.2019, 10.00h	Rampar Village, Nakhtrana	SL/A	PN	A male Caracal jumped in a shallow well to feed on Indian Bullfrog <i>Hoplobatrachus tigerinus</i> . It caught a rope in its mouth, which was hanging in the well. The rescuer put a wire mesh tree guard in the well, and it successfully climbed up and ran away. The rescue was filmed by rescuer Jagat Sinh Sodha	A Jagat Sinh Sodha, pers. comm. 2019
26	iv.2019	Guglani Rakhal, Oaran Mata – near the Lifri Lignite Mine	SL	PWH	A Caracal seen and peafowl alarm calls noted	B Jugal Tiwari pers. comm. 2019
27	Winter 2018–2019	Mosuna Village	SL	SN	A Caracal repeatedly entered a shepherd's livestock shelter and killed 18–20 lambs in a span of 15–20 days despite close vigilance	B Sujan Bhai Raibari pers. comm. 2019
28	xii.2018, 19.30h	Jalu	SL	SN	Sodha was observing animals on a water body and saw a Caracal. No photograph	B Vikram Sinh Sodha pers. comm. 2019
29	Xii.2015, 23.45h	Gatchdo Village	PJT	SN	Caracal seen and photographed	A Jugal Tiwari pers. comm. 2019
30	14.vi.2015	Nani Aral Village	PJT	SN	A sub adult Caracal killed by trained hunting dogs when it was near the charcoal maker's colony, photographed	A Shivbhadra Sinh in litt. 2019
31	2015	Devisar Village	PJT/ SL	SN	A Caracal killed eight lambs belonging to a Sodha Rajpoot pastoralist who killed the Caracal and also photographed.	A Vikram Sinh Sodha pers. comm. 2019
32	3.xi.2014	Nani Vamoti Village	SL	SN	A Caracal seen crossing the road. No photograph	B Shivbhadra Sinh in litt. 2019
33	21.i.2014	Near Khanay Village	SL/A	SN	A male Caracal came to hunt poultry and was killed by trained dogs. No photograph	B Shivbhadra Sinh in litt. 2019
34	25.xi.2013	Jatavira Village	PJT	SN	A Caracal was trapped in an iron jaw trap planted for Wild Boar <i>Sus scrofa</i> . Staff of a local NGO helped Forest Department (FD) officers to treat the injured animal. FD officers rescued a Caracal; several photographs	A Jugal Tiwari, Vikram Sinh Sodha, Shivbhadra Sinh, Ashok Chaudhary pers. comm. 2019
35	i.2014, 9.45h	Near Beru Village, Kutch, Gujarat.	SL	SN	Jugal Tiwari saw a Caracal	B Jugal Tiwari pers. comm. 2019
36	17.iii.2013	Jara-Jumra Road	SL/PJT	SN	A female Caracal killed in a road accident	B Shivbhadra Sinh in litt. 2019
37	18.ix.2012	Near Fulay Village	SL/A	SN	A local herder frequently saw a Caracal in these areas during the evening	B Shivbhadra Sinh in litt. 2019
38	24.xii.2010	Naliya forest area	SL	SN	Photographed a female Caracal with cub	A Adesh Shivkar pers. comm. 2019
39	xii.2009, 8.30h	Bitta Village, towards Abdasa Taluka on the way to Naliya	SL	SN	Female Caracal with two cubs, slipped into a thicket. No photograph	B Jugal Tiwari pers. comm. 2019
40	xi.2008	Near Mata-no-Madh of Gugliya Rakhal	SL	SN	Seen a Caracal. No photograph	B Pankaj N. Joshi in litt. 2019
41	iii.2008	Kotdi, Mandvi	SL	SN	Caracal killed in a conflict with a shepherd and his dog. Caracal seen three times before this incident. Dead Caracal photographed	A Deepak Goswami pers. comm. 2019
42	2006–2007	Naliya	SL	SN	Photographed a Caracal	A Yogendra Shah in litt. 2020
43	xi.2005	Narayan Sarovar Wildlife Sanctuary	SL	SN	A team of forest officials of Gujarat spotted a pair of Caracals, photographed	A Nair (2006)

Table 7. Reports of the Caracal in Madhya Pradesh from 2001 onwards

No. on map	Date	Location	Habitat type	Water source	Type of report	Source
Chhattarpur District						
44	2007–2008	Between the Chhattarpur and Jhansi roads The distance between the roads is 110km and the exact location was not specified	TF	SN	Caracal road kill, took a picture on his phone but apparently lost it. He shared the same image with H.S. Pabla	B Forest officer L.K. Chaudhary pers. comm. 2019
Bhind District						
45 I	11.iv.2001	Agricultural land between Bijapuri, Lavan, Chandupura, Karke Ka Pura and Goplapura	RH	SN	Spotted by Khudsar (2004) in a ravine area	B Khudsar (2014)
45 II	26.iii.2001	Agricultural land between Bijapuri, Lavan, Chandupura, Karke Ka Pura and Goplapura	RH	SN	Spotted by Khudsar (2004) in a ravine area	B Khudsar (2014)

