ISSN 1014-2789

FEATURING FOREST NEWS

TIGER PAPER

Regional Quarterly Bulletin on Wildlife and National Parks Management

Vol. XXVIII: NO. 3

July-September 2001

REGIONAL OFFICE FOR ASIA AND THE PACIFIC (RAP)
FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS
BANGKOK

Contents

TIGERPAPER

FOREST NEWS

A TRANSLOCATION PROPOSAL FOR WILD BUFFALO (*Bubalus bubalis*) IN NEPAL: RECOMMENDED MANAGEMENT ACTION IN THE FACE OF UNCERTAINTY FOR A CRITICALLY ENDANGERED SPECIES

by Joel T. Heinen

Introduction

All populations of wild Asiatic buffalo, the progenitor of domestic buffalo (*Bubalus bubalis* [*Bubalus arnee*]; Groves, 1981) are considered to be endangered to critically endangered for many reasons (Heinen & Srikosamatara, 1996), and have probably been in decline for at least a century (Daniel & Grubh, 1966; Choudury, 1994). Current site locations of putative wild stock are western Thailand, east and central India, southern Bhutan and southeastern Nepal (Corbet & Hill, 1992) in several isolated reserves. A major concern is that domestic and feral buffalo are completely interfertile with wild buffalo; thus, the genetics of wild stocks are in question and some field censuses have been criticized because the identification criteria have not been consistent. Besides genetic introgression, threats of disease transmission are high when domestic and wild forms intermingle. The American Zoo and Aquarium Association recommended field censuses and clarification of the species/subspecies of Asiatic buffalo (Read, 1999). IUCN - The World Conservation Union's Species Survival Commission has recommended antibody research, genetic research, field studies and translocations where possible (e.g. Beyers *et al.*, 1995; Hedges, 1995; Read *et al.*, 1995) to better secure the species in the wild.

Due to the endangered status and the importance of the species worldwide, the Department of National Parks and Wildlife Conservation in Nepal (DNPWC) is considering translocating buffalo from Kosi Tappu Wildlife Reserve, the only Nepalese protected area with a wild population, to one or more of Nepal's other lowland parks or reserves to better secure the species in the country. Kosi Tappu Wildlife Reserve was established in 1976 and is approximately 175 km^2 in area. It is Nepal's only Ramsar site and contains extensive wetlands that are important stopover and wintering areas for waterfowl (Sah, 1997). It is located on the flood plain of the Kosi River in Sunsari, Saptari and Udayapur Districts in southeastern Nepal (elevation 75 to 100 m above mean sea level).

The reserve is subject to extreme flooding during the monsoon; buffalo and other ungulates frequently leave at that time and seek refuge in croplands and flood-related mortality is a problem for the population (Heinen, 1993). Thus, the need for a translocation to a more secure site is imminent, and this paper considers translocation options given census figures for buffalo in Kosi Tappu, and several issues regarding the management situation in potential translocation sites in other areas of lowland Nepal. It is suggested that the translocation can be planned without detailed genetic analyses (which are both costly and time consuming), based on a series of consistent field survey criteria previously described for identifying putative wild stock.

Previous research on buffalo in Kosi Tappu

The population of wild buffalo in Kosi Tappu has been censused numerous times and methods have been scrutinized because there are semi-feral as well as domestic buffalo that regularly backcross with wild bulls in the area (e.g. Mishra, 1982; Shrestha, 1997), a typical problem in places in which putative wild stock are found (e.g. Divakar, 1977). Most censuses were done by people with little prior experience who spent limited periods of time in Kosi Tappu (one to two weeks). There have been two longer-term studies: one by Dahmer (1978) in

1976 (for 1 year), and the other by Heinen (1993) from 1986 to 1988 (for 1.5 years). Both studies followed buffalo herds for long periods in both wet and dry seasons, recorded observations on home ranges, movements, population structure, and behavioral and phenotypic characteristics of the wild versus feral backcrossed herds, and interviewed local livestock owners in the region. Heinen and Singh (2000, in press) recensused the population in 2000 and discussed the phenotypic and behavioral characteristics used to distinguish wild buffalo from feral backcrosses in the study area.

Using consistent identification criteria to differentiate wild from feral buffalo, Dahmer (1978) described two mixed (females and dependent calves) herds: the north herd and the south herd. It has been previously reported that female wild buffalo are thought to remain with their natal herds and show a high degree of philopatry (e.g. Heinen, 1993). Subsequent studies (Heinen, 1993; Heinen and Singh, in press) relocated those herds and found that they were using similar home ranges to those mapped by Dahmer (1978). The females and calves counted in those two mixed herds were the only ones considered to be wild in those Kosi Tappu censuses. The sizes of herds thought to be feral backcrosses were also reported (Heinen and Singh, 2000). Males, which tend to be solitary, were censused separately. Other studies in Kosi Tappu are thought to have overestimated the population of wild buffalo by including some feral backcrossed females and their calves in wild census figures, from one herd in particular that behaved very similarly to those counted as wild (Heinen and Singh, 2000). A few reports have undercounted wild buffalo due to an insufficient sampling effort (e.g. Shrestha, 1996).

The results of the 2000 census compared to the previous studies raised several new concerns about the status and conservation of wild buffalo in Kosi Tappu. In spite of adequate population growth overall (about 3.5% per year), the first year calf to cow ratio showed a consistent decline over time and the adult sex ratio was male-biased. Furthermore, records from the reserve's office showed at least 12 reported cases of human-caused buffalo mortality from 1995 to 2000, which was not the case in previous studies. These included incidences of shooting, poisoning, electrocution, and vehicular collisions when animals left the reserve. Estimates for herd-specific population growth rates in 2000 were consistent with observations made in previous studies that flood-related mortality is impacting this population (Heinen and Singh, in press). For long-term conservation prospects, the wild buffalo population in Kosi Tappu cannot be considered viable and a translocation into one of Nepal's other reserves is highly advised. This was also recommended in Nepal's Biodiversity Action Plan, but has yet to be approved (Anon, 1998). Based on the above and the previous research, there is strong support for the argument that some of the stock in Kosi Tappu is truly wild, that many backcrossed animals are likely to be mostly wild (based on nuclear DNA), and there is sufficient expertise and written descriptions to distinguish putative wild from feral backcrossed buffalo to chose animals for translocation, in spite of a lack of direct genetic evidence to differentiate between them.

Translocation Recommendations

A number of considerations must be made in planning a translocation (Stanley Price, 1989; Kleiman, 1996). Included among them are the ecological and political feasibility of establishing a new population; what individuals should be moved based on social, demographic and genetic considerations; whether sufficient resources and expertise exists locally; and whether the release should be 'hard' or 'soft'. These issues are considered here.

There are four other protected areas in Nepal within the presumed historical range of wild buffalo. These are: Parsa Wildlife Reserve, Chitwan National Park, Bardia National Park and Sukla Phanta Wildlife Reserve. Parsa is dominated by dry upland forest and has very little grassland/riverine habitat; thus, it should not be considered as a translocation site. Sukla

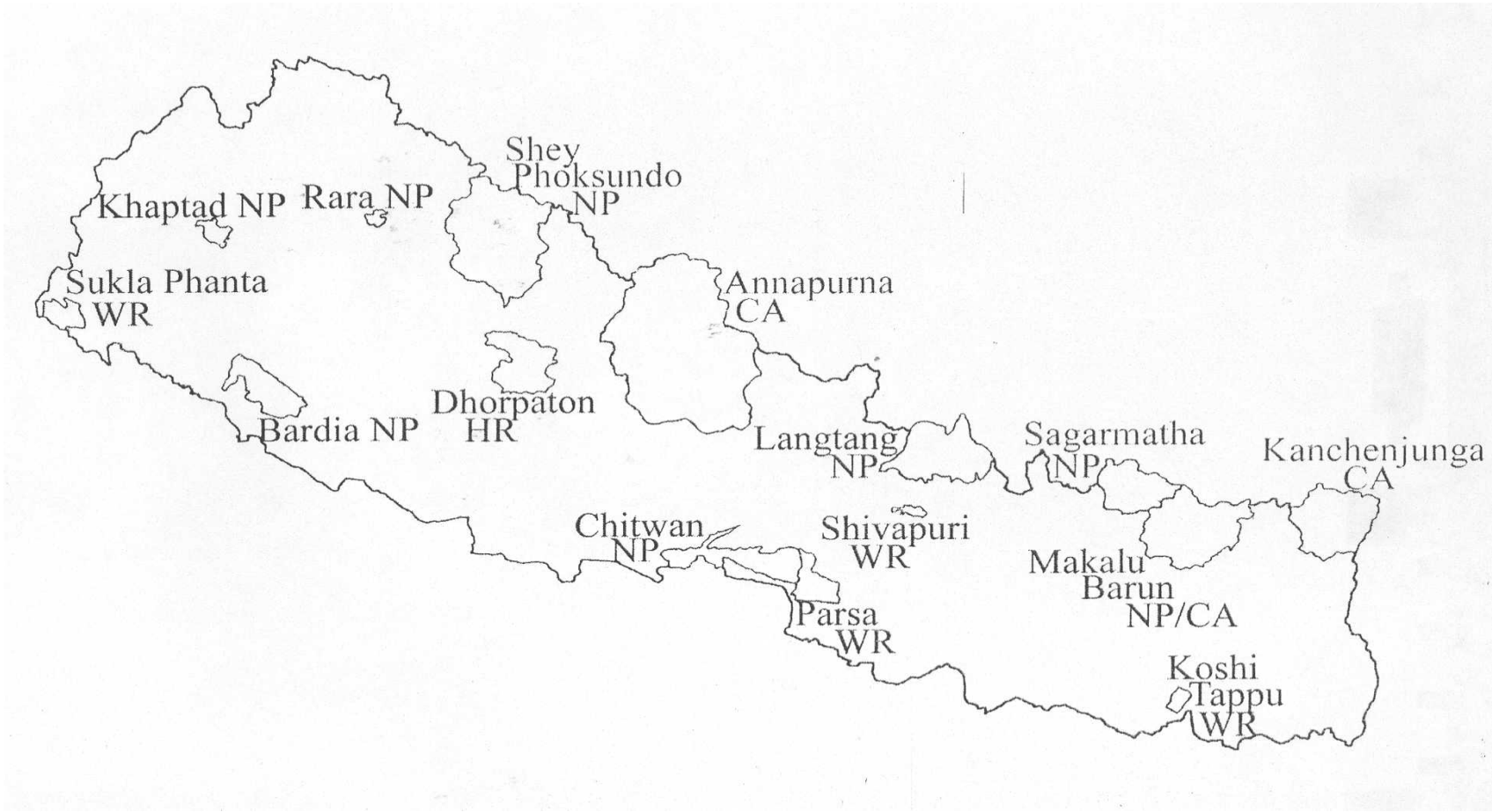

Figure 1: Locations of protected areas of Nepal. (NP=National Park; WR=Wildlife Reserve; CA=Conservation Area; HR=Hunting Reserve). The five protected areas located along the southern border are all considered to be within the historical geographical range of wild buffalo.

Phanta was recently extended in area and there are still many people living in and around the extension sites. Numerous conflicts with land compensation are a current political issue in the region (Heinen & Mehta, 2000). Sukla Phanta should therefore not be considered at present, but may be appropriate for future translocations if the habitat is better secured.

Chitwan and Bardia both have the advantage of much larger land areas, extensive riverine habitats adjacent to upland forests which could provide flood refugia, and better protection, given that they are national parks as opposed to wildlife reserves (His Majesty's Government of Nepal, 1973). There are some specific advantages and disadvantages of translocating buffalo to either park. Wild buffalo were recorded in Chitwan as recently as the 1960s. The reason for their extirpation is not known, but it is thought that falling prey to diseases transmitted from domestic stocks is the most likely explanation from several lines of indirect evidence (Seidensticker, 1975). Chitwan is now much better protected and extensive habitat remains along its northern and western boundaries. Furthermore, Chitwan is closer to Kosi Tappu than Bardia is, so translocating animals would be logistically more easily accomplished. The main disadvantage of translocating animals in Chitwan is the fact that most prime habitat is adjacent or near to villages; this will likely increase the amount of crop damage in the area and virtually ensure that wild buffalo are in regular contact with domestic livestock. Thus, this would likely be a politically contentious issue as it is in many parts of Nepal (e.g. Sharma, 1990; Nepal & Weber, 1995; Studsrod & Wegge, 1995). Most of the threats buffalo currently face in Kosi Tappu will, therefore, likely be present at any site in Chitwan, with one exception: high flood-related mortality.

There are two potential translocation sites within Bardia: the Karnali River flood plain along the western boundary of the park, and the Babai River flood plain in the east. The Karnali has abundant prime habitat and it is thought that wild buffalo naturally occurred in the valley into the 20th century. The East-West Highway leads into this area, so transporting buffalo to this site is more feasible than to the Babai River. The Karnali flood plain has the same disadvantages, however, of any Chitwan translocation site. There are villages along the western side of the river and to the south of the park.

The Babai River is a tributary that joins the Karnali farther south in India. Compared to rivers in the other locations, it is narrow and restricted in habitat area. This valley has the decided advantage of being isolated. Sites within could be found (i.e. far north of the highway) in which there are no nearby villages, and Bardia is scheduled for extension well to the east in the near future. Thus, the population would be secured from most or all human influences only at this site. Given the longer transit time, a veterinary team should assess the safety of a translocation to the Babai. Both the DNPWC and the King Mahendra Trust for Nature Conservation (KMTNC - a potential funder for the project) have a good deal of expertise in immobilizing and moving larger mammals; rhinoceros (*Rhinoceros unicornis*) were successfully introduced from Chitwan into both the Karnali and Babai Valleys in Bardia (Anon, 1999) and the British Government has provided veterinarians in several different projects recently (Dr. Jacques Flamand, pers. comm.). Thus, the resources and expertise exist in-country.

Both Chitwan and Bardia have natural predators (especially tigers (*Panthera t. tigris*)) that have been absent from Kosi Tappu since the 1960s. This would make it advisable to move a sufficient number of females from each mixed herd so that they can protect the calves from predation while the population is small. It will also require that at least some older females are moved, since behavioral observations suggest that they are very important in leading stereotypical group defense behaviors, which would presumably reduce predation-related mortality of calves. These include very large approach distances and phalanx-formation behavior. Since younger females are more important for breeding, these concerns will necessitate moving more females than would otherwise be needed. Since it is thought that females remain within their natal herds, equal numbers should be moved from both the north

and south herds to assure greater genetic variability in the founding population.

Given the above, a minimum of eight females from each of the two mixed herds should be moved, of which at least four should be older animals. Any females accompanied by first year calves should not be moved, since this will likely result in some calf mortality and furthermore, unaccompanied females are likely to be pregnant, thus increasing the size of the founding population. At least 10 bulls of varying ages should be moved. This is justified because bulls, which tend to be more solitary, may initially suffer a high predation risk and moving a reasonable number will have the effect of increasing the genetic variation in the founding population. This is within the range recommended by other studies; few mammalian translocations have been successful in which fewer than 20 animals were initially released (Stanley Price, 1989).

