CONSERVATION VALUES OF ZOOLOGICAL PARKS/SAFARIES - LION SAFARI PARK : A CASE STUDY

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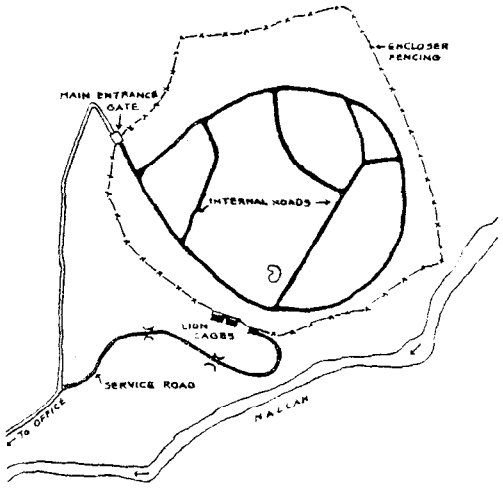
Introduction

Menageries, Zoological Parks and "Safaries" were established mainly for their taxonomic and entertainment values. However, the Parks and Safaries are now expected to have broader goals with greater emphasis on their contribution to *ex-situ* gene pool conservation. To comprehend conservation values of existing Zoological Parks/Safaries, a critical study of Lion Safari Park, Borivali, Mumbai (Bombay) was carried out during 1993-95 as a case study.

Lion Safari Park in "Krishna Giri Upavan", Mumbai

At the initiative of Ministry of Tourism, Govt. of India and with the objective of attracting foreign tourists entering India through Mumbai (Bombay), a Lion Safari Park was established at Borivali in the Krishna Giri Upavan (now known as Sanjay Gandhi National Park) during 1972-73. The Safari Project comprised of establishment of a chain link fenced enclosure over an area of 11.5 ha, erection of mechanically operated gates, all-weather shelter to hold Lions, landscape developments including establishment of water-holes, circular paths for viewing animals and purchase of four Asiatic Lions (Fig. 1). After a period of decade or so, additional shelters have been added, which comprise of secondary cages and holding pens, each of 2.35 m x 2.3 m size (Fig. 2).

Fig. 1



Lion Safari, Borivali

Initial objectives and achievements

The Lion Safari started with founder population of six animals, two Lions and three Lionesses from Jija Mata Udhyan and one male purchased from private individual, Dr. Purnapatre. By 1982 the population had increased to 17 animals and by 1995 there were 25 animals (14 males, 8 females and 3 cubs). In between, 37 animals have been transferred or sold. This increase was mainly due to uncontrolled breeding, and addition of captive zoo bred animals. Responses of management, to overcome dangers of over crowding, have been commendable. During 1986, simple Silicon rubber implants were inserted in five

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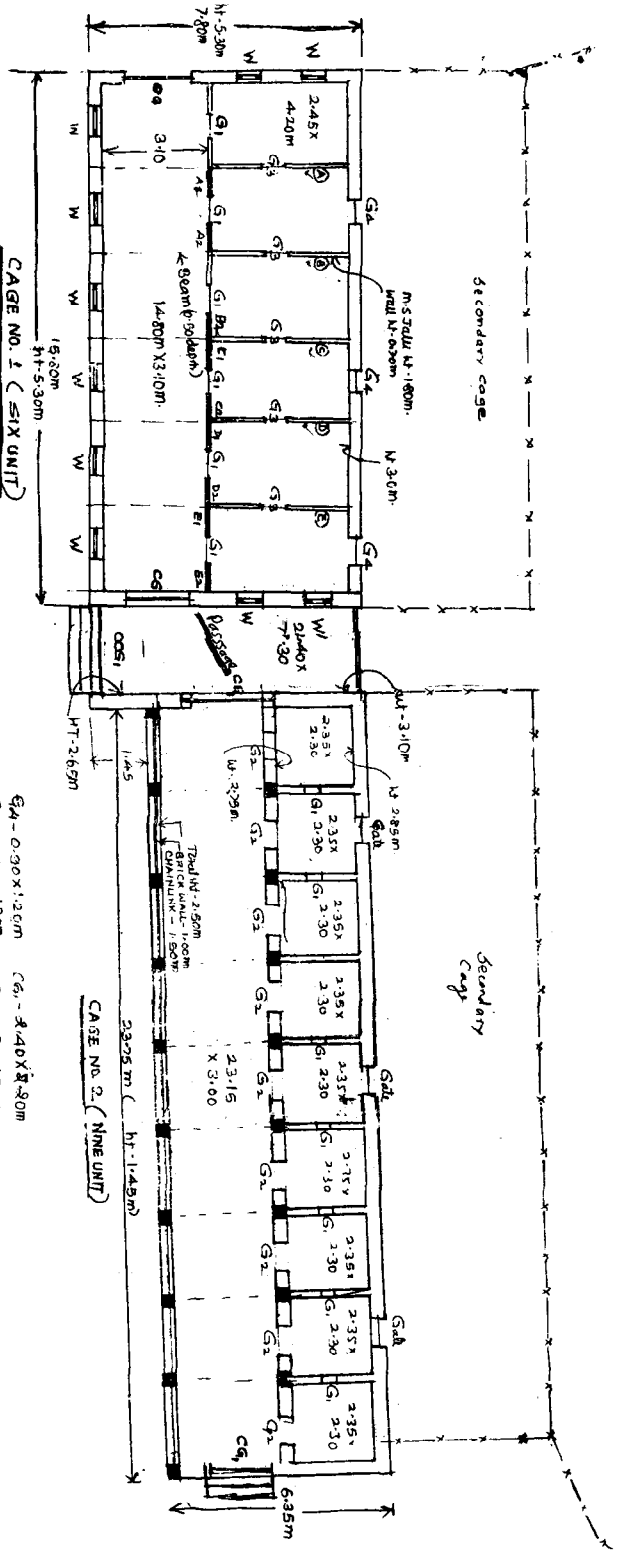

