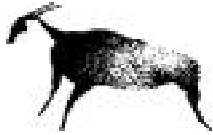


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Cover photo: Black Rhino in Ngorongoro Crater, Tanzania
Photo credit: African Wildlife Foundation

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CHAIRMAN'S REPORT: ASIAN RHINO SPECIALIST GROUP

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The Asian Rhino Specialist Group (AsRSG) Action Plan for Asian rhino conservation has been published: *Asian Rhinos: Status and Survey and Conservation Action Plan, New Edition*; Foose, Thomas J. and Van Strien, Nico (editors). The Action Plan provides the latest estimates of numbers and assessment of status for the three species of Asian rhinos: the Indian, the Javan, and the Sumatran. The Plan also presents a general strategy and specific actions for Asian rhino conservation, including 36 specific project proposals with estimated costs. The Plan contains eight maps of rhino distribution, past and present, and 10 photographs of rhinos and conservation activities for them. Copies of the Action Plan are available from the IUCN Publications Services Unit; 219c Huntington Road; Cambridge CB3 0DL, UK, Fax: +44(1)223-277175; Email: iucn-psu@wcmc.org.uk.

AsRSG has been requested to convene a colloquium on the Javan rhino and its principal protected area, Ujung Kulon National Park in Indonesia. Many organisations have been, or are interested in being, involved in conservation of this species and area. Considerable funds have been expended. However, these efforts have been largely unco-ordinated. Moreover, despite the efforts and funds, conservation problems continue; one or two rhinos have been lost to poachers in recent years (a significant loss considering the small size of the population, numbering around 50 individuals); there is concern that ecological conditions in the Park such as the invasion of several exotic plant species and the explosion of the banteng population are detrimental to the rhino. The colloquium will assemble the parties that are actually or proposing to be operative in Javan rhino conservation, to discuss relative needs and interests and produce an ad hoc plan. This plan would affirm priorities; propose actions; identify parties who would implement actions, and thereby co-ordinate and reconcile the various initiatives and interests; develop a work plan and time table; and consider mechanisms for long-term

financial sustainability of Javan rhino conservation in Ujung Kulon, beyond the dependence on external donors like the Rhino Tiger Conservation Fund (RTCF).

The RTCF of the U.S. Fish and Wildlife Service has selected seven projects on Asian rhino conservation for support:

- Equipment for guards in rhino protected areas in Assam
- Wireless communications network for rhino protected areas in Assam
- Conservation awareness and training programme for rhinos and tigers in India Support for rhino protection units (RPU) in Way Kambas National Park, Indonesia
- Electric fence equipment for the Sumatran Rhino Sanctuary, Way Kambas National Park, Indonesia
- Colloquium on conservation action and co-ordination for Javan Rhino in Ujung Kulon National Park, Indonesia
- Adopt-A-Warden programme by Minnesota Conservation Officers in Ujung Kulon and Way Kambas National Parks, Indonesia.

The AsRSG has been assisting the USFWS in review of proposals submitted for Asian rhino conservation.

AsRSG has done some preliminary groundwork for a rhino survey in Myanmar which will be conducted jointly by the Forest Department of Myanmar, the Department of Wildlife and National Parks Peninsula Malaysia, and the AsRSG.

Progress continues on development of the managed breeding centre in native habitat for the Sumatran rhino (Sumatran Rhino Sanctuary or Suaka Rhino Sumatera [SRS]) in Way Kambas National Park. After some delays due to heavy and long rains, it is

pected the first rhino will be moved from captivity to the SRS in August or September 1997. The managed breeding centre at Sungai Dusun in Malaysia is also progressing with significant support for improvements expected from Malaysian donors.

The GEF Project to initiate implementation of the Conservation Strategy for Rhinoceros in Indonesia and Malaysia is also progressing well. There are 12 teams operating in Indonesia in Way Kambas, Bukit Barisan Selatan and Kerinci Seblat National Parks. In Malaysia, there are 10 teams in Peninsula and two teams in Sabah. The GEF funds will conclude in 1998 and, according to the GEF/UNDP, there is no possibility of renewal or extension. Hence a major objective currently in progress is to develop financial sustainability for the

rhino conservation programmes. For the long term (by the year 2001) the major mechanism being developed for financial sustainability is the eco-tourism programmes associated with the Sumatran Rhino sanctuaries. Over the shorter term, i.e. 1997-2000, the AsRSG, in partnership with the International Rhino Foundation (IRF), are both providing and recruiting from other conservation partners bridging funds until the eco-tourism programmes are in full operation. Partners include the American Association of Zoo Keepers (AAZK) which has adopted the teams in Bukit Barisan Selatan N.P. and the USFWS RTCF which is supporting teams in Way Kambas N.P.

Finally, the AsRSG has a subpage on the IRF website at <http://www.rhinos-irf.org>.

RAPPORT DU PRESIDENT: GROUPE DES SPECIALISTES DES RHINOCEROS D'ASIE

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Le Plan d'action pour la conservation des rhinos asiatiques du Groupe des Spécialistes des Rhinocéros d'Asie (GSRAs) a été publié : *Rhinos d'Asie : Statut, Contrôle et Plan d'action pour leur Conservation, Nouvelle édition*; Foose, Thomas J. et Van Strien, Nico (éditeurs). Le Plan d'action apporte les dernières estimations de nombres et l'évaluation du statut des trois espèces de rhinos asiatiques : les rhinocéros d'Inde, de Java et de Sumatra. Le Plan présente aussi une stratégie générale et des actions spécifiques à entreprendre pour la conservation des rhinos asiatiques, y compris 36 propositions de projets spécifiques avec l'estimation de leur coût. Le plan comporte huit cartes donnant la distribution des rhinos, présente et passée, et dix photos de rhinos et des activités de conservation qui les concernent. Des exemplaires du Plan d'action sont disponibles à l'Unité du Service des Publications de l'UICN, 219c Huntington Road, Cambridge CB3 0DL, UK. Fax : +44(1)223-277175. Email : iucnpsu@wcmc.org.uk.

Le GSRAs a été prié de réunir un colloque sur le Rhinocéros de Java et son aire protégée principale, le

Parc National d'Ujung Kulon, en Indonésie. Beaucoup d'organisations voudraient, depuis plus ou moins longtemps, être impliquées dans la conservation de cette espèce et de cet endroit. On y a dépensé des fonds considérables. Pourtant, ces efforts ont été en grande partie mal coordonnés. Qui plus est, malgré les efforts et les fonds, les problèmes de conservation persistent; les braconniers ont prélevé on ou deux rhinos ces dernières années (ce qui est une perte considérable étant donné la taille réduite de la population qui compte environ 50 individus); l'on s'inquiète aussi des conditions écologiques prévalant dans le parc, telles que l'invasion de plusieurs plantes exotiques et l'explosion de la population banteng qui pourraient nuire aux rhinos. Le colloque rassemblera les parties qui sont ou qui se proposent de devenir actives dans la conservation du Rhino de Java, pour discuter des besoins et des intérêts qui le touchent et produire un plan ad hoc. Ce plan définirait les priorités, proposerait des activités, identifierait les parties qui réaliseraient les actions et ainsi coordonnerait et réconcilierait les différents intérêts et initiatives; il mettrait au point un plan de travail et un

calendrier; enfin, il analyserait les mécanismes à mettre en place pour le maintien financier à la longue de la conservation du Rhino de Java à Ujung Kulon, hormis la dépendance financière vis-à-vis de donateurs extérieurs tel le Fonds pour la Conservation du Rhino et du Tigre (RTCF).

Le RTCF du U.S. Fish and Wildlife Service a choisi sept projets à supporter dans le cadre de la conservation des rhinos asiatiques :

- Equipement des gardes dans les aires protégées pour les rhinos en Assam.
- Réseau de communications sans fil pour les mêmes aires protégées d'Assam.
- Sensibilisation et programme de formation à la conservation pour le rhino et le tigre en Inde.
- Support des unités de protection des rhinos (UPR) du Parc National de Way Kambas, en Indonésie.
- Matériel nécessaire pour des clôtures électriques au Sanctuaire des Rhinos de Sumatra, dans le Parc National de Way Kambas, en Indonésie.
- Colloque sur les actions de conservation et la coordination pour le Rhino de Java au Parc National d'Ujung Kulon, en Indonésie.
- Programme "Adoptez un garde" par les Responsables de la Conservation du Minnesota dans les Parcs Nationaux d'Ujung Kulon et de Way Kambas, en Indonésie.

Le GSRAs a aidé le USFWS dans l'examen des propositions soumises pour la conservation des rhinos asiatiques.

Le GSRAs a réalisé quelques travaux de terrain préliminaires à une étude du rhino à Myanmar qui sera menée conjointement par le Département des Forêts de Myanmar, le Département de la Faune et des Parcs Nationaux de la Péninsule malaise et le GSRAs.

Les progrès se poursuivent dans l'installation du centre de reproduction contrôlée dans l'habitat

d'origine du Rhinocéros de Sumatra (Sanctuaire du Rhino de Sumatra ou Suaka Rhino Sumatera {SRS} dans le Parc National de Way Kambas). Après quelques retards dus aux pluies longues et abondantes, on prévoit d'amener le premier rhino de son lieu de captivité au SRS en août ou septembre 1997. Le centre de reproduction contrôlée de Sungai Dusun, en Malaisie, est lui aussi en progrès grâce au support significatif attendu des donateurs malais.

Le Projet FEM pour lancer la réalisation de la Stratégie de Conservation du Rhinocéros en Indonésie et en Malaisie avance bien. Il y a douze équipes qui travaillent en Indonésie, dans les Parcs Nationaux de Way Kambas, de Bukit Barisan Selatan et de Kerinci Seblat. En Malaisie, il y a dix équipes dans la Péninsule et deux équipes à Sabah. Les fonds du FEM arrivent à leur fin en 1998 et, selon le FEM/PNUD, il n'existe aucune possibilité de les renouveler ni de les prolonger. C'est pourquoi un des objectifs principaux auquel on travaille actuellement est d'assurer le maintien financier des programmes de conservation du rhino. A long terme (pour l'année 2001), le mécanisme principal développé actuellement pour arriver à la soutenabilité financière consiste en programmes d'écotourisme mis au point en association avec les Sanctuaires de Rhinos de Sumatra. A plus court terme (de 1997 à 2000), le GSRAs, en collaboration avec l'International Rhino Foundation (IRF), fournissent et recherchent auprès des autres partenaires en matière de conservation des fonds qui permettront de tenir jusqu'à ce que les programmes d'écotourisme soient pleinement opérationnels. Ces partenaires comprennent l'Association Américaine des Gardiens de Zoos (AAZK) qui a adopté les équipes du Parc National de Bukit Barisan Selatan, et le USFWS RTCF qui soutient les équipes du P. N. de Way Kambas.

Enfin, sachez que le GSRAs possède un bas de page sur le site web de l'IRF à <http://www.rhinos-irf.org>.

CHAIRMAN'S REPORT: AFRICAN RHINO SPECIALIST GROUP

Martin Brooks

Natal Parks Board PO Box 662 Pietermaritzburg 32000 South Africa

Activities over the past year, since the African Rhino Specialist Group's (AfRSG) meeting in February 1996, have focused on the revision of "A Continental African Rhinoceros Status Summary and Action Plan" and technical support to a number of rhino range states.

African Rhino Action Plan

A draft of the new *African Rhino Action Plan* has been completed, and reviewers' comments are being incorporated into the final text before printing and distribution later this year. The plan comprises twelve chapters dealing with: (1) past and present distribution, status and conservation of African rhinos; (2) the conservation framework for African rhinos; and, (3) action strategies. Apart from appearing in hard copy, it will also be made available in due course on the web.

CITES

A preliminary briefing document entitled "Towards evaluating the effectiveness of rhino conservation actions" was drafted for the CITES Standing Committee meeting in December 1996. This resulted from CITES Res. Conf. 9.14, which called for the development and application of indicators to provide a basis for evaluating policy interventions pursuant to CITES. The document describes a preliminary conceptual model, but considerable additional effort will be required to develop an effective means of differentiating the effects of various policy and management actions in range and consumer states. The identification of appropriate, robust and measurable indicators of these management actions will not be an easy task. To move the process we plan to liaise closely with the Asian Rhino Specialist Group and TRAFFIC, and to hold a small workshop of rhino horn trade and conservation experts. This will probably take place in early 1998, funds permitting, with a view to develop fully a working model prior to CITES COP 11.

At the request of IUCN's Trade Officer, 13 AfRSG members reviewed and provided technical advice on

the proposed amendment to the Appendix II listing of South Africa's southern white rhinos *Ceratotherium simum simum*. In addition, a comprehensive review of TRAFFIC's report reviewing trade controls and conservation actions in response to CITES Resolution Conf. 9.14 was completed by the AfRSG's Scientific Officer, Richard Emslie, and a number of AfRSG members. This work highlights the role which IUCN plays in providing assistance to governments in critically evaluating proposals and policies relating to CITES.

Zimbabwe

I, and two other AfRSG members, Dr. Holly Dublin and Professor Nigel Leader-Williams, participated in the review of Zimbabwe's rhino policy held in Harare in December 1996. Written comments were submitted and presentations given which described the critical factors for conservation success. The evaluation of Zimbabwe's current approach was well received, and many of the critical success factors recommended were adopted at the seminar for inclusion in the revised policy. The need for constructive partnerships with the private sector and non-governmental agencies was recognised. Zimbabwe still conserves significant rhino populations, and the point of "no return" has definitely not been reached.

Kenya

Kenya's official country representative on the AfRSG, Tim Oloo (Kenya's Rhino Co-ordinator), visited the AfRSG office in Pietermaritzburg, South Africa, to discuss approaches for estimating black rhino ecological carrying capacity, population monitoring and the importance of producing regular status reports on the performance and management of populations. Kenya currently holds 420 (or 88%) of the East African subspecies of *Diceros bicornis michaeli*. Only Namibia (598 *D.b. bicornis*) and South Africa (1,204, mainly *D.b. minor*) hold more black rhinos. The success of Kenya's rhino programme is therefore critical to the survival of the African black rhino. Thus,

through its network of members the AfRSG is playing a valuable role by facilitating the sharing of knowledge and expertise between range states experiencing common rhino conservation problems. Richard Emslie and I are likely to visit Kenya later this year following invitations from the Kenya Wildlife Service and the private landowners to discuss a number of rhino conservation techniques and issues.

Tanzania

Richard Emslie assisted the Tanzanian Rhino Coordinator in the planning of a proposed field survey of two areas in the Selous Game Reserve known to have small breeding populations of black rhino. Advice was given on survey techniques, sample design and data analysis. The primary aim of the Selous surveys is to determine the distribution and numbers of rhinos in the two areas, so as to decide where Intensive Protection Zones (IPZs) might be set up to protect the remaining rhinos. The AfRSG strongly promotes efforts to protect rhino populations from poaching, recognising that it is generally only where sufficient levels of anti-poaching efforts have been deployed that poaching has been significantly slowed or stopped. Furthermore, the Group supports proposals to concentrate law enforcement effort in the Selous Game Reserve into IPZs rather than spreading effort too thinly throughout the area. The planned surveys are necessary precursors for any plans to establish IPZs in the Selous.

Cameroon

A meeting was held in Pietermaritzburg to discuss the situation regarding conservation of the last remaining West African black rhino (*Diceros bicornis longipes*) in Cameroon, which are thinly scattered throughout the northern part of the country. An AfRSG member with WWF Cameroon, Dr. Steve Gartlan, and Mr. Jaap Schoorl (Co-ordinator WWF-NL/Cameroon Programme) then visited the Hluhluwe-

Umfolozzi Park where they were briefed on anti-poaching and rhino security strategies by the Natal Parks Board. The critical status of Cameroon's rhinos requires the urgent formulation and implementation of a plan to save this subspecies.

Zaire

Since the outbreak of civil war in Zaire, at the end of 1996, Garamba National Park has experienced a degree of instability. While the Park's headquarters was first occupied by mercenary forces, it was later taken over by members of the rebel forces who remain there today. Though there have been rumours of new poaching activity from gangs infiltrating the Park from the north, the current situation for the northern white rhinos (*C.s.c.*) remains unclear. In 1996, the AfRSG/WWF Technical Assistance Mission prioritised the need to build capacity of the Park's guards to carry out anti-poaching activities. AfRSG helped to establish communications between WWF and the Game Rangers Association of Africa, who may be able to provide such specialised training when conditions in Garamba permit.

AfRSG's Sponsors

While the AfRSG could not operate without the invaluable contributions of its members; many of our activities, from the holding of meetings and the drafting of strategies to the provision of technical advice, would be seriously curtailed were it not for the generous funding received from a number of sponsors. In particular, I should like to thank the World Wide Fund for Nature (WWF), the UK Department of Environment and the European Commission for supporting the Scientific Officer for the past three years; and the United States Fish and Wildlife Service, WWF, the United Nations Environmental Programme, the African Wildlife Foundation, the Howard Gilman Foundation and the Natal Parks Board for covering administrative expenses or providing funds for specific activities.

