

Dispersion of the Asiatic lion *Panthera leo persica* and its survival in human-dominated landscape outside the Gir forest, Gujarat, India

H. S. Singh

Expansion and consolidation of Gir Protected Area, Gujarat, India – habitat of the Asiatic lion, and response of prey and predator to the management and dispersion trend of lions outside the Gir forests are interesting and noteworthy. During the last five decades (1965–2015), an approach for the Asiatic lion conservation is one of the best efforts in the world. Unlike other super predators, the number of lions has increased by 4-folds and wild ungulates by over 13-folds in the Gir forest during this period. The distribution range of lions has also expanded to a large landscape in four districts in the state. The consistent shift in feeding patterns of lions is mainly due to the improved availability of wild prey. Lions were restricted in the Gir forest till 1990, and the dispersion started when their population increased. In two decades, more than 40% of the total number of lions was spotted outside the Gir landscape. It is interesting to know that lions and leopards live in human-dominated landscape outside the Gir forest. Blue bull, wild boar and feral cattle, and carcasses of livestock in the villages are major food for the lions. The prey population, predation behaviour of the lion and acceptance of the lion as honourable animal by the villagers indicate that the present trend may continue in the near future as well.

Keywords: Dispersion, *Panthera leo persica*, predation, ungulates.

GIR, synonymous with the Asiatic lion – *Panthera leo persica*, is located southwest of Saurashtra in Gujarat, India. Gir and Girnar, the two hill systems in the region have significant ecological, cultural and religious values which have been recognized through the ages¹. The area in and around these hills has the largest compact tract of dry deciduous and thorny forest intermixed with patches of savannah-type vegetation in western India, which has helped save the Asiatic lion – only gene pool in the world. Stability of the ecosystem with tremendous regenerating, self-supporting and self-sustaining capacity, due to rich and diverse flora and fauna, is the most important characteristic of this large compact block of forests¹. In India, the Gir has the highest concentration of big cats – lions and leopards – numbering over 625 individuals, and 1025 (523 lions + 502 leopards) individuals in the lion distribution range. Over the last two decades, spilled population of the lions has been accommodated in patches of forest in four districts – Junagadh, Gir – Somnath, Amreli and Bhavnagar. When the number of lions reached a saturation level in the Gir forest^{1,2}, they dispersed towards the historical distribution range, and

established several satellite populations in the human-dominated areas. In 2015, about 208 lions and 190 leopards were estimated in and around these satellite areas outside the Gir forest. During the last two decades (1995–2015), the number of lions has increased consistently from 42 to 208 outside the Gir forest. If the present trend continues, the number of lions outside the Gir forest is expected to exceed that within the forest in a decade³.

Area – the lion habitat

The Gir Wildlife Sanctuary, the first Protected Area (PA) in Gujarat, was established in 1965 to conserve the Asiatic lion which was on the verge of extinction^{4,5}. Subsequently, a sequence of administrative, managerial and legal measures were taken to consolidate and expand the lion's habitat. The core area of the Sanctuary was declared as a National Park, which was subsequently expanded. The Sanctuary was expanded to cover peripheral forests. The adjoining area, an integral part of the Gir forest in Amreli district, was declared as Pania Sanctuary. Subsequently, the wastelands and community lands around Gir were notified as Protected Forests to manage them as buffer zone. A patch of forest near Gir in Mitiyala, historically known as a lion habitat, was declared as

H. S. Singh is in the National Board for Wild Life, Plot-44, Sector-8, Gandhinagar 382 010, India.
e-mail: hss.ifs@gmail.com

