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

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**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.

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**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.

**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 *Antilope 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 Knowledge of its conservation status, however, is largely outdated, especially for the Asian populations (Moqanaki et al. 2016).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 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 Fatehsinghrao 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:

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

 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;

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

 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.

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**Camera trapping**

Regular camera trapping using Cuddeback X-ChangeTM 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 from1948 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, 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 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 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 onthe 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, 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).

**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 byDas 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 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 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 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 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.

**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 |

**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 | 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. | Parks (1850) |
| 3 | 15.iv.1852 | Bhainsrorgarh, Rajasthan | Saw a large Lynx (Caracal) | 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. | Forsyth (1889) |
| 5 | ~1872 | Kutch, Gujarat | Observed the Rao of Kutch hunting a Caracal | Stoliczka (1872) |
| 6 | ~1874 | Northern Circars, Andhra Pradesh and Odisha | Caracal sighted or collected | Jerdon (1874) |
| 7 | ~1874 | Neermul Jungle, Telangana | Caracal sighted or collected | Jerdon (1874) |
| 8 | ~1874 | Mhow, Madhya Pradesh | Caracal sighted or collected | Jerdon (1874) |
| 9 | ~1874 | Jeypore – Koraput, Odisha | Caracal collected and sent to Edward Blyth | Jerdon (1874) |
| 10 | ~1874 | *Chutia* (Chota) NagpurDivision | Seen a Caracal | Ball (1874) |
| 11 | ~1883–1884 | Jhang, Punjab, Pakistan | Detailed description of presence in the region. Vernacular name *bar billa* provided. | 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. | Rice (1884) |
| 13 | ~1887 | Mumdot, Firozpur, Punjab | Missed a shot on a Caracal | Newall (1887) |
| 14 | 1888 | Central Province, Maharashtra | Baker(1890) hunted a Caracal | Baker (1890) |
| 15 | vii.1891 | Goona (Guna), Madhya Pradesh | Caracal skull deposited by G.E. Money, Reg. no. 6056 | Sameer Bajaru, 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 | Drake-Brockman (1892); MacDonald (1893) |
| 17 | Early 20th 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) | Taylor (1961) |
| 18 | 18.ii.1905 | Khadir of Meerut, Uttar Pradesh | Smith and Parsons killed a Caracal | Wardrop (1914) |
| 19 | ~1908 | South Punjab | Detailed description of presence in the region. | Rose et al. (1908) |
| 20 | ix.1908 | Jalaun District, Central Province, Uttar Pradesh | Caracal skin deposited at BNHS by L.R. Clarke | Millard (1908) |
| 21 | ~1909 | Sambalpur, Odisha | Dogs killed a Caracal. | 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. | De Brett (1909) |
| 23 | ~1911 | Amravati, Maharashtra | Detailed description of presence in the region. Vernacular name, *jhua* or *jhuva* distinct from that of the Jungle Cat provided. | Fitzgerald & Nelson (1911) |
| 24 | ~1912 | Dhondsa, Kutch, Gujarat | Male Caracal skin | Wroughton (1912) |
| 25 | ~1912 | Bhuj, Kutch, Gujarat | Female Caracal skin | Wroughton (1912) |
| 26 | Christmas 1912 | Sagar, Madhya Pradesh | A Caracal is hunted | Maxwell (1914) |
| 27 | 28.xii.1912 | Mirzapur, Uttar Pradesh | Hunted a Caracal | Allen (1919) |
| 28 | 8.iv.1914 | Wano, Waziristan, Pakistan | Caracal skin deposited at BNHS by F.L. Hughes, Reg. no. 6054 | Sameer Bajaru, 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 | Burke (1920) |
| 30 | ~1923 | Okha, Devbhumi Dwarka, Gujarat | Detailed description of presence in the region | Desai & Clarke (1923) |
| 31 | ~1923 | Punjab | A male Caracal hunted | Ward (1923) |
| 32 | ~1928 | Punjab Salt range, Pakistan | Shot a Caracal | Stockley (1928) |
| 33 | ~1932–1933 | Dholpur, Rajasthan | Seen a Caracal | Waddington (1933) |
| 34 | ~1920–1930 | Lotiya Jheer Jhalawar, Rajasthan | Head mount of a subadult Caracal in Prithivi Vilas Palace, Jhalawar, Rajasthan | Mahijit Singh pers. comm.2019 |
| 35 | 1935 | Nara Magrahillock, very close to Udai Vilas Palace, Dungarpur, Rajasthan | One Caracal head mount displayed in the dining hall of Udai Vilas Palace, Dungarpur, Rajasthan | Image 3 |
| 36 | ~1940s–1950s | Saharanpur, Uttar Pradesh | Shot three Caracals in 20 years.  Holdsworth (1960) shot a Caracal in Saharanpur while hunting junglefowl *Gallus* and was not aware of the identity of the killed cat. Later, Holdsworth shot two cats on junglefowl beats, which he identified as Caracal using the book by Brander (1923). | Holdsworth (1960, 1962) |