RAPPORT DU PRESIDENT

GRUPE DES SPECIALISTES DES RHINOCEROS D'AFRIQUE

Martin Brooks

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Depuis la réunion du Groupe des Spécialistes des Rhinos d'Afrique (GSRAf) de Février 1996, les activités de l'année dernière se sont portées sur la révision du "Résumé du Statut et Plan d'Action au niveau Continental pour le Rhinocéros Africain" et sur le support technique d'un certain nombre de pays de l'aire de répartition.

Plan d'Action pour le Rhino Africain

On a terminé une nouvelle version du *Plan d'Action pour le Rhino Africain* et l'on est occupé à intégrer les commentaires des réviseurs dans le texte final avant l'impression et la distribution qui auront lieu cette année. Le plan comprend douze chapitres qui traitent de : (1) la distribution passée et actuelle, le statut et la conservation des rhinos africains; (2) le cadre de la conservation des rhinos africains; et (3) les stratégies d'action. En plus de l'édition papier, le plan sera aussi disponible sur le web.

CITES

Un document préliminaire sur l'évaluation de l'efficacité des actions de conservation des rhinos" a été préparé pour la réunion du Comité Permanent de la CITES de décembre 1996. Celui-ci faisait suite à la Résolution 9.14 de la Conférence de la CITES qui avait appelé à la mise au point et à l'application d'indicateurs permettant de fournir une base pour une politique d'évaluation des interventions dans le cadre de la CITES. Le document décrit un modèle conceptuel préliminaire mais il faudra fournir un effort supplémentaire considérable pour mettre au point un moyen efficace de différencier les effets des différentes politiques et actions de gestion dans les pays de l'aire de répartition et les pays consommateurs. L'identification de critères appropriés, solides et mesurables, de ces activités de gestion ne sera pas chose aisée. Pour faire avancer le processus, nous prévoyons de nous rapprocher du Groupe des Spécialistes des Rhinos d'Asie et de TRAFIC et de tenir un séminaire restreint d'experts en matière de commerce et de conservation des rhinos. Celui-ci aura probablement lieu au début de l'année 1998, si les

fonds le permettent, avec l'idée de développer un modèle de travail avant la COP 11 de la CITES.

A la demande du Responsable du Commerce de l'UICN, 13 membres du GSRAf ont révisé et apporté un commentaire technique sur l'amendement proposé pour le classement à l'Annexe II des Rhinos Blancs du Sud (*Ceratotherium simum simum*) d'Afrique du Sud. De plus, une révision globale du rapport de TRAFFIC reprenant les contrôles du commerce et les activités de conservation qui répondent à la Résolution 9.14 de la Conférence de la CITES a été effectuée par le Responsable scientifique du GSRAf, Richard Emslie, et par un certain nombre de membres du GSRAf. Ce travail met en lumière le rôle que joue l'UICN en aidant les gouvernements à évaluer de façon critique les propositions et les politiques relevant de la CITES.

Zimbabwe

Avec deux autres membres du GSRAf, le Dr. Holly Dublin et le Professeur Nigel Leader-Williams, j'ai participé à la révision de la politique du Zimbabwe en ce qui concerne les rhinos, à Harare, en décembre 1996. On a soumis des commentaires écrits et fait des présentations qui décrivaient les facteurs critiques pour le succès de la conservation. L'évaluation de l'approche actuelle du Zimbabwe a été bien reçue et de nombreux facteurs critiques de succès qui avaient été recommandés ont été adoptés lors du séminaire afin de les intégrer dans la nouvelle politique. On a reconnu la nécessité de partenariats constructifs avec le secteur privé et les organismes non gouvernementaux. Le Zimbabwe abrite encore des populations de rhinos significatives et n'a certes pas atteint le point de non-retour.

Kenya

Le délégué officiel du Kenya auprès du GSRAf, Tim Oloo (Coordinateur du Kenya pour les rhinos), a visité les bureaux du GSRAf à Pietermaritzburg, en Afrique du Sud, pour discuter des approches permettant d'estimer la capacité écologique potentielle pour les rhinos noirs, le

contrôle de leur population et l'importance du fait de produire des rapports réguliers sur l'état de la performance et de la gestion des populations. Le Kenya détient actuellement 420 (ou 88%) individus de la sous-espèce est-africaine *Diceros bicornis michaeli*. Seules la Namibie (598 *D.b.bicornis*) et l'Afrique du Sud (1.204, principalement *D.b.minor*) hébergent plus de rhinos noirs. Le succès du programme kényan en matière de rhinos est donc critique pour la survie du rhino noir africain. Donc, grâce à son réseau de membres, le GSRAf joue un rôle très important en facilitant le partage des connaissances et de l'expertise entre les états de l'aire de répartition qui connaissent des problèmes communs de conservation des rhinos. Richard Emslie et moi visiterons sans doute le Kenya plus tard cette année, à l'invitation du Kenya Wildlife Service et de propriétaires privés, afin de discuter un certain nombre de techniques et de questions de conservation.

Tanzanie

Richard Emslie a aidé le Coordinateur tanzanien pour les Rhinos dans la programmation d'une étude de terrain proposée dans deux zones de la Réserve de Faune de Selous connues pour abriter de petites populations de rhinos noirs qui se reproduisent. Il a donné des conseils en matière de techniques de recherches, de choix d'échantillonnage et d'analyse des données. Le but premier des recherches à Selous est de déterminer la distribution et le nombre de rhinos dans les deux zones et aussi de décider où les Zones de Protection Intenses (ZPI) doivent être créées pour protéger les rhinos qui restent. Le GSRAf encourage vigoureusement les efforts pour protéger les populations de rhinos contre le braconnage, car il reconnaît que c'est en général seulement là où l'on a maintenu un niveau suffisant de lutte antibraconnage que l'on a pu réduire ou arrêter significativement le braconnage. De plus, le Groupe soutient les propositions qui visent à concentrer les efforts de maintien des lois, dans la Réserve de Faune de Selous, dans les ZPI, plutôt que de disperser les efforts de façon trop superficielle sur toute l'étendue de la réserve. Les recherches prévues sont les précurseurs nécessaires à tout plan destiné à établir les ZPI dans le Selous.

Cameroun

Une réunion s'est, tenue à Pietermaritzburg pour discuter de la situation de la conservation des derniers rhinocéros noirs d'Afrique de l'Ouest (*Diceros bicornis*

longipes) restant au Cameroun, qui sont dispersés dans la partie nord du pays. Un membre du GSRAf au sein du WWF Cameroun, le Dr. Steve Gartlan, et Mr. Jaap Schoorl (Coordinateur WWF-NL/Programme Cameroun) ont alors Visité le Parc de Hluhluwe-Umfolozi où le personnel des Parcs du Natal les a mis au courant des stratégies contre le braconnage et pour la sécurité des rhinos. Le statut critique des rhinos du Cameroun exige la formulation et l'application urgentes d'un plan pour sauver cette sous-espèce.

Zaire

Depuis l'irruption de la guerre civile au Zaire à la fin de 1996, le Parc de la Garamba connaît un certain degré d'instabilité. Tandis que le quartier général du Parc avait d'abord été occupé par des mercenaires, il fut ensuite récupéré par des membres des forces rebelles qui y sont encore aujourd'hui. Bien qu'il y ait, eu des rumeurs de nouvelles activités de braconnage de la part de gangs infiltrés dans le parc par le nord, la situation actuelle du Rhino blanc du Nord (*C.s.c.*) reste floue. En 1996, la mission d'assistance technique GSRAf/ WWF a mis la priorité sur le besoin de créer parmi les gardes du parc le potentiel nécessaire pour mener à bien les activités antibraconnage. Le GSRAf a aidé à l'établissement de communications entre le WWF et a Game Rangers Association d'Afrique, qui pourrait être à même de fournir une telle formation spécialisée lorsque les conditions le permettront à la Garamba.

Sponsors du GSRAf

Si le GSRAf ne pourrait fonctionner sans les inestimables contributions de ses membres, beaucoup de nos activités, de la tenue des réunions à la préparation de stratégies pour l'apport de conseils techniques, seraient gravement restreintes si nous ne pouvions disposer du financement généreux que nous recevons d'un certain nombre de sponsors. Je voudrais particulièrement remercier le Fonds Mondial pour la Nature (WWF), le Département Britannique de l'Environnement et la Commission Européenne pour le soutien apporté au Responsable Scientifique au cours de ces trois dernières années; je remercie aussi le United States Fish and Wildlife Service, le WWF-US, le Programme des Nations unies pour l'environnement, l'African Wildlife Foundation, la Fondation Howard Gilman et le Conseil des Parcs du Natal qui ont couvert les frais administratifs ou apporté des fonds pour des activités spécifiques.

CHAIRMAN'S REPORT: AFRICAN ELEPHANT SPECIALIST GROUP

Holly T. Dublin

WWF Regional Office, PO Box 62440, Nairobi, Kenya

Change, we are told, is good for us all. This is a relief because the simple reality is that change is unavoidable and a lot of it goes on around us. For the most part, the changes experienced in 1996 have been remarkably good. It is clear, however, that as we get older change becomes more difficult to grapple with, despite its inevitability. Your ageing Chair and the, considerably younger, African Elephant Specialist Group (AfESG) have been through many recent changes but seem to be emerging intact and full of energy for the challenges of the coming quadrennium.

Ruth Chunge, as anticipated, left her post at the end of 1996 and was ably replaced by Keiren Bluestone in January and February. Greg Overton, our new Programme Officer for the AfESG, assumed his duties amidst a swirl of activity as February seamlessly merged into March. The production of this, the 23rd volume of *Pachyderm*, is evidence that Greg is already very much "on the job". In addition to appointing a new staff member to the Secretariat here in Nairobi, the AfESG has also taken on a full-time manager for the African Elephant Database, Willy Simons. Willy will be bringing the benefits of his considerable technical expertise in Geographical Information Systems to bear in the next updating of the African Elephant Database while assisting with the AfESG's newest initiative in the field of human-*elephant* conflict (see below).

The AfESG Secretariat (the Chair, the Deputy Chair, and both the Interim Programme Officer and Programme Officer) was honoured to participate in facilitating the African Elephant Range State Dialogue Meeting held in Dakar, Senegal last November. The meeting provided a unique opportunity for senior range-state officials to discuss the full breadth of their concerns regarding the issues facing conservation of Africa's elephants. The attitude was candid and open and the dialogue informative and spirited. The meeting concluded with an extensive joint communique covering a wide range of topics, including: ivory

stocks; current illegal killing and trade; the possible re-opening of a limited ivory trade; and the problems which occur in securing sustainable funding for elephant conservation. This dialogue meeting will be followed by a second round of discussions immediately prior to the opening of the Tenth Meeting of the Conference of the Parties (COP10) to CITES in Harare, Zimbabwe in June 1997.

Acting on recommendations emerging from the African Range State Dialogue Meeting, TRAFFIC and AfESG immediately launched a joint study into the dynamics of the illegal ivory trade and the status of ivory stocks in West and Central Africa. To this end, Lamine Sebogo, the AfESG Programme Officer for West and Central Africa, has been expanding his skills since the first of the year by taking on a special assignment. In close collaboration with TRAFFIC, Lamine has conducted the first of a series of proposed country studies to determine the scale and extent of illegal ivory trade and the status of private and government-held ivory stocks in West and Central Africa. Lamine began in Burkina Faso and will try to complete the inquiry and several additional investigations before the COP10.

In January 1997, the AfESG took a major step forward on the development of its initiative on human-*elephant* conflict with the first formal meeting of the Task Force on Human-Elephant Conflict, which was held in Nairobi, Kenya. The Task Force, chaired by AfESG member Richard Hoare (Zimbabwe), and attended by other experts in this field, Martin Tchamba (Cameroon), Moses Kofi Sam (Ghana) and Sam Kasiki (Kenya), along with Willy Simons, set an ambitious work programme for the future. Beginning with an extensive multi-regional assessment of sites experiencing human-*elephant* conflict, the Task Force has plans for extensive follow-up activities over the next several years. With the help of the AfESG Secretariat, the Task Force is now drafting a proposal to carry out more detailed work on: the factors involved

in human-elephant conflict in different bio-geographical zones; establishing a central information point on human-elephant conflict, containing a library and standardised data from around the continent; the sites where this conflict is most likely to become a problem in future; determining the prospects for mediation and mitigation; and carrying out field trials in selected sites. We hope that this work will involve and assist many of our members and partners over the years to come on this important but difficult problem.

Just before this volume of *Pachyderm* is printed, the Parties to CITES will have met once again and made their decision on three significant proposals before them for the down listing of elephant populations in Namibia, Botswana and Zimbabwe. At this stage, it is too early to predict the direction the debate will take this time around. However, it is certain that regardless of the outcome of COP10, the decisions taken will affect those of us who are involved in the conservation of the species. Outside the now-familiar array of divergent, opinions and arguments for and

against the proposed down listings one thing remains certain. Ban or no ban, down listing or no down listing, Africa's elephants continue to be killed in significant numbers to fuel the continued, and possibly growing, demand for ivory. As CITES fever rages around me, I cannot help but wonder about the Convention's direct relevance to the future of the African elephant. I continue to ask myself when the world will begin to understand the true cost of conserving a species as psychologically and/or economically dear to all as the African elephant. And, when we finally understand the true cost, who will pay?

Over the next few months, the Chair of the AfESG and the Chair of the SSC will be formalising the new membership. This membership will be appointed for a four year period and will lead us into the new millennium. To all new members, I wish you a warm welcome. To all those leaving the AfESG, I would like to extend my appreciation for your contributions over the last triennium. The AfESG has grown from strength to strength over the past three years and I look forward to similar progress over the next four.

RAPPORT DE LA PRESIDENTE

GROUPE DES SPECIALISTES DE L'ELEPHANT D'AFRIQUE

Holly T. Dublin

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Le changement, dit-on, est bon pour nous tous. C'est un soulagement parce que le changement est inévitable et que nous en constatons beaucoup tout autour de nous. En 1996, les changements qui nous ont touchés ont été pour la plupart remarquablement favorables. Il est clair cependant, qu'avec l'âge, le changement devient plus difficile à appréhender, même s'il est inévitable. Votre Présidente vieillissante et le beaucoup plus jeune Groupe de Spécialistes de l'Eléphant Africain (GSEAf) ont traversé récemment de nombreux changements mais semblent en ressortir intacts et pleins d'énergie pour relever le défi posé par les quatre années à venir.

Comme on s'y attendait, Ruth Chunge a quitté 'a la fin de l'année 1996 et elle a été bien remplacée par Keiren Bluestone en Janvier et Février. Notre nouveau Responsable de Programme pour le GSEAf, Greg Overton, a rempli ses fonctions dans un tourbillon d'activités tandis que Février se fondait imperceptiblement en mars. La parution de ceci, le 23ème numéro de *Pachyderm*, est la preuve que Greg est déjà bien "en place". Non content d'avoir nommé un nouveau membre pour le secrétariat ici, à Nairobi, le GSEAf s'est aussi adjoint un gestionnaire full-time pour la banque de données sur l'Eléphant d'Afrique, Willy Simons. Willy nous fera profiter des bénéfices de son expertise technique considérable dans les Systèmes d'Informations Géographiques pour réaliser la prochaine mise à jour de la Banque de données sur l'Eléphant d'Afrique tout en prêtant la main à la nouvelle initiative du GSEAf dans le domaine des conflits hommes-éléphants (voir plus bas).

Le Secrétariat du GSEAf (la Présidente, le Président, adjoint et les deux Responsables de Programme) ont eu l'honneur de participer 'a la facilitation de la Réunion Dialogue entre les Etats de l'aire de répartition de l'Eléphant d'Afrique à Dakar, au Sénégal, en novembre dernier. La réunion fut une occasion unique pour les cadres responsables des états de l'aire de répartition de discuter de toutes leurs préoccupations au sujet des

problèmes que connaît La conservation de l'éléphant en Afrique. L'attitude de chacun fut honnête et ouverte, et le dialogue constructif et animé. La réunion s'est terminée par un long communiqué commun touchant un grand nombre de sujets comme les stocks d'ivoire, le massacre et le commerce illégaux actuels, la réouverture possible d'un marché limité pour d'ivoire et les problèmes qui apparaissent lorsqu'on cherche à garantir un financement durable de la conservation de l'éléphant. Cette réunion dialogue sera suivie d'une autre série de discussions juste avant l'ouverture de la Dixième Réunion de la Conférence des Parties (COP10) à la CITES, à Harare, en Juin 1997.

Suite aux recommandations émises lors de la Réunion Dialogue des Etats de l'aire de Répartition, TRAF-FIC et le GSEAf ont lancé immédiatement une étude commune sur la dynamique du commerce illégal d'ivoire et sur le statut des stocks d'ivoire en Afrique occidentale et centrale. Dans ce but, Lamine Sebogo, le Responsable de Programme du GSEAf pour l'Afrique occidentale et centrale a étendu son domaine de compétences depuis le début de l'année en se chargeant d'une mission spéciale. En étroite collaboration avec TRAFFIC, Lamine a mené la première de toute une série d'études dans plusieurs pays pour déterminer l'importance et l'étendue du trafic d'ivoire et le statut des stocks d'ivoire détenus par des particuliers ou par les gouvernements en Afrique occidentale et centrale. Lamine a commencé par le Burkina Faso et essaiera d'avoir terminé son enquête et plusieurs autres investigations avant la COP 10.

