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Cover: The greater one-horned rhino in Kaziranga National Park, India.
Credit: © Bibhab K Talukdar
Acknowledgements

The production of this issue of *Pachyderm* was possible through contributions from a number of organizations and individuals. In particular, we would like to thank the following:
As I have reported in previous reports, in September 2012, the IUCN World Conservation Congress called for a high-level meeting on African elephants, in response to the changing dynamics around elephant poaching and illegal ivory trade, noting that the situation warranted high-level government commitment and multisectoral action not limited to only wildlife and environmental sectors.

In response, the African Elephant Summit was co-convened by the government of Botswana and IUCN, and hosted by the president of the Republic of Botswana, His Excellency Lt. Gen. Seretse Khama Ian Khama, 2–4 December 2013. Participants during different sessions of the three-day summit included delegates from 30 countries involved in or concerned about the ivory supply chain, along with a number of intergovernmental organizations and NGOs.

The overall objective of the summit was to secure commitment at the highest political level to take Urgent Measures along the illegal ivory trade value chain to effectively protect elephants and significantly reduce the illegal trade in ivory.

The main outcome of the summit was a set of 14 Urgent Measures, adopted unanimously by the meeting participants. However, a wealth of information is also available from the meeting, both from the background documentation and from some of the activities undertaken during the summit itself. These are all available on the summit website (http://iucn.org/african_elephant_summit).

The summit took up the great majority of our African Elephant Specialist Group report.
time over the last six months, and we are now moving back into the day-to-day AfESG work. I look forward to sharing exciting progress on the African elephant library, the African elephant database, and our work on human–elephant conflict in the next edition of *Pachyderm*.

**African Elephant Summit**

2–4 December 2013, Gaborone, Botswana

**Urgent Measures**

3 December 2013

**Preamble**

The representatives of governments along the illegal ivory value chain and intergovernmental organizations:

RECALLING that the African elephant range States adopted in 2010 the African Elephant Action Plan and the African Elephant Fund and that these mechanisms were commended by the Parties to CITES at the 16th meeting of the Conference of the Parties.

RECOGNIZING that the conservation of the African elephant requires a comprehensive approach, as enshrined in the African Elephant Action Plan, emphasizing the challenges of habitat fragmentation and loss, illegal killing and growing human–elephant conflict.

NOTING that elephant poaching and the illegal ivory trade are a major concern across Africa and beyond, with serious security, economic, political and ecological ramifications as these crimes increase in frequency and severity and expand into previously secure elephant populations.

AWARE that in some cases, transnational criminal organizations and armed groups are using sophisticated military equipment and tactics to kill elephants and are taking advantage of high-level corruption, or lack of border security, to move ivory across borders and to avoid detection and prosecution.

Further AWARE that corruption can fuel and facilitate illicit ivory trafficking and that a zero-tolerance policy on corruption for all levels and sectors, including investigations and prosecutions, is warranted in this regard.

Le sommet a pris la plus grande partie de notre temps au cours les six derniers mois, et nous revenons maintenant au travail au jour le jour du GSEAf. Je suis impatiente de pouvoir partager avec vous les progrès passionnants sur la bibliothèque de l’éléphant d’Afrique, la base de données de l’éléphant d’Afrique, et notre travail sur le conflit homme-éléphant dans le prochain numéro du *Pachyderm*.

**Sommet de l’éléphant d’Afrique**

Gaborone, Botswana

2–4 Décembre 2013

**Les mesures d’urgence**

3 Décembre 2013

**Préambule**

Les représentants des États au long de la chaîne de valeur de l’ivoire illégal [et organisations intergouvernementales]:


RECONNAISSANT que la conservation de l’éléphant d’Afrique nécessite une approche complète, tel qu’il est consacré dans le Plan d’Action pour l’éléphant d’Afrique, soulignant les défis de la fragmentation et de la perte d’habitats, et l’abattage illégal et le conflit croissant entre les humains et les éléphants.

Ayant NOTE que le braconnage des éléphants et le commerce illégal de l’ivoire sont une préoccupation majeure à travers l’Afrique et au-delà, et que cette activité affecte la sécurité, l’économie et produit des conséquences politiques et écologiques sérieuses alors que ces crimes augmentent en fréquence et en gravité et s’étendent à des populations d’élèphants précédemment à l’abri du braconnage.

SACHANT que, dans certains cas, les groupes criminels et les milices utilisent un arsenal militaire sophistiqué pour tuer des éléphants et profitent de la corruption des hautes sphères, ou le manque de sécurité des frontières pour faire circuler l’ivoire à travers les frontières et pour éviter la détection et les poursuites judiciaires.