**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 | Ranjitsinh (2017) |
| 2 | 1.–5.iii.1951 | Satukhera (Satookhera) Block, Todgarh-Raoli Forest, Rajasthan | Keshav Sen Khaarwa hunted a Caracal | Sharma (2015) |
| 3 | 1954 | Bikaner, Rajasthan | Saw a Caracal skin with a *Sansi* hunter who killed it in Bikaner and refused to sell the skin | Prakash (1960) |
| 4 | ~1954–1958 | Between Delhi and Rohtak, Harayana | Geoffrey C. Ward hunted a Caracal | Ward & Ward (1993); Geoffrey C. Ward in litt. 2019 |
| 5 | v.1955 | Saharanpur, Uttar Pradesh | Caracal hunted by forest officer Srivastava. | 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 | Sharma & Sankhala (1984b) |
| 7 | xii.1956 | Ajabgarh, Alwar, Rajasthan | Caracal spotted in grassy scrub land | Sharma & Sankhala (1984a) |
| 8 | xii.1957 | Hazaribagh NP, Jharkhand | Caracal seen | Sen (1959) |
| 9 | 1960 | Kurabad, Udaipur | A Caracal shot by Raza Tehsin | Satish Sharma in litt*.* 2020 |
| 10 | 30.i.1962 | Amritkua Baran, Rajasthan | Caracal head mount | 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. | 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 *Bawri* hunter around Jodhpur in November 1962. | Prakash (1994) |
| 13 | 1962–1963 | Ajabgarh, Sariska TR, Rajasthan | Hunted a Caracal and photographed it | Rungta pers. comm. 2019 |
| 14 | 1964 | Burhanpur, Madhya Pradesh | Caracal sighted | Ranjitsinh (2017) |
| 15 | 1967 | Sariska TR, Rajasthan | Seen a Caracal | David (1967) |
| 16 | 1967 | Machedi Village, Alwar, Rajasthan | A mother Caracal with a cub seen by forest officer V.S. Saxena | Satish Sharma in litt. 2020 |
| 17 | 1967 | Kalighati, Sariska, Alwar, Rajasthan | A Caracal seen by forest officer V.S. Saxena | 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 | Raghunandan S. Chundawatpers. comm. 2020 |
| 19 | 1970–1973 | Gandhisagar WS, Madhya Pradesh | Biologist Raghunandan S. Chundawat saw a Caracal on foot, they flushed the Caracal from *Acacia* bushes in an overgrazed area. The Caracal ran away. | Raghunandan S. Chundawatpers. comm. 2020 |
| 20 | Unknown, before 1972 | Teetarkheri Jhalawar, Rajasthan | A Caracal head mount in the possession of Vartol Jagirdar, Sabarkantha, Gujarat | Satish Sharma pers. comm. 2019 |
| 21 | 1973 | Ranthambhore TR, Rajasthan | A Caracal seen by forest officer V.S. Saxena | Satish Sharma in litt. 2020 |
| 22 | I.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 *Cheetal*. Possibly the only photo of a Caracal from Uttar Pradesh. | (Singh 1975) |
| 23 | ~1975 | Sangod Baran, Rajasthan | Caracal sighted | Bharat Singh pers. comm. 2019 |
| 24 | ~1977–1979 | Phagwara, Punjab | Caracal rescued from villagers who tried to beat it to death. | Gurmit Singh pers. comm.2019 |
| 25 | v.1979 | Buja, Sariska TR, Rajasthan | Caracal spotted in grassy plain in search light | Sharma & Sankhala (1984a) |
| 26 | 1980 | Pali, Rajasthan | Five skins recovered thought to have been killed in Pali for skin trade | Sharma & Sankhala (1984a) |
| 27 | Unknown | Ajmer, Rajasthan | A Caracal killed by Daud Khan | Sharma & Sankhala (1984a) |
| 28 | iii.1981 | Shyamgiri Kalda Plateau, Madhya Pradesh | Skin of a Caracal poached by local people | H.S. Pabla in litt. 2019; Shyamendra Singh pers. comm. 2019 |