Singh et al. (2014, 2015) on abundance and population density, no other surveys contributed to the knowledge about Caracal ecology in India in the 21st Century. The Caracal is among India’s most neglected cats, although already in 2010, Ranjitsinh & Jhala (2010) considered the Caracal to be on the brink of extinction in the country. Surveys on population size, reproduction, mortality, home range sizes and prey dynamics of the Caracal are urgently needed. A review of how land policy especially the categorization of land as wasteland, impacts the Caracal as a scrub dwelling species is also necessary. Between 2008–09 and 2015–16, 2,146.11km² of sandy semi-stabilised, dense scrubland and open scrubland has been converted into cropland in Rajasthan for example (Government of India 2019). Equally essential are long-term studies focusing on movement patterns of Caracals to determine and establish wildlife

corridors that are suitable to connect the remaining fragmented population units. We hope to inspire fellow conservationists to contribute to saving the Caracal from becoming extinct in the country.

REFERENCES

Acharjyo, L.N. (1998). The six cats of Orissa. *ENVIS Bulletin of Wildlife & Protected Areas* 1(2): 18–20.

Allen, G.O. (1919). Caracal (*Felis caracal*) and Hunting Leopard (*Cynailurus jubatus*) in Mirzapur, Uttar Pradesh. *Journal of the Bombay Natural History Society* 26(3): 1041.

Arnold, E. (1893). *The Book of Good Counsels: From the Sanskrit of the Hitopadesa*. W.H. Allen, London, 184pp.

Asrari, R., V.V. Kumar, A.K.R. Mahato & R.K. Raman (2013–14). Status and Distribution of Caracal (*Caracal caracal*) in Gujarat, p. 21. In: *Annual Report: 2013–14*. Gujarat Institute of Desert Ecology, Bhuj, Kutch, Gujarat, 45pp.

Avgan, B., P. Henschel & A. Ghoddousi (2016). *Caracal caracal* (errata version published in 2016). In: *The IUCN Red List of Threatened Species*: e.T3847A102424310. Downloaded on 20 June 2020. <https://doi.org/10.2305/IUCN.JK.2016-2.RLTS.T3847A50650230.en>

Baker, S.W. (1890). *Wild Beasts and Their Ways. Reminiscences of Europe, Asia, Africa and America*. Macmillan, London, New York, 520pp.

Ball, V. (1874). On the Avifauna of the Chutia Nagpur Division, S.W. Frontier of Bengal. *Stray Feathers* 2(4&5): 355–376.

Behura, B.K. & G.B. Guru (1969). Wildlife of Orissa. *Prakruti-Utkal University Journal Science* 6(2): 95–96.

Bell, W.M. (1907). Contributions to the Museum. *Journal of the Bombay Natural History Society* 17(4): 1043–1045.

Blanford, W.T. (1888–91). *Felis caracal*. The Caracal. Pp. 88–89 in: *The Fauna of British India, including Ceylon and Burma*. Mammalia. Taylor and Francis, London, 617pp.

Blochmann, H. (1873). *The Ain i Akbari* by Abul Fazl I Mubarik I Allami. Volume 1. Asiatic Society of Bengal, Calcutta, 1556pp.

Blyth, E. (1842). Monograph of the species of Lynx. *Journal of the Asiatic Society of Bengal* 11(128): 740–760.

Brander, D. (1923). *Wild Animals in Central India*. E. Arnold & Co. London, 296pp.

Brandon-Jones, C. (1997). Edward Blyth, Charles Darwin, and the Animal Trade in nineteenth century India and Britain. *Journal of the History of Biology* 30: 145-178



Image 5. One of 176 village wildlife volunteer camera trap reports of Caracal in Ranthambhore Tiger Reserve, Rajasthan. © Tiger Watch Ranthambhore