SACHANT en outre que la corruption peut alimenter et faciliter le trafic illicite d’ivoire et qu’une politique de tolérance zéro contre la corruption pour tous les niveaux
RECOGNIZING that poaching and illegal ivory trade are serious, often transnational crimes, which significantly impact on wildlife but also on national and international peace, security, social, cultural and political development and the rule of law

RECOGNIZING that the cross-cutting nature of the problem requires effective collaboration and collective action across all agencies, including law enforcement, security and intelligence agencies, customs, the judiciary and prosecutors, foreign and finance ministries, as well as CITES authorities and natural resource ministries, nationally and internationally

Further RECOGNIZING that action is required at all points along the illegal ivory value chain, both to conserve African elephants in the field and to cut off the flow of illegal ivory

UNDERSTANDING that measures to combat wildlife crime should respect the rights and livelihoods of rural communities and seek to engage them as important stakeholders in these efforts

RECOGNIZING that sustainable use of natural resources has generated economic benefits that have contributed directly to the conservation of the species, rural development and poverty reduction in a number of countries

ACKNOWLEDGING the various ongoing initiatives, declarations and existing commitments at national, regional and international levels

We, the delegates assembled:

AGREE to safeguard the men and women who risk their lives to protect elephants in the wild and make the necessary human, financial and logistical resources available at national and regional levels to the practical extent possible to address elephant poaching on the African continent and the illegal ivory trade across the world in recognition and support of the African Elephant Action Plan.

URGE all donors to provide resources and support, as appropriate, for the implementation of the Urgent Measures and to support technical assistance, advisory services, the sharing of best practices and other forms of assistance.

DEDICATE OURSELVES to providing political support at the highest level to ensure the implementation of the following Urgent Measures in the context of the African Elephant Action Plan within the agreed timeline.

et secteurs, y compris les enquêtes et les poursuites judiciaires, est justifiée à cet égard.

RECONNAISSANT que le braconnage et le commerce illégal de l’ivoire sont des crimes graves, et souvent transnationaux, qui ont une incidence significative sur la faune mais aussi sur la paix et la sécurité au niveau national et international, le développement social, culturel et politique et la primauté du droit.

RECONNAISSANT que la nature transversale du problème nécessite la collaboration efficace et une action collective entre tous les agences, y compris les agences d’exécution de la loi, de la sécurité et de renseignements, ainsi que les douanes et le système de poursuite judiciaire, le ministère des Affaires étrangères, le ministère de finance, aussi que les autorités de CITES et les ministères des ressources naturelles, au niveau national et international.

RECONNAISSANT en outre que l’action est nécessaire tout le long de la chaîne de valeur illégale de l’ivoire, à la fois pour conserver les éléphants d’Afrique dans leur milieu, et pour endiguer le flux illégal d’ivoire.

Ayant ENTENDU que des mesures pour lutter contre la criminalité de la faune doivent respecter les droits et les moyens de subsistance des communautés rurales et chercher à les faire participer comme intervenants importants dans ces efforts.

RECONNAISSANT que l’utilisation durable des ressources naturelles a généré des avantages économiques qui ont contribué directement à la conservation de l’espèce, le développement rural et la réduction de la pauvreté dans un certain nombre de pays.

RECONNAISSANT les différentes initiatives en cours, les déclarations et les engagements existants au niveau national, régional et international.

Nous, les délégués réunis,

NOUS ENGAGEONS à protéger les hommes et les femmes qui risquent leurs vies pour protéger les éléphants dans la nature, et à rendre les ressources humaines, financières et logistiques disponibles au niveau national et régional, dans la mesure la plus pratique possible pour traiter le braconnage d’éléphants sur le continent africain et le commerce illégal de l’ivoire à travers le monde, en reconnaissance de et avec soutien pour le Plan d’Action pour l’éléphant d’Afrique.

EXHORTE tous les donateurs à fournir des ressources et soutien, où approprié, pour la mise en œuvre des mesures d’urgence et à soutenir l’assistance technique, les services consultatifs, le partage des meilleures pratiques et autres formes d’aide.
Urgent Measures

Urgent Measures, to halt and reverse the trend in illegal killing of elephants and the illegal trade in ivory, are outlined below for implementation or initiation by the end of 2014, although it is understood that the measures will remain relevant beyond 2014.

The measures listed below are considered to be urgent in nature and requiring commitment from the high-level political representatives at the African Elephant Summit.

