# Conservation of the Andaman Serpent Eagle *Spilornis elgini* in the Andaman Islands: Phase – I

SACON Technical Report - 192

*Submitted to*

Raptor Research and Conservation Foundation,
Godrej & Boyce Premises-1st Floor, Old Mumbai Gas Work Lane,
Lalbaug, Parel, Mumbai 400012

*Submitted By*

Manchi Shirish S., Senior Scientist
Shivkumari Patel, Junior Research Fellow

Sálim Ali Centre for Ornithology and Natural History
(Centre of Excellence under Ministry of Environment, Forest and Climate Change)
Anaikatty, P.O., Coimbatore-641108, INDIA

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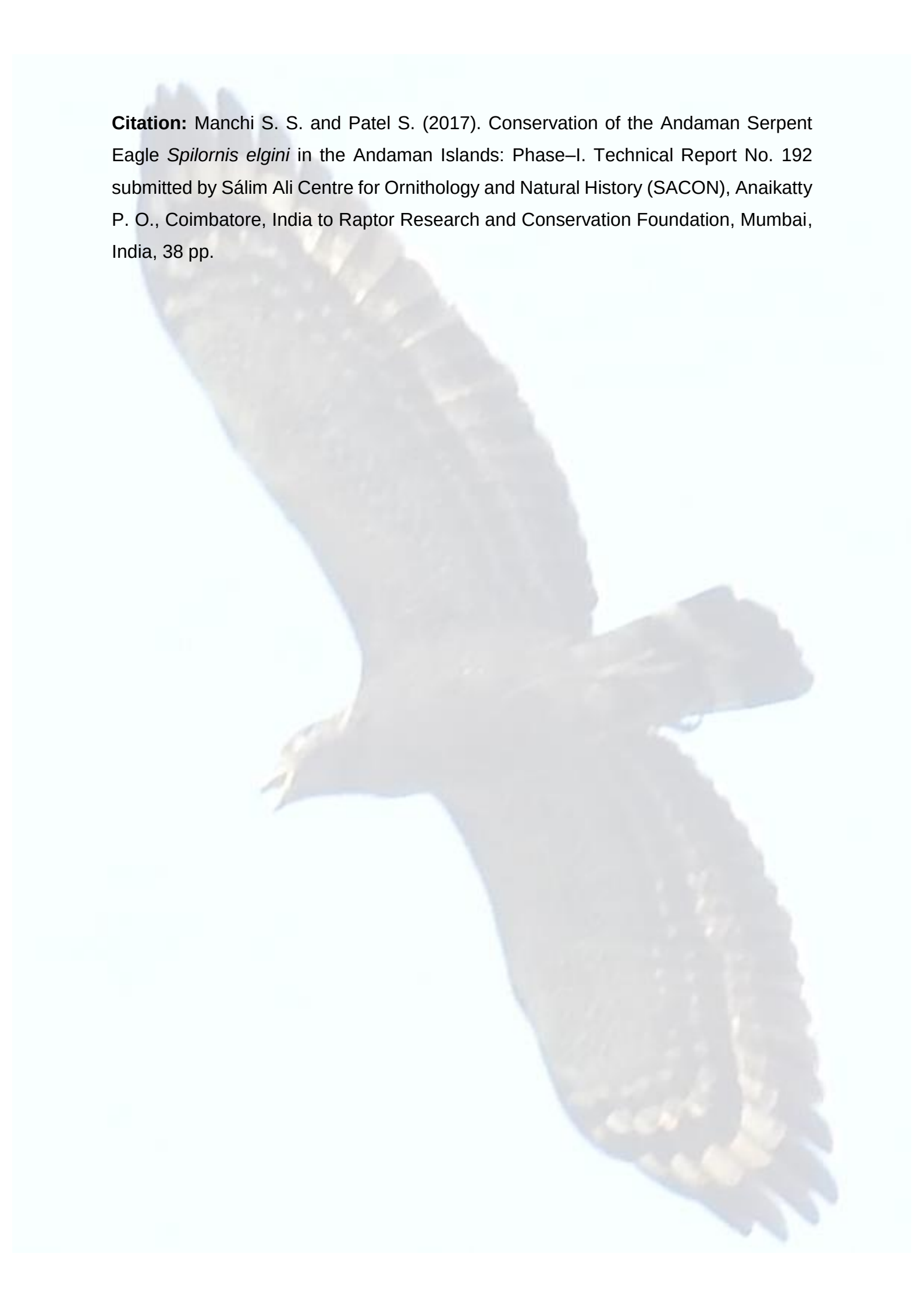