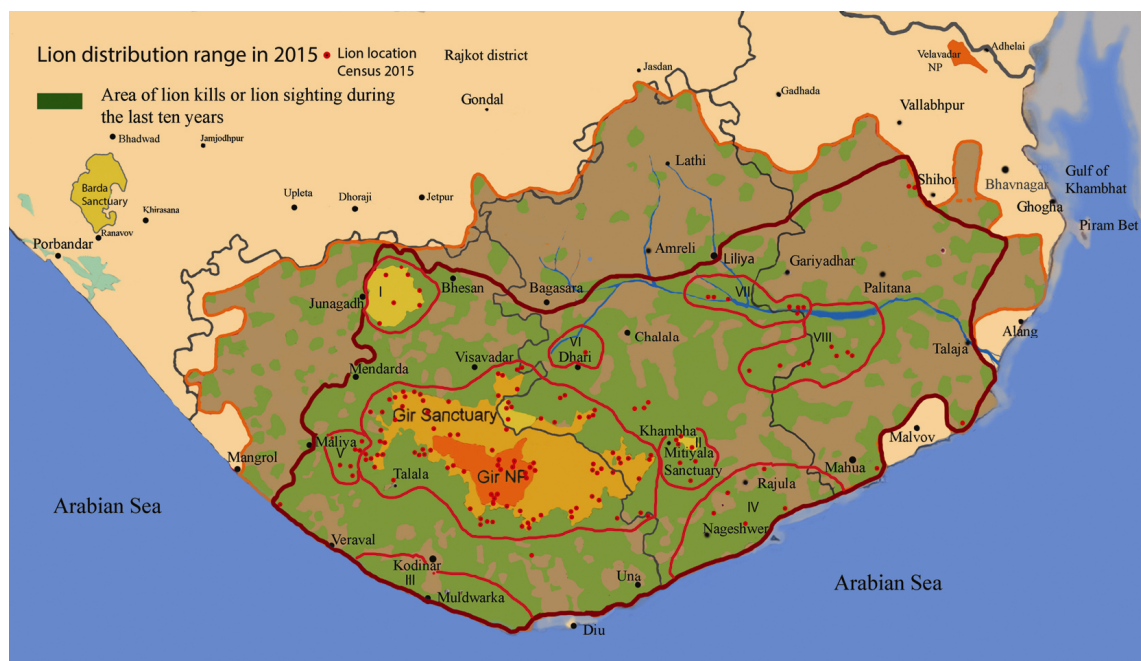


Figure 1. Location of lions during census 2015 in the Gir forests and the satellite areas.

a sanctuary for further consolidation of its habitat². In 2007, Girnar, a lion satellite area, was also declared as a sanctuary. Thus, five PAs – Gir National Park, Gir Sanctuary, Pania Sanctuary, Mitiyala Sanctuary and Girnar Sanctuary, covering 1621 km² are presently managed as the Asiatic lion's habitats. Among these, the Gir Protected Area, covering Gir National Park, Gir Sanctuary, and Pania Sanctuary includes about 1452 km² of a compact block of forests in three districts – Junagadh, Gir-Somnath and Amreli. Additionally, forest area and grasslands in the periphery of the Gir forest are also a part of the Gir Conservation Area². Mitiyala near Gir east and Girnar near Gir west are the first two satellite sanctuaries for the lion, where animals move freely from the Gir forest through both forests and non-forest areas.

With strengthening conservation measures and habitat recovery, the number of lions has increased and they have dispersed into the satellite areas Girnar, Mitiyala, Babaravidi, coastal areas, Amardi, Liliya–Krankach, Jesor, Shatrunjay hills and Hippavadli areas (Figure 1). More than the area of PAs covering satellite areas and their corridors has been proposed for notification as an Ecological Sensitive Zone (ESZ), which is pending with the Government of India for final declaration (source: Gujarat Forest Department).

With five PAs (1649 km²), and a substantial area (more than five PAs) under the proposed ESZ, the total area under the conservation regime would be quite high.

However, the visiting area of lions may be three times the above, spreading in over 1475 villages of the four districts.

Methods

The present analysis is based on previous studies, data of the Forest Department, livestock predation in the villages, and recent population estimates of prey and predator. A series of studies during the last four decades and official monitoring of data provide adequate information to understand the trend that prevails in the Gir forest.