- Briggs, I.G. (1861). *The Nizam, his History and Relations with the British Government*. Volume II. B. Quaritch, London, 440pp.
- Buffon, G.L. (1761). Le Caracal, pp. 262–267. In: *Histoire naturelle générale et particulière, avec la description du Cabinet du Roi*. Tome 9. Imprimerie Royale, Paris, 376pp.
- Burke, W.S. (1920). *The Indian Field Shikar Book*. Fifth edition, Thacker, Spink & Co., Calcutta and Simla, 406pp.
- Capeller, C. (1891). *A Sanskrit-English Dictionary: Based Upon the St. Petersburg Lexicons*. Karl J. Trübner, Strassburg, 672pp.
- Chakraborty, R. (2004). Reports of the ZSI: A catalogue of Mammalian Exhibits of Zoological Galleries of the Indian Museum. Zoological Survey of India. Kolkata, 99pp.
- Chakraborty, S. & V.C. Agarwal (2000). Mammalia, pp. 15–84. In: Baqri, Q.H. (ed.) *Fauna of Gujarat* (Part 1). State Fauna Series No. 8. Zoological Survey of India, Calcutta, 469pp.
- Chakravarty, K.K. & R.G. Bednarik (1997). *Indian Rock Art and its Global Context*. Indira Gandhi Rashtriya Manav Sanghralaya. Motilal Banarsidas Private Publishers Ltd., Delhi, 228pp.
- Champion, H.G. & S.K. Seth (1968). *A Revised Survey of the Forest Types of India*. Manager of Publication, Delhi, 377pp.
- Chand, R.C., S.K. Srivastava & J. Singh (2017). *Changing Structure of Rural Economy of India Implications for Employment and Growth*. Discussion Paper. National Institution for Transforming India, Government of India, New Delhi, 26pp.
- Corbett, G.B. & J.E. Hill (1992). *The mammals of the Indo-Malayan region: A systematic review*. Oxford University Press, Oxford, 488pp.
- Das, P.K., J.P. Lal & V.C. Agrawal (1993). Mammalia, pp. 143–180. In: Ghosh, A.K. (ed.). *Fauna of Orissa, Part 4*. State Fauna Series Issue 1. Zoological Survey of India, Calcutta, 200pp.
- David, A. (1967). Sariska: A Lonely Sanctuary. *Cheetal, Journal of Wildlife Preservation Society of India* 9(2): 49.
- De Brett, E.A. (1909). Bastar State. P. 32 in: *Central Provinces Gazetteers: Chhattisgarh Feudatory States*. The Times Press, Bombay, 354pp.
- Desai, G.H. & A.B. Clarke (1923). Chapter II. *Gazetteer of the Baroda State* 1: 73.
- Desai, H.S. (1974). *The Forest of Gir*. Sorath Research Society, Junagarh, Gujarat, 84pp.
- Dhar, I. & M. Dhakad (2018). *Wildlife Warriors: The Village Wildlife Volunteers Programme*. Tiger Watch & Forest Department of Rajasthan, Rajasthan, 95pp.
- Dharmakumarsinhji, K.S. (1978). The Changing Wildlife of Kathiawar. *Journal of the Bombay Natural History Society* 75(3): 632–650.
- Divyabhanusinh (1987). Note on the Sighting of a Caracal (*Felis caracal*) at the Sariska National Park. *Journal of Bombay Natural History Society* 84(1): 201.
- Divyabhanusinh (1993). *The End of a Trail: The Cheetah in India*. Banyan Books, Bombay, 248 pp.
- Dodsworth, P.T.L. (1913). Notes on some mammals found in the Simla District. The Simla Hill States, and Kalka and Adjacent country. *Journal of the Bombay Natural History Society* 22(4): 726–748.
- Drake-Brockman, H.E. (1892). 'A Lynx attacking a man'. *Journal of the Bombay Natural History Society* 7(4): 548.
- Farhadinia, M.S., H. Akbari, M. Beheshti & A. Sadeghi (2007). Ecology and status of the Caracal, *Caracal caracal*, in Abbasabad Naein Reserve, Iran. *Zoology in the Middle East* 41: 5–9.
- Fitzgerald, S.V. & A.E. Nelson (1911). *Central Provinces District Gazetteers Amraoti District*, Volume A. Gazetteer Department, Government of Maharashtra, Bombay, 437pp.
- Forsyth, J. (1889). *The Highlands of Central India: Notes on their Forests and Wild Tribes Natural History and Sports*. Chapman & Hall Ltd. London, 388pp.
- Foster, W. (1924). Hunting with Caracal in the 17th Century. *Journal of the Bombay Natural History Society* 30(2): 466–467.
- Foster, W. (1926). *John Company*. John Lane, London, 285pp.
- Ghoddousi, A., T. Ghadriani & H. Fahimi (2009). Status of Caracal in Bahram'gur Protected Area, Iran. *Cat News* 50: 10–13.
- Ghosh, M. (1982). The review on the remains of 'Domestic Cat' from Harappa, Nagda and Nagarjunakonda in Indian subcontinent. *Indian Museum Bulletin* 17: 57–61.
