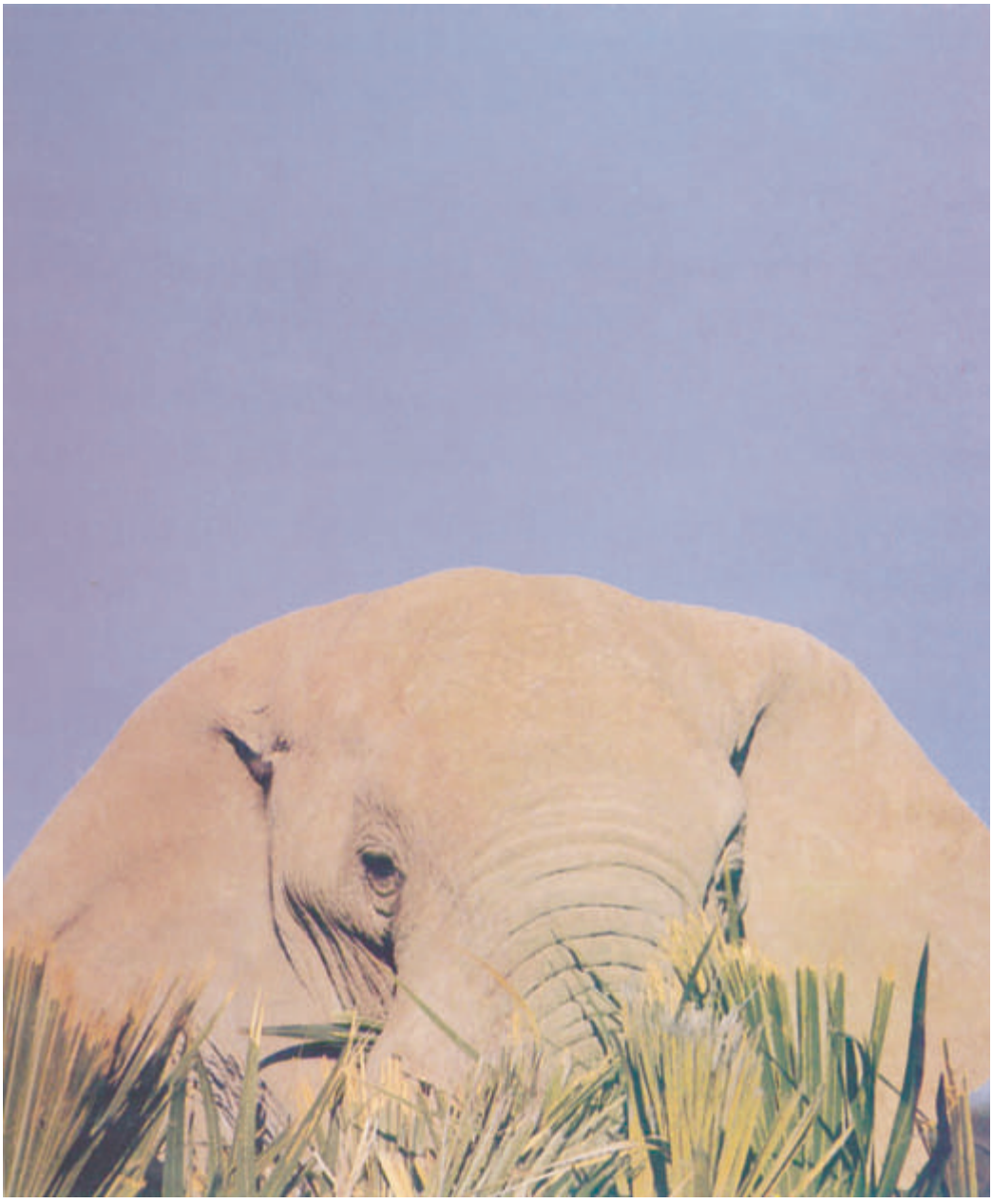
Pachyderm

JAN-DEC 1997 Number 24



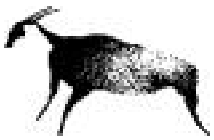


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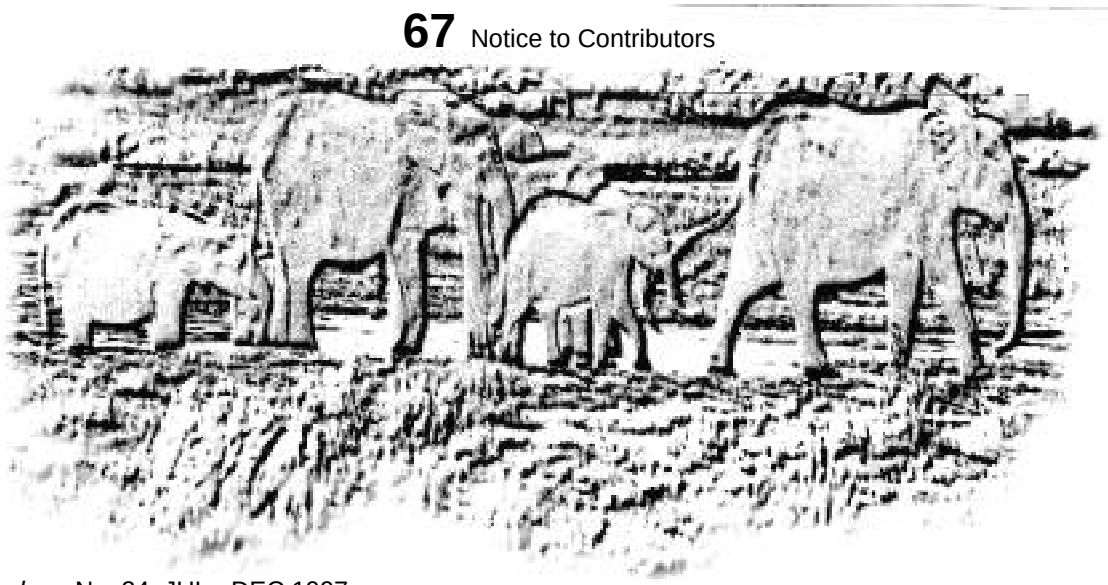
Photo credit: Jonathan P Sood

Notes from the Field



CHAIRMAN'S REPORT: AFRICAN ELEPHANT SPECIALIST GROUP

Holly T Dublin
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The 10th Conference of the Parties (COP) to CITES has come and gone leaving behind two very critical decisions affecting the African elephant. COP I 0 also left behind one additional residual effect - a tremendous amount of confusion among a tremendous number of people in a tremendous number of places. Since the COP. I have visited the four "comers" of Africa as well as Europe, the United Kingdom and the United States. I have found that, for the most part, people are unclear on what exactly was decided at COP 10. Even for those of us present in Harare it is often necessary to stop and reflect on the actual wording of the decisions and what they truly say.

Of the two major decisions regarding African elephants and their ivory, the first decision mandated the transfer from Appendix I to Appendix II for the elephant populations of Botswana, Namibia and Zimbabwe. The downlisting signifies a clear recognition that populations of these three countries do not meet the biological criteria for maintenance on Appendix I; Appendix I being reserved for those populations of species threatened with extinction due to unsustainable exploitation for the purpose of commercial trade. At the same time as these three populations were downlisted, it was agreed that a legal, one-off sale of identified stocks of known national origin (25.3t for Bots, 13.8t for Na, 20t for Zm) could be allowed between the three proponent countries and Japan, once strict conditions have been met. Compliance with these conditions can be judged by the Standing Committee but the earliest any reopening of trade will even be considered is at their meeting in early 1999.

Herein the confusion. What the Parties **did do** was to vote on a strict set of conditions which must be in place before CITES could allow a one-off sale between Botswana, Namibia, Zimbabwe and Japan to take place. What the Parties did not do was to approve the blanket resumption of legal, international ivory trade. The clear and continuing confusion on this point concerns me greatly. From the day of the vote, newspapers and people around the world have announced the decision that "the ivory ban has been lifted". Whether these statements are made in ignorance or with conscious intent to mislead is unclear. But what is abundantly clear is that such false statements are potentially very dangerous for elephants.

Spreading a false message of this sort can only be damaging to the very elephants that the world cares so much about. It would be better if the message was louder and clearer that the ivory ban was not lifted by the Parties and will not be lifted until very strict conditions have been met. Even then, the only resumption of trade will be limited to set amounts in the three proponent countries that have been checked and verified through the CITES Panel of Experts process. **There will be no new killing, no new ivory and no new amounts admissible under this agreement.**

The second elephant-relevant decision of COP 10 allowed for a one-off, non-commercial buyout of marked and registered government stocks in the Range States of the African elephant. In taking this decision, the Parties to CITES allowed only a 90-day period in which to mark and register these stocks for verifiable audit by TRAFFIC later in the year. The decision stipulates that any proceeds from the non-commercial sale of registered and audited stocks must be ploughed back into elephant-related conservation through the establishment of trust funds dedicated to this cause. The actual fate of purchased stocks is not specified in the decision but no resale will be allowed, thus limiting the "buyer's" options to destruction or indefinite, secured storage. In effect, the buyout decision has allowed the establishment of an alternative ivory trade for some Range States, albeit a non-commercial one. Sale of stocks is just that - a business transaction, transferring ivory from seller to buyer, commercially or noncommercially. This alternative trade allows ivory of unknown origin and source to be sold to willing buyers for non-commercial use. If it works as hoped, its biggest contribution will be the expenditure of these proceeds on the conservation of elephants.

Another false message which is finding its way around Africa is also concerning me. It is being suggested that this non-commercial buyout may only be the first in an ongoing series of buyouts. This is untrue and would

clearly defeat the primary purpose of the decision - to remove Africa's existing ivory stocks from the legal or illegal commercial trade. By the closing time for registration (1 8 September 1997), only IS of Africa's 37 Range States had declared their stocks. Although some may hold significant stocks, the remaining 26 Range States did not register by the cut-off date.

If there is a clear message that no further noncommercial buyouts will take place then, at best, we can hope that a significant portion of government-held stocks have been captured in this process. However, if there is no clear reinforcement of the agreed decision, that this is a one-off, non-commercial buyout, then I believe there may be dangerous "signals" being transmitted to the world. If there is any reason whatsoever, for anyone to believe that this is just the first in a series of such buyouts then I fear we may see an increase in the illegal offtake of elephants in Africa to feed this new "market" demand. Ivory trade, whether commercial or non-commercial, legal or illegal, can only be controlled by applying the most stringent of measures and surely the protection of Africa's elephants, where they live, is one of the most important considerations. Whether or not Botswana, Namibia or Zimbabwe commercially trade their limited stocks and whether or not the additional 13 countries that registered their stocks are able to find willing non-commercial buyers, the majority of African elephant Range States will have emerged from COP I 0 empty handed with no increased ability to accomplish what they most need - to protect effectively and manage their elephants and the current illegal trade in ivory.

As I (and many others) have long argued, with or without CITES and the decisions of the Parties, trade in ivory continues and, in some parts of Africa, the offtake is surely unsustainable. As the Chair of the AfESG, it is this fact that concerns me most. There is still a market for ivory and it is very likely increasing. There are new trade routes and new trade dynamics but they are probably continuing virtually unhampered. If we really mean business about protecting Africa's elephants from the scourge of illegal killing, then we must be prepared to put our cards on the table, pool our resources and put our money where are mouths are. If we can not stop demand (which I believe to be an impossible goal) then we will have to protect elephants. Protecting Africa's elephants is a costly affair. With few exceptions, the donors have not distinguished themselves with meeting these costs but have left it to the beleaguered African governments to carry the burden. I believe the Range States want to rise to this challenge, but it is a long and treacherous road to self-sufficiency, laden with political minefields. Why should they carry the burden for being the guardians of a global resource? Probably because no one is willingly coming to their aid!

While the funding side has yet to be resolved, the need to get on with the technical tasks could not wait. IUCN/SSC, through the African and Asian Elephant Specialist Groups, were cited repeatedly in the relevant CITES Decisions and Resolution and given explicit responsibility for the technical development of a monitoring system to track the illegal offtake of elephants in the Range States and to develop a means of determining whether "observed trends are a result of changes in the listing of elephant populations in the CITES Appendices and/or the resumption of legal international trade in ivory". The first step in this undertaking took place in December 1997, when thirty of the top individuals in the business of elephant management, law enforcement and ivory trade control spent a most intensive and challenging week of brainstorming. The group came to the clear conclusion that this will be a very big and expensive undertaking, requiring continual updating, with many potential pitfalls along the way.

On the other hand, there was tremendous enthusiasm that, in the long term, we should be able to gain a grip on the status of populations and the flow of trade across the Range States of Africa and Asia if fundamental elements of an international monitoring system are put in place. It was recommended that the AfESG help further to develop data needs and modalities for collection and compilation on illegal killing as well as identifying specific sites where this monitoring should be carried out. TRAFFIC will work with the CITES Secretariat, the World Customs Organisation, INTERPOL and others to establish and maintain a monitoring system on the trade side.

How these recommended systems will be implemented and who will shoulder the costs remains to be seen. 'Re will of IUCN/SSC, TRAFFIC and many concerned individuals to assist in this process is clearly apparent. The will of the relevant governments, other Parties and the donors has still to be demonstrated. I believe legal commercial or non-commercial sales of any sort should not resume until such will is clearly shown. The Range States now have a chance to commit to such a monitoring scheme and make it happen. It is envisaged that such commitment will be sought at the next meeting of the Range State Dialogue envisioned for some time later in

1998. IUCN has already been asked to continue to facilitate the dialogue process and funds are now being sought.

CITES COPs never pass without a build-up of storm clouds and a torrential downpour of unexpected and unsolicited work on IUCN/SSC and particularly the AfESG. Not unlike any African deluge, the rain stops and we are left to get on with the tasks at hand no matter how muddy and slippery the paths may be. The AfESG has another challenging year ahead. The new membership has been appointed to the year 2000. We will kick off 1998 with a members' meeting in Burkina Faso. This is the first meeting of the entire Group to be held in French-speaking Africa and, once again, we have the USFWS to thank for making it possible for all members to attend. The year will also encompass the elephant's share of the work in updating the African Elephant Database in preparation for a 1999 hard-copy release. The Secretariat and many members will continue to assist in our ongoing process of "south-south" capacity building while a new generation of qualified African scientists and managers is graduating and joining the ranks. The Human-Elephant Conflict Task Force has set out an ambitious work programme and must now try to secure the necessary funds to be able to really kick their efforts into high gear. Somehow, there is never a shortage of work nor a shortfall in challenges to undertake.

In my resting and waking hours, these challenges never venture far from my thoughts. Recently, while sitting on the beach in Petit Loango Reserve on the Atlantic coast of Gabon, I reminded myself that the real battles for the survival of our elephants will be won or lost inside and outside protected areas in the savannahs and forests of Africa not in the back halls and conference rooms of future CITES COPS. It is because of this that we must use the expertise, the tools and the knowledge available simply to get on with our primary goal conserving and managing Africa's elephants into the new millennium and beyond.

RAPPORT DE LA PRESIDENTE: GROUPE DE SPECIALISTES DE L'ELEPHANT AFRICAIN

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La dixième Conférence des Parties (COP) à la CITES s'est déroulée puis terminée en laissant derrière elle deux décisions tout à fait critiques pour l'éléphant africain. La COP 10 a eu aussi un effet résiduel supplémentaire, à savoir une confusion effrayante chez un nombre effrayant de personnes en un nombre d'endroits effrayant. Depuis la COP, j'ai visité les "quatre" coins de l'Afrique et de l'Europe, le Royaume Uni et les Etats Unis. J'y ai découvert que, pour la plupart, les gens ne savaient pas exactement ce qui s'était décidé lors de la COP 10. Même pour ceux d'entre nous qui étaient présents à Harare, il est souvent nécessaire de s'arrêter pour réfléchir aux termes réels des décisions et à ce qu'ils signifient en fait.

Des deux décisions concernant les éléphants d'Afrique et leur ivoire, la première entraîne le transfert des populations d'éléphants du Botswana, de Namibie et du Zimbabwe de l'Annexe 1 à l'Annexe II. Le déclassement en lui-même signifie clairement que l'on reconnaît que les populations de ces trois pays ne répondent plus aux critères biologiques d'un maintien à l'Annexe I; celui-ci est en effet réservé aux populations des espèces menacées d'extinction à cause d'une exploitation non soutenable à des fins commerciales. Au moment où ces trois populations étaient déclassées, on a aussi accepté qu'une vente légale, unique, des stocks identifiés d'origine nationale connue (25,3 tonnes pour le Bots., 13,8 t. pour la Na., 20 T. pour le Zm) soit autorisée entre

les trois pays en question et le Japon, pour autant que l'on respecte des conditions strictes. C'est le Comité permanent qui doit juger du bon respect de ces conditions, mais toute réouverture du commerce devra attendre au plus tôt jusqu'à la réunion du début de 1999 pour être envisagée.

D'où la confusion. Ce que les Parties ont fait, ce fut de voter une série de conditions strictes qui doit être établie avant que la CITES puisse permettre une vente unique entre le Botswana, la Namibie, le Zimbabwe et le Japon. Ce que les Parties n'ont pas fait, c'est d'approuver une reprise globale du commerce légal et international de l'ivoire. La confusion visible et durable sur ce point m'inquiète beaucoup. Dès le jour du vote, les journaux et les gens du monde entier ont annoncé qu'on avait décidé que "l'interdiction du commerce de l'ivoire avait été levée". Il est difficile de savoir si ces proclamations ont été faites par ignorance ou intentionnellement. Mais ce qui est tout à fait clair, c'est que ces assertions risquent d'être très dangereuses pour les éléphants.

Répandre un message erronné de cette sorte ne peut que nuire à ces mêmes éléphants auxquels le monde entier tient tant. Il vaudrait beaucoup mieux que le message dise plus haut et plus clairement que l'interdiction du commerce de l'ivoire n'a pas été levée par les Parties, et qu'elle ne le sera pas tant que des conditions très sévères n'auront pas été remplies. Et même alors, la reprise du commerce se limitera aux quantités précisées pour chacun des trois pays, qui auront été vérifiées et contrôlées par le Panel des Experts de la CITES. Il n'y aura pas de nouveaux abattages, pas de nouvel ivoire et aucune nouvelle quantité d'ivoire acceptable dans le cadre de cet accord.

La seconde décision de la COP 10 concernant les éléphants autorisait le rachat unique, non commercial, des stocks gouvernementaux marqués et enregistrés dans les Etats de l'aire de répartition des éléphants. En prenant cette décision, les Parties à la CITES autorisaient seulement une période de 90 jours durant lesquels ces stocks pouvaient être marqués et enregistrés avant vérification par un audit de TRAFFIC plus tard dans l'année. La décision stipule que tout bénéfice tiré de la vente non commerciale des stocks enregistrés et audités doit être réinvesti dans la conservation touchant les éléphants par la création d'un fonds dévolu à cette cause.

Le sort des stocks acquis n'est pas précisé dans la décision, mais aucune revente ne sera permise, ce qui limite les options des "acheteurs" à la destruction ou au stockage surveillé, de durée indéfinie. En fait, la décision du rachat a permis la création d'un commerce d'ivoire alternatif pour certains Etats de l'aire de répartition, encore que ce soit une transaction non commerciale. La vente des stocks n'est que cela, une transaction d'affaire, un transfert d'ivoire d'un vendeur à un acheteur, commercialement ou non. Ce commerce alternatif permet à de l'ivoire d'origine et de source inconnues d'être vendu à des acheteurs volontaires, pour un usage non commercial. Si cela fonctionne comme on l'espère, la contribution la plus intéressante sera l'investissement des bénéfices dans la conservation des éléphants.

Un autre message erroné fait aussi son chemin en Afrique et m'inquiète. On laisse entendre que ce rachat non commercial pourrait n'être que le premier d'une sérié de rachats. Ceci est faux et mettrait clairement en péril l'objectif premier de la décision qui est de retirer les stocks d'ivoire existant en Afrique du trafic commercial, légal ou non. A l'échéance du délai accordé pour l'enregistrement (18 septembre 1997), seuls 15 des 37 états africains de l'aire de répartition avaient déclaré leurs stocks. Bien que certains des autres pays soient susceptibles de détenir des stocks importants, ils ne les avaient pas enregistrés à la date limite.

Si l'on peut faire passer clairement le message qu'il n'y aura pas d'autre rachat non commercial, alors peutêtre pouvons-nous espérer qu' une partie significative des stocks détenus par les gouvernements soient récupérés dans cette opération. Pourtant, s'il n' y a pas d'application effective de la décision qui a été prise, disant que ceci doit être un rachat unique, non com mercial, alors je crains que des "signaux" dangereux ne soient envoyés dans le monde. S'il existe quelque raison que ce soit pour que quelqu'un croie que celui ci ne serait que le premier d'une série de tels rachats, alors je crains fort que nous assistions à une augmentation des prélèvements illégaux d'éléphanis en Afrique pour alimenter cette nouvelle demande du "marché". Le trafic d'ivoire, qu'il soit commercial ou non, légal ou non, ne peut être contrôlé qu'en appliquant les mesures les plus strictes, et il est cer tain que la protection des éléphants africains, là où ils vivent, est une des préoccupations les plus importantes qui soient. Que le Botswana, la Namibie et le Zimbabwe puissent disposer commercialement ou non de leurs stocks limités et que les autres pays qui ont enregistré leurs stocks soient capables ou non de trouver un acheteur volontaire non commercial, la majorité des Etats de l'aire de répartition des éléphants seront sortis de la COP 10 les mains vides, sans pouvoir mieux qu'avant accomplir ce dont ils ont le plus besoin, protéger

efficacement et gérer leurs éléphants et le trafic actuel de l'ivoire.

Comme je l'ai longuement expliqué (ainsi que de nombreux autres), avec ou sans la CITES et les décisions des Parties, le commerce de l'ivoire continue et, dans certaines régions d'Afrique, les prélèvements ne sont certainement pas soutenables.

Comme Présidente du GSEAf, c'est cela qui m'inquiète le plus. Il existe encore un marché pour l'ivoire, et il est même probablement en augmenta tion. Le commerce emprunte de nouvelles voies et il est poussé par une nouvelle dynamique; il semble que rien n'y fasse obstacle. Si nous voulons vraiment être crédibles dans la protection des éléphants d'Afrique contre la plaie que constituent les massacres illégaux, nous devons être prêts à mettre cartes sur table, à rassembler toutes les ressources possibles et à mettre l'argent où il faut. Si nous ne pouvons pas arrêter la demande (ce qui, je crois, est un but impossible à atteindre), alors, nous devrons protéger les éléphants. Protéger les éléphants d'Afrique est une tâche coûteuse. A quelques exceptions près, les donateurs ne se sont pas fait remarquer par leur intention de couvrir ces coûts; ils ont laissé les gouvernements africains, durement éprouvés, supporter ce fardeau. Je crois que les Etats africains veulent faire face à ce défi, mais c'est un parcours long et vicieux vers l'auto suffisance, miné d'embûches politiques. Pourquoi devraient-ils seuls supporter la charge d'être les gardiens d'une ressource mondiale? Peut-être parce que personne ne veut leur venir en aide!

Alors que l'aspect financier n'est pas résolu, la nécessité de progresser dans les tâches techniques ne peut attendre. La CSE/UICN, par l'intermédiaire des Groupes des Spécialistes des Éléphants d'Afrique et d'Asie, a été citée à plusieurs reprises lors des Décisions et de la Résolution qui les concernaient, et on lui a donné expressément la responsabilité de la mise au point technique d'un système de surveillance destiné à déceler les prélèvements illégaux d'éléphants dans les Etats de l'aire de répartition et celle de trouver un moyen de déterminer si "les tendances observées sont le résultat des changements apportés au classement des populations d'éléphants dans les An nexes de la CITES et/ou de la reprise du commerce international légal d'ivoire". La première étape a eu lieu en décembre 1997, lorsque trente des personnes impliquées au top niveau dans la gestion des éléphants, de l'application des lois et du contrôle du commerce de l'ivoire, ont passé la semaine de brainstorming la plus intense et la plus exigeante qui soit. Ils sont arrivés à la conclusion que ce sera une entreprise énorme et coûteuse, qui exigera une réactualisation permanente et sera semée d'embûches. D'autre part, il était extrêmement stimulant de penser qu'à long terme, nous puissions influencer le statut des populations et l'importance du commerce entre les pays de l'aire de répartition et l'Asie si les éléments fondamentaux d'un système de contrôle international sont mis en place. On a recommandé que le GSEAf aide à développer les nécessités et les modalités des récoltes et de compilation des données sur les massacres illégaux ainsi qu'à identifier les sites spécifiques où ces contrôles doivent être exécutés. TRAFFIC travaillera avec le Secrétariat de la CITES, l'Organisation Mondiale des Douanes, INTERPOL et d'autres, afin de créer et de gérer un système de sur veillance sur le site même du trafic.

Il reste à trouver comment réaliser les systèmes recommandés et qui va prendre en charge les coûts de l'opération. Il est clair que la CSE/UICN, TRAFFIC et de nombreuses personnes intéressées veulent aider au processus. La volonté des gouvernements concernés, d'autres Parties et des donateurs reste à prouver. Je crois que les ventes légales, commerciales ou non, de quelque sorte que ce soit, ne devraient pas reprendre avant que cette volonté ne soit manifeste. Les Etats de l'aire de répartition ont une occasion de s'impliquer dans un tel système de contrôle et de le rendre effectif. On envisage de solliciter cet engage ment à la prochaine réunion du Dialogue entre les Etats de l'aire de répartition prévue plus tard, cette année ci. On a déjà demandé à l'UICN de continuer à faciliter le processus de dialogue, et maintenant, on recherche des fonds.