Fig. 2

Lion Cage No. 1 (Six unit) and Lion Cage No. 2 (Nine unit)

females and one male was vasectomised, thereby restricting growth. However, for some reasons, implants in two females have been removed and increase in population has continued.

The Forest Department has skeletal veterinarian service and therefore, services of vets are stretched to the limit, in providing succour to other areas e.g. catching monkeys and panthers and their care during capture and confinement. But even then specialised service of veterinarian, has proved to be very useful in maintaining animal health in recent period; despite odds like limited space, hot humid weather, inbreeding etc, measures like deworming, supplementary diet, have proved to be useful and the veterinarian is complimented for being innovative and trying new approaches, like use of homeopathic and bio-chemic medicines. Even hopeless Lion with leg amputed for suspected gangrene, has been kept alive for considerable period.

With advantageous position of part, being part of mega city Mumbai, the Safari has been a great tourist attraction. Number of visitors per annum is in the range of hundred to hundred and fifty thousand. During peak season, tourists arrive in thousands, but all of them don't get a chance to view the pride because of limitations imposed by Safari area, number of buses which can ply through it, as also the entry fee. Despite these limitations, revenue earned from entry fee alone is to the tune of Rs. 0.913 to Rs. 1.104 million/annum during 1992 to 1994 financial years.

Maintaining a large pride is, however, a costly proposition and thus average expenditure incurred is to the tune of Rs. 2.6 to Rs. 3.5 million/annum during corresponding period. Though revenue realised is not commensurate with expenditure incurred on the Safari, from the tourist attraction point of view, the Safari has been a success.

As compared to the need of conservation efforts on the ground, these achievements by way of developing concern for environment and conservation of endangered animals like Lions, the success of Safari is only limited.

Conservation goals of Parks/Safaries

With changing social, economic and political ground situation, problems of *in-situ* conservation of Asiatic Lions *(Panthera leo persica)* have increased mani-fold (Chellam and John Singh, 1993; Sinhji and Wynter Blyth, 1951; Oza, 1983; Wynter Blyth, 1950, 1951). There have been earlier attempts to find alternative sites to Gir, first in Madhya Bharat (Singh, 1955) and Uttar Pradesh and now again in Madhya Pradesh (Negi, 1969; Nowell Kristin and Jackson, 1996; Rashid and David, 1992; Srivastav, 1969). But there has not been much progress in actually relocating animals to a new natural habitat. Relocation attempts in Chandra Prabha Sanctuary in Uttar Pradesh proved failure (Negi, 1969) and introduction to Palpur Kuno in Northern Madhya Pradesh is yet to commence (Nowell Kristin and Jackson, 1996). On this background, the Lion Safari seems to be an alternate proposition. Viewed from goal of *ex-situ* conservation following issues emerge from the case study.