Urgent Measure 1

Applying a zero tolerance approach, secure and report on maximum, and therefore deterrent, sentences for wildlife crime using a combination of existing laws and strengthened regulatory frameworks for investigation, arrest, seizure and prosecution of suspected wildlife criminals; such laws may include, inter alia, wildlife, corruption, money laundering, organized crime, fire arms, employment and terrorism laws.

Urgent Measure 2

Form and support National Interagency Mechanisms to allow immediate action against anyone implicated in or abetting illegal killing of elephants and the illegal trade in ivory.

Urgent Measure 3

Enhance capacity of law-enforcement and wildlife-protection agencies at the national level to respond to well-armed, highly-organized poaching syndicates.

Urgent Measure 4

Introduce elephant poaching and the illegal ivory trade as a standing agenda item of National Security Committees (or their equivalent) in countries where proceeds from these criminal activities are known or are likely to be used to fuel internal conflict, armed rebellion or external aggression. Include, where possible, the head of the national wildlife agency on the National Security Committee (or its equivalent) in these countries.
Urgent Measure 5
Over the next year, in order to support evidence-based decision-making, pool efforts to improve the coverage of monitoring of:

a) African elephant populations, transmitting data as a matter of urgency to the IUCN/SSC African Elephant Specialist Group, the agreed data repository for elephant population data;
b) levels of illegal killing, transmitting data as a matter of urgency to CITES MIKE, the agreed monitoring program; and
c) levels of illegal trade, transmitting data as a matter of urgency to ETIS, the agreed monitoring program.

Urgent Measure 6
Strengthen cooperation among law-enforcement agencies in range, transit, and consumer states, including through participation in activities of the CITES Ivory Enforcement Task Force, and, through the use of controlled deliveries, whenever possible, and other appropriate law-enforcement techniques; with support from the International Consortium on Combating Wildlife Crime (ICCWC).

Urgent Measure 7
States that signatories to regional wildlife law-enforcement networks such as the Lusaka Agreement Task Force (LATF); Rhino and Elephant Security Group of Southern Africa Development Community (SADC); Horn of Africa Wildlife Enforcement Network; Central African Wildlife Enforcement Network; ASEAN Wildlife Enforcement Network; and the recently proposed Wildlife Enforcement Network for Southern Africa; recommit their individual support to the objectives of the regional agencies and to meeting their material, financial and human resource commitments.

Urgent Measure 8
Mobilize financial and technical resources from various national and international sources utilizing those mechanisms that best support the implementation of the African Elephant Action Plan.

Urgent Measure d’Urgence 5
Au cours de la prochaine année, afin de soutenir la prise de décision basée sur des preuves, unir les efforts pour améliorer la couverture de la surveillance des:

a. populations d’éléphants d’Afrique et la transmission de données comme une question d’urgence à l’UICN / CSE Groupe des Spécialistes de l’éléphant d’Afrique (GSEAf ), le dépôt de données convenu pour les données de population d’éléphants ;
b. niveaux d’abattage illégaux et la transmission de données comme une question d’urgence à CITES MIKE, le programme de surveillance convenu ; et
c. niveaux du commerce illégal et la transmission de données comme une question d’urgence à ETIS, le programme de surveillance convenu.

Mesure d’Urgence 6
Renforcer la coopération entre les organismes d’application de la loi dans les États de l’aire de répartition des éléphants, les États de transit et les pays consommateurs, y compris par la participation dans les activités de l’Équipe spéciale de la police de l’Ivoire de la CITES, et à travers l’utilisation des livraisons surveillées, chaque fois que possible, et d’autres techniques appropriées d’application de la loi, avec l’appui du Consortium international sur la lutte contre la criminalité environnementale (ICWCC).

Mesure d’Urgence 7
Les États qui sont signataires de réseaux régionaux de mise en œuvre des lois sur la faune tels que la Lusaka Agreement Task Force (LATF), Rhino and Elephant Security Group of Southern Africa (SADC); Horn of Africa Wildlife Enforcement Network; Central African Wildlife Enforcement Network, ASEAN Wildlife Enforcement Network, et le Wildlife Enforcement Network for Southern Africa récemment proposé, s’engagent encore à apporter leur appui individuel en faveur des objectifs des agences régionales, et pour répondre à leurs engagements concernant des questions matérielles, les ressources financières et les ressources humaines.
Plan and these agreed Urgent Measures at national, regional and continental levels.

**Urgent Measure 9**

Design and carry out national studies and public awareness programs aimed at all sectors, which include information on the ramifications of illegal killing of elephants and the illegal ivory trade on the economy, national security, public safety and the ecosystem services elephants provide.