- Gogate, M.G. (1998). Smaller cats of Maharashtra. *ENVIS Bulletin of Wildlife & Protected Areas* 1(2): 24–28.
- Government of India (2019). Rajasthan, pp. 175–18. In: *Wastelands Atlas of India*, Department of Land Resources, Ministry of Rural Development, 247pp.
- Government of Punjab (1904). Part 1. Kangra Proper: Fauna, p. 12. In: *Punjab District Gazetteers Volume XA*. Punjab Government Press, Lahore, 338pp.
- Gritsina, M.A. (2019). The Caracal *Caracal caracal* Schreber, 1776 (Mammalia: Carnivora: Felidae) in Uzbekistan. *Journal of Threatened Taxa* 11(4): 13470–13477. <https://doi.org/10.11609/jott.4375.11.4.13470-13477>
- Gupta, A. (2018). *How India Manages Its National Security*. Penguin Randomhouse India Pvt. Ltd., 440pp.
- Gupta, V.K. (2019). Prehistoric Art of Braj Region: Based on Study of Rock Shelters Near Fatehpur Sikri. *Heritage: Journal of Multidisciplinary Studies in Archaeology* 7: 373–396.
- Hamilton, A. (1727). *A New Account of the East Indies*. Volume 1. John Marsman, Edinburgh, 396pp.
- Harting, J. (1883). An Arabic Treatise on Hunting, pp. 362–370. In: *Essays on Sport and Natural History*. Horace Cox, London, 485pp.
- Heerden, H.V. (2004). Caracal. Flickr, electronic version at <https://www.flickr.com/photos/hvhe1/252592577> accessed on 23June 2019.
- Holdsworth, R.L. (1960). Our Less Known Species: The Caracal. *Cheetal: A Journal of the Wild Life Preservation Society of India* 3(1): 9.
- Holdsworth, R.L. (1962). Editorial. *Cheetal: A Journal of the Wild Life Preservation Society of India* 5(2): 10.
- Jerdon, T.C. (1874). *The Mammals of India: A Natural History of All the Animals Known to Inhabit Continental India*. John Wheldon, London, 335pp.
- Joshi, P., M. Koldiya & N.B. Gajera (2015). The chase still continues: *Caracal caracal*. *guide.net (Quarterly e-newsletter of the Gujarat Institute of Desert Ecology)* 4(2): 1–2.
- Karanth, K.U.K. & M. Ramaswamy (2006). The Many Ways to Count a Cat. P.111 in: *A View from the Machan: How Science Can Save the Fragile Predator*. Permanent Black, 153pp.
- Kazmi, R. (2020). Where the Wild Cat Roams: On Spotting the Black-Eared one. *Roundglass Sustain*. Electronic version at <https://roundglass/sustain/species/caracal/> accessed on 02 September 2020.
- Kolipaka, S.S. (2011). *Caracals in India: The forgotten cats*. IBD Press, Dehradun, 84 pp.
- Khandal, D. & D. Khandal (2017). *Unexplored Ranthambhore: Wolf, Jackal, Fox, Hyena*. Dhonk Craft, Sawai Madhopur, 238pp.
- Khudsar, F.A. (2004). Sighting of Caracal in the Chambal ravines of Bhind district. Madhya Pradesh. *Journal of the Bombay Natural History Society* 101(1): 149.
- Kitchener, A. (1991). *The natural history of the wild cats*. Christopher Helm Publishers, London, 280pp.
- Lydekker, R. (1907). The Caracal (*Felis caracal*), pp. 339–341. In: *The Game Animals of India, Burma, Malaya, and Tibet*. Rowland Ward limited, London, 409pp.
- MacDonald, D. (1893). Proceedings of the Meeting held on 23rd February, 1893. *Journal of the Bombay Natural History Society* 8(1): 157–159.
- Maurice, S.D. (1953). Mughal Painting Under Akbar the Great. *Metropolitan Museum of Art Bulletin* 12(2): 46–51.
- Maxwell, N.N. (1914). Saugor Hog Hunting. P. 288 in: Wardrop, A.E. *Modern Pig-sticking*. Macmillan and Co. Ltd., London, 304pp.
- McMaster, A.C. (1871). No. 26 *Felis Caracal*. P. 37 in: *Notes on Jerdon's Mammals of India*. Higginbotham & Co., Madras, 266pp.
- Millard, W.S. (1908). Contributions to the Museum. *Journal of the Bombay Natural History Society* 18(4): 938–940.
- Moqanaki, E.M., M.S. Farhadinia, M. Tourani & H. Akbari (2016). The Caracal in Iran – current state of knowledge and priorities for conservation. *Cat News Special Issue* 10: 27–32.
- Mukherjee, S. (1998). Cats: Some large, many small. *ENVIS Bulletin of Wildlife & Protected Areas* 1(2): 5–13.
- Mukherjee, S., S.P. Goyal, A.J.T. Johnsingh & M.R.P.L. Pitman (2004). The importance of rodents in the diet of Jungle Cat (*Felis chaus*), Caracal (*Caracal caracal*) and Golden Jackal (*Canis aureus*) in Sariska