Les COP de la CITES ne se déroulent jamais sans la formation de nuages de tempête et sans une pluie torrentielle de travail inattendu et certes pas demandé sur la CSE/UICN, et particulièrement sur le GSEAf. A l'instar des déluges africains, la pluie cesse et il nous reste à affronter les tâches qui nous sont tombées dessus, aussi boueux et glissant que soit le chemin. Le GSEAf fait face à une nouvelle année très stimulante. Ses nouveaux membres ont été nommés jusqu'en l'an 2000. Nous donnons le coup d'envoi de 1998 avec une réunion des membres au Burkina Faso. C'est la première réunion de tout le groupe qui se tienne en Afrique francophone et, une fois encore, nous pouvons remercier le USFWS pour avoir permis que tous les membres puissent participer. Cette année se taillera aussi la part de l'éléphant du travail puisqu'il faut remettre à jour la

Banque de Données de l'Eléphant Africain pour préparer sa publication en 1999. Le Secrétariat et de nombreux membres continueront à aider le processus en cours d'élaboration des capacités "sud-sud", alors qu'une nouvelle génération de scientifiques et de gestionnaires africains qualifiés sont formés et rejoignent les rangs. La Force de frappe pour les Conflits hommes-éléphants s'est fixé un programme de travail ambitieux et doit maintenant tenter de s'assurer les fonds nécessaires pour pouvoir réellement pousser ses efforts à la vitesse supérieure. Quels qu'ils soient, il ne manque jamais de travail ni de défis à affronter.

Pendant mes heures de repos, lorsque je suis éveillée, ces défis ne sont jamais très loin de mes pensées. Récemment, alors que j'étais assise sur la plage dans la Réserve de Petit Loango, sur la côte atlantique, au Gabon, je me suis rappelée que les vraies batailles pour la survie de nos éléphants seront gagnées ou perdues à l'intérieur et à l'extérieur des aires protégées, dans les savanes et les forêts africaines, et non dans les couloirs et les salles de conférence des futures COP de la CITES. C'est pour cela que nous devons utiliser l'expertise, les outils et les connaissances disponibles simplement pour poursuivre notre but premier, conserver et gérer les éléphants d'Afrique pendant le prochain millénaire et au-delà.

CHAIRMAN'S REPORT: ASIAN RHINO SPECIALIST GROUP

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Under the auspices of the AsRSG and in collaboration with the Directorate General of Forest Protection and Nature Conservation (PHPA) in Indonesia and many NG0s, a Javan Rhino Colloquium was conducted on 1-3 July 1997 at the Safari Garden Hotel, Cisarua, Bogor, Indonesia. Funds and encouragement were provided by the Rhino and Tiger Conservation Fund (RTC) of the US Fish and Wildlife Service.

The ultimate goal of the conservation programme for this species is to ensure long-term viability. Towards this end, the objectives of the Colloquium were:

- To assemble all the principle parties involved or in terested in conservation efforts for the Javan rhino in Ujung Kulon as well as representatives working with the species in Vietnam to define better and co-ordinate interests, activities, and needs.
- To attempt to arrive at a consensus plan of action . for conservation of the Javan rhino in Ujung Kulon, that would include:
  - affirmation of priorities.
  - development of detailed proposals for effective actions.
  - identification of parties who would implement actions which would co-ordinate and reconcile the various initiatives and interests.
  - formulation of a work plan and time table.
  - consideration of mechanisms for long-term financial sustainability of Javan rhino.
  - conservation in Ujung Kulon.
- To integrate and prioritise various kinds of conservation activities, i.e. protection, management, and research.
- To provide guidance and priorities for funding agencies.
- To advance effective actions to conserve the Javan rhino in Ujung Kulon.
- To delineate some possible actions for Javan rhino in Cat Loc Wildlife Reserve, Vietnam.

The Colloquium comprised intensive and interactive sessions in both plenary and working groups. The situation in Ujung Kulon was considered **first** and the representatives from Vietnam participated in the various working groups. Five major working groups were convened to discuss Ujung **Kulon.** The discussion topics for the working groups were:

I . Census and survey methods of rhinos.

2. Intensive protection and institution aspects of rhino conservation in Ujung Kulon, including: rhino protection units; facilities and equipment; and training.

3. Habitat research and management, including: status, change and management; numbers of Banteng and other herbivores and their impact on rhinos; and the carrying capacity for rhinos.

4. Population and habitat viability analysis (PHVA) considerations, including: target population size for Ujung Kulon; establishment of a second population of Javan rhino in Indonesia; and creation of a rhino sanctuary within Ujung Kulon.

5. Community interactions.

Each working group organised its considerations according to a number of major questions and points about each major problem as summarised in Table I which provided the framework for the Colloquium. Reports of the individual working groups as well as other background documents were provided. Thereafter, there was a plenary session organised along the same framework to delineate some suggestions for the conservation of Javan rhinos in Vietnam.

A number of important recommendations and results emerged from the Colloquium.

For Ujung Kulon National Park, Indonesia, recommendations were:

1 .To establish 2-3 rhino protection units (RPUs).

2. To improve rhino censuses by intensifying the transect counts in conjunction with extensive photo trapping.

3. To initiate habitat management experiments entailing the removal of Langkap and Banteng in an endeavour to expand carrying capacity. This may help to facilitate the attainment of a target population size of I 00 Javan rhinos.

A direct result of the Colloquium has been the formation of a Javan rhino consortium to continue the communication and co-ordination of all the organisations involved in Javan rhino conservation in Indonesia.

For Cat Loc Wildlife Reserve and Cat Tien National Park, Vietnam recommendations were:

1. To conduct a track count of rhino in Cat Loc in early 1998 with technical assistance from experts from Indonesia and to correlate the track count with a photo census later.

2. To initiate habitat analysis work in 1998, again with technical assistance from Indonesia.

3. To encourage the large WWF project being conducted in Cat **Tien** to provide for specific rhino action, including increasing guards in Cat Loc from eight to 40.

The full results and recommendations of the Colloquium will be published and will be available from the AsRSG.

Progress continues on developing the managed breeding centres in native habitat for the Sumatran rhino in both Indonesia and Malaysia. The first three rhinos (one male from England and two females from Indonesia) will be moved from zoos to the Sumatran rhino sanctuary called Suaka Rhino Sumatera (SRS) in Way Kambas National Park, Sumatra, Indonesia during the first week of October 1997. Further improvements in facilities, staff, and programmes are being implemented at the Sungai Dusun Rhino Conservation Centre in Peninsular Malaysia. Meanwhile, matings have occurred with a pair of Sumatran rhinos at the Cincinnati Zoo in the United States.

Readers are reminded that the AsRSG has a subpage on the IRF website at the http:/www.rhinos-irf.org.

RAPPORT DU PRESIDENT: GROUPE DE SPECIALISTES DES RHINOS D'ASIE

Mohammed Khan bin Momin Khan[1] avec Thomas J. Foose[2]
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Un colloque sur le rhino de Java s'est tenu du 1er au 3 juillet 1997, au Safari Garden Hôtel, à Cisarua, Bogor, en Indonésie, sous les auspices du GSRAs, en collaboration avec la Direction Générale de la Protection Forestière et de la Conservation de la Nature (PHPA) d'Indonésie et de nombreuses ONG. Les fonds et les encouragements provenaient du Rhino and Tiger Conservation Fund (RTC) du Service Américain de la Pêche et de la Faune.

Le but ultime du programme de conservation de cette espèce est de lui assurer une viabilité à long terme. C'est pourquoi les objectifs de ce colloque étaient :

- De rassembler toutes les principales partie impliquées ou intéressées par les efforts de conservation du Rhinocéros de Java à Ujung Kulon ainsi que les représentants qui travaillent sur cette espèce au Vietnam afin de mieux cemer et coordonner les intérêts, les activités et les besoins.
- D'essayer d'arriver à un plan d'action commun pour la conservation du rhino de Java à Ujung Kulon, qui comprendrait :
  - la description des priorités.
  - la mise au point de propositions.
  - détaillées d'actions efficaces.
  - l'identifïcation des parties qui pourraient réaliser les actions afin de coordonner et de réconcilier les différents intérêts et initiatives.
  - la formulation d'un plan de travail et d'un calendrier.
  - une étude des mécanismes visant la soutenabilité à long terme de la conservation du rhino de Java à Ujung Kulon.
- D'intégrer et de classer par ordre de priorité.
- Différentes sortes d'activités de conservation, par ex. la protection, la gestion et la recherche.
- De fournir des directives et les priorités aux bailleurs de fonds.
- De promouvoir des actions efficaces pour conserver le rhino de Java à Ujung Kulon.
- De décrire certaines actions possibles pour le Rhinocéros de Java dans la Réserve de Faune de Cat Loc, au Vietnam.

Le colloque comprenait des sessions intensives et interactives, soit en assemblée plénière, soit en groupes de travail. On s'est d'abord intéressé à la situation à Ujung Kulon, et les représentants venus du Vietnam ont participé aux différents groupes de travail. Cinq groupes principaux se sont rassemblés pour discuter d'Ujung Kulon. Les sujets de discussion de ces groupes étaient :

1. Méthodes de recensement et d'étude des rhinos.
2. Aspects de la protection intensive et des institutions de la conservation des rhinos à Ujung Kulon, y compris : unités de protection des rhinos, installations et équipement et formation.
3. Recherche et gestion de l'habitat, y compris : statut, changements et gestion; nombre de Banteng et d'autres herbivores et leur impact sur les rhinos; et capacité d'hébergement des rhinos.
4. Considérations analytiques de la viabilité de la population et de l'habitat (PHVA), y compris : taille idéale de la population à Ujung Kulon; installa tion d'une seconde population de Rhinocéros de Java en Indonésie; et création d'un sanctuaire pour les rhinos à Ujung Kulon.
5. Interactions avec les communautés.

Chaque groupe de travail a organisé ses réflexions en fonction d'un certain nombre de questions et de points majeurs touchant chaque problème important, ainsi que cela avait été résumé au Tableau 1 qui a fourni le cadre du Colloque. On a fourni des rapports sur chaque groupe de travail ainsi que d'autres documents antérieurs utiles. Ensuite, il y a eu une session plénière organisée selon ce même cadre, afin de générer des suggestions pour la conservation du Rhinocéros de Java au Vietnam.

Le Colloque a produit un certain nombre de recommandations importantes et de résultats.

Pour le Parc National d'Ujung Kulon, en Indonésiens recommendations étais:

1. Créer 2 ou 3 unités de protection des rhinos (RPU).

2. Améliorer les recensements des rhinos en intensifiant les comptages par transects, associés à un dispositif extensif de pièges photos.

3. Lancer des expériences de gestion de l'habitat qui comprennent l'enlèvement des Langkap et des Banteng afin d'augmenter la capacité d'hébergement. Ceci pourrait aider à rendre possible d'arriver au nombre souhaité qui est de 100 rhinos de Java.

La formation d'un consortium pour le rhino de Java fut une conséquence directe du Colloque. Il est destiné à poursuivre la communication et la coordination de toutes les organisations impliquées dans la conservation du Rhinocéros de Java en Indonésie.

Pour la Réserve de Faune de Cat Loc et le Parc National de Cat Tien, au Vietnam:

1. Mener un comptage des traces des rhinos à Cat Loc au début de 1998 avec l'assistance technique d'experts venus d'Indonésie; ce comptage serait lié ultérieurement à un recensement par photos.

2. Commencer un travail d'analyse de l'habitat en 1998, ici aussi avec l'aide de l'Indonésie.

3. Encourager le gros projet WWF en cours à Cat Tien à mener spécifiquement une action en faveur des rhinos, y compris l'augmentation du nombre des gardes de huit à quarante.

L'ensemble des résultats et des recommandations du Colloque sera publié et disponible auprès du GSRAs. Le développement des centres de reproduction assistée se poursuit dans l'habitat d'origine des Rhinocéros de Sumatra en Indonésie et en Malaisie. Les trois premiers rhinos (un mâle provenant d'Angleterre et deux femelles d'Indonésie) viendront des zoos vers le Sanctuaire des Rhinos de Sumatra ou Suaka Rhino Sumatera (SRS) au Parc National de Way Kambas, à Sumatra, en Indonésie, pendant la première semaine d'octobre 1997. Le Sungai Dusun Rhino Conservation Centre de la Péninsule malaise apporte d'autres améliorations aux installations, au personnel et aux programmes. Entretemps, le zoo de Cincinnati, aux Etats Unis, a observé des accouplements chez un couple de Rhinos de Sumatra.

Nous rappelons à nos lecteurs que le GSRAs dispose d'une page sur le site intemet de l'IRF, dont voici l'adresse : http:/www.rhinos-irf.org.

CHAIRMAN'S REPORT: AFRICAN RHINO SPECIALIST GROUP

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Next Af RSG meeting

The AfRSG Office has been busy planning for its next meeting which is due to be held in Namibia in April 1998. One of the tasks of the meeting will be to update and collate continental rhinoceros numbers, and I will report back on the latest updated figures to emerge in the next edition of *Pachyderm.*

CITES

The Chairman and Scientific Officer were part of IUCN's delegation at the 10th Conference of the Parties (COP) to CITES held in Harare, Zimbabwe in June 1997. A number of other AfRSG members also attended COP 10, either as part of their country delegations, or as members of WWF, TRAFFIC and other NGO delegations, with one member sitting on the CITES Secretariat. Due to the length of time spent debating the downlisting of African elephant populations and the lifting of ivory trade-bans in three proposing countries, limited time was left for discussion of the proposed annotated downlisting of 'South Africa's white rhino population to allow a regulated trade in horn some time in the future, but with an initial zero quota. In effect this proposal sought support for the continued efforts by South Africa to investigate the desirability of reopening the trade, and in particular to continue the development and investigation of possible control measures to prevent illegal laundering of horn which might threaten other taxa of rhinos. Although IUCN did not make any interventions from the floor on the South African rhino proposal, the Parties to the Convention were able to consult IUCN and TRAFFIC's review of the white rhino downlisting proposal, to which many AfRSG members provided input. The white rhino proposal was narrowly defeated, just failing to achieve the necessary two-thirds majority. When the South African proposal was put to a secret ballot later in the proceedings, it again got a majority of votes, although with a significantly reduced majority.

At COP 10, the CITES Secretariat expressed its appreciation and support for the assistance given to it by the AfRSG.

A limited print run of the **first** edition of the AfRSG's newsletter, African Rhinos, was also produced and distributed at COP I 0.

Development of ‚Indicators of Success"

In the last edition of *Pachyderm* I discussed the progress that had been made in developing indicators of success (called for in CITES Resolution Conf. 9.14) with a view to using these indicators in future to evaluate policy interventions pursuant to CITES. The need for a workshop, including the participation of rhino horn trade and conservation experts, to develop the process further was highlighted. At COP 1 0, the CITES Secretariat recommended that the Parties provide financial support to the AfRSG to enable the Group to hold the workshop. The representative of the SADC countries in Committee II also spoke strongly in favour of funding the proposed workshop. Unfortunately, despite this strong support, severe budget cuts meant that the Parties to CITES were unable to support any new projects.

The AfRSG has therefore prepared a project proposal which it has sent to the CITES Secretariat who will use this proposal to source funds for the workshop. It is provisionally planned to hold the workshop in mid-September 1998 (contingent on funding). The process of developing the "indicators of success" is also scheduled to be discussed at the upcoming AfRSG meeting.

AfRSG involvement in rhino poaching and horn dealing court cases

In South Africa (Africa's main rhino range State), past sentences for those convicted of rhino-related crimes have generally not been commensurate with the severity of the crimes committed (often with only paltry fines

being imposed). In an attempt to improve this situation, the AfRSG's Scientific Officer appeared (at the request of Natal Parks Board's Wildlife Investigators and the Endangered Species Protection Unit of the South African Police Service) as an expert state witness in South African rhino horn dealing and poaching cases in KwaZulu-Natal during 1997. In each case, the Scientific Officer worked closely with the investigating officer and prosecutor, and presented both written and verbal statements to the court arguing in aggravation of sentence. In particular, the Scientific Officer stressed the seriousness of rhino crimes, and the need for the imposition of heavy sentences to act as a deterrent.

In the **first** case, the four convicted of illegal possession and attempted dealing in one rhino horn were sentenced to a total fine of R85,000 (approximately US$17,000), well above the local black market value of the horn, or a total of 9 years 3 months in prison.

In the second case, a man convicted of poaching four white rhinos received the maximum sentence of ten years in jail (plus an effective additional two years for stealing a vehicle used in the crime) without the option of a fine. This was the first time that the maximum jail sentence for a rhino **crime** had been imposed by a South African court. Field conservationists were very pleased with the sentence.

Horn fingerprinting

The AfRSG has obtained sponsorship from the World Wide Fund for Nature to undertake its horn fingerprinting project. Pilot projects have indicated that trace element and stable isotopic analysis of horn samples provides a chemical signature specific to different locations. The problem to date has been that samples from only a limited number of areas have been analysed, and there is a need to increase the number of baseline areas for which horn fingerprints are available. The AfRSG office has therefore initiated the process of obtaining samples of horn for this project from as many key and important populations throughout the continent as possible. The project also seeks to refine the statistical analysis procedures used to discriminate between different areas.

In the most recent rhino horn dealing case in South Africa, the results of stable carbon isotope analysis of the horn in question was presented in court for the first time, and showed that the horn in question was definitely that of a black rhino. With the delay caused by the postponement of this case, it is hoped that additional horn-fingerprinting data obtained from this horn, and results of trace element and other stable isotopic analyses can be analysed to shed light on the likely origin of the horn.

Zimbabwe

In the last edition of *Pachyderm* I mentioned the participation of AfRSG members in a workshop to review Zimbabwe's rhino policy. Following the workshop, I am pleased to report that the Zimbabwean Minister of the Environment and Tourism has subsequently published and released the country's new Rhino Policy and Management Plan, and that it incorporates many of the critical success factors recommended by the AfRSG members at the workshop. It is encouraging that the new plan recognises the need for constructive partnerships with the private sector and non-governmental agencies, by requiring the establishment of national and provincial rhino management committees which are to include representation by stakeholders from government, and also from the private sector and civil society. However, it is concerning that a number of properties which currently form part of Zimbabwe's black rhino conservancies have recently been designated for expropriation by the government to provide additional land for resettlement.

Following CITES COP I 0, the Chairman and Scientific Officer took the opportunity to visit and be briefed on rhino and community conservation initiatives in the Save Valley and Bubiana conservancies and at Malilangwe. A meeting was also held with the Warden of Gona-re-Zhou National Park to discuss park security.

The Scientific Officer and another AfRSG member also attended a meeting in Harare in December 1997 to discuss a possible SADC rhino conservation project that might be funded by the Italian Government,

Northern white rhino

The situation on the ground in Garamba National **Park** in the Democratic Republic of Congo remains extremely serious, with poachers having moved into the rhino's core area, and a number of carcasses and horns having been found. Only about twenty rhinos may remain, and a more accurate estimate of the number of rhinos surviving will only be available later following more aerial survey work.

Project review and priority rating

The AfRSG office has continued reviewing and priority-rating proposed projects on the request of a number of funding organisations, in particular the World Wide Fund for Nature (WWF) and US Fish and Wildlife Service's Rhino and Tiger Conservation Fund.

AfRSG sponsors

Once again I would like to acknowledge the generous funding received from a number of sponsors, without which the AfRSG's activities would be seriously curtailed. The initial three year contract for the AfRSG's Scientific **Officer** (jointly funded by the UK Department of the Environment (UK DOE), the World Wide Fund for Nature (WWF) and the European Commission) ended in mid-October 1997. I would particularly like to thank the UK Department of the Environment for providing the necessary bridging **finance** to support the Scientific Officer's work till the end of June 1998. 1 hope that the necessary funds can be secured to employ the Scientific Officer for the remainder of the IUCN quadrennium: please contact me should you be able to provide any support. The close relationship and collaboration between WWF and the AfRSG continues, and support for the work of the AfRSG comprises one of the five major core programmes of WWF's efforts on behalf of African rhinos. WWF will be the major sponsor of the next AfRSG meeting scheduled for Namibia in April 1998, has continued to provide support to the Chairman, will finance an edition of Pachyderm, and has provided the necessary funds to enable the horn-fingerprinting project to be undertaken. Mount Etjo Safari Lodge is thanked for generously offering the AfRSG a significant discount to support the holding of the next AfRSG meeting. US Fish and Wildlife Service's Rhino and Tiger Conservation Fund is also thanked for supporting the revision and production of a new edition of the "Training programme for field rangers involved in rhino population monitoring".

RAPPORT DU PRESIDENT: GROUPE DE SPECIALISTES DES RHINOS AFRICAINS

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Prochaine réunion du GSRAf

Le Bureau du GSRAf a été très occupé par la préparation de la prochaine réunion qui doit se tenir en Namibie, en avril prochain. Un des points importants de la réunion sera de remettre à jour et de rassembler les chiffres concernant les rhinos du conti¬ nent, et je présenterai mon rapport sur les tout derniers nombres dans la prochaine édition de *Pachyderm.*

CITES

Le Président et le Responsable scientifique faisaient partie de la délégation de l'UICN à la 10e Conférence des Parties à la CITES, qui a eu lieu à Harare, au Zimbabwe, en juin 1997. Un certain nombre d'autres membres du GSRAf ont aussi assisté à la COP 10, soit en tant que membres de leur délégation nationale, soit en tant que membres du WWF, de TRAFFIC ou tt de délégations d'autres ONG, dont un représentant siège au Secrétariat de la CITES. En raison du temps passé à débattre du déclassement des populations d'éléphants d'Afrique et de la suppression de l'interdiction du commerce de l'ivoire dans les trois pays qui la demandaient, il ne restait plus que peu de temps pour discuter de la proposition de déclassement de la population de rhinos blancs d'Afrique du Sud afin de permettre un commerce réglementé de la corne dans un avenir raisonnable, mais avec un quota de zéro pour commencer. En réalité, cette proposition demandait le support des efforts suivis fournis par l'Afrique du Sud pour analyser l'opportunité de la réouverture du commerce et particulièrement pour poursuivre la mise au point et les recherches de mesures de contrôle réalisables, afin d'empêcher le blanchiment illégal de come, qui pourrait mettre en danger d'autres taxons de rhinos. Bien que l'UICN n'ait fait aucune intervention au sujet de la proposition de l'Afrique du Sud sur les rhinos, les Parties de la Convention ont pu consulter la position de 1' UICN et de TRAFFIC sur la proposition

de déclassement du rhino blanc à laquelle beaucoup de membres du GSRAf ont participé. La proposition concernant le rhino blanc a échoué de peu, manquant de quelques voix la majorité requise des deux-tiers. Quand la proposition de 1'Afrique du Sud fut mise au vote secret plus tard au cours des discussions, elle reçut de nouveau une majorité de voix, mais cette fois, elle était significativement plus faible.

A la COP, le Secrétariat de la CITES a exprimé sa reconnaissance et son support pour l'assistance fournie par le GSRAf.

On a aussi produit un tirage limité de la première édition de la revue du GSRAf, African rhinos, qui fut distribué à la COP .

Mise au point des "Indicateurs de Succès"

Dans la dernière édition de Pachyderm, j'ai discuté les progrès réalisés dans la mise au point d'indicateurs de succès (demandés lors de la Résolution 9.14 de la Conférence de la CITES) afin de les utiliser pour évaluer les changements de politique conformément à la CITES. On a souligné la nécessité d'un atelier qui comprendrait la participation d'experts en commerce de corne de rhino et en conservation. A la COP 10, le Secrétariat de la CITES a recommandé que les Parties apportent un support financier au GSRAf pour permettre au Groupe de réunir cet atelier. Le représentant des pays de la SADC au Comité II a défendu énergiquement le financement de cet atelier, Malheureusement, malgré ce vigoureux soutien, les coupes rigoureuses pratiquées dans le budget ont empêché les Parties de la CITES de soutenir tout nouveau projet.

C'est pourquoi le GSRAf a préparé un projet de propo sition qu'il a envoyé au Secrétariat de la CITES qui l'utilisera pour générer des fonds pour cet atelier. Il est prévu de tenir cet atelier vers la mi-septembre 1998 (en fonction des fonds). Le processus de mise au point des "indicateurs de succès" est aussi au programme des discussions de la prochaine réunion du GSRAf.

Implication du GSRAf dans les procès traitant du braconnage des rhinos et des transactions touchant la corne

En Afrique du Sud (le pays principal de l'aire de répartition des rhinos en Afrique), les peines infligées à ceux qui étaient reconnus coupables de crimes liés aux rhinocéros n'étaient en général pas à la mesure de la gravité des crimes commis (souvent des amendes dérisoires). Dans le but d'améliorer la situation, le Responsable Scientifique du GSRAf (à la demande des enquêteurs de la faune du Natal Parks Board et de l'Unité de Protection des Espèces menacées du Service de Police Sud Africain) a paru comme expert national, témoin, dans les cas de transactions de cornes et braconnage de rhinos sudafricains, au KwaZulu-Natal en 1997. Dans chaque cas, le Responsable Scientifique a travaillé en collaboration étroite avec l'enquêteur et le procureur, et il a fourni des déclarations tant écrites que verbales au tribunal, arguant pour une augmentation des peines. Le Responsable Scientifique a particulièrement insisté sur la gravité des crimes touchant les rhinos et sur la nécessité d'imposer d'assez fortes peines pour avoir un effet dissuasif.

Dans le premier cas, les quatre personnes reconnues coupables de possession et de tentative de commerce illégales d'une corne de rhino ont été condamnées à une amende totale de 85.000 rands (environ 17.000 dollars US), ce qui est bien au-dessus de la valeur de la corne au marché noir local, ou à un total de 9 ans et 3 mois de prison.

Empreinte "digitale" de la corne

Le GSRAf a obtenu le parrainage du Fonds Mondial pour la Nature pour lancer son projet d'"empreinte" des cornes. Des projets pilotes ont montré que l'analyse des traces d'éléments et d'isotopes stables dans les échantillons de corne apporte une signature chimique spécifique aux différents lieux d'origine. Pour l'instant, le problème est qu'on n'a encore analysé des échantillons que de quelques régions et qu'il est nécessaire d'augmenter le nombre de lieux de référence pour lesquels les" empreintes" des cornes seront disponibles. Le bureau du GSRAf a donc commencé à recueillir pour ce projet, des échantillons de cornes venant des populations clés ou importantes les plus nombreuses possibles dans tout le continent. Le projet vise aussi à affiner le processus statistique d'analyse utilisé pour faire la différence entre les régions. Dans le cas le plus récent concernant le commerce de corne en Afrique du Sud, les résultats de l'analyse de l'isotope de carbone stable de la corne en question ont été présentés au tribunal pour la première fois, et ont montré que la corne était certainement celle d'un rhino noir. Malgré le délai dû au report de ce cas, on espère que l'on pourra analyser

des données supplémentaires sur l'empreinte" de cette corne et les résultats de l'analyse des traces d'éléments et des autres isotopes stables pour déterminer 1'origine probable de la corne.