**Urgent Measure 10**

Implement efficient measures to register and secure ivory stockpiles, including comprehensive marking and inventory of stored ivory, as agreed under CITES Resolution Conf. 10.10 (Rev. CoP16).

**Urgent Measure 11**

Develop and implement strategies to eliminate the illegal trade in ivory and use evidence-based campaigns for supply and demand reduction that use targeted strategies including, where appropriate, government-led approaches, to influence consumer behaviour.

**Urgent Measure 12**

In African elephant range States, engage communities living with elephants as active partners in their conservation by supporting community efforts to advance their rights and capacity to manage and benefit from wildlife and wilderness.

**Urgent Measure 13**

Strengthen existing or implement new legislation to classify wildlife trafficking involving organized criminal groups as a ‘serious crime’ to effectively unlock international law-enforcement cooperation provided under the United Nations Convention against Transnational Organized Crime, including mutual legal assistance, asset seizure and forfeiture, extradition and other tools to hold criminals accountable for wildlife crime.

**Mesure d’Urgence 8**

Mobiliser des ressources financières et techniques provenant de diverses sources nationales et internationales en utilisant les mécanismes existants qui soutiennent le mieux la mise en œuvre du Plan d’Action pour l’éléphant d’Afrique et ces mesures d’urgence approuvées au niveau national, régional, et continental.

**Mesure d’Urgence 9**

Concevoir et réaliser des études nationales et des programmes nationaux de sensibilisation du public, destinés à tous les secteurs, qui comprennent des informations sur les conséquences de l’abattage illégal des éléphants et le commerce illégal de l’ivoire sur l’économie, la sécurité nationale et la sécurité publique, et les services écosystémiques que fournissent les éléphants.

**Mesure d’Urgence 10**

Mettre en œuvre des mesures efficaces pour enregistrer et sécuriser les stocks d’ivoire, y compris le marquage et l’enregistrement complet de l’ivoire stocké, comme convenu dans la résolution CITES Conf. 10.10 (Rev. CoP16).

**Mesure d’Urgence 11**

Développer et mettre en œuvre des stratégies pour éliminer le commerce illégal de l’ivoire, en utilisant des campagnes basées sur des preuves pour appuyer la réduction de la demande et l’approvisionnement à travers des stratégies ciblées, y compris, le cas échéant, des approches dirigées par le gouvernement, pour influencer le comportement des consommateurs.

**Mesure d’Urgence 12**

Dans les États de l’aire de répartition, engager les communautés vivant avec les éléphants en tant que partenaires actifs dans leur conservation en soutenant les efforts de la communauté pour faire avancer leurs droits et la capacité de gérer et de bénéficier de la faune et de la nature sauvage.

**Mesure d’Urgence 13**

Renforcer la législation existante ou mettre en œuvre une nouvelle législation pour classer le trafic de la faune impliquant des groupes criminels organisés comme un «crime grave» ; déverrouiller efficacement la coopération internationale de l’application de la loi prévue par la
Urgent Measure 14

Support the development of a network of accredited forensic laboratories able to determine the origin of seized ivory according to internationally standardized protocols for DNA and isotopic analysis that can provide evidence admissible in a court of law.

Implementation

Each country will assess its progress with implementation of these Urgent Measures and will report on a voluntary basis to appropriate regional and international forums such as but not limited to:

- further one-off meetings on wildlife crime
- meetings of the CITES Standing Committees
- next sessions of the IUCN World Conservation Congress
- annual African Union summits
- regional economic cooperation forums
- African Elephant Fund Steering Committee
- meetings of the Conferences of the Parties to CITES and CMS
- meetings of the United Nations General Assembly
- meetings of the United Nations Environment Assembly.

Mise en œuvre

Chaque pays évaluera ses progrès dans la mise en œuvre de ces mesures d’urgence et rendra compte volontairement aux forums régionaux et internationaux appropriée, tels que mentionnés ci-dessous, mais sans s’y limiter:

- autres réunions ponctuelles sur la criminalité de la faune;
- réunions du Comité Permanent de CITES ;
- prochain UICN Congrès Mondial de la Conservation ;
- sommets annuels de l’Union africaine;
- forums pour la coopération économique régionale ;
- comité directeur du Fonds d’éléphant Africain ;
- réunions de la Conférence des Parties de la CITES et de la CMS ;
- réunions des Nations Unies, Assemblée Générale ;
- réunions des Nations Unies, Assemblée Environnementale ;
Population numbers

The final continental rhino number estimates by country and subspecies for Africa (as of December 2012) are provided in Table 1. Figures 1 and 2 show estimated numbers of both species in the wild since 1992. The totals for 2012 are an update to the provisional updated continental rhino population estimates that were consolidated at the February 2013 AfRSG meeting and released to inform Parties at CITES COP16 (Inf Doc 51). However, as is normal in the months following the AfRSG meeting, some estimates have been updated based on checking and new information.