- Tiger Reserve, Rajasthan, India. *Journal of Zoology* 262(4): 405–411. <https://doi.org/10.1017/S0952836903004783>
- Nair, A. (2006).** Caracal spotted and photographed in Kutch after 10 years. Outlook, The Newswire. Electronic version at <https://www.outlookindia.com/newswire/story/Caracal-spotted-and-photographed-in-kutch-after-10-years/377286> accessed on 21 December 2019.
- Newall, D.J.F. (1887).** *The Highlands of India strategically considered: With Special Reference to Their Colonization as Reserve Circles.* Volume II. Harrison and Sons, London, 274pp.
- Nowell, K. & P. Jackson (1996).** Caracal, *Caracal caracal* (Schreber, 1776), pp. 50–53. In: Wild cats. Status survey and conservation action plan. IUCN Cat Specialist Group, Gland, Switzerland, 421pp.
- O'Malley, L.S.S. (1909).** *Sambalpur. Bengal District Gazetteers.* The Bengal Secretariat Book Depot, Calcutta, 232pp.
- Parashar, M.D. (2020).** *Siyagosh of Ranthambhore: Report on Status of Species.* Forest Department of Rajasthan, Rajasthan, 5pp.
- Parihar, A.S. (1989).** Caracal (*Felis caracal* Schreber) sighted in Panna forests. *Journal of the Bombay Natural History Society* 86(2): 237.
- Parks, F. (1850).** *Wanderings of a Pilgrim in Search of the Picturesque, During Four and Twenty Years in the East; with Revelations of Life in the Zenana.* Volume 1. Pelham Richardson, London, 479pp.
- Phipson, H.M. (1888).** Contributions to the Museum. *Journal of the Bombay Natural History Society* 3(3): 199–201.
- Phipson, H.M. (1889).** Proceedings of the Meeting of 5th May 1889. *Journal of the Bombay Natural History Society* 4(2): 161–162.
- Phipson, H.M. (1891).** Proceedings of the Meeting on 1st July, 1891. *Journal of the Bombay Natural History Society* 6(2): 278–281.
- Pocock, R.I. (1939).** Genus *Caracal* Gray, pp. 306–309. In: *The Fauna of British India, Ceylon and Burma*, Volume I Mammalia. Taylor and Francis, Ltd. London, 464pp.
- Prakash, I. (1960).** The present status of the Caracal (*Felis caracal* Schreber). *Journal of the Bombay Natural History Society* 58(3): 790–791.
- Prakash, I. (1994a).** Biodiversity Conservation in the Thar Desert. *The Indian Forester* 120(10): 175.
- Prakash, I. (1994b).** *Mammals of the Thar Desert.* Pawan Kumar Scientific Publishers, Jodhpur, 114pp.
- Prakash, S., A.K. Mitra, I.M. Momin, E.N. Rajagopal, S. Basu, M. Collins, A.G. Turner, K. Achuta Rao & K. Ashok (2015).** Seasonal intercomparison of observational rainfall datasets over India during the southwest monsoon season. *International Journal of Climatology* 35(9): 2326–2338. <https://doi.org/10.1002/joc.4129>
- Prater, S.H. (1948).** *The Book of Indian Animals.* Bombay Natural History Society, Bombay, 326pp.
- Punjab Government (1884).** Chapter 1 – The District. Wild animals and game. Pp. 20–21 in: *Gazetteer of the Jhang District*, 1883–84. Arya Press, Lahore, 204pp.
- Ranjitsinh, M.K. (1999).** Sighting of the Caracal *Caracal caracal* in Jalore District. Rajasthan. *Journal of the Bombay Natural History Society* 96(3): 464.
- Ranjitsinh, M.K. (2017).** *A Life with Wildlife: From Princely India to the Present.* Harper Collins Publishers India, Noida, 380pp.
- Ranjitsinh, M.K. & Y.V. Jhala (2010).** *Assessing the potential for reintroducing the Cheetah in India.* Wildlife Trust of India, Noida & Wildlife Institute of India, Dehradun, 179pp.
- Rice, W. (1884).** Chapter XII, pp. 216–217. In: *Indian Game: From Quail to Tiger.* W.H. Allen & Co., London, 221pp.
- Rice, W. (1857).** Chapter XIII, p. 117. In: *Tiger-shooting in India: Being an account of hunting experiences on foot in Rajpootana, during the hot seasons from 1850 to 1854.* Smith, Elder and Co., London, 219pp.
- Rodgers, W.A., H.S. Panwar & V.B. Mathur (2002).** *Wildlife Protected Area Network in India: A review.* Wildlife Institute of India, Dehradun, 44pp.
- Rose, H.A., J. Coldstream, R.E. Youngusband, E.R. Abbott, P.J. Fagan, H. Calvert, R.M. Lewis, M.R. Das, R.S. Sharma, G. Singh, M.M. Din & J.P. Thompson (1908).** *The Imperial Gazetteer of India (1908).* Provincial Series Punjab; Volume 1, Part 12. Superintendent of Government Printing, Calcutta, 483pp.