Zimbabwe

Dans la dernière édition de Pachyderm, j ' ai mentionné la participation de membres du GSRAf à un atelier destiné à réviser la politique du Zimbabwe en matière de rhinos. Suite cet atelier, j'ai le plaisir d'annoncer que le Ministre zimbabwéen de l'Environnement et du Tourisme a publié les "Nouvelle politique et Plan à de gestion" nationaux et que ceci intègre de nombreux facteurs de succès critiques que les membres du GSRAf avaient recommandés au cours de l'atelier. Il est encourageant de constater que le nouveau plan reconnaît la nécessité de partenariats constructifs avec le secteur privé et avec les organes non gouvernementaux, en demandant la création de comités nationaux et provinciaux de gestion des rhinos, qui devraient inclure des représentations des personnes concernées au gouvernement mais aussi dans le secteur privé et dans la fonction publique. Il est cependant inquiétant de constater qu'un certain nombre de propriétés qui font actuellement partie des réservoirs naturels de rhinos noirs au Zimbabwe, aient été récemment choisies par le gouvernement pour être expropriées en vue d'y pratiquer de nouveaux peuplements

Suite à la COP 10 de la CITES, le Président et le Responsable Scientifique ont saisi l'occasion de visiter et de se renseigner sur les initiatives touchant les rhinos et la conservation avec les communautés locales dans les réserves de la vallée de Save et de Bubiana et à Malilangwe. Ils ont aussi rencontré les conservateurs du Parc National de Gona-re-Zhou avec qui ils ont discuté de la sécurité du parc. Le Responsable Scientifique et un autre membre du GSRAf ont aussi assisté à une réunion à Harare en décembre 1997 pour discuter de la possibilité de lancer un projet de conservation des rhinos de SADC qui pourrait être financé par le Gouvernement italien.

Rhino blanc du nord

La situation du Parc National de la Garamba, en République Démocratique du Congo reste extrêmement préoccupante, car les braconniers ont pénétré au coeur de la zone des rhinos, et on a découvert un certain nombre de carcasses et de cornes. Il est possible qu'il ne reste qu'une vingtaine de rhinos, et une estimation plus précise du nombre de rhinos survivants ne sera possible qu'après de nouveaux travaux de recherches aériennes.

Révision des projets et classement des priorités

Le bureau du GSRAf a poursuivi la révision et le classement des projets proposés, à la demande d'un certain nombre d'organismes bailleurs de fonds, en particulier le Fonds Mondial pour la Nature (WWF) et le Fonds de Conservation du Rhino et du Tigre du Département américain de la Pêche et de la Faune.

Sponsors du GSRAf

Une fois encore, je voudrais remercier pour les fonds considérables reçus d'un certain nombre de sponsors, sans lesquels les activités du GSRAf seraient sérieusement restreintes. Le premier contrat de trois ans du Responsable Scientifique du GSRAf - financé conjointement par le Département britannique de l'Environnement (UK DOE), le Fonds Mondial pour la Nature (WWF) et la Commission Européenne - a pris fin à la mi-octobre 1997. J'aimerais remercier particulièrement le Département britannique de F Environnement qui a apporté les fonds nécessaires pour assurer le travail du Responsable Scientifique jusqu'à la fin juin 1998. J'espère que nous pourrons trouver les fonds pour employer ce collaborateur jusqu'à la fin du programme de quatre ans de l'UICN (prière de me contacter si vous pouvez nous aider de quelque façon que ce soit).

La relation étroite et la collaboration continuent entre le WWF et le GSRAf, et le soutien apporté au travail du GSRAf comprend un des cinq programmes majeurs de l'implication du WWF en faveur des rhinos. Le WWF sera le sponsor principal de la prochaine réunion du GSRAf qui doit se dérouler en Namibie en avril 1998, il a continué à soutenir le Président, il financera une édition de Pachyderm et il a fourni les fonds nécessaires au lancement du projet sur les "empreintes". Je remercie encore le Mount Etjo Safari Lodge qui nous a offert des réductions appréciables pour la tenue de la prochaine réunion du GSRAf. Que le Fonds de Conservation du Rhino et du Tigre du Département américain de la Pêche et de la Faune soit aussi remercié pour son support à la révision et à la production d'une nouvelle édition du "Programme de formation pour les gardes impliqués sur le terrain dans la surveillance des populations de rhinos".

CONFLITS HOMME-ELEPHANTAUTOGO

Okoumassou Kotchikpa
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GENERALITIES

Du point de vue superficie, le Togo est un des plus petits Etats d'Afrique de l'Ouest. Il couvre une superficie de 56,500km^2 s'étirant sur une longueur de 600km et une largeur variant entre 50 et 120km.

Il est limité au Sud par l'Océan Atlantique, à l'ouest par le Ghana, au nord par le Burkina Faso et à l'Est par le Bénin. Situé entre le 6° et le 11° de latitude nord, le méridien de Greenwich et 1°4' de longitude est, il est caractérisée par une végétation de savane soudanienne dans le nord (Brunel, 1981) alors qu'au centre et plus au sud dans les plateaux et à l'Est, s'étend une savane arborée; l'ouest du pays est couvert par une mosaïque de forêts semi-décidues et décidues; la moyenne des pluies varie entre 900 et 1,400mm selon les régions (Vanpraet, 1977). La flore dans son en semble est altérée par les feux de brousse et l'abattage des arbres (Yahmed, 1985).

Comme dans beaucoup de pays du tiers monde, la population humaine au Togo ne cesse de croître et cette croissance prend l'allure d'une explosion démographique sans précédent. Estimée à 4,200,000 habitants en 1996; elle pourrait atteindre 5,000,000 en l'an 2,000 (Bos et al., 1993), avec une densité de 88 habitants au km2. Contrairement au statut de cette population, la production alimentaire par habitant diminue progressivement.

La capacité de charge des terres en milieu rural, évaluée à 65-85 personnes par km2 est en dépassement déjà dans certaines zones (PNUD et FAO, 1991) où les populations locales ont plus besoin de terre. Au même moment, le besoin d'espace pour la conservation du patrimoine biologique se pose.

C'est dans ce contexte, que l'homme et la faune sauvage rentrent en compétition pour la conquête du potentiel foncier, événement qui fait naître souvent des conflits, tel le cas des conflits entre l'homme et l'éléphant perçus dans les zones de distribution des pachydermes.

LES CONFLITS HOMMES - ELEPHANTS

- La conservation du cheptel sauvage, notamment la population d'éléphants au Togo pose des problèmes qui s'avèrent difficiles à résoudre pour deux raisons essentielles:

- La population humaine est dépendante visa vis de la viande du gibier.

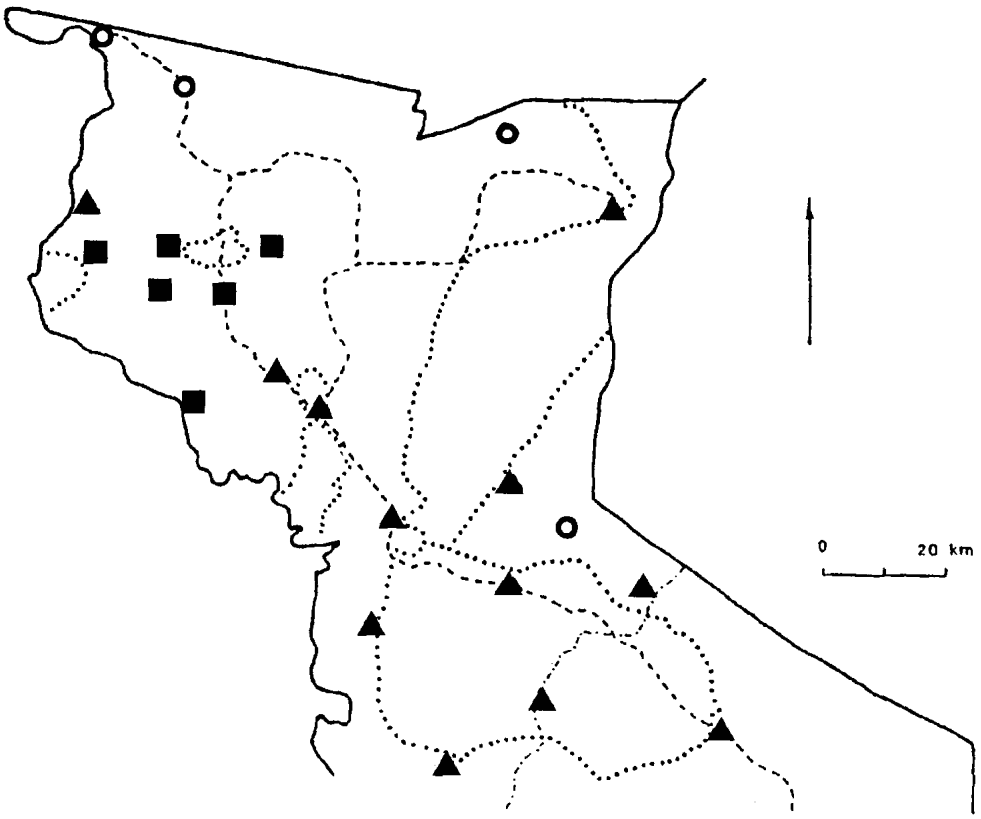
Beaucoup d'habitats naturels réservés aux éléphants sont rendus inutilisables suite à l'extension des projets de développement urbain et agricole. Environ 52% du territoire est dévolu à l'agriculture et au pâturage et 5.3% recouverte par une forêt dense (Mackinnon, 1996), 14% environ pour les aires protégées et le reste réservé pour d'autres utilisations.

ZONES DE REPARTITION DES ELEPHANTS

Au Togo, les éléphants sont divisés en deux populations. La population du nord, jusqu'en 1990, rencontrée à l'intérieur et dans les zones périphériques des Parc nationaux de la Fausse - aux - lions et de la Kéran, des réserves de Faune d'Oti - Mandouri et de Galangashie. L'autre population se retrouve au centre du pays à l'intérieur et dans les environs du Parc National de Fazao - Malfacassa, de la réserve de Faune d'Abdoulaye et aires adjacentes (MET, 1991) conf. Figure 1.

La situation des éléphants au nord du pays a changé complètement en 1995 (Sam et autres, 1996). Les pachydermes dont la présence était permanente dans les écosystèmes précités avant les années 1990, sont devenus absents ou saisonniers à partir de 1995 (Figure 2). Cette situation est liée aux crises socio-politiques intervenus dans le pays entre 1990 et 1992 (Sam et autres, 1996).

La population d'éléphants du centre du pays est relativement très peu connue. Des études sérieuses sont nécessaire pour déterminer son statut et pour identifier les pressions auxquelles elle est soumise.



1990

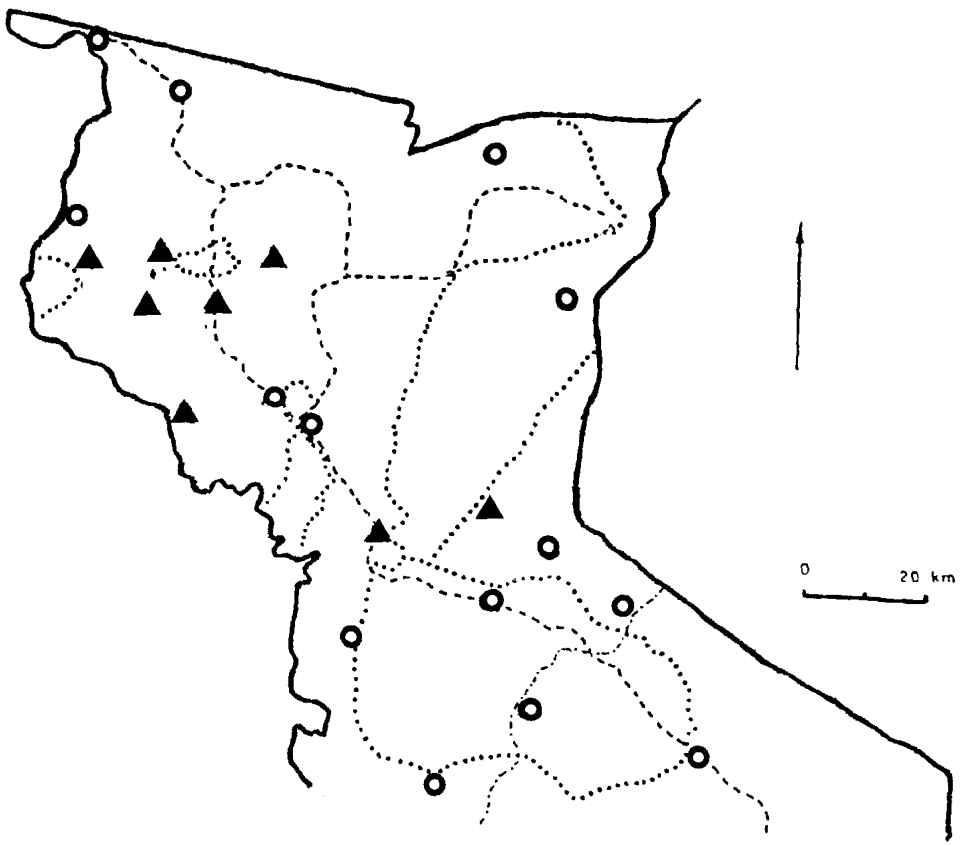
Les éléphants étaient permanement présents

Les éléphants étaient saisonniérement présents

Les éléphants étaient absents

Sam et autres, 1996)

Figure 1. Distribution des éléphants dans l'extréme nord du Togo en 1990



995

es éléphants étaient saisonniérement présents

es éléphants étaient absents

Figure 2. Distribution des éléphants dans l'extréme nord du Togo en 1995

LES ZONES DES CONFLITS

Les éléphants et les hommes, chacun souffre de la présence de l'autre lorsqu'ils utilisent le même écosystème. Cette cohabitation qui n'est pas sans effet, se manifeste par le ravage des récoltes que causent les éléphants dans les plantations et les menaces des locaux sur les éléphants. C'est donc une menace réciproque.

Au Togo, les zones de conflits sont principalement les localités riveraines aux aires protégées. Quelques uns des rapports tenant lieu de plaintes recueillies auprès des populations et les constats effectués par le personnel de l'administration, justifient la relation de la cohabitation

En effet, dans la Préfecture de Kpendjale, Tchambougou Kokou (1994) rapporta que 12,259 tonnes de récoltes furent détruites par les éléphants dans les localités de Borgou, de Koundjoaré et de Mandouri respectivement située entre 10°45'LN et 0"32'LE, 10°58'LN et 0033'LE et 10°48'LN et 0°56'LE.

Du côté de la préfecture de Bassar, dans le village de Kona situé entre 9"12'LN et 0°1 'LE, les dégâts furent évalués à cinquante quatre mille quatre cents quarante (54,440) francs (Djato Bama, 1994).

Bakemsa Kokou, Mars 1997, constata que 4.5ha de champs de pastèque , 30 buttes de semenceaux d'igname, 727 semenceaux correspondant à 0.7ha d'ignames, 268 buttes de patate douce correspondant à 0.25ha et 540 pieds de manioc équivalent à 1.4 ha furent détruits par les éléphants en déplacement saisonnier dans la réserve de Faune d'Oti - Mandouri, chef- lieu de la Préfecture de Kpendjale, les 16, 18, et 25 Janvier 1997.

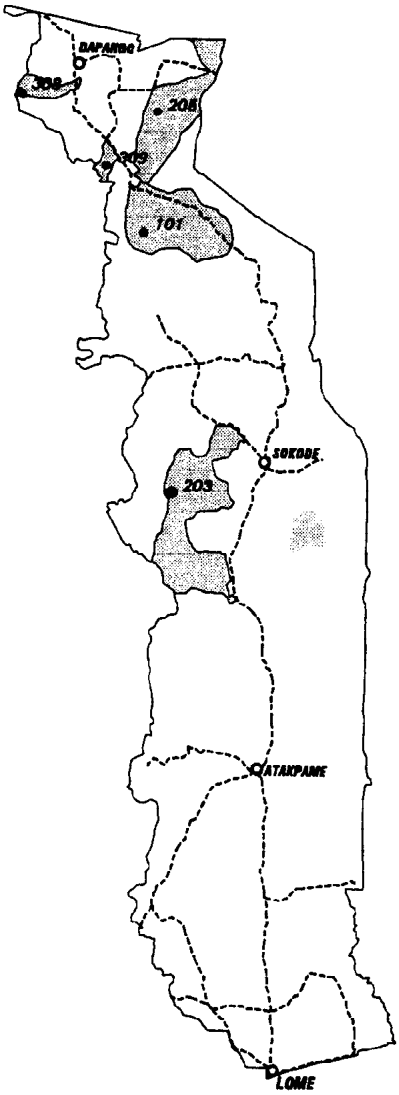
Vers les années 1989, au niveau des zones de distribution des éléphants au Togo et dans certaines localités ci-dessus géographiquement définies, les habitants furent déçus par les divers dégâts occasionnés par les éléphants à leur préjudice. Cette situation a conduit les populations locales à coopérer avec les chasseurs venus du Ghana pour abattre les pachydermes en 1990-1992 (Sam et autres, 1996).

Contrairement à ce qui précède, il convient de souligner que l'action des locaux sur la population d'éléphants du Togo a été très néfaste pendant les périodes de troubles. Entre 1990 et 1993, à la faveur des troubles socio-politiques, plus de 37 éléphants ont été abattus. Les plus importantes aires de distribution que sont le Parc National de la Kéran et le Parc National de la Fausse - aux- lions ont été partiellement ou totalement envahis par les populations. Face à cette situation, les éléphants qui ont survécu au drame ont migré pour se réfugier dans les pays voisin.

CONCLUSION

Les menaces réciproques que constituent les conflits homme-éléphant ont connu une évolution régressive entre 1990 et 1992, en rapport avec la chute des effectifs des éléphants.

Cependant, en tenant compte de l'augmentation de la population humaine, la baisse de la fertilité des sols, la dégradation des habitats, l'avenir des éléphants au Togo suscite des inquiétudes si des stratégies efficaces de gestion ne sont pas mises en place. C'est seulement à ce prix que l'éléphant pourra encore résister aux différentes pressions dans le pays.



KEY TO POPULATION ESTIMATES

CODE	CENSUS/ZONE NAME	ESTIMATE
101	Keran NP	25
203	Fazao Malfacassa GR	45
205	Oti GR	20
308	Fosse qux lions FR	128
309	Galangachi FR	10

Source: African Elephant Database

Elephant Range ----- Road ● Input Zone o Towns

Figure 3. Localisation des conflits homme-éléphant.

REFERENCES

Banque Mondiale (1995) Rapport sur 1'état de 1'environnement au Togo, Washington D.C. Rapport non publie.

Bakemsa, K. (1997) Compte rendu de 1 tournee du 21/ 03/97 a Mandouri, No21/DRERFS.

Barnes, R.F.W. (1996) The conflict between humans and elephant in the Central Africa forest. *Mammal Rev.* 1996, Volume 26, no 2/3, 67- 80.

Bos et al. (1993) Projections de la population mondiale, edition 1992-1993, John Hopkins University Press, Baltimore.

Brunel, J.F. (1981) *Végétation, Atlas du Togo*, 16-17, les editions J.A Paris.

Departement de la division de la population des Nations-Unis, New York, 188/ST/ESH/SER/106.

Djato, B. (1994) Compte rendu des dégâts, No 03/ AEB du 4 Juin 1994, Antenne Environnement de Bassar.

M.E.T (1991) Plan de conservation de 1'éléphant au Togo, Ministere de 1'Environnement et du Tourisme, Lome. Rapport public.

Parker et Graham (1989) Men, elephants and competition. *Symposia of the Zoological Society of London*, 61: 242-252.

PNUD et FAO (1991) La dégradation des terres dans 14 secteurs DRDR du Togo. Projet PNUD/FAO/TOG/84/ OOo; PNUD/FAO, Lome. Rapport non publie.

Sam et autres (1996) Rapport de 1'étude préliminaire des éléphants de 1'extreme Nord - Est Ghana et de 1'extreme Nord Togo. Non publie.

Tchambougou, K. (1994) Rapport des degats causes par les elephants dans les plantations d'ignames et autres dans la Prefecture de Kpendjal, Antenne Environnement de Kpendjal.

Vanpraet, C.L. (1977) Carte *ecologique du convert vegetal du Togo.*

ELEPHANTS, RHINOS AND THE ECONOMICS OF THE ILLEGAL TRADE

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INTRODUCTION

The June 1997 meeting of the Convention on International Trade in Endangered Species (CITES) was something of a turning point for wildlife trade policy. The eight-year old ban on international trade in elephant products was relaxed slightly, to allow three African elephant Range States (Namibia, Botswana and Zimbabwe) to initiate a strictly controlled legal trade. A proposal by South Africa to investigate the potential of a controlled legal trade in rhino products was defeated, but by a small margin. There appears to have been a shift in international thinking to approaches that are more innovative than simple blanket trade bans to save endangered species.

What happens next? Are the latest CITES measures an appropriate way to tackle the problem of elephant poaching? Was the decision to maintain a complete ban on rhino products the correct one? These are not easy questions, and there may be no straightforward answers, especially as the issue of wildlife trade policy remains one charged with controversy and emotion. However, the discipline of economics may offer some fresh insight into these issues, and provide some direction for future policy measures. Inspired by economic analysis, this paper considers some alternative views on elephant and rhino trade issues.

ELEPHANTS

The ivory ban

Few people dispute that the trade in elephant products, especially ivory, was poorly regulated before 1989. Poaching was rife, and large elephant populations were decimated in many parts of Africa. A CITES Appendix II listing, along with various other measures such as the 1986 quota system, failed to solve the problem. According to the Ivory Trade Review Group, these measures failed because of "weak management and enforcement capacity".

There were only two evident solutions to this problem. One was to strengthen management and enforcement capacity; the other was to ban all trade in elephant products, by listing the African elephant on CITES Appendix 1. The latter option was chosen in 1989.

Eight years later, there is still much disagreement over the effectiveness of the ivory ban. There is no doubt that both ivory trade levels and prices dropped considerably after 1989, that poaching levels dropped in some (but not all) Range States (Dublin *et al.*, 1995), and that many elephant populations stabilised and/or increased, but what does this signify? Proponents of the ban argue that this is clear evidence that the ban has succeeded, but this conclusion may be premature and incorrect.

Around the time of the 1989 ban, there was widespread media coverage of the elephant's plight, accompanied by appeals to consumers to refrain from buying ivory. In western consuming nations, these media appeals were especially effective in suppressing or even eliminating much of the consumer demand for elephant products. The drop in ivory prices probably has much more to do with the impact of western media appeals than with actual enforcement of the CITES ban.

Economic logic tells us that if the supply of a product is reduced, its price will increase unless there is an equal or greater compensating drop in demand. Trade bans are often intended to reduce both supply and demand, but do not always achieve this. Trade bans on products such as rhino horn and tiger bone did not result in sufficient reductions of consumer demand, and thus brought about price increases, which provided added incentives for poaching and illegal trade ('t Sas-Rolfes, 1997). There is a growing realisation that trade bans cannot be effective without the use of direct measures (such as consumer awareness campaigns) that genuinely reduce consumer demand to residual levels. Whether such reductions in demand are always achievable is a moot point.

Few people would argue that consumer demand for ivory and elephant products has declined sufficiently for the elephant to be declared safe. Recent evidence suggests that demand in Asia continues to be significant; at the latest CITES meeting, TRAFFIC reported that close to 100 tonnes of illegal ivory had been seized since 1989, and that 80% of this was destined for Asian consuming markets (Anon., 1997). Whereas most western consumers have been persuaded to stop buying ivory, the same cannot be said for Asia. With the continued growth of Asian economies and rising levels of disposable income, there is a real risk that future Asian consumer demand will increase rather than decline. This would drive up black market prices for ivory, and add to existing poaching pressures. Given this possibility, what is the most appropriate response: to maintain a complete ban whilst attempting to discourage Asian consumers; or to reinstate some form of regulated legal trade?

To address this question, let us consider likely future scenarios for elephant management in Africa.

FUTURE PROSPECTS

According to the IUCN's African Elephant Database (Said *et al.,* 1995), there were between 286,000 and 580,000 elephants in Africa in 1995. Of these, some were part of declining populations, but others represented healthy populations that were expanding. Indeed, there are several populations that have reached levels at which they are degrading their habitat or encroaching on the lands and livelihoods of local rural people.

In previous times, natural processes may have regulated elephant numbers. However, in modem Africa there are many instances where unchecked expansion of elephant populations will impose serious (and unacceptable) economic and social costs on African people. To prevent this, conservators can erect fences and control elephant numbers using one of three methods: translocation, birth control and killing (by sport hunting or culling, with or without product harvesting). Unfortunately, all these options are also costly.

Translocation is a seemingly humane but a very costly way to control elephant numbers, and is only feasible as long as suitable unpopulated habitat remains available. Birth control techniques are being developed and have yet to be perfected. They are also likely to remain costly, and raise some animal rights and welfare concerns. Killing elephants may be regarded as inhumane, but remains the least costly method of control. Nevertheless, even conventional elephant culling is not costless. If products such as ivory and skins are not harvested and sold commercially to international markets, the financial costs of culling typically exceed any possible revenues.

In reality, many elephant populations are already subjected to a form of culling; it takes place informally, in an uncontrolled and erratic way, and is usually called "poaching". A challenge for the future is whether to legitimise and try to regulate culling, or whether to allow it to continue unabated in its present illegal form.

Of all the methods of population control, a combination of sport hunting and culling with the commercial, international sale of elephant products remains the most economically attractive option, whether legal or illegal, which can still maintain the ecological integrity of the area. This is unlikely to change in the foreseeable future.