Wildlife census has been conducted every five years in the Gir forest by the Forest Department since 1950. The counting of the lion and ungulates in the Gir forests and lion's satellite areas in 2015 have been used in the analysis². Previous studies, management plan, livestock predation data and the recent counting of wildlife in Saurashtra region have also been used. Wildlife census data and trends related to lions in different areas, and livestock predation there during the last five decades provide definite trends of dispersion in different zones of the four districts. This article analyses how over 40% of the lions dispersed and survived, hunting prey in the villages. The article also explores the scope of trend and dispersion of the lion in Saurashtra region.

Results and discussion

Trend of lion population

The number of Asiatic lion was lowest during the first and second decade of the 20th century, when only a few dozen of them survived in and around the Gir^{1,3}. The restriction on hunting and protection measures initiated

Table 1. Population trend and lion dispersion

Area	Years			
	1974	1995	2010	2015
Core population – Gir forest, including Pania and Babara <i>vidi</i>	180	262	306	315
Satellite-I: Girnar	*	13	23	33
Satellite-II: Mitiyala	*	*	7	8
Satellite-III: Coastal Junagadh	–	10	9	32
Satellite-IV: Coastal Amreli	–	16	12	18
Satellite-V: Amardi–Lilia–Krankach– Savarkundala in Amreli district	–	*	31	80
Satellite-VI: Satrunji–Jesor–Hippavadli, coastal area in Bhavnagar district	–	–	23	37
Total	180	304	411	523

*A few lions frequented from the Gir forest and were counted with the core population.

Table 2. Decadal growth of lion and wild ungulate population in the Gir forest

Year	Total population of lions	Lions in and around the Gir forest	Wild ungulates in the Gir forest	Ungulates per lion in the Gir forest
1974	180	180	9,640	54
1984	239	235	16,910	74
1995	304	265	38,220	146
2005	359	291	51,330	176
2015	523	315	83,150	264

About 310 leopards and 150 hyena are estimated to be in the Gir forest.

during the second and third decades in the 20th century paid dividends and helped in the conservation of lions. The Asiatic lion again faced problems on transition of political power after independence, when the animal was on the verge of extinction in the late 1950s and early 1960s (ref. 5). After the establishment of the Gir Wildlife Sanctuary in 1965 and resettlement of 588 maldhari (a cattle-rearing community) families among 845 families outside Gir, the situation improved.

Analysis of census data shows that the impact of intensive conservation during the last five decades since implementation of the Gir Sanctuary Project is reflected in the population growth of prey and predator (Tables 1 and 2).

Trend of dispersion

The trend of lion dispersion from Gir, after its number recovered from near saturation, is interesting. It followed the historical trend of its extermination in those areas. During 1950–1984, few lions, less than a half dozen, were reported from Girnar and Mitiyala, outside the Gir forest^{1,4}. Lion dispersion started after severe drought in 1987–88. When the population reached near saturation (306 in 2010 and 315 in 2015), nomads and grown subadults were compelled to leave prides in search of food and space³. Subsequently, the six satellite areas in the four districts were captured by the lions. Table 1 shows the trend of settlement of the lion in different areas.

Year 1974: During the lion census in 1974, the entire population was restricted in and around the Gir forest and about half a dozen of them frequented from Gir to Girnar and Mitiyala forests. Most of the lions were counted in the Gir west and the number was very low in the Gir east. Some lions moved in peripheral villages at night and hunted livestock. The movement range of the lion was estimated to be approximately 3000–3500 km².

Year 1995: Dispersion of lions to the coastal zone and Babara *vidi* started in late 1980s, after a severe drought. In 1995, a total of 42 lions was counted outside the Gir forest and its surrounding areas. The presence of lions improved in the Gir east and their number was comparable to that in the Gir west. A lioness with her two grown cubs arrived in Diu Island in 1995, and were captured subsequently. Around the same time lions were also spotted in Hippavadli and Liliya–Krankach, but they were floating lions. The distribution range of the lions reached roughly about 5000–5500 km².