- Roy, P.D. & A.K. Singhvi (2016).** Climate variation in the Thar Desert since the Last Glacial Maximum and evaluation of the Indian monsoon. *TIP Revista Especializada en Ciencias Químico-Biológicas* 19(1): 32–44. <https://doi.org/10.1016/j.recqb.2016.02.004>
- Rungta, K. (2017).** Breeding Siyagosh, pp. 80–87. In: *Stalking Tigers on foot.* The Marine Sports, Mumbai, 186pp.
- Saleem, S. (2014).** Prehistoric Cupule Site at Senetary: Recent Prehistoric Investigations in Kachhchh District, Gujarat. *Heritage: Journal of Multidisciplinary Studies in Archaeology* 2: 449–456.
- Sen, N.N. (1959).** The present status of the Indian Lynx. *Journal of the Bombay Natural History Society* 56(2): 317.
- Sharma, M.L. (2014).** Rock Art of Rajasthan, pp. 43–74. In: *History and Culture of Rajasthan: from earliest times upto 1956 A.D.* Centre for Rajasthan Studies, University of Rajasthan, Jodhpur, 627pp.
- Sharma, S.K. (2015).** Todgarh-Raoli Wildlife Sanctuary: Some historical facts about the presence of Tigers during last century, pp. 1–4. In: *Anushandhan* (Vigyan Sodh Patrika), Volume 1, Allahabad, 292pp.
- Sharma, V. & K. Sankhala (1984a).** Vanishing Cats of Rajasthan, pp. 117–135. In: Jackson, P. (ed.). *The Plight of the Cats. Proceedings from the Cat Specialist Group meeting in Kanha National Park.* IUCN Cat Specialist Group, Bougy-Villars, Switzerland, 84pp.
- Sharma, V. & K. Sankhala (1984b).** Vanishing Cats of Rajasthan. *Cheetal, Journal of the Wildlife Preservation Society of India* 26(1): 5–23.
- Srivastava, B.P. (1959).** The present status of the Indian Lynx (*Caracal caracal*). *Journal of the Bombay Natural History Society* 57(1): 214–215.
- Singh, A. (1975).** A rare animal of the cat family - Caracal (*Felis caracal*). *Cheetal, Journal of the Wildlife Preservation Society of India* 16(3): 51.
- Singh, A., J. Singh & P. Gandhi (2011).** *Ranthambhore: The Tiger's Realm.* Sujan Art Pvt. Ltd., New Delhi, 151pp.
- Singh, H.S. (1998).** Reports of small cats in Gujarat. *ENVIS Bulletin of Wildlife & Protected Areas* 1(2): 22–23.
- Singh, H.S. & V.C. Soni (1999).** Status of Wildlife in Wild Ass Sanctuary (Little Rann of Kutch, Gujarat State, India). *The Indian Forester* 125(10): 1025.
- Singh, R., Q. Qureshi, P.R. Krausman, K. Sankar & S.P. Goyal (2014).** Population and habitat characteristics of Caracal in semi-arid landscape, western India. *Journal of Arid Environments* 103: 92–95. <https://doi.org/10.1016/j.jaridenv.2014.01.004>
- Singh, R., Q. Qureshi, P.R. Krausman, K. Sankar & S.P. Goyal (2015).** Estimating occupancy and abundance of Caracal in a semi-arid habitat, Western India. *European Journal of Wildlife Research* 61(6): 915–918. <https://doi.org/10.1007/s10344-015-0956-y>
- Sinha, D. & R. Chaudhary (2019).** *Wildlife Inventory and Proposal of Sloth Bear Conservation Reserve in Marihan-Sukrit-Chunar Landscape of Mirzapur Forest Division, Uttar Pradesh.* Vindhyan Ecology and Natural History Foundation, Mirzapur, Uttar Pradesh, 73pp.
- Sinha, N.K. (1995).** Mammalia, p. 209. In: Ghosh, A.K.(ed.). *Fauna of Western Himalaya.* Volume 1. Uttar Pradesh. Zoological Survey of India, Calcutta, 359pp.
- Skinner, J.D. & C.T. Chimimba (2005).** *Caracal caracal* (Schreber, 1776) Caracal, pp. 397–401. In: *The Mammals of the Southern African Subregion, Third edition.* Cambridge University Press, Cambridge, UK, 814 pp.
- Sterndale, R.A. (1884).** No. 218. *Felis Caracal*, pp. 198–199. In: *Natural History of the Mammalia of India and Ceylon*, Thacker, Spink & Co., Calcutta, 540pp.
- Stockley, C.H. (1928).** The Caracal (*Felis caracal*), pp. 180–181. In: *Big Game Shooting in the Indian Empire.* Constable and Comp. Ltd., London, 200pp.
- Stoliczka, F. (1872).** Notice of the mammals and Birds inhabiting Kachh. *Journal of the Asiatic Society of Bengal* 41(3): 211–258.
- Stuart, C.T. (1984).** The extent of occurrence and status of *Felis caracal* Schreber, 1776. *Säugetierkundliche Mitteilungen* 31(2/3): 197–204.
- Sunquist, M. & F. Sunquist (2002).** Caracal *Caracal caracal* (Schreber, 1776), pp. 37–47. In: *Wild Cats of the World.* University of Chicago Press, Chicago, 452pp.