As elephants continue to reproduce and die, stockpiles of ivory will continue to increase. According to TRAFFIC, African elephant Range States now possess in excess of 470 tonnes of stockpiled ivory potentially worth millions of dollars (Milliken, 1997). However, the Range States are unable to sell these stockpiles, even though most of their conservation departments are facing ongoing budget cuts and are desperately short of funds for basic **field** protection.

This incongruous state of affairs cannot prevail indefinitely. Either the market demand for ivory will disappear, or the ivory stockpiles will somehow find their way to the market. Since the former scenario seems unlikely, we can expect the latter. For the sake of elephant conservation, it makes sense to try and regulate this process in a way that will be beneficial to conservation; for example, by ensuring that the proceeds from ivory sales are spent on covering the costs of field protection.

The problem that remains is that many Range States are far from establishing sufficient management and enforcement capacity to cope with a legal trading regime. This raises fears that any legal trade will provide loopholes that allow for "laundering" of ivory from illegal sources. The issue of ivory trade regulation could continue as a political tug of war between countries and environmental groups that prefer to vest the responsibility of elephant protection with international institutions and customs officials on one end, and those

Range States that carry the substantial costs of proper field management and are looking for a way to offset them on the other.

In the long run, this dispute will only be resolved completely when all remaining Range States end up with effective, synchronised management and enforcement systems, while elephants are likely to become locally extinct in Range States with inadequate enforcement. Such systems are expensive, and to justify their costs, governments will seek sources of revenue to justify them. If there is to be more than just a few populations of elephants in key tourist destinations and safari hunting areas, a controlled legal ivory trade seems almost inevitable.

If we are prepared to accept this inevitability, the next question to address is how to set about reintroducing legal trade. Given the disparities in institutional capacity between different Range States, this is no easy issue: there are likely to be winners and losers in this process. It is important to try and keep any losses to a minimum. As part of this process, one aspect deserves close attention: the handling of all existing legally held ivory stockpiles.

THE STOCKPILE ISSUE

From the last CITES meeting, CITES provides a mechanism whereby donor countries and organizations can acquire stockpiles of ivory from Range States for "non-commercial purposes". This measure is designed to eliminate potential security problems and financial liabilities imposed upon African Range States, and tries to encourage the creation of conservation trust funds with the proceeds from such sales. Since the ivory thus acquired could not be resold, the new owners would be obliged to either retain the stockpiles or destroy them. What should they do?

For some, the answer may seem simple: destroy the stockpiles to prevent any possibility of them entering the black market, and thereby send out a message that ivory should not be used commercially. However, there are two fundamental misconceptions underlying this approach. One is that leakages of stockpiled ivory onto the black market will threaten living elephants. The other is that destroying stockpiles of ivory will dissuade further consumption and therefore poaching. In both cases, the reverse is probably true.

Photo Credit: Esmond Bradley Martin

Ivory store room at Kruger National Park,Skukuza, South Africa

Trading in old ivory stocks does not in itself pose a threat to living elephants; in fact it is more likely to help conserve them. Consumers who have already decided to acquire ivory will seek the best price for a certain quality of product. **If** their only source is from fresh illegal stocks, they are likely to contribute indirectly to further poaching of elephants. However, if they are offered the option of a cheaper alternative source, they will obviously choose that, especially if that source is also legal. If ivory from legal stockpiles is offered at competitive prices, poaching and black market trading will be discouraged through competition, not encouraged.

Destroying stockpiles of ivory reduces the potential legal supply relative to demand, thereby increasing the perceived market value of all ivory. This pushes up the street price of ivory, and makes black market trading and poaching more lucrative. If some Range States start legal trading, the destruction of other stockpiles will also enhance their monopoly power. This will benefit those particular Range States by increasing their revenues from sales, but may not benefit elephant conservation as a whole, because it will put a higher price tag on the heads of all unprotected elephants.

The latest round of CITES measures allows for the initiation of a controlled legal trading regime, but such a regime should be designed to out-compete illegal poachers and suppliers, not increase their share of the supply system. Range States have been encouraged to set up mechanisms for the legal sale of ivory stockpiles with proceeds somehow flowing back to elephant conservation, which makes good sense. However, if the purchasers of those stockpiles destroy them, this could be counterproductive as a general conservation measure. It makes more sense for the new owners of the stockpiles to secure and retain them until such time that the evolution of the ivory market is better understood. Those stockpiles may prove critical in establishing control over the supply mechanism in a future legal trading regime.

RHINOS

A conservation crisis

Humans have hunted rhinos for many thousands of years, mainly for meat and medicines. Rhino horn is regarded as an essential ingredient in traditional oriental medicines used to treat serious fevers, and has been used as such for many centuries. Following the decline of Asian rhinos, Asians have imported African rhino horn for several centuries. The volumes of rhino horn consumed as medicine are fairly low, and until recent decades medicinal use probably never posed a serious conservation threat.

Photo Credit: Esmond Bradley Martin

Weighing of rhino horns at the Kenya Game Department storeroom, Nairobi.

In the early 1970s, a series of events in the Middle East precipitated a rhino conservation crisis. The discovery of oil in Saudi Arabia created many lucrative employment opportunities for people from neighbouring countries, including Yemen. The disposable income of Yemeni men rose substantially and with it, their willingness to pay large sums of money for rhino horn *jambiyya* (ceremonial dagger) handles, a key Yemeni status symbol. The demand for rhino horn surged, causing a rise in prices and a consequent escalation of poaching in Africa.

By the late 1970s, CITES had started to become operational, with all rhinos listed on Appendix I. Initially, the trade ban was a dismal failure ('t Sas-Rolfes, 1995). Rhino horn prices soared on all markets, especially in the Far East. Black market trading

continued unabated, and most of Africa's rhino populations were decimated by poachers. By the early 1990s, poaching levels had dropped (Martin and Vigne,

1997), and numbers have subsequently stabilised, with surviving populations confined to a few Range States and highly protected situations.

Only a few countries have succeeded in protecting and even growing their rhino populations. Currently, the world's most significant and successful rhino range State is South Africa. This country has used a combination of bold management strategies and market-based economic incentive measures to turn its seriously threatened population of southern white rhinos into the world's least threatened variety. Consistent with its past practices, South Africa has proposed investigating a managed legal rhino horn trade as a possible conservation measure, but this proposal has met with stiff opposition.

There is a belief that the rhino horn ban is finally working. Now that most consumer states have joined CITES and outlawed domestic use of rhino horn, and now that poaching levels have dropped to sustainable levels, the problem seems to have abated. There is a fear that re-opening a legal trade will once again endanger surviving populations.

To consider the legitimacy of this argument, let us consider an alternative explanation of the ban's effects.

WHAT DID THE BAN REALLY ACHIEVE?

The sudden surge in demand for rhino horn in the early 1970s will have caused some price increases in Asian markets, but because Yemeni *jambiyya* handle carvers re-sold off-cuts and shavings, the supply to the medicine markets was not under serious threat. However, it is likely that the CITES ban created a perceived supply shortage, which in turn led to the dramatic rise in prices in the late 1970s. Asian traders and traditional doctors, fearing that their supplies of horn were now under threat, probably stockpiled in anticipation of future shortages, placing considerable upward short-term pressure on prices.

Rapidly rising prices led to further speculation, and subsequent undercover investigations have revealed at least two cases of large-scale illegal stockpiling (one in China and one in the UK). Markets tend to overreact to bad news, and this overreaction is exacerbated in black markets, where prices fail to reflect accurate information about a product's scarcity. It appears that speculators overestimated the demand for rhino horn, and found themselves stranded with stockpiles that they could not sell. The black market price for rhino horn subsequently dropped.

Apart from this probable "overshooting" of black market prices, two other factors contributed to a decline in rhino poaching in the 1990s. The first was the outbreak of civil war in Yemen, which had a significant negative effect on the country's economy, and suppressed levels of consumer demand. The second was the fact that virtually no unprotected rhino populations remained. Most surviving rhinos are now well protected in areas under surveillance by armed field staff. A few remain in remote and inaccessible areas, but all the "easy pickings" are gone.

It is thus possible that the rhino horn trade ban created a perception of enhanced scarcity, which led to the unnecessary death of many rhinos, and that the market continues to digest the glut of horn that was poached during the late 1970s and 1980s. The incentive to poach rhinos is currently low, because there are still ample stockpiles of horn on the black market. However there is evidence of ongoing consumption and demand (Mills, 1997; Mainka, 1997). Does this pose any potential future threat, and if so, what should be done to address this?

SHOULD THE BAN REMAIN IN PLACE?

If the alternative theory of the ban's effects is correct, rhinos will enjoy a period of respite as long as the consumer market continues to digest existing stockpiles. However, if consumer demand persists (or increases) and stockpiles become depleted, rhinos could face another serious onslaught of poaching. Establishing a managed legal market would enable conservationists to monitor market trends. The present situation has everyone guessing.

It is wrong to assume that establishing a legal market is risky. It may in fact be riskier to leave the rhino horn trade solely in the hands of illegal operators. Establishing a legal market could provide a further advantage: a substantial source of revenue for conservation agencies. Even more so than with ivory, the potential to fund field protection with the proceeds from legal rhino horn sales is considerable, and could be of great benefit to conservation generally. Conversely, if poaching pressure increases, and conservation budgets continue to shrink, the outlook for rhino protection is bleak.

Despite the apparent changed perspectives emerging from the latest CITES meeting, there appear to be two aspects of wildlife trade that remain poorly understood. The **first** is the nature of the relationship between legal and illegal trade; the second is the extent to which trade can be "controlled" and the implications of this for policy.

There is much resistance to allowing any form of legal trade, out of fear that this will create loopholes for laundering of illegally obtained products. Legalising trade may reduce the transactions costs of illegal trading, but it also reduces the profit margins of illegal traders. If properly designed, a legal trading mechanism should do much more to discourage illegal trade than to encourage it.

Not all illegal "trade" is bad for conservation. Trade of products obtained directly through poaching is certainly undesirable, but as discussed above, trade of old accumulated stockpiles can actually help to reduce poaching pressure. The real issue for conservation is the source of supply of a particular product: was the product obtained from a source that will encourage further poaching, or does the source compete with the providers of freshly supplied (poached) product? The CITES system of trade restrictions and bans is not well equipped to make this critical distinction, and much time is wasted trying to prevent illegal transactions that may actually benefit conservation.

An implicit objective of CITES and related wildlife trade policies is to "control trade" of wildlife products (Hemley, 1994). But attempting to "control" trade is futile. There are few, if any, examples of any commodity trade being successfully controlled through a system of bans and regulations. There have certainly been attempts to achieve this for products such as alcohol and narcotic drugs, but these have been notorious failures. Even in the diamond industry, the worldwide De Beers cartel is unable to control trade, and smuggling and illegal trade is widespread. What De Beers does achieve, however, is a high degree of control over the supply of diamonds. By preventing an unfettered flow of new product to the market-place, De Beers is still able to exercise considerable influence over the diamond market.

Herein lies and important lesson of conservation: the key to managing trade in wildlife products is to exercise control over supply, not over subsequent transactions.

Ironically, trade bans do create a measure of control over commodity trade: they place it in the the hands of organised crime. Organised crime syndicates specialise in acquiring monopoly power in the provision of high value, illegal goods. They establish links with corrupt enforcement officials to ensure a high degree of legal immunity, and rely on the law enforcement system to keep their competition out of business. They specialise in obtaining specific products, and develop efficiencies in so doing. In the wildlife trade, bans can create illegal industry structures that are more concentrated and powerful, harder to control and more likely to over-exploit the resource than before.

As an institution, CITES is hardly capable of thwarting the activities of well-organised criminal syndicates that are proficient in smuggling goods such as narcotics. This is unlikely to change, as CITES has some inherent weaknesses in its institutional design that preclude it from ever being implemented properly (for a detailed discussion see Trexler, 1990). In the long run, trade restrictions such as CITES are not the answer to overexploitation of wildlife. We must **find** ways to protect the supply at the source; there is no substitute for adequate field protection.

CONCLUSIONS

The conventional wisdom has been that banning trade in both elephant and rhino products has been the right thing to do, and that any shortcomings of this approach were due to poor implementation rather than a fundamental flaw in the policy.

However, if we consider some alternative views on these issues, we may reach different conclusions. The ivory trade ban is likely to prove unsustainable and even counterproductive in the longer term. Given that it is probably desirable to gradually re-establish a managed trading regime, it is important to deal with existing official ivory stockpiles in an appropriate way: destroying them probably makes little conservation sense.

The rhino horn trade ban appears to be successful at present, but probably exacerbated the poaching problem in the past. If demand for rhino products persist, the ban may again prove counterproductive in the future **if** existing stockpiles become depleted through consumption. It is still worth considering the option of managed legal trade.

The whole issue of wildlife trade remains poorly understood. Illegal trade in old stockpiles is not always a conservation threat. The real challenge for conservation is to reduce the profitability of poaching, by providing any alternative supply sources that do not involve the illegal and uncontrolled killing of further animals. Trade bans do not always achieve this goal ≠they often achieve the opposite by driving up prices and enhancing the position of illegal suppliers.

The key to solving wildlife trade problems does not involve "controlling trade" - that is an unattainable ideal. Wildlife trade problems will only be solved by controlling supply, i.e. by adequate field protection. The challenge for conservation is to create the right incentives and funding mechanisms for such protection to continue on a sustainable basis.

REFERENCES

Anon. (1997) Assessing global illicit ivory trade - The TRAFFIC Bad Ivory Database System: Using law enforcement data to monitor trade developments, *mimeo.*

Dublin, H.T., Milliken, T. and Barnes, R.F.W (1995) *Four Years After the CITES Ban: Illegal Killing of Elephants, Ivory Trade and Stockpiles. Gland,* Switzerland: IUCN Species Survival Commission.

Hemley, **G.,** ed. (1994) *International Wildlife Trade: A CITES Sourcebook.* Washington, DC: World Wildlife Fund.

Mainka, **S.A.** (1997) *Rhino Progress? The response to CITES Resolution Conf. 9.14.* Cambridge, UK: TRAFFIC International.

Martin, E. and Vigne, L. (1 997) Good News for Rhinos. SWARA September/October: 13-14.

Milliken, T. (1 997) African Elephants and the June 1997 CITES meeting: A TRAFFIC Network Briefing, July 1997, *mimeo.*

Mills, **J.A.,** cd. (1 *997) Rhinoceros Horn and* **Tiger Bone** *in China: an investigation of trade since the 1993 ban.* Cambridge, UK: TRAFFIC International.

Said, M.Y, Chunge, R.M., Craig, G.C., Thouless, C.R. Barnes, R.F.W. and Dublin, H.T. (1995) *African Elephant Database: 1995.* Gland, Switzerland: IUCN.

Trexler, M.C. (1990) *The Convention on International Trade in Endangered Species of Wild Fauna and Flora: Political or Conservation Success?* Arm Arbor, MI: UMI Dissertation Service.

't Sas-Rolfes, M. (1995) *Rhinos: Conservation, Economics and Trade-Offs.* London: IEA Environment Unit.

't Sas-Rolfes, M. (1 997) Does CITES work? Four Case Studies. IEA Environment Briefing No. 4. London: Institute of Economic Affairs.

PROPOSAL FOR "GREEN HUNTING" OF ELEPHANTS AS AN ALTERNATIVE TO LETHAL SPORT HUNTING

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It has been argued that sport hunting of elephants offers social and economic benefits for conservation and does not endanger the species (Bond, 1994). Sport hunting when properly controlled can be maintained at a sustainable level (Craig and Gibson, 1993), and the revenues used to reward communities for tolerating and conserving such potentially challenging neighbours. Although the African elephant is recognised as an endangered species, sport hunting is still permitted in a number of African countries where it is not commercial nor a threat to their survival. Under CITES regulations sport hunters are permitted to bring their trophies back to their home countries.

However, in most parts of Africa excessive offtake by poaching or sport hunting has diminished stocks of large tuskers until old male elephants have become extremely rare or absent from populations. Destroying large bulls in an elephant population significantly alters the elephants' way of life, as female elephants prefer to mate with the largest and hence oldest bulls if given the choice (Moss, 1988). Contrary to some hunters' beliefs, these are not old mates past the age of effective breeding, but some of the fittest males in the stock who, by their longevity, have demonstrated their adaptiveness. Shooting a big tusker is killing a mature and useful member of society in the prime of life.

Depletion of the gene pool is evident in Uganda where Eve Abe has commented that a gene for tusklessness is spreading through the elephant population in Queen Elizabeth National Park, which experienced heavy poaching for ivory in the 1970s and '80s. Even in Zimbabwe where sport hunting has been instituted on a sustainable basis of not more than 0.75% of a total population, the tusks of trophy animals are small. In contrast populations with no hunting and little poaching, like Amboseli National Park in Kenya or Kruger National Park in South Africa, there are many old bulls with large tusks. Moreover, there are ethical objections against killing elephants for pleasure on the grounds that they are higher order sensate beings like chimpanzees, gorillas or dolphins, which no one would consider hunting for sport these days.

If it is accepted that sport hunting has economic and conservation benefits despite the strength of ethical and ecological arguments against it, it is worth considering a form of "green hunting" which could offer an alternative to actually killing the elephant. A non-lethal "green hunt" could be done with immobilising darts rather than bullets and could provide most of the benefits of sport hunting without the ethical and ecological downside. However, it must be recognised that even darting an elephant is a risk to the elephants' life and health, but it is greatly preferable to killing the animal, and may prove to be an acceptable alternative to lethal hunting. The conservation ideal of green hunting requires that it be used only as an alternative to lethal hunting and not as an additional quota, as that would only cause extra harassment to the elephants.

The technology of immobilising animals is now well advanced and can be done quickly, efficiently and repeatedly with relatively low risk to the elephant. It is routinely employed in research and in veterinary treatment of elephants, and may involve many of the traditional elements of a hunt, including a detailed knowledge of the quarry's behaviour. **It** can be performed on foot with a dart gun and a small team of trackers. The target animal needs to be carefully selected, and may require a skillful stalk from downwind, angling to get past other elephants, and a good shot from close quarters. The elements of skill, danger and luck would all be present with additional challenges. An elephant never collapses from a dart as it would from a brain-shot, but usually rushes off as if it were wounded until the drug takes effect. The hunter would have to follow and track assiduously. To lose an elephant might endanger its life, if it were to fall onto its trunk or to collapse into a swamp. So for ten to twenty minutes the hunter must keep pace with the elephant. However, it would be neither unethical nor illegal to immobilise and follow-up from the safety of a car if the hunter so desired.

If the elephant is approached carefully on foot and from down-wind, the elephant need never be aware of human presence. The darting then causes the minimum disturbance and in such cases the elephant would most

likely run for only a few paces before resuming a slow walk or stopping.

Green hunting would require an experienced veterinarian to be present to calculate the dose rate and administer to the elephant should anything go wrong. The drug should be given at a sufficient dose to put the elephant down quickly, aiming at 1 0 to 15 minutes at the most. When an elephant goes down and rests on it's breastbone or sternum it should be pulled over on its side with a rope attached to one of the tusks running up over its back. With a large bull a vehicle may be required to pull the animal over. The trunk should be straightened out to ease breathing and the heart and breathing rate measured. If it is a hot day the elephant should be cooled by a jerrycan of water being poured over its body and behind its ears.

Once the animal is recumbent the hunter can have photographs taken with his quarry. The only difference at this stage from a conventional hunt is that the animal is still breathing, living and unharmed. Practically all the great hunters admit that it is not the killing of the animal that gives them pleasure, but the hunt itself, with all the assimilated skill, mystique and bush lore. None of that will be impaired. A cast could be made of the tusks with a quick-setting foam which will set a perfect mould from which the exact details of the ivory can be replicated in plastic or fibre-glass as a non-lethal trophy. Revival of the bull is done simply by an injection of antidote into one of the large veins in the ear. Within about one minute the elephant would stir, flap his ears, rock back and forth and stand up.

Linking green hunting to research could justify green hunting by restricting it to animals that would be immobilised anyway, and a radio-collar could be affixed in a matter of minutes. If it is an advanced GPS model, the movements of the elephant could be recorded at regular intervals with great precision. The hunter will not only have experienced his hunt, taken photographs of his fallen quarry, and acquired his non-lethal trophies, but can be introduced to the excitement of field research. Precise records of the daily movements across the home range by the individualised bull can be sent to the hunter at intervals as well as observations on his general behaviour and ecology. Hunters could learn about the natural habits of their chosen species, and develop a more objective interest in their ecology and behaviour. This in turn might help to bridge the conceptual gap between hunters and animal rights activists. But above all the justification would be to spare the lives of elephants.

Ale risks inherent in this whole procedure are those of a normal hunt. Safety precautions in the form of an experienced professional hunter on stand-by with a gun should be taken.

In summary, the advantages of green hunting are as follows. On ecological grounds the idea will avoid depleting the resource of big tuskers and disrupting preferred mate selection be females. Use of large trophy animals would become sustainable, and the most successful big bulls would be allowed to breed and increase large tusk size in the population's gene pool. Economically it would bring in revenue which could be used for conservation or community development, while at the same time avoid frightening animals and lowering the amenity for tourism of an area. From a sporting perspective the skill and the risk of a green hunt would be undiminished, while giving access to better quality trophies, Ethically, and most importantly, it would offer an alternative to disrupting elephant society by temporarily immobilising rather than killing useful individuals.

There are, however, a number of problems which need to be weighed before the adoption of green hunting. Legal objections might be raised in connection with the control of narcotics, and drug control authorities might be resistant to the use of a restricted drug for sport. There would need to improved training of veterinarians and careful criteria devised for suitable qualifications for a veterinarian to accompany a green hunt. Being a domestic animal veterinarian would not necessarily qualify someone to carry out elephant anaesthesia. There would also be a risk to clients as in a normal hunt, and an attempted green hunt might sometimes result in the death of an animal which charged rather than ran away.

There are also welfare questions. The technique of immobilisation, although widely deployed, still involves a risk to the elephant's life and health. Clinical trials of the drug have not been conducted on the scale which would be required to classify M99 etorphine hydrochloride, the narcotic used, as a safe anaesthetic. Problems to the elephant's future health cannot therefore be discounted. The risks of mortality, lung and heart pathology in elephants from the effects of the immobilisation may be significant, and this is particularly true for larger animals which would be preferred in green hunting. M99 is a potent respiratory depressant and cardiac stimulant. Repeated knock downs might impose a greater risk. A poorly placed dart might cause the animal to run for 30 minutes or so, and the

distances covered can be large. The animal could fall in an awkward place and die as a result. The questions of how many times an animal can be immobilised which is acceptable, what age the animal should be, and whether pregnant animals should be included would all need to be considered. A hunter might argue that when one shoots an animal none of these problems except wounding would arise.

Ideally from an elephant's point of view it would be better to be left alone and neither immobilised nor killed, but in an imperfect world, hunting elephants is going to happen while there is still profit to be made in countries where it is permitted. The bottom line is that the discomfort and danger suffered by relatively few elephants in green hunting must be contrasted to the certain death of elephants in lethal hunting, and the question of morality of killing higher order sensate beings for sport. Most of the objections would be overcome by linking initially green hunting to research.

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REFERENCES

Bond, 1. (1 993) The Importance of Sport-hunted African Elephants to CAMPFIRE in Zimbabwe.

Craig, C.G. and Gibson, D. (1 993) Records of elephant hunting trophies exported from Zimbabwe, Department of National Parks and Wildlife Land Management, Harare, Zimbabwe.

Moss, C. (1 988) *Elephant Memories.* Elm Tree, London.

MANAGEMENT OF ELEPHANT POPULATIONS IN KENYA- WHAT HAVE WE LEARNT SO FAR?

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INTRODUCTION

The issue of elephant-habitat interactions has stimulated debate amongst members of the IUCN/SSC African Elephant Specialist Group and other ecologists since the formation of the Group (Jachmann and Bell, 1984; Lindsay, 1984 and 1985; du Toit, 1985; Jachmann, 1987; McShane, 1989). Years later, the issues raised in the discussions have become extremely relevant to Kenya. Many aspects of elephant-habitat interactions have changed drastically. Within this period, important elephant populations in Kenya have been artificially contained within different types of barriers. Good examples include the 550 elephants confined within 250km^2 in Shimba Hills, over 6,000 in Mt. Kenya, 3,000 in Aberdares and various sub-populations living in fragmented habitats in Samburu and Laikipia. The 42km^2 Mwea Reserve will be completely fenced by mid-1998, while a fence currently under construction in Naari, Meru District, will effectively block seasonal migration of the Imenti-Isiolo elephants. Indeed, most of the remaining elephant populations in Kenya are surrounded by human settlements and have lost their traditional migratory routes and dispersal areas. The increasing confinement of these populations will have devastating effects on trees and shrubs and the general condition of their habitats. One of the major concerns of wildlife managers is whether the habitats will compensate for the overabundance of elephants.

Studies in areas with high elephant densities indicate that the habitats are already undergoing stress. Western (1990) looked at the elephant problem in Amboseli by examining aerial photographs over a period of about 40 years along fixed transects. While the theory put forward is contestable, and alternative explanations exist, Western argues that measurements of fever tree *(Acacia xanthophlea)* density showed that by 1989, following the compression of elephants into the park vicinity, the woodland had disappeared within the central basin and increased in density where elephant activity was negligible, thus creating a woodland-density gradient. A similar situation has been reported in Aberdares National Park where elephants have destroyed over 98% of trees in localized areas and converted a huge tropical mountain forest into a high shrub land (Waithaka, 1994). In Samburu, Gakami (1996) reported catastrophic destruction of riverine vegetation along the River Uaso Ngiro by huge elephant herds. Mwathe (1997) has recorded continuous destruction of forests within Shimba Hills National Reserve after a four-year study of elephant-habitat interactions. Between 1993 and 1997, 85% of the trees have been destroyed by elephants in some areas. A tree density-elephant model for Shimba Hills (Kamanga, 1997) predicted a 50% reduction in species diversity by the year 2002, assuming a 4% increase in elephant density without any management intervention. The extensive Mt. Kenya forest has experienced similar impacts from the 6,000 elephants that are confined in the area (Mwathe *et al.*, 1997). This trend has been observed in many National Parks with high elephant populations that are no longer able to move freely within their former ranges, resulting in habitat degradation characterized by low biological diversity, reduced habitat heterogeneity and weakened structural complexity.

