

Wildlife rehabilitation in Mizoram, northeastern, India

Wildlife rehabilitation is “the treatment and temporary care of injured, diseased and displaced indigenous animals and the subsequent release of healthy animals to appropriate habitats in the wild” (Miller 2012). The alteration of habitats due to anthropogenic activities have resulted in massive encroachment and habitat loss which has driven an inevitable increase in interaction between humans, wildlife and domestic animals (Schmeller et al. 2020). This increase in interactions at the human wildlife interface disinclines peaceful coexistence between the two, resulting in either perceived or real human-wildlife conflict situations. Wild animals also face high risk of extermination when they are displaced in human dominated areas while wandering in search of food and shelter (Singh 2015). Higher level of decline in wild animal populations has been found to be associated with high degree of human wildlife conflict (Woodroffe et al. 2005).

All these factors lead to situations where wild animals are in distress, displaced, injured or orphaned, thus, warranting rescue. Mizoram is a state in the Northeastern region of India and is situated among the Indo-Burman biodiversity hotspot. Not only is there a lack of awareness and paucity of information on the basic ecology and population of species in the area, wildlife populations here are severely threatened with hunting and habitat degradation (Lalthanzara et al. 2014). To add to these existing threats, infectious diseases transmissible between domestic

and wild animals have been a cause of worry for free ranging wildlife populations (Dutta et al. 2018). With all these considered, it is evident that wildlife rescue and rehabilitation is pertinent to conservation (Shine & Koenig 2001), especially in areas where wildlife is threatened with hunting and habitat destruction. However, although wildlife rehabilitation is practiced across the globe, it is still in its infancy in India (Holcomb 1995; Ashraf & Menon 2005; Roshnath & Jayaprasad 2017) and more so in certain parts of the country, by and large, in the northeastern region.

Here, we catalogue and evaluate a list of opportunistic rescues of wild animals that have been rehabilitated by the authors and the outcome of the treatment of animals brought into care. Considering the threats wild populations face in this area, this paper may serve as a useful case study subject to evaluate the importance of rescue and rehabilitation to conservation of wild animals in the state of Mizoram and may be replicable to other states of northeastern India as well.

All the animals listed in this data were rescued within Aizawl District, Mizoram or near it. Except for the cases in which animals had to be captured and retrieved from conflict situations, all the animals were brought by enthusiasts and presented to the authors who have undertaken the task of rescue and rehabilitation voluntarily. None of them are a part of any funded rescue program and all the expenses incurred have been borne by them.

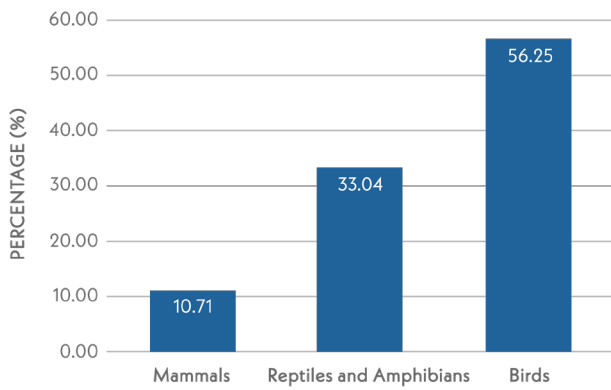


Figure 1. Percent of rescues from each taxa.

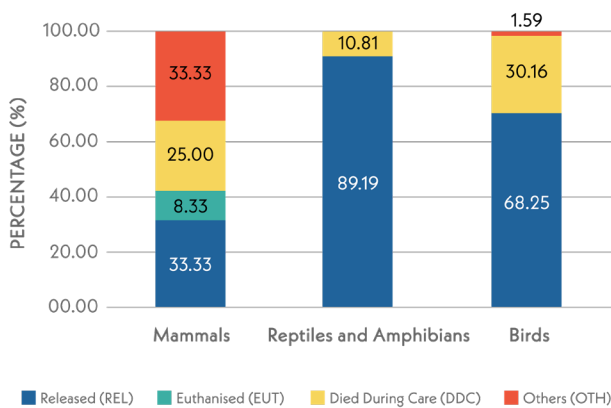


Figure 2. The outcome of the rehabilitation for each taxonomic representation.

