

## Elephant Response Units (ERU)

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*Following is a summary of a discussion initiated in March 2006 by Dr. Meenakshi Nagendran of the U.S. Fish and Wildlife Service. Inputs were received from members of the Asian Elephant Specialist Group from various Asian Range States. Heidi Riddle edited the collective inputs and the main points are published below.*

The idea suggested for discussion is the use of Elephant Response Units (ERU) to mitigate for human-elephant conflict (HEC). ERUs would be a committed group of individuals who respond to the presence of a wild elephant or a herd near a village, and effectively drive the elephant or herd back into the forest/natural habitat. Potentially such elephants could also be fitted with GPS collars so one could have advance warning about the approaching wild elephant/herd. ERUs may not be feasible for every village but might be feasible at a district level. Captive elephants could be used to drive back unwelcome wild elephants from villages.

### Regional experiences

*Sri Lanka*

The Department of Wildlife Conservation (DWC) in Sri Lanka had initiated in 1968 what they called Elephant Conservation Units (ECU). Three ECUs had been established to cover three provinces. Each ECU had about 15 DWC personnel and a jeep. Their main function was to provide villagers with guidance and assistance to manage crop raiding. Generally the villagers with problems went to them and the ECU would do a site visit and advice the villagers on what and how they should work to minimize raiding. The ECU also distributed Elephant Thunder Flashes and flares. There was no radio collaring but they did chase elephants and there were also some

major drives to move large populations of elephants to the closest national parks during the late 60s and the early 70s.

Currently whenever elephants raid crops, the villagers complain to the DWC and officers chase the elephants. The greatest value in the exercise is that it may help the relationship between villagers and authorities.

However, in general ERUs in common with activities like driving, translocating, and fencing, ultimately end up becoming an end in themselves and a substitute for a conservation strategy. Consequently, it ends up being a 'strategy' that is basically putting out fires and not addressing the causation - which soon becomes a treadmill. Using such activities as strategies rather than tools to achieve a particular end in a planned conservation strategy makes them largely useless at best and detrimental to conserving elephants at worst. While ERUs and other such tools are of use in some particular instances, they are not a panacea for HEC, and may end up creating more problems than they solve when used out of context of a proper conservation strategy.

Specific problems associated with 'chasing' elephants through ERUs are:

- Elephants become unresponsive to things like firecrackers and firing in the air, ultimately leading to the drive either becoming ineffective or having to resort to more lethal deterrents such as shooting.
- State sponsored ERUs also reinforce the idea that the state is responsible for protecting people from raiding elephants, leading to worsening of relationships when the elephants become unresponsive to chasing and/or the authorities cannot respond quickly.

- When elephants are ‘chased’ from one locality, they probably just move to another locality, which is not so protected. Because elephants have large ranges, the area of HEC is vast, and it is not logistically possible to undertake such activities across the entire area. So one ends up chasing elephants from one crop area to another and back again.

Like almost all Asian elephant issues there are no data on the elephant side of HEC and raiding. Given the scale of the problem, the costs of using GPS collars as a warning method is economically or logistically difficult. However, if used in a proper study, such collars would provide baseline data on elephant raiding behavior and their response to activities such as chasing, which will be extremely useful for developing a management strategy and deciding the appropriate use of different tools.

With regards to using captive elephants to chase crop raiders – some things to consider are that raiding occurs at point locations over a very large area (a single elephant can move 10 km a night, they have ranges that cover tens to hundreds of square km), occurs almost exclusively in the night, mostly in remote areas without electricity.

ERUs could be a useful tool in particular instances, if used as part of a conservation strategy, with a clear idea of what one is trying to achieve, but could too easily become a liability if used inappropriately.

### *India*

In North Bengal a system of wildlife squads guide and assist communities in driving away elephants while distributing crackers, torches, etc. These squads communicate with and operate through local eco-development and forest committees and receive substantial support from these. In addition to being somewhat effective in preventing crop-raiding (to be carefully assessed) these squads provide a very visible demonstration of the government’s resolve in addressing conflict issues thus enhancing the wildlife department’s

image. They are also equipped with tranquilizing equipment and necessary training in its operation and can intervene fairly rapidly if elephants have to be captured.

It is important to discuss land use issues. In countries like India where the density of humans and settlements is high, the point of no return for effective land use planning may have been reached.

However there are still a few kinds of landscape transformations that could be targeted for HEC mitigation.