En Janvier 1997, le GSEAf a fait un grand pas en avant dans la mise au point de son initiative concernant les conflits hommes-éléphants, avec la première réunion officielle de la Force chargée des Conflits Hommes-Eléphants. Cette Force, présidée par un membre du GSEAf, Richard Hoare (Zimbabwe), avec l'assistance d'autres experts dans ce domaine comme Martin Tchamba (Cameroun), Moses Kofi Sam (Ghana) et Sam Kasiki (Kenya) ainsi que Willy Simons, s'est fixé un

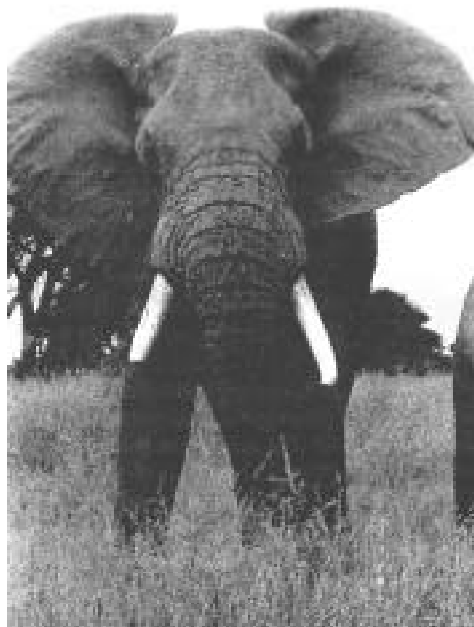
programme de travail ambitieux. Tout en commençant par une évaluation complète et multirégionale des endroits qui connaissent des conflits hommes-éléphants, la Force prévoit aussi des activités de suivi très étendues au cours de années suivantes. Aidée par le Secrétariat du GSEAf, la Force est en train de préparer une proposition pour mener à bien un travail sur : les facteurs impliqués dans les conflits hommes-éléphants dans les différentes zones biogéographiques; l'établissement d'un point central d'informations sur les conflits hommes-éléphants, comprenant une bibliothèque et des données standardisées provenant de tout le continent; les endroits où ces conflits risquent de devenir de vrais problème à l'avenir; la détermination de perspectives de médiation et de conciliation, et la réalisation d'essais de terrain à certains endroits choisis. Nous espérons que ce travail impliquera mais aussi aidera beaucoup de nos membres et partenaires dans les années à venir car cette question est importante et très difficile.

Entre ce numéro de *Pachyderm* et le suivant, les Parties à la CITES se seront réunies une fois de plus et auront pris une décision au sujet de trois propositions significatives qui leur ont été soumises, concernant le déclassement des populations d'éléphants de Namibie, du Botswana et du Zimbabwe. Pour le moment, il est impossible de prévoir la direction que prendront les débats, pourtant il est certain que, quel que soit le résultat de la COP 10, les décisions qu'elle aura prises

affecteront ceux d'entre nous qui sont impliqués dans la conservation de l'espèce. Exception faite de la gamme maintenant bien connue des opinions et des arguments divergents pour ou contre le déclassement proposé, une seule chose reste certaine: interdiction ou non, déclassement ou non, les éléphants africains continuent de se faire tuer en grand nombre pour répondre à la demande continue, voire même croissante, pour l'ivoire. Alors que la fièvre de la CITES bouillonne autour de moi, je ne peux que m'interroger sur l'impact direct de la Convention sur l'avenir de l'éléphant africain. Je ne cesse de me demander quand le monde va enfin commencer à comprendre le coût réel de la conservation d'une espèce qui est aussi psychologiquement et économiquement chère à chacun que l'éléphant d'Afrique. Et, quand nous aurons enfin compris le coût réel, qui va payer?

Ces prochains mois, la Présidente du GSEAf et le Président de la CSE vont formaliser la présence des membres. Les membres sont nommés pour une période de quatre ans et nous conduiront dans le prochain millénaire. A tous les nouveaux membres, je souhaite chaleureusement la bienvenue. A tous ceux qui quittent le GSEAf, je voudrais redire ma reconnaissance pour leur contribution ces trois dernières années. Le GSEAf est devenu de plus en plus solide pendant ces années, et je me réjouis de vivre un progrès semblable pendant les quatre suivantes.

Photo Credit: Joyce Poole



AERIAL CENSUS OF THE GASH-SETIT ELEPHANT POPULATION OF ERITREA AND ETHIOPIA

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ABSTRACT

A total elephant aerial count was carried out in south-western Eritrea and northern Ethiopia between 31 October and 16 November 1996 as a joint initiative between the Governments of Ethiopia and Eritrea. One aircraft covered approximately 4,952km², in the Gash-Setit region and the Sheraro region.

A total of eight elephants were counted, of which two were near Haicota along the Gash River and six were along the Tekezze River on the Ethiopian side of the border. The two elephant groups are considered one population, although there is a considerable gap between them. In Gash-Setit Province, these elephants are the only remaining elephants in Eritrea. This figure is less than expected and, as this was the first aerial survey to be conducted in the region at the end of the wet season, it is not safe to conclude that these are the only elephants present. A dry season aerial count is strongly recommended to determine the status of this elephant population more clearly. No elephants or their signs were seen in the settled area around Sheraro, but the two bulls seen at Haicota are likely to be responsible for crop-raiding in the adjoining cultivation. Two old carcasses were seen, which is an indication that some poaching has occurred.

INTRODUCTION

Despite the long years of war in Eritrea and northern Ethiopia, preliminary observations indicate that a remnant elephant population exists in the Gash-Setit Province (Hagos, 1993). According to Hagos (1993), this population crosses the Gash-Setit (Tekezze) River into Ethiopia and back on a seasonal basis. The existence of elephants in Gash-Setit is significant as it appears to be Eritrea's only elephant population, and it represents one of the northern-most populations of Africa's elephants which could be genetically different from the rest. Only Mali's Gourma elephants inhabit a more northern site (Said et al, 1995). As these elephants constitute a cross-border population, both the governments of Ethiopia

and Eritrea have taken a bilateral initiative to establish the current status of the Gash-Setit elephants with a view to protecting the species and its habitat.

Previous surveys of elephants in Ethiopia (e.g. Allen-Rowlandson, 1990; Manspeizer, 1994; and Lamprey, 1994) have not covered the Gash-Setit population. This paper describes the first elephant aerial survey to be conducted in south-western Eritrea and northern Ethiopia. The overall objectives of the survey were to obtain data on the current status of elephants, their numbers and distribution.

STUDY AREA

The study area is located in Gash-Setit Province of south-western Eritrea and northern Ethiopia. It was divided into two census zones, the Gash-Setit zone and the Sheraro zone (Figure 1). The Gash-Setit region is located at longitude/latitude N 150 13' E 370 29' and S 140 03' W 370 at its longest and widest points, respectively, and covers an area of 3,752km². The second zone is Sheraro, 50km east of the Tekezze valley. It lies at longitude/latitude N 140 33' E 370 55' and S 140 10' W 370 35', respectively, and covers an area of about 1,200km². The altitude within the survey areas ranges from 550m to 1,321m above sea level. The east and central parts of the Gash-Setit region are dominated by undulating hills and a chain of mountains, interspersed with isolated hills. The western part of the region, which borders Sudan, is generally flat. Sheraro area is generally flat with a few scattered hills. Northern Ethiopia has a rolling landscape with a few hills.

The dominant soil is black alluvial soil, although some hilly areas are surrounded with sandy gravel. These soils are drained by the seasonal Gash River in the north, and the Tekezze River (the only permanent river in the region) in the mid-south. The Tekezze River forms the boundary between Eritrea and Ethiopia. At the time of the survey, some drainage lines in northern Ethiopia still had running water, while only dry, sandy riverbeds were seen in the eastern Gash-Setit and Sheraro regions.

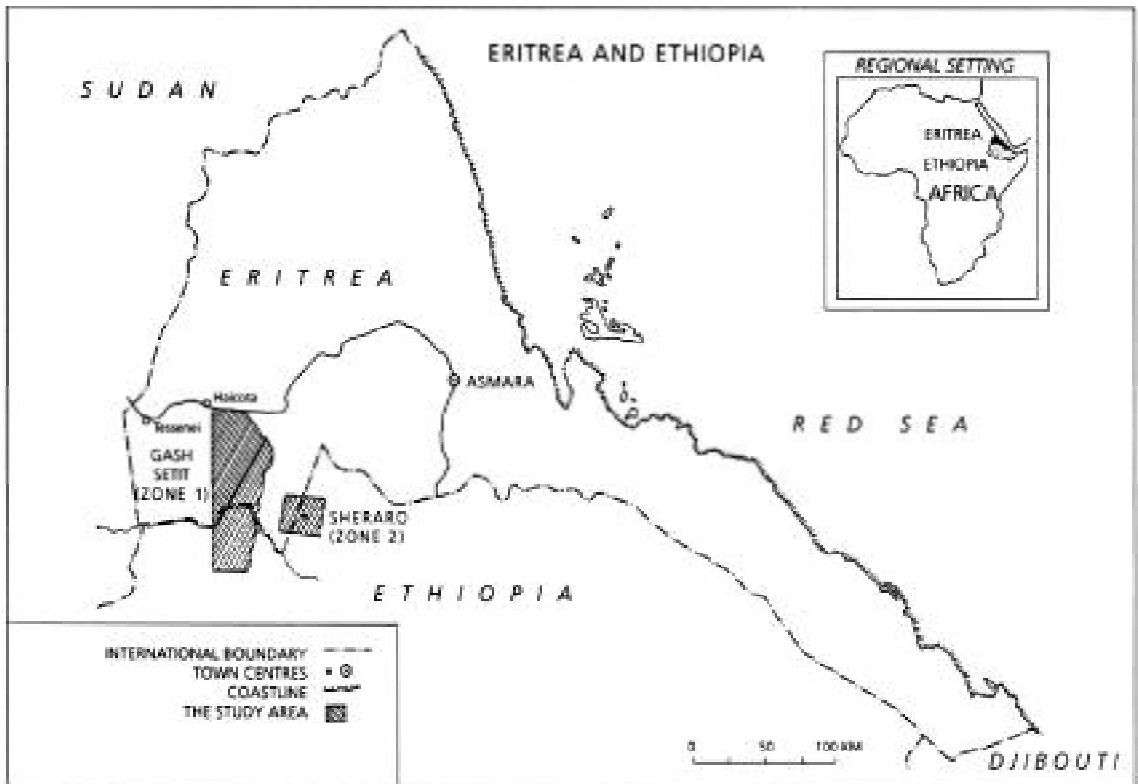


Figure 1. Map of the study area.

Flora

Detailed information on the vegetation of the area is scanty. However, Hagos (1993), Hagos (1995) and Butynski (1995) have given good general information on the vegetation of the Gash-Setit region. Basically, this is open country with scattered bushes, making it easy to count elephants from the air. Broadly, the vegetation comprises savannah bushland and patches of riverine vegetation dominated by doum palm (*Hyphaene thebaica*). Common trees are gum olibanum (*Boswellia papyrifera*), baobab (*Adansonia digitata*), *Balanites aegyptiaca*, *Gum arabica*, *Acacia seyal*, *Ficus sycomorus*, *Tamarindus indica*, *Tamarix aphylla*, *Ximania americana*, *Acacia seyal*, *Zizyphus spina*, *Acacia nilotica*, *Acacia tortilis* and *Acacia nilotica*. The Tekezze riverine vegetation is not well-developed and often is dominated by *Zizyphus spina* and *Hyphaene thebaica* (doum palm). Riverine vegetation along the Gash River is also dominated by patches of doum palm, which become thick in some places, particularly around Haicota. During this study, a reconnaissance ground survey was con-

ducted in the Haicota area, and it was observed that the doum palm provides shade and building material for local shelters. It is browsed not only by elephants (which were present at the time of the survey), but also by domestic stock. Additionally, the doum palm protects the river banks from erosion.

METHODS

Because information on other wildlife species was scanty, the entire census area was flown to determine large mammal species occurrence and distribution. It was agreed that only large mammals would be counted. Consequently, total aerial count, as described by Norton-Griffiths (1978) and Douglas-Hamilton (1996), became the obvious choice, the aim of which was to cover the entire surface of the defined census zone and to record individual elephants or groups of elephants and their geographical locations.

Total aerial counts rely heavily on the experience of both the pilot and the flight crews (Douglas-Hamilton *et al*, 1994; Litoroh, 1995). The flight crew and the pilot were

in training during this count, though the consultant was not. The flight crew and the pilot were instructed in their roles according to the protocol described by Norton-Griffiths (1978) and improved upon by Douglas-Hamilton *et al* (1994) and Douglas-Hamilton (1996).

A six-seat Beaver DHC-2 aircraft was used for the census. The aircraft and crew were based at Tessennei, which was the nearest airstrip to the census zone in order to minimise “dead” time. Out of 40hrs of flight time, 3.5 hrs were used on repeat counts while 7.27hrs were spent moving from Asmara to Tessennei, as well as getting to and from the survey area each day.

The survey was divided into two phases for technical reasons. The first phase started on 31 October 1996 and ended on 3 November 1996, when the aviation fuel ran out and the aircraft was due for service. The survey resumed nine days later, from 14 to 16 November 1996. Approximately 4,952km² were covered in 28.42hrs of survey time, giving a search rate of about 1 75km²/hr.

Census zones and counting blocks

The entire census area was divided into counting blocks, which were demarcated using a GPS. The initial survey area covered 1,500km² in northern Ethiopia and the Tekezzze valley, where a few elephants had been previously sighted (Hagos, 1993). However, in July 1996 elephants were sighted near Haicota along the Gash River, about 65km north of the Tekezzze valley. Prior to the aerial survey, a ground survey was conducted during which fresh elephant dung was spotted near Haicota. In light of this evidence, the census zone was extended northwards to cover Haicota. Additionally, based on hearsay on elephant sightings at Sheraro, about 50km east of the Tekezzze valley, it was agreed that the Sheraro area should be surveyed as well. Hence there were two census zones: the Gash-Setit region, covering south-western Eritrea and northern Ethiopia as zone 1; and Sheraro region as zone 2. Zone 1 was divided into three counting blocks (Figure 2). Blocks 1, 2, and 3 had an area of 687km², 1,702km² and 1,548km², respectively. Zone 2 had an area of 1,015km², and was a counting block of its own (Figure 3).