Year 2010: The lions started inhabiting new areas such as Liliya–Krankach in Amreli and Jesor–Hippavadli in Bhavnagar, and started breeding there. A total of 105 lions were counted in the areas far away from the Gir forest. Lions reached Jesor–Hippavadli–Dholi kunwa in 1995. Subsequently, they occupied Lilia–Krankach, Sha-trunji river bed and Bhavnagar coast. The environment of the riverine area and cover of evergreen *Prosopis* thicket provided cool environment for the lions during summer.

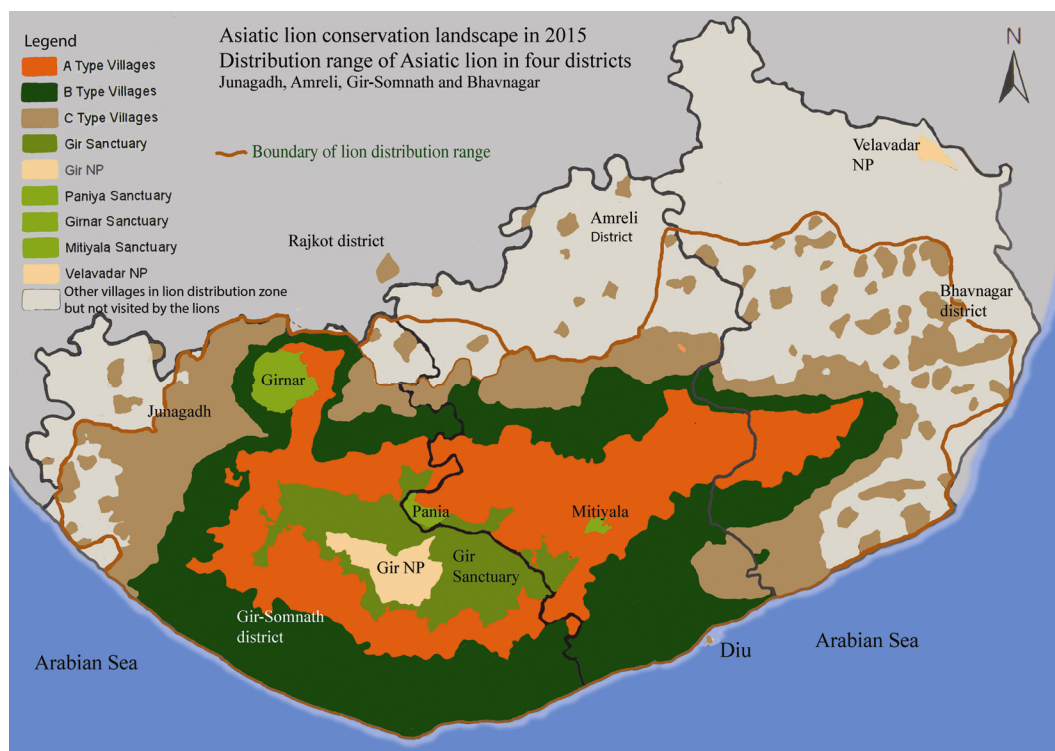


Figure 2. Zoning of the lion concentration in the lion conservation landscape.

The livestock kill data reveal that the lions moved in 20 talukas in the three districts (now four, after bifurcation of Junagadh district). Lion distribution range further expanded to approximately 10,500 km².

Lion distribution range in 2015

Surprisingly, the number of lions and their dispersion trend continued beyond the expectation of conservationists. Lions had limitations of dispersion in the west due to intensive cultivation and human habitation, but wasteland, forests and presence of grazing ground with livestock and blue bull attracted the spilled lion population in the east, radiating far away in the eastern landscape in Amreli and Bhavnagar districts. A total of 356 lions were counted in the five PAs, including Girmar and Mitiyala – the satellite sanctuaries. A total of 208 lions were counted in satellite and other areas, far away from the boundaries of the Gir forest.