Here we identified patterns of taxonomic representation and the outcome of the rehabilitation as percentage released (REL), died during care (DDC), euthanized (EUT) and others (OTH) (Figure 2). The causes of presentation and disposition were cases of orphaned, trauma, diseases and physical displacement in human habituated areas.

Numbers and composition of rescues

(Table 1; Figure 2)

Over a period of one and half years (January 2016 to July 2017), the authors took into their care, 112 wildlife displaced animals (Table 1). Apart from these 112 cases, a number of cases could not be attended by the authors since they all happened in other districts.

There is a marked predominance in the number of bird cases (N= 63). All the birds that died during care (N= 19) were presented to the authors with gunshot wounds. This could be attributed to the recent popularity and indiscriminate use of air guns in the state as reported by Chda (2018) in Zalen, a local newspaper. A lone case of displaced Burmese Green Peafowl *Pavo muticus spicifer* (Table 2) was presented to the authors by local women who found the bird adjacent to their jhum. The bird had clipped feathers and wounds indicating that it had probably escaped from captivity. Sailo et al. (2015) reported that *P.m. spicifer* was believed to be extinct in northeastern India in the wild owing to habitat destruction and hunting but in the same paper reported a one-time sighting of the extremely rare bird. After proper veterinary care was given and the bird was considered healthy, it was handed over to the state forest department (N= 1). Out of the 63 birds rescued, the birds that were considered healthy and capable to survive on their own were released back to the wild after care (N= 43).

The next predominant group in the record as shown in Table 1 are reptiles and amphibians. Most of the snake rescue cases arise from encounters where they have entered houses or premises of human settlements. A single case of injured Peacock Soft-shell Turtle *Nilssonina hurum* (Table 2) procured from market by an unidentified rescuer was presented to the authors. Once the animal was considered fit to survive on its own, it was released back to the area where it was said to have been initially caught. The snakes that died during care (N= 4) suffered severe injuries when they were presented to the authors. When snakes are in conflict

situations and caught in sudden encounters, be it outside and within human dominated areas, the usual tendency of people is to kill them as they are considered a threat to human life. Awareness and education could go a long way in changing the mindset of people to seek rescuers' help in addressing the conflict situation.

Twelve animals representing the mammalian taxa was presented to the authors for rehabilitation. Among these, four animals were released, three died during care, one animal had to be euthanized as it was suffering from critical injury with grave prognosis, while the remaining four non-releasable animals were handed over to the State Forest Department as they had suffered from injuries that resulted in permanent physical disability and their survivability in the wild was questionable.

Impediments in the reasons for rescue during presentation and ultimate diagnosis

The variables recorded on admission includes species, age (wherever possible), sex, location found (as reported by the person who presented the animal) and reason for presentation. The reason for presentation given by the presenters is invariably questionable as it could be completely different from the cause that actually led to their displacement. Similar impediments

have been reported by Grogan & Kelly (2013). All orphan cases were claimed to have been found alone in the forests or jhum fields, but true cause of displacement could well be killing of the parents, as hunting is rampant in the state and this has been uncovered in many of rescue cases.

It is also important to note that different taxa presented may not give the realistic picture of what species get most commonly displaced and what the most common cause of displacement is. Certain animals are more likely to be rescued than others as they being charismatic, are more likely to draw the attention of public. While many species are rescued only when they are disadvantaged or in danger of being persecuted, some demand removal and relocation only because they inflict fear in humans.

Survival under care (Figure 2)

71.42% (N= 80) of the casualties were released back to the wild, 0.89% (N= 1) had to be euthanized as they were suffering from imminently fatal injuries. The number of days an animal was kept under care varied, depending upon the severity of illness or injury. 23.21% (N= 26) died during care. The survivability of the animal also depends on the severity of injuries. Deep-seated wounds, bullet wounds on or near critical organs, complex fractures, and blood

Table 1. Numbers, composition of rescues, and outcome.