Flight paths

The flight lines were determined using the Magellan Global Positioning System (GPS), the NAV 5000D and a 1:100,000 map and were flown east-west. Ini-

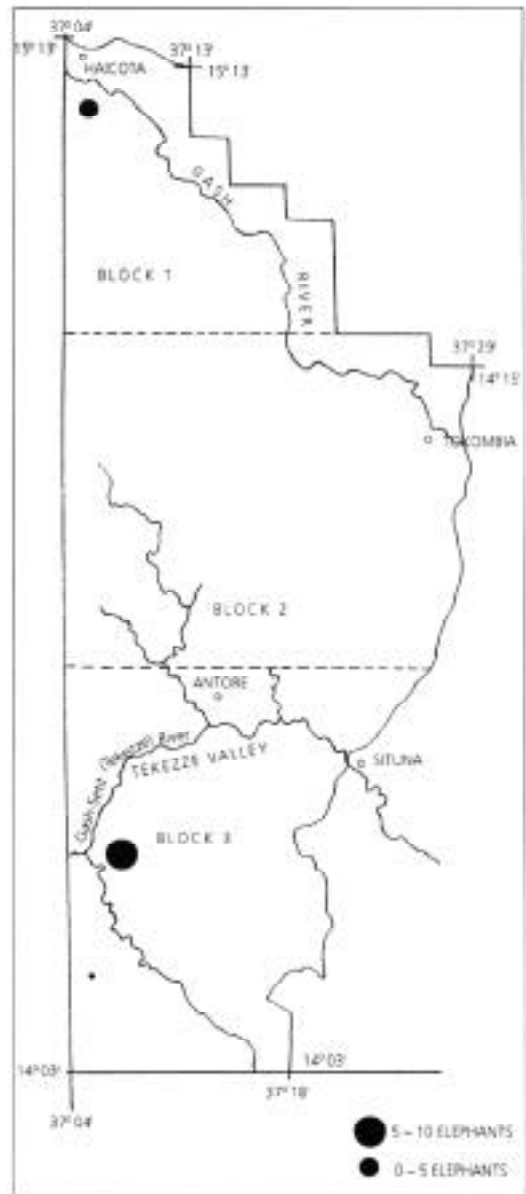


Figure 2. Counting block and distribution area map of elephants (Gash-Setit region).

tially, transects were spaced at one kilometre intervals, but it became obvious that they could be spaced further apart since livestock (sheeps, cattle and camels) encountered on one flight line remained readily visible on the next. Therefore, the transects were spaced at one nautical mile (1.8 km) for most of the study area, except along drainage lines with relatively thick vegetation, where they remained one kilometre apart. For reasons explained above, the aircraft flight

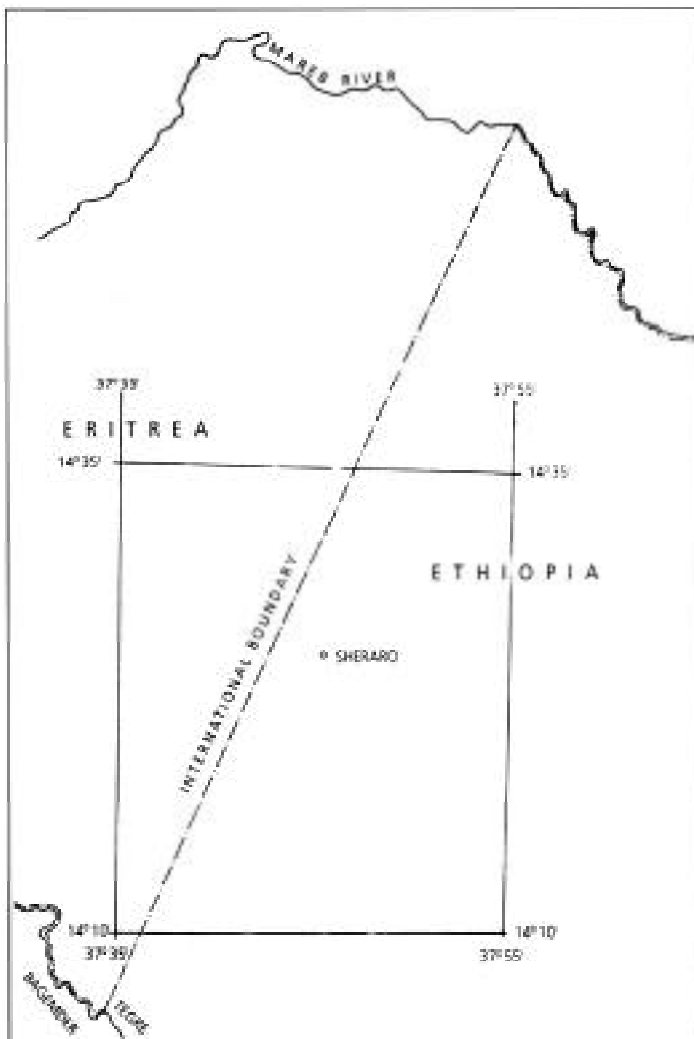


Figure 3. Counting block (Sheraro area).

paths are not shown. The aircraft flew at a speed of 160km/hr at a height of about 400ft above the ground.

The procedure for data recording was according to Norton-Griffiths (1978) and Douglas-Hamilton (1996).

RESULTS

Elephant numbers and distribution

A total of eight elephants were counted in the study area (Table 1). Two of these were bulls are probably over 40 years old. They were spotted near Haicota along the Gash River while six (three adult females and three six-to-twelve year-olds) were recorded along the Tekezze River,

on the Ethiopian side (Figure 2). Two elephant carcasses were seen. No elephants or their signs were seen at Sheraro.

The total number of elephants given is a minimum estimate and it is probable that the true figure for the area is slightly more. According to Norton-Griffiths (1978) total counts of elephants typically underestimate the true number by a factor of about 10%. However, this will vary depending on the vegetation cover, searching intensity, time for the count, observer skills and pilots. Some attempts were made to establish the level of these errors during the training exercise; block 1 was flown twice in the same day to see how many animals were seen by each set of observers. Both sets of observers returned the same count.

Table 1: Number of large mammal species counted during the survey.

Species	Number
Elephant	8
Greater Kudu	9
Waterbuck	7
Bushbuck	3
Oribi	2

All these species occur at low numbers, probably due to human activity in the region.

HUMAN ACTIVITY AND CROP RAIDING

Qualitative observations on human activity on the Eritrean side noted a heavy concentration of livestock in the Tekezze valley and along the Gash River although their numbers were not recorded. Cultivation on the hills as well as bush fires were observed. On the Ethiopian side, approximately 100km² of habitat were destroyed by fire during the survey period.

Crop depredation by elephants is reported mainly along the Gash River. Elephant dung piles observed near Haicota contained considerable amounts of sorghum. At a few sorghum farms visited, farmers use fire and beat empty tins to frighten elephants away. However, because elephants come at night when there is no guard, these methods are not particularly effective. Banana plantations are also raided, and at Haicota, one farmer had abandoned about 10 acres of bananas because of crop-raiding elephants.

DISCUSSION

The aerial census counted six elephants in the Gash-Setit region. This figure tallies exactly with the estimate of six elephants made by Hagos (1993) and is half the number video-taped by the National Environmental Management Plan (Government of Eritrea, 1995), but is significantly less than the 70 to 100 speculated (Said *et al.*, 1995). In Haicota the figure of two elephants counted does not favourably compare with the local hearsay or with guesses of five to ten elephants. While the number of elephants needs further investigation, there are at least eight elephants in the region.

For this survey, the primary bias is that while counting conditions were generally easy in the majority of the

census area, there is relatively dense woodland along the Gash River (near Haicota) where a few elephants may have been missed. Second, the majority of crew members, including the pilot, were surveying for the first time and therefore were inexperienced. Nevertheless, it is unlikely that many elephants were missed in view of two trial counts around Haicota. Third, since the count was interrupted, it is possible that if there were elephants in the uncensused area, they could have moved into previously surveyed by the time the second census resumed nine days later. The potential movement may have been caused by a large fire on the Ethiopian side, which destroyed approximately 100km² of range. While an overlap of 10km was surveyed, this may have been insufficient because the elephants and other wildlife counted earlier were not spotted again.

According to information provided by local people, the Gash-Setit area seems to be core elephant range, while Haicota appears to constitute only seasonal or periodic range. Thus, the two elephants found in Haicota are probably part of the Gash-Setit region population. Additionally, if hearsay information on elephant numbers is to be taken seriously, then it is possible that the range for these elephants extends beyond the census zone. If this is the case, elephants outside the counting block were missed. Since the survey was conducted at the end of wet season, water pools were sighted in some river valleys, and elephants could still have been dispersed and utilising these water sources. According to Leykun (pers. comm.), the Tekezze valley elephants probably have a linkage with elephants in Sudan. If this is the case, then some elephants may have moved to Sudan during the survey.

The sighting of two old carcasses along the Tekezze River and the killing of four elephants in late 1995 (Hagos pers. comm.) is an indication that some elephant poaching is continuing. However, there was no evidence that serious poaching of elephants had been occurring in the census zone. In Tsavo National Park in Kenya, where poaching was severe in the 1970s and 1980s, very old carcasses can still be seen today, which was not the case for the study area.

Although north of Sheraro appears to be typical elephant country, no elephants or their signs were found. The absence of water in this region probably discourages its use by elephants. Additionally, the level of settlement immediately south and west of Sheraro may also deter elephants. Unfortunately, there was

insufficient aircraft time available to cover all areas suspected of containing elephants. It is felt, however, that if elephants have been sighted at Sheraro, they probably come from the Tekezze valley.

While the Ethiopian side appears to have minimal human influence and remains essentially intact (apart from bush fires), the considerable human activity on the Eritrea side is likely to lead to habitat degradation in the medium and long term if not adequately controlled. Additionally, agricultural activities have led to human-elephant conflict in some areas like Haicota. The Eritrean Government has to address the issue of human-elephant conflict not only in the Tekezze valley and the surrounding hills, but also at Haicota. This points to the need for having a clear land-use policy in Eritrea to avoid a conflict of interests or the eventual loss of elephant range entirely.

CONCLUSIONS AND RECOMMENDATIONS

While the aerial survey thoroughly covered a large area, only eight elephants were seen. Contrary to high expectations, these appear to be the only remaining elephants in Eritrea. This elephant population is probably not viable unless there is contact with other viable populations. If there is continuous undisturbed habitat between Tekezze and elephant range in Sudan, then there could be the possibility of elephants occurring further to the west. Therefore, there is a need to conduct further surveys to determine if these elephants interact with those in Sudan.

If the Tekezze valley elephants are considered to be of conservation importance, then they need immediate protection for their survival. Hence there is a need to define a minimum viable population for elephant conservation, as pointed out by Sukumar (1993). This will help Eritrea and Ethiopia to determine the size of the protected areas which need to be established on either side of the common border. As small populations are likely to be at risk of losing genetic variability, the potential long-term problem of inbreeding in this population should not be ignored.

In view of the fact that these may be the only elephants in Eritrea, they should probably be viewed as a conservation priority by Eritrea and Ethiopia, and a core protected area should be established of about 250km² in

the Tekezze valley along their common border. However, this would mean displacing the local people from their land on the Eritrean side. This is a less severe problem for Ethiopia, as the Ethiopian side of the border is largely uninhabited. For Eritrea, participation of the local people in the entire decision-making process will be crucial to ensuring mutual understanding and a positive atmosphere. While Ethiopia has a legal structure in place for the gazettement of protected areas (Negarit Gazetta, 1972), Eritrea has no such laws. Therefore, Eritrea will need to enact comprehensive legislation which allows the legal establishment of protected areas.

Specific recommendations are:

- To obtain a complete picture of the Tekezze valley elephants, a dry season elephant aerial survey is strongly recommended. But, such a survey should be preceded by a ground survey to gather information on elephant distribution on both the Eritrean and Ethiopian sides. This ground survey will help delineate the relevant areas for aerial surveys, thereby minimising costs.
- Eritrea and Ethiopia should continue their regional initiative to census and manage this shared, cross-border elephant population. More detailed reasons for this approach can be found in Said *et al* (1995).
- In view of reports of elephant poaching, these elephants require immediate protection from both Eritrea and Ethiopia if they are to survive. For the moment, Eritrea could achieve this by making use of the existing security system in the country (e.g. the Eritrean defence force). Ethiopia already has a wildlife protection unit which could be deployed on its side of the border.
- Information on elephant movement is important for their conservation and management. While modern techniques for monitoring elephant movement (e.g. radio-tracking) may prove cost-prohibitive, such information could be obtained from local people in the short term. Local scouts should be hired to identify elephants and their movement.
- Eritrea and Ethiopia should establish a wildlife protected area of about 250km², preferably in the Tekezze valley, along the common border. As for crop raiding by elephants at Haicota, Eritrea should consider erecting an electric fence around the farming communities as a long-term solution. This option would protect people's property while allowing free movement by elephants.

- In view of possible cross-border elephant movements, the Ethiopian Wildlife Conservation Organisation (EWCO) and Eritrean Government should consult the relevant authorities in Sudan concerning a joint survey, as a long-term approach to managing this elephant population.

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CURRENT ELEPHANT CONSERVATION PROBLEMS IN BORNO STATE, NIGERIA

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INTRODUCTION

Borno State of Nigeria is located in the north-east corner of the country within latitude 11°N and longitude 13°E. The State comprises an area of approximately 69,436km², occupies a portion of the Lake Chad Basin and shares borders with the Republics of Cameroon to the south-east, Chad to the north-east and Niger to the north-west.

Borno State is one of the few states in Nigeria endowed with elephants. Though it is difficult to trace where Borno's elephants originated, due to a lack of oral or written data, reports from the Ministry of Agriculture reveal that thousands of elephants have existed in the State for centuries. In the past, elephants lived peacefully and in harmony with people because the available habitat was enough to accommodate the elephants and reduce their chances of coming into contact with humans.

Because of the relatively large population of elephants in the State, three Protected Areas were established

in the 1970s along the traditional migration routes/elephant range: Lake Chad Game Sanctuary (approximately 530km²), located in the north-east of the State and bordering Chad; Chingumi/Duguma Game Reserve (approximately 488km²), located in the south-east of the State, and bordering Cameroon; and the Sambisa Game Reserve (approximately 518km²), located at the southern agricultural areas of the State.

Two elephant populations are known to exist in Borno State. One population occupies the southern agricultural areas of the State, which is the core range for elephants, and the migratory population (moving between Cameroon, Chad and Nigeria) occupying the Lake Chad Basin. In the 1970s the total number of elephants in Borno was estimated at 8,060 (Grema, 1990), while at present, it is estimated that Borno has fewer than 200 elephants. This decline is attributed to habitat fragmentation, heavy poaching and unsystematic and uncontrolled problem animal control. Furthermore, there is lack of political will, inadequate funding and until recently, little international concern over the elephant management issue in Borno.

HUMAN-ELEPHANT CONFLICT

During the past two decades, expansion of human and livestock populations coupled with the demand for agricultural land has led to the fragmentation and reduction of elephant habitat. Consequently, human-elephant conflict arising from the competition for food, water and space has intensified. The trend is further exacerbated in the Lake Chad portion of elephant range by the severe drought in the northern part of the State, which has forced people to migrate to the Lake Chad Basin where they can cultivate crops on the receding lake shoreline without the need for irrigation. The greater part of elephant range is now under cultivation and settlement. This, together with the insecurity of the Chad territory due to civil war creates extremely difficult conditions to manage elephants in this area. Conflict between people and elephants is worsening and there are serious problems with poaching in the area. The worst recent incident

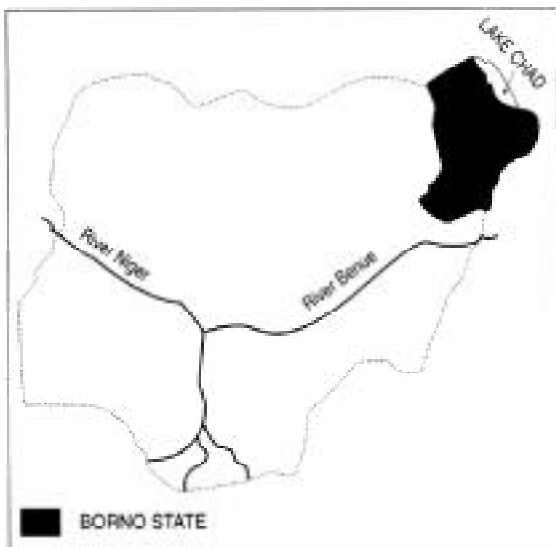


Figure 1. Map of Nigeria, showing the position of Borno State.

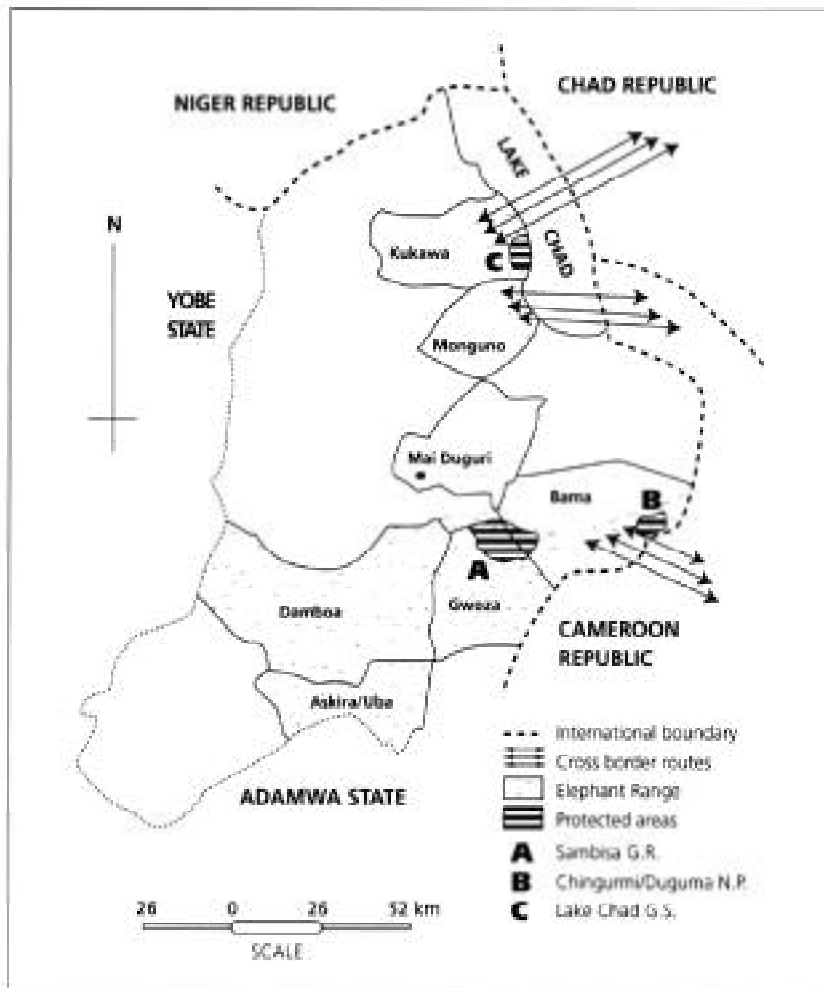


Figure 2. Map of Borno State showing elephant ranges and cross-border migration routes.

was the discovery of 36 elephant carcasses on the Lake Chad shoreline in 1988, with all the tusks removed (Bitu, B.B. 1988). Following this incident, few elephants have been seen in the Lake Chad area of Nigeria, and the usual seasonal migration from Waza National Park to Lake Chad is rarely observed. Unfortunately, it is extremely difficult to obtain reliable data on human deaths and injuries caused by elephants, and elephant mortality arising from conflicts. It is important to note that some deaths and injuries to both humans and elephants go unreported, often because they occur in remote areas. However, available data seem to indicate that most incidents of death and injuries occur in Askira/Uba, Damboa and Gwoza local government areas (see Tables 1 and 2).