Although a 'soft' release may be less necessary for translocated wild as opposed to captive-bred stock, it is recommended that animals be initially corralled in large enclosures with their herd mates for at least several days so that the stress of transit may abate. Corralling bulls singly for limited periods should also be considered by the veterinary team. The translocation should be planned for mid-February to early April, both to allow better visibility and vehicle access during capture, and less potential mortality in transit, since that is the dry season and before the heat of pre-monsoon. Finally, the translocated and Kosi Tappu buffalo populations should be monitored for growth, mortality, and movements over time to assess success and plan subsequent translocations if feasible.

Discussion

The wild buffalo population in Kosi Tappu Wildlife Reserve is more secure than previously, and an average annual growth rate of 3.5% attests to good recovery since the reserve was created in 1976. However, the decline in the calf to cow ratio, a male-biased adult sex ratio, risk of disease transmission from domestic and feral livestock, known flood-related mortality, and increased human-induced mortality recorded in the 1990s, all indicate that the population is not viable and measures are needed to secure the species in Nepal. A translocation should be carried out in the near future due to the critically endangered status of Nepal's wild buffalo population and to the endangered to critically endangered status of the species worldwide (Heinen & Srikosamatara, 1996). The conservation goal is to establish a new population in better-secured habitat, but one of the policy goals is to reduce crop losses around Kosi Tappu without imposing new threats on local villagers elsewhere.

The suggestion given here is that a translocation can be planned based on available research, without detailed genetic studies of wild buffalo versus feral backcrosses. This is because Dahmer (1978), Heinen (1993) and Heinen and Singh (in press), repeatedly used a consistent (and conservative) set of phenotypic and behavioral characteristics to differentiate wild from feral backcrossed forms. It is possible that one large herd considered feral in both Heinen (1993) and Heinen and Singh (in press) is, in fact, a wild herd. Since it is assumed from previous works that females remain with their natal herds, and it was observed that some members of that herd (censused at 40 animals in 2000) lacked a few minor phenotypic traits of wild buffalo, the herd was not included in wild census figures (although Suwal (1993) included it). If mitochondrial DNA work showed that the matriline is of wild origin (i.e. without significant differences from animals in the north and south herds, and with wild genetic markers identified), these animals could also be considered wild and used in subsequent translocations. It is hypothesized that the herd was of feral domestic origin that had backcrossed with wild bulls for at least 6 generations, and furthermore, that it should not be used for translocation unless detailed genetic tests showed otherwise. In any case, the type of genetic research needed to make distinctions between feral, highly backcrossed and wild forms is both time consuming and costly, so since the species is highly endangered and the Kosi Tappu population is not viable, there is at least one protected site in Nepal to which individuals could be moved in the near future.

The author believes that the management recommendation of a translocation is justified without genetic studies, as sufficient knowledge based on conservative identification criteria currently exists. Genetic studies would only be needed if it is proposed that some animals be used for translocation based on less conservative criteria for identifying wild buffalo. This is an issue throughout tropical Asia in all areas in which putative wild buffalo are found, as crossbreeding domestic females with wild males is encouraged by buffalo owners. Hall and Ruane (1993) recognized 74 breeds of domestic cattle, fewer than for any other major domesticated mammal species. This testifies both to the relative recency of domestication (Clutton-Brock (1989) and Nowak (1999) place it at about 4,000 to 4,500 years ago) and to the crossbreeding encouraged throughout the range. We will likely never have in-depth knowledge of the full genomes of putative wild, feral, semi-feral and domestic buffalo to make absolute distinctions here. In the meantime, we must make every effort to secure the putative wild stock.

The Babai Valley in Bardia National Park is recommended as the best single location at present, due mostly to its isolation from human influences. Although several other Nepalese protected areas contain sufficient lowland riverine habitat, the author suggests that moving animals to sites in which they are likely to conflict with local residents is ill-advised. Hopefully, in the future, habitat can be better protected in Chitwan National Park, the Karnali Valley of Bardia National Park, and Sukla Phanta Wildlife Reserve, but this is not the case at present. Sufficient numbers of animals must be moved to assure adequate genetic variation in the founding population and group defense of calves by females given the presence of natural predators in Bardia. The suggestion that a minimum of 26 adults should be moved in the initial translocation (16 females and 10 males) is based mostly on subjective criteria from other published works and on field observations of the defensive behavior of Kosi Tappu females when approached by humans. This is a conservative estimate, but it is possible that fewer animals could be moved if, for example, tiger depredation proves not to be a problem in the Babai Valley (i.e. tiger densities are known to be higher in Chitwan and Sukla Phanta compared to Bardia).

The feasibility and cost of moving these animals must also be considered, but the success of the rhinoceros translocation in Nepal shows that these projects can be carried out provided that the political will is there. The financial resources and expertise exist in-country at present. Since wild buffalo are currently much more rare than rhinoceros in Nepal, and the species worldwide is very understudied and critically endangered, the author suggests that wildlife authorities in Nepal and elsewhere should make every effort to muster the necessary political will and proceed with this and other translocations.

Acknowledgments

Dr. T.M. Maskey, Director-General, and Mr. N. Paudel, Senior Ecologist, of the DNPWC gave permission to work in Kosi Tappu. Mr. L. Yadhav, Warden of Kosi Tappu, and his staff, were very helpful in facilitating my stay. Mr. G.R. Singh helped with the field censuses and Mr. C. Shrestha served as our driver. Dr. J. Flamand of the Zoological Society of London, Dr. G. Ghaire of the Ministry of Forests and Soil Conservation, and Dr. M. Gregory of the Nepal/EC Project for Livestock Disease Control accompanied us for part of the census. This work was supported by a sabbatical leave from Florida International University, Miami, FL. O. Byers, S. Hedges, B. Read, U.S. Seal, S. Srikosamatara and other members of IUCN's Species Survival Commission provided encouragement and important references. The views expressed here are my own and not necessarily those of any individual or organization cited.

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EUCALYPTUS – BANE OR BOON?

by Debabrata Swain

Eucalyptus, an exotic to India, has become very controversial in this country. But an interesting feature has been noticed regarding its association as a host plant for Sandal (*Santalum album*), a tree so indigenous to India that there are references to it in Indian mythology, folklore and ancient scriptures. The association of Sandal in close proximity to Eucalyptus results in a luxuriant growth in Sandal.

The Khandagiri Silvicultural Research Station at Bhubaneswar (Orissa) has conducted extensive field trials of different exotic and indigenous species. A field trial plot for Sandal was established in 1984. Surrounding this Sandal plot are field trial plots of *Acacia lenticularis* (1984 & 1985), *Cassia siamea* (1985), several species of bamboos (1987), *Leucaena leucocephala* (1982), *Emblica officinalis* (1985), *Anacardium occidentale* (1984), *Derries indica* (1985), Eucalyptus (1987 and 1989) and *Dalbergia latifolia* (1987). It is surprising to note that a large number of Sandal seedlings have come up in the Eucalyptus plots. Some of the seedlings have been regenerated right at the base of the tree trunk. Seedlings in Eucalyptus plots are luxuriant in growth and quite healthy.

It is also interesting to note that contrary to the belief that birds do not nest in Eucalyptus trees, the author has observed bats sheltering in Eucalyptus trees in the Baliguda Forest Division and also seen a few bird nests in the Eucalyptus groves inside Muniguda FRH Campus of Rayagada Forest Division (Orissa).

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Ba nte ng (Photo: WCS Cambodia/WPO)

STATUS AND DISTRIBUTION OF WILD CATTLE IN CAMBODIA

by Men Soriyun

Introduction

Cambodia has long been known as an important country for wild cattle species, especially since the enigmatic Kouprey *(Bos sauveli)* was first discovered in the 1930s (Urbain, 1937). Recently, another bovid, the Khting Vor *(Pseudonovibos spiralis*), has been described from the southern Indochina region (Peter & Feiler, 1994*b*) and is thought by some to still occur in Cambodia (Dioli, 1995, 1997), though this is questioned by others (Hassanin *et al.,* 2001, Thomas *et al*., 2001). Therefore, Cambodia is potentially home to five extant species of wild cattle: Banteng *(Bos javanicus*) [Global Conservation Status (IUCN 2000): Endangered]; Gaur *(Bos gaurus)* [Vulnerable]; Wild Water Buffalo *(Bubalus arnee*); Khting Vor *(Pseudonovibos spiralis)* [Endangered]; and Kouprey [Critical]. However, there is little data on the status and distribution of these species in Cambodia and some are possibly now extinct. This paper presents new data on wild cattle in Cambodia.

Former Status and Distribution

Up until the 1970s, cattle were widely distributed throughout the forests and grasslands of Cambodia. The low human population (about seven million at the time) meant that large mammal populations thrived (Wharton, 1966). However, during the late 1960s, the security situation deteriorated and fighting began which finally resulted in the Khmer Rouge taking control of the country in 1975. Even though the Khmer Rouge was overthrown in 1979, they still controlled large parts of Cambodia up until the mid-1990s and some areas up until 1998. Between 1970 and 1995, almost no surveys were conducted on large mammals and the fate of wild cattle was unknown. Then, with security returning to most of the country, a few surveys began again (e.g. Olivier & Woodford, 1994; Desai & Lic Vuthy, 1996; Timmins & Men Soriyun, 1998). The results of these surveys were varied, but all indicated a dramatic decline in wild cattle populations. An aerial survey covering more than 5,500 km^2 of eastern Cambodia (Olivier & Woodford, 1994) identified only 97 Banteng, 4 Gaur, 13 Eld's Deer *(Cervus eldii)* and a number of Sambar *(Cervus unicolor*), even though the open forest allowed excellent visibility. A foot survey in the same region found cattle signs at very low densities (Desai & Lic Vuthy, 1996). Two years later, a survey along a major river in the east of the country revealed a similarly low abundance of cattle signs (Timmins & Men Soriyun, 1998).

In the same year, an interview survey of 150 hunters through the country, led by the Government's Wildlife Protection Office (WPO), produced the first broad map of the probable distribution of some large mammals (Heng Kim Chhay *et al.,* 1998). Subsequently, the Wildlife Conservation Society (WCS), working with the Ministries of Environment (MoE) and Agriculture, Forestry and Fisheries (MAFF), began an extensive survey program to identify and prioritize the most important areas for wildlife conservation in Cambodia (see Walston *et al*., 2001 and Net Neath, 2001). Other international conservation organizations have also begun surveys in some areas, including WWF, FFI and CI.

Current Status and Distribution

Cambodia still has large areas of forest, although both legal and illegal logging are now reducing the extent and quality of these forests. Much of the land in the east and north of the country is dominated by open deciduous dipterocarp forest, with large natural grasslands and small areas of closed-canopy semi-evergreen forest. For the purposes of large mammals, Cambodia can be divided into the following four broad biogeographical regions, which facilitates displaying the data:

The Northern Plains: A vast flat area of dry forest bordered by the Mekong river to the east, Thailand and Laos to the north and the Tonle Sap Great Lake to the south-west.
The Eastern Plains: Similar habitats to the Northern Plains, but east of the Mekong river, with Vietnam to the east. The province of Mondulkiri dominates this area.
The South-West: A relatively low-altitude mountain range (max. 1,800 masl) covered by evergreen and semi-evergreen forest.
The North-East: The southern extreme of the Annamite mountains containing the largest block of evergreen and semi-evergreen forest in the east of the country.

Data collected over the last two years have mainly come from two survey methods, camera-trapping and sign surveys. While sign surveys are useful in confirming the presence of wild cattle, the use of camera-traps is the only reliable method for identifying species and minimum numbers with confidence, especially given the potential confusion of the tracks and the varying abilities of surveyors and hunters. Table 1. details the results of all camera-trap surveys undertaken in the country up until May 2001.

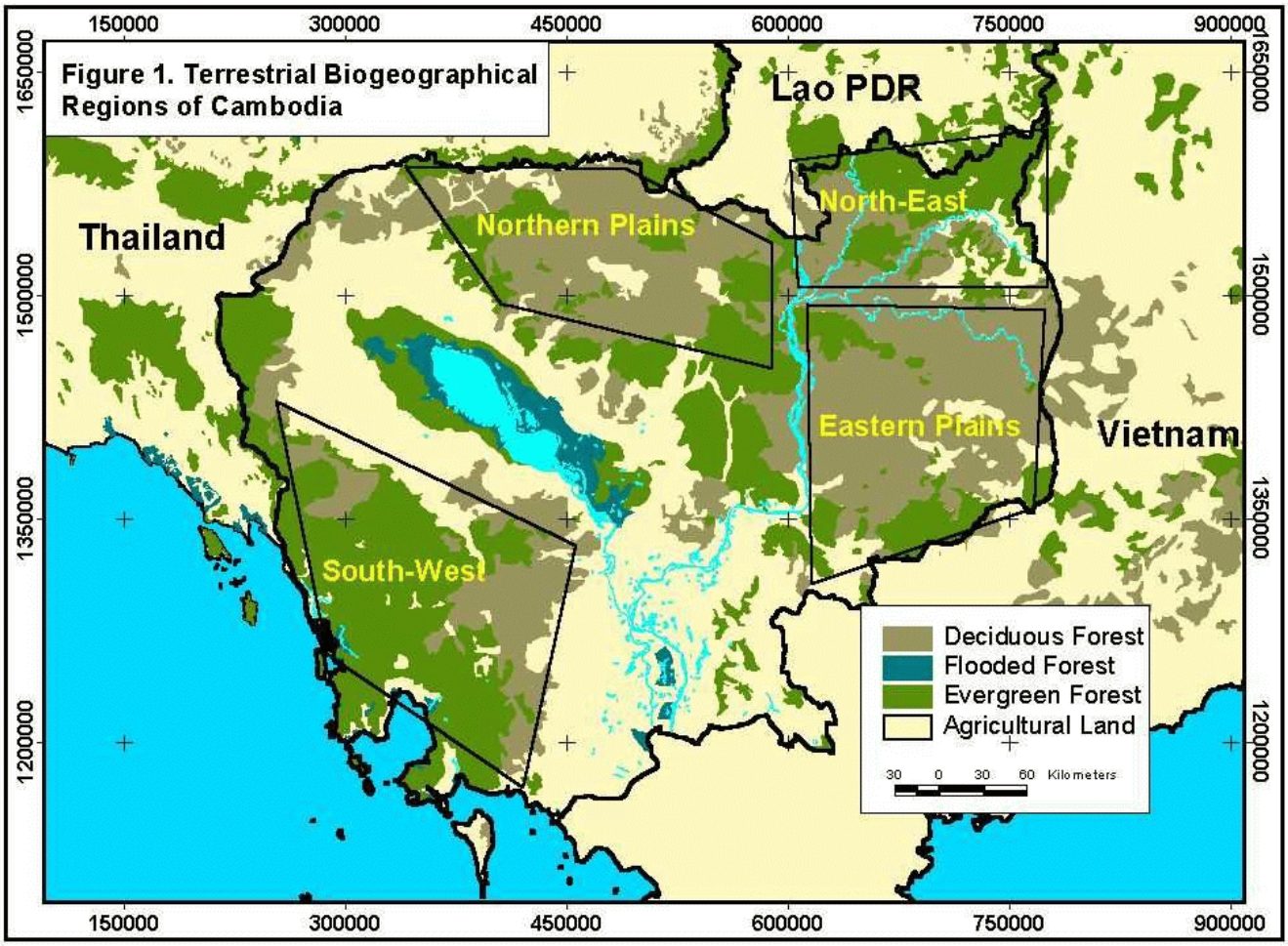

Table 1. Numbers of photographs of wild cattle from camera-trap surveys 2000-2001

Type of cattle	Eastern Plains[1]	Northern Plains[2]	North-East[3]	South-West[4]
Gaur	85	15	4	0
Banteng	92	18	0	0
Wild Water Buffalo	2	0	0	0
Kouprey	0	0	0	0
Khting Vor	0	0	0	0
Camera-trap nights	2,194	1,734	1,632	1,054

Major sources of data: [4]Daltry and Momberg (Eds.) 2000, [1]Walston and Davidson (2001), [1]Net Neath *et al*. (2001), [4]Net Neath (Ed.) (2001), [4]Kong Kim Sreng *et al*. (2001). Unpublished data: [1,2,3,4]Wildlife Conservation Society, [3]World Wide Fund for Nature, [4]Fauna and Flora International, [4]Conservation International.