According to official records of livestock kills during the last three decades, movement of lions had been reported in 1475 villages in the four districts, although the animals occasionally visited some villages in Jetpur and Gondal talukas in Rajkot district as well. In fact the occupancy area of the lion is less than the visiting or movement areas. Presence of the animal was noticed in 57% of total villages in the four districts⁵. Based on livestock kill data and lion census in 2015, the Wildlife Divi-

sion, Sasan estimated very high distribution range because certain villages visited by nomad lions once due to some compulsion were also included along with other villages within this range which were never visited by the lion. Such areas are excluded in this study. It is difficult to estimate accurate distribution range of the lion, but, based on livestock kill data and the frequent movement of the animal, the range may be projected roughly about 12,500–13,000 km², a substantial increase from 2010. In recent years, annual predation rate of the livestock in the villages is about 3400 individuals. Depending on predation pressure of the lion on livestock outside the Gir forest, the villages are divided into three categories (Figure 2): (i) category A villages – high predation; (ii) category B villages – moderate predation and (iii) category C villages – occasional or uncommon predation⁵.

Two decades ago, conservationists advocated for alternative options in order to increase the population beyond 500 individuals to improve the position of the Asiatic lion from the list of ‘Critically Endangered’ to ‘Endangered’ in the IUCN Red Data Book, however, it has been achieved without utilizing any such options. When lions dispersed in new areas beyond the Gir forest, the first management plan prepared in 1996 by the present author evolved a concept of ‘Greater Gir Management’. At that time no one considered about the presence of lions beyond the Greater Gir landscape – Gir, Girmar, Mitiyala and coastal forests. By the beginning of the 21st century, the lions moved over 100 km away from the boundary of

the Gir forests in different geological landscapes of Shastrunji–Jesor–Hippavadli and Bhavnagar coast. The concept of the Greater Gir landscape is now irrelevant. As a result, the recent management plan has coined a different phrase – ‘Asiatic lion conservation landscape’ or ‘lion conservation area’.

Prey population

With decreasing biotic pressure and improving habitats, the populations of both prey and predator have increased over a period in the Gir forest. The population dynamics of the wild ungulates is governed by both change in livestock population, and predation by the lion and leopard. Wild prey population, which was small in the early 1970s, has improved consistently after settlement of the maldharis outside the Gir forest.

The Gir Lion Sanctuary Project, which started in 1972, was a turning point for the lion^{1,3}. About three-fourths of the maldhari families, along with their livestock, were relocated outside the Gir forest under the project during 1870s and 1980s. Subsequently, the recovery of habitat as well as ungulate population was impressive.

The six wild ungulates in Gir are – spotted deer (*Axix axis*), sambar (*Cervus unicolor*), blue bull (*Boselaphus tragocanelos*), chinkara (*Gazella gazelle*), Four-horned antelope (*Tetracerus quadricornis*) and wild boar (*Sus scrofa*). Blackbuck which is absent within the Gir boundary and found in the peripheral villages, was never a prey for the lion. The number of the two small ungulates – four-horned antelope and chinkara is low, and they are insignificant in the lion’s food. The other four mammals – spotted deer, sambar, blue bull and wild boar are the main wild prey for the lions. Hanuman langur (*Presbytis entellus*), peacock and minor mammals also make a small contribution to the lion’s food, but they form substantial food of leopard. Buffalo and cow are hunted by the lions in good numbers. Thus, six mammalian species – four wild mammals and two domestic ungulates form the main food base for the Asiatic lion^{6,7}.