The increasing frequency of reports in the Nigerian news media, containing headlines such as: “Elephants

menace”, “Elephants killed some people and injured some in Askira/Uba, Damboa and Gwoza local government areas”, may indicate that human-elephant conflict has reached crisis levels throughout elephant range in the State.

Table 1: Human deaths caused by elephants in Borno 1993 - 1996.

Local government	1993	1994	1995	1996
Askira/Uba	4	4	6	2
Bama	1	-	2	4
Damboa	5	7	5	4
Gwoza	2	6	6	5
Total	12	17	18	15

Table 2: Elephant deaths during human-elephant conflict, 1993-1996.

Local govt.1993	1994		1995		1996			
	CT	CF	CT	CF	CT	CF	CT	CF
Askira/Uba	4	-	6	3	5	1	6	2
Bama	2	1	4	-	2	-	5	3
Dambo	5	6	6	1	7	4	4	2
Gwoza	3	-	5	-	6	3	3	1
Total	21	25	28	26				

CT - control shooting CF - conflict death

COMMUNITY PARTICIPATION IN MANAGEMENT

While local communities bear the brunt of the opportunity cost of living with elephants, they are left out of the decision-making process regarding management action surrounding elephants and communities. As a consequence, they do not derive any benefit from elephants, not even those animals destroyed for problem animal control. When these problem animals are destroyed, the meat and trophies are sold to licensed dealers, with no proceeds returning to the community to cover the damage costs. Because of this, farmers feel alienated from their land and its resources, and regard the elephant as a pest and not as a valuable natural resource. This feeling leads to antagonistic behaviour towards the wildlife authority, and creates the scenario where communities welcome poachers, who will eliminate the elephants and return some proceeds to the village.

PROTECTED AREAS

Borno State has three constituted game reserves; Lake Chad Game Sanctuary, Chingumi/Duguma Game Reserve and Sambisa Game Reserve, covering a total area of about 1,536km², or 2.2% of State land. The control and management of the reserves is the responsibility of the government. In the last two decades, however, government resources dwindled rapidly and proper maintenance of the reserves became increasingly difficult. The reserves do not have any bufferzones, and have been almost abandoned by the government owing to lack of funds, which allowed neighbouring communities to claim the land for settlements and farms (e.g. Chore, Durfata, Njibia and Alafa villages in Sambisa Game Reserve). Sambisa Game Reserve was a stronghold for elephants and other wildlife species, and has

now become a hunting, felling and grazing ground for the surrounding communities. The previously abundant natural resources and protective habitat for elephants in the Reserve has been almost entirely destroyed.

PROBLEM ANIMAL CONTROL

The management of elephants in Borno is the responsibility of the Forestry and Wildlife Services Department of the Ministry of Agriculture and Natural Resources. The Ministry has established an elephant control squad which is trained and equipped with guns and fire crackers for controlling problem animals and also for controlling poaching of elephants. Equipment, such as 4-wheel drive vehicles, motorcycles and radiophones, is provided at strategic stations throughout the elephant range in the State. Problem animals are reported by local wildlife authorities to headquarters, who then arrange the appropriate action. Elephants are only shot on control following human death and/or injury, or persistent crop-raiding. However, lack of funds has limited the effectiveness of the team.

In 1984, most Rangers in the State wildlife authority were retrenched due to the dwindling budgetary allocation for wildlife management. Recruitment of new Rangers and staff training became almost impossible, and equipment maintenance also became increasingly difficult. Increasing the problem was the enactment of a recent government policy which states that budget allocation to each Ministry depends on the amount of revenue earned by the respective Ministry. Therefore, the sale of elephant carcasses and ivory are considered an important method of generating revenue. There appears to be no limit to the number of elephants killed in any given conflict situation, as long as they generate revenue for the Ministry. Consequently, increasing numbers of elephants are being shot under the pretext of elephant control.

POLICY AND LEGISLATION

There is no clear policy on elephant conservation and management in Borno State. The State government, despite its long history of conservation policies, has not integrated a multipurpose approach toward land-use classification (by designating specific areas for elephant conservation and agricultural land), resulting in serious fragmentation of elephant habitat and human-elephant conflict.

There are two principal pieces of legislation which have direct bearing on the status of elephant and ivory trade issues in Bomo State: The Wild Animals Law (No. 16 of 1963, amended in 1975); and Decree No.11 of 1985, Endangered Species (Control of International Trade and Traffic).

Under the Wild Animals Law of 1975, elephants which bear less than 10kg of ivory are defined as "Immature" elephants and are prohibited animals on the First Schedule. This essentially grants them total protection. "Mature" elephants are designated as a specially protected species on the Second Schedule and can be hunted under licence. This law also allows the possession and trade of ivory in Nigeria under a trophy dealer's licence.

The Decree no. 11 of 1985 imposes a regulatory system for the import and export of wildlife species listed on the two schedules. Again "immature" elephants are listed under Schedule I and are strictly prohibited in trade, while "mature" elephants are listed on Schedule II which allows trade under licence. The law prescribes fines and/or imprisonment for any offender in violation of the law. Because of the extreme devaluation of the Nigerian currency (Naira signified by #) in recent years, the fines are an inadequate deterrent. For example, under the Wild Animals Law, violations involving a First Schedule species, including possession of immature ivory tusks without a free disposal permit, are punishable with a fine not exceeding #1,000 (approximately US\$ 7) and/or six months imprisonment. Similarly, under the Decree No. 11 of 1985, illegal international trade in a Schedule I species is also penalised with a fine of #1,000. These fines, when compared to the current value of elephant carcasses and ivory, which are sold at #2,000 (approx, US\$ 14) and #20,000 (approx, US\$ 140) per kg respectively, cannot deter offenders.

The Nigerian legal framework is inadequate for prosecuting wildlife-related offenses, and their effectiveness in enforce laws leaves much to be desired. The most discouraging aspect is the time involved in trying a case. Cases involving elephants or ivory are often delayed unnecessarily in courts, and in most cases the judges exercise leniency and charge culprits less than the fines stipulate in the law, which as they stand, are more symbolic than deterrent in nature. Under these conditions wildlife officers are discouraged from taking cases to courts.

CONCLUSION

Bomo State of Nigeria is potentially rich habitat for elephants. The existence of these elephants is, however, threatened by the factors described: lack of clear policies on land use in the context of elephant conservation, poaching, an inadequate legal system, unsystematic and uncontrolled problem animal control and no constructive local community involvement in protected area management.

It is also clear that human-elephant conflict in Borno is real and worsening. This trend is further exacerbated by the desperate lack of government resources to address the situation. Furthermore, the State has not enjoyed the support of either national or international conservation organisations specifically for elephant management. Consequently, Borno's elephants are being lost at such a rate that, unless urgent action is taken, elephants in Borno State will only be found in literature. As long as there continues to be a market for elephant meat and ivory, there will continue to be the problem of illegal killing of elephants in the State as many people are joining the hunting and ivory trade business in the State without fear of punishment.

However, it is encouraging to note that the Environmental Protection Agency was conceived in the State in September 1995. This Agency is the focal point for protection, conservation and management of the environment and natural resources in the State. The Agency has already compiled a compendium of all existing laws and regulations in the State that are impinging on the environment (including the wildlife laws) for review. The Agency is also putting the finishing touches to an Action Plan for elephant conservation in Borno State. These efforts help in alleviating the plight of the remnant elephant population in the State.

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A SCHEME FOR DIFFERENTIATING AND DEFINING THE DIFFERENT SITUATIONS UNDER WHICH LIVE RHINOS ARE CONSERVED

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INTRODUCTION

Rhinos are being conserved under an increasing range of management systems. These systems have attracted a variety of names and acronyms among different users and constituencies. Unfortunately, the same names (eg. sanctuary) and acronyms (eg. IPZ) have sometimes been applied to entirely different systems, while several terms have also been used for essentially the same situation (eg. outlier, straggler, doomed). Furthermore, terms such as *captive* and *wild*, and *in situ* and *ex situ* are being used in a continuum that has caused increasing confusion and ambiguity. In turn, it becomes difficult for those wishing to understand or implement policy, or for those evaluating the effectiveness of different management strategies, to do so when there is confusion over terminology. Similar confusion exists in the much wider, non-rhino context, where definitions and responsibilities for *ex situ* and *in situ* conservation have been recently been proposed (Anon, 1996).

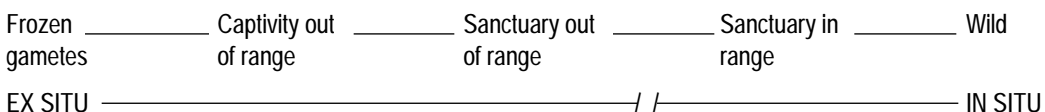
The African Rhino Specialist Group (AfRSG) has attempted to prevent the situation for rhinos to become further confused during their last two meetings, by pro-

ducing a scheme and appropriate definitions that allow differentiation of the various management systems. In 1994, AfRSG adopted definitions for rhino protection areas *in situ*. In 1996, AfRSG developed a decision tree as the basis for defining all management systems under which live rhinos currently exist in the wild and in captivity. This paper combines the outcome of these two meetings, to present a holistic and generic scheme that defines alternative management systems.

PREVIOUS SCHEMES FOR CLASSIFYING MANAGEMENT SYSTEMS

An early proposal (Stanley Price, 1993) provided options for maintaining rhinos that ranged from frozen gametes through to animals in the wild, and from *ex situ* to *in situ* (Figure 1). This proposal was useful in starting to define the different management systems under which rhinos are conserved. Nevertheless, the proposal was not sufficiently inclusive, and did not cover the full range of management systems for live rhinos. This proposal caused a partial response from AfRSG in 1994, by refining definitions for rhino protection areas (see later in Table 2).

Figure 1. An early scheme of classifying situations under which rhinos may be conserved (from Stanley Price, 1993).



A later scheme was developed by the captive breeding community for their latest breeding plans (Foose, 1995). This scheme reflected the belief of the captive breeding community that all surviving wild rhinos are under some form of intensive management. Furthermore, the captive breeding community is moving towards larger and more natural conditions for rhinos under their management, and this trend is occurring both inside (in situ) and outside (ex situ) countries of origin. Accordingly, the captive breeding community proposed the following broad categories:

- Wild: should now be called *Intensively Protected* in situ (symbolized as IPZ)
- Captive: should now be called Intensively Managed Population (symbolized as IMP)

This proposal incorrectly assumes that all surviving rhinos are now under some kind of intensive treatment. In fact, most rhinos are conserved in areas where the levels of management of the rhinos is low to moderate (see Table 1). Furthermore, the proposal wishes to abandon commonly used and understood terms of *wild* and *captive*. In addition, the proposal encompasses the following: an over-arching acronym IPZ that has already been adopted for a specific type of rhino protection area, an Intensive Protection Zone; and, the use of *sanctuary* out of context, when this has long been used for a specific type of rhino protection area (see later in Table 2). AfRSG responded to this proposal in 1996, by producing a decision tree (Table 1) and refining definitions for all other management systems for live rhinos (Tables 3, 4).

DEFINITIONS USED IN THE DECISION TREE

The decision tree (Table 1) aims to classify a range of diagnostic features that cover all the management systems for live rhinos. The decision tree requires that a number of diagnostic features are first defined.

Manipulated breeding controls mating opportunities between individuals to achieve predetermined genetic goals using pedigree analysis.

Table 1: Decision tree for different types of rhino area
Abbreviations: Breeding: unmanaged (U); manipulated (M); In (I) or out (O) of range; Space and density; natural (N) or compressed (C); Size of area: large (L); medium (M); small (S); very small (VS); very very small (VVS); Food supplementation: partial (P); full (F); Management intensity: low (L); medium (M); none (N)

	U	U	U	U	U	U	U	U	U	U	M	M	M	M	M	M				
Breeding: unmanaged or manipulated	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	O				
Space and density: natural or compressed	N	N	N	N	N	N	N	N	N	N	C	C	C	C	C	C				
Size of area	L/M	L/M	S	S	S	S	S	L/M	S	S	VS	VVS	VVS	VS	VS	VVS				
Food supplementation	—	—	—	—	—	—	—	—	P	P	P	F	F	F	F	F				
Management intensity	L	L/M	M	M	N	N	N	N	H	H	H	VH	VH	N	N	VH				
Definition	RCA	IPZI Conservanc	In range Sanctuary	In range Sanctuary	Out of range Sanctuary	Ranch	Sanctuary	Outlier	Semi-wild	Sungai Desun paddock	In range paddock	In range pen	Chipengali paddock	Out of range pen	Out of range pen	Out of range pen				
Examples	Kruger, Hluhluwe, Kaziranga	Sinamatella, Save Valley	Nairobi, Solio	Addo	(Confidential)	Kenya, Sumatra, Selous	Imire (Confidential)	Kenya, Sumatra, Selous	Sungai Desun	Chipengali	Texas, Taman Safari	City zoo								
Generic classification	WILD										SEMI-WILD						CAPTIVE BREEDING			

Manipulated breeding excludes:

- the removal of individuals to minimise inbreeding protection areas (see Table 2).
- the introduction of additional individuals to free-ranging populations for the purpose of enhancing population viability for demographic purposes.

In or out of range refers to the known historical range of the subspecies, taxon or ecotype.

Compressed in the context of **space and density** implies that management creates a higher than natural density or less space per individual than under natural conditions, to the extent that any reproduction, or the survival of individuals, inevitably requires either selective removal of rhinos soon after successful breeding, or supplementary feeding.

Size of area is a relative categorisation to illustrate the variation encountered for different locations in which populations or groups or individuals occur or are kept, and it follows on from the definitions of rhino protection areas (see Table 2).

Food supplementation is categorised on a continuum from none through partial to full, irrespective of whether that supplementation is of natural or artificial food.

Management intensity is categorised on a continuum from low through medium to high, and refers to the extent of husbandry and veterinary intervention, and of the necessary adjustment to the size and composition of the population.

Table 2: Definitions of types of areas in which rhinos are protected.

The following types of area may be set up for the protection of rhinos where breeding is not manipulated. These areas may not necessarily have any particular legal status, over and above that which the area already had beforehand. All these areas may be established around natural populations, or through translocation or reinforcement.

Rhino conservation Area

A medium to large sized area of state protected areas (PA), private or communal land in which the natural patterns of distribution and movement of the rhino cover the whole of the available area, which may be fenced or unfenced, and where staff are deployed at moderate to high density throughout the area specifically to protect the rhino population. Rhinos remain largely un-managed, other than ensuring adequate protection.

Rhino Intensive Protection Zone (IPZ)

A definite zone within a larger area of state PA, private land or communal land where law enforcement staff are deployed at moderate to high density specifically to protect the rhino population. The concentration of rhinos within an IPZ reflects natural patterns of distribution and movement, and is not the deliberate result of fencing or other methods of confinement.

Rhino Sanctuary

A small area of state PA, private land or communal land in which rhino are deliberately confined through perimeter fencing, the use of natural barriers or other methods of confinement, and where law enforcement staff are deployed at high density to protect the rhino population. The confinement of rhinos within a sanctuary permits close observation and relatively intense management of the rhino.

Rhino Conservancy

A relatively large fenced area of primarily private land, possibly some state PA, in which rhino live in land units that are under the control of two or more landholders, where staff are deployed at moderate to high density to protect the rhino population, and where the need for biological management is reduced. Conservancies aspire towards the fusion of commercial and community-based approaches under unified management obligations and policies to conservation, in support of conventional anti-poaching.

DEFINITIONS ARISING OUT OF THE DECISION TREE

The decision tree (Table 1) has provided a basis for defining all management systems under which Live rhinos are maintained. These definitions are presented separately for the following: areas where rhino are protected but not subjected to manipulated breeding (Table 2); areas where rhinos receive virtually no management, in terms either of protection or breeding

(Table 3); and, management systems in which rhinos are subjected to manipulated breeding (Table 4). The systems involving manipulated breeding (Table 4) have been given functional names that may require further refinement by the captive breeding community for the purposes of marketing. However, it is hoped that the captive breeding community will reconsider their use of overlapping terms and acronyms, and adopt the terms and definitions already developed by AfRSG in 1994 (Table 2) in the interests of uniformity.

Table 3: Definitions of types of areas and situations where rhinos are not intensively managed.

The following areas and situations cover rhinos that are not under any form of intensive management, in terms of either protection or manipulated breeding.

Rhino Ranch

A small area of private land in which rhino are deliberately confined through perimeter fencing, the use of natural barriers or other methods of confinement, but any law enforcement effort that may be present is not orientated specifically towards the protection of rhinos.