Table 2. is a combination of all survey data, giving a comparative abundance index of the wild cattle between each of the areas.

Table 2. Relative abundance of wild cattle in Cambodia based on a combination of methods

Type of Cattle	Eastern Plains	Northern Plains	North-East	South-West
Gaur	III	II	II	I
Banteng	III	II	0/I	I
Wild Water Buffalo	I	0	0	0
Kouprey	0	0	0	0
Khting Vor	0	0	0	0
Survey effort	Medium	Low/Medium	Medium	Low/Medium

0 = Presence not recorded, I = Rarely recorded, II = Occasionally Recorded, III = Often recorded, IV = Frequently recorded.

The results of all wildlife surveys over the past few years clearly indicate that the Eastern Plains of Mondulkiri Province are now the most important site for wild cattle in Cambodia, with the Northern Plains second.

Kouprey

There has been no confirmed evidence for the continued presence of this species for many years. Possibly extinct, but equally possible that a few doomed individuals still live within Banteng herds in the east or the north of the country. However, it is highly unlikely that any breeding population still occurs and the species should be considered effectively extinct in the wild.

Wild Water Buffalo

Wild-living buffalo still inhabit an area of forest in the north-east of Mondulkiri Province (Eastern Plains). Local people insist that they are truly wild, since they have not come into contact with domestic buffalo as they live very far from villages and are shy. However, there is no data on possible historical interactions. Locals are fearful of this population as they are known to be exceptionally aggressive, swift and alert, features notably lacking in most domestic stock. Tracks are also distinctly larger than those of domestic buffalo, with many measuring over 185 mm. in diameter. In June 2001, the author, WCS and WPO conducted a brief camera-trap survey in the north of Mondulkiri Province resulting in two pictures of buffalo from this population at a mineral lick after leaving eight traps for a one month period. The local guides claim that there are 20-30 Wild Water Buffalo in two localities of this region on both sides of the Sre Pok river. Although the exact genetic status of this population cannot be established without further analysis, the fact that a wild living population of buffalo exists in a remote area, far from domestic populations, is of high conservation significance.

Banteng

Hunting has devastated many populations of this species and is still the single biggest threat to the species' survival in the country. However, reasonably healthy breeding populations still occur, especially in southern and central Mondulkiri, where signs and camera-traps often capture five or six animals in a single shot, comprising a number of young. Direct observations of herds of about 10 individuals have been made on a number of occasions during WCS surveys.

Gaur

As with Banteng, Gaur have been seriously depleted in numbers and range due to hunting, but still occur in reasonably healthy numbers in some places. Herds of 7 and 8 animals were recently observed by the present author in Preah Vihear Province in the Northern Plains and have been photographed regularly in Mondulkiri by WCS.

Khting Vor

The present author knows of no conclusive evidence for the historical or present existence of this species. Field surveys and interviews have often produced conflicting reports about the appearance, ecology and distribution of the alleged species. Its listing in the **2000 IUCN Red Data Book** (Hilton-Taylor, 2000) as Endangered C2a is entirely unjustified given the complete lack of data which is required to meet the listing criteria. The conservation status of the species, if it has ever existed, is likely to be either Extinct or Critically Endangered. However, speculation on its conservation status is of little value until there is sufficient evidence to suggest that the species is valid.

Conservation Recommendations

Cambodia must be considered one of the last remaining hopes for very large-bodied animals in Asia, as the country still maintains vast areas of prime cattle habitat with a low human population. However, many of these areas are easy to penetrate and conducive to hunting; thus, measures must be taken to prevent this. The reduction in available arms, the increased implementation of the laws prohibiting hunting, broader conservation awareness, and more extensive efforts to tackle wildlife trade are all essential steps to be taken in the next few years to protect these species.

Unfortunately, the current protected area system does not adequately protect the remaining populations. It is essential that some priority core areas within wildlife sanctuaries and national parks receive immediate protection and that these areas are then expanded as the populations within them do. It is also important that a landscape approach be adopted which includes protected areas, logging concessions, untitled land and community land, so that long-term planning can prepare for wider conservation of cattle populations. Currently projects are being implemented by WCS and the government in both Mondulkiri and the Northern Plains, and it is hoped that future cooperation between all government agencies, NGOs and local communities can secure the future for wild cattle in Cambodia.

Acknowledgements

I would like to thank Ty Sokhun, Director of the Department of Forestry and Wildlife, for supporting my work for the Government and as a staff member of WCS Cambodia. I am also grateful to Men Phymean and Sun Hean, Director and Deputy Director of the Wildlife Protection Office (WPO) who have both helped my work. I am especially grateful to Joe Walston (WCS Cambodia) who worked with me on the field surveys and helped me with this paper, and to Colin Poole (WCS Cambodia). Finally, I would like to thank Seng Teak (WWF Cambodia) and my other colleagues at the WCS Cambodia Program.

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Gaur (Photo: WCS Cambodia/WPO)

REPTILE RICHNESS AND DIVERSITY IN AND AROUND THE GIR FOREST, GUJARAT, INDIA

by Raju Vyas

Introduction

Gir Forest is one of the largest and most environmentally important forests in the Saurashtra peninsula. It is also the only place in the world where the Asiatic lion (*Panthera lio persica*) is still found in the wild. Many studies and research works have been carried out on the large mammals, birds, ecology, social, economic and other important aspects of wildlife in the Gir Forest. However, up to the present, no serious studies have examined the reptile and amphibian fauna of the area, with the exception of a few works on crocodiles (Whitaker, 1978; Chavan, 1979; Chellam, 1986; Vijaykumar, 1997), turtles (Frazier, 1989), and reptiles in general (Singh and Kamboj, 1996; Bhatt *et al.*, 1999).

Study Area

Gir Forest is located in Junagadh District of the Saurashtra peninsula, Gujarat State. It encompasses an area of 1,412.13 km^2, which includes Gir National Park and Sanctuary. The protected area is covered with dry, deciduous thorn and riparian forest, where the major floristic species are: *Tectona grandis, Diospyros melanoxylon, Wrightia tinctoria, Zizyphus mauritiana, Ficus benghalensis, Morinda tinctoria, Phyllanthus emblica, Bauhinia racemosa, Holoptelea integrifolia, Boswellia serrata* and *Lannea coromandelica*.

Rainfall data from the area over the last ten years indicates that the average annual rainfall is approximately 1,000 mm. There are distinct seasons with a southwest monsoon that starts in mid-June and lasts until September. This is followed by winter from December to March, when temperatures can drop to an average minimum of 8°C. Temperatures rise again during summer (average maximum: 45°C) from April to mid-June.

Materials and Methods

Assessments of reptile fauna were made during four trips to Gir Forest and the surrounding areas between 1991 and 1998,where a total of 45 days were spent covering all three seasons. The status of the species (abundant or very common, common, less common and rare) was classified on the basis of observations and attempted sightings of species occurrence in all important types of micro habitats. Important specimens were collected and the necessary measurements and date were recorded.

Results

A total of 42 species of reptiles were recorded from the Gir Forest. The descriptions and measurements of a few important and newly recorded species are given below.

Kollegal ground gecko: *Geckoella collegalensis* (Bedomme, 1870)

Collection and locality: 8 November 1996, Pilhipat, Sasan, Gir Forest (BNHS 1434). *Measurements*: Total body length (TBL) 7 cm, snout to vent length (SVL) 4 cm, tail length (TL) 3 cm;

Description & pholidosis: 12 supra labials, 9 lower labials, posterior labials smaller and there are granules near the jaw angle. A pair of large, post mental scales. Enlarged dorsal tubercle absent, belly with rounded imbricate scales. Tail scales larger than the dorsal and belly scales. Head moderate, snout larger; eyes large with vertical pupil; ear opening small and oval in shape. Tail shorter than head and body length, and cylindrical with last two distal phalanges compressed and angularly bent. Hind limbs just reach the axilla. Body color a light grey with large, rounded, black-edged brown spots from head to tail, in paired row with small lateral spots. Limbs are dark brown marbled mark. Lower jaw and throat are white with brown dots. Belly is white and tail has dark brown bands.

Found under rocks and pebbles in wet, dry deciduous forest patches along the river and stream areas.

White-spotted supple skink: *Lygosoma albopunctata* (Gray, 1846)

Collection and locality: 8 November, 1996. Philhipat, Sasan, Gir Forest. *Measurements*: TBL 6.2+ cm; SVL 4.5 cm; TL 2.2+ cm (Lost).

Description & pholidosis: 7 supra labials, 5th larger below the eye; 26 scales round the body; scaly eyelids; distance between axilla and groin 2.8 cm; between snout and forelimb 1.5 cm. Twelve lamellae under fourth toe. Tail thicker at base. Body elongate, brown colored with five less distinct longitudinal stripes formed by dark spots on each scale and more distinct at tail.

Brown vine snake: *Ahaetulla pulverulenta* (Dumeril & Bibron, 1854)

Collection & locality: 22 April 1989. Endhania, near Mendarda. *Measurements*: TBL 129cm, SVL 78 cm, TL 81 cm.

Description & pholidosis: 8 supra labials, 5th touching the eye; 9 lower labials; temporals 1+2; scales around the body 15:15:11; ventrals 198, caudals 168 divided, anal plate 2. Long snout terminating in a pointed dermal appendage; large oval eyes with horizontal pupil. Body very elongate and compressed with smooth scales. Body color is brown, interstitial skin black and white forming oblique lines on anterior body parts, belly a light brown and dark brown line along the outer margin of the ventral. Lips, lower jaw and throat white in color. Light, indistinct stripe on either side of the face, passing through the eye.

Discussion

Forty-two reptile species were recorded from in and around the Gir Forest. Species-wise, this represents 45.62% of the State's and 10.88% of the country's reptile fauna.

The gecko *Geckoella collegalensis* (Beddome, 1870) and snake *Ahaetulla pulverulenta* (Dumeril, Bibron & Dumeril, 1854) are both endemic species found only in Western Ghats (India) and Sri Lanka (Murthy, 1985; Das, 1994). The northern-most distribution records of *G. collegalensis* is Sanjay Gandhi National Park, Mumbai, Maharashtra (Sekar, 1994), and for *A. pulverulenta* is Pimpri, Dangs, Gujarat (Vyas, 1988) in Western Ghats, India. The present records of *G. collegalensis* and *A. pulverulenta* from Gir Forest are a new distribution record for both species.

The presence of *G. collegalensis* and *A. pulverulenta* in Gir Forest, Gujarat raises the possibility that in the distant past, Gir Forest may have had a connection with Western Ghats, or the Western Ghats faunal structure was extending more towards the north than at present, and that at some point the connected habitat area was lost due to some geological changes. The geology of Gujarat State shows that the Saurashtra peninsula was once connected with south Gujarat and Maharashtra before the Deccan Trap plutonic eruptions, at or around the end of the Jurassic and beginning of the Cretaceous periods (Merh, 1995). Early in the Eocene, Saurashtra was dislocated from the mainland during major plate-tectonic events coinciding with Deccan volcanic activity, the breaking apart of Greater India and Madagascar, and the collision of the sub-continent with southern Asia. Due to this collision, a fault lies north-south in the Cambay (=Khambhat) area and the Deccan Traps have dropped down to a depth of about two thousand meters in the sea (Krishnan, 1968).

Distribution records of the recent past of a few known Western Ghats species from Gujarat and present records of *G. collegalensis* and *A. pulverulenta* from Gir Forest shows that Western Ghats once extended north up to the Mahi River and the geological stratigraphy of Gujarat State supports that the Saurashtra peninsula was once connected with Western Ghats.

Acknowledgments

I am very thankful to the Conservator of Forest and Dy Conservator of Forest, Sasan, Junagadh

Forest Department, Gujarat State for granting me permission and providing facilities during this study. Thanks also to Mr. Rohit Vyas, Vadodara and Mr. Sanshank Buch, Rajkot for providing useful information on birds and snakes. Also, without the help and company of Mr. Kautilya Bhatt the field work could not have been finalized.