(a) Though location of Safari is justified from tourist point of view, from holistic, Lion and its natural habitual conservation point, the site is not proper; a typical Lion habitat is altogether different than the high rainfall, moist-deciduous forests on the

Geneological Chart

(A) Seriatum list of Animals

1. Rani (F)
2. Raj (M)
3. Meenakshi (F)
4. Gurudatta (M)
5. Sarika (F)
5A. Sachin (M)
6. Jamuna (F)
7. Ganga (F)
8. Ram (M)
9. Janki (F)
10. Jyoti (F)
11. Shankar (M)
12. Parvati (F)
13. Mohan (M)
14. Mohini (F)
15. Suraj (M)
16. Chanda (F)
17. Tara (F)
18. Moti (M)
19. Hira (F)
20. Jay (M)
21. Jayesh (M)
22. Maya (F)
23. Bajirao (M)
24. Mastani (F)
25. Rahu (M)
26. Ketu (M)
27. Prithvi (F)
28. Venus (F)
29. Sharma (F)
30. Uma (F)
31. Hema (F)
32. Vasanti (F)
33. Nilakshi (F)
34. Jagannath (M)
35. Surya (M)
36. Saurabh (M)
37. Rustam (M)
38. Deepak (M)
39. Nanda (F)
40. Manda (F)
41. Lav (M)
42. Kush (M)
43. Brahma (M)
44. Vishnu (M)
45. Mahesh (M)
46. Krishna (F)
47. Godavri (F)
48. Bhima (F)
49. Sambhaji (M)
50. Sahu (M)
51. Arjun (M)
52. Julius (M)
53. Ceasur (M)
54. Alaknanda (F)
55. Sindhu (F)
56. Bhagirathi (F)
57. Balram (M)
58. Krishna (M)
59. Radha (F)
60. Vinayak (M)
61. Vishnu (M)
62. Seeta (F)
63. Geeta (F)

Short lived cubs not named (and hence not numbered).

Western Coasts of Maharashtra. This location was never part of Lion's natural habitat at any time in past (Burton, 1933; Chavan, 1987; Kinner, 1920; Nowell Kristin and Jackson, 1996; Sinha, 1975).

(b) Founder population comprised of doubtful lineage as animals have been collected from unauthenticated sources. None of the founder animals have been authenticated as pure Asiatic Lion

(*Panthera leo persica*). A closer study of existing animals during 1995 showed mixed characteristics of African as also Asiatic Lions e.g. fuller mane with black hair in some cases, pale to dark body colour, variations in elbow patches and belly folds, etc. (Otto Joslin *et al.*, 1987). Skull of one of the dead animal also exhibited mixed traits like undivided infra-orbital foramen, absence of third premolar, fusion of roots. Theoretically, such captive populations of Asiatic Lions can be considered to represent second population. But present population is a mixture of African-Asiatic hybrids. May be, on the lines of American Zoo and Aquarium Association's Felid Taxon action group's recommendations, this population may be continued to be bred to monitor their vigour, until such time as space is required for pure Asiatic Lion (Nowell Kristin and Jackson, 1996).

(c) There has been considerable inbreeding e.g. Raj breeding with (daughters) Sarika, Ganga and Jamuna, over a long period of ten years (1974 to 1984), crossing between Raj x Jyoti, etc. The chart records births of sixty three animals in the Safari. Records of births are rather sketchy and do not include all miscarriages, still births etc. and thus are incomplete. However, from whatsoever available records it is seen that Raj (12) had continued to sire offspring over a period of a decade and has mated with Sarika (5), Jamuna (6), Ganga (7), his offsprings with female Rani (1). Jamuna's (6) litter from Raju in 1985 was not healthy and died prematurely. Raj and Gurudatta have sired over twenty individuals each over a span of eleven years. Crossing between closely related Ram (8) and Jyoti (10) when they were three years old, resulted in cubs with poor health. It is feared that on the lines of erosion in White Tiger bred in Nandan Kanan Zoo, Lion population at Borivali is also suspect. Number of still births, (not shown in chart) infant mortalities and congenital impairments, are the warning signals that should be taken into account.

(d) Lion, being a social animal, deserves special consideration while being held in captivity. Pride members maintain (family) ties but at the same time, there should be inflow and outflow of animals which help in keeping pride in a healthy condition.

(e) Ten animals obtained during 1982, from Sangli Zoo were not accepted by the pride already existing in the Safari; these new introductions created problems, leading to their disposal.

(f) With increase in number and lack of scope for expansion or outflow, pride has now split into incompatible prides. This has forced the management to release only one pride in open space at a time, thereby restricting the other group, in confines of over restricted space, per animal (10.56 m^2), over long periods of time.

(g) Limited space (11.5 ha) and large number of animals (over twenty animals) is seriously jeopardising special needs like breeding, cub rearing etc.

