



Pride in Place: Reintroduction of Asiatic Lions in Gir Forest, India

Mark Paulson

The Gir Protected Area - Gujarat, India

Asiatic lions (*Panthera leo persica*) once ranged from Syria through India and Iran to as far west as Greece until the middle of the 19th century, when firearms became universally widespread (Joslin 1985). Hunting and habitat loss have since compromised the species' populations to the extent that by the turn of the century they were found only in a relatively small portion of western India. The population descended to its lowest number in 1893 with 18 remaining individuals (Saberwal et al. 1994). Protection efforts have since raised that number from 177 in 1968 (Joslin 1985) to 284 in 1994 (Chellam and Johnsingh 1994). Asiatic lions now dwell almost exclusively in the Gir forest of northwestern India, located in the Junagadh district of Saurashtra, Gujarat State (Saberwal et al. 1994). The Gir forest has been reduced to almost one-third its original size and now covers about 1400 square kilometers of semiarid country. Contained within the Gir forest are the Gir Wildlife Sanctuary (established in 1965), and Gir National Park (established in 1975), which together make up the Gir Protected Area or "PA". The area is of high conservation value as the last remaining example of native landscape within the Saurashtra peninsula (Chellam and Johnsingh 1994).

Restoration efforts for Asiatic lions are complicated by their current low numbers and habitat availability restrictions. Current plans are directed toward managing lion-human conflicts and restoring water hole habitat. Future restoration attempts must also advance lion translocation efforts and integrate Maldhari involvement in the management of the species.

The first significant effort toward protection for the Asiatic lion occurred in 1900 when the Nawab of Junagadh banned lion hunting on his private landholdings (Meegama 1979). After Indian independence in 1947 the area was declared a preserve and achieved full sanctuary status in 1965. Numerous studies have been done on the Gir lions and their habitat, but the essential conservation issue was first addressed in the early 1970's when lion predation studies began to focus directly on human factors regarding lion-livestock depredation and lion-on-human attacks. A 1973 study found that 75% of the lion's diet was livestock while wild ungulates made up only 25% (Joslin 1985). About 2,200 local grazers, the Maldharis, have long endured losses in livestock and in human life, while many of their grazing practices and traditional customs have contributed to lions-human altercations. Stabilization of the Asiatic lion population and the reclamation of its dwindling habitat has thereafter focused on maintaining a workable human-lion coexistence.

Early Management Efforts

The Gir forest and its lions are managed by the Gujarat Forest Department (GFD), which employs some 300 rangers and guards in the protection of the Gir preserve area (Chellam and Johnsingh 1994). Since 1986, management has been directed toward relocating Maldharis, creating water holes, introducing native plant species, conducting a wildlife census every five

years and returning lions that have strayed out of the park back to the interior. The GFD also does some processing of compensation reimbursements for Maldharis who have suffered losses due to livestock depredation. A number of biologists continue to study and assist the efforts of the GFD, largely inspired by long-time lion researcher Ravi Chellam. New direction in management springs mainly from that quarter (Saberwal et al. 1994).

Maldharis have generally resisted human relocation attempts, though Khan (1995) has suggested that this should eventually result in "better living conditions and earnings from livestock". Human relocation would address a number of lion and habitat issues. Inhabitants of the Gir forest have ranged further afield in collecting ever greater amounts of topsoil, fruit and firewood. This depletes nutrients from the ecosystem and brings people into increasing contact with lions and their natural prey. Relocation efforts to date seem to have been unsuccessful at this point (Chellam and Johnsingh 1994; Saberwal et al. 1994) but the GFD still plans to move all settlements outside the Gir area eventually. Relocation has been attempted gradually over about five years, largely due to the fact that livestock still plays a significant role in sustaining the endangered lions.

Transporting stray lions back to the interior of the PA seems to have been wholly unsuccessful as a deterrent to lion-human conflict. Strays are predominantly subadults that claim no interior territory and subsequently gravitate back to the preserve edges where there is less competition. Gir populations have become quite dense; each full-grown male requiring about 100 square km of space. New habitat requirements are a major issue in population restoration efforts.

The Drought of 1987-1991: The Issue Is Forced

In recent years, climactic conditions have compromised the already strained coexistence between humans and Asiatic lions (Srivastav 1997). A great drought occurred between 1987-1991 as the monsoon season never materialized. Water holes within the preserve dried up, dispersing native ungulates and driving lions further afield to find prey. *Panthera leo persica* prefer (in descending order) chital (*axis axis*), sambar (*Cervus unicolor*) and chinkara (*Gazella gazella*) as their native prey. In 1995, as many as 1,650 livestock were killed by Asiatic lions in and around the Gir PA. With water holes dry and no longer convenient hunting spots, livestock became easier prey and correspondingly drew lions into contact with humans (Srivastav 1997).

Prior to the drought of 1987, lion attacks on humans averaged 7.3 per year with 14.5% of attacks resulting in human mortality (Saberwal et al. 1994). The rate of attacks increased to 40 per year following the drought and lions for the first time began to feed off the corpses they had killed. General Maldhari perspective toward lions had in the past been one of cautious coexistence. Human-lion interactions had been an established part of local history for decades. While fatalities occasionally occurred, Maldhari sentiment seemed adaptive to the amount of risk (David Quammen 1999, personal communication). Livestock losses due to predation, once established as lion kill, could be petitioned through the GFD for reimbursement. Recent Maldhari sentiment suggests that the compensation process is too unwieldy, either in time spent petitioning or in overly confusing bureaucratic procedures. The greater number of human fatalities as well as government failure to adequately address Maldhari-lion economic concerns has increased the pressure on tribes to deal with lion activity. Assessment of the Maldhari

perspective toward lions altered correspondingly and illegal killing of lions, by weapon or by poison, has increased (Saberwal et al. 1994).