Species	Release (REL)	Euthanised (EUT)	Died during care (DDC)	Others (OTH)	Total
Birds	43 (68.25%)	-	19 (30.15%)	1 (1.58%)	63
Reptiles and amphibians	33 (89.18%)	-	4 (10.81%)	-	37
Mammals	4 (33.33%)	1 (8.33%)	3 (25%)	4 (33.33%)	12
Grand total	80 (71.42%)	1 (0.89%)	26 (23.21%)	5 (4.46%)	112

loss significantly determines the success of survival. In addition to the injuries, wild animals under human care are under immense stress due to handling and the alien environment they are in. Stress plays a significant role in determining the rate and success of a rehabilitation process as it is not conducive for recovery (Janssen et al. 2020). All the cases presented to us were given proper veterinary care regardless of the severity of injury and chances of survival upon admission.

Post-release survival and monitoring

All the released animals (N= 80; 71.42%) were released after they were considered fit to survive in the wild. Considering that only animals considered fit and healthy by the veterinarians were released, it is assumed that all the released animals will have a fair chance of survival in the wild.

Although in many cases, release of an animal is used as a measure of success, it does not define the ultimate success of a rehabilitation process. Successful wildlife rehabilitation has to be determined beyond recuperation and subsequent release, based on the successful integration of the animal back to their wild habitat and with their wild counterparts (Grogan & Kelly 2013). The documented cases in this paper do not include survivability post release as all these rescues and rehabilitation care were done voluntarily without any resources for tracking released individuals. All the animals documented in this paper were hard-released and were not supplemented with food. Soft-release simulates natural behavior by giving time to the animal to acclimatize with the new environment and hence, increases the survival chances but there is

no substantive evidence which supports that food provisioning post-release increases survivability and therefore, warrants further studies (Taylor 1993; Hall 2005; Saran et al. 2011).

Post- release monitoring is crucial not only to monitor the survivability and integration of the translocated individuals but also to monitor any possible adverse impact on the recipient population, as translocations of animals from one place to another can potentially result in changes in local abundance, distribution, and demography. It could also affect recipient populations through transmission and introduction of pathogens and disruption of genetic variability (Madsen et al. 1999; Roshnath & Jayaprasad, 2017; Berish et al. 2000).

Limitations and recommendations

Successful wildlife rehabilitation exceeds rescue operation, captive veterinary care and release, and therefore, the success must be gauged on the survivability of the released animals and their successful integration in the wild. In the present study, all juvenile/orphaned cases, cases that resulted in permanent disabilities due to serious injuries, and animals that could not be released back to the wild were handed to the State Forest Department where quality life in captive or semi captive facility is assured. However, it is to be taken into account that housing a disabled animal in captivity could also inadvertently add to its suffering, and thus quality captive facilities are a must for providing lifetime care.

Presence of a properly organized center dealing with rescue and rehabilitation will not only address animal welfare by catering

Table 2. List of species rescued.

Category	Species (No of individuals)	Category	Species (No of individuals)	
Birds	Burmese Green Peafowl (<i>Pavo muticus spicifer</i>) (2)	Birds	Tree Sparrow (<i>Passer montanus</i>) (4)	
	Red-headed Trogon (<i>Harpactes erythrocephalus</i>) (2)		Himalayan Griffon (<i>Gyps himalayensis</i>) (2)	
	Lesser Whistling Duck (teal) (<i>Dendrocygna javanica</i>) (4)		Cinnamon Bittern (<i>Ixobrychus cinnamomeus</i>) (1)	
	Racket-tailed Drongo (<i>Dicrurus paradiseus</i>) (2)		Frogmouth (2)	
	Red-vented Bulbul (<i>Pycnonotus cafer</i>) (8)	Reptiles and Amphibians	Indian Peacock Softshell Turtle (<i>Nilssonina hurum</i>) (1)	
	Hoopoe (<i>Upupa upops</i>) (3)		Gunther's Tree Frog (<i>Zhangixalus smaragdinus</i>) (3)	
	Orange-breasted Green Pigeon (<i>Treron bicinctus</i>) (2)		Red Neck Keelback (<i>Rhabdophis subminiatus</i>) (5)	
	Common House Martin (<i>Delichon urbicum</i>) (3)		Green Pit Viper (<i>Trimeresurus erythurus</i> & <i>Trimeresurus popeiorum</i>) (8)	
	Burmese Collared Scops Owl (<i>Otus lettia</i>) (3)		Burmese Python (<i>Python bivittatus</i>) (2)	
	Brown Wood Owl (<i>Strix leptogrammica</i>) (4)		Mountain Pit Viper (<i>Ovophis monticola</i>) (3)	
	Pale Blue Flycatcher (<i>Cyornis unicolor</i>) (1)		Black Krait (<i>Bungarus niger</i>) (3)	
	Indian Roller (<i>Coracias benghalensis</i>) (2)		Monocled Cobra (<i>Naja kaouthia</i>) (4)	
	White-throated Kingfisher (<i>Halcyon smymensis</i>) (1)		Asian Vine Snake (<i>Ahaetulla prasina</i>) (2)	
	Malayan Night Heron (<i>Gorsachius melanolophus</i>) (2)		Twin Spotted Wolf Snake (<i>Lycodon jara</i>) (2)	
	Little Spiderhunter (<i>Arachnothera longirostra</i>) (2)		Tawny Cat Snake (<i>Boiga ochracea</i>) (1)	
	Shikra (<i>Accipiter badius</i>) (2)		Green Cat Snake (<i>Boiga cyanea</i>) (3)	
	Peregrine Falcon (<i>Falco peregrinus</i>) (1)		Mammals	Hoolock Gibbon (<i>Hoolock hoolock</i>) (2)
	Common Moorhen (<i>Gallinula chloropus</i>) (2)			Indian Jackal (<i>Canis aureus</i>) (1)
	Asian Paradise Flycatcher (<i>Terpsiphone paradisi</i>) (1)			Slow Loris (<i>Nycticebus bengalensis</i>) (3)
	Grey Nightjar (<i>Caprimulgus jotaka</i>) (1)			Leopard Cat (<i>Prionailurus bengalensis</i>) (3)
Green Billed Malkoha (<i>Phaenicophaeus tristis</i>) (1)	Burmese Ferret Badger (<i>Melogale personata</i>) (1)			
Hooded Pitta (<i>Pitta sordida</i>) (5)	Goral (<i>Naemorhedus griseus</i>) (2)			

to distressed, displaced and injured wildlife, but also help provide information on local abundance, distribution of taxa, nature of threats to urban wildlife and biological attributes such as spatial and temporal patterns in activity and age structure of poorly known species (Shine & Koenig 2001). This information will help us fill the knowledge gaps in ecology and help the state agencies and conservation enthusiasts to understand the scope and magnitude of wildlife emergencies in the state.

In summary, this data collated from an informal rescue and rehabilitation team establishes the need for a trained, formal and functional rescue and rehabilitation system in the state of Mizoram which lies within a rapidly developing biodiversity hotspot area. It is to be kept in mind that rescue and rehabilitation should be conducted in consonance with sound scientific protocols as it could easily lead to disastrous events that threaten the wild populations with impediments to genetic variability, disturbing the demography and introduction of novel pathogens threatening both the recipient and source population.

Notwithstanding this, rescue activities also supplement crucial ecological information as has been the case with rescue and rehabilitation centers across the globe that provide data on the distribution of populations, local abundance of species and information on anthropogenic activities that are threats to wildlife and habitats.

It also gives information on what human activities drive conflict or what entails the requirement to remove an animal from its location due to perceived threat to humans,

and thus valuable information is gained on people's perception towards wildlife. When the entire rescue, rehabilitation and release data are collated through a centralized system, the analytical results could serve better in informing the managers on the threats faced locally by wild populations for better management and law enforcement.

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