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Table 1: Systematic list of reptiles of the Gir Forest

Common name (Species)	Status	Habitat
Crocodylidae		
-Mugger (*Crocodylus palustris*)	Co	W
Testudinidea		
-Indian star tortoise (*Geochelone elegans*)	Co	D,S,G,A
Trionychidae		
-Indian flapshell turtle (*Lissemys punctata*)	Ab	W
Eublepharidae		
-Fat-tailed gecko (*Eublepharis fuscus*)	Ra	D,S,F
Gekkonidae		
-Kollegal ground gecko (*Geckoella collegalensis*)	Ra	D,F
-Brook's house gecko (*Hemidactylus brookii*)	Ab	ALL
-Yellow-green house gecko (*Hemidactylus flaviviridis*)	Co	D,H
-Termite hill gecko (*Hemidactylus triedrus*)	Lc	D,S
Agamidae		
-Indian garden lizard (*Calotes versicolor*)	Ab	ALL
-Fan-throated lizard (*Sitana ponticeriana*)	Ab	ALL
Chamaeleonidae		
-Indian chamaeleon (*Chamaeleo zeylanicus*	Co	D,R
Schincidae		
-White-spotted supple skink (*Lygosoma albopunctata*)	Lc	D,R
-Spotted supple skink (*Lygosoma punctata*)	Lc	D,F,R
-Common keeled skink (*Mabuya carinata*)	Co	D,F,R,H
-Bronze grass skink (*Mabuya maculara*)	Ab	D,F,R,H
Lacertidae		
-Snake-eyed lacerta (*Ophisops jerdoni*)	Lc	S,G
Varanidae		
-Bengal monitor (*Varanus bengalensis*)	Ab	ALL
Typhloidae		
-Brahminy worm snake (*Ramphotyphlops braminus*)	Co	D,R,F
-Slender worm snake (*Typhlops porrectus*)	Co	D,R,F
Boidae		
-Common sand boa (*Eryx conicus*)	Co	D,S,A
-Red sand boa (*Eryx johnii*)	Co	D,S,A
-Indian rock python (*Python molurus*)	Lc	R,D
Colubridae		
-Common vine snake (*Ahaetulla nasuta*)	Lc	D,R
-Brown vine snake (*Ahaetulla pulverulenta*)	Ra	R
-Buff-striped keelback (*Amphiesma stilata*)	Co	R,D,G
-Banded racer (*Argyrogena fasciolatus*)	Lc	D,R
-Common cat snake (*Boiga trigonatus*)	Lc	D,R,S
-Common bronzeback tree snake (*Dendrelaphis tristis*)	Lc	D,R
-Indian trinket snake (*Elephe helena*)	Lc	D,R,H
-Common wolf snake (*Lycodon aulicus*)	Co	H,D,R
-Barred wolf snake (*Lycodon striatus*)	Lc	H,D
-Banded kukri snake (*Oligodon arnensis*)	Co	D,A,H
-Streaked kukri snake (*Oligodon taeniolata*)	Lc	D,A,H
-Common rat snake (*Ptyas mucosus*)	Ab	ALL
-Pakistani ribbon snake (*Psammophis leithii*)	Co	D,S,A
-Black-headed snake (*Sibynophis subpunctatus*)	Co	ALL
-Checkered keelback water snake (*Xenochrophis piscator*)	Ab	W

Elapidae		
-Common krait (*Bungarus caeruleus*)	Co	D,R,H
-Common slender coral snake (*Callophis melanurus*)	Ra	R
-Spectacled cobra (*Naja naja*)	Ab	ALL
Viperidae		
-Russell's viper (*Dobia russeli*)	Co	D,S,A
-Saw-scaled viper (*Echis carinatus*)	Co	ALL

***Habitat**: A=Agriculture; D=Dry Deciduous; F=Fossorial; G=Grass Land; H=Associated with human habitat; R=Riverine forest; S=Scrub forest; W=Water bodies*
***Status**: Co=Common; Lc=Less common; Ab=Abundant; Ra=Rare.*

Table 2: List of recorded threats to wildlife observed at Gir Forest, Gujarat, India

Type of Threat	Impact on Environment	Degree
Grazing of livestock (Over 20,000 head of livestock grazing in forest)	-Diseases might be introduced and spread in forest. -Continued degradation of habitat -Soil erosion	Very high
Encroachment (Agricultural)	-Habitat area reduced -Indirect pesticide effects	Moderate
Illegal forest product collection (Firewood, timber, grasses, medical plants & herbs)	-Habitat destruction	Moderate
Poaching (On lion, leopard, crocodile, python, deer and bird's eggs)	-Loss of wild stock	Small or Negligible
Traffic, transport and communication (Roads, railways)	-Continued disturbances -Small vertebrates killed -Large and small mammals killed	Very high
Pilgrimages (Three large temples)	-Continued disturbances -Noise and air pollution increasing -Implication of laws & rules	Very high
Tourism development	-Continued disturbances	Moderate
Industries and mining (Large number adjoining forest)	-Effects on satellite population of wild animals -Disturbances -Problem increasing	High
Forest fires	-Loss of forest -Degradation of habitat -Loss of small animals (especially reptiles) & nests of ground nesting birds	Moderate
Man and wildlife conflict (-Attacks by large cats; -Depredations on domestic livestock; -Agricultural crop damage)	-Creating problems -Conflict with forest department -Adverse effects on conservation	High

A COMPARISON OF IDENTIFICATION TECHNIQUES FOR PREDATORS ON ARTIFICIAL NESTS

by Peter Leimgruber and Brij Kishor Gupta

Introduction

Nest predation is the major factor reducing the breeding success of passeri+ne birds (Martin, 1991; Ricklefs, 1969). The identification of nest predators, however, is hampered by technical difficulties and has often not been very successful. Commonly used identification techniques range from rather coarse and speculative approaches, such as incidental observations (Yahner and Cypher, 1987; Yahner and Scott, 1988), conclusions based on the abundance of potential predators (Klett *et al.*, 1988; Stooras and Weege, 1987), and determination of tracks or bite marks on egg shells (Green *et al.*, 1987; Rearden, 1951), to more advanced techniques such as systematical observation of nests (Götmark and Åhlund, 1986; Salathé, 1987), haircatchers (Baker, 1980), trackboards (Angelstam, 1986; Wilcove, 1985), and trip cameras (Leimgruber *et al.*, 1994; Martin, 1987; Picman, 1987; Reitsma *et al.*, 1990). Little is known about how accurate identification techniques are. Nevertheless, major conclusions and management recommendations for the conservation of bird species have been based on predator identification studies such as the studies by Wilcove (1985) or Angelstam (1986)(Askins *et al.*, 1990; Terborgh, 1989). Presented in this paper are the results of a comparative study on the effectiveness and accuracy of three different identification techniques.

Methods

A 4 ha study plot was established at the Conservation and Research Center (CRC), a 1,200 ha research facility 2 km southeast of Front Royal, Virginia. The study plot was located in a 25 ha remnant of deciduous forest and consisted of a grid with 100 stations, each station 20 m apart and marked with red tape.

Between 17 July and 4 August 1991, three 4-day trials were conducted. During each trial, 30 nests were placed at randomly selected stations. Generalized ground nests were constructed within 5 m of the station by forming depressions in the ground or leaf litter close to a shrub, log or tree trunk. These nests were lined with leaves, moss, dry grass or other organic materials found in the vicinity of the nest. In each nest were placed two fresh northern bobwhite quail (*Colinus virginianus*) eggs. At the end of each 4-day trial the eggs were removed. To reduce the possible impact of human scent, the eggs and nest materials were handled with vinyl rubber gloves. During each trial, the 30 nests were evenly divided into three different categories, i.e. fluorescent pigment nests, trackboard nests and control nests.

Fluorescent pigment nests: Eggs and nest were powdered with fluorescent pigments. Predators that destroy the nests pick up these pigments and leave fluorescent tracks. A Raydetector III portable "Ultra Violet Light" was used to detect tracks.

Trackboard Nests: A thin layer (1 mm) of a mixture of petroleum jelly and clay powder was applied to a 3 mm thin board (32x32 mm) to preserve tracks of nest predators. Eggs and nests were placed on these trackboards (Angelstam, 1986; Schultz, 1991).

Camera systems: Cameras were used in the last trial in combination with trackboards (7 nests) and fluorescent pigments (8 nests). The camera systems operated with an infrared light beam and were activated by sudden changes in the "heat-profile" of the monitoring area (Rappole *et al.*, 1986). Nocturnal visitors could be

photographed with the aid of an automatic flash. The cameras were also equipped with an automatic film advance and a databack that stamped Day-Hour-Minute on each exposure.

Results

A total of 84 (93.3%) nests were destroyed (i.e. at least one egg was removed or destroyed). There was no significant difference in the number of destroyed nests between trials (n-90, X^2=0.037, 2 df., *P*=0.9817). Although predation rates were lower for control nests than for fluorescent pigment or trackboard nests, this difference was not significant (n=90, X^2=0.265, 2 df., *P*=0.8756).

Predators were identified at 25 of the destroyed nests that were equipped with cameras, fluorescent pigments or trackboards. The most common nest predator was raccoon (*Procyon lotor*) (30%), followed by opossum (*Didelphis virginiana*) (5%), gray fox (*Urocinereus argenteus*) (3.33%), gray squirrel (*Sciurus carolinensis*) (1.67%), and black bear (*Ursus americana*) (1.67%). Nest predators remained unknown at 33 of the artificial nests that were equipped with cameras, fluorescent pigments or trackboards. There was a significant difference in the effectiveness between the three identification techniques. Based on their cell contribution to the chi-square value, cameras (86.6%) were the most effective, followed by fluorescent pigments (58.7%) and last by trackboards (20%). Cameras allowed the identification of nest predators when fluorescent pigments (1 nest) or trackboards (4 nests) failed. Trackboards were frequently found to have been removed and severely damaged so that no signs or tracks could be recognized.

Automatic film advance and an internal clock built into the camera allowed us to identify species that showed up at nests after they had been destroyed by a previous predator (n=11). These 'second' visitors included raccoon, opossum, striped skunk (*Mephitis mephitis*), and gray squirrel.

Discussion

Nest predation rates were very high in our study plot. This may be explained by the high density of artificial nests and the location of the study plot within a forest fragment (Wilcove, 1985). However, all species identified at artificial nests in this study were previously reported to be nest predators (Martin, 1987; Wilcove, 1985).

Previously fluorescent pigments were used for tracking of small mammals (Duplanter *et al.*, 1984; Lemen *et al.*, 1985) and to describe physical contact interactions among mammals (Dickman, 1988). MacDonald and McShea (pers.comm.) successfully used fluorescent pigments for the identification of nest predators. However, the major drawback of this inexpensive technique is that rain washes off the pigments. Also, identification is often restricted to medium-sized predators and the detection of small predators is extremely difficult. However, this technique was more effective and accurate than the trackboards in our experiments.

Trackboards with different coatings were commonly used in next predation studies (Angelstam, 1986; Schultz, 1991; Wilcove, 1985), but only the European studies that used grease-based coatings were successful (Angelstam, 1986; Schultz, 1991). Angelstam (1986) and Schultz (1991) identified 75% and 93% of the nest predators. This difference in effectiveness may be explained by the absence of raccoons at the European study sites. Raccoons destroyed or removed many trackboards in our study. However, Angelstam (1986), as well as Schultz (1991), did not identify many small rodents. As for the fluorescent pigment techniques, identification was restricted to medium-sized predators.

Camera systems were the most effective and accurate technique. These systems allowed the identification of predators that were not detected with other techniques. Small predators like gray squirrels did not leave clear tracks in fluorescent pigments or on trackboards. Large predators like black bears did not touch fluorescent pigments or trackboards with their paws but still destroyed nests.

Only recently has the phenomena of 'second' visitors at artificial nests been described in a study that used the same camera techniques for

predator identification (Leimgruber *et al.*, 1994). Only cameras with a databack can provide data on the sequence of different predator species at nests. Fluorescent pigments and trackboards are selective and may bias the results towards medium-sized predators such as raccoons or opossums, especially if these species appear as 'second' visitors after the destruction of the nest by a small predator.

We did not find significant evidence that identification techniques had an impact on the number of destroyed nests. However, with camera systems we obtained a series of pictures of raccoons that played extensively with trackboards. On one picture a raccoon even licked the petroleum jelly and clay powder mixture. We suspect that olfactorial-oriented nest predators may be attracted to trackboards.

Groups of predators described in previous studies with the help of fluorescent pigments or trackboards may not reflect the true diversity of this guild (Angelstam, 1986; Schultz, 1991; Wilcove, 1985). The role of medium-sized predators may have been overestimated and the role of small rodents, although frequently reported as nest predators (Boag *et al.*, 1983; Maxon and Oring, 1978; Reitsma *et al.*, 1990), may have been underestimated. Nest predation in forest habitats may not depend on a few important species, but on a diverse guild of predators that compensates population fluctuations of a single predator species (Leimgruber *et al.*, 1994; Reitsma *et al.*, 1990). Therefore, management recommendations based on a single or a few important predator species should be reviewed.

Conclusions

Number of artificial nests at which particular predator species were successfully identified with at least one of the identification techniques at the Conservation and Research Center, 1991

Predator Species	Nest predators identified by			Total
	Trackboard	Pigment	Camera	
Raccoon	4	11	8	8
Gray fox	1	1	1	2
Opossum		1	2	3
Gray squirrel			1	1
Black bear			1	1
Unidentified	25	17	2	33

**Cameras were always employed with one of the two other techniques. In some cases predators identified with cameras were also determined with the other techniques. Thus, the total number of nests that were robbed by a particular species does not equal the sum of individuals that were identified.*

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Carcass of an Indian rhinoceros that drowned in the flood at Kaziranga NP (Photo: Anwaruddin Choudhury)

DEVASTATING FLOOD IN KAZIRANGA NATIONAL PARK

by Anwaruddin Choudhury

In 1988, Kaziranga National Park of Assam in northeastern India was ravaged by devastating floods which caused immense loss of flora and fauna. Ten years later in 1998, Kaziranga was again hit by flooding of similar intensity as in 1988, this time resulting in the deaths of a large number of animals, including some endangered species such as the Indian rhinoceros (*Rhinoceros unicornis*), swamp deer (*Cervus duvauceli*), wild water buffalo (*Bubalus arnee)* and Asian elephant (*Elephas maximus*). A tiger (*Panthera tigris*) was also trampled to death by a wild elephant during the flood. To assess the situation in the field, the author visited the park in September (during the floods), October and December (post-flood), 1998.

The park covers an area of 473 km^2 in the flood plain of the Brahmaputra River. Kaziranga has the largest concentration of Indian rhinoceros, accounting for about 60% of the world population (Choudhury, 1985, 1997). The estimated rhino population in Kaziranga is around 1,100. Being located right on the flood plain of a major river, the park is subjected to annual flooding; however, the occasional high flood has devastating effects.

The floods in 1998 came in three phases. The first phase lasted from 25 June to 3 August, the second from 13 to 29 August, and the third and worst between 3 and 19 September. The flood peaked during 5-7 September and started slowly receding thereafter. By 8 September, National Highway 37, which had been submerged at places, was fully uncovered, and by 10 September most of the highlands and major roads inside the park also emerged. By 12 September, the water level had subsided by more than a meter. During this phase, the bulk

of the highlands were still submerged and more than half of the anti-poaching camps were damaged. The road network was breached at places and most of the wooden bridges were also damaged.

As usual during the floods, the animals took shelter in the artificial high grounds (totaling 69) and roads, while a few moved towards Kukurakata Hill Reserve Forest (RF), Burhapahar hillock, Panbari RF, Bagser RF, the hills of Karbi Plateau and the adjacent tea, coffee and rubber gardens. But during the peak days of the third wave, when almost all the artificial high grounds were under water, the bulk of the animals had to move out of the park in a disorderly manner. During this movement, the animals had to cross the busy NH 37, as well as move through human settlements. This resulted in a large scale loss of animal life that were either crushed by speeding vehicles or killed by the villagers and plantation laborers. From the northern areas of the park, some animals tried to cross the Brahmaputra River, but most drowned or were killed by poachers. Species such as hog deer (*Axis porcinus*) suffered most, while some of the swamp deer, wild buffaloes and rhinos could remain in partly submerged roads and high grounds for a few days. The carnivores did not suffer much as they moved out or climbed trees and shrubs.