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# EXECUTIVE SUMMARY

India is home to four species of serpent eagles, viz. Crested Serpent Eagle (CSE) *Spilornis cheela*, Andaman Serpent Eagle (ASE) *Spilornis elgini*, Central Nicobar Serpent Eagle (CNSE) *Spilornis minimus* and Great Nicobar Serpent Eagle (GNSE) *Spilornis klossi*. Of these, CSE is the only widespread *Spilornis sp.* In India. ASE is endemic to the Andaman Islands, and CNSE and GNSE are endemic to the Nicobar Islands. Total there are 22 diurnal raptor species known from Andaman and Nicobar Islands. Though these Islands are known to have a considerable number of endemic diurnal raptors, hardly an attempt was made to study them in these islands. The only raptor survey done in these islands was as part of the Nation Raptor Survey, conducted in 1995. However, it mostly focused on the South Andaman Islands (SA).

ASE, because of its very dark brown colour, is known as Andaman Dark Serpent Eagle. ASE is known to be locally common in the Andaman Islands, especially in the North and Middle Andaman Islands (N&MA). The presumably sedentary ASE is known to use the forest interiors with clearings, scattered trees and hillslopes. Though both the sympatric species ASE and CSE do occur and display near each other, however, both these species are known to be segregated ecologically. CSE, in the Andaman Islands, is claimed to be mainly restricted to the coastal habitats like tidal creeks and mangrove swamps. However, the ASE is common in the inland forests. ASE is distributed to almost all the medium and large size islands of the Andaman group and known to occur at all the altitudes (0-756m above MSL) available in the Andaman Islands. Recently, ASE is upgraded to Vulnerable status, from Near Threatened, by International Union for Conservation Network (IUCN). At present, we are unaware of the current population, distribution and habitat of the species. It is now imperative to review the conservation status of the species and threats through the studies focused towards understanding the population and habitat status of the species. This necessary information would then be used to design and initiate conservation action along with further investigation to improve conservation strategies. Accordingly, following objectives were formulated to start the study:

1. Estimate population abundance and distribution of the Andaman Serpent Eagle on the large islands in the Andaman group.

2. Identify potential threats to the Andaman Serpent Eagle in the Andaman Islands.
3. Recommend immediate conservation measures for the betterment of the Andaman Serpent Eagle and also identify the key sites for implementation of Phase – II.

Grid Sampling method was adopted to conduct the occupancy survey of ASE. The islands with more than 100 $km^2$ were selected for sampling as the species is known to have most of its population on the large islands. Moreover, the most human population is known settled on the large islands. Therefore most of the disturbance must be happening on the large islands. We laid the grid of 5 km X 5 km cell size and selected 10% of the cells distributed spatially, for data collection. The data was collected using Line Transect Method. Total 284 transects were laid covering around 391 km length in 41 cells. Additionally, we covered around 848 km distance off transect, during random walks in the different cells. Anticipating that ASE may have the detection probability less than one, we visited each transect thrice, within a week time. While walking on the transect, we recorded sightings of different raptor species, especially the Andaman Serpent Eagle, its activity, location and habitat. Initially, to identify potential threats to the Andaman Serpent Eagle in the Andaman Islands we planned for the snowball survey, wherein the raptor hunters were the target. During the initial investigation, we realised that most of the forest-dwelling populations are involved directly or indirectly in bird hunting. Therefore, we targeted people dependent on and lived in and around the forest. Following Snowball Survey Method, we identified the interviewees by the information from the people like them interviewed earlier. Instead, of the regular questionnaire survey, we designed a discussion to be done with people to get answers to the questions of interest. People's replies were then converted into the answer format and used for further analyses.

Akin to the earlier bird studies, the sympatric serpent eagles, among seven species encountered, were found to be the most common raptors in the Andaman Islands. Among these, ASE was the most encountered followed by CSE. Two serpent eagles with Changeable Hawk Eagle (CHE) *Nisaetus limnaeetus* and Black Baza (BB) *Aviceda leuphotes*, had more than 95% of the encounters. More than 54% raptors

encountered were soaring than perch. A significant proportion of the ASE and BB come across were perched, whereas most of the CSE and CHE were soaring.

*Occupancy-Abundance Model* estimated the Naïve Occupancy (Ψ) = 0.83 ± 0.16SD for ASE with the detection probability (P) = 0.8 ± 0.16SD indicating that the species occupied more than 80% of the total area surveyed. Also, the model estimated the occupancy-abundance of the species as 4.4 individuals per cell of 25 $km^2$, indicating the density of around 4-5 individuals in 25 $km^2$ area. The species seem to be more common in the N&MA than SA with the estimated abundance of 4.8 and four individuals per cell, respectively. The *Habitat-Occupancy Model* depicted low dependency of ASE on the habitat ($R^2$ = 0.35). However, the occurrence of ASE was highest in the Deciduous Forest and lowest in the Agricultural land.

The *Single-Season Two Species Model* showed that CSE (Ψ = 0.78) occupied 78% of the landscape surveyed and the endemic ASE (Ψ = 0.22) held the remaining. Both the species were observed co-occurring in the Deciduous, Semi-evergreen and Mangrove forests and Agricultural land. While assessing the competition across landscape between these two species, the model estimated the co-occurrence (phi) = 0.0314, suggesting 30% possibility of the species occurring together.

Apart from estimating the population status of ASE, one of the objectives of this study was to identify the threats to the species. Apparently one of most commonly known and described risk to any raptor species in India today is the habitat alteration/loss. We confirm ASE habitat is not an exception throughout the Andaman Islands but is comparatively more disturbed in the southern part of the Andaman Islands. This loss of the natural forest is pushing the woodland species towards open Agricultural and urban habitats. The study also revealed that CSE, the sympatric species, is occupying more and more habitats, which may be the reason for the patchy distribution of ASE.

Apart from the habitat destruction, there is also a direct pressure of hunting on the Andaman Serpent Eagle along with other diurnal raptors. The frequent killing of the free-ranging livestock (poultry) by the raptors resulted in a Raptor-Human Conflict via an economic loss to the people. Around 68.75% (N = 112) people, residing in and around the forest, were into conflict either with CHE, CSE and ASE. About 36.61% of

them admitted having trapped or hunted eagles. The Raptor-Human Conflict was found to be the primary reason as most (66.07%) people found hunting raptors to save their poultry. Living in the hamlets inside the forest is a suitable condition for hunting activities ($\chi^2 = 21.975$, $P < 0.05$) as people in these areas were more involved in the hunting of raptors. Similarly, people from the Ranchi community, living in and around the forest areas, were found to have more access to the raptor meat for consumption ($\chi^2 = 67.271$, $p = 0.000$). People with good knowledge (20.82%) about raptors were found using all the three methods (Airgun, trap and Catapult) to hunt the raptors. However, they mostly used Airguns (41.69%) for hunting, followed by the traps (33.33%). Inversely, people with moderate knowledge of raptors were found hunting raptors mostly by using traps (40.30%) than airguns (35.81%). The Chi-square test depicted that the use of different hunting methods in the Andaman Islands is dependent on knowledge of the hunters about raptors ($\chi^2 = 19.171$, $p = 0.004$) and location of their houses ($\chi^2 = 22.010$, $p = 0.001$). The knowledge about the raptors seems to be dependent on the area of the house ($\chi^2 = 16.622$, $p = 0.002$) as most knowledgeable people have their homes away from the road but close to the forest.

The coefficients of determination ($R^2 = 0.996$) depicted the highest correlation between the age groups of < 30 years and > 50 years (likely being connected to each other) and also with the age group of > 30 years ($R^2 = 0.748$). It is an indicator of the knowledge flow from the elders to the next generations.

As the species is found to be under the threat of natural competition and direct and indirect anthropogenic pressure, we recommend the focused study of the ecological aspects of the Andaman Serpent Eagle and other diurnal raptors in the Andaman Islands. Also, suggest further work to minimise the Raptor-Human Conflict in the islands.