New Plans

Lion attacks on humans following the drought forced the restoration issue for lion conservationists. Locals, lacking technical ecological criteria to validate lion behavior, were forced into direct conflict with both lions and GFD officials, increasing tensions on all sides. More aggressive strategies would be required. The new plan proposes (Chellam and Johnsingh 1994):

- Immediate and consistent response to all human based lion problems. Poachers, illegal harvesting of firewood or grazing within the park etc.
- Reevaluation of Maldhari relocation plans. Emphasis on decreasing edge effects by reducing the number of private landholdings that pierce the interior of the PA should be sought. If officials decide to continue with the relocation plan, the gradual pace must be maintained to soften the effect of livestock disappearance from lion prey options.
- Habitat restoration at water hole locations and riverine forest sites should become a high priority. Native teak (*Calophyllum elatum*) harvesting has been proposed as an option toward habitat reclamation (Gadgil 1992). Some dispute remains over whether lions are inhibited in the hunt in dense underbrush. Pruning of shrubbery around watering holes to improve hunting habitat has not been wholly embraced.
- Maldari involvement in the GFD should be encouraged as well as their involvement in new ecotourism options. While some care must be taken in incorporating ecotourism into traditional lifestyles, limited use of the methods may succeed if Maldharis become beneficiaries from that source. Existing attempts at educational tourism require more funding and adequate resources as well as a working site that is closer than the current location west of the park at Sasan.
- Saberwal (1994) recognizes the need for improving public opinion regarding living with lions and suggests that financial incentive should be offered "by the government to all residents of subdistricts that abut the Gir forest, possibly in proportion to lion densities..."

These management alterations have been proposed as improvements to existing habitat. Most biologists involved in Asiatic lion research also support lion translocation in an attempt to meet a larger goal of population stability.

Lion Translocation

There has been great concern among biologists over Gir lion population viability given that genetic diversity was limited to the minimum population base (in 1893) of 18 animals. This genetic bottleneck can be partially alleviated by translocation. Lion males have a natural instinct to range outside of the pride's original territory in order to establish their own communities. This reinforces the need for new habitat considering that currently non-reproductive males (due to

competition) would then contribute to the gene pool via new populations. Evidence of increased cub mortality due to inbreeding has been suggested and action toward establishing a new population in a new location or sponsoring a corridor to an adjacent area has had many proponents (Sale 1986; Saberwal 1994; Khan 1993). Suggested sites for relocation include: The Desert Protected Area (3162 square km, low human factor but lacking water sources), Kumbalgarh (only 573 square km, lots of prey but high human exploitation) and Palpur Kund (445 square km, low disturbance but has resident populations of tigers that could compete). All of these sites would require extensive long-term monitoring and study before relocation plans could be implemented.

Support for Local Management

In combination with other lion population control measures, encouraging national pride in the biological resources of the Gir region may be the first step in redirecting attitudes toward *Panthera leo persica*. This may resemble a reawakening of traditional Indian values that were compromised with the onset of Western economic control. Maldhari and other Indian traditional values are strongly rooted in biological conservation, based largely in religious views toward sacred plants, animals and places (Gadgil 1992). Srivastav (1997) determined that most Maldharis tolerate lions as part of their environment and are sensitive towards animals in general. In contrast, Chellam et al (1993) previously found that "Maldharis who had remained tolerant... seem now to be retaliating." Acceptable risk standards for Maldharis in relation to lion conflicts seem to be deteriorating. Reducing lion-human conflicts through Maldhari relocation and increased economic stability through ecotourism could help reverse this loss. Ecotourism, however, introduces risks that might negatively impact the stability of traditional Maldhari culture.

Liberation ecologists such as Ramachandra Guha have asserted that the protectionist nature of species preservation "accepts the environmental costs of population growth and development as inherent and frames ecological problems such as deforestation as separate from human problems such as poverty and malnutrition" (O'Neal et al. 1995). The implication is that protectionist policies are merely further excuses for imposing economic subservience on often economically desperate locals. Indian conservation policy currently retains its structure in British colonial economy. Decisions are made by a centralized authority that favors providing inexpensive resources for the Indian agricultural complex (Gadgil 1992). If localized management of Gir Forest and its lions could be adopted (with guidance from the biological community), recovery would then be overseen by those "most likely to be motivated to take good care of the landscape and ecosystems on which they depend" (Gadgil 1992).

Conclusion

Further steps toward restoration of *Panthera leo persica* and its habitat need to address some key biological needs. Existing habitat should continue to be managed for restoration of native plant species that support chital and other native lion prey, especially around water holes and other favored hunting spots. Purchasing private land holdings that intrude into the PA would be a great advancement toward reducing edge effects and lion-human interactions, although it will likely be

an expensive one. Lion translocation seems to be the most immediate long range need. Hopefully one of the many study locations for establishing new prides will prove viable.

Redirecting efforts in solving human-lion interactions seems critical. Maldharis have in the past shown a willingness to risk some lion hazards to human life and livestock losses. If the number of interactions could be reduced, a more sustainable lion-human relationship could be reclaimed. Efforts on this behalf should probably be directed toward translocation and Maldhari relocation initially. Included in any management plan should be immediate economic compensation for established losses and aggressive attempts to employ Maldharis in management, either through the GFD or a newly established bureau. These tactics may serve to improve the local opinion of lions in the form of reducing economic losses and in lowering attacks on people.

It seems likely that only when Maldharis perceive the protection of Gir lions as a public good will a long-range, effective preservation program be successful. As Kellert (1985) points out: "Most species are endangered not because of their biological inadequacies, but because of a variety of human social, psychological, and cultural factors". Recovery plans should integrate lion habitat and population management with the difficult objectives of socio-economic development for the Maldhari

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