Outlying Rhinos

Rhinos that occur in highly dispersed situations of largely enforced solitariness, either outside an area where any form of effective protection is offered or outside a ranch. (As a result, rhinos will be either under imminent threat of illegal exploitation or of losing habitat, and will not be in regular breeding contact with other rhinos. Such rhinos are the prime candidates for translocation to more secure situations where they will be in regular breeding contact with other rhinos.)

GENERIC DEFINITIONS OF WILD AND CAPTIVE BREEDING

A basis for a comprehensive definition for the commonly used terms of *wild* and *captive breeding*, together with an intermediate state of semi-wild, has emerged from the process of progressing through the decision tree (Table 1). These commonly used terms have been retained, despite the wish of the captive breeding community to abandon them (Foose, 1995). The reasons for this are three-fold. First, to retain primary emphasis upon rhino conservation in the wild, and to prevent attention and funds being deflected away from this overriding priority. Second, because the supposition that all surviving rhinos are now under intensive treatment is incorrect. Third, these terms are more widely used and understood than the alternative terms of *intensively protected* in situ (symbolised as IPZ) and *intensively managed populations* (symbolised as IMP) proposed by the captive breeding community (Foose, 1995).

Wild: Free-ranging rhinos, usually in large to medium (>10km²) generally in the historical range of

the taxon, living at natural density and spacing, without food supplementation, with only very occasional husbandry and veterinary intervention, and a natural breeding system.

Semi-wild: Rhinos, usually in small (<10km²) areas, either in or out of the historic range of the taxon, living at compressed density and spacing, with routine partial food supplementation, with a high management intensity, but with a natural breeding system.

Captive breeding: Rhinos, usually in small (<10km²) to very small areas, either in or out of the historic range of the taxon, living at compressed density and spacing, with partial or full food supplementation, with frequent levels of husbandry and veterinary intervention, and a manipulated breeding system.

CONCLUSIONS

AfRSG commends this scheme for adoption by all those working with rhinos in Africa, in Asia and in captivity, to promote the standardisation of terminology.

Table 4: Definitions of types of area where rhino breeding is manipulated.

The following areas where rhino breeding is manipulated have been defined with functional names that may require further refinement by the captive breeding community for the purposes of marketing. However, it is expected that the captive breeding community will not choose names that overlap with those already adopted for rhino protection areas (Table 2).

Paddock

An area where manipulated breeding of rhinos is practised, in or out of range, and where rhinos are confined within a physical barrier, and normally of a size of more than 0.1km² and less than 10km². The area will contain natural or modified vegetation, and rhinos will require partial supplementation of food and a high level of husbandry.

Pen

An area where manipulated breeding of rhinos is practised, in or out of range, and where rhinos are confined within a physical barrier, and normally of a size not exceeding 0.051 ha. Rhinos will be fully dependent upon supplemented food, and will require a very high level of husbandry and sanitation.

The definitions will allow full evaluation of the different alternatives under which rhinos are kept.

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AN HISTORICAL PERSPECTIVE OF THE YEMENI RHINO HORN TRADE

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EARLY REPORTS OF THE RHINO HORN TRADE FROM EASTERN AFRICA

Traders in Yemen have been importing rhino horn from Africa for centuries and sending it on to other places, but when Yemenis began using rhino horn themselves is not known. The earliest document describing the trade from eastern Africa is the *Periplus of the Erythraean Sea*, a handbook on the trade of the Indian Ocean. Written in the Greek language, it was probably by a Greek merchant who lived in Egypt during the first century A.D. (Casson, 1989; Huntingford, 1980). There are two references in it concerning the exports of rhino horn from eastern Africa. The first is about the area around Adulis, which was then the major port for Ethiopia: "The mass of elephants and rhinoceroses that are slaughtered all inhabit the upland regions, although on rare occasions they are seen along the shore around Adulis itself... Exports from this area are ivory, tortoise shell, rhinoceros horn" (Casson, 1989). No specific reference in the Greek text is given as to where the rhino horn was taken, but some of it probably ended up in Egypt and in various Mediterranean ports (Casson, 1989). Wilfred Schoff (1912), who was Secretary of the Commercial Museum in Philadelphia, and who produced an annotated translation of the *Periplus* in 1912, believed that rhino teeth and hide were also exported from Ethiopia, but he did not name their probable destination. Interestingly, Lionel Casson (1989), in his intro-

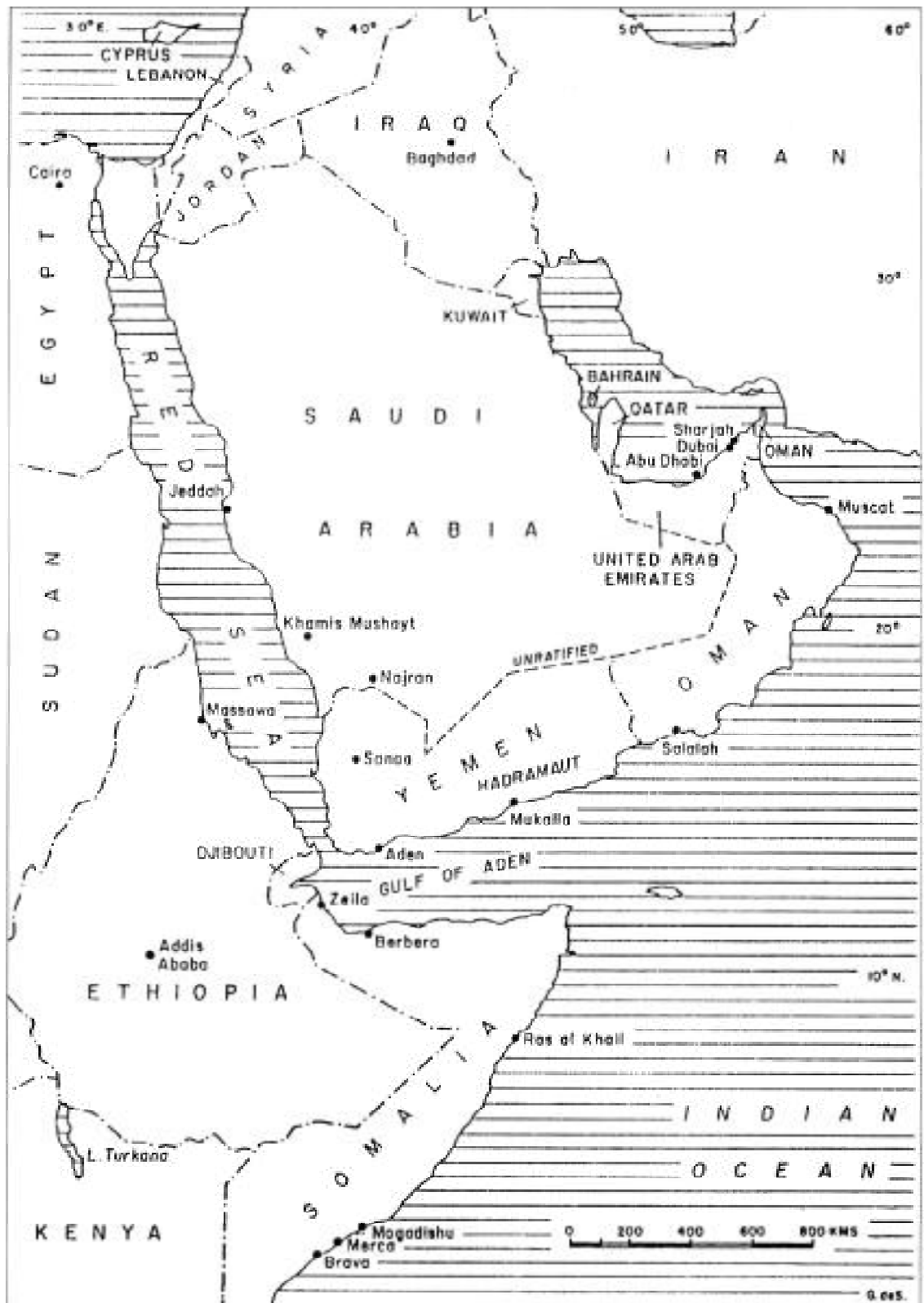
duction to the *Periplus*, wrote: "Muza was an entrepot as well, offering for export what it had imported from Adulis". Most scholars believe that Muza was located near present-day Mocha in Yemen; therefore, if Casson was correct, then rhino horn was being exported from Adulis in Ethiopia to Yemen in the first century.

The second reference to the export of rhino horns in the *Periplus* concerns a port called Rhapta, its location still controversial among scholars. While some archaeologists and historians believe that Rhapta was in southern Tanzania (Dato, 1970), others think that it may have existed in northern Tanzania between Dar es Salaam and Pangani. Irrespective of its location, the *Periplus* states: "the area exports a great amount of ivory but inferior to that from Adulis; rhinoceros horn; best quality tortoise shell after the Indian; a little nautilus shell" (Casson, 1989). Again, no destination is given in the text, but we know that almost all the luxury products obtained along the African coast by the merchants of Roman Egypt were exported through Egypt, ending up in the hands of wealthy buyers in the Mediterranean world. Huntingford believed that perhaps much of the rhino horn from Adulis and Rhapta went to India, but gave no evidence for this statement (Huntingford, 1980). According to the *Periplus*, Rhapta was under the rule of the governor of Mapharitis, a province in what is now Yemen, and whose main port was Muza; Arabian traders from this

Photo credit: Guillaumin, 1856



During the mid-19th century large quantities of rhino horn, from what are today Tanzania and Kenya, were shipped to Zanzibar for sale to Arabs and Indians.



part of Yemen settled among the Africans of Rhapta and traded extensively with them (Mathew, 1963). Therefore, it is likely that rhino horn from Rhapta was exported to southwest Arabia, now present-day Yemen, in exchange for goods from Muza, including metal spears, axes, small swords and awls.

Paragraph 17 of the *Periplus* text lists exports from Yemen to Rhapta. Among these is what McCrindle (1879) translated as “knives” and Schoff (1912) as “daggers”; William Vincent (1807), then Dean of Westminster, who translated and had published an early edition of the *Periplus* in 1807, believed that the correct translation from the Greek was “knives”. In a footnote, Vincent wrote that these “knives, called jambea or canjars, are still a great article of trade in Africa, Arabia and India; they are carried in the girdle and ornamented with silver, gold or jewels, according to the ability of the possessor”. Consequently, the *Periplus* may be the earliest reference to allude to the trade of rhino horn from Africa to Yemen, and it is definitely one of the earliest documents specifically referring to the export of jambiyas from Yemen to East Africa. The international trade in rhino horn and daggers with Yemen thus may be at least 2 000 ears old

From the time of the *Periplus* until the 19th century, there are references to the export of rhino horn from eastern Africa to Asia, but few refer specifically to Yemen as an entrepot or end market. Almost all the sources are Arab, Chinese or, later, European. There certainly was a demand, if not the major one, for African rhino horns in China, since they were considerably larger than the Asian horns and thus could be used for making large bowls and other works of art. In fact, from the ninth century, the Chinese specifically mention rhinoceros horn as one of the major imports into Guangzhou (Hirth & Rockhill, 1966). However, the horn was not sent directly from eastern Africa to China, rather via entrepots in Arabia, India and elsewhere in the Indian Ocean. One 13th-century Chinese document refers to the Hadramaut as a major entrepot for the surrounding Arab lands. One of the products available there was rhinoceros horn. Some, if not all of it, according to this Chinese document, was sent to Palembang (in Indonesia), and to the Malayan peninsula for barter. These African horns may have come originally from Somalia, since this document notes that the Berbera coast produced some of the biggest rhino horns, over six kilos each

Photo credit: National Maritime Museum, Greenwich



Rhino horns have been brought to Yemen by dhows for over 2,000 years from the East Africa coast.

Besides horn going from the eastern African coastal ports to Arabia, and then eventually on to China, it also continued to be sent to Egypt and Europe over this 2,000-year period. During the European Middle Ages up until the World Depression in 1929, there was a strong demand for rhino horn for a wide variety of uses, including medicines and works of art in continental Europe. Unfortunately, references to how much rhino horn was actually consumed in what is now Yemen until the 20th century have not been found. We know that Yemen underwent an economic decline before the European Middle Ages; furthermore, according to World Bank economists, economic stagnation persisted into recent times (World Bank. 1979). It is highly probable, therefore, that comparatively small quantities of rhino horn were used by the Yemenis. From at least the 12th century up to the present, rhino horn has been a luxury commodity, and only the wealthy have been able to afford it. Perhaps future archival research in Yemen and in Turkey, which at various times controlled parts of Yemen, will provide more information on the amount of horn consumed by the Yemenis.

IMPORTS OF RHINO HORN INTO YEMEN FROM THE 19TH CENTURY

With the arrival of the British in the Red Sea in the early part of the 19th century, some commercial statistics become available. William Milburn, who worked for the East India Company, compiled a huge amount of trade data which Thomas Thornton later edited and published as *Oriental Commerce*, in 1825.

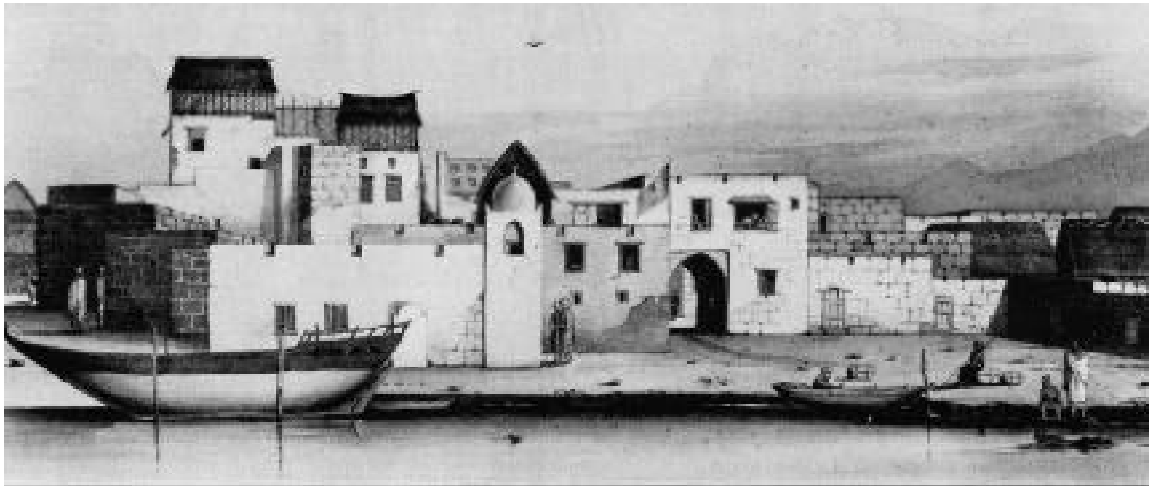
In Mocha, he noted that:

“Rhinoceros’ Horns are much esteemed among the Mahametans, on account of their being considered a powerful antidote against poison... A good sized horn, sound, and not broken at the point, is worth from three to four pounds sterling... They are made into drinking cups and snuff boxes” (Milburn, 1825).

According to Milburn (1825), the rhino horns in Mocha came from Zeila, Massawa and other places. There is additional information on rhino horn exports from Somalia and Ethiopia going to the Red Sea countries and Arabia. Massawa exported rhino horns for one to six dollars each, depending on their quality; Brava and Mogadishu businessmen were exporting rhino horns throughout the 19th century, which in 1896/7 were worth US\$ 1,120. In that same financial year, Merca merchants were sending out US\$ 1,057 worth of horns. Even tiny ports such as Ras al-Khail were shipping out horns; in 1889 traders there exported US\$ 20,000 worth of ivory and rhino horn, mostly to Aden and Mocha, even though much of the horn was re-exported (Pankhurst, 1968).

During the first half of the 19th century, the port of Aden developed at the expense of Mocha. Aden was administered as part of the Indian Empire from 1839 until 1937, and trade statistics for this period can be found in the India Office Library in London. There are several reasons why rhino horn is not mentioned. One is that chaos reigned in the Yemeni highlands, and it was almost impossible to transport goods there.

Photo Credit: Royal Geographical Society, London



In the 19th century Massawa, as painted here in 1833, was a major port for rhino horn being exported from Ethiopia to Yemen.

R.L. Playfair (1855), the Assistant Political Resident in charge of customs in Aden, wrote in 1855 that overall trade in Aden had declined because of “almost total anarchy reigning in the neighbourhood of Sanaa”. In 1926, similar comments were being made: “business with the hinterland has been more or less interfered with owing to the hostilities... The hinterland <is> occupied by many tribes who are generally engaged in warfare among themselves” (Downing Street to Aden Resident, 1926). Throughout the 19th century in Yemen there were continual disturbances, including invasions by Mohammed Ali of Egypt and the capture of Sanaa by the Ottoman Turks in 1872.