- Taylor, J.C. (1961).** Editorial Notes. *Cheetal*, *Journal of Wildlife Preservation Society of India* 4(1): 53.
- Thackston, W.M. (1999).** *The Jahangirnama – Memoirs of Jahangir, Emperor of India*. Oxford University Press, New York, 532pp.
- Thapar, V., R. Thapar & Y. Ansari (2013).** *Exotic Aliens: The Lion and the Cheetah in India*. Aleph Book Company, New Delhi, 304pp.
- Thurston, E. (1913).** Chapter 10. Fauna, p. 86. In: *The Madras Presidency with Mysore, Coorg and The Associated States*. Provincial Geographies of India. Cambridge University Press, Cambridge, 293pp.
- Tian, H., K. Banger, T. Bo & V. Dadhwal (2014).** History of land use in India during 1880–2010: Large-scale land transformations reconstructed from satellite data and historical archives. *Global Planetary Change* 121: 78–88. <https://doi.org/10.1016/j.gloplacha.2014.07.005>
- Vanak, A.T., A.J. Hiremath, S. Krishnan, T. Ganesh & N.D. Rai (2017).** Filling in the (forest) blanks: the past, present and future of India's savanna grasslands, pp. 88–93. In: Hiremath, A.J., N.D. Rai & A. Siddharta (eds.). *Transcending Boundaries: Reflecting on Twenty Years of Action and Research at ATREE*. Ashoka Trust for Research in Ecology and the Environment, Karnataka, 189pp.
- Verma, T. (1994).** *Karkhanas under the Mughals from Akbar to Aurangzeb: A Study in Economic Development*. Pragati Publication, New Delhi, 181pp.
- Vigne, G.T. (1842).** Chita-hunting, pp. 41–42. In: *Travels in Kashmir, Ladakh, the Countries Adjoining the Mountain-Course of the Indus, and the Himalaya, North of the Panjab*. Volume 1. Henry Colburn, London, 456pp.
- Vira, R., K.N. Dave & L. Chandra (1953).** *Indian Scientific Nomenclature of the Mammals of India, Burma and Ceylon*. International Academy of Indian Culture, Nagpur, 187pp.
- Waddington, C.W. (1933).** Indian India: As Seen by a Guest in Rajasthan. Jarrold, London, 168pp.
- Wakankar, V.S. (2005).** *Painted Rock Shelters of India*. Directorate of Archaeology, Archives, and Museums, Government of Madhya Pradesh, 420pp.
- Wakankar, V.S. (2008).** Indian Prehistory as Revealed by Excavations, Explorations, and Rock Art Study at Bhimbetka and in the adjoining Regions. *Purakala* 18: 65–72.
- Ward, A.E. (1923).** Game animals of Kashmir and Adjacent Hill Province. *Journal of the Bombay Natural History Society* 29(1): 23–35.
- Ward, G.C. & D.R. Ward (1993).** *Tiger-Wallahs: Encounters with the men who tried to save the greatest of the great cats*. Harper Collins Publishers, New York, 170pp.
- Wardrop, A.E. (1914).** Chapter VII. The Meerut Tent Club, p. 106. In: *Modern Pig-sticking*. Macmillan and Co. Ltd., London, 304pp.
- Wroughton, R.C. (1912).** Bombay Natural History Society's Mammal Survey of India. *Journal of the Bombay Natural History Society* 21(3): 820–851.