Les chiffres de la population

Les calculs du nombre final de rhinocéros continentaux par pays et sous-espèce pour l’Afrique (à partir de décembre 2012) sont fournis dans le tableau 1. Les figures 1 et 2 montrent les chiffres de deux espèces à l’état sauvage depuis 1992. Les totaux pour 2012 sont une mise à jour des estimations provisoires continentales actualisées de la population des rhinocéros qui était consolidées lors de la réunion du GSRAf en février 2013 et publiées pour informer les Parties à la CdP 16 de la CITES (Inf. Doc 51). Toutefois, comme il est normal dans les mois qui suivent la réunion du GSRAf, certaines estimations ont été mises à jour sur base de la vérification et de nouvelles informations. Dans d’autres cas, les chiffres ont été transférés dans la colonne de déduction logique (qui n’est pas prise en compte dans les totaux nationaux). Même si les chiffres estimés ont augmenté depuis leur...
Table 1. Revised estimated numbers of white and black rhinos in Africa as of 31 December 2012, by country and subspecies

<table>
<thead>
<tr>
<th>Country</th>
<th>White rhino subspecies</th>
<th>Black rhino subspecies</th>
<th>Total white and black rhinos</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>C. s. cottoni (Northern)</td>
<td>C. s. simum (Southern)</td>
<td>Total</td>
</tr>
<tr>
<td>Angola</td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Botswana</td>
<td></td>
<td></td>
<td>185</td>
</tr>
<tr>
<td>Kenya</td>
<td>4</td>
<td>390</td>
<td>394</td>
</tr>
<tr>
<td>Malawi</td>
<td></td>
<td></td>
<td>26</td>
</tr>
<tr>
<td>Mozambique</td>
<td>1?</td>
<td>1</td>
<td>Down</td>
</tr>
<tr>
<td>Namibia</td>
<td>524</td>
<td>524</td>
<td>Up</td>
</tr>
<tr>
<td>South Africa</td>
<td>18,933</td>
<td>18,933</td>
<td>Up</td>
</tr>
<tr>
<td>Swaziland</td>
<td>84</td>
<td>84</td>
<td>Stable</td>
</tr>
<tr>
<td>Tanzania</td>
<td></td>
<td></td>
<td>100</td>
</tr>
<tr>
<td>Uganda</td>
<td>14</td>
<td>14</td>
<td>Up</td>
</tr>
<tr>
<td>Zambia</td>
<td>10</td>
<td>10</td>
<td>Up</td>
</tr>
<tr>
<td>Zimbabwe</td>
<td>284</td>
<td>284</td>
<td>Down</td>
</tr>
<tr>
<td>Total</td>
<td>4</td>
<td>20,424</td>
<td>20,429</td>
</tr>
</tbody>
</table>
In other instances, numbers have been transferred into the speculative guesstimate column (which is not counted in the country totals). While estimated numbers were up since they were last compiled two years previously, indications are that growth is slowing in response to the increase in poaching. The updated rhino figures indicate a continental total of 25,510 rhinos, consisting of 20,429 white rhinos and 5,081 black rhinos (Table 1). South Africa, Namibia, Kenya and Zimbabwe account for 98% of these rhinos. White rhino numbers are marginally (1.3%) up from the 20,165 recorded in 2010, while the 5,081 number of black rhino noted for end 2012 is 4% up from the 4,880 total for 2010 (Knight 2011).

Since CITES CoP 16 and the AfRSG meeting, intensive helicopter block counts with high coverage have been completed in Kruger National Park, which has the largest white rhino population in the world. The results suggest that white rhino numbers in this population are currently around 8,968 (95% confidence interval: 8,394–9,564), and indications are that the tipping point may have been reached in this population (Sam Ferreira, pers. comm.). South Africa National Parks (SANParks) plans to increase removals from this Key 1 population, not only on strategic grounds (to move some animals to safer locations further from Mozambique), but also to enhance metapopulation growth rates.