1. In Eastern India (West Bengal, Orissa and Jharkand) social forestry plantations maintained through joint forest management have exacerbated elephant human conflict. These plantations increase forest cover and provide elephant “colonizers” access to crop-lands (e.g. the rich vegetable gardens in south West Bengal are today more attractive than habitats in Jharkand (formerly Bihar) battered by mining and other forms of development). These mono-culture plantations have little in the way of elephant food species, so all elephants sheltered within crop-raid incessantly (and kill scores of people while doing so).
2. In several parts of India, degraded forests are often converted to Eucalyptus and Acacia plantations and form “bivouacs” for raiding herds. Despite recommendations that these should be de-foliated, the forest department is reluctant to do so given the plantations’ high revenue generating capacity. These are often patchy or have tattered edges making them difficult to barricade and increasing the interface with human settlements.
3. National Parks on the edges of some major Indian urban centres (e.g. Bangalore and Bhubaneshwar) maintain artificially inflated densities of elephants due to habitat enrichment (e.g. water holes, salt-licks, etc.). These areas are usually sinks for source populations living in less attractive, though more natural areas.

4. Disruption of elephant flow along corridors is a significant cause for conflict. There has already been much talk about this.
5. The loss of natural forest cover in tea-plantations and proliferation of paddy cultivation within, are frequently cited as an example of conflict in West Bengal and Assam. Given the recession in the Indian tea-industry, this is presently a complicated issue to address.
6. Alternate cropping is an attractive solution and would require collaborations across several agencies.

With respect to the “self-help” conflict resolution committees, unfortunately the prevailing sentiment in most of India is that elephants are government property and thus compensation (cash or kind) for their existence should be borne by the government. This sentiment has been re-enforced by large grants from multi-lateral agencies and the budgets of federal agencies like Project Elephant that get bigger every year. The concept of local communities being more empowered to source de-centralized funds from existing donors as well as others (e.g. through corporate social responsibilities) could reverse this sentiment and make communities more accountable in conflict management.

#### *Northeast India*

There is a need to decentralise the protection to the local farmers. Otherwise HEC schemes work as long as they are supported, funded and under the supervision of wildlife biologists. They fall apart the moment the support group leaves. This is landscape level HEC mitigation work, but has a big local component to it.

In the North Bank Landscape (NBL) in Assam, Anti Depredation Squads (ADS) have been established:

- There are 50 ADS, based purely on volunteers from the villages, like a chain along the southern boundary. This comes from watching such squads function in North Bengal.

- In cooperation with the forest department, a chain of 14 kunkies (i.e. trained elephants) was set up along the southern boundary of NBL.
- In many cases local people know that the conflict is mainly because of habitat loss of a recent nature, but were angry because no forest personnel came and shared their loss or grief when elephants raided.

For two years now, there are declining losses of elephants and 80% of the drives by ADS to push the elephants back into the forest have been successful. To make it more local and sustainable, groups are encouraged to become almost like registered local societies or NGOs that can then source funds directly to carry out their anti-depredation work. The current problem is that funds are not reaching the ground. So if these local groups can be formal and become civil society pressure groups, they can put pressure on their local politicians to make sure that the money reaches the ground and is spent in a way that is meaningful to them.

The challenges:

1. In some places people can get very angry and manhandle the forest personnel. In one such case, a decision to undertake a major drive got postponed for two weeks. A group of over 100 elephants mulled about for two weeks and ended up killing 3/4 people in addition to destroying huts.
2. Possible Solution: Police security for forest personnel who conduct these drives. The tea gardens in which this type of incident happens need to invest time and energy to prevent this from happening. Maybe fencing in the people since most of the deaths occurred in the nights. Tea gardens maintain some of the best fences, but their temporary labour is not protected.
3. The ADS are quite functional during the conflict season, but very laid back in talking about a more formal structure in the non-crop raiding season.
4. It is very difficult to find trained kunkie elephants. A trained kunkie actually participates in these drives by moving to

cut off stragglers, etc. An elephant training school needs to be established in order not to lose this art form. There are very capable people in Assam, but they need more support to get this going.

One fortunate situation is that the Government in India by law is forced to defend elephants very rigorously and there are outcries against any elephant deaths, which forces the retaliatory killings (or captures) to be stopped instead of getting carried away. Also while it is very easy to say that these elephants who have lost a significant portion of their home ranges to humans have no future, we have to learn to conserve elephants who live part of their time in human dominated landscapes.

### *Malaysia*

At the moment, one of the elephants collared in Kinabatangan Wildlife Sanctuary provides good information on movement and habitat utilisation. The information gathered from this activity provides data on which area should be maintained or is critical for corridor. A long term solution or mitigation focus in Kinabatangan would be providing a continuous corridor for the elephants. Using an elephant to control elephant encroachment in Kinabatangan would be a new issue for the villagers, since the villagers' culture is not related to the elephant, unlike India or Sri Lanka.