Although floods are a feature of areas such as Kaziranga, due to the lack of sufficient high grounds and the closeness of human settlements and cash crop plantations in the higher fringe areas, the animals suffer greatly. The drowning of 39 of the highly endangered rhinoceros is an indication of the magnitude of the loss. And the death of a large number of hog deer and other prey species reduces the prey base of the tiger, thus increasing the possibility of an upward swing in predation on rhino calves as well as swamp deer. Moreover, most of the beels (ox-bow lakes) are becoming slowly silted up. Due to prolonged submergence, most of the grassland area was damaged, as either the grasses have died or were covered with mud, thus making it difficult for the animals to feed on for about a month or so. The main advantages of the floods are the clearing of wetlands of weeds like the exotic water hyacinth, siltation in the grasslands (which provides nutrients), and the accretion of new chapories (riverine islets and tracts).

Speeding vehicles along the NH 37 have hit and killed many animals, including rhinoceros. In 1998, 46 animals comprising nine species, including an elephant, were killed by motor vehicles. The official casualty figures only list the number of carcasses that were found. The number of small animal casualties was probably much higher but went unrecorded because the carcasses were submerged and silted over or carried away. Many of the animals were poached by villagers for food. In the case of hog deer, this could amount to a few thousand animals. After the 1988 floods, less than a thousand carcasses were found, but the census of 1993 found only about 2,000 deer against the 10,000 counted in 1984, indicating that the casualties were greater than 5,000 (Choudhury, 1997). The case of the wild pig is similar.

Damage to the infrastructure of the park was also very significant. According to the park authorities, at least 200 km of roads and patrolling paths, 25 bridges, 64 Forest Camps, 30 raised platforms and 70 country and ferry boats were partly or wholly damaged. The total estimated loss in monetary terms was around US$385,000.

Construction of more high grounds inside the national park seems to be the only viable alternative. Declaration of protected areas in the Karbi Plateau will help protect a large number of marooned animals, but it is impossible for all the animals to move to the area, especially those in the northern areas of the park. The Indian army has constructed 10 high grounds in the Burhapahar Range area, while the Karbi Anglong Autonomous Council has agreed to set up a wildlife sanctuary on their side. The Government of Assam has released some funds for repairs of roads and bridges and NGOs, especially The Rhino foundation based at Guwahati, have provided some immediate post-flood requirements such as tarpaulins and hurricane lanterns for the anti-poaching camps, and torch-light batteries for night patrolling.

Recommendations

- More high grounds should be constructed; some in the northern areas between Diffolumukh and Debeswari.

- The movement of vehicular traffic along NH 37 should be regulated during the floods, especially at night.

- Strong measures should be taken to check erosion by the Brahmaputra River in Agoratoli Range area. An estimated 50 km^2 have been eroded away in the last few decades (Choudhury, 1997). The possibility of diverting a channel through Mora Dhansiri River would have a devastating effect on the park.

- Panbari, Kukurakata and Bagser Reserved Forests should be included in the park.

Acknowledgments

The author would like to thank Dr. A.K. Goswami of WWF-India; B.S. Bonal, Director; S. Ahmed, Jt. Director of Tourism; P. Das (DFO WL); Borua and Dey (ACFs); Dharanidhar Boro, Chakravarty, Kiten Bora, F. Ali, Tamuly (Range Officers); Deka (FG); Lakkhi Saikia of Bokakhat and other park staff; Padmeswar Koch, Bhuban Boro and Moniram Boro.

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Table 1: Casualties of other species during floods of 1998 (between 1 June and 30 September)

Name	By drowning	Hit by vehicle	Total
Capped langur (*Presbytis pileata*)	–	1	1
Sloth bear (*Ursus ursinus*)	1	–	1
Hog badger (*Arctonyx collaris*)	5	2	7
Civet (*Viverridae*)	–	2	2
Fishing cat (*Felis viverrina*)	1	1	2
Asian elephant (*Elephas maximus*)	6	1	7
Indian rhinoceros (*Rhinoceros unicornis*)	39	–	39
Wild pig (*Sus scrofa*)	19	3	22
Swamp deer (*Cervus duvauceli*)	9	–	9
Sambar (*Cervus unicolor*)	15	–	15
Hog deer (*Axis porcinus*)	473	33	506
Wild water buffalo (*Bubalus arnee*)	23	–	23
Porcupine (*Hystrix brachyura*)	9	–	9
Cobra (*Naja naja*)	2	2	4
Python (*Python molurus*)	2	1	

A tiger also died during this period by being trampled by a wild elephant. Source: Forest Department

BIRD DAMAGE TO GUAVA (*Psidium guava*) AND PAPAYA (*Carica papaya*)

by C.S. Malhi

Introduction

Birds often conflict with man's endeavors in various ways and sometimes can become a pest problem causing serious economic losses in certain situations (Grazio, 1989). Besides agricultural crops, they can also cause losses to horticultural crops (Dhindsa and Saini, 1994). Bird damage to fruit crops is a primary problem in most parts of the world in both developed countries like the United States, Canada and Europe, and in developing countries in Latin America and Asia (Ali and Ripley, 1969; Mehrotra and Bhatnagar, 1979; Grazio, 1989). In the United States, bird damage to fruits amounts to $US19 million annually; in Tunisia it amounts to 15,000 tons loss in yield per year.

In India, fruit crops suffer heavy economic losses owing to bird depredations; however, the information available is too meager. Among the different crops targeted by birds, guava and papaya are most susceptible to damage (Mehrotra and Bhatnagar, 1979; Sandhu and Dhindsa, 1981; Malhi and Brar, 1985, 1987 a,b, 1988). These crops are grown in small and large-sized orchards, or as intercropping in most pockets of the Punjab.

An attempt has been made to work out the intensity of damage at different stages of these crops' growth cycle with a view to determining the appropriate timing to prevent damage by birds.

Material and Methods

The studies were conducted in a guava (*Psidium guava*) orchard and among papaya grown as intercropping, each area covering an area of about 4 ha and 1.5 ha respectively. The study area was located at Ludhiana (36°N 56'N; 75°52E) Punjab. In each fruit crop, twenty trees were selected at random. In the case of guava, four branches (two from the upper canopy and two from the lower canopy) were randomly selected and marked with tags. The total number of fruits on each branch were counted and subsequent counts were made of fruits damaged by birds at three different stages, viz. rind formation, varation stage and ripening stage. For papaya, the total number of fruits on each tree was counted and observations of damage were recorded during rind formation and the varation stage. Observations could not be recorded at the ripening stage due to unavoidable technical problems.

Observation data included the total number of healthy fruits, gnawed/injured fruits, and completely damaged fruits, including those which fell to the ground due to pecking and clinching with claws by birds.

The percentage of damage was calculated as per the formula worked out earlier by Malhi and Brar (1987), i.e. C/Nx100, where C is the total number of damaged and partly damaged fruits per tree/branch and N is the total number of healthy fruits per branch/tree. Cumulative damage was calculated as per the method specified by Malhi and Brar (1988).

Observations on the bird species that were inflicting damage and those inhabiting the study area or roosting on trees were also made.

Statistical analysis to work out the significant difference in damage level between different growth stages, if any, was done by employing student 't' test.

Bird Species at the Study Site

A total of nine species were found to inhabit the guava and papaya orchards. Of these, the principal bird species causing damage to fruits were found to be the rose-ringed parakeet (*Psittacula krameri*) and the house crow (*Corvus splendens*). Besides these, other species

observed feeding on the floor of the orchard and also roosting under the expanded canopy of both guava and papaya included house sparrow (*Passer domesticus*), pied-myna (*Sturnus contra*), common myna (*Acridotheres tristis*), pigeon (*Columba livia*), ring-dove (*Streptopelis decaocto*), baya weaver bird (*Ploceus phillipinus*), and red-vented bulbul (*Pycnonotus cafer*). Three nest holes of rose-winged parakeet were found in old guava trees. Nests of myna, bulbul, house sparrow, pigeon and ring-dove were frequently seen, but no nests of baya weaver birds were seen in the guava orchard. However, they were frequently found in the adjoining Ber (*Ziziphus mauritiana*) orchard.

Mode of Damage

The dense canopy of guava and expanded canopy of papaya trees served as the best roosting sites for these birds. Almost all the bird species roosting on trees were seen pecking on either twigs or fruits (rinds). At the rind formation stage, when the pericarp and flesh of the fruit is too hard and tough, the rose-ringed parakeet and the crow were observed nibbling guava and peeling off the pericarp of papaya rinds, thus inflicting injuries in the form of cuts and holes. These injuries were found to be healed up after a few days, leaving black scars on the rinds. This led to a little crumbling of the rinds. In most cases rose-ringed parakeet was found to completely eat the stone part of the guava fruit. Guava fruits, whether partly or completely damaged, were found to be unfit for human consumption. The rose-ringed parakeet used its hooked and beak to cut the rinds of guava and papaya and cause them to fall to the ground. Similar damage by rose-ringed parakeet to guava fruits was recorded by Ahmad *et al.* (1987) in Pakistan. Earlier, Malhi and Brar (1987) observed parakeets damaging a papaya crop in the same way.

Extent of Damage

Guava

The average damage to guava rinds during three observations taken at 5-day intervals varied from 0.75-2.14±0.74 and 1.89 to 2.56 in the upper canopy respectively. The cumulative damage of 3.8±1.29 to 5.90±0.49 rinds in upper and lower canopy respectively was recorded. The student 't' test employed to measure the damage level between two stages at a time, to rinds in the upper canopy, revealed significant differences between stages I and II. It was highly significant between stages I and III and stages II and III ($P<0.05$). There was a similar pattern in the damage level of rinds in the lower canopy ($P<0.05$). The damage level at the varation stage (transitional stage between rind and ripening) revealed a low level of damage in both the upper and lower canopies compared to that observed during rind formation, which may be due to the softening of the pericarp and pulp part of the fruit and low sugar content, which might have discouraged nibbling by birds. However, a significant difference in the intensity of damage between the two stages at varation stage was observed ($P<0.05$). At the ripening stage, a reverse phenomenon occurred as the intensity of damage in the lower canopy was greater than at the branches in the upper canopy. The overall intensity of damage was significantly more ($P<0.05$) at the ripening stage, which ranged from 7.32±0.37-14.28±0.29 percent. The ranking of cumulative damage was done by taking into account the percentage of damage to fruits in the upper and lower canopies. This revealed the maximum damage at the ripening stage, followed by the rind formation stage and then the varation stage. The higher damage at the ripening stage may be attributed to the increased sugar content, sweet flavor, and easy accessibility by parakeets to the stone parts of fruits. These factors might also have attracted other birds (mainly granivorous) to feed on these fruits. Morever, the fleshy part at this stage is highly preferred by the house crow.

Papaya

No fruits were observed to be damaged at the rind formation stage, as any injuries or wounds inflicted by birds at that stage to the fruits rapidly healed with the oozing out of a light yellowish fluid from the rinds. At the varation stage, when the flavor of the fruit attracts a relatively greater number of birds, the average damage of fruits was 0.80±0.20, which resulted in a 3.42 percent damage. After the varation stage, the crop was not available; therefore, the earlier reference of 5.42 percent damage at the

mature stage recorded by Malhi and Brar (1987) was taken into consideration, which revealed a significant difference ($P<0.05$) in the damage level at the mature stage compared to the observed damage at the varation stage. Here again, the strong sweet flavor, increased sugar content and softening of the pulp of the papaya fruit might have attracted a larger number of granivorous birds than might otherwise venture in the intercrop. Crow and rose-ringed parakeet preferred soft pulp and seeds respectively. Earlier studies on the damage to fruits like almonds, ziziphus, papayas and cherries have revealed almost similar factors influencing the intensity of damage to the respective fruits (Sandhu and Dhindsa, 1981; Malhi and Brar, 1985, 1987; Fiedler *et al.*, 1991).

The present study envisages the application of physical and non-chemical methods to deter the birds such as drumming, firecrackers, scarecrows, netting or spraying repellents, particularly at rind formation and the ripening stage to prevent bird depredations on guava and papaya. Since the birds easily become used to each method, a combination of methods may prove more successful (Grazio, 1989; Fiedler *et al.*, 1991). Earlier, Malhi and Brar (1987) found that wrapping the branches of papaya with gunny bags not only prevented damage by birds, but also helped in the proper and early ripening of papaya fruits.

Acknowledgments

The authors are grateful to Dr. V.C. Kapoor, Professor and Head, Department of Zoology, Punjab Agricultural University, Ludhiana, for providing the necessary facilities and to the Punjab State Government for providing financial assistance under the project on "Research on Harmful Birds".

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Table 1: Bird damage to guava (*Psidium guava*)

Stage of Fruits	Average number of fruits per branch		Average percent of fruits partly damaged by birds		Average percent of fruits exclusively damaged by birds		Cumulative complete damage by birds per tree (average)	Upper flower	Ranking[0]
	Upper canopy	Lower canopy	Upper canopy	Lower canopy	Upper canopy	Lower canopy			
Rind formation									
Stage I	273	324	2.14 ±0.74	2.56 ±0.23	4.11 ±0.08$^{a}_{0}$	2.09*$^{a}_{1}$ ±0.23	6.25 ±0.85	2	2
Stage II	223	214	1.47 ±0.49	2.17 ±0.33	5.90 ±0.49	1.70*^{a} ±0.32	5.37 ±1.50	4	4
Stage III	207	203	0.75 ±0.35	1.89 ±0.27	3.81*$^{a}_{1}$ ±1.29	4.59*$^{a}_{2}$	5.52 ±0.68	3	3
Varation									
Stage I	198	185	0.25 ±0.25	0.50± 0.50	0.25^{b} ±0.25	1.31 ±0.31	1.15*^{a} ±0.38	6	6
Stage II	180	171	1.47 ±0.0	2.41 ±0.0	1.72**$^{b}_{1}$ ±0.74	1.93**$^{b}_{1}$ ±1.45	3.76*$^{a}_{1}$ ±0.5	5	5
Ripening									
Stage I	169	139	7.32 ±0.37	14.28 ±0.29	12.45*** ±0.41	12.45*** ±0.43	11.62*** ±1.49	1	1

* and *$^{a}_{0}$ - *Non-significant difference between stage I, II of rind formation stage (P>0.05)*

*$^{a}_{1}$ $^{a}_{2}$ - Significant difference between each two successive stages (P<0.05)

*** - *Significant difference compared to each preceding stage (P<0.05)*

[0] - *Ranking based on relative percent of damaged fruits*

DEATH OF AN ELEPHANT BY SUNSTROKE IN ORISSA, INDIA

by Debabrata Swain

The Satkoshia Gorge Sanctuary in Orissa covers an area of 795.52 km^2. It harbors a large number of wild animals including elephant (*Elephas maximus indicus*), tiger (*Panthera tigris*), leopard (*Panthera pardus*), wild dog (*Cuon alpinus dukhunensis*), wild boar (*Sus scrofa cristatus*), sloth bear (*Melursus ursinus*), sambar (*Cervus unicolor*), chital (*Axis axis*), barking deer (*Muntiacus muntjak*), mouse deer (*Tragulus meminna*), leopard cat (*Felis bengalensis*), jungle cat (*Felis chaus*), hyaena (*Hyaena hyaena*), bison (*Bos gaurus*), etc. The elephant population in the area was estimated to be 201 (males-43, females-116, young-42) in the 1995 census

.