Poaching update

The updated numbers of rhinos reported poached in Africa every year since 2006 are listed in Table 2. Note that these figures represent the minimum number reported poached: the true figure is likely to be higher as some carcasses will not have been detected, especially in large areas or in the case of very young animals. While poaching continues to decline in Zimbabwe, the escalation of poaching on the continent has continued to escalate—1,004 were poached in South Africa in 2013. In 2013 poaching also spiked in Kenya where in relative terms it is now a little higher than in South Africa. While poaching levels are currently at sustainable levels, both countries are approaching the tipping point where poaching ceases to be sustainable and deaths start to exceed births. Animals walking into Mozambique from Kruger continue to have short

compilation il y a deux ans, les indications sont que la croissance ralentit suite à l’augmentation du braconnage. Les chiffres actualisés de rhinocéros montrent un total continental de 25,510 rhinocéros, composés de 20,429 rhinocéros blancs et 5,081 rhinocéros noirs (tableau 1). L’Afrique du Sud, la Namibie, le Kenya et le Zimbabwe abritent 98 % de ces rhinocéros. Le nombre de rhinocéros blancs est légèrement en hausse (1,3 %) par rapport à 20.165 enregistrés en 2010, alors que le chiffre de 5081 rhinocéros noirs enregistré fin 2012 est en hausse de 4 % par rapport à un total de 4880 pour 2010 (Knight 2011).

Depuis la CdP 16 de la CITES et la réunion du GSRAf, des comptages intensifs par hélicoptère des blocs ayant une grande couverture ont été accomplis dans le parc national Kruger, qui a la plus grande population de rhinocéros blancs dans le monde. Les résultats suggèrent que les chiffres de rhinocéros blancs dans cette population sont actuellement autour de 8.968 (95 % d’intervalle de confiance: 8.394 à 9,564), et les indications sont que le point de basculement aurait été atteint au sein de cette population (Sam Ferreira, pers. comm.). Les Parcs Nationaux d’Afrique du Sud (SANParks) prévoient d’accroître la translocation de cette population clé, non seulement pour des raisons stratégiques (transférer certains animaux vers des lieux plus sûrs loin du Mozambique), mais de manière à améliorer les taux de croissance de la métapopulation.

Mise à jour sur le braconnage

Les chiffres actualisés de rhinocéros braconnés signalés en Afrique chaque année depuis 2006 sont répertoriés dans le tableau 2. Notez que ces chiffres représentent le nombre minimum braconné déclaré, le chiffre réel est probablement plus élevé car certaines carcasses n’auront pas été détectées, surtout dans les grandes aires ou dans le cas de très jeunes animaux. Même si le braconnage continue à baisser en Zimbabwe, l’intensification du braconnage sur le continent a continué de grimper — 1,004 rhinocéros ont été braconnés en Afrique du Sud en 2013. En 2013, le braconnage a atteint un pic au Kenya où en termes relatifs, il est maintenant un peu plus élevé qu’en Afrique du Sud. Bien que les niveaux de braconnage soient actuellement à des niveaux viables, les deux pays approchent un point de basculement où le braconnage cesse d’être viable et les décès commencent à dépasser les naissances. Les animaux qui vont au Mozambique à partir du parc de Kruger continuent à avoir une courte espérance de vie étant donné la forte pression du braconnage là-bas. Le nombre braconné
### Table 2. Reported poaching by country since 2006 to 2013 with poaching expressed as a percentage of the number of rhinos estimated to be present in each country at the end of 2012.

<table>
<thead>
<tr>
<th>Country</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>Country totals</th>
<th>2012 poaching total as % of 2012 pop size</th>
<th>2013 poaching total as % of 2012 pop size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Botswana</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>2</td>
<td>4</td>
<td>1.03</td>
<td></td>
<td>1.03</td>
</tr>
<tr>
<td>DR Congo</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
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<td>1.42</td>
<td>2.05</td>
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*The numbers of rhinos poached in Mozambique represent a known minimum and the true figure for 2013 is likely to be higher. The 2012 total for Mozambique has also been increased in the light of additional information obtained by AIRSG.

* Le nombre de rhinocéros braconnés au Mozambique représente un minimum connu et le vrai chiffre pour 2013 est susceptible d'être plus élevé. Le total de 2012 pour le Mozambique a ainsi été acro à la lumière des informations complémentaires obtenues par le GSRAf.
Life expectancy given the high poaching pressure there. The Mozambique poaching total would also have been much higher had it not been for the efforts of conservationists in Mozambique who have chased many rhinos back across the border into South Africa where they are safer. Although poaching in Malawi in absolute terms is low, in relative terms (as a percentage of the population) it is high and at an unsustainable level. Poaching in Namibia remains low, but worryingly, more rhinos were poached there in 2013 than for many years.