(h) From the view point of conservation of key species as means of conserving the whole habitat of the key species, the present site is not appropriate and thus these efforts need be relocated at suitable sites and in larger enclosures. Going by earlier reports of Lion's natural habitat, part of 'Khandesh' located South of Narmada river in Dhulia or Jalgaon districts, could be suitable.

(i) Present infrastructure facilities at Borivali, Mumbai with suitable changes could be utilised for *ex-situ* conservation of

GENEOLOGICAL CHART

B) Sequence of pairing and litters (Numbers who paired Individuals in litter)

1974, 1975	----	----			
1976	1X2 5,5A				
1977	---				
1978	1X2 6,7				
1979, 1980, 1981	----	----			
1982	7X2 8,9,10	3X4 11,12			
1983	5X2 13,14	6X2 15,16,17	3X4 18,19		
1984	5X2 20,21,22	6X2 23,24	3X4 57,58,59		
1985	10X8 F,M1,M2	6X2 25,26,27,28 F1,F2	12X4 29,30,F	5X4 31,32,33,34	12X4 35,36,37
1986	8X14 38,39,40	3X4 60,61,62,63			
1987	22X15 41,42				
1988	----				
1989	22X15 43,44,45				
1990	22X15 46,47,48,49,50	8X15 51			
1991	8X15 52,53				
1992	----				
1993	46X21 54,55,56				

- All still births not recorded, Short lived cubs not numbered.

other cats like Panther, Rusty Spotted-cat.

(j) It is necessary to infuse genes of true *Panthera leo persica* in a phased manner and overcome possible dangers of inbreeding. Genes of African type could possibly be isolated through critical selection of breeding individuals. A field guide need be evolved for discerning genetic purity by physiognomic attributes.

(k) Guidelines on carrying capacity of a Safari need be evolved and measures suggested to augument the same through habitat improvement, so that ill effects of over crowding or impairment of ethological requirements are mitigated.

(l) There is need to evolve proper guidelines for constructing pens/holding areas as animals need be held in ideal conditions.

Discussions

With severe resource limitations, it is difficult to keep pace with the conservation needs by action oriented programmes on the ground. Even maintenance of protected areas that have been established, suffer from shortage of resources. A critical appraisal of cost benefit ratios is therefore essential, so that limited available resources are utilised on high priority issues. There needs be greater emphasis on Zoological Parks or Safaries as environmental resource centres, concentrating on ecosystem conservation or survival of species with a holistic and comprehensive out look. Establishment of Zoological Parks/Safaries etc. require considerable investments as compared to maintaining the existing flora and fauna of a given area by constituting a sanctuary. At the same time, educational and recreational values of Parks are much higher and cater to needs of urban areas in a big way.

The aforesaid case study indicates that unless mid course corrections are carried out, diversion of scarce resources for conservation efforts, will not yield expected results. Genetic aspects of conserving major herbivores and carnivors be given higher priority. Due care must be taken while selecting sites for establishing a Park or a Safari.

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SUMMARY

A case study of Lion Safari Park in Sanjay Gandhi National Park, Mumbai indicates doubtful lineage of animals and considerable inbreeding that has led to deleterious effects. For better utilisation of safari parks/zoos, as means of *ex-situ* genetic conservation of endangered species, these aspects need be considered, or else, diversion of already scarce resources for wildlife conservation of Safari Parks or Zoos may be misplaced.

प्राणि उपवनों सफारियों का संरक्षण मूल्य - सिहं सफारी उद्यान : एक विशिष्ट अध्ययन

एम०जी० गोगटे

सारांश

संजय गांधी राष्ट्रीय उपवन, मुम्बई में बने सिंह सफारी उद्यान का विशिष्ट अध्ययन करने पर इन प्राणियों का वंश संदिग्ध होने तथा अधिक अंतः प्रसवन होने का संकेत मिला है जिसके परिणाम हानिप्रद रहे हैं। विलुप्ति खतरे में पड़ी हुई जातियों का उनके प्राकृतिक स्थान से बाहर जाननिक संरक्षण कराने के उपाय स्वरूप सफारियों और प्राण्यालयों को अधिक अच्छी तरह उपयोग में लाते समय इन पक्षों पर अवश्य विचार किया जाना चाहिए। अन्यथा, वन्य प्राणियों के संरक्षण के लिए पहले से दुर्लभ बन रहे संसाधनों को सफारियों अथवा प्राण्यालयों में भेजना अनुचित ही बन जाएगा।

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