The main problem for the work in Kinabatangan includes:

- Lack of communication system/network, where data on elephant location (in real time) can be channeled, perhaps a long range radio could solve the issue. At the moment, data on elephant location is provided every 3 days to the local wildlife office in Kinabatangan so they can monitor the movement.
- Only one elephant in a group (where this elephant represents 40-60 elephants, from 120-150 elephants) is collared. There is a need to use another 2 satellite collars, since the elephants sometime split into several groups when they enter the village areas.

Using captive elephant to mitigate the elephant conflict in Kinabatangan would

- require higher costs (for elephant food and maintenance).
- be suitable for short term mitigation measure.
- not be suitable for the culture in Kinabatangan.
- need a cost-benefit analysis - for long term solution in reducing HEC, providing a continuous corridor would be able to reduce encroachment into the village area.

### *North Sumatra*

Using camp elephants to drive wild elephants in HEC areas is the immediate response usually applied by several patrol teams as part of HEC mitigation.

During the driving, the patrol team is also doing assessments on the various aspects involved in the conflict. The two most important things are the likely viability of the elephant population involved in the conflict and the condition of the habitat in the conflict area. This is very important, because the human-elephant conflict situation is very site specific. So, before we start to think about a trial for any method, we need to ensure having the information about these two aspects, otherwise we may be in danger of wasting resources and ignoring the elephant conservation aspect of the conflict resolution.

One example is Saree-Aceh, where conflict incidents occurred several times a year. In this location, implementing various physical and psychological barriers, which may cost a lot of money, may help the community but never the elephants. This is a group of 11 all female elephants wandering in an isolated small block of forest that is already separated from other forests by the development of roads and residences. Unless this group can be connected to others by maintaining corridors, or transporting them to other viable habitat with more genetic resources, this group will not sustain itself. Having GPS collars would be very useful to verify whether this group uses other habitat and connects with other groups, before considering whether to translocate this group or rebuild the corridor.

The opposite case is the conflict in Aceh Tenggara, at the edge of over 1 million hectares of continuous and protected habitat. In this case there is no reason to capture or translocate the animals. Various methods, such as barriers, could be applied and tried for this case. Whatever the option, barriers potentially work if they are properly designed and applied in the right conditions. Of course ditches will not work if applied in a swamp, or power fencing with no power or maintenance, etc. There have been both failures and successes of some barriers; the success is mainly dependent on how people apply it. The failure may not be caused by a method that is wrong, but by the wrong way to implement the method.

The other option is to have alternative land use, without trying to limit the elephants' natural movement pattern drastically. If people grow crops not liked by elephants, they can still use the area for a migration route with minimum impact. This approach needs an involvement of regulatory framework and should be part of the land use planning policy.

### *South Sumatra*

Some experiments with Elephant Response Units - called Crop Protection Units - in southern Sumatra (at Way Kambas National Park) were found to be counterproductive (and certainly not sustainable) because they encouraged the farmers to rely on outsiders to solve the HEC problem for them rather than adopt and use low cost/low tech methods themselves. This experience is a common one and has resulted in a growing recognition of the need to decentralize responsibility for crop protection to the farmers themselves. Current work at Way Kambas NP aims to facilitate local self-reliance, while also providing new tools and ideas from the experiences of others working on HEC elsewhere in Asia and in Africa.

The relative ineffectiveness and expense of most large-scale methods of reducing human-elephant conflict, including electric fencing and translocations, have led to increasing calls for the development of land use plans that address human-wildlife conflict and other conservation

issues. In theory, addressing human-wildlife conflict at the planning stage could help prevent conflicts, although in many areas settlements are too well established for such an approach. Moreover, it is now generally accepted that the resolution of human-elephant conflict will require small-scale, site-based, participatory approaches to the crops farmers select, the way they lay out their fields and the methods they adopt of keeping elephants out of their fields.

A key strategy in many places is likely to be the creation of buffer zones between agricultural areas and elephant habitat (including but not limited to protected areas). The creation of buffer zones will help to establish a zone of 'reduced attractiveness' between the crop fields and the elephants' habitat. An optimal buffer zone should contain unpalatable crops grown adjacent to sub-optimal elephant habitat. Furthermore, the active management of a buffer zone with low-cost string fences, coupled with a vigorous deterrence regime, may instill recognition in elephants attempting to raid that the fence demarcates a "no-go" area. Increased farmer vigilance together with a new range of deterrents seems to reduce the damage caused by elephants, but convincing farmers that they can - and should - take responsibility for protecting their own crops is the key to the success of this approach. The central theme that emerges from examination of the failures of intervention is the need to decentralize responsibility for crop protection to the farmers. This represents a considerable shift in thinking, because farmers have historically depended on centralized PAC [Problem Animal Control] units to reduce this conflict. Furthermore, the methods adopted need to be financially and technologically within the capacities of the people implementing them if they are to be sustainable.