www.threatenedtaxa.org

PLATINUM
OPEN ACCESS



The Journal of Threatened Taxa (JoTT) is dedicated to building evidence for conservation globally by publishing peer-reviewed articles online every month at a reasonably rapid rate at www.threatenedtaxa.org. All articles published in JoTT are registered under [Creative Commons Attribution 4.0 International License](https://creativecommons.org/licenses/by/4.0/) unless otherwise mentioned. JoTT allows unrestricted use, reproduction, and distribution of articles in any medium by providing adequate credit to the author(s) and the source of publication.

ISSN 0974-7907 (Online) | ISSN 0974-7893 (Print)

December 2020 | Vol. 12 | No. 16 | Pages: 17171–17262

Date of Publication: 14 December 2020 (Online & Print)

DOI: 10.11609/jott.2020.12.16.17171-17262

Editorial

Foreword to the third special issue on small wild cats
– Angie Appel & Shomita Mukherjee, Pp. 17171–17172

Review

Historical and current extent of occurrence of the Caracal *Caracal caracal* (Schreber, 1776) (Mammalia: Carnivora: Felidae) in India
– Dharmendra Khandal, Ishan Dhar & Goddilla Viswanatha Reddy, Pp. 17173–17193

Communications

Rediscovery of Caracal *Caracal caracal* (Schreber, 1776) (Mammalia: Carnivora: Felidae) in Abu Dhabi Emirate, UAE
– Robert Gubiani, Rashed Al Zaabi, Justin Chuyen & Pritpal Soorae, Pp. 17194–17202

The Fishing Cat *Prionailurus viverrinus* (Bennett, 1833) (Mammalia: Carnivora: Felidae) in Shuklaphanta National Park, Nepal
– Bhupendra Prasad Yadav, Angie Appel, Bishnu Prasad Shrestha, Bhagawan Raj Dahal & Maheshwar Dhakal, Pp. 17203–17212

The Rusty-spotted Cat *Prionailurus rubiginosus* (I. Geoffroy Saint-Hilaire, 1831) (Mammalia: Carnivora: Felidae) in Rajasthan, India – a compilation of two decades
– Satish Kumar Sharma & Meenu Dhakad, Pp. 17213–17221

Male residency of Sunda Clouded Leopard *Neofelis diardi* (Cuvier, 1823) (Mammalia: Carnivora: Felidae) in a peat swamp forest, Indonesian Borneo
– Lynn Pallemerts, Adul, Ici P. Kulu, Karen Anne Jeffers, David W. Macdonald & Susan Mary Cheyne, Pp. 17222–17228

Clouded Leopard *Neofelis nebulosa* (Griffith, 1821) (Mammalia: Carnivora: Felidae) in illegal wildlife trade in Nepal
– Yadav Ghimirey & Raju Acharya, Pp. 17229–17234

Anaesthetic, clinical, morphometric, haematological, and serum chemistry evaluations of an Andean Cat *Leopardus jacobita* (Cornalia, 1865) (Mammalia: Carnivora: Felidae) before release in Bolivia
– L. Fabián Beltrán-Saavedra, Rolando Limachi Quiñaja, Grace Ledezma, Daniela Morales-Moreno & M. Lilian Villalba, Pp. 17235–17244

Reunion with the mother: a successful rehabilitation strategy for displaced wild Rusty-spotted Cat *Prionailurus rubiginosus* (I. Geoffroy Saint-Hilaire, 1831) (Mammalia: Carnivora: Felidae) kittens
– Ajay Deshmukh, Yaduraj Khadpekar, Mahendra Dhore & M.V. Baijuraj, Pp. 17245–17251

Short Communications

Updating records of a threatened felid species of the Argentinian Patagonia: the Guigna *Leopardus guigna* (Molina, 1782) (Mammalia: Carnivora: Felidae) in Los Alerces National Park
– María de las Mercedes Guerisoli, Mauro Ignacio Schiaffini & Gabriel Bauer, Pp. 17252–17257

Records of Rusty-Spotted Cat *Prionailurus rubiginosus* (I. Geoffroy Saint-Hilaire, 1831) (Mammalia: Carnivora: Felidae) in Mount Abu Wildlife Sanctuary, Rajasthan, India
– Hemant Singh & Aditya Kariyappa, Pp. 17258–17262

Member



Publisher & Host