Studies on elephant-habitat interaction in Kenya have varied tremendously in spatial and temporal scales and in duration and precision. Unfortunately, there are no clear answers deriving from the considerable amounts of research carried out in Kenya during the past 30 to 40 years. Even where detailed long-term studies have been undertaken, few of the results have been made available for valid interpretation and use in management. Many of the scientists who worked in East Africa in the 1960s and 1970s viewed the loss of woodlands as catastrophic and permanent (Buechner and Dawkins, 1961; Laws, 1969 and 1970). This is in contrast to the views expressed by Vesey-Fitzgerald (1 973), Petrides (1 974) and Caughley (1 976) who advanced the theory that vegetation change is cyclical in nature and that the woodlands and grasslands have historically alternated with each other in time and space. Others have suggested models, e.g. multiple climax vegetation model (Lamprey *et al.*, 1967), stable-limit-cycle model (Norton-Griffiths, 1979; Pellew, 1983), climate fluctuation model (Western and Van Praet, 1973), multiple stable states model

(Dublin *et al.,* 1990), as approaches for describing and understanding the dynamics of savannah ecosystems. However, these models , while useful for developing our understanding of the dynamics of heavily studied savannah ecosystems such as Amboseli, Tsavo, Serengeti and the Maasai Mara, require improved and current data on the states and processes involved, using both environmental and socioeconomic factors, to be useful.

If correct management decisions about the future of elephants are to be made, an understanding of their ecological requirements and impacts must precede the action taken. Indeed, appropriate management actions should be based on the management objectives for the area and for the nation as a whole. Furthermore, much of the policy reform, strategy and investment to ensure the long-term survival of elephants must also be based on a broadly integrated approach to conservation through the use of adaptive management.

That elephants destroy trees and alter habitat is a well known fact, but knowledge from such observations has been of limited applicability in Kenya. In many situations, management responses have not always been appropriately geared towards resolving the perceived problem. The unfolding elephant scenario in Kenya calls for decisive management actions, especially where habitat destruction by elephants at high densities is a real ecological threat, and particularly in situations where the vegetation is unable to compensate for the "over-abundance" of elephants.

LESSONS FROM TSAVO NATIONAL PARK

Tsavo National Park covers an area of some 21,00OkM^2, making it one of the largest parks in Africa. During the 1950s and 1960s the Tsavo elephant populations increased through reproduction and immigration in response to effective protection within the park and increasing poaching outside. Aerial counts in 1962 indicated approximately 1 1,000 elephants in the Park, with another 4,800 in adjoining areas (Glover, 1962). These pioneering counts were probably underestimates. At that time, however, there was already concern about vegetation destruction by elephants, which was aggravated by drought and fires. Detailed reconnaissance flights by Laws (1969) estimated a minimum population of 35,000 elephants. Recent extrapolation from carcass data suggests that the population could have been as high as 68,000 (Douglas-Hamilton and Burrill, 1991).

Most research in the Tsavo area in the 1960s was generated by and directed towards solving the "elephant problem". It was within this period that a debate erupted between the advocates of "cropping" (maintaining a stable elephant population) and "laissez faire" (letting elephant populations rise and/or fall naturally) policies on the management actions to be taken to control the elephant population in order to save some of the woody vegetation and safeguard the habitat and food supply of other herbivores. After a sample cropping for research purposes in 1966, the "laissez faire" policy was adopted following strong opposition to culling by the then Park Warden, David Sheldrick. Elephants at high densities were left to respond to natural forces, the result of which was high mortality during the drought of 1970-1971 (Corfield, 1973). However, the problem was "solved" in the late 1970s by a reduction of the elephant population of approximately 80% through starvation and poaching. This, and other experiences with elephant populations in Tsavo, are a good example of the consequences of taking no management action even when sufficient information is available.

The "laissez faire" management option for Tsavo was based on conjecture that nature, left on its own, will **find** a perfect balance. However, today's "natural environment" is an ecological island where a species can increase rapidly, exhaust its food supply, starve and suffer a rapid decline, meanwhile causing considerable **harm** to the species, and sometimes even endangering the survival of other species. More modem arguments would allow change to occur with minimal intervention, based on the goals and objectives of the protected area and/or nation.

The management options for elephant populations in Kenya points at reducing their densities in areas where they are artificially compressed. This can be done by culling or translocation. Where culling is regarded as inappropriate and translocation impeded by technical difficulties, the elephant-tree relationship must be balanced by reducing elephant densities through dispersal. Increasing space for elephants increases their ability to respond to resource depletion by moving elsewhere, a natural response that has been eliminated by blockage of their migratory routes and hostility outside parks. Restoration of migration corridors would reduce impacts associated with high elephant densities, prevent isolation of herds and improve genetic variability of the populations.

Based on the Kenya experience, the "laissez faire" management should only be considered where wildlife habitats have not been intensely altered, fragmented, reduced, manipulated or degraded. Many examples exist where the "hands off" policy failed to work, but Kenya has been unable to make appropriate elephant management decisions, preferring to court imminent ecological disaster. The decisions on elephant management are usually based on ecological, economic, social, political, ethical and practical considerations. However, the inclination towards political and ethical aspects have outweighed sound scientific and technical considerations. This position is, in my view, untenable.

REFERENCES

Botkin, D.B. (1991) A new balance of nature. The *Wilson Quarterly,* Spring 1991.

Buechner, H.K. and Dawkins, H.C. (1961) Vegetation change induced by elephant and fire in the Murchison Falls National Park, Uganda. *Ecology.* 42:752-766.

Caughley, G. (1976) The elephant problem- an alternative hypothesis. *E. Afr Wildl. J.* 14, 265-283.

Corfield, T.F. (1973) Elephant mortality in Tsavo National Park, Kenya. *E. Afr Wild. J.* 11, 339-368.

du Toit, R. (1986) Elephants and woodlands. Comments. *Pachyderm* No. 7.

Gakami, N. (1996) The impacts of elephant on the vegetation of Samburu National Reserve. MPhil Thesis, Moi University, Kenya.

Jachmann, H. and Bell, R.H.V. (1984) Why do elephants destroy woodlands? *AERSG Newsletter* No. 3.

Kamanga, C. (1 997) Impacts of increasing elephant densities on biodiversity in Shimba Hills National Reserve. A consultant report submitted to KWS.

Kortland, A. (1976) Tree destruction by elephants in Tsavo National Park and the role of man in African ecosystems. *Netherlands Journal of Zoology,* 26:449-451.

Laws, R.M. (1969) The Tsavo Research Project, **J.** *Reprod.* **Fert. Suppl.** 6:495 531.

Laws, R.M. (1970) Elephants as agents of habitat and landscape change in East Africa. *Oikos 21:1-15.*

Lawton, R.M ' (1971) Destruction or utilization of a wildlife habitat? In: Duffy, E. and Wat, A.S. (editors). The scientific management of animal and plant communities for conservation. Symposium of British Ecological Society 11:333 336.

Lindsay, K. (1984) Comments on Jachmann H. and Bell R.H.V (1984). *Pachyderm* No. 4.

Lindsay, K. (1986) Elephants and woodlands - what are the issues? *Pachyderm* No. 7.

Lindsay, **K.** (1993) Elephants and habitats : the need for clear objectives. *Pachyderm* 16: 34-40.

REFERENCES (cont'd)

McShane, T.O. (1 989) Some preliminary results of the relationship soils and trees response to elephant damage. *Pachyderm No.* 11.

Mwathe, **K., (1** 997) Elephant **Habitat** studies in Shimba Hills National Reserve. **KWS-WWF Report.**

Mwathe, K., Mungai, P. and Ngoru S. (1997). The impacts of confined elephant populations on their habitats. The Mt. Kenya example. KWS-)- Report.

Pellew, R.A.P. (1983) The impact of elephant; giraffe and fire upon the *Acacia tortilis* woodlands of the Serengeti. *Afr.* **J.** *Ecology,* 21:41 74.

Swart, J.H. and Duffy, K.J. (1987) The stability of a predator-prey model applied to the destruction of trees by elephants. *South Africa Journal of Science* 83:156-158.

Verhulst, RE (1 938) Nitice sur la lo; Que la population Suits dans son accroissement. *Correspondences math, phys. 10:113-121.*

Volterra, V. (1926) Variations and fluctuations of the numbers of individual animal species living together. (Reprinted in 1931. In: R.N. Chapman, Animal *Ecology*. McGraw-Hill, New York).

Waithaka J.M. (1 994) The ecological role of elephants in restructuring wildlife habitats and their impacts on land use patterns. PhD. Thesis, Kenyatta University, Nairobi, Kenya.

Western, D. (1 990) The ecological value of elephants: A keystone role in African ecosystems. The ivory trade and the future of the African elephants. Ivory Trade Review Group meeting, Gaberone, Botswana, 1989.

Western, D. and Van Praet, C. (1 973) Cyclic changes in the habitat and climate of an East African ecosystem. *Nature,* 24:104 106.

RECORDS OF THE SUNDARBANS RHINOCEROS (Rhinoceros sondaicus inermis) in India and Bangladesh

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SUMMARY

The Javan rhinos existed in the forests near the Bay of Bengal, called the Sundarbans, in southern Bangladesh and the state of West Bengal, India. It was **first** shot by F.V. Lamarepicquot in 1828, whose two specimens were described as a new species, Rhinoceros inermis, by Lesson in 1838. The animal was noted in the Sundarbans with some regularity until 1892. In total 11 specimens are known in different museums. The rhinos lived in small numbers in well-defined localities throughout the entire Sundarbans. It must have become extinct before 1925.

INTRODUCTION

The Javan rhino *(Rhinoceros sondaicus* Desmarest, 1822) today has a severely restricted range with very low numbers. It is easily the most endangered species of rhino. However, in the last century it roamed much wider, from the Indonesian islands of Java and Sumatra, northwards to Malaysia, Thailand and Burma. It is also likely that most records of rhinos from Laos, South Vietnam, and southern Cambodia pertain to this single-homed species (Rookmaaker, 1980 and 1988). On the western side it extended to the northeastern states of India and into northern Assam, and in the Sunderbans of Bangladesh and India (Rookmaaker, 1984). The records concerning the existence of the Javan rhino in the Sunderbans have never been collected and an attempt is made here to map the extent of the animal's range in these forests.

The Sundarbans or Sunderbunds is a name for the tidal swamp forest formed by the estuary of the Ganges, on the sea-front of southern Bangladesh and the adjoining part of the Indian state of West Bengal. It is an area of islands surrounded by small creeks, covered by dense forest, daily flooded by the tidal currents. Swamp deer *(Cervus duvauceli)* and wild buffalo *(Bubalus bubalis)* have disappeared from the area, but it is still inhabited by larger land mammals like axis deer *(Axis axis)*, wild *pig (Sus scrofa)* and tiger *(Panthera tigris)*, known to be dangerous man-eaters (De, 1990; Chakrabarti, 1992). It would not be a habitat where one would immediately expect a rhino, as elsewhere in the world it is rare to find this animal in estuarine forests with limited supply of fresh water. The occurrence of the single-horned Javan rhino *(Rhinoceros sondaicus* Desmarest, 1822) in the Sundarbans, however, is established beyond doubt, and the animal is thought to belong to a separate subspecies, *R. s. inermis* Lesson, 1838. While there are a few early records, almost all available information pertains to the 19th century, and it is believed that the rhino must have become extinct in the area during the **first** decades of the 20th century.

The northern edge of the Sundarbans is just a few hours travel from Calcutta or from Dhaka, but still the area was seldom visited. It required substantial preparations to take enough water and food for several days, a boat was essential, and few braved the heat, the mosquitoes and the fear of man-eating tigers. To most sportsmen in India of the 19th century, who only looked for game in their spare time, the Sundarbans was hardly a favourite destination, generally not deemed to be worth the trouble. Still, a few people recorded how they encountered rhinos in the Sundarbans, and the present paper will try to summarize who saw the animal at which places. The area has so many waterways and islands, that it is a nightmare to a cartographer, hence there is an absence of good maps. Most of the names mentioned in the available reports cannot be found on modem maps, which is a serious obstacle in reviewing the occurrence of the Sundarbans rhino.

REPORTS

After a brief review of early records from the Sundarbans, the various reports have been roughly divided into those from the immediate vicinity of Calcutta, from the Indian part of the Sundarbans and further west in Bangladesh. The localities are indicated by numbers in square brackets found on the map in Figure I and also included in Table 1.

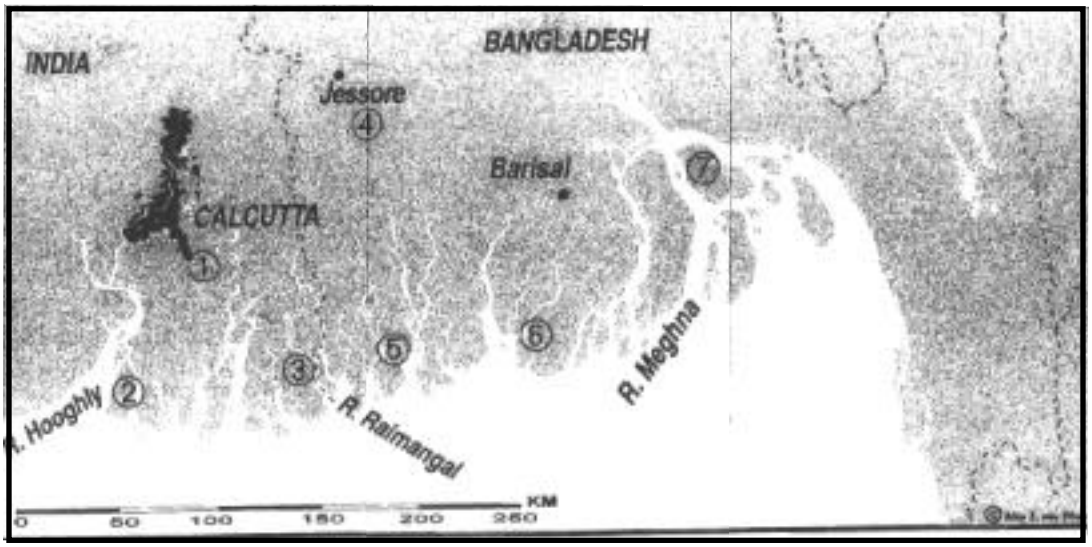


Figure 1. Map of the Sundarbans of India and Bangladesh. The numbers show localities where minos were sighted, see Table 1.

EARLY REPORTS (17TH AND 18TH CENTURIES)

At the end of the 1 8th century, Thomas Pennant published an elaborate account of a totally imaginary tour through India. When he reached the Sundarbans, he noted that 'the one-horned rhinoceros is very common in these islands, it loves forests and swampy places' (Pennant, 1798). Apparently his authority for the existence of rhinos in this region was 'a gentleman of my acquaintance', who Pennant (1793) elsewhere identified as Charles Pigot, of Peploe, Shropshire, at that time in the Indian service. Mr Pigot had landed on an island and 'roused a rhino, which rushed on him, flung him down, and ripped open his belly; the rhino proceeded without doing him any further injury; the gentleman survived the wound, and lived to a very advanced age (Pennant, 1798). It must be realised, partly from this story, that every ship of the Dutch, French and British East India Companies trying to reach their stations along the Ganges had to pass the Sundarbans. One could suggest (but not prove) that when in those early days people mentioned rhinos in India or Bengal, they might have actually referred to the Javan species rather than the Great Indian rhino (Rhinoceros unicornis L., 1758).

There are three earlier reports of rhinos in the Sundarbans. Around 1630, Sebastien Manrique passed the island Xavaspur (point 7 in Figure 1), in the estuary of the Meghna River, and 'came across many Rhinos, whose horns, offensive in life, are after their death used in a defensive drug' (Manrique, 1927). On 16 January 1664, the Dutchman Wouter Schoutens (1 676) passed the River Jillisar [?], where the shores of the Ganges are covered with bushes, inhabited by rhinos and other animals. Another traveler, Thomas Bowrey (1905) visited the 'creeks and rivolets at or about the entrance into the ganges' around 1670 and mentioned the presence of 'rhinocerots' besides tigers and bears.

Table 1. Records of rhinos in the Sundarbans in chronological order. The map reference refers to the numbers on Figure 1.

Map	Locality	Date and Collector	Source	Section
7	Island Xavaspur	1630	Manrique 1927	Early Reports
?	River Jillisar	1664	Schoutens 1676	Early Reports
	Sundarbans	1670	Bowrey 1905	Early Reports
	Sundarbans	1828, Lamarepicquot	Berlin Museum	Eastern Sunderbans; Naturkunde der Humboldt - Universitat- No I and 2
2	Saugor Island, Middleton Point	1832	Shekarea 1832	Western Sunderbans (India)
4	Baugundee, Jessore district	1834, J.H. Barlow	Calcutta Museum	Calcutta, Indian Museurn - No. 2
	Sundarbans	1850, C.Huffnagle	Calcutta Museum	Calcutta, Indian Museum - Museum No. I
1	Pealee River, near B arrapoor	c. 1850	Baker 1887	South of Calcutta
6	Eastern part of Sundarbans	c. 1850	Baker 1887	Eastern Sunderbans (Bangladesh)
	Sundarbans	1859, A. Grote	London Museum	London, Museum of the Royal College of Surgeons of England - No. 1
6	Foolzurree, S.of Backergunge	1860	Simson 1886	Eastern Sunderbans (Bangladesh)
	Sundarbans	1867, W.W.Shepperd	Calcutta Museum	Calcutta, Indian Museum No. 5
	Sundarbans	1872, J.F. Barckley	Calcutta Museum	Calcutta, Indian Museum No. 4
	Sundarbans	1874, O.L.Fraser	Calcutta Museum and J.E Barckley Fraser 1875	Calcutta, Indian Museum No. 3
6	Matabangah River, Barisal district	1875	Calcutta Museum	Calcutta, Indian Museum No. 6
3	Ray Mangal River	1876, Jamrach	Sclater 1876	Western Sunderbans (India)
	Sundarbans	1876	London Museum	London, Natural History Museum - No. I
	Sundarbans	1877, Jamrach	Sclater 1877	Western Sunderbans (India)
?	Chillipang / Chillipangpi	1879, Capt.Charling	Calcutta Museum	Calcutta, Indian Museum - No. 7
	Sundarbans (one killed)	1888	De 1990	Discussion
5	R.Pizon Khalee. S.Issuripore	1892	de Poncins 1935	Eastern Suderbans (Bangladesh)
	Sundarbans (one seen)	1900	Shebbeare 1953	Discussion
	Sundarbans (present)	1908	Hussain 1985	Discussion

SOUTH OF CALCUTTA

There were many sportsmen in Calcutta in the 19th century. Around the middle of the century they had organized themselves in the Tent Club, going out for short excursions in the environs of the town. On one of these outings, villagers told the party that a rhino was in the neighbourhood, according to Edward Baker, 'late deputy inspector-general of police, Bengal' on the title-page of his book published in 1887. The presence of a rhino met with disbelief, as the town was just a few hours away. However, the next day a few people went to explore the banks of the Pealee River (point 1 in Figure 1), some six miles from Barrapoor (or Piali River near Baruipur, 22^{0}30'E 880'E, just south of Calcutta). In a patch of jungle, they disturbed a 'huge bull rhinoceros' which made off across a field, and although wounded, it disappeared without being killed. The villagers had known these animals a bit further south, but not in this particular patch of jungle (Baker, 1887).

WESTERN SUNDARBANS (INDIA)

On 16 March 1832, A. Shekarea wrote a letter to the editor of the *Bengal Hurkara and Chronicle* (quoted here from the *Oriental Sporting Magazine*, probably a reprint). The author maybe used a pseudonym, based on the Indian name for a hunter, a shikari. He reported that while visiting Edmondstone Island, he received information that a rhino was seen 'close to the residence at Middleton Point, on Saugor Island; I was requested (being a killer) to go over and try my luck.' Saugor should be Sagar (point 2 in Figure 1), the most western island of the Sundarbans on the mouth of the Hooghly River in West Bengal. It was known to be a dangerous place, as parties who landed here by mistake in 1786 and 1792 were attacked by tigers (Burton, 193 1). Despite some mishaps, Shekarea and a friend located and shot the rhino: it was 12 feet long (366cm) (plus a tail of 2 feet - 6 I cm), 7 feet (213cm) high and 13 feet (397cm) in circumference. The hide and the horn were taken as a trophy.

In 1876 and 1877, the animal dealer William Jamrach, based in London, tried to import a living Javan rhino. His men captured one specimen in 1876, at the Ray Mangal River (point 3 in Figure 1) (or Raimangal River, the border between India and Bangladesh). The animal died and only the skin reached London (Sclater, 1876). In the next year, Jamrach imported a rhino caught in an unknown place in the Sundarbans. It lived in his quarters in London for six months, but for some reason, nobody was interested in buying it (Sclater, 1877). After its death, the viscera were extensively studied by Garrod (1 877).

EASTERN SUNDARBANS (BANGLADESH)

On 2 November 1828, the Frenchman François Victor. Lamarepicquot (1785-1865) set out from Calcutta. In an appendix hidden away in the back of a booklet on other matters, he told how he shot the 'rhinoceros without horn' (Lamarepicquot, 1835). Unfortunately, where he went in the Sundarbans is not clear.

One gets the feeling, however, that he traveled quite a distance from the town. He shot a female and its calf of 4 months old. The adult female was 11 feet 7 inches (353cm) long and 5 feet 3 inches (160cm) high. Neither had any sign of a hem. Both specimens were taken to France and there described as a new species of rhino.

Frank B. Simson, of the Bengal Civil Service, published his Letters on Sport in Eastern Bengal in 1886, combining incidents from 1847 onwards. Some time during this forty year period, he found himself stationed at Backergunge, now called Bakarganj, south of Barisal, Bangladesh. The people told him that no rhinos were known to reside near the town, but the animals should be plentiful further south towards the shores of the Bay of Bengal. It took Simson two nights and a day in a boat to reach those parts, near a village which he called 'Isla Foolzurree' (point 6 on Figure 1), established by a colony of people of Arakan. He spent a few days in that area and he saw six rhinos in the dense forest. He wounded one, and shot another, the head of which he took with him (Simson, 1886).

Another book combining tales of some forty years appeared in 1887 by Edward B. Baker. He is very vague where he encountered the rhino, except that it was in the eastern part of the Sundarbans (possibly point 6 in Figure 1) 'within reach of an ebb tide of the mouth of one of the many rivers' (Baker, 1887). This is what he saw: 'On the margin of a mud-hole twenty or thirty feet in diameter stood a huge rhinoceros in deep contemplation of two shapeless slate-coloured lumps just showing above the muddy water; in other words, two companions enjoying a mud-bath, while he, having had his, as his well-plastered hide testified, was basking in the sun half asleep, working his ears and stamping with

a foot now and then as flies pestered him'. Baker truly lived in different days, thinking nothing special of witnessing three Javan rhinos taking a mudbath, while today tourists brave long journeys to remote parts with far less certainty to see anything like it. Baker shoots two of these animals, one a male 'of the largest size, carrying a well-worn horn of moderate size', the other a full-grown cow. The heads and some parts of the hide were taken. Later, he shot a third rhino, 'a large male, with a better horn than the other two had.'

Presumably the last person to go after the Sundarbans rhino, certainly the last to tell his story (in 1935), was Viscount Edmund de Poncins. He traveled in January and February 1892. In those days, the rhinos were quite rare, and de Poncins believed that there could not be more than a maximum of six specimens alive. These lived on islands 165, 172, 171, 170, 169, numbers taken from the map which he used, near the River Pizon Khalee (point 5 in Figure 1), some 15 miles south of Issuripore (probably the present lswaripur, $22^0$19'E 89^0 07'S). He believed that the animals were attracted by a well of sweet water in the area. He only saw one: 'For the first and, I am sorry to say, the last time in my life I saw that long, grey, hornless head and everything was explained: these rhinos were *R. sondaicus, they* had no trophy worth having and shooting them was without excuse.'

SPECIMENS

There have been eleven specimens of *R. sondaicus* from the Sundarbans in natural history museums, in Calcutta, Berlin and London.

Calcutta, Indian Museum (now Zoological Survey of India)

The specimens available in this collection were **first** catalogued by Blyth (1 863), and again by W.L.. Sclater (1891). Since that time, the collection underwent some administrative changes. The mammal collection is now maintained by the Zoological Survey of India, and the rhinos present were discussed recently by Groves and Chakraborty (1983).

1. Stuffed skin, young male, Sundarbans. Blyth (1 863): ,a. Stuffed specimen, under 3.5 feet high. Carcass presented by C. Huffnagle, Esq. in 1850.' Similar information had been recorded in the *Journal of the Asiatic Society of Bengal* (vol. 10, p.88, 185 1). While its locality is not recorded here, it seems to be this specimen to which Blyth (1862) referred when he discussed a 'less than half-grown' stuffed specimen, from the 'Sundarban'. The animal was not listed by Sclater (1 89 1), maybe it had disappeared by then. 2. Skeleton, female, from Jessore. Blyth (1 863): 'b. Skeleton of a nearly full-grown female, not quite complete ... killed in the Jessore districts, and presented to the Society by J.H. Barlow, Esq. in 1834'. Pearson (1840) adds the exact locality: Baugundee, Jessore district (point 4 Figure I). The same skeleton is listed by Sclater (1 89 1), but it was no longer present when Groves and Chakraborty (1983) investigated the collection.

3. Stuffed skin, skeleton, female, Sunderbans, presented by O.L. Fraser and J.F. Barckley, 1874 (Sclater, 189 1). The skull had a partially ossified nasal septum described by Fraser (1 875), who noticed the condition 'whilst cleaning the skull of a *Rhinoceros sondaicus* lately obtained by me in the Sunderbuns' in a female 5 feet 6 inches high. It had no horn. It was not listed by Groves and Chakraborty (1983). 4. Stuffed skin, skeleton, femalejuv. Sunderbunds, J.E Barckley, 1872 (Sclater, 1891). It was no longer present in this century.