Joslin⁸ estimated a total of 5600 wild ungulates and Berwick⁹ reported an equally low population of 6400 individuals in the Gir forest. Subsequently, in 1974, the Forest Department estimated a population of 9650 individuals belonging to the 6 main wild prey species. The number of these mammals grew consistently and reached 83,150 in 2015. On the other hand, resident livestock population – buffalo and cow dropped from 25,300 in 1970s to below half the value in mid-1980s; it has subsequently increased during the recent years and reached close to the value of 25,300 that prevailed in 1970s. Additionally, domestic livestock – mainly cows and buffaloes in the peripheral villages around Gir exert pressure on the Sanctuary. This provides an opportunity to the lions to hunt them at night. Table 2 shows the trend of

population growth of lions, wild ungulates and co-predators.

The trend reveals that the number of wild ungulates has increased by about 13 times during the last four and half decades. Despite increase in the lion population, the availability of wild ungulate per lion has also increased over fivefold. Of the wild prey species, the two deer species – spotted deer and sambar – showed maximum population growth during the period. Due to increasing number of livestock during the last decade, the growth rate of wild ungulates may slow down. If the present trend continues, the number of wild ungulates may stabilize at some level in the future and may increase when some of the domestic ungulates are removed cautiously from the Gir forest.

Prey–predator ratio, an important indicator for assessing carrying capacity of predators, has consistently improved in the Gir forest from 54 per lion in 1974 to 264 per lion in 2015. Standing biomass density of prey in the Gir forest is also high – about 8271 kg/km² (domestic – 4700 kg and wild ungulates – 3571 kg), which is comparable with the best lion habitats in Africa^{9,10}. Among PAs in India supporting lion or tiger, prey–predator ratio is highest in the Gir forest, despite exceptionally high density of predators^{2,10,11}.

Predation pattern in and around the Gir forest

The predation ecology is interesting in and around the Gir forest, which is presently occupied by about 315 lions and 310 leopards and over 150 hyenas. Analysis of lion scats collected in 1969–70 showed that about three-fourths of the lion’s food included domestic livestock and the rest from wildlife⁸. The predation pattern gradually shifted toward the wild ungulates in line of improving their number on the one hand, and decline in the resident livestock population on the other^{9,12–14}. In recent years, the contribution of livestock to the diet of lions in and around the Gir forest is about one-fourth; the rest is from wild ungulates^{7,15}.

Prey population and predation trend outside the Gir forest

On an average, lions have killed about 1675 cattle, buffaloes and other livestock annually during the last 15 years (1986–2001)³, which increased to 1710 (during 2005–09) in and around the Gir forest. In recent years, about the same number of livestock was killed in satellite zones in the four districts. Thus, total livestock kills have doubled due to dispersion of lions.

About 210 lions, 190 leopards, and almost the same number of hyenas are found in the satellite areas in the four lion districts. In the lion distribution districts outside Gir, there are about 74,125 wild ungulates (33,900 blue

Table 3. Prey population outside the Gir forest

District	Blue bull	Wild boar/pig	Sambar	Chital	Chausingha	Blackbuck	Chinkara	Total
Junagadh	9970	14,200	2470	3110	0	970	955	31,675
Amreli	10,560	540	10	310	0	520	190	12,130
Gir–Somnath	4030	320	15	2490	20	5	130	7010
Bhavnagar	9330	6410	10	150	0	5700	1710	23,310
Total	33,890	21,470	2505	6060	20	7195	2985	74,125
Gir Protected Area	4130	6530	4640	65,520	1090	0	1240	83,150

bulls, 21,200 wild boars, the rest chinkara, blackbuck and others) (Table 3). The concentration of these ungulates is more in the lion distribution range. About 57% of these districts is under the lion distribution range; thus at least 42,250 wild ungulates along with a large number of feral cattle and livestock carcasses are freely available for the lions without contest and conflicts⁵. Increasing population of blue bull in the region has favoured the lions staying outside the Gir, although their presence in numbers in the area has negative impact on agriculture. Blue bull, the largest antelope in India, numbering about 38,020 individuals (4130 in the Gir forest and 33,890 outside it) in the lion distribution districts and at least 19,320 in the lion distribution range outside the Gir forest, is now a major source of food for the lion. Recent studies reveal that half of the total food for the lion outside the Gir comes from blue bull and wild boar^{7,15}. Blue bull and wild boar are considered as nuisance by the farmers, but the lion is respected. People prefer the presence of lions in their areas as their enemies are regularly killed by them and also the leopards are kept away from the villages. Studies have reported dependency of lions on livestock ranging from 50% to 55.2% in satellite areas¹⁴, which further declined in favour of blue bull^{7,15,16}. Naturally dead carcasses, disposed by panjarpols (large cow-keeping centres), feral cattle and illegal baiting also supplement the lion's food.

Liliya–Krankach, a satellite area covering about 60 km², supported about four dozen lions in 2015. Devastating flood in Shatrunji River submerged the entire low-lying lion habitat in Liliya–Krankach, after unprecedented rainfall (about 60 cm) on 24 June 2015. The rescue teams found 1788 carcasses of wildlife, which included 5 lions and 5 lionesses, over 1670 blue bulls, and rest other wild mammals, although actual number of dead animals was greater than that record. A large number (thousands) of cattle and feral cattle also died in the floods. This indicates concentration of prey in the satellite areas.

Changing perceptions of conservationists

The acceptance of the lions in the villages and the behaviour of the animal towards people changed the percep-

tions of the conservationists. Increasing number of blue bulls and wild boars is the main cause of man–wildlife conflicts in the villages, which is partly addressed by the presence of the lion. The intentional attack of lions on human beings is rare. If people are aware about the habits of the lions, and do not provoke them, and the number of lions remains below a tolerance limit, human being and lions can live together in Saurashtra with a low level of conflict.

One and half decades ago, nobody expected that such a large number of lions could live in areas away from the Gir forest. Liliya–Krankach area, on both sides of the Shatrunji River, is not a part of forest or PA, but supported the highest concentration of lions in the world (about 50 lions, including floating lions, in about 60 km²) in 2015 (ref. 16). This is possible due to high concentration of livestock, blue bull and wild boar in the wastelands, and poor agricultural land. Major source of food for the lions in this area includes blue bull, wild boar and feral cattle. If this norm is applied in the new areas, which are not away from the reach of the lion, the present trend of population and dispersal may reach another milestone.

A lioness reached Hingolghadh and Umeth grassland; a small group of lions visited Kunal and catchment area of Kalubhar River in 2015 which are at the junction of the three districts – Amreli, Botad and Rajkot. A small group reached this area again in December 2015. These areas, potential lion satellite zones, having a good number of blue bulls, stray cattle and other ungulates have been already visited and surveyed by the lions.

Development of Barda Sanctuary, an alternative habitat, is already in progress. The trend indicates that the Gir lion may migrate to patches of forests and grasslands in majority of the districts in Saurashtra and survive there hunting blue bull, wild boar, stray cattle and livestock. However, a setback was observed when the lions killed three people in April–May 2016 in the villages around a small patch of Amardi forest (satellite area) near Dhari, where lions are found in good numbers. A group of 17 lions were captured in May 2016. Subsequently, except a confirmed man-eater, the rest 16 were released after 25 days in captivity. This is a warning to manage the number of lions below a tolerant limit to avoid conflicts and also to preserve values of people–lion association, a key

element of success in managing the Gir lions in human-dominated landscape. If a comprehensive conservation approach is extended in the new areas to involve people in the conservation, the number of lions and their distribution range may reach surprising levels in 1–2 decades.

Issues, problems and limitations in satellite areas

Development of industries and ports, mining activities, rails and high-speed roads in the coastal area have already impacted the lions. The increased frequency and speed of goods trains in Pivavav–Rajula line has posed a new threat as ten lions were killed during 2013–15 (source – Forest Department). Industries and mining activities around Veraval coast have forced the lions to leave the area. Pipavav port and new port activities near Kaj wetlands in Kodinar taluka cause disturbance to a group of lions settled there. The change in land-use pattern and disappearance of wastelands and community lands are other issues.

The network of roads, widening and converting some of them as high-speed roads in the lion conservation landscape are a matter of concern. People around the Gir forests and some of the satellite areas are aware of the habits of the lions and have developed understanding to live with them. Villagers in some of the new satellite areas have poor understanding about the behaviour of the lion, and they need to be educated.

Unproductive livestock and stray cattle virtually become victims of the big predators and the lions derive substantial food from them and their carcasses without conflict. Unlike other parts of the country, the supply of livestock, especially unproductive animals to meat industries is restricted in Saurashtra but growing trade of meat industries may turn into a potential threat, due to higher market price of the animals than the compensation amount for livestock killed by the lion.

The human mortality rate by the lions is very low compared to the tigers and leopards in their respective areas in the country¹⁷. The human casualties by leopards in the Gir lion conservation landscape is normally four times that of the lions. People's support to the lion is the main strength of its conservation, which has to be preserved by the management. The administration should be sensitive and alert, and should not hesitate to remove problem lions to avoid anger among people. Although the forest administration is prompt at addressing man–wildlife conflicts and payment of compensation, there is scope for improvement. Response of the rescue team and quick redressal of the problem are key areas of management.

Establishing the Gujarat Lion Conservation Society to get support of people and corporate houses; constructing parapet walls around wells (over 24,500) to avoid casualties of wildlife, including lions; employing 310 vanmitras and 193 eco-development committees as forest friends in

the villages to improve vigilance and people's support; managing outstanding wildlife rescue and health-care centres at Sasan, Jasadhar and Sakkarbaug zoos with modern equipment, and establishing a quick grievance redressal system are some of the noteworthy initiatives during the last decade. These need extension in the new areas in the expanding lion domain.

Conclusion

The success of lion conservation in the last five decades has been possible due to the following reasons:

- (i) Gir lion is the pride of Gujarat, and the local people own these lions and feel proud of the only ownership in the world.
- (ii) The conservation of wildlife is deep-rooted in the culture and tradition of the people in Saurashtra.
- (iii) Blue bull and wild boar are considered a nuisance and cause severe economic losses to the farmers. The lions control their population and thus help the farmers.
- (iv) High concentration of blue bull, wild boar and feral cattle, and carcasses of domestic livestock in the villages provide substantial food to the lions without any conflicts. Plenty of livestock in the villages fulfil the deficit.
- (v) People are aware about the habits of the lions, they know that lions do not attack unless provoked.
- (vi) Man–leopard conflicts are serious. The presence of lions saves people from leopard menace.

Like the four lion districts, each of adjoining districts – Rajkot, Botad, Porbandar and Jamnagar supports a good population of blue bulls, wild boars and feral cattle, important prey base for the lion, and the forests pocket in these districts are potential lion habitats.

Ban on hunting wildlife and subsequent several fold increase in blue bull population in Saurashtra has helped improve food availability for the lions. A shift in predation pattern of the lions towards blue bull has also been observed outside the Gir forest due to its increased availability. If the present dispersion trend continues, facilitating the arrival of lions in Barda and its surrounding landscape, the scenario after the next two decades may be different. If the present demographic status of wild ungulates is maintained; livestock carcasses in the villages continue to remain available; the growing trend of trade of domestic animals for meat industry is restricted in Saurashtra; rescue and public grievances teams operate efficiently in all the lions areas; network of nature or eco-clubs is created in the villages to connect the Forest Department with locals; and people are educated about the behaviour of lions, there is no reason why the present occurrence of lions outside the Gir forest is not replicated

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in the pocket of forests, grasslands and wastelands in Saurashtra. At present, the population composition is in favour of lionesses and number of reproductive lionesses is four times that in 1970s. Given this background, the scope for doubling the present number of Asiatic lions in Saurashtra exists under an efficient conservation regime.

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