The Mahanadi River is the only perennial water source in the sanctuary. Although there are a number of streams draining into the Mahanadi during the monsoons, these dry up by March/April. However, small waterpools retained in the beds of these streams are accessible at several places through dugouts. Most of these waterholes are within the village limits. Elephants depend entirely on these available water sources, which creates competition and conflict with man and his cattle.

A female elephant aged about 60 years died inside Majhipara Reserve Forest Compartment No.15 in the sanctuary in March 1999 while on her way to a water source near a village. The day was very hot with temperatures reaching 43°C. The death of the animal was reported by a flower collector to the local Range Officer at Purunakote.

Upon examination of the carcass, no bullet injury was noticed, but there were signs of profuse bleeding through the snout. The elephant was strongly built and the circumference of the front foot measured 125 cm, indicating the height at the shoulder would be about 2.50 m. The local Veterinary Surgeon who carried out the postmortem examination reported swelling of the tongue, an extremely open mouth, and marks of profuse bleeding through the nasal cavity. There were blood clot patches in the brain indicating cerebral thrombosis. The possibility of poisoning was ruled out after examining the liver and other internal organs. It was concluded that death was due to water-stress and resultant sunstroke.

Thus, it appears that a full-grown elephant met a tragic death due to lack of water during excessive heat. In the summer of 1998, more than two thousand human lives perished due to heat waves, and about 100 people died of sunstroke in March 1999. But no studies have been carried out on the effects of heat waves on the wildlife of Orissa, and particularly on large herbivores like elephants, bison and sambar.

MSc IN FOREST AND NATURE CONSERVATION FOR TROPICAL AREAS

The Wageningen University and Research Centre (WUR) in the Netherlands is offering a 17-month MSc program in Forest and Nature Conservation for Tropical Areas, starting every year in September. The core of the program is the MSc thesis research and there are three specializations – Policies, Management and Ecology.

Specialization in forest and nature *policies* focuses on social, economic, extension and policy aspects of the use of natural resources by rural people.

Specialization in forest and nature *management* focuses on business administration for forest and nature conservation, sustainable silvicultural systems, wildlife management and nature conservation.

Specialization in *ecology* focuses on the analyses and understanding of fundamental ecological processes, and the understanding of ecosystem structure and functioning.

Other subjects offered include: agroforestry, geographic information systems (GIS), geoecology and leisure, tourism and environment. Lecturers from different university departments contribute to the program.

Each individual program consists of a thesis, research methodology and thesis-oriented programs. In addition, the student can include general or specific optional programs in the individual program, subject to the approval of the Board of Examiners. The thesis research might be conducted within the framework of ongoing development projects in the country of the applicant.

In general students should arrange their own funding, but the WAU has a very limited number of fellowships for outstanding students.

Applicants should have a BSc in forestry, nature conservation or the equivalent, be fluent in English, and preferably have working experience. Applications for the 2002-2004 program must be submitted before November 15, 2001.

For more information, please contact:

Sub-department of Forestry
Director MSc program: Frits J. Staudt
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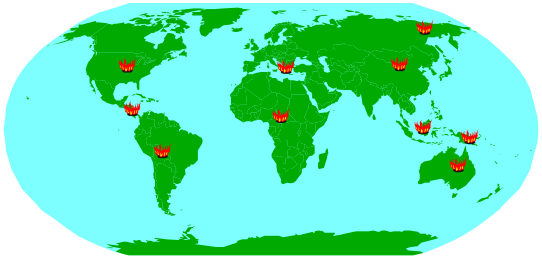
FOREST NEWS

Vol.XV:No.2

Communities in Flames



REPORT OF AN INTERNATIONAL CONFERENCE ON COMMUNITY INVOLVEMENT IN FIRE MANAGEMENT

Balikpapan, East Kalimantan, Indonesia, 25-28 July 2001

Introduction

Recent large wildfires in several countries around the world have highlighted the high social, economic, and ecological costs of catastrophic forest fires. Major fires and their negative impacts have received unprecedented coverage in the international media, prompting demands from NGOs, people's organizations, and civil society for improved management and control of forest fires.

Past government responses to forest fires have tended to focus on suppression and costly technological solutions to fight fires. Contrary to alleviating forest fire problems, these approaches have at times increased the scale and magnitude of forest fires. Furthermore, they have largely ignored the human dimensions of fire and the positive social and ecological benefits of smaller prescribed and managed fires. Fire and forest management authorities often perceive local communities as the problem rather than as part of the solution to mitigating wildfires in forest areas.

As the number of forest fires has increased, conventional suppression measures have increasingly come under question. Many agencies have begun exploring more pro-active approaches in managing and combating fires, including more effective prevention activities. The search for improved approaches has led to calls for revisiting traditional forest fire management regimes that emphasize prescribed burning and prevention of large fires, and the involvement of local communities. Many of these systems and approaches may be more effective in tempering uncontrolled burns, more beneficial to local ecosystems, and more cost effective in the long term.

***Communities in Flames* conference**

To advance the understanding and enhance awareness of the potential for community-based fire management, an international conference entitled *Communities in Flames* was organized 25-28 July 2001, in Balikpapan, Indonesia. More than 120 individuals, from 21 countries, participated. The conference was organized by Project FireFight South East Asia, FAO, and the Regional Community Forestry Training Center (RECOFTC). In addition to the support of the organizers, financial and in-kind contributions for the conference were provided by the European Union, USDA Forest Service, Indonesian Ministry of Forestry, the GTZ Integrated Forest Fire Management Project, the World Conservation Union (IUCN), and the Worldwide Fund for Nature (WWF).

The objectives of the conference were to:

- expose forestry departments and fire control agencies to alternative approaches to forest management, which promote the participation of local communities in planning and managing forest fire regimes (within the context of past/traditional practices and socio-economic needs);
- examine the approaches and elements for promoting these alternatives (including identifying fire research needs, forest policy reforms, legal and regulatory restructuring, and appropriate strategies for community-based fire management); and
- identify ways to collaborate and capture the opportunities that these alternatives offer.

The program included keynote presentations, plenary sessions (with presentations of case study experiences from Asia, Africa, Europe, and North America), working group sessions (focusing on institutions, economic and social incentives, and capacity building), field trips, and panel discussions.

Key points from the conference

Communities have a role. Communities can play a significant role in fire management, especially in areas where most fires are started by people. In many places, fire is an important tool for cultivating crops and non-timber forest products, hunting, enhancing forage production, and managing pests and diseases. Therefore, fires cannot simply be eliminated from the rural landscape, but communities can play significant roles in preventing and suppressing harmful fires. Communities cannot do everything, however. Their strengths lie in fire prevention, monitoring, and joint suppression activities. In most cases, local communities will not be in a position to fight large fires or provide a complete fire management system. Local communities must be seen as partners among a larger set of stakeholders — including the public and the private sector — in managing fires.

Importance of indigenous and local knowledge. Communities often possess a great deal of knowledge about fires and fire use. In some locations, for example, knowledge of how to use fire safely in agricultural, pastoral, or agro-pastoral systems has been passed from generation to generation. Traditional or local knowledge itself is not sufficient to ensure sound, effective fire management, however. There is a need for institutional structures (both within the community, and perhaps outside it) and capacity to apply the knowledge. Integration of traditional approaches into a fire management system is possible, but it requires a concerted effort by all stakeholders to build constructive partnerships for managing fire.

Sense of community. Within a given community, there might be sub-groups or other stakeholders that have dramatically differing interests in how fire is managed. Each of these sub-groups is likely to have varying knowledge and experience with fire management, or perhaps none at all. These different perspectives, objectives, and expectations must be reconciled if community-based fire management is to be successful.

Sense of ownership. There are many different ways for communities to participate in fire management, ranging from simply providing labor to making major decisions on how fire will be managed. Community interest and involvement are most active when people have a "sense of ownership" of fire management systems. Community participation can be initiated,

stimulated and supported with a variety of social or economic incentives—the strongest, perhaps, being tenure or ownership over land and natural resources that are impacted by fire.

Conclusions and suggestions

The conference presentations and discussions highlighted the following issues, conclusions, and suggestions:

- Fire management is carried out under a wide range of conditions—approaches toward management must therefore be carefully crafted to match local needs and conditions.
- Attitudes toward involving local communities in managing fire need to be changed to foster appreciation of the potential benefits of such involvement.
- Forest and land-use policies should be reviewed and revised, as necessary, to give adequate consideration to their influences on fire use and management.
- Greater appreciation should be given to traditional fire management knowledge and efforts to document and share such knowledge.
- Clear tenure and resource-use rights are essential for motivating effective fire management.
- Multi-stakeholder forums and conflict resolution mechanisms can be important tools for identifying and developing fire management priorities and strategies.
- There is need for improved coordination and collaboration between local and national fire management programs.
- Community-based fire management and other effective fire management approaches should be integrated into a broad range of rural development projects and programs.
- Greater attention must be given to enforcing fire management rules and laws.
- The media plays an important role in educating and influencing opinion related to fire management—efforts should be made to work together for objective reporting and effective information dissemination.
- Greater attention is needed to identifying the incentives and disincentives for improved fire management, including sharing of benefits and costs.
- More research and analyses are needed to better understand fire management issues, but enough is already known to advance community-based fire management.
- There is need for strengthening information centers and networks dealing with community-based fire management.

Anticipated follow up

The conference proceedings are being edited and will be available for distribution in early 2002. Project FireFight South East Asia will maintain an email contact list of conference participants and other interested individuals, to which relevant information will regularly be disseminated.

The conference recommended that further work be carried out to analyze community-based fire management experiences, using a case study approach. FAO, RECOFTC, and Project FireFight South East Asia are now cooperating on follow-up studies, which are expected to be published in 2002.

It is also anticipated that a short policy booklet and a "FAQ" (frequently asked questions) sheet regarding community-based fire management be drafted for use in influencing policy makers.

Further information

For more information on the *Communities in Flames* conference, or follow-up activities, please contact the following:

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ASEAN SENIOR OFFICIALS ENDORSE CODE OF PRACTICE FOR FOREST HARVESTING

At the Fourth Meeting of the ASEAN Senior Officials on Forestry (ASOF), held 22-25 July 2001, in Manila, a discussion of the *Code of Practice for Forest Harvesting in Asia-Pacific* was included on the agenda

Following the introduction and background presentation on the Code, each ASOF delegation presented their views on the Code.

The report of the ASOF meeting positively reflected the discussions on the *Code of Practice for Forest Harvesting in Asia-Pacific*. It recognized the potential value of the Code as a tool for improving forest harvesting and management in the region, and endorsed the Code as a guide in developing specific national codes and/or guidelines. To facilitate exchange of information and experiences in developing and implementing various national codes, the ASOF meeting agreed to establish a network for regional implementation of the Code in ASEAN countries. Cambodia was requested to draft a proposal for a mechanism to support collaboration between ASEAN and FAO in monitoring and reporting the progress of the Code implementation, and for facilitating the exchange of information and experiences on implementation.

ASIAN MODEL FORESTS DEVELOP CRITERIA AND INDICATORS GUIDELINES

Adapted from the Model Forest Approach News

Thirty individuals working to develop model forests in China, Myanmar, Philippines, and Thailand participated in a *Workshop on Field/Model Forest Level Criteria and Indicators for Sustainable Forest Management*, 10-15 June 2001 in Lin'an, Zhejiang Province, China. The workshop was organized and sponsored by the Regional Model Forest Project (RMFP) in collaboration with the Chinese Academy of Forestry, Lin'an Forestry Bureau, Zhejiang Forestry College, USDA Forest Service, and the International Model Forest Network Secretariat. The RMFP is funded by the Government of Japan.

The aim of the workshop was to share experiences in the development of criteria and indicators (C&I) at the field level, and to provide guidance and assistance for the development of C&I for the model forest projects in Lin'an (China), Paukkhaung (Myanmar), Ulot Watershed (Philippines), and Ngao (Thailand). The main outputs of the workshop were a set of guidelines for C&I development and provisional 12-month work plans for each country.

Among the observations made by the workshop were the following:

- There are many possible approaches to developing C&I at the model forest level and no single "correct" way.
- Partnerships and local communities have important roles in the development of indicators.
- Although there may be common C&I among model forests, the relevance of each set of C&I should be determined for a specific model forest.
- Standards of performance (SOP) can provide a benchmark against which a particular indicator is measured; if the SOP is assessed and found to

have been attained, it means that the indicator has been satisfied.

- The linkages among criteria, indicators and verifiers are not always clearly established, and can result in reduced appreciation of the purpose and need for the C&I processes.
- It is important to ensure that the common terms used in the development and application of C&I are understood in the same way by all concerned.
- No single indicator can reflect the status of the forest; it is necessary to use a group of indicators for this purpose.
- Having too many indicators per criterion makes their measurement difficult or unrealistic, and having too few may render them ineffective; a balance between some "*core*" indicators and other "*non-core*" indicators should be considered.
- In assessing sustainability, we need to recognize our starting point, changes that take place over time, and where we are heading.
- A systems approach is extremely beneficial in handling the complexity of economic, social and ecological relationships.
- Multi-stakeholder, multi-disciplinary and participatory approaches are essential for effective C&I development.
- Assessment of C&I developed at various levels by independent third parties can provide useful suggestions for improvement.
- It is important to acknowledge the potential contribution of community knowledge, use and management of the forest, and promote its inclusion in the C&I development process.
- Whilst indicators or measurements can change with time, their linkages with the appropriate criteria should always be clearly established.

The workshop made the following recommendations:

1. It is very important for model forests to be clear about why they are developing C&I, what are the desired outcomes and who are the intended audience/partners.
2. The development of partnerships among stakeholders, including local communities, must be an integral part of the development of criteria and indicators for model forests.
3. Clear linkages should be established among criteria, indicators and verifiers so that the purpose and need for the C&I processes can be better appreciated.
4. The common terms used in the development and application of C&I should be clearly and consistently defined, and disseminated.
5. The number of indicators per criterion should be kept to a realistic number, consisting of "core" and "non-core" indicators.
6. The use of existing data and related initiatives should be maximized in the development and maintaining of C&I..
7. Forest departments should train their staff in the particular skills required for effective working and communicating with communities, and C&I development, and/or secure the services of specialists in these fields.
8. The special role and contribution of local communities in the sustainable management of model forest should be explicitly acknowledged and actively solicited.
9. Efforts should be taken to address conflicts of interest or priorities among stakeholders, and to build trust among all the stakeholders to ensure the successful development of model forests, and of C&I for the model forests.

The workshop participants screened a number of potential indicators for use at model forests, using matrices developed by the Canadian Model Forest Network and CIFOR. Draft guidelines for developing and implementing C&I for model forests were prepared, reviewed, and finalized by the participants. Based on the *Guidelines for Field-level C&I for Model Forests,* each of the four RMFP countries prepared a proposed action plan for July 2001-May 2002.

Copies of "Guidelines for Field-Level Criteria and Indicators for Model Forests" can be obtained from: Mr. Tang Hon Tat, Chief Technical Adviser, GCP/RAS/177/JPN, c/o FAO Regional Office for Asia and the Pacific, Maliwan Mansion, Phra Atit Road, Bangkok 10200, Thailand

EAST ASIAN COUNTRIES PLEDGE ACTION ON ILLEGAL FOREST ACTIVITIES

In what has been described by many as a historic meeting, ministers from East Asian countries, gathered at the East Asian Ministerial Conference on Forest Law Enforcement and Governance in September, and adopted an unprecedented declaration committing their countries to combat illegal logging and trade, wildlife poaching, and other forest crimes. The declaration represents the first-ever multi-country commitment to combat corruption in the forestry sector. Government and NGO representatives alike praised the conference and the resulting ministerial declaration as bold initial steps against forest crime and corruption.

Nearly 150 people from 20 countries, representing government, international organizations, non-governmental organizations, and the private sector, participated in the conference, which was convened in Bali, Indonesia. The conference, which was held 11-13 September 2001, was co-hosted by the World Bank and the Government of Indonesia, with financial support from the Governments of the United Kingdom and the United States. FAO, ITTO, other international organizations also participated.

The conference objectives were to:

- share and explore the best current thinking on forest law enforcement;
- deliberate further on the previously identified priority issues of forest law enforcement, including illegal logging in the East Asia region, with senior officials from forests and related ministries, NGOs, and industry representatives; and
- concur on a statement expressing political commitment for action at the national and regional levels.

The first two days of the conference were comprised of nine technical sessions focusing on forest law enforcement in relation to governance, forest policy, forest management, and operational aspects.

The final day of the conference included ministers and ministerial-level officials from the East Asian countries of Cambodia, China, Indonesia, Laos, Philippines, Thailand, and Vietnam (and from Congo and Ghana outside the region). High-level officials from Japan, the European Commission, UK, USA, and the World Bank also participated in the ministerial sessions, which focused on future actions to combat illegal forest activities and ways of strengthening forest law enforcement.

The declaration adopted by the ministers and other high-ranking officials (see below) commits participating countries to intensify national efforts and to strengthen bilateral, regional, and multi-lateral collaboration for addressing violations of forest law and forest crime. It also outlines commitments to create a regional task force on forest law enforcement and governance to advance the declaration's objectives.

"If we can stand together against terrorism, surely we can stand together against forest crime."

Patrick Cronin
Asst. Administrator for Policy & Program Coordination
U.S. Agency for International Development

FOREST LAW ENFORCEMENT AND GOVERNANCE
EAST ASIA MINISTERIAL CONFERENCE
Bali, Indonesia, 11-13 September 2001

MINISTERIAL DECLARATION

Countries from the East Asian and other regions participating in this Ministerial Conference:

Understanding that forest ecosystems support human, animal and plant life, and provide humanity with a rich endowment of natural, renewable resources;

Deeply concerned with the serious global threat posed to this endowment by negative effects on the rule of law by violations of forest law and forest crime, in particular illegal logging and associated illegal trade;

Recognizing that illegal logging and associated illegal trade directly threaten ecosystems and biodiversity in forests throughout Asia and the rest of our world;

Also recognizing the resulting serious economic and social damage upon our nations, particularly on local communities, the poor and the disadvantaged;

Further recognizing that the problem has many complex social, economic, cultural and political causes;

Convinced of the urgent need for, and importance of good governance to, a lasting solution to the problem of forest crime;

Recognizing that all countries, exporting and importing, have a role and responsibility in combating forest crime, in particular the elimination of illegal logging and associated illegal trade;

Emphasizing the urgent need for effective cooperation to address these problems simultaneously at the national and sub-national, regional and international levels;

Declare that we will:

Take immediate action to intensify national efforts, and to strengthen bilateral, regional and multilateral collaboration to address violations of forest law and forest crime, in particular illegal logging, associated illegal trade and corruption, and their negative effects on the rule of law;

Develop mechanisms for effective exchange of experience and information;

Undertake actions, including cooperation among the law enforcement authorities within and among countries, to prevent the movement of illegal timber;
Explore ways in which the export and import of illegally harvested timber can be eliminated, including the possibility of a prior notification system for commercially traded timber;

Help raise awareness, through the media and other means, of forest crimes and the threats which forest destruction poses to our future environmental, economic and social well-being;

Improve forest-related governance in our countries in order to enforce forest law, inter alia to better enforce property rights and promote the independence of the judiciary;

Involve stakeholders, including local communities, in decision-making in the forestry sector, thereby promoting transparency, reducing the potential for corruption, ensuring greater equity, and minimizing the undue influence of privileges groups;

Improve economic opportunities for those relying on forest resources to reduce the incentives for illegal logging and indiscriminate forest conversion, in order to contribute to sustainable forest management;

Review existing domestic forest policy frameworks and institute appropriate policy reforms, including those relating to granting and monitoring concessions, subsidies, and excess processing capacity, to prevent illegal practices;

Give priority to the most vulnerable transboundary areas, which require coordinated and responsible action;

Develop and expand at all appropriate levels work on monitoring and assessment of forest resources;

Undertake the demarcation, accurate and timely mapping, and precise allocation of forest areas, and make this information available to the public;

Strengthen the capacity within and among governments, private sector and civil society to prevent, detect and suppress forest crime.

Further, in order to give full effect to the intentions of this Declaration, and to proceed with urgency to explore timely implementation of significant indicative actions developed by technical experts at this meeting, we:

Undertake to create a regional task force on forest law enforcement and governance to advance the objectives of this Declaration;

Invite the representatives at this conference from NGOs, industry, civil society and other relevant stakeholders to consider forming an advisory group to the regional task forces;

Decide to meet again at the Ministerial level in 2003 to review progress on first actions to implement these commitments, in cooperation with relevant international partners;

Request the ASEAN and APEC countries participating in this Conference to inform the next ASEAN and APEC Summits of the outcome of this Ministerial Conference and to invite their support;

Pledge to work to see that the issue of forest crime is given significant attention in future international fora, including by the World Summit on Sustainable Development (WSSD) and the United Nations Forum on Forests, and by the member organizations of the Collaborative Partnership on Forests;

Request the G-8 countries and other donors to consider further how they can join in the fight against forest crime, including through capacity building efforts;

Encourage other regions to consider creating similar regional initiatives to combat forest crime

SOUTH PACIFIC MINISTERS CONSIDER FORESTRY ISSUES

Agriculture ministers from eight South Pacific countries (Kiribati, Marshall Islands, New Zealand, Niue, Samoa, Solomon Islands, Tonga, and Vanuatu), along with representatives from Australia and Fiji, gave special attention to forestry issues at the Fourth Meeting of South West Pacific Ministers for Agriculture. The meeting, which was convened in Port Vila, Vanuatu, 23 to 24 July 2001, examined and discussed a range of issues relating to food security in the Pacific region and elaborated a program of work for addressing the issues. One of the six agenda items focused on opportunities for enhancing food security through forestry.

During the discussion, ministers and representatives acknowledged the importance of forestry in sustaining rural livelihoods. For large island countries (e.g. Papua New Guinea, Fiji, Solomon Islands and Vanuatu) forestry is a significant foreign exchange earner through log and timber exports. In high island countries like Samoa, Cook Islands, Tonga, Niue, Federated States of Micronesia, Palau and atoll islands like Kiribati and Tuvalu, agroforestry systems are key sources of firewood, local building materials, and food.

The meeting participants noted that because non-timber products and services from forests and trees are difficult to quantify, policy makers often overlook their contributions to food security. Ministers recognized several problems facing the forestry sector in the South Pacific, including: the lack of appropriate policies and legislation governing sustainable use of forest resources, continuing deforestation and forest degradation, increasing demands from competing uses, and the small size of the high islands which render them vulnerable to natural and manmade disasters.

The ministers and representatives underscored the importance of strong political commitment and clear legislation, policies and management plans in dealing with forestry challenges. Vanuatu was cited as an example of how countries can progress rapidly if political commitment is combined with clear programs for improvement. Country representatives suggested that greater attention should be given to promoting the role of forestry in enhancing rural livelihoods and food security through a regional initiative. FAO was urged to work closely with other organizations in support of such efforts.

FAO was also requested to assist countries in reviewing priorities and implementing the IPF/IFF (Intergovernmental Panel on Forests / Intergovernmental Forum on Forests) proposals for action. Among the specific needs identified, several countries expressed a desire for assistance in acquiring mobile coconut sawmills and the technical capacity to mill logs on a sustainable basis. Reference was also made to opportunities for better utilizing to the abundance of fallen trees regularly blown down in cyclones. Kiribati expressed a desire for technical assistance in the preparation of plans to plant forests on its outer-islands and for participation in studies proposed to investigate the nutritional value of forest foods

"Behold the turtle; it makes progress only when it sticks its head out."
– James Conant –

TROPICAL ECOSYSTEMS, STRUCTURE, DIVERSITY AND HUMAN WELFARE

Prepared by S. Appanah, FORSPA/FAO, Bangkok

The Association of Tropical Biology held its International Conference on "Tropical Ecosystems, Structure, Diversity and Human Welfare" for the first time in Asia, in Bangalore, India from 15-19 July 2001. The meeting was hosted by the Ashoka Trust of India and co-sponsored by the Forest Research Support Programme for Asia and the Pacific (FORSPA). Participants from over 18 countries attended.

The Conference had three major themes. In Theme I, "Global Change and Tropical Ecosystems," the subjects discussed included climate change, land-use change, economic valuation of natural resources, indigenous knowledge, anthropogenic pressures, impact of land use and forest cover change on biodiversity, and the harnessing of market forces for biodiversity conservation. The speakers examined the drivers of global change and their impacts on tropical forests. It was generally recognized that while these ecosystems are complex and present daunting challenges to global conservation efforts, sustainable management in a socially responsible manner offers the best route.

In Theme II, "Tropical Forests: Structure, Diversity and Function," the key issues that were examined included the linkages between tropical forest structure and diversity, how forest dynamics and species interactions change with forest recovery, the impact of invasive species on forest functioning and biodiversity, and how inventories and measurement of species richness can be used in conservation planning.

Theme III, "Biodiversity Hotspots" was a hot subject in the sense that conservationists are taking a second look at what is going on in the 25 global hotspots which have been identified as the areas on earth that are richest in terrestrial biodiversity. These areas constitute about 12 percent of the earth's land surface area, but contain over 60 percent of the world's species. The Conference explored the patterns of distribution of biodiversity, and the relevance of such patterns to conservation planning, the nature of threats and the mitigation measures possible, and policy changes needed. Besides the scientific presentations, a Panel Discussion was held on "Future Challenges in Conservation and Management of Tropical Forests: Perspectives from Government Agencies, NGOs and Donor Agencies." Several exciting and novel views were expressed during the discussion.

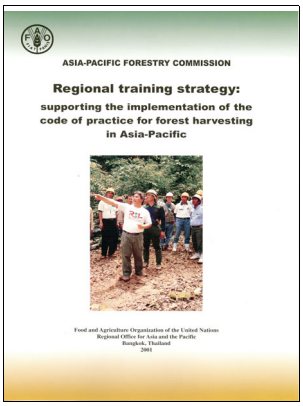
DRAFT WEBPAGE FOR INTERNATIONAL NEEM NETWORK

A draft webpage for the International Neem Network has been posted on the FAO Internet site. The webpage was developed according to recommendations from the International Neem Network workshop on data analysis, held in Jodhpur, India in March 2001. The site can be accessed via the home page for FAO, Forest Genetic Resources at the following address: http://www.fao.org/forestry/FOR/FORM/FOGENRES/Inn/INNhome.stm.

NEW FAO FORESTRY PUBLICATIONS

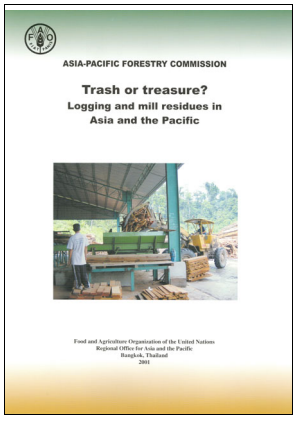
REGIONAL TRAINING STRATEGY: SUPPORTING THE IMPLEMENTATION OF THE CODE OF PRACTICE FOR FOREST HARVESTING IN ASIA-PACIFIC RAP Publication 2001/15

In recent years, countries in the Asia-Pacific region have undertaken numerous efforts to improve forest operations. An important milestone was reached with the development of the *Code of Practice for Forest Harvesting in Asia-Pacific*, which encourages environmentally-sound forest harvesting. Although the need for change has been accepted widely, putting the *Code* into practice is constrained by a number of factors. Perhaps the most critical of these is the lack of skilled and properly trained industry and forest agency personnel.



The Asia-Pacific Forestry Commission has prepared the Regional Training Strategy to help address this impediment. FAO is pleased to make this document available to assist countries in developing training activities with the goal of improving forest harvesting for the benefit of the region's forests and its people.

TRASH OR TREASURE? LOGGING AND MILL RESIDUES IN ASIA AND THE PACIFIC
RAP Publication 2001/1



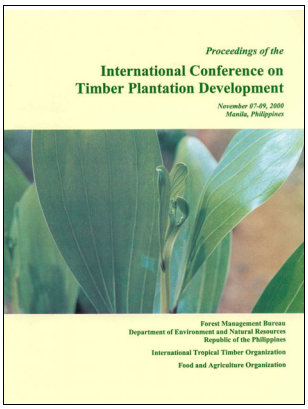
Timber harvesting and wood processing in the Asia-Pacific region generate huge volumes of residues—often referred to simply as "wastes." Little is known about the actual quantities of residues that are produced or the volumes that could be used productively and cost-effectively. The heterogeneity of residues that are generated, and the diversity of circumstances under which they are used, begs the question of whether residues are simply "trash" or indeed an under-appreciated "treasure" that might contribute significantly in the pursuit of sustainable forest management.