5. Skull, Sunderbunds, W.W. Shepperd, 1867 (Sclater 1891). It was present in 1983, registered no. 19241. 6. Skull and feet bones, adult female, Matabangah River [Barisal district], Sunderbunds (point 6 Figure 1). Purchased 1875 (Sclater, 1891), present as no. 17688 in 1983.

7. Skull, female, Chillichang Creek, Sunderbunds, Capt. Charling' (Sclater, 1891), present as no. 3521 in 1983. Groves (1967) says that it was collected in 1879 or earlier at the Chillipangpi Creek.

Berlin, Museum für Naturkunde der Humboldt-Universitbt

8. Stuffed skin, skull, adult female (no. 1957), type of *Rhinoceros inermis* Lesson, 1838, collected by F.V. Lamarepicquot in 1828. The skulls of this and the next specimens were described and figured by Peters (1877). These skulls are now in the same collection as the hides, but in the last century they were kept in the Museum of Anatomy, where Johannes Müller wrote the labels with numbers 10603 and 10602 for this and the next skull respectively (R. Angermann, Berlin, in litt.).

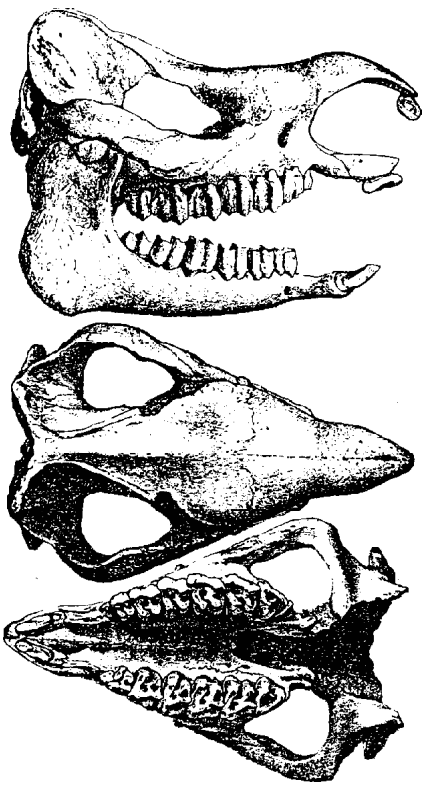
9. Stuffed, skull, young female (no. 1958), collected by Lamarepicquot in 1828 together with the previous specimen.

London, Museum of the Royal College of Surgeons of England

10. Skull, Bengal Sunderbunds in 1859, presented by A. Grote 1882 (Flower and Garson 1884, no. 2132). This specimen was destroyed in the second world war.

London, Natural History Museum

11. Skull, adult male from Sunderbunds, no. 76.3.30.1 (Pocock, 1946). Possibly it had belonged to the skin or the specimen imported by Jamrach in 1876.



Skull of Rhinocerous sondaicus inermis, from Peters (1877)

THE SUBSPECIES RHINOCEROS SONDAICUS INERMIS

Lamarepicquot returned to Paris around 1830 with a collection of zoological specimens obtained in India and at the Cape of Good Hope. He was a pharmacist born in Bayeux. He made a trip to South Asia specifically to collect the natural products of the country, works of arts and reports about the inhabitants. His zoological collections contained 53 mammals, 150 birds, 30 reptiles, 123 fishes, over 300 shells, 52 crustaceans, and over 500 insects (Geoffroy *et al.*, 1831).

The single-horned species of rhino which is now known as the Javan rhino had just been recognised as a separate species some ten years earlier, so it was natural that scientists were interested to see the two skins brought from India. Geoffroy-St. Hilaire, Duméril and Cuvier (1831) saw this 'rhinoceros without horn' and suggested that it was similar to the Javan species, except for the complete absence of a horn. It is mentioned that Lamarepicquot submitted a Memoire about these animals, which apparently was never printed, but maybe it was like the story which he published in 1835. The whole collection brought home by Lamarepicquot was bought in 1836 by King Friedrich Wilhelm 111 for 6000 Thaler, to be deposited in the new zoological museum in Berlin (Peters, 1877).

While the French scientists had noticed the peculiar absence of a horn in both these specimens, it took a few years before the species was described by René P. Lesson in a book designed to complement Buffon's *Histoire Naturelle,* as 'Le Rhinoceros sans come, ou Gaindar, *Rhinoceros* inermis' (Lesson, 1838). It came from the Bay of Bengal, and differed from other rhinos by the absence of a horn. Lesson referred to the published report by Lamarepicquot (1 835). There has been some discussion about the date of appearance of Lesson's book. I saw a copy with a title-page with the date 1838 in the library of the Natural History Museum,@ London, and some other copies with the same date are known. However, others (like the one in the library of the Zoological Society of London) have a title-page with date 1848, which is probably a reprint. It appears clear

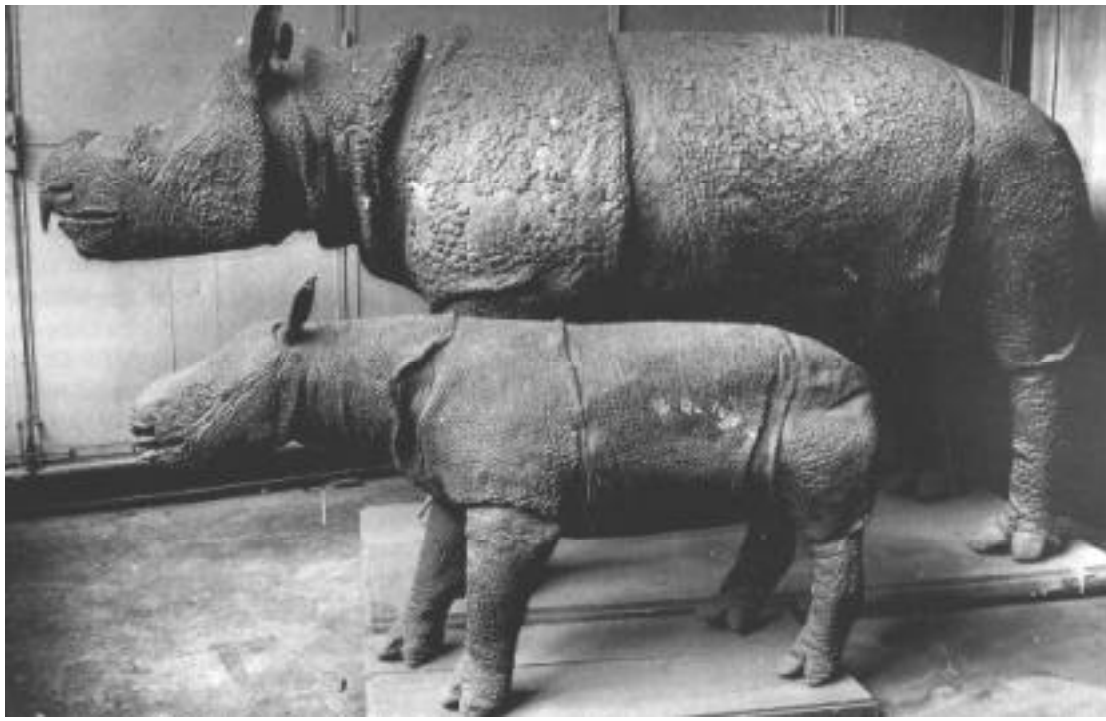


Photo Credit: Annonymous

The mounted skin of Rhinoceros sondaicus inermis in the Museum fürNaturkunde in Berlin.

that Lesson's name can be dated 1838 without problem. Lesson's taxon is still recognized as the extinct single-homed Javan rhino in India (Sundarbans, Assam) and Bangladesh,

Rhinoceros sondaicus inermis, Lesson, 1838; it is characterized by a shorter basal length and less inclined occipital plane than specimens from Java, and large teeth (Groves, 1967). The absence of a **horn** in the female rhinos from the Sundarbans is a peculiarity often alluded to in the reports quoted here. The males were said to have a visible horn. Groves (1971) discussed the available evidence to see if this applied only to animals from the Sundarbans or also to those from other areas. While the evidence was not quite conclusive, it appeared that the Javan rhino of the Sundarbans had no horn, at most an indication, while in Malaysia, Sumatra and Java occasionally at least a small horn was reported.

DISCUSSION

The various localities where rhinos were encountered in the Sundarbans are summarized in roughly chronological order in Table 1 and shown in Figure 1.

The rhino probably once was distributed throughout the Sundarbans, from Sagar Island in the west to the Meghna River in the east. The paucity of early records must be due to the poor accessibility of the area. The animals were usually seen quite near the sea-shore. One also gets the impression from the few written reports that the rhinos were only known in very specific localities, not just everywhere throughout the entire estuary. The range may have been limited by the presence of sweet water, rather than the pressure of expanding human population. However, the latter may have been a limiting factor further away from the sea. The species was killed in Jessore district, just north of the boundary of the Sundarbans proper, but only once, before 1834. The sighting of a rhino just south of Calcutta, in a place now almost covered by the ever expanding estates of the sprawling city, is a surprise. There were many sportsmen, naturalists, visitors in Calcutta from early days, and nobody noticed wild rhinos there, at least not in specific terms. Still, on what basis could we deny Baker's tale?

De Poncins (1935) implied that the rhinos were quite rare at the time when he saw them, in 1892, only a handful of specimens remaining. Actually, nobody ever gave the impression that these estuarine forests were really swarming with rhinos, they were always seen in small numbers in rather well-defined localities. According to official records, the last rhino was killed in the Sundarbans in 1888 (De, 1990). De Poncins still saw a few in 1892. At the same time, Kinloch (1892) suggested that they were 'still tolerably abundant.' An officer of the Survey Department reportedly saw the animal or its tracks around 1900, said Shebbeare (1953), who admitted that there had been no 'recent' report when he started to work in the area in 1906. An unspecified record refers to 1908 (Hussain, 1985). There are no further records for the rest of the 20th century. The Sundarbans are inaccessible and rarely visited, so we may never know when the animal became extinct in the area. We could say before 1925.

ACKNOWLEDGEMENTS

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REFERENCES

Baker, E. B. (1 887) *Sport in Bengal: and how, when,* and where to seek it. London.

Blyth, E.(1862) A memoir on the living Asiatic species of rhinoceros., *Journal of the Asiatic Society of Bengal,* 31 (2): 151-175, pls. 1-4.

Blyth, E. (1863) *Catalogue of the mammalia in the Museum Asiatic Society.* Calcutta.

Bowrey, T. (1 905) A *geographical account of countries round the Bay of Bengal 1669 to 1679,* edited by R.C. Temple. Works Hakluyt Society, 2nd series, vol. 12. London.

Burton, R.G. (1 93 1) *A book of man-eaters.* London.

Chakrabarti, K. (1 *992)* Man-eating tigers. Calcutta.

De, R. (1 990) *The* Sundarbans. Calcutta.

Flower, W.H. and Garson, J.G. (1884) *Catalogue of the specimens illustrating* the osteology and dentition *of* vertebrated animals, *recent and extinct, contained in the Museum of* the Royal College of Surgeons of *England,* Vol. 2. London.

Fraser, O.L. (1875) Note on a partially ossified nasal *septum in Rhinoceros sondaicus.* Journal of the Asiatic *Society* of *Bengal,* 44 (]): 10-12, pl.5.

Garrod, A.H. (1877) On some points in the visceral anatomy of the rhinoceros of the Sunderbunds *(Rhinoceros sondaicus).* Proceedings of the Zoological Society of London, 1877: 707-71 1, Figs. 1-3.

Geoffroy-St.Hilaire, E. Duméril, A.M.C. and Cuvier, G. (1831) Rapport sur les collections zoologiques et botaniques, ramassées dans les Indes Orientales et au Cap de Bonne-Esperance, par M. Lamare Picquot. *Bulletin des sciences et de géologie,* 26: 180-184.

Groves, C.R (1967) On the rhinoceroses of South-East Asia. *Saugetierkundliche Mitteilungen,* 15 (3): 221-237, Figs. 1-4.

Groves, C.P. (1971) Species characters in rhinoceros *horns. Zeitschrift fur Saugetierkunde,* 36: 238-252, Figs. 1-22.

Groves, C.P. and Chakraborty, S. (1 983) The Calcutta collection of Asian rhinoceros. *Records of the Zoological Survey of India,* 80: 251-263.

Hussain, K.Z. (1985) Last living rhinoceros in *Bangladesh [in Bengali].* Bichitra, Dhaka, Jan. 1985: 3.

Kinloch, A.A.A. (1892) *Large game shooting in Thibet, the Himalayas, and Northern and Central India.* Calcutta.

Lamarepicquot, F.V (1835) *Réponse pour servir de réfutation aux opinions et à la critique du rapport de M. Constant Dumeril, sur mon memoirs concernant les Ophidiens... suivie d'une relation de chasse dans les iles des bouches du Gange.* Paris.

Lesson, R.P (1838) *Compléments de Buffon,* 2me edition, revue, corrigee et augmentee. Paris. [Sometimes with title-page dated 1848.]

REFERENCES (cont'd)

Manrique, **S.** (1927) Travels of Fray Sebastien Manrique 1629-1643. A *translation of the Itinerario de las Missiones orientales,* edited by C. Ecford Luard. Works Hakluyt Society, 2nd series, Vols. 59, 61.

Pearson, J.T. (1 840) Zoological catalogue of the museum of the Asiatic Society. *Journal of the Asiatic Society of Bengal, 9* (1): 514-530.

Pennant, T. (1 *793) History of quadrupeds. London.*

Pennant, T. (1798) *The view of Hindoostan,* Vol. 2: Eastern Hindoostan. London.

Peters, W. (1877) Ueber *Rhinoceros inermis* Lesson. *Monatsberichte der Königlich Preussischen Akademie der Wissenschaften zu Berlin,* 1877: 68-71, pls. 1-3.

Pocock, R.I. (1946) Some structural variations in the second upper premolar of the lesser one-horned rhinoceros *(Rhinoceros sondaicus).* Proceedings of the Zoological Society of London. I 1 5: 306-309, Fig. 1.

Poncins, E. de (1 935) A hunting trip in the Sunderbunds in 1892. *Journal of the Bombay Natural History Society,* 37: 844-858, pls. 1-4.

Proceedings of the Zoological Society of London (1877) A living specimen of *Rhinoceros sondaicus* from the Sunderbans. Proceedings of the Zoological Society of London, 1877: 269-270.

Schoutens, W. (1676) *Oost-Indische voyagie, [2nd* part]. Amsterdam.

Sclater, P.L. (1 876) A skin of a young rhinoceros from the Sunderbunds. Proceedings of the Zoological Society of London, 1876: 751

Sclater, W.L.. (1891) *Catalogue of Mammalia in the Indian Museum,* Calcutta, Vol. 2. Calcutta.

Shebbeare, E.O. (1953) Status of the three Asiatic rhinoceros. *Oryx,* 2: 141-149.

Shekarea,A. (1832) The Saugor Island rhinoceros. *The Oriental Sporting Magazine,* 2: 313-314.

Simson, F.B. (1 *886) Letters on sport in Eastern Bengal* London.

FOREST CLEARINGS AND THE CONSERVATION OF ELEPHANTS *(LOXODONTA AFRICANA CYCLOTIS)* NORTH-EAST CONGO REPUBLIC

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INTRODUCTION

The Odzala National Park (PNO), and north-east Congo in general, harbour dense populations of elephants (Fay and Agnagna, 1991). In PNO this seems related to the diversity of habitats, in particular in its large areas of Marantaceae forests which provide herbaceous food for elephants, and to the presence of many forest clearings which are important for social interactions and their potential role as salt licks and foraging sites. Both Marantaceae forest distribution and the location of forest clearings were found to influence considerably forest elephant movements (Vanleeuwe and Gautier-Hion, 1997). Besides being important foraging sites for elephants, forest clearings provide excellent conditions for observation of forest mammals and are consequently ideal for both tourists and hunters.

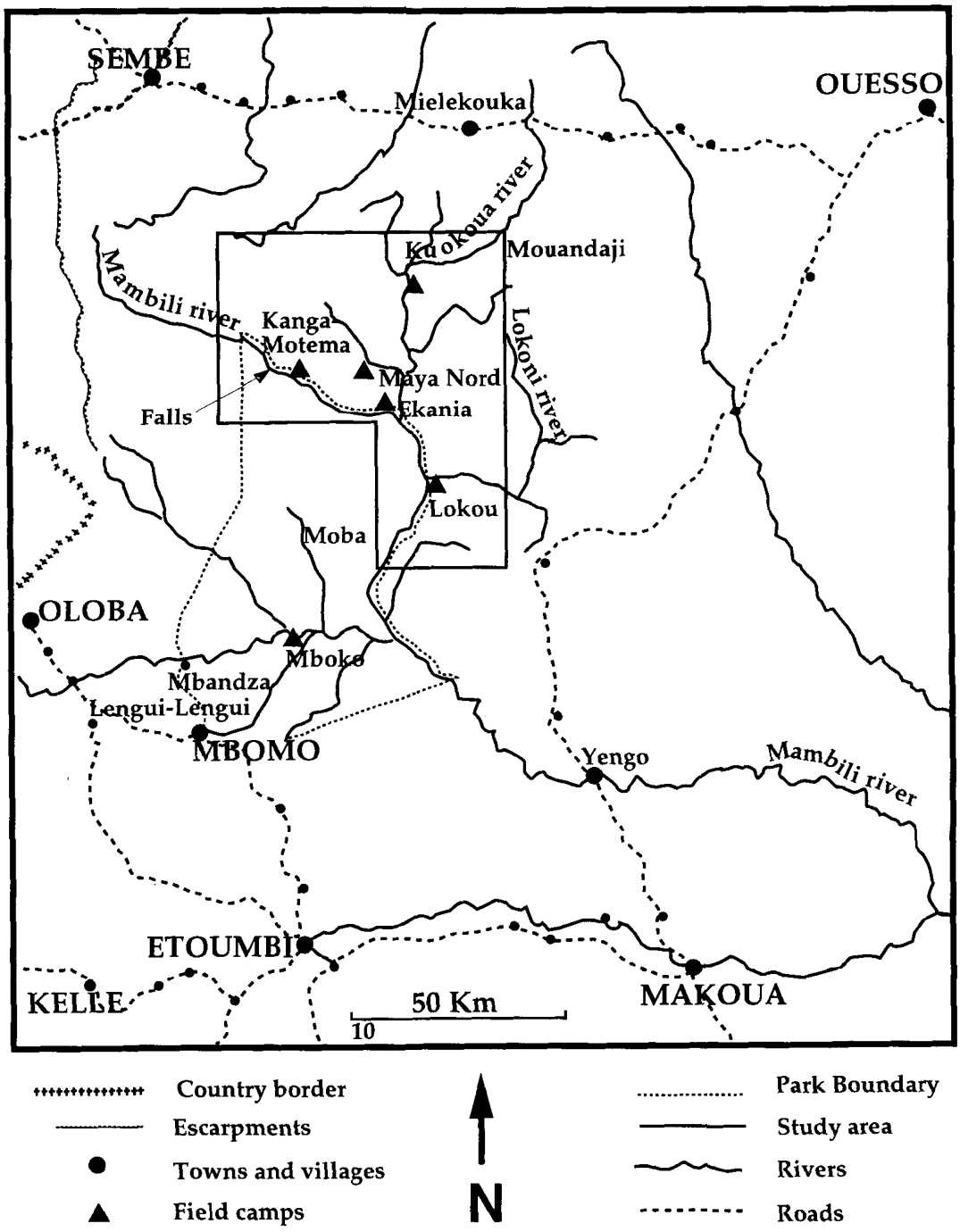
Local hunting and fishing activities are especially important at clearings near the Mambili river which has functioned, from past until present, as the only access route to the north of PNO (Figure 1) (Hecketsweiler *et al.*, 1991). These activities were altered by a decree from the "Ministère des Eaux et Forêts" in 1990, proceeded by the initiation of the EEC project ECOFAC (Utilisation rationnelle des Ecosystèmes Forestièrs en Afrique Centrale) in 1992. As part of this project we examined the importance of forest clearings for elephant populations and evaluated their potential for development of eco-tourism, as well as their role in poaching.

METHODS

INTERA radar and SPOT satellite images (ECOFAC - Univ. of Gent, Belgium, 1996) show over one hundred clearings, concentrated especially in the northern areas of the Park. Thirty-siy (of these clearings were located and investigated. They were reached by motorised canoe and on foot. The distance of the clearings from rivers was recorded and their size estimated using maps. Direct observations and indirect signs (footprints and dung) of elephant activity at clearings were recorded and the presence of carcasses noted. The number of visits per clearing varied from one to 40 (Table 1). Clearings observed only once were also used in the analysis since indirect signs of elephants such as tracks or dung were so evident that they could not be over-looked. One clearing, Maya Nord, was subject to direct observations from December 1995 to December 1996 (n = 213h). The time of arrival and departure, and the size and composition of all elephant groups visiting this clearing were recorded.

RESULTS

Table 1 lists the clearings investigated. Their size ranges from 0.2ha to 42ha The majority of the clearings (61 %) are situated less than 0.5km from the Mambili river or important tributaries. All clearings which do not border rivers have water running through them,



The Odzala National Park and the study area

Table 1. The location, size, direct and indirect signs of elephant presence at clearings.

Regions	Clearing	Distance of rivers (m)	Surface area (ha)	No. of observer visits	Total no. of species	Number of elephants
Moba	Abandza	1100	2	5	2	++
	Avoué	50	2	1	2	+
	Louamé	150	4.2	1	1	++
	Moba	0	6.4	5	4	++
	Moba A	400	2.1	4	3	++
	Moba B	1300	1	3	2	++
	Moba Nord	150	6	1	1	++
Lokoué	Lokoué1	0	5.2	2	6	+*
	Lokoué 2	500	3.4	1		
	Lokoué 3	900	4.5	1	2	+-+
	Mbaya	200	0.2	2	3	++
Ekania	Hippos	150	3.8	3	3	++
	Moungali A	0	42	17	9	1
	Moungali B	500	5	4	4	++
	Moungali C	0	23.2	12	5	1-3
	OssaAsanga	100	2.1	20	7	++
	Tragos	0	0.3	7	4	++
Maya	Maya Sud	5000	29.6	20	9	2
	Maya Centre	7000	25.9	20	10	1-6
	Maya Nord	12000	22	40	11	1-100+
	Obandaka	6000	4.8	5	5	1-21
Koukoua	Amberre	200	20.5	10	7	1
	Bauge M.	0	1	1	1	
	Gorilleunda	200	0.5	1	3	1
	Koukoual	300	21	1	4	++
	Koukoua 2	100	10	1	4	++
	La Capital	0	25.4	5	5	++
	Mouandji	0	35	4	7	++
	Mouangui N	50	8.8	1	1	
	Satellite	0	1.4	2	3	++
Kanga-	Banane	16000	40	1	2	++
Movma	Liboulou	150	19.5	5	7	++
	Ngonda Nord	1200	9.7	5	5	3
	Ngonda Sud	1700	8.5	2	3	++
	Odiba 600		35.1	5	8	6
	4WO 4000		5	1	2	++
Total	36			219		92%

n-n minimum and maximum number of elephants derived from direct observations

+, ++ indirect evidence of elephant activity: one (+) or several (++) individuals

92% of the 36 clearings investigated were visited by elephants. At 39% of these clearings elephants were observed, and at the others (61 %) indirect signs of elephant activity were found. The number of elephants observed at one time varied from one to more than 100 (Table 1).

Elephant carcasses were present at all but two clearings (Table 1) Their number varied from one to several hundred. At the Mouandji clearing, several hundred carcasses were counted in November 1996, approximately 80 were the result of recent and v recent poaching (Figure 2). The two clearings with poaching indices are situated fairly far from rive Maya Nord (12km) and Obandaka (6km). They pro to be the only clearings regularly visited by elephants during daylight.

Photo Credit: Hilde Vanleeuwe

Elephant carcass at Mouanaji.

At Maya Nord, elephants were observed during 37% of daytime observation (n = 21 3h). The average number of individuals sharing the clearing was nine, and the maximum number was more than 100 (observed once). During nocturnal observations on five successive nights (n = 40h using a thermic camera) more than 100 individuals visited the clearing each night. Since most elephants went directly to the stream situated over 100m in from the edge of the clearing upon entering the clearing, it was possible during diurnal observations to collect data on group size and composition of groups. However, we cannot exclude double counting of animals re-entering the clearing. An elephant group was defined as a clustered unit of one or several individuals leaving or entering the clearing together. The composition of 271 elephant groups were analysed, with the most common group size of one individual (46%), while 15% included two individuals and 14% had three individuals (Figure 2). Groups did not exceed 14 individuals. 82% of the single unit groups were solitary males, accounting for 38% of the population observed. Male groups of two or three individuals were also seen (5% and 2% of the population respectively). Matriarchal groups were most commonly composed of two, three or four individuals (1 0%, 12%, and 8% respectively). Solitary females accounted for 8% of the observed population (Figure 2). Average group size was 3.7 individuals when solitary bulls were excluded, and 2.6 when solitary bulls were included.

Photo Credit: Hilde Vanleeuwe

Photo Credit: Hilde Vanleeuwe

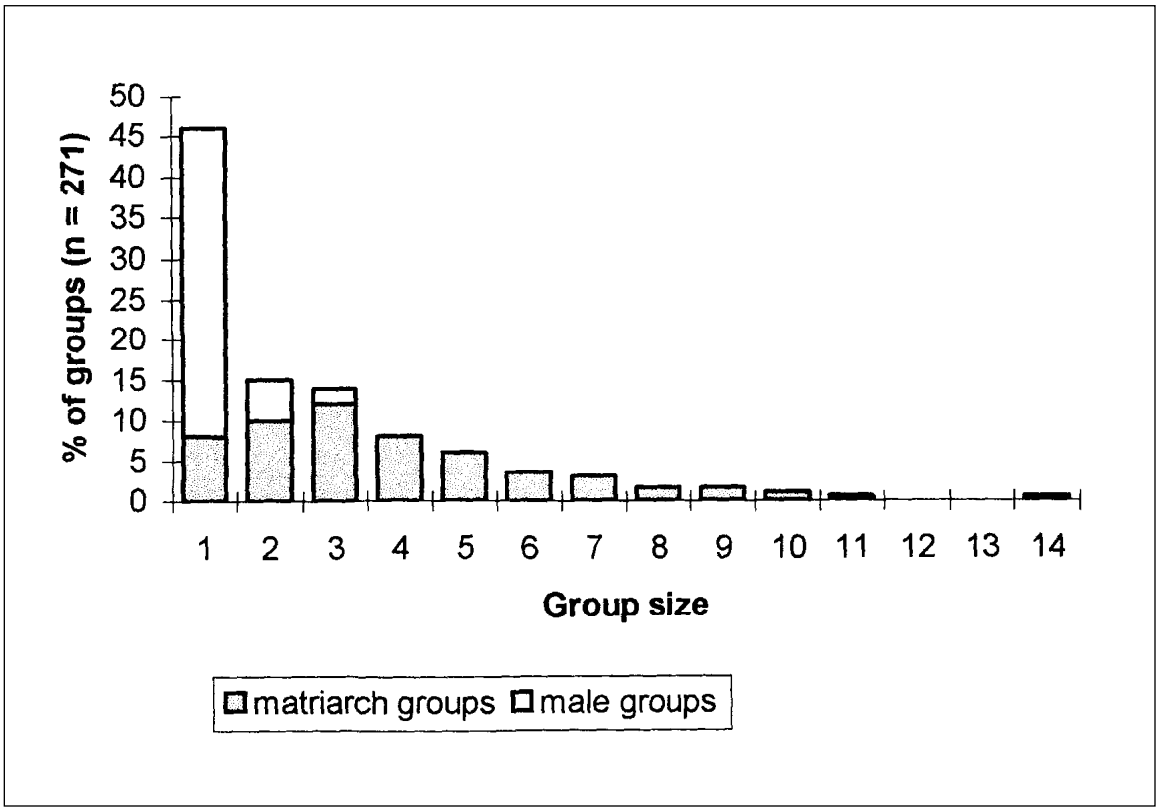


Figure 2. Group size for 271 elephant groups visiting Maya Nord in 1996

DISCUSSION

In an on-going study which began in 1990, Andrea Turkalo has identified more than 2,000 elephants visiting the Dzangha clearing in the Central African Republic (CAR) and stressed the role clearings play for feeding (on mineral salts) and social purposes (Turkalo and Fay, 1995). Additionally, the role and influence the location of clearings play in elephant movements was described (Vanleeuwe and Gautier-Hion, 1997). The present results, showing that 92% of the 36 clearings investigated were frequented by elephants, supports previous conclusions regarding the importance of forest clearings in forest elephant populations.

Our results also show that most clearings were subject to poaching. The exact number of elephants killed per clearing was difficult to determine since carcasses of wounded elephants which did not die on the spot were found in the forest up to several hundred meters from clearings. According to ex-poachers, clearings situated farther from rivers were discovered by poachers upon following wounded elephants. This may explain why no signs of elephant poaching were found at the Maya Nord and Obandaka clearings, both situated far from the river, and why this region was the only area well frequented by elephants during the day. However, as poachers usually hunt for ivory only at night, it remains unclear why this hunting pressure has no influence on the nocturnal activity of elephants at clearings. This is the case at the Mouandji clearing, which has hundreds of old and fresh carcasses, and continues to be frequented by elephants at night. Several potential answers can be given but they remain hypothetical: one, the need for visiting clearings in order to balance or supplement their diet may be more important than the risk of being killed; two, elephants may be attracted to the elephant carcasses in the clearings; and three, elephants, unlike their reaction to human odours at Odzala, may not associate elephant carcasses with danger.

CONCLUSION

Obviously, the frequency (37%), the average (nine) and maximum number (over I 00) of elephants visiting clearings such as Maya Nord during the day offer a remarkable opportunity for tourists to observe the forest dwelling giants which are otherwise difficult to view. Because these clearings attract large mammals, forest clearings may represent the most important ecological value and economically sustainable source of revenue for the PNO. Paradoxically, they are also quite vulnerable, since clearings equally constitute excellent sites for organised hunting for ivory, and ivory hunters may travel over 50km from their villages to these sites. The park is currently free from poaching, but the area north of the park boundary, including the Maya Nord, Obandaka, and Mouandji clearings, remains accessible to illegal hunters living along the Ouesso-Sembe axis (Figure 1).

The CITES participants decided in June 1997, if certain criteria are first met, to re-open trade of legally held ivory in Zimbabwe, Namibia and Botswana, with the possibility to alter the decision if poaching were to escalate as a result of legal trade. Donor governments stressed that revenues from a well managed ivory trade could support elephant conservation (WWF, 1997). Zimbabwe, Namibia, and Botswana are, however, not isolated from the portions of Africa where laws are forced, money and staff for conservation is limited, illegal traffic is easy, and proving incidences of illegal poaching difficult. In Congo, with its impoverished economic and fractured political conditions, organised illegal hunting for ivory would be easy and the benefits potentially large. The future of elephant populations could be dangerously compromised quite rapidly. Regionally adapted protection measures are needed for forest areas such as northeast Congo, which could be included in an extension of the northern park boundary of the PNO and provide this forest area with protected area status.

ACKNOWLEDGEMENTS

This study was carried out as part of the EEC project, ECOFAC - Congo (Conservation et utilisation rationelle des Ecosystèmes Forestiers en Afrique Centrale), in light of park management and conservation. We thank Mr Tsila, Director of the DFF of the Ministère des Eaux et Forêts, Dr C. Aveling, ECOFAC Research coordinator, and all members of the Ministère des Eaux et Forêts - Congo, the EEC, ECOFAC, the University of Rennes, and the Nicolas Hulot Foundation, for their assistance in making this study possible. Material support and supervision were provided by J.M. Froment, Park manager. We are very grateful to Damase Ekondzo (Ingenieur du Ministère des Eaux et Forêts) and the field assistants J.B. Lépale, A. Okondza, R. Ngounga, and A. Atebo for their indispensable aid throughout the study.

REFERENCES

Fay, J.M. and Agnagna, M.(1991) A population survey of forest elephants *(Loxodonta africana cyclotis) in* Northern Congo. *Afr J. Ecol,* 24, 177-187.

Heeketsweiler, P., Doumenge, D. and Mokoko lkonga, **J. (1** 99 1) *Le Parc National d'Odzala, Congo. IUCN,* Programme de conservation des forêts. IUCN, Gland Switzerland, 334.

Turkalo, A. K. and Fay, J.M. (1995) Studying forest elephants by direct observations: preliminary results from the Dzanga clearing, Central African Republic. *Pachyderm,* 20, 45-54.

Vanleeuwe, H. and Gautier-Hion, A. (1997) Forest elephant paths and movements at the Odzala National Park, Congo: the role of clearings and Marantaceae forests. *Afr J. Ecol.* (in press).

WWF (1 997) CITES, 10th International Conference on Wildlife Trade: WWF statement on CITES elephant decision. Internet: http://www.panda.org/cites/release **5.htm.**

ELEPHANT PROBLEM IN THE MUNGO DIVISION, LITTORAL PROVINCE CAMEROON

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RESUME

Cette étude préliminaire a montré qu'il existe encore une importante population d'é1éphants dans le département du Nkam et du Mungo, avec une densité estimée à 1.3 ± 0.3 é1éphants par km^2. Une pressio constante exercée par le braconnage sur les é1éphants à l'intérieur de la forêt apparaît être la principal cause qui les repoussent vers les villages. En restant constamment aux abords des villages, les éléphants auraient graduellement exploré des nouvelles aires (telles que des vielles et des nouvelles plantation regorgeant de cultures vivrières plus succulentes et nourrissantes que la végétation naturelle. Cette découverte les aurait amenés à mettre au point un nouveau cycle de migration pouvant leur perrnett d'avoir une alimentation riche pendant tout le cycle saisonnier. A cela, il faudrait ajouter le développeme agricole de la zone dû elle-même à la population humaine galopante qui a pour conséquence la dégradation continue de l'habitat de 1'éléphant.

Contrairement au probléme des é1éphants de Kaélé dans I'extrême nord Cameroun, celui du Mungo semble être la conséquence des activités humaines telles que l'agriculture et le braconnage. Avec I'expansion de l'agriculture dans la zone, le conflit deviendra plus important et les é1éphants seront sûrement les grands perdants. Les pertes que pachydermes imposent aux populations rurales dans la zone doivent à tout prix être réduits sinon, ils ne scront plus tolérés par les populations humaines a qui ils partagent l'écosystème et leur survie sera compromise. Le probléme des é1éphants destructeurs de cultures dans le Mungo mérite une attention particulière et urgente.

Il est suggéré un projet de recherche dans la zone qui devra comprendre deux principaux volets:

- Une étude systématique de la distribution l'espace et dans le temps des destructions des cultures par les é1éphants. Ceci fournira des éléments de base nécessaires pour la compréhension de la nature et l'importance du problème. Ces travaux devront être suivis par un phase d'expérimentation des méthodes pouvant être efficace à repousser les é1éphants maraudeurs.
- Une étude systématique des densités, mouvements et de la distribution au cours de tout un cycle saisonnier par des transects à largeurs variables distribués au hasard dans la forêt. Ces travaux permettront de connaître la zone d'action de ces é1éphants et d'être capable de prévoir leurs mouvements. Ces données pourront aussi être utiles pour la planification de l'utilisation des terres ainsi que pour la localisation et la délimitation du site d'une réserve qui devra être crée pour la conservation de ces é1éphants.

Deux solutions à court terme sont proposées en attendant la mise en ceuvre d'un tel projet:

- Les dérangements (battues, coups de feux au-dessus des têtes des é1éphants, les feux d'artifices, les gaz lacrymogènes, le feu, et des bruits des tam-tams)
- Les battues contrô1ées.

Le succès de toutes ces méthodes est conditionné par la réduction du braconnage à l'intérieur de ce grand massif forestier.

SUMMARY

This preliminary survey has shown that there is an important elephant population in the Mungo and Nkam divisions (Littoral Province, Cameroon), a density of 1.3 ± 0.30 elephants per km^2. A con poaching pressure on elephants in the inner part forest appeared to he the main cause that keeps close to villages. It is possible that with a constant stay in the forest edge, elephants have been gradually exploring new areas (such as fallow lands and farms and have found locations where there are crops

that are richer food source than natural vegetation. This discovery might have brought them to redesign a new cyclic migration pattern that enables them to have rich food during the whole seasonal cycle. To poaching should be added the spread of agriculture in the area due to an increased human population density that has as side effect a constant encroachment on elephant natural habitat.

Unlike in Kaele, problems in the Mungo division may have resulted from human activities such as poaching and farming that triggered changes in elephant movements. As agriculture will expand in the forest zone, conflicts will escalate and it is sure that elephants will lose. The costs elephants impose on the rural population in the Mungo division should be reduced. Otherwise, they will not be tolerated by people who share the forest with them and their survival will be in doubt. The issue of crop-raiding in the Mungo and Nkam division needs to be urgently tackled.

It is suggested that research be carried out in the area and this should include:

- A systematic survey of the spatial and temporal distribution of crop-raiding that will furnish a basic understanding of the nature and scale of the problem. This work should be followed by an experimental phase to test methods of deterring marauding elephants.
- A systematic study of densities, distribution and movements over a whole seasonal cycle using randomly distributed line transects in cells. This will make it possible to determine the elephant range, the population size and migration patterns over a seasonal cycle. These data could also be useful in land use planning and in the choice of the exact location, size and shape of a reserve for the conservation of the elephant population in the area.

Two short-term solutions of controlling marauding elephants are suggested:

- Disturbance (shooting, firecrackers, drums, lights, **fires,** pepper gas, thunderflashes and shooting over elephants' heads).
- Control shooting.

The success of these management options will only be possible with a dramatic reduction of poaching in the area.

INTRODUCTION

A joint WWF/MINEF team spent 25 days in the Mungo Division, from 28 November to 22 December 1995, to undertake preliminary studies on elephant herds that have been raiding crops in the area

The villages of Ebone, Ekomtolo, Djanga, Badjong, Nlonako and Balondo (south-east of Nkonsamba, Mungo division), are located in an important primary forest adjacent to the Nkam division where significant herds of elephants are still found. Minor crop-raiding by elephants in these villages started in 1991. Since February 1994, important crop destruction has been reported on a regular basis and one hunter was recently killed by these elephants. The "Cellule Centrale du Système National d'Alerte Rapide et d'lnformation sur les marchés" estimated a total of 94 plantations (palm, raffia, cassava, plantains, cocoyams, Colocassia, yams, pineapples, coffee, various fruit trees, and sugar cane) destroyed in the above cited villages.

Development Committees of the concerned communities, in collaboration with MINEF services in the Mungo division, have been shooting elephants to deter them from destroying crops. This technique has kept the bulk of the herds away, although some isolated crop-raiders are still reported to be present in the area. The populations of these villages are facing starvation, according to the "Cellule Centrale du Systeme National d'Alerte Rapide et d'lnformation sur les marchés". Therefore, it was of the utmost importance to undertake a preliminary study of these elephant populations.

OBJECTIVES

This study aimed to assess the importance of the elephant problem in the Mungo and to provide MINEF with preliminary recommendations for the conservation of elephants in the area. It also addressed issues of basic importance in mitigating human-elephant conflicts which are a major concern here and around Africa.

The primary objectives were as follows:

- Collect preliminary data on density, range and seasonal movements of elephants in the area.
- Collect preliminary information on crop depredation by elephants in villages.

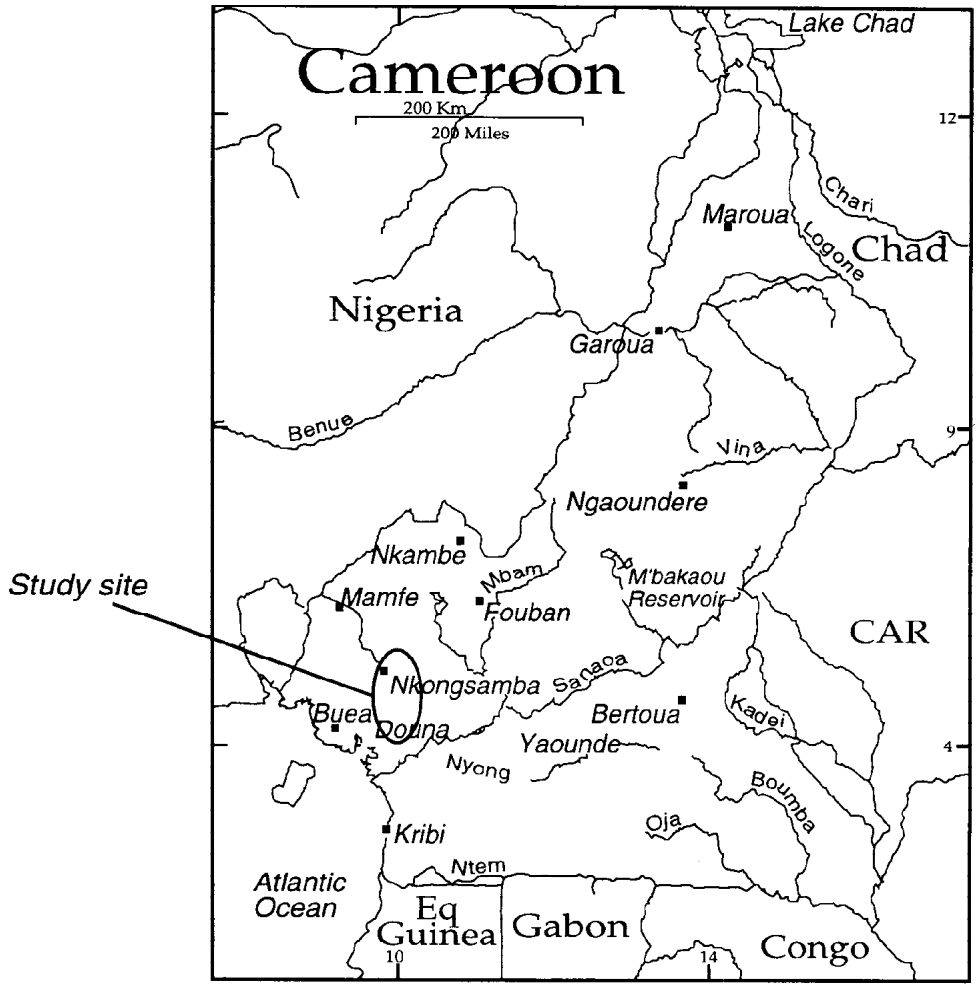

Figure 1. Map of Cameroon showing the study site.

STUDY AREA

The study area covers part of the Mungo division and the Nkam division in the Littoral province (Figure 1). The town of Nkongsamba borders on this study site to the west, the town of Nkondjok to the east, the town of Yabassi to the south and the Nkam river to the north-east (Figure 2). The lack of a good map made it impossible for us to estimate its area. However, the Mungo division is estimated to cover an area of 3,720km^2, with a population of 430,000 inhabitants, or an approximate density of about I 1 6 people per km^2.

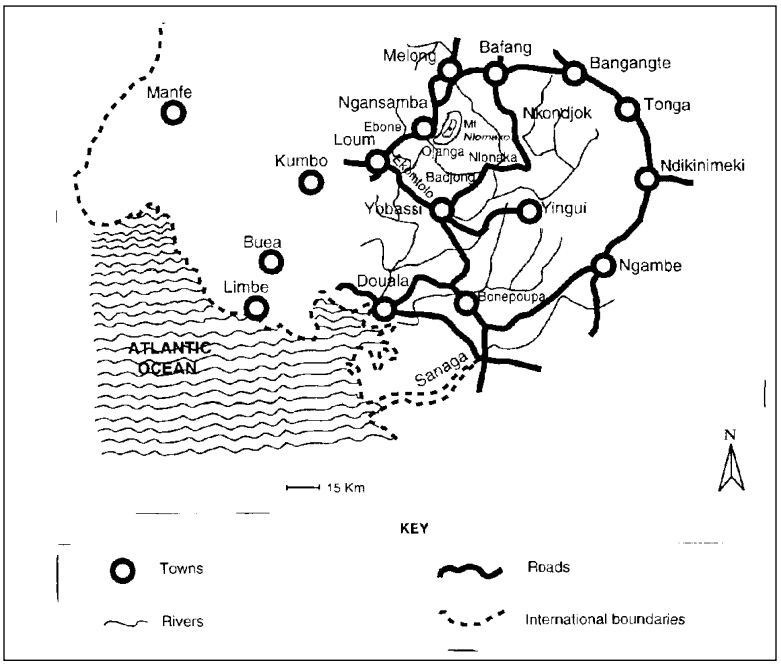

Figure 2. Map of the study area.

The flora could be described as an evergreen rainforest with an open understory, dominated by species such as *Afzelia sp, Lophira alata, Chlorophora excelsa, Pterocarpus soyauxii, Nauclea diderrichii, Lovoa trichiloides, Erythrophleum ivorense, Piptadeniastrum africanum, Entandrophragma cylindricum, Guibourtia sp, Terminaliasuperba, Distenionenthus banthamianus, Khaya sp, Garcinia kola, Garcinia lucida and lrvingia gabonensis.* An area of 41,375ha has been given as logging concessions to two companies: SICAB (Licence no 1654 of 9,375ha and Licence no 1738 of 11,120ha) and SFS (Licence no 1773 of 20,880ha). However, the uneven terrain makes it difficult for logging companies to operate in the area.

Despite heavy poaching pressure, the fauna is rich in important species such as the elephant *(Loxodonta africana), chimpanzee (Pan troglodytes),* drill *(Mandrillus leucophaeus),* African buffalo *(Syncerus coffer nanus)* and sitatunga *(Tragelaphus spekei).*

The climate is characterised by rain for most of the year, with a relatively dry period from December to February. The annual rainfall is about 3,000mm. The mean annual temperature varies between 21^{0}C and 23^{0}C.

METHODS

Elephant density

The line transect method based on dung counts was used to estimate elephant density in the area. For this preliminary survey, transects were not randomly distributed. Seventeen transects were surveyed in total. The first transect (2km in length) was cut due cast from the Ekomtolo village. The geographical coordinates of its starting point are: N 4^0 49, E 9^0, 54'; altitude 515m. A base-line of 20km in length was cut due east, with the starting point located in the Badjoki village at N 4^0 50', E 9^0 56', and at an altitude of 447m. This base-line was subdivided into eight transects of 2.5km each. Another set of eight transects, 2.5km each, were surveyed (four due north and four due south) along the same base-line. The starting points were located at 2.5km, 7.5km, 12.5km and 17.5km from the village. A total distance of 42km of transects was therefore surveyed for this study.

The following data were recorded for each dung-pile detected: The distance (y) along the transect (in kilometres); the perpendicular distance (x) from the line to the centre of the dung-pile (in metres); the dungpile

grade (following the grades used by Barnes and Jensen [1987], as follows: Stage A - boli intact, very fresh, moist with odour, Stage B - boli intact, fresh but dry, no odour; Stage C I - some of the boli are disintegrated, but more than half are distinguishable as boli; Stage C2 - less than half of the boli are distinguishable, the rest are disintegrated; Stage D ≠all boli form an amorphous flat mass; Stage E - it is impossible to detect the dung-pile at 2m range in the undergrowth). Distances of dung-piles of grade E were not recorded as they were assumed to have "disappeared" (Barnes and Jensen, 1987). In addition, information on other elephant signs (feeding, footprints, digging), vegetation change (primary forest, logged forest, swampy forest, clearing), human activities (logging, hunting, fishing, farming) and streams were also recorded

DATA ANALYSIS

The x values (perpendicular distances from the**)** in transect to the centre of dung-piles) for all the droppings were used by the programme DISTANCE (Laake *et al.*, 1994) to estimate the detection function g(x). This is the probability of detecting a dung-pi] given that it is at distance x from the transect (Buckland *et al.*, 1993). The DISTANCE programme uses g(x) to estimate the probability density function (pdf) f(x) of the perpendicular distance data, conditional on the dung-pile being detected (Buckland *et al.*, 1993). Fro the probability density function. the DISTANCE programme calculates an estimate for f(O), which an estimate of the frequency with which dung-pi] occur on the centre-line (Barnes and Jensen, 1987) as well as its 95% confidence interval.

The detection function g(x) is not known in advance and it varies with factors like the environment observer effectiveness to detect dung-piles. Several models of *g(x)* are implemented in the program DISTANCE. Three different statistical tests can used in selecting the best model that **fits** the data. These tests are the likelihood ratio test, the goodness of test and the Akaike's Information Criterion (AIC) test. However, Buckland *et al.*, (1993) advise the use the AIC test because, unlike the likelihood ratio test which works only for nested models and the goodness of **fit** test which provides only the warning that model might be poor, the AIC test allows all the mod implemented in the programme DISTANCE to tested at the same time and the best model is the with the lowest AIC. The AIC test was therefore chosen for data analysis.

For this survey, the hazard rate model was selected (AIC = 376.29) The formula is:

$$g(x-) = 1 - exp(-x/A,)^{-A_2}, \qquad (1)$$

A, and A, were calculated by the DISTANCE programme.

For each transect, the programme DISTANCE estimated the dropping density per km^2 (Y) using Equation 2 (Buckland *et al.* 1993).

$$Y = \frac{n.\ f(0)}{2L} \qquad (2)$$

where n in the number of dung-piles in the transect and L is the total length of the transect.

After estimating dung-pile densities for each transect the programme pooled the data over the 17 replicate transects for the estimation of the dung-pile density of the study site. The coefficient of variation an confidence limits were also calculated by the programme DISTANCE.

It was assumed that dung-piles in the study area we in a steady state (number of dung-piles disappears each day were equal to the number of dung-piles being deposited). The density of elephants (E) per square kilometre was therefore estimated using the three variables (McCIanahan, 1986; Barnes and Jensen 1987): dung-piles density (Y), elephant defecation rate (D) and dung decay rate (r).

$$E = \frac{Y.\ r}{D} \qquad (3)$$

The defecation rate estimated by Tchamba in 199 the Santchou reserve (D = 20 defecations per day). and the decay rate estimated by Ekobo in the Lobeke forest in 1995 (r = 0.008333) were used for data analysis because those two parameters have not have not been estimated for the study area.

Each of the variables *(Y, r, D)* is an estimate with its own variance. The variance of each of the three variables will contribute to the variance of E, which is estimated by:

$$Var(E) = Var(D) \times \frac{(Yxr)^2}{D^2} + Var\left(\frac{Y \times r}{D^2}\right) \qquad (4)$$

(Barnes)

where

$$Var (Y \times r) = Var (Y) \times Var (r) + y^2 \times Var (r) + r^2 \times Var (y) \quad (5)$$

The 95% confidence interval was estimated as

E ± 2. 12 x SE

because, with a sample size n = 17, $t_{0.05}$ is about 2.12 (Zar, 1984). Pearson correlation was used to test the relationship between the number of observations per transect and the distance to the nearest village.

QUESTIONNAIRE SURVEY

Individual interviews were conducted in Nkongsamba, Nkondjok, Yabassi as well as in 16 other villages which are experiencing crop-raiding. All interviews were started opportunistically and questions asked in the course of conversation. This approach gave informants the opportunity to develop their answers outside a structured format and therefore were more likely to provide other useful information. The set of topics investigated were: the presence or absence of elephants; the period of the year when crop-raiding occurs; the probable range and migration patterns; the location of farms; the methods used to deter elephants from raiding crops; the human-elephant relationship in the area; as well as poaching pressure.

We could not undertake an assessment of crop-raiding damage as no incidents of crop-raiding reported during the study period. It would have been too subjective to study old signs which were not clearly elephant related.

RESULTS

Elephant density

The sampling effort was 42km for a sample size of 17. The largest x value was 10.94m for a total of 138 observations. Table I gives parameters used by the DISTANCE programme for line transects' data analysis.

Table 1. Summary of statistics for the survey using the Hazard rate detection function.