### **The use of telemetry**

Integrating new technologies such as GPS telemetry, etc., into the operation of potential ERUs may be a very good idea but there are some issues to be initially considered. The expense of telemetry (\$4000-5000 per GPS transmitter/collar + costs of associated IT and

other running costs e.g. immobilization, etc) places a limit on the number of elephants that can be collared. The question is, for a given area, what is the optimal number that needs to be tagged? Of course if we know that most HEC is caused by a set of recognizable animals the answer is fairly trivial. But what if most elephants crop raid, like in North Bengal? We may be assisted here by one facet of elephant ecology that needs to be looked at. Anecdotal information from India seems to indicate that in fragmented habitats elephants tend to aggregate in large numbers during the harvest season, and such aggregations may be responsible for a high proportion of crop raiding incidences. Thus if we could determine how many such aggregations do occur and how fluid are these aggregations, we may have some clues to the number of animals we may need to tag. Obviously this itself is an independent study but must be carried out if we were to use this technology.

Even though the costs of telemetry appear high, a cost benefit analysis may ultimately indicate that knowledge of the real time location of raiding aggregations could offset costs associated with the search for offending aggregations, crop and property damage caused by late arrival of squads and the lack of coordination in planning interventions and consequent increase of risks to personnel.

A project in West Bengal began with the older technology satellite transmitter (PTT) being attached to a bull. But PTTs do not work very well under heavy cover and several triangulated locations have too large an error bar to be useful. However the intention was to demonstrate the use of this technology as one that could provide “early warning signals” for pre-empting conflict by habitual raiders.

The project then moved on to GPS. There are four elephants fitted with such transmitters with the data being downloaded, decoded, put on maps and the maps sent daily by email to a number of wildlife officials in West Bengal. The basic idea of this programme is to test and develop the technologies needed for “real time” transmission of locational data of crop raiding elephants to wildlife authorities with the explicit

intention of pre-empting elephant-human conflicts. It is quite encouraging that wildlife staff found two of the collared animals with crop raiding cohorts and, spontaneously realizing the relevance of this technology, requested locations closer to “real time”.

If collaring is chosen as an option, it is advised to use GSM collars tied to a GPS like the ones used in Iain Douglas-Hamilton’s study in Africa. These have a higher likelihood of real time data flow than GPS collars and are cheaper (cost around US\$ 2000/- plus airtime).

The experience with GPS-satellite collars in Sabah, Malaysia is that the success rate of locations is good in deciduous habitats, moderate in fragmented-degraded evergreen habitats and only 20-30% of attempts result in a successful location under very thick canopy. So this would not be good for real time data flow that would be required to pin point areas of incursion into human habitats. The one way to potentially work around this is to use existing GPS satellite collar data and model the time series incursions to build a GIS model to predict future incursion areas based on the last location. This is very time consuming and would need investment in human and hardware resources at a local site.

## **Conclusion**

It appears that variations of the ERU theme are being applied across the range. There may be no need to change anything in certain places, and there may be a need to explore different approaches in other locations. Captive elephants, where they are not part of a culture, should likely not be introduced into a culture for various reasons. Yet habitat maintenance, enhancement and corridors are the most important issues.

Some countries have a lot of elephants in captivity currently, but very few of these are “kunkies”, although some projects use captive elephants for patrolling purposes in forests. In regions where there are captive elephants, some of these elephants may also be good means of transportation for tourists into forests for viewing wildlife. It is also important that

revenues generated benefit local people, and not just corporations, so the benefits of wildlife and their habitats are more than a buzz-word for locals.

There are numerous means to address HEC mitigation, and these are tools, which would be effective for a while. With creative permutations they could be effective for longer periods. Only if local communities become involved with the mitigation processes can there be sustainability. Every technique faces numerous challenges, but the HEC mitigation tool box combined with good policy would, for the most part, be good for elephants and people. Translocation should be an outlier, to be carried out only under extreme circumstances, and should be well researched as translocated elephants are further likely to be involved in HEC at another location.

There are a few projects trying hard to protect existing habitat, and a few that are acquiring more habitat. The creation of corridors, protecting, enhancing and increasing habitat should become policy decision at National and State levels. Land use issues and policies should also be addressed by National and State agencies. Then there is the human population dimension and corporations going wild with unsustainable resource extraction and land conversion.

Clearly a multi-disciplinary approach to wildlife management is necessary, especially when dealing with problems such as those faced by Asian elephants, in the face of exploding human populations and rapidly rising economies.

### **Responders**

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