"Trash or treasure" does not claim to provide the definitive answer to this question, but does offer insights into the magnitude of residues that are generated and that could potentially be used for productive purposes. It also recommends ways to reduce unnecessary logging and mill residues and suggests approaches to encourage better use of those residues that cannot be avoided.

PROCEEDINGS OF THE INTERNATIONAL CONFERENCE ON TIMBER PLANTATION DEVELOPMENT

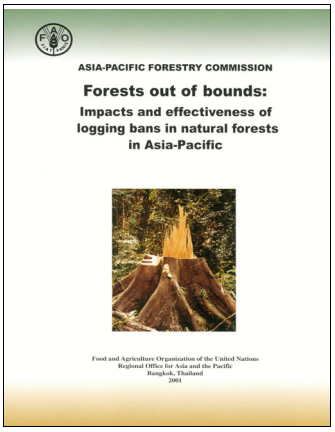
Natural forests used to be the only source of commercial timber in tropical timber producing countries. In the past several years, however, many governments have begun implementing strict conservation policies, which have curtailed the harvest levels from this fast depleting resource base. To meet their respective wood requirements and at the same time revegetate denuded areas, most tropical countries have embarked on tree plantation programs.

Within this context, the Government of the Philippines held an International Conference on Timber Plantation Development on 7-9 November 2000, in Manila, Philippines. The conference was organized by the Forest Management Bureau of the Philippines Department of Environment and Natural Resources, with assistance from the International Tropical Timber Organization (ITTO) and FAO.



FORESTS OUT OF BOUNDS: IMPACTS AND EFFECTIVENESS OF LOGGING BANS IN NATURAL FORESTS IN ASIA-PACIFIC

RAP Publication 2001/08



In response to rapid deforestation and forest degradation, a number of countries in Asia and the Pacific have imposed partial or total bans on harvesting timber from natural forests. The study of *"Impacts and effectiveness of logging bans in natural forests"* arose from the need to assess the successes and failures of such strategies and approaches in the Asia-Pacific region.

There are a number of questions regarding the effectiveness and impacts of logging bans. The answers to these questions are crucial in guiding government policies related to logging restrictions and ensuring a policy framework that effectively supports forest conservation.

This study was requested by the Asia-Pacific Forestry Commission (APFC) and highlights the increasing relevance of regional cooperation in developing forestry policy in Asia and the Pacific.

For copies of the these publications, please write to: Forestry Section, FAO Regional Office for Asia and the Pacific, Maliwan Mansion, Phra Atit Road, Bangkok 10200, Thailand; Fax: (662) 697-4445; E-mail: FAO-RAP@fao.org

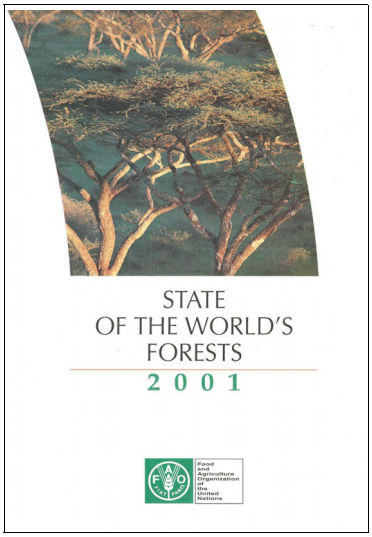
STATE OF THE WORLD'S FORESTS 2001
Rome, FAO, 181 pages plus map supplement, US$40.00

The State of the World's Forests reports every two years on the status of forests, recent major policy and institutional developments and key issues concerning the forest sector. The purpose of the publication is to provide current, reliable and policy-relevant information to policy-makers, foresters and other natural resource managers, academics, forest industry and civil society.

The fourth edition of this publication, the State of the World's Forests 2001, is organized into four parts. Part I focuses on the past two to three years in its discussion of the main issues and emerging trends in the forest sector. An overview of recent developments regarding the management, conservation and sustainable development of forest resources, forest goods and services, and the changing institutional framework for the forest sector is presented. Part II begins with a chapter that summarizes the methodology and key findings on forest area and forest management of FAO's most recent and comprehensive forest assessment, the Global Forest Resources Assessment 2000 (FRA 2000). It is followed by chapters on three key issues in the forest sector today: climate changea; biodiversity conservatin; and illegal activities and corruption.

International dialogue and global, regional and national initiatives related to forests is the topic of Part III. It includes sections on the

Intergovernmental Forum on Forests (IFF) and its successor - the United Nations Forum on Forests (UNFF), major international conventions and agreements pertaining to forets, efforts at the ecoregional level and national-level initiatives to support sustainable forest management. Part IV provides brief synopses of forest cover and forest products for eleven regional economic groups. For each group a brief history of its establishment,



purpose and list of members is given along with a description of the forest sector in that region.

The State of the World's Forests 2001 provides a diverse and extensive profile of the current state of global forest resources and the progress in and challenges to their sustainable management. It is thus an invaluable resource which hopefully will facilitate informed discussion and decision-making with regard to the world's forests

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ASIA-PACIFIC FORESTRY CHIPS AND CLIPS

BANS ON TRADING RAMIN

The government of Indonesia has banned both exporting and domestic trade of ramin (*Gonystylus bancanus*). The Indonesian government also requested the United Nations Convention on International Trade in Endangered Species (CITES) to place ramin in CITES Appendix III, effectively banning trade in all unexempted ramin products. Several companies with certified forest operations have been granted exemptions to the ban by the Indonesian government. The bans are in response to continued illegal logging of ramin in several Indonesian national parks. International trade in ramin is estimated to be valued at around US$22 million. Ramin is used in furniture construction, interior joinery, panelling, and smallwood articles.
– Environment News Service –

MILL CLOSURES IN JAPAN

The 2000 census of sawmills and plywood mills in Japan shows a continuation of a decline in the number of primary wood processing facilities in Japan. The census shows there were 11,692 operational sawmills in Japan in 2000, a decrease of around 5 percent from the previous year. Plywood mill numbers declined by around 6 percent, to 354 mills in 2000. Most mills in Japan are small, with sawmills averaging only 6.3 employees, with average log input of only 2,300 cubic metres.
–ITTO Tropical Timber Market Report–

MALAYSIA'S NEW WORLD HERITAGE SITES

Malaysia's Gunung Mulu National Park and Kinabalu Park were approved for addition to the UNESCO List of World Heritage Sites at a recent meeting of the Bureau of the World Heritage Committee in Cairns, Australia. The World Heritage List identifies the world's most precious natural and cultural sites and includes such world-renowned attractions as the Pyramids, the Taj Mahal and the Grand Canyon. To be included on the World Heritage List, sites must meet rigorous criteria including, "containing superlative natural phenomena or areas of exceptional natural beauty." Gunung Mulu achieved the distinction of being the only site to be inscribed at the Cairns meeting to meet all four Natural Heritage Criteria. Also inscribed on the list from the Asia-Pacific region were four sites in China, including the Tombs of the Ming and Qing Dynasties, Sites and Properties from the Kingdom of Ryukyu in Japan, the Greater Blue Mountains area in Australia, and two sites, including Kyongju Historic Area, in the Republic of Korea.
– Malaysian Timber Bulletin –

CHINA'S FURNITURE EXPORTS BOOMING

Exports of wooden furniture from China to the United States showed their sixth consecutive year of more than 30 percent growth in 2000. Since 1992, China's annual exports of wooden furniture to the US have increased from US$69 million to US$1.7 billion. The quality of exports has also lifted, with several producers attempting to penetrate high-end U.S. markets. At the same time, some American firms are being squeezed out of furniture markets. In the first six months of this year, 50 to 75 U.S. furniture plants closed. Canadian and European furniture manufacturers are also being affected by competitive Asian furniture exports.
–ITTO Tropical Timber Market Report–

COMMUNITY FORESTRY ADVANCES IN MYANMAR

More than 13,000 hectares of land will be handed over to Community User Groups in Myanmar after a breakthrough in the titling process. The land, mainly unclassified marginal and fragile uplands around villages in southern Shan State, had applications for 30-year land title certificates dating back to 1995. Many of these applications were stalled due to problems relating to

appropriate jurisdiction over unclassified lands. The Southern Shan State Administration has now authorised the Forestry Department to issue certificates on all pending applications. Community groups are now finalising management plans to ensure compliance with the requirements for obtaining title certificates.
–FAO Internal Report–

"FOREST MANAGEMENT 2001" IN THAILAND

The Forestry Department of Thailand has unveiled its "Forestry Management 2001" policy, which gives emphasis to the role of local people in forest management and forest protection. The policy centers on a concept of "one forest, two management systems" and recognizes that effective forest management and protection cannot be achieved without community participation. The policy envisages that forests will be zoned, with people being allowed to continue to live in forests under regulations that they will help draft. A Departmental priority will be to push for promulgation of the Community Forestry Bill, which has been stalled for several years.
–Bangkok Post–

PERUM PERHUTANI LOSING CERTIFICATION?

The Rainforest Alliance's Smartwood program has suspended Perum Perhutani's teak plantation certificates, effective as of October 2001. The suspension is based on non-compliance with certification conditions based on FSC criteria and Smartwood standards. Thirty-six companies with FSC chain-of-custody certification are reliant on Perhutani as their main supplier of certified logs or sawn timber supplier. These companies, mainly manufacturing teak garden furniture for export to Europe and the United States, will be directly affected by the suspension.
–RECOFTC E-letter–

DENMARK REQUIRES SUSTAINABLE MANAGEMENT

The Danish Parliament has ruled that all of Denmark's public institutions should only use sustainably produced tropical timber. The Parliament will require public institutions that use tropical timber to report as to how they have checked that the timber they use originates from sustainably managed forests.
–ITTO Tropical Timber Market Report–

SINO-THAI EUCALYPTUS PROJECT

The Prime Minister of Thailand, Thaksin Shiniwatra, and China's Premier Zhu Rongji discussed a proposed major eucalyptus pulp project during their meeting in August. The project envisages the establishment of around 110,000 hectares of eucalyptus plantations in three eastern provinces of Thailand as a base resource to support a pulp and paper mill with a 700,000 ton capacity. The proposed joint venture is expected to have an investment cost of around US$1 billion. The project remains a source of controversy in Thailand with concerns expressed over social and environmental impacts.
–Bangkok Post–

SINGAPOREAN PLANTATIONS IN DPR KOREA

Singaporean company Maxgro Holdings has signed a joint venture agreement with the Government of the Democratic People's Republic of Korea to establish 20,000 hectares of plantations in DPR Korea. The joint venture plans to plant paulownia, a fast-growing hardwood species, grown in a number of countries in the Asia-Pacific. Paulownia is mainly used in the furniture-making and veneer industries.
–Bangkok Post–

GREENER WORLD SOAKING UP CO_2?

Researchers have found that increased concentrations of atmospheric CO_2 have resulted in plants growing more vigorously in latitudes above 40 degrees North. In Asia, this includes areas of Northern China, Japan, Mongolia and the Korean peninsula. Research using satellite data for northern latitudes shows that since 1981, vegetation areas have not expanded, but they have increased in density. The research suggests that global warming is likely to extend growing seasons in high latitude regions and promote far more lush vegetation in areas that are currently sparsely vegetated.
– Environment News Service –

FAO ASIA-PACIFIC FORESTRY CALENDAR

12-14 November 2001. Islamabad, Pakistan. ***6th APAFRI Executive Committee Meeting.*** Contact: Dr. S. Appanah, Senior Programme Advisor, FORSPA, c/o FAO/RAP, Maliwan Mansion, Phra Atit Road, Bangkok 10200, Thailand; Tel: (66-2) 697-4106; Fax: (66-2) 697-4411; E-mail: Simmathiri.Appanah@fao.org

25-30 November 2001. Pyay and Yangon, Myanmar. ***3rd Project Steering Committee Meeting and Regional Model Forest Workshop of RMFP.*** Contact: Tang Hon Tat, Chief Technical Officer, GCP/RAS/177/JPN, c/o: FAO/RAP, Maliwan Mansion, Phra Atit Road, Bangkok 10200, Thailand; Tel: (66-2) 697-4220; Fax: (66-2) 697-4432; E-mail:Hontat.Tang@fao.org

26-28 November 2001. Rome, Italy. ***Expert Meeting on Trees Outside the Forest "Enhancing Trees-Outside-Forest Contribution to Sustainable Livelihood".*** Contact: Tage Michaelsen, Chief, FORC, Forestry Department, Food and Agriculture Organization of the United Nations, Viale delle Terme di Caracalla, 00100 Rome, Italy; Tage.Michaelsen@fao.org

3-7 December 2001. Kuching, Malaysia. ***Seminar on Sustainable Forest Management: From Theory to Practice.*** Contact: Thomas Enters, Forestry Sector Analysis Specialist, FAO/RAP, Maliwan Mansion, Phra Atit Road, Bangkok 10200, Thailand; Tel: (66-2) 697-4328; Fax: (66-2) 697-4445; E-mail: Thomas.Enters@fao.org

4-7 December 2001. Phnom Penh, Cambodia. ***Training Workshop on "Designing Local Auditing Systems for Sustainable Forest Management.*** Organized by FORSPA, APAFRI and GTZ. Contact: Dr. S. Appanah, Senior Programme Advisor, FORSPA, c/o FAO/RAP, Maliwan Mansion, Phra Atit Road, Bangkok 10200, Thailand; Tel: (66-2) 697-4106; Fax: (66-2) 697-4411; E-mail: Simmathiri.Appanah@fao.org

January 2002 (tentative schedule/venue). Hanoi, Vietnam. ***Workshop on "International Mechanisms to Promote Sustainable Forest Management: Effective Participation and Implementation".*** Contact: Dr. S. Appanah, Senior Programme Advisor, FORSPA, c/o FAO/RAP, Maliwan Mansion, Phra Atit Road, Bangkok 10200, Thailand; Tel: (66-2) 697-4106; Fax: (66-2) 697-4411; E-mail: Simmathiri.Appanah@fao.org

26-30 August 2002. Ulaan Bator, Mongolia. ***19th Session of the Asia-Pacific Forestry Commission.*** Contact: Patrick Durst, Senior Forestry Officer, FAO/RAP, Maliwan Mansion, Phra Atit Road, Bangkok 10200, Thailand; Tel: (66-2) 697-4139; Fax: (66-2) 697-4445; E-mail: Patrick.Durst@fao.org

2-11 September 2002. Johannesburg, South Africa. ***World Summit on Sustainable Development ("Rio+10").*** More information is available at the following website: www.johannesburgsummit.org

21-28 September 2003. ***XII World Forestry Congress.*** Québec City, Canada. Contact: Secretariat General, XII World Forestry Congress 2003, P.O. Box 7275, Québec City, Canada G1G 5E5; E-mail: sec-gen@wfc2003.org

FOREST NEWS is issued by the FAO Regional Office for Asia and the Pacific as part of TIGERPAPER. This issue of FOREST NEWS was compiled by the FAO/RAP Forestry Group

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