In the early 20th century, fighting against the Turks in Yemen continued. Egyptian, British and Turkish incursions hampered economic growth: “The result was that Yemen remained an economic backwater, largely self-sufficient in foodstuffs, and exporting only minimum quantities of a very narrow range of agricultural goods (especially coffee). The great variety of goods produced or processed in Yemen from the earlier centuries were all but gone...” (Wenner, 1987).

Up until 1962, North Yemen remained one of the most backward and poverty-stricken countries in the world,

due mainly to the extremely conservative policies of the Imams who ruled the country (Halliday, 1974). Strife and poverty kept the demand for rhino horn extremely low. Statistical files for several years are missing from the India Office Library, but in those that are available can be found no mention of any rhino horn imports coming into Aden; probably though, small quantities did reach the highlands through other, less significant ports, such as Hodeidah and Mukalla. The Government of India in 1907 prohibited the import of rhino horn and hide into Aden “except such as are imported under cover of an export pass-note issued in respect of them by an officer of customs at the place of export” (Government of India, 1907). This customs notification would obviously have discouraged official trade in rhino products.

EAST AFRICAN EXPORTS OF RHINO HORN FROM THE 19TH CENTURY

Nevertheless, large amounts of rhino horn were transported from eastern Africa from 1850 to 1950 to other places. According to statistics from the Zanzibar archives for the financial year 1863/4, Zanzibari merchants imported 6,350kg of rhino horn (calculated from the value of the horn) from the coastal towns of main

Photo Credit: Royal Geographical Society, London



Hodeidah, as seen here in 1907, was a significant port in Yemen for goods, including rhino horn, coming from eastern Africa.

land eastern Africa (Playfair to Russell, 1865): Its import value was US\$ 0.63 per kg. In 1867/8 Bagamoyo, near Dares Salaam, supplied Zanzibar with 9,700 kg of rhino horn (calculated from the value of the horn) (Secretariat E60, 1868). In 1872/3 Zanzibar's imports of rhino horn further expanded to 12,700kg, valued at US\$ 10,000 (Secretariat E71, 1874). At the time of the partition of East Africa into German and British territories, large quantities of rhino horn were going out: about 7,000kg of rhino horns were exported from Tanganyika in 1893, 9,000kg in 1894 and 13,400kg in 1895 (Bradley Martin & Bradley Martin, 1982). Approximately 11,000kg of rhino horn were annually exported from East Africa between 1849 and 1895. Most was shipped to India, which served as an entrepot for Southeast Asia and China, and to Germany and Britain. In the early 20th century, roughly 30% of all the horn exported from Kenya went to Britain.

During the first 80 years of the 20th century, East Africa was by far the world's largest exporter of rhino horn. In the 1930s an average of 1,596kg was legally exported per year, 45% from Tanganyika, 43% from Kenya and 12% from Uganda. During the next decade, exports declined slightly to an average of 1,528kg per year, probably due to the disruption of transport during World War II. The average price per kg rose from US\$ 6.26 in the first six years of the 1930s to about US\$ 8.38 in the 1940s. Between 1950 and 1959, East Africa officially exported an average of 1,783kg yearly, 51% from Kenya, 47% from Tanganyika and 2% from Uganda, but only a recorded average of 59.5kg a year was exported to Aden or any other Yemeni port. During the 1960s legal exports from East Africa to Yemen gradually increased to a yearly average of 398kg, which was 29% of the total East African rhino horn exports. Prices increased at the end of the decade; the average export price for a kilo of rhino horn in 1969 was US\$ 22.94. From 1970 to 1976 there was a tremendous increase in official exports from East Africa, 97% of which was supplied by Kenya. On average, 3,406kg were exported each year. Of the total 23,841kg exported from 1970 to 1976 (representing the deaths of about 7,950 rhinos), 4,436kg, 28% of the total, went to Yemen. The largest amounts went to Hong Kong (36%) and China (30%).

YEMEN'S RECENT IMPORTS OF RHINO HORN

Looking at North Yemen's official statistics for rhino horn, which only started in 1969/70, at the end of the

civil war, imports of rhino horn increased from 233 kg in 1969/70 to 8,310kg in 1975/6. These statistics, published in the *Annual Reports of the Central Bank of Yemen*, show that the total value of official imports of rhino horn reached their peak in 1977/8, but the weight of the horn is not recorded. The next financial year, the Central Bank stopped all mention of rhino horn imports. It has been difficult to obtain further government statistics from the Central Bank and other government departments, because from 1979 to 1982 (the year imports were made illegal), rhino horn imports were merged with other raw materials, such as buffalo horns, and the computers were unable to disaggregate the data. There is one other set of statistics, also from the Central Bank, which illustrates where rhino horn imports may have originated. These import figures are for three years only, 1973 to 1975, and are for calendar years. For 1973 and 1974, according to these statistics, 65% of the horns came from "Democratic Yemen" (presumably from Aden), 15% from Ethiopia and 9% from Djibouti; in 1975, almost all the horn was imported from Kenya.

Caution should be taken when interpreting these Yemeni import figures. They only represent official statistics and they may also include other types of horn. Varisco wrote, "These figures reflect all horn materials, but that the vast majority refers to rhino" (Varisco, 1987). Nevertheless, the steady increase of horn imports from 1969 to 1979, as shown by the Yemeni statistics, conform with the major expansion in the amount of horn exported from East Africa to South Yemen, according to East African customs figures. Also, the family members making the largest number of daggers with rhino horn handles (about 80%) stated that they had greatly increased their purchases of rhino horn from the 1950s to the 1970s: during the 1950s they bought between 250 and 300kg a year, mostly from Aden; in 1960 and 1961 (just before the outbreak of the civil war), they bought about 400kg a year. The next decade, the boom years for their business in rhino horn handles, the family purchased 3,000kg a year (Vigne & Bradley Martin, 1993; Bradley Martin, 1978a).

It is therefore possible, with these various sets of statistics and data from the main jambiya family in Sanaa, to estimate how much horn was imported into North Yemen, legally and illegally, from the 1950s to the 1970s. The amount of horn consumed by both South and North Yemen during the 1950s was small, due to



Mocha was the main port in Yemen in the early 19th century trading in rhino horn. This sketch shows the Old French Factory in *Mocha* in 1835.

the low demand. From 1962 to 1970, the civil war in North Yemen disrupted communications and adversely affected the economy, which resulted again in small quantities of imports. After the end of the civil war, and with the sharp increase in the price of oil in the early 1970s, about a million men from North Yemen emigrated to Saudi Arabia and the Gulf countries as labourers. They sent back about US\$ 1,000,000,000 a year; the standard of living improved tremendously, and for the first time a large number of North Yemenis could afford to buy daggers with rhino horn handles. The merchants responded by importing enormous quantities of rhino horn, especially from Kenya, to meet the demand. From 1969/70 to 1976/7 North Yemeni official import statistics show that 2,878kg of horn were imported each year on average. Additional supplies were smuggled in to avoid the bureaucracy of the North Yemeni administration. For example, to import rhino horn legally, an import licence from the foreign exchange control board was required. According to the Central Bank report of 1971/2, "after obtaining the licence, the holder has to apply to his commercial bank within a month... for a letter of credit. He also has to deposit in local currency a minimum of 20% of the value of imports... Importation must be completed within three months" (Yemen Arab Republic, 1973). In

addition, in 1972 the importer also had to pay a 15% customs duty on the horns, plus a 5% defense tax, 2% statistics tax and a 50 rial "calculation fee". No wonder there was smuggling into North Yemen!

The East African customs records show that from 1970 to 1976 634kg were exported annually to the Yemens, while North Yemen's official statistics show 2,878kg being imported annually. Some rhino horns imported into North Yemen came from sources other than East Africa, such as Somalia, Ethiopia and Sudan. Even so, they would have constituted a small proportion of the total. The simple answer to the disparity is smuggling out of East Africa. During the 1970s there was a breakdown in law and order in East Africa, and an increase in corruption that facilitated illegal killing of rhinos and the illicit export of horns. Ian Parker, a former Game Warden in Kenya and an authority on the wildlife trade of Africa, was told by traders that the actual exports of rhino horn from East Africa were always more than the official ones, due to businessmen trying to avoid taxes and exchange control laws (Parker & Bradley Martin, 1979). Some of the Kenyan horn was smuggled out to Somalia; between 1951 and 1963 the Republic of Somalia statistics state that 1,687kg were exported, but due to the scarcity of rhinos in Somalia, almost all that

horn must have come from Kenya (Funaioli & Simonetta, 1966). During the 1950s Tanzania officially exported 8,385kg of horn, or 47% of East Africa's total. From 1970 to 1976, despite the poaching of over a thousand black rhinos, Tanzanian official exports declined to just 720kg. Where possible, the middlemen evaded legal export channels. It was practically the same in Uganda. During the 1970s poachers eliminated the entire black and white rhino populations, perhaps a total of 500 animals, but official statistics only record an export of 43kg, or horns from approximately 14 rhinos.

Thus, during the 1970s at least 3,000kg of rhino horn were annually imported into North Yemen, representing almost 40% of the total amount of rhino horn on the world market (Bradley Martin, 1980). Practically all this horn was used for making dagger handles. More horn was consumed in North Yemen in the 1970s than in any other period in the country's history, and far more than for any other nation.

EARLY REFERENCES TO JAMBIYAS AND THE USE OF RHINO HORN IN NORTH YEMEN

In Sanaa's museum there is a fifth or sixth century B.C. bronze statue of a man who has a jambiya tucked into his belt. The sculpture was found in Mareb, in the eastern part of the country (Boissiere, 1988; Abdullah,

1983). The archeologist, Wendell Phillips (1955), saw the statue at Mareb, just after its excavation by his expedition, and he wrote about it in his book, "I was particularly struck by a sheathed dagger or jambiya fastened in the man's belt. It was similar to those used today, twenty-five centuries after the time of the statue". Professor Alfred Beeston of Oxford University has found an allusion in a pre-Arabic language to a dagger in Yemen, also testifying to the antiquity of the Yemeni jambiya (Serjeant & al-Akwa, 1983; Boissiere, 1988). The earliest known reference in Arabic to making dagger blades and sheaths in Sanaa is in the 11th-century manuscript written by al-Razi; he also noted that certain trades were associated with certain mosques; the dagger-blade polishers' mosque was called the Masjid al-Sayaqil (Dostal, 1983).

Although Yemeni men have been wearing daggers for more than 2,000 years, there is no known reference to rhino horn as a substance for making the dagger handles until the 1950s. This is very strange since rhino horn has been imported into the country for hundreds of years. According to *The Encyclopaedia of Islam*, the Arabs knew about the African rhino well before Islam and the Muslim conquest of Persia. They were also aware that Ethiopian princes made knife handles from rhino horn (Vire, 1978). The anthropologist Daniel Varisco (1987) believes that there is a possibility that Ethiopians brought rhino horn handles with them when they invaded Yemen in the fourth century A.D.

Photo credit: Esmond Bradley Martin



The souk, inside Sanaa's old city, can be reached through the medieval gate-way called Bab al-Yaman.

Muhammad al-Damiri completed a zoological lexicon in Arabic in 1372 entitled *Hayat al-Ha yawan al-Kubra* which was well known in Yemen, and contained information on rhino horn (Varisco, 1987). Al-Damiri said that rhino horn was used in India to cure colic and to help women give birth; also he noted that the most prestigious trinkets of the Chinese were made from rhino horn. A belt of rhino horn was worth 18,720 grammes of gold (Varisco, 1987). Daniel Varisco (1989) believes, even though he does not have written references, that “the manufacture of rhino horn daggers has been pursued in Yemen for at least 750 years and may antedate the arrival of Islam in the seventh century”. The director of the Centre Francais d’ Etudes Yemenites in Sanaa, Dr Franck Mermier, has read most Arabic and European chronicles and books on daggers but has found no reference on making the handles from rhino horn until the mid-20th century (Mermier pers. comm., 1994; Mermier, 1988). The former director of the American Institute of Yemeni Studies, also in Sanaa, David Warburton, believes that some rhino horn may have been used to make dagger handles in Yemen hundreds of years ago since there was a long-term trade connection between Yemen with Ethiopia and Somalia (Warburton pers. comm., 1993).

The German explorer, Carsten Niebuhr (1723 and 1792), who visited Yemen in the 1760s, mentioned that Arabs there wore ‘jambea’ that were made in the Hadramaut, but he doesn’t say from what substance the handles were carved. Walter Harris (1893) travelled to the Sanaa souk in 1892 and wrote:

“...the greatest skill of the jewellers of Sanaa, who are rightly renowned for their workmanship, is exhibited in the dagger-sheaths, many of which are of rich silver-gilt, and even at times of gold. Perhaps the most lovely, however, are of plain polished silver inlaid with gold coins, principally of the Christian Byzantine emperors; others again, of delicate filigree, which the natives line with coloured leather or silk. But more than even the sheaths of these jambiyas, as they call their daggers, the natives value the blades. Antique ones are generally considered the best and the people declare that the old art of hardening the steel has been lost. Be this as it may, there is no doubt that the modern blades are of no mean workmanship, and great prices, for the Yemen, are paid for good specimens. The two parts of the dagger are nearly always sold separately and a Yemeni, having found a blade to suit him, has a sheath made according to his taste and wealth”.

Photo credit: Lucy Vigne



Belts with sheaths attached to them are usually sold separately from the jambiyas, as seen here in Sanaa.

Ameen Rihani (1930) in *Arabian Peak and Desert Travels in Al- Yemen*, gave a first-hand account of how the traditional dagger was made. He also says that the age of the dagger is very important. Hugh Scott (1942), who visited Aden in 1937, recognized that people in various parts of Yemen possessed different styles of daggers, although in the town of Aden the British prohibited people from wearing daggers.

Claudie Fayein (1957), who served as a physician for the Imam in Taiz in 1951 and 1952, gave the first written reference to rhino horn as a substance for making Yemeni jambiya handles. She noted the translucent quality of the horn when it is carved. What is also interesting in her description is the fact that one could immediately tell the status of a person by the kind of dagger he wore:



A Yemeni man proudly wears his old jambiya with a rhino horn handle in the small town of Manakha, near Sanaa.

“All that one needs is a glance at the waist... to know whether or not he is of the Prophet’s family, whether or not he is rich, and where he was born. A Seyed (a descendent of Mahomet) wears his dagger to the right. Those of the wealthy are sheathed in silver... The mountaineer’s dagger differs from those of the Tihama and the central desert areas by its wooden sheath wound with fine strips of green-dyed sheepskin and by its hilt of zebu horn decorated with brass reproductions of ancient Byzantine coins .

In many Asian countries, rhino horn is consumed for medicinal purposes, but it is rarely used as a medicine in Yemen, although there are accounts of it being used to detect and neutralize poisons, including snake-bites (Varisco, 1987 and 1989; Myntti pers. comm, 1978). In 1983 one dagger-handle maker in

Taiz said that he sometimes burned rhino horn shavings and inhaled the smoke to cure his headaches, but this is very unusual (Bradley Martin, 1983).

CONCLUSION

This detailed account shows that rhino horn has been a trading commodity going in and out of Yemen for at least two thousand years. Academics believe that there has been an internal trade in rhino horn for the making of dagger handles for equally as long in Yemen. Because of this ancient use of rhino horns for the traditional jambiya, it is a very valuable part of Yemeni culture. No other symbol of traditional Yemeni culture is so revered and valued as an antique jambiya with a rhino horn handle. These are equivalent to works of art in the western world. Called “sayfani” old rhino horn has a unique patina, almost translucent at the tips when held up to the light, and with a subtle grain running through it. With age the patina improves. The most expensive item of Yemeni dress one can buy is such a jambiya, reflecting its great significance and popularity. The Sheikh of the Bakil tribe, Yemen’s largest and most powerful tribe, paid the most ever for a jambiya in 1992: a million dollars. It had been owned by Imam Ahmed (who had ruled North Yemen from 1948 to 1962). This jambiya had a well known, long and prestigious pedigree. Past ownership of a good jambiya is a favourite topic of conversation among Yemeni men; Yemenis are extremely aware and proud of their long history, able to trace their ancestry, and that of certain jambiyas, very far back in time.

To prohibit the sale of old jambiyas within Yemen would thus be a mistake as it would rid Yemenis of part of their heritage. Such a regulation would also have disastrous consequences concerning the rhino horn trade. Rather than reducing demand, it would increase the need for new rhino horn. As long as old rhino horn jambiyas are permitted to be traded, the law allows Yemenis to buy an alternative to new rhino horn jambiyas. Therefore, the sale of these old jambiyas must be allowed to continue in Yemen.

Yemenis understand increasingly the need to ban the sale of new rhino horn for jambiya handles. The government prohibited imports in 1982, and in 1987 banned the re-export of rhino horn and left-over shavings. Then in 1992 the domestic trade in new rhino horn was made illegal. With severe political and eco

conomic difficulties in the country over the last few years, the government has been unable to put much attention into enforcing these bans, however.