| 29 | ix1981 | Sariska TR, Rajasthan | Caracal seen by zoologist J.H. Reichholf | Stuart (1984) |
| 30 | ~1982 | Padam Talab, Ranthambhore TR, Rajasthan | Seen and photographed a Caracal | Valmik Thapar in litt. 2020 |
| 31 | xii.1982 | Tehla, Sariska TR, Rajasthan | A dead Caracal collected by a forest officer | Sharma & Sankhala (1984a) |
| 32 | Winter 1982 | Chittorgarh, Rajasthan | Caracal caught and sent to Jaipur Zoo | (Rungta 2017) |
| 33 | v.1983 | Bodal Ranthambhore, Rajasthan | Caracal run over by a vehicle | Sharma & Sankhala (1984a) |
| 34 | 1982–1983 | Road from Rajgarh to Narsinghgarh, 50–58 km distance, Rajgarh District, Madhya Pradesh | A Caracal road kill seen by biologist Raghunandan S. Chundawat. | Raghunandan S. Chundawat pers. comm. 2020 |
| 35 | 11.iii.1984 | Semli, Ranthambhore TR, Rajasthan | Caracal sighted by forest officer Fateh Singh Rathore | 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). | Raj Chauhan pers. comm.2019 |
| 37 | 24.iv.1986 | Between Sariska NP gate and Kalighati, Rajasthan | Caracal sighted | Divyabhanusinh (1987) |
| 38 | 1986 | Melghat, Maharashtra | Caracal sighted | Ranjitsinh (2017) |
| 39 | vi.1987 | Luharpur Pipliya Manak Chok, Ramgarh Vishdhari WS, Bundi, Rajasthan | A Caracal sighted by forest officer P.K. Jain | Satish Sharma in litt. 2020 |
| 40 | 1991 | Jawda Nimdi, Chittorgarh, Rajasthan | A Caracal sighted by Shyam Singh Mahechha | Harshvardhan Singh Mahechha pers. comm. 2020 |
| 41 | 1993 | Modia, Kumbhalgarh WS, Rajasthan | Two adult Caracals seen by forest officer Parbat Singh | Satish Sharma in litt. 2020 |
| 42 | 1994 | Sirondh Kalan, Alwar, Rajasthan | A Caracal rescued from a well by forest officer B.M. Sharma | Satish Sharma in litt. 2020 |
| 43 | 1994 | Ghanerao, Desuri, Pali District, Rajasthan | Two adult Caracals seen by forest officer Parbat Singh | Satish Sharma in litt. 2020 |
| 44 | 1994 | Sadri Latada, Kumbhalgarh WS, Rajasthan | A single Caracal sighted multiple times by forest officer Parbat Singh | Satish Sharma in litt. 2020 |
| 45 | vii.1995 | Sariska TR, Rajasthan | Observed a Caracal plucking feathers off a dead Peacock *Pavo cristatus* | 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 | Bharat Jethva pers. comm. 2019 |
| 47 | 1997 | Tera Village, Kutch, Gujarat | Seen a Caracal | Bharat Jethva pers. comm.2019 |
| 48 | vi.1998 | Malik Talab to Lakarda Road, Ranthambhore TR, Rajasthan | Observed a Caracal crossing the road | G.V. Reddy pers. obs. |
| 49 | ii.1998 | Takhatpura, tehsil and district Jalore, Rajasthan | Caracal sighted by Pradeep Singh | Ranjitsinh (1999) |
| 50 | 1998 | Tera Village, Kutch, Gujarat | A Caracal feeding on a Cattle Egret *Bubulcus ibis*, photographed | Dinesh Sharma in litt. 2020 |
| 51 | 1999 | Ganeshdham, Ranthambhore TR, Sawai Madhopur, Rajasthan | Seen a Caracal crossing road at 21.00h | Aditya Singh pers. comm. 2020 |
| 52 | 1999 | Dhopchok, Ranthambhore TR, Sawai Madhopur, Rajasthan | Seen a Caracal | Aditya Singh pers. comm. 2000 |
| 53 | xi.1999 | Guda–Lahpur road, Ranthambhore TR, Rajasthan | Caracal seen crossing road | G.V. Reddy pers. obs. |

**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 | *Nara Magra* 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 Bajaru, 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 Bajaru, 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 | | | - |
| **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 | |

**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 | 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 | Balendu Singh in litt. 2019 |
| VI | 05.v.2013 | Indala | HDF | SN | A Caracal observed leaping towards a flock of doves, photographed | Dharmendra Khandal pers. obs. |
| VII | 2.i.2010 | Padam Talab | HDF | L | Seen a Caracal, photographed | Balendu Singh pers. comm.2019 |
| VIII | 17.i.2010 | Padam Talab to Rajbagh | HDF | L | A Caracal was seen and photographed | Balendu Singh, Gobind Sagar Bhardwaj & Subhas Sharma in litt. 2019 |
| IX | xi.2009 | Berda | HDF | SN | A Caracal on a tree, photographed | Soonoo Taraporewala in litt. 2019 |
| X | xi.2009 | Rajbagh | HDF | L | Few glimpses of a Caracal hiding in *Justicia adhatoda* bushes near the lake | Dharmendra Khandal pers. obs.  Photographed by Rahul Rao |
| XI | 2.xii.2009 | Bhoot Khora | HDF | SN | A Caracal photographed | 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 | Dharmendra Khandal pers. obs. |
| XIII | 29.i.2009 | Bhoot Khora | HDF | SN | A female Caracal with cubs photographed | Balendu Singh in litt. 2019 |
| XIV | 2009 | Ranthambhore TR | HDF | L | Photographed a Caracal | Singh et al. (2011) |
| XV | 8.iii.2008 | Rajbagh – Malik Talab Road | HDF | L | Caracal seen on a tree, photographed | 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 | Singh et al. (2014) |
| XVII | 6.vii.2004 | Berda | HDF | SN | A female Caracal with two sub adult cubs photographed | Margarita Steinhardt in litt. 2019 |
| XVIII | vi.2001 | Lahpur | HDF | SN | A Caracal was observed crossing the road | 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 | Dharmendra Khandal pers. obs. |
| XX | 15.x.2016 | Balaji Telai Dangda | HDF | SN | Photographed a Caracal | Dharmendra Khandal pers. obs. |

**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 | 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 | 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 Khiarwa, no photograph | 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 | Satish Sharma in litt. 2020 |
| 9 | 2004 | Karna Ka bas, Sariska Tiger Reserve, Alwar | HDF | SN | Caracal seen by forest officer Udayram Chaudhary | Satish Sharma in litt. 2020 |
| 10 | 23.vii.2004 | Sariska Tiger Reserve, Alwar | -- | -- | A Caracal photographed | Heerden (2004) |
| 11 | 18.iv.2017 | Keoladeo National Park,  Bharatpur | SL | L | Forest Department camera trapped a Caracal | 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 | 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 | 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 | Manoj Parashar pers. comm. 2019 |
| 15 | ~xii.2016–i.2017 | 5–6 km away from Johjawar village, Kamli Ghat,  Todgarh Raoli Wildlife Sanctuary, Pali | HDF | SN | A Caracal seen by Nagendra Singh Johjawar, no photograph | Nagendra Singh Johjawar pers. comm. 2019 |
| 16 | x. 2006 | Devriya Farm, Jawda Nimdi  Bhainsrorgarh Wildife Sanctuary,  Chittorgarh | HDF | R | Caracal seen crossing road, no photograph | Harshwardhan Singh Mahechha pers. comm. 2020 |

**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. | Dharmendra Khandal pers. obs. Photographed |
| **Udaipur District** | | | | | | |
| 18 | 30.iv.2013 | Baghdarrah | SL | L | Forest officer Satish Sharma seen a Caracal crossing Badar road | 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 | Satish Sharma in litt. 2020 |
| 20 | v.2009 | Near Banki Forest area | HDF | SN | Seen a Caracal, no photograph | Sharad Agarwal pers. comm. 2019 |
| 21 | 2004 | Kheroda | SL | SN | Flying squad of Forest Department rescued a Caracal from an open well | Satish Sharma pers. comm. 2020 |
| **Pratapgarh District** | | | | | | |
| 22 | 22.iv.2008 | Salamgarh, Arnod, Pratapgarh | OTF | SN | A subadult Caracal caught by forester Chhotulal Meena near village and later released there | 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 | 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 | Satish Sharma in litt. 2020 |

**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 *Hoplobatrachus tigerinus*. 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 | 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 | 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 | 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 | Vikram Sinh Sodha pers. comm. 2019 |
| 29 | Xii.2015, 23.45h | Gatchdo Village | PjT | SN | Caracal seen and photographed | 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 | 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. | Vikram Sinh Sodha pers. comm. 2019 |
| 32 | 3.xi.2014 | Nani Vamoti Village | SL | SN | A Caracal seen crossing the road. No photograph | 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 | 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 *Sus scrofa*. Staff of a local NGO helped Forest Department (FD) officers to treat the injured animal. FD officers rescued a Caracal; several photographs | 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 | Jugal Tiwari pers. comm. 2019 |
| 36 | 17.iii.2013 | Jara-Jumra Road | SL/PjT | SN | A female Caracal killed in a road accident | 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 | Shivbhadra Sinh in litt. 2019 |
| 38 | 24.xii.2010 | Naliya forest area | SL | SN | Photographed a female Caracal with cub | 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 | Jugal Tiwari pers. comm. 2019 |
| 40 | xi.2008 | Near Mata-no-Madh of Gugliya Rakhal | SL | SN | Seen a Caracal. No photograph | 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 | Deepak Goswami pers. comm. 2019 |
| 42 | 2006–2007 | Naliya | SL | SN | Photographed a Caracal | 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 | 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 | 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 | 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 | Khudsar (2014) |

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