Conclusion

The magnificent species Sloth bear is largely understudied and undermined when compared to other large mammals in India. This species does exhibit interesting characteristics that makes it unique from the other bear species across the world. However, in last decade, rapid development across landscapes have threatened their existing habitats throughout their distribution range. In this regard, several reasons have been identified with major ones listed as sharing of resources with human, degradation and fragmentation of habitats. These characteristics force the bears to move out of their natural habitats escalating their encounters with humans residing in near vicinity, hence earning them the infamous title of being "dangerous" or "aggressive" species. The rising encounters have demanded considerable attention from researchers, wildlife managers and conservationists to bring advancement in management and conservation of species.

There is a significant research gap when it comes to utilisation of advanced tools and technologies to develop region specific mitigating measures, especially for elusive species like sloth bears. Therefore, the present work is aimed to understand and assess the factors influencing sloth bear occurrence in protected and non-protected habitats of Gujarat utilising advanced tools and software such as ArcGIS, R studio, Maximum Entropy Model, Linkage mapper and Gnarly utilities tool. This work contributes towards developing mitigating measures that can be potentially used to increase landscape connectivity, to increase movement of bears, developing favourable habitats between protected areas and aid in reducing human sloth bear encounters.

As discussed in the thesis, different models are used to identify factors that potentially influenced sloth bear occupancy in bear landscape of Gujarat. In the beginning the importance of water resource availability for the bears in the drier

regions of the state has been considered. It was found that sloth bear signs were more prevalent near water bodies in summer, though low dependency of the bears was indicated irrespective of the season. Also, it was revealed that a natural water resource visited by sloth bear in summer is likely to be visited in winter too. Thus, sloth bear occupancy in the sanctuaries of North Gujarat i.e. Jessore and Balaram Ambaji sloth bear sanctuary is independent of natural water resources. The other variables such as human settlements, slope, elevation and fruiting tree species does not seem to impact the bear occupancy. The study emphasizes on developing more water containment structures near natural resources in the core region of sloth bear habitats retaining water for longer duration. The study strongly recommends a longer-term study to obtain robust data to reveal the limiting factors influencing sloth bear's movement to water sources. It is suggested that this work should be expanded in other regions to determine the availability of natural water resources throughout the year. An extended study should be undertaken to monitor the natural water resources in such areas especially in summer.

In the second chapter, the study highlighted areas across the state for potential human-sloth bear conflicts using MaxEnt (Maximum Entropy Model). The identified potential areas were limited to the surroundings of the protected sloth bear habitats. Amongst the variables used for predicting the model, protected areas were revealed to be most influencing variable followed by human settlements and land use land cover patterns. Whereas, the other variables such as human population density, waterbodies and rural road have shown relatively weaker effect on identified potential conflict zones. Different categories of land use land cover had a varied influence on predicting potential risk zones, with deciduous forest, scrublands, and waterbodies being the most influential for the human bear conflict areas.

In the next chapter, study has shown connectivity between the five protected habitats of sloth bears in the state developed using the habitat resistance and the linkage mapper tools. The results presented in the study shows potential links joining sloth bear habitats of Gujarat with the natural habitats of neighbouring states (i.e. Rajasthan and Madhya Pradesh), that can be developed in future to study migratory movements for sloth bears in the region. The landscape connectivity between these habitats might play a significant role in increasing the genetic flow for the long-term survival of the species. The connectivity identified can be developed as an ecological corridor for the large mammals to migrate towards suitable habitats. This would be advantageous in providing access to basic resources required to the species to survive. Also, this will connect the densely populated habitats to less populated regions allowing the populations to move between them reducing the competition for resources.

Thus, the present work explores multifaceted approaches to alleviate the human-bear conflict in Gujarat state based on use of occupancy modelling and landscape connectivity geospatial techniques. These tools are time and cost effective allowing a researcher to develop a simulation model based on data collected through field surveys. However, there are certain limitations that should be addressed while developing these models to combat human-bear conflicts. Due to inevitable development occurring across the world, the landscapes are subjected to changes, constantly altering the land use patterns. Thus, it should be taken into considerations while implementing these models on ground level.

It is important to identify fundamental factors influencing bear movement in different landscapes. A comprehensive insight should be gained through a prolonged study validating these corridors for the potential movement of the animals. It is viable to combine both technology and field work giving an edge to the wildlife managers and conservationists to deal with conflict situations. Such research has already been conducted for other charismatic species such as tigers

and elephants, thus required to be extended towards other species such as sloth bears. The present study provides an insight for human- sloth bear conflict mitigation measures once validated on ground can be significant for reducing the encounters and promoting co-existence in the state.