At last, this may be changing. Yemen's interest in conservation and joining international conventions is growing. On 5 January 1997, following a visit from a WWF/TRAFFIC delegation, the President signed his agreement for his country to ratify CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora). On 23 April 1997, during a follow-up WWF mission to Yemen, the Foreign Minister, Dr Abdul Karim al-Iryani, signed the final document needed for Yemen to accede to the Convention. Although it was the hectic week of elections (Yemen's first elections since the 1994 civil war) and despite Dr al-Iryani's position as the Secretary General of the main political Party, he did not hesitate in getting the document written and signed. The Acting Minister of Industry then volunteered to see the process through to completion. He himself brought the document from the Foreign Ministry to hand over, as required, to the Swiss Consul in Sanaa. It was a great moment, after about five years of prodding by WWF, to witness the Yemen government complete its final stage for joining CITES. Therefore, it is appropriate that the international community should now respond in supporting Yemen's efforts to enforce its trade bans on new rhino horn. The long history of Yemen's trade in rhino horn from Africa could finally be drawing to a close.

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ELEPHANTS AND WOODLANDS IN NORTHERN BOTSWANA: HOW MANY ELEPHANTS SHOULD BE THERE?

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ELEPHANTS AND WOODLANDS

In some African reserves, elephant population densities are often a major factor in management policy concerned with conserving woodlands. The associated 'elephant problem' is a typical paradigm whereby an increase in elephant numbers is followed by a decline in woody vegetation due to over-browsing. This has been reported in several nature reserves in East and southern Africa (Barnes, 1983; Laws, Parker & Johnstone, 1975; van Wyk & Fairall, 1969). Much emphasis has been put on the role of elephants, probably because of the apparent destructive behaviour of these animals and conspicuous effects of elephant browsing on adult trees in woodland savanna habitats.

The decline in woody vegetation resulting from elephant impact could be attributed to biomass removal from living trees or the reduction of tree densities through tree mortality. However, in most semi-arid savannas, elephants are not the only agent that modifies woodlands. Other factors facilitating woodland loss include: prolonged periods of drought; intense browsing by large herbivore species other than elephants; and, a high frequency of fire. Yet, the dynamics of plant growth, rates of change in vegetation structure, and the magnitude of impacts of elephants and other factors on woody plant species, have not been assessed. As a result, the desired elephant density remains an arbitrary decision by local managers.

ELEPHANTS IN NORTHERN BOTSWANA

Northern Botswana is defined as an area of more than 80,000km² between 180 and 21° south and 21° and 26° east, but excluding the permanent swamps of the Okavango Delta. Rainfall ranges from 400mm in the south and 650mm in the north-east. Rains occur during the summer from November to April and mainly in scattered heavy storms. Temperatures vary between a monthly mean maximum of 34°C (October) and a mean minimum of 6°–7°C (June) (Bhalotra, 1987).

In this region, the resident elephant population is a prominent factor influencing vegetation structure because of its abundance and high recruitment potential (Calef, 1988; Melton, 1975). Northern Botswana woodlands carry between 65,000 and 94,000 elephants (DWNP, 1993). The elephant population is probably increasing, due to natural recruitment and to immigration from neighbouring countries (Calef, 1988; Melton, 1985). Moreover, the elephant population is likely to be compressed in response to habitat loss due to expanding human population and development. If elephant densities in northern Botswana continue to increase, then over-utilisation of woodland habitats are expected.

Major woodland types in northern Botswana include *Baikiaea plurijuga*, *Acacia erioloba*, *Burkea africana* and *Colophospermum mopane*, all of which have associated woody vegetation that also contributes to the diet of the elephants. Woody species that are relatively abundant and make a substantial contribution to the diet of elephants include *Baphia massaiensis*, *Combretum spp.*, *Bauhinia petersiana*, *Diplorhynchus condylocarpon*, and *Terminalia sericea*. These species however, often appear as shrubs and do not dominate the cover abundance of tall tree stands. Elephant damage to woodland vegetation is widespread throughout the region. Occasional observations on woodland types along the Chobe and the Linyanti river fronts indicated severe damage to trees as a result of elephant activity (Child, 1968; Sommerlatte, 1976). The impact of fire on woodlands in northern Botswana is also apparent and there is some distinction between the effects of elephants and fire on different plant communities. Accordingly, woodland vegetation in the region can be viewed as a mosaic of three states containing: low elephant utilisation and high fire damage; high elephant impact and low fire damage; and, minor utilisation by elephants and/or minor fire damage (Ben-Shahar, 1993).

Elephants in northern Botswana tend to converge around water sources and reach high densities (7—

10 elephants/km²), particularly towards the end of the dry season (Craig, 1990; Melton, 1985). The proximity of food sources to these localities is often detrimental to cover abundance of preferred species (Ben-Shahar, 1993). When utilising vegetation, elephants may strip the plants of leaves, break twigs, uproot and debark trees. I chose mopane plants to demonstrate the effects of elephants on woodlands because much of the elephants' range is within mopane woodlands (Child, 1968). Moreover, mopane is a principal food source for elephants in many conservation areas of southern Africa (de Villiers, Pietersen, Hugo, Meissner & Kok 1991; van Wyk & Fairall 1969).

CAN A BALANCE BETWEEN ELEPHANTS AND WOODLANDS BE MAINTAINED?

Since 1991, I have been monitoring woodland habitats throughout northern Botswana and measured the extent of plant mortality and biomass loss in relation to plant utilisation through all its forms and local elephant densities. Following a preliminary survey (Ben-Shahar 1993), I chose sites that contained the range of regional spatial heterogeneity in vegetation structure of different woodland habitats. These sites are subjected to varying elephant densities, fire occurrence, large herbivore browsing and tree mortality from unknown reasons. I described the likelihood of woodland loss under different elephant utilisation rates and fire regimes through mathematical models. The models rely on records of plants from sites re-visited from 1991 to 1996.

Elephants and fire appear to have a pivotal role in the dynamics of certain woodland types in northern Botswana. Their respective effects however, are likely to differ between woodland habitats dominated by specific plant species. It appears that woodlands dominated by *C. mopane* are susceptible to elephant induced damage, whereas woodlands dominated by *B. plurijuga* are prone to fire damage and less to elephant damage.

Previous research indicated that the influence of elephants on tree density was species specific (Barnes, 1983). *C. mopane* exhibits a significant reduction in tree densities with the increase in local elephant abundance (Ben-Shahar, 1996a). However, high variation found in tree densities at low elephant densities suggest that other factors, such as soil nutrients, water drainage and fire, also control tree densities (Guy, 1989; Lewis, 1991).

Seedlings of some woody plant species seem to be particularly vulnerable to the influence of elephants, fire, flooding, and other large herbivorous species that may also damage plants by trampling. As a result, a large proportion of the seedlings that germinate are often lost before the seedlings establish themselves and persist as small shrubs. Woodlands dominated by *Acacia erioloba* are influenced through the combination of these factors in northern Botswana. Under such diverse range of oppressing factors, the recruitment rate of *A. erioloba* seedlings is low by comparison to *B. plurijuga* and *C. mopane*. Nonetheless, on a regional scale, *A. erioloba* woodlands are viable because elephant impact and fire damage are low (Ben-Shahar, 1996a).

Biomass reduction (as opposed to mortality) was examined through elephant off-take and growth rates of plants. A logistic model differentiated between sustainable utilisation and over-utilisation of *C. mopane* plants by elephants (Ben-Shahar, 1996b). Predictions were based on recorded range of above ground biomass of mopane shrubs and trees and elephant densities in sites within northern Botswana. The model suggests that *C. mopane* shrubs and trees were resilient to the impact of elephant browsing, even at lower growth rates, which are assumed to coincide with dry years. Rates of biomass production reached the maximum measured level within 10 years. The prevalence of periodic drought (50% of the maximum growth rate of plants) did not hinder woodland growth (Ben-Shahar, 1996b).

THE STATUS OF WOODLANDS AND ELEPHANT NUMBERS

Central to the argument supporting the expansion of grasslands formerly dominated by woodlands (Caughley, 1976) is the likelihood that high elephant densities over-utilise woodlands already weakened by the effects of lower than average annual rainfall. During the period of sampling, northern Botswana had a lower than average rainfall regime. Nonetheless, records from *A. erioloba*, *B. plurijuga* and *C. mopane* woodlands indicated healthy and potentially increasing populations of woody plant species within.

There was no substantial evidence to imply that elephants will diminish woodlands below a sustainable level if their numbers are allowed to increase considerably beyond the current estimate. Hence, elephant

culling as a means to prevent woodland loss is unlikely to meet the objective.

From an ecological perspective, northern Botswana can sustain well beyond the maximum number (60,000) set in 1991 by the DWNP. But then, for the future conservation of the region management policies should prioritise, setting the desired composition and structure of indigenous plant communities, rather than maintaining a threshold number of elephants. As it is, northern Botswana can sustain many more elephants as long as people can tolerate the decline of woodlands.

The ecological aspect of the elephant problem' in northern Botswana is confined to areas of interest to people where elephants seem to have an excessive impact, such as Chobe, Khwai and Linyanti river fronts. A management policy based on the ecological balance between elephants and woodlands would best consider habitats dominated by specific woody plant species where managers perceive a desired vegetation composition and structure to be maintained. Managers should review optional combinations of the density of elephants, fire regime and densities of other herbivore species that accomplish the desired vegetation form.

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RHINO MUSEUM IN THE WATERBERG MOUNTAINS OF NORTHERN PROVINCE, SOUTH AFRICA

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The Waterberg Mountains, situated some 300km from Johannesburg in the Northern Province of South Africa, is a 15,000km² mountain range in the shape of an inverted saucer. The late Eric Rundgren, a former Kenyan professional hunter and warden, was the first person to attempt the introduction of white rhino into these mountains back in 1975. Today, there is an estimated 200 plus white rhino, mainly located in Welgevonden Game Reserve, Lapalala Wilderness, Touchstone and Kwalata Game Reserve. The newly established National Park, Marakele, is to be found in the south-west corner of the mountain range and it too, has seen the introduction of white rhino.

In addition to this, the first black rhino ever to go onto private land in South Africa, took place here in August 1990 and since then, three founder populations have been established; two private and one State (Marakele National Park). In 1989 the Waterberg Nature Conservancy was formally established and presently comprises 25 landowners, controlling some 130,000ha where conservation has become the priority activity. Fifteen years ago, there was very little conservation activity, other than the traditional private hunting which had gone on for three decades. Since that time there has been a dramatic shift away from agricultural practises, which have become increasingly unprofitable, resulting in significant change in the land-use of this unique area. There are few or no areas left in South Africa of comparable size that still have the potential to go across to wildlife with a habitat that is largely intact. There is no forestry or industry and as a consequence, pollution is absent and mining prospects are zero. These dramatic land-use changes have resulted in a serious attempt at tourism development and with it a highly professional hunting community, many of whom still practise traditional farming activities, which they combine with hunting during the dry, winter seasons. Future areas for rhino conservation, therefore, are most encouraging.

The Chairman of Rhino & Elephant Foundation of Africa, who is also the Chairman of the African Rhino Owners Association and a representative member of

the African Rhino and Elephant Specialist Groups, has been at the forefront of the drive to establish the area as important future rhino habitat and is responsible for the founder population of black rhinos on private land, whose numbers are steadily increasing.

An important component of the activities carried out in the reserve for which he is responsible, is the environmental school established in 1981, with expansion in 1985 which has enabled the governing body, namely the Wilderness Trust of Southern Africa, to provide no less than 2,500 children and teachers with the opportunity of environmental courses in an outdoor classroom. The school is run throughout the year and can accommodate up to 100 course participants at any one time.

An important component of the course participants visit is the opportunity to view a tame black and white rhino at the same time, have their field officers explain the history of rhino conservation in Africa to the present day. Children from as far afield as Korea, Hong Kong, Taiwan, Australia, Tanzania and numerous West African countries have attended these school courses, which have expanded into game farm management for final year school leavers, as well as specialised teacher training courses.

The Lapalala Wilderness School operates through the Wilderness Trust of Southern Africa, a non-profit, non-governmental organisation, which works closely with both the government of the Northern Province and various institutions — particularly those that deal with students from disadvantaged backgrounds. Between 500 and 800 participants per annum are sponsored by the organisation.

The idea of a Rhino Museum has occupied the author's mind for many years. Therefore, when the opportunity presented itself to acquire a farm boarding school, which closed in 1962, the decision was taken to approach the Rhino and Elephant Foundation to take the running of this establishment under

their auspices. The Board agreed, and plans are well underway, together with the renovations of the facilities, which comprise large dormitories up to 21 metres long x 6 metres wide — an ideal venue in which to establish a museum.

The museum is based directly on the route to Lapalala Wilderness and will cater to the needs of the rapidly developing tourism industry, and is close to one of the main tarred roads to Botswana and the Limpopo Valley. The museum will largely take the form of displays and high quality photographs, but will also include artifacts related to the rhinoceros. This will include both species of African rhino and a section will be devoted to the three Asian species.

Anna Merz, founder of the Ngare Sergoi Rhino Sanctuary at Lewa Downs, now known as Lewa Conservancy, has kindly agreed to be the Deputy Director and a number of prominent rhino specialists have agreed to assist: Peter Jenkins from Kenya, Peter Hitchins from South Africa, Dr. Anthony Hall-Martin of the National Parks Board of South Africa, Dr. Esmond Bradley Martin from Kenya and Dr. Eugene Joubert formerly of Namibia, now working in Saudi Arabia.

The exhibits will depict the following lines:

- Evolution
- Past and present distribution (including aspects of early hunters)
- The threat to the rhinoceros (rhino wars)
- The use of rhino horn (medicinal purposes/ornate dagger handles)
- The present position
- The illegal trade
- Private rhino sanctuaries (AROA)
- Men and women in rhino conservation (all aspects)

Artists who will support the project are David Shepherd, Robert Bateman, Keith Joubert, Paul Bosman, Keith Calder and Clive Walker. There will also be a collection of traditional African carvings of the rhinoceros. It is further planned to establish a library and archival facilities for rhino researchers.

The museum will be open seven days a week and apart from the educational value and public awareness, it is hoped that through this medium, funds will be generated for rhino conservation.

Photo credit: Tim Oloo



BOOK REVIEW

AZA RHINOCEROS HUSBANDRY RESOURCE MANUAL

Edited by Michael Fouraker & Tarren Wagener
Fort Worth Zoological Park and Cockrill Printing Co., Fort Worth, TX, 1996

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As the management of rhinos becomes more intensive and more urgent, whether in zoological parks or large reserves, experiences must be shared by all participants. Several good works have come from African sources on large scale management and husbandry. Now, this manual, written by a number of authors, funded by the American Zoo and Aquarium Association's Rhino Taxonomic Advisory Group and the International Rhino Foundation, and produced by the Fort Worth Zoological Park, provides an easily readable compilation of the experiences of zoological parks in the USA regarding the husbandry of all rhino species. While rhinos are managed on a continuum, from captive to free-ranging populations, there are grey areas between the various management levels, from zoos to sanctuaries to parks. However, knowledge and expertise can still flow between these various management layers, and this manual should serve as a catalyst for further inquiry and dialogue in rhino management.

The book is an impressive collection of data in the science and practice of rhino husbandry. The handbook is well laid out in a two column format, with one column for the major body of text and the second for informative tables, diagrams, photographs and appropriate text boxes on particular subjects. The graphics are exemplary with a large amount of simple rhino artwork. However, the editors readily admit that many gaps remain and further contributions are requested from all readers.

There are excellent sections on taxonomy and conservation status, management and behaviour, and design. The descriptions and visual examples of rhino enclosures, behaviour and management strategies should be of interest to all people who work with rhinos. In particular a rhino behaviour ethogram in appendix II provides a useful tool to ensure that all rhino facilities describe their observations with the same terminology. The nutrition and health sections are very brief reviews and could have been expanded.

The research chapter is important and provides discussion and a listing of research priorities for the captive rhino community. The chapter provides guidance to any facility holding and researching rhinos, and provides excellent suggestions for field-based rhino researchers on topics that could parallel research on captive rhinos.

A few areas of the book require improvement, and the following points were noted. There are references to protocols for rhino blood and tissue collection, but, no indication of a source for these protocols is given. A central source (print or internet bulletin board) for guidance regarding sample collection and dispersion would be of use to all researchers. Sections on manual restraint have been duplicated by two authors and combining them would be appropriate. The anaesthesia discussion lacks a mention of medetomidine as an exciting new tool to be explored. To counter these small shortfalls, the book contains an ample international bibliography to allow the reader opportunity to study further.

Appendix I is a short summary regarding Sumatran rhino husbandry. Considering the poor captive breeding successes with this species, the section needs to be expanded. Certainly the caretakers of wild Sumatran rhino populations should study this section, and provide input for conservation of the species.

In Appendix III, the final page, there is a plea for information, and on the back cover a list of international contacts is included as an aid to continue the discussion. It is this reviewer's sincere wish that many people will study this manual and contribute to future editions. This manual will be of use to all institutions where rhinos are held and in particular for groups building or remodelling rhino holding facilities. Additionally, all rhino researchers should be familiar with the priority list. In particular, the experiences of facilities in rhinos' countries of origin will be most useful to expand the body of rhino husbandry knowledge.

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