Parameter	Point estimate	Standard error	Coefficient of variation(%)	95% confidence limits
A(I)	0.1094	0.03718	33.99	–
A(2)	1.031	0.1104	10.71	–
f(O)	1.9240	0.30695	15.95	1.4101 -2.6251
p	0.04751	0.00757	15.95	0.03482-0.064823
ESW	0.51976	0.08290	15.95	0.38093-0.70917

A(1) = first parameter in the estimated probability density function (pdf)
A(2) = second parameter in the estimated pdf
f(O) = the pdf of the perpendicular distances from the line, evaluated at zero distance
p = probability of detecting a dung-pile
ESW = effective strip width *(w x P)* in metres

The programme DISTANCE calculates the estimated dung-pile density for each transect using the genera) estimator **(Equation** 2). The mean estimate, its standard error and 95% confidence interval are presented in Table 2

Table 2

Mean dung density	Standard error	95% confidence interval
3160	331	± 702

The mean elephant density and its 95% confidence limits were calculated from **Equation 3, Equation 4 and Equation 5**. The result is presented in Table 3.

Table 3.

Mean elephant density estimate (per km2).

Point estimate (per km2)	Standard error	95% Confidence limits
1.3	0.14	± 0.30

Elephant populations could not be estimated as the area of their range is not known.

The scatterplot of the number of observations per transect against the distance to the nearest village is shown in Figure 3.

Pearson correlation analysis suggests a strong negative relationship between the number of dung-piles detected per

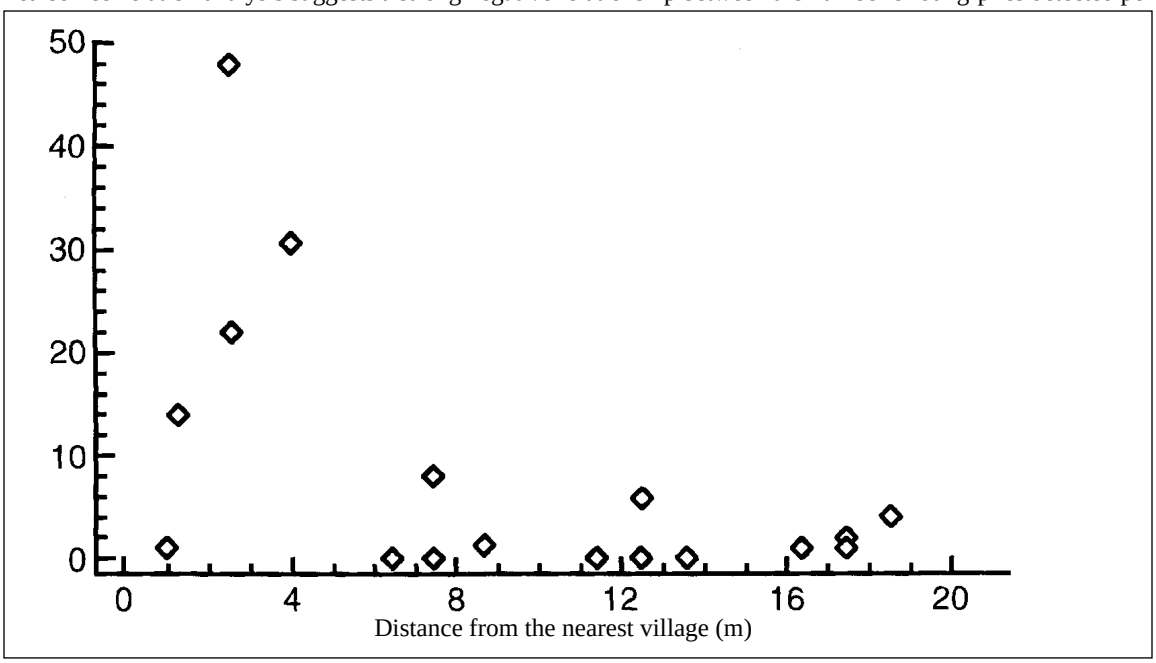

Figure 3. Plot of the number of observations per transect versus the distance from the nearest village

transect and the distance from the nearest village (r = -0.549, df = *15*. $P < 0.05$). In other words, there is a significant decrease of the number of dung-piles observed per transect with an increase in distance from the nearest village.

QUESTIONNAIRE SURVEY

For the entire survey, 100 people were interviewed. The youngest informant was 16 years old and the oldest I] 4 years old

The questionnaire survey suggests that most of the local community farms (85%, n = 100) are located less than 4km from villages. This was confirmed by the line transect survey in the forest. According to 82% of the informants, elephants come within 500m of their houses and 98% of them locate elephant crop-raiding activities within five kilometres of their villages.

Most of the local people think that elephants are simple wild animals (57%, $n = 99$). According to 25% of people interviewed, elephants are totems and 19% consider elephants as enemies. Most people talked to valued elephants for their meat (92%, n = 100).

Evidence indicates that elephants are poached in the area. Poaching is more frequent in the Nkam division than in the Mungo division ($X' = 34.346$, df = *1*, $P < 0.001$).

Methods used by the local communities to deter elephants from raiding their crops include noise (51 %, $n = 78$), smoke (42%), killing (5%), lights (1%) and burning elephant dung (1%). According to most of the informants (72%, n = 100), elephants come to their villages just to raid their farms. However, some (24%) do think that crop-raiding is a side effect of high elephant poaching in the area. Few of them (3%) attribute crop raiding to a migration phenomenon, and only 1 % of the informants linked crop-raiding to witchcraft.

This survey suggests an elephant range covering the area located between the towns of Nkongsamba (Mungo division), Yabassi and Nkondjok (Nkam division) and Ngambe and Bonepoupa (Sanaga Maritime division). Figure 4 shows the probable elephant range.

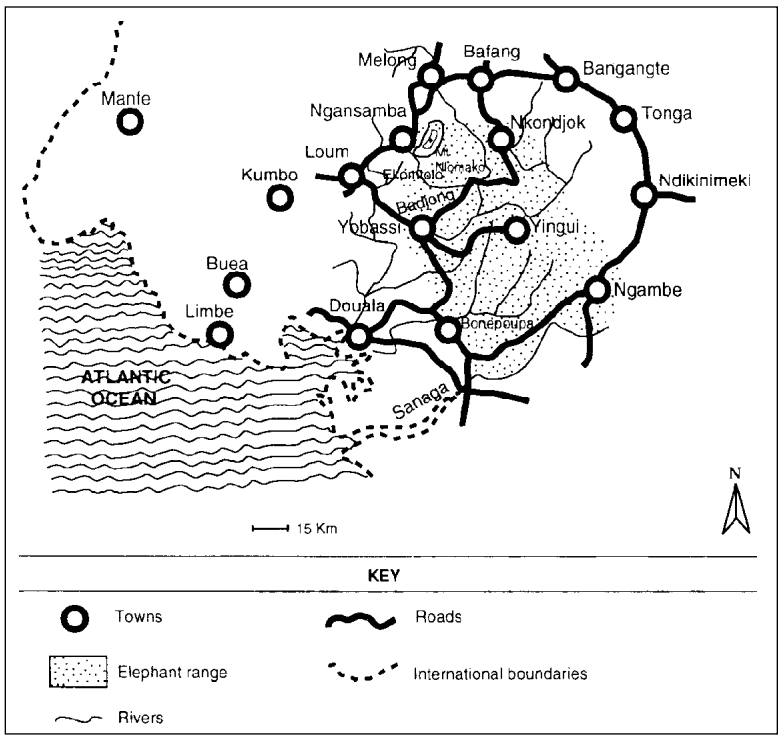

Figure 4. Probable elephant range in the study area

Crop-raiding by elephants appeared to present a cyclic pattern. Elephants are reported to destroy farms in the subdivisions of Nlonako and Nkongsamba between February and June. This activity is reported to occur in Nkondjok subdivision between July an October and in Yabassi subdivision between December and January. Figure 5 shows the probable direction of migration patterns.

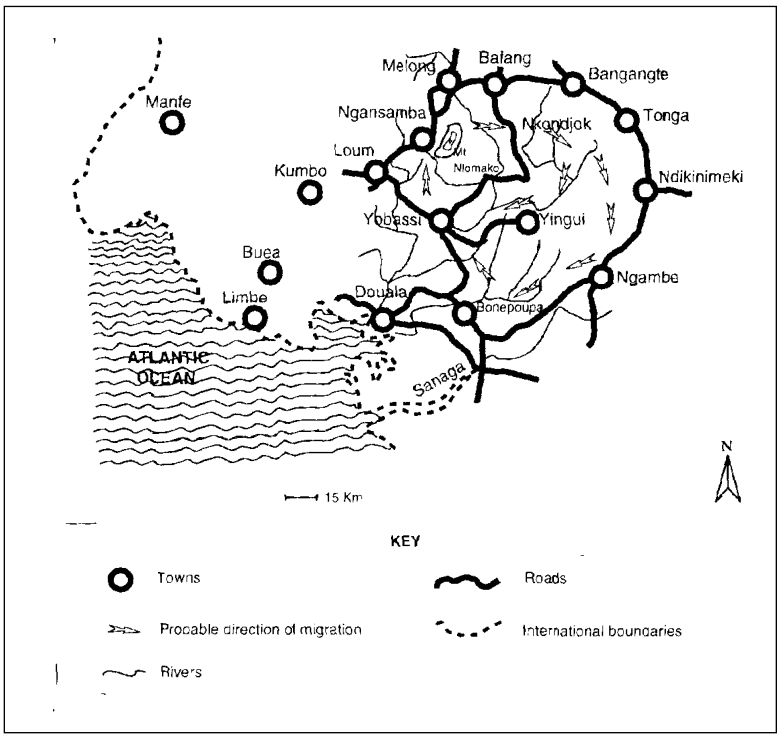

Figure 5. Probable elephant migration patterns

POSSIBLE CAUSES OF CROP-RAIDING

Poaching pressure on elephants

This preliminary survey has shown that there is an important elephant population in the Mungo Nkam divisions, with a density of 1.3 ± 0.30 elephants per km^2. Pearson correlation analysis suggests concentration of elephants in the vicinities of villa contrary to what is observed in the south-cas Cameroon (pers. obs.), in Gabon (Barnes, pers. comm. or Congo (Agnagna, pers. comm.). This unusual phenomenon could be explained by a high concentration of poachers in the forest. In fact, about 15km along the base-line an increased number of poachers encampments were recorded. Some poachers are equipped with modem weapons, sue the 458 and 375 rifles, Constant poaching pressure on elephants in the inner part of the forest appears to be the main cause forcing elephants close to villages.

Acquisition of a taste for crops

It is possible that with a constant stay in the forest edge, elephants have been gradually exploring new areas (such as fallow lands and farms) and have found locations where there are crops that are a richer food source than natural vegetation. This discovery may have brought about a new cyclical migration pattern (Figure 5) which enables the elephants access to rich food sources throughout the year.

Increased agricultural development in the Mungo Division

The estimated population density in Mungo division is 116 inhabitants per km^2. Increased levels of conflicts in the area may be partly explained by a high human population density with resultant encroachment on elephant habitat, The spread of agriculture increases

competition between humans and elephants for land, and exacerbates conflicts between the two.

RECOMMENDATIONS

Unlike in Kaele, problems in Mungo and Nkam divisions may have resulted from human activities, such as poaching and fanning, which triggered changes in elephant movements. As agriculture expands into the forest zone the number of conflicts will escalate. The costs these conflicts impose on the rural population in the Mungo division need to be reduced, otherwise elephants will no longer be tolerated by the people who share the forest with them, and the elephants' long term survival will be in doubt. To the local people, conflict with elephants seems insoluble (unless all the elephants are killed!), as their methods of controlling crop-raiders (including burning elephant dung!) have been, to date, ineffective. However, these problems are not intractable, and solution do exist to improve the situation.

It is suggested that a research project be initiated in the area to look at some of the basic aspects of human and elephant dynamics to determine solutions to the problems outlined in this paper. Any project initiated should include:

- A systematic survey of the spatial and temporal distribution of crop-raiding. This work will furnish a basic understanding of the nature and scale of the problem. This phase should be followed by an experimental phase to test methods of deterring problem elephants.
- A systematic study of elephant population densities, distribution and movements over an entire seasonal cycle using randomly distributed line transects in cells (Ekobo, 1995) to determine the elephant range, the population size and migration patterns over a seasonal cycle. It would therefore be possible to anticipate elephant movements in relation to existing human settlements. These data would also be useful in land-use planning and in the choice of the exact location, size and shape of a conservation reserve for the elephant population in the area.

There are also a wide range of possible short-term solutions or methods of controlling marauding elephants. Two of these management options are more realistic and suitable to an evergreen rainforest ecosystem:

1. Disturbance
   This solution involves attempting to drive elephants away from farms by methods such as shooting, firecrackers, drums, lights, **fires,** capsicum (pepper gas), thunderflashes and shooting over elephants' heads. Many of these methods have been tried by local communities in the area and have proven to be ineffective because they were used in isolation and elephants became accustomed to them. Appropriate forms of disturbance such as those cited above, when used in combination with control shooting could increase the effect of disturbance.

2. Control shooting
   This solution involves shooting individual elephants as a deterrent, in an attempt to drive other elephants away. This method has also proven to be ineffective in the area because:

- poachers and hunters who are hired to kill problem elephants generally select bulls because they carry large tusks and because they are usually the ones found to raid crops most frequently. Experience from other parts of Africa where crop-raiding occurs has shown that the deterrent effect of shooting bulls is very small.
- shooting often takes place well after elephants have become established in the area and when the elephants are not actually raiding crops. This does not give a clear message to elephants.

It is important to understand that if the shooting is badly done, the situation may be exacerbated with aggressive wounded elephants.

Control shooting should take place in the crop-raiding area to deliver a clear signal to elephants. Ideally, young females below breeding age should be shot. Shooting should take place as soon as animals arrive in the area and all animals shot should be killed. Single-shot heavy calibre guns should be used rather than light automatic machine guns.

It should be noted that all of the above suggested solutions will only be effective if there is a dramatic reduction of poaching in the area.

REFERENCES

Barnes, R. E W. (1 993) Indirect methods for counting elephants in forest. *Pachyderm.* 16: 24-30.

Barnes, R. F. W and Jensen, K. L. (1 987) How to count elephants in forests. *African Elephant and Rhino Specialist Group. Technical Bulletin No. 1.*

Buckland, S. T., Anderson, D. R., Burnham, K. R and Laake, J. L. (1993) *Distance sampling: Estimating abundance of biological population.* London, Chapman and Hall.

Ekobo, A. (1 995) Conservation of the African forest elephant (Loxodonta africana) in the Lobeke, south-east of Cameroon. PhD thesis, University of Kent. England,

Laake, **J.** L., Buckland, S. T., Anderson, D. R. and Burnham, K. R (1 *994) DISTANCE User's Guide V 2. 1.* Fort Collins, CO. 84 pp, Colorado Cooperative Fish and Wildlife Research Unit Colorado State University.

McClanahan, T. R. (1986) Quick population survey method using faecal droppings and a steady state assumption. *Afr J. Ecol.* 24: 37-39.

Système National d'Alerte Rapide et d'Information sur les Marchés (1995). Departement du Mungo: Les éléphants sèment la panique. *Bulletin d'information No 9.* MINAGRI, Yaoundé.

Tchamba, M. N. (1992) Defecation by the African forest elephant (Loxodonta africana cyclotis) in the Santchou Reserve, Cameroun. *Mammalia.* 56: 155-158.

Zar, J. H. (1984) *Biostatical analysis.* London, Prentice-Hall International, Inc.

Notes from the Field

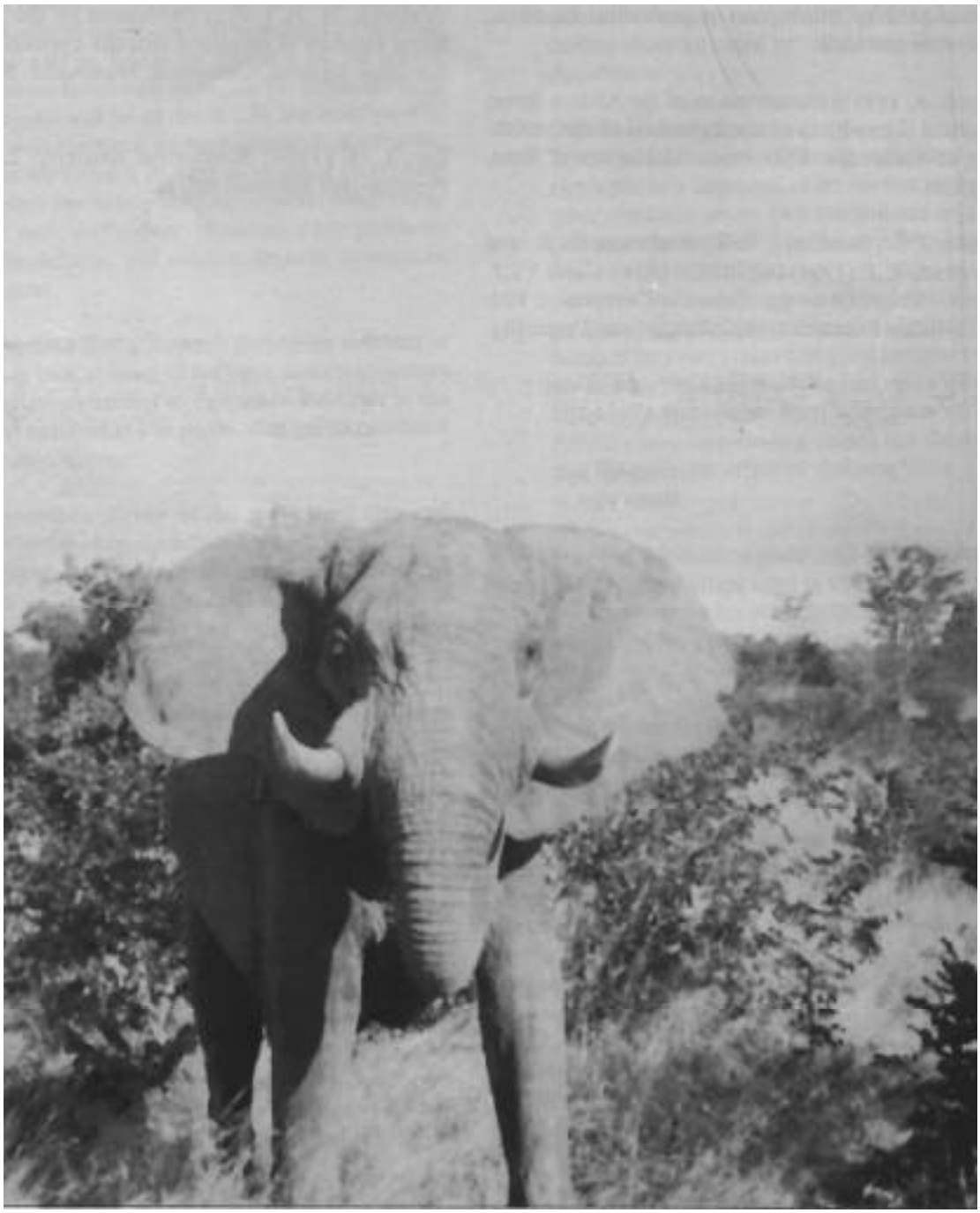

Photo Credit: Jennifer Overton

RHINO POACHING IN THE MAASAI MARA

The first rhino poaching incidents reported in Kenya since 1992 took place in the Maasai Mara Reserve between June and July 1997. Two black rhinos were killed, one of which survived for a week after it was shot and was treated for the bullet wound. However, it died from gunshot damage to critical internal organs in the abdominal and thoracic area. The horns remained intact. The second rhino was found dead with its horns removed. The **first** incident was near Ole Tokoshi and the second was shot one kilometre from the Sand River. Both of these sites are outside the Reserve. Ballistics tests on the bullets show that they originated from a 30-06 rifle, which is not in official use by the Kenya Wildlife Service (KWS), the General Services Unit (the GSU is a branch of the Kenya police charged with security issues). Police nor the Maasai Mara anti-poaching units. Both rhinos were positively identified, and were known to be resident in the Mara, but regularly moved into Tanzania's Serengeti National Park.

Following the incidents, the main security organisations involved in the area, KWS, Narok County Council (responsible for the management of the Maasai Mara Reserve), the GSU and the Police, met to discuss the situation and what could he done. Resulting from the deliberations, a massive investigation has been launched to identify the cause of the sudden increase in poaching activity for the area. Furthermore, additional security measures have been put into place and rhino monitoring has been intensified to protect against a repeat occurrence.

Source - KWS News/Tim Oloo, Kenya Wildlife Service Rhino Coordinator, PO Box 40241, Nairobi, Kenya

RHINOS IN SWAZILAND

Two of the Kingdom's Big Game Parks, Hlane National Park and Mkhaya Game Reserve, are home to all of Swaziland's white rhino while the country's only black rhino occur in Mkhaya.

The actual numbers of rhinos existing in Swaziland are not released here as this is still considered classified" information for security reasons. What can be said is that both populations are flourishing and expanding after the near total wipe-out by poaching between November 1988 and December 1992. During these four years Swaziland lost more than 70% of its rhinos to poaching, in what became generally known as the Rhino Wan 'his resulted in upgraded legislation and many judicial confrontations. The close of this period happened also to be the culmination of the worst drought recorded in history; this impacted severely on reproduction by causing many rhino calves to perish because their mother's milk dried up.

Following a short hiatus of stability, with no adult rhinos being lost to poaching after December '92 and no recruitment from surviving calves during the closing years of the drought, the rains came. Over the last 36 months, white rhino have shown a 58% increase in numbers by natural increment, probably enhanced by the synchronization of receptive females after the drought. Every cow capable of siring offspring has done so, with the only negative being that 72% of their young are males. This reflects a very healthy state of affairs within the Big Game Parks and says much for the dedication and effectiveness of the ranger force.

The rhino conservation situation in Swaziland has gone from losing one rhino every two weeks on average, and on occasion up to three in one day, to no rhino poaching incidents reported since December 1992. This dramatic improvement can be ascribed to the new game laws and their inclusion in the Non Bailable Offences Act together with the ability of the Big Game Parks to implement this legislation effectively. The total support and commitment of His Majesty, King Mswati 111, in facilitating the control which now is in place and which is backed by extremely tough anti-poaching legislation, has enabled this remarkable and encouraging achievement in rhino conservation.

Source: Ted Reilly, Mkhaya Game Reserve, PO Box 33, Mbabane, Swaziland

ELEPHANT POACHING IN KENYA

There has been much speculation over the number of elephants poached in Africa since the CITES meeting held in Harare in June 1997 when elephant populations from Botswana, Namibia and Zimbabwe were downlisted to Appendix II to allow limited trade in ivory. Kenya in particular was the target of adverse press reports that elephants were being "massacred" at rates reminiscent of the holocausts of the 1970s. The reports continue to be widely publicised internationally, despite lack of corroborative evidence from the field. In response to these reports, KWS convened a meeting for all interested parties in November 1997 to scrutinise the KWS elephant mortality database and get authenticated reports from the field security network and private landowners. This meeting was attended by over ten local and international organisations, KWS and landowners, and each expressed concern about the unsubstantiated claims of high numbers of poached elephants.

KWS established an Elephant Mortality Database in 1992 for monitoring all incidents of elephant deaths to enable the relevant departments to respond appropriately to each particular circumstance. The database has information on poaching, illegal trafficking of ivory, patrols, surveillance, problem animal control, etc. The information obtained from the data enables KWS to organise effective anti-poaching operations and wildlife protection and monitoring strategies through its widespread security network.

A strong collaboration and information dissemination network exist between KWS and landowners in all the elephant range within the country. Information in the database indicates that there has been a decline in elephant poaching in the 1990s compared to the over 7,000 that were being poached annually in the 1970s and 80s. The number of elephants poached between 1992 and 1997 were 35, 75, 61, 34, 29 and 44 respectively. This indicates that 1997 was not different from other years. Even upon examination of the monthly data for 1997 there appears to be no evidence to support claims for an upsurge in ivory poaching since the CITES meeting. The authenticated poaching figures for elephants in 1997 are: January 4, February 4, March 5, April 5, May I 0, June 1, July 2, August 0, September 12, October 0, November I and December 0 (Total 44). In future, these figures will be submitted to AfESG on a monthly basis for prompt and independent evaluation of elephant poaching trends in Africa.

The current picture of poaching in Kenya must be seen in the proper context. Elephant numbers have grown from 19,000 in 1989 to 27,000 in 1997 and continue to increase at over 1,000 per year. Elephants are also re-establishing their former migratory routes outside parks, some trekking over 200 kilometres away. By June 1997, the number of elephants outside parks exceeded the number inside. This creates a growing threat, requiring greater vigilance and a wider security effort.

Kenya is committed to the conservation of elephants and accurate reporting of poaching incidents. Recently, more elephants have been poached by the pen than by the poacher. This situation must be guarded against as these alarmist tendencies may send the wrong signals and awaken potential poachers.

Source: John Waithaka, Kenya Wildlife Service Species Programme, P 0 Box 40241, Nairobi, Kenya.

Pachyderm

Notice to contributors

Pachyderm welcomes original manuscripts (not published elsewhere) dealing with the conservation and management of elephants and rhinos. All submissions are reviewed by at least two referees. Manuscripts should not exceed 4,000 words; shorter ones have a greater chance of being published. Contributions may be written in English or French and should be typed on one side of A4 paper, double-spaced with ample margins. Final versions of manuscripts should be submitted on IBM-compatible 3.5" diskettes in WordPerfect or Microsoft Word format if possible. The full postal address of the first author should be included as well as the address of any other author.

Tables and figures should be submitted on separate sheets and the captions to illustrations typed out on another sheet. Figures should be black-and-white high quality graphics, suitable for reduction. Photographs should be unmounted, glossy prints of good quality. Abbreviations and references should be made using same format provided by the *African Journal of Ecology*.

We also welcome short updates for the Notes from the field section of *Pachyderm*. Notes from the Field should describe activities and/or the current conservation situation in your area or country. They should be 500 words or less, and give an account of the current conservation status for elephants or rhinos, new developments (positive or negative), or an important event which affects or will significantly affect elephant and/or rhino conservation. Furthermore, Notes from the Field should be informative pieces, which provide an update on important elephant or rhino issues, where there is insufficient information to write an entire manuscript the author feels it is important to inform the *Pachyderm* readership about recent developments. Notes from the Field may also include letters responding to a manuscript published in a previous edition of *Pachyderm*.

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