The increase in poaching raises the question as to when, if current trends continue, the tipping point is likely to be reached (when numbers start to decline) and how fast numbers might decline. Using the HGROWTH function, which uses all data points in its calculation, giving greater weight to more recent years, it is estimated that continentally poaching has been growing by 38.76% a year from 2008 to 2013. Modelling a continued exponential increase in poaching at this rate (for a range of underlying growth rates from 5% to 9%) predicts that the tipping point at a continental level will be reached sometime between 2014 and 2016 (Figure 3). Furthermore, if poaching continues to increase exponentially (as it has been doing in recent years) rhino numbers are predicted to drop to fewer than 10,000 (by over 60%) by the end of 2019 and 0 by 2020. The latter, however, is unrealistic as it ignores the likelihood that the last few rhinos are likely to be harder to find and poach and most probably will be under high protection. Thus, in reality it probably would take longer to reach extinction than predicted by this simple model. Last year, continental poaching increased by 46.86% and at this rate the tipping point will be reached by 2014–2015. However, just as businesses cannot keep growing earnings at +40% a year forever, poaching growth rates may slow in future. It was therefore decided to also model a more conservative arithmetic increase in poaching using both the average increase over the last three years (2010–2013) of +225 rhinos/year.

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1 HGROWTH is a measure of annualized growth rate of a sequence of historical data that uses all data points and not just the first and last. It is primarily used in financial estimation of growth in sales or earnings per share. It also places more emphasis on recent data compared with older data and makes special adjustments for extreme outliers, negative data and data near zero (Price 2011, 2013).
and the 351 more rhinos/year reported poached from 2012–2013. This modelling predicted the tipping point will also be reached very soon (by 2014–2017 at +351 rhinos/year) with numbers projected to drop below 10,000 by 2022–2026 (at +351/year) and 2024–2031 (at 225/year). Simple extrapolated projected time to extinction under the two scenarios was 2024–2028 (+351/year) and 2027–2033 (+225/year). This crude modelling highlights the urgency of the poaching crisis. Time is not on our side, and as Figure 3 shows even if we manage to keep populations productive (underlying growth of 9%) this will not really make a difference if poaching continues to increase exponentially as it has been doing. Clearly urgent international attention is needed to address this matter before the gains of two decades are destroyed.

The trend of significantly increased poaching rates in the last quarter of the year discussed in Knight (2013) did not occur in 2013 (Figure 4). This suggests that poaching levels have been more consistent over the last 11 years. It remains to be seen whether this apparent levelling off in poaching in South Africa will continue or whether poaching will once again continue to trend upwards. While there is considerable month-to-month variation, poaching appears to spike in November (Figure 5). It is evident that within a few months of the clampdown on pseudo-hunting in South Africa poaching spiked and has remained at high levels.

**Horn infusion debate**

The infusion under pressure of a dye and an ectoparasiticide into the rhino horn of living rhinos has been advocated as a possible method to reduce the value of horn, demand for it, and the threat of poaching, without dehorning the animal. The ectoparasiticide is said to be a mild poison causing gastric disorders that should deter would-be consumers, while the dye acts as a visual identification for treated animals. However, recently retrieved horns from poached treated animals that have been sectioned show virtually no penetration of the dye into the horn (Marcus Hofmeyr, pers. comm.). This is not unexpected given the dense nature of rhino horn, suggesting that in all probability the poison does not penetrate either. Despite the failure of the dye to penetrate, numbers (2010–2013) de +225 rhinocéros/an et les 351 rhinocéros ou plus/an déclarés braconnés en 2012–2013. Cette modélisation prédit que le point de basculement sera ainsi atteint bientôt (d’ici 2014–2017 à plus de 351 rhinocéros/an) et que le nombre projeté pourrait descendre en dessous de 10.000 en 2022–2026 (à 351/an) ou 2024–2031 (à 225/an). Une simple extrapolation du temps prévu à l’extinction dans les deux scénarios était 2024–2028 (+351/an) ou 2027–2033 (+225/an). Cette modélisation brute met en évidence l’urgence de la crise du braconnage. Nous n’avons pas de temps, et comme la figure 3 le montre, même si nous parvenons à maintenir des populations productives (croissance de 9 %), cela ne fera vraiment pas de différence si le braconnage continue à augmenter de façon exponentielle comme c’est le cas à présent. Evidemment il faut une attention internationale urgente pour aborder cette question avant que les gains des deux décennies soient détruits.

L’évolution des taux de braconnage considérablement accusé au cours du dernier trimestre de l’année discuté dans Knight (2013) n’a pas eu lieu en 2013 (Figure 4). Cela suggère que les niveaux de braconnage ont été plus cohérents au cours des 11 dernières années. Il reste à voir si cette apparente stabilisation du braconnage en Afrique du Sud continuera ou si le braconnage continuera sa tendance vers la hausse.

Alors qu’il existe des variations considérables d’un mois à un autre, le braconnage semble atteindre le pic en novembre (Figure 5). C’est évident aussi qu’un creux solide en quelques mois de la répression sur la pseudo-chasse, le braconnage en Afrique du Sud a atteint son pic et il reste à des niveaux élevés.

**Débat sur la perfusion de la corne**

La perfusion sous pression d’un colorant et d’un ectoparasiticide dans la corne d’un rhinocéros vivant a été préconisée comme une méthode possible de réduire la valeur de la corne, sa demande et la menace du braconnage, sans écorner l’animal. On dit que l’ectoparasiticide est un poison doux qui provoque des troubles gastriques qui devrait décourager les consommateurs potentiels, tandis que le colorant agit comme une identification visuelle pour les animaux traités. Toutefois, des cornes récemment récupérées à partir des animaux braconnés et traités qui ont été sectionnées ne montrent pratiquement aucune pénétration du colorant dans la corne (Marcus Hofmeyr, comm. pers.). Ceci n’est pas inattendu étant donné la nature dense de la corne de rhinocéros, ce qui suggère dans toute probabilité, que le poison ne pénètre pas non
Figure 3. Projected rhino numbers if poaching continues to escalate exponentially as it has done since 2008 (+38.76 % increase per year) given underlying population growth rates from 5 % to 9 %.

[Le nombre de rhinocéros prévus si le braconnage continue à augmenter de façon exponentielle comme c’est le cas depuis 2008 (augmentation de 38,76 % par an) étant donné un taux de croissance de la population d’entre 5 % et 9 %.]

Figure 4. Poaching levels in South Africa by quarter since January 2010.

[Niveaux de braconnage en Afrique du Sud par trimestre depuis janvier 2010.]
this treatment continues to be sold, raising questions as to the motivation of those selling it. Furthermore, as the horns of treated animals are expected to get soiled quickly after such treatment, poachers will not be able to visually tell if an animal has been treated, thus rendering them no different from normal untreated animals and thus these animals will be equally exposed to poaching unless warning that some rhinos’ horns have been poisoned has a deterrent effect. However, sooner rather than later poachers will discover that the dye, and hence presumably the poison also, doesn’t penetrate the horn, and then any deterrent effect can be expected to disappear. Even if the poison were somehow to act differently from the dye and penetrate through into the horn it is unlikely to deter buyers or consumers from purchasing treated horns given the small dosages consumed in either traditional Chinese medicinal uses or the new status uses in Vietnam.

Figure 5. South African reported rhino poaching by month from January 2010 to December 2013. [Braconnage des rhinocéros signalé en Afrique du Sud par mois entre janvier 2010 et décembre 2013.]

Given the relatively high cost of the treatment and the need to repeat it, as horns keep growing, there is a significant lost opportunity cost. The large amount of money spent to date on such treatments could probably have been more profitably used for other conservation activities such as increased law enforcement, intelligence gathering and data analysis or dehorning (which shifts the cost-benefits away from the poacher). Thus, in the absence of any conclusive scientific plus. Malgré le fait que la teinture ne pénètre pas, on continue à vendre ce traitement, soulevant des questions quant à la motivation de ceux qui le vendent. De plus, puisqu’on s’attend à ce que les cornes des animaux traités soient rapidement souillées après un tel traitement, les braconniers ne pourront pas visuellement dire si un animal a été traité, le rendant donc pas différents des animaux normaux non traités et donc ces animaux seront tout aussi exposés au braconnage à moins qu’un avertissement que les cornes de rhinocéros ont été empoisonnés ait un effet dissuasif. Cependant, tôt ou tard les braconniers vont découvrir que le colorant, et donc probablement le poison, ne pénètre pas la corne et l’effet dissuasif prévu pourrait disparaître. Même si le poison devait en quelque sorte agir différemment du colorant et pénétrer dans la corne, il est peu probable que cela va dissuader les acheteurs ou les consommateurs d’acheter les cornes traitées étant donné les petites doses consommées dans les usages médicaux chinois ou les nouveaux usages de statut au Vietnam.

Etant donné le coût relativement élevé du traitement et la nécessité de le répéter, car les cornes continuent à pousser, il y a une dépense importante d’opportunité perdue. La somme d’argent importante dépensée jusqu’à aujourd’hui sur de tels traitements aurait probablement pu être plus rentable si on l’avait utilisée pour d’autres activités de conservation telles que l’application de la loi, la collecte de renseignements et l’analyse des données ou l’écornage (ce qui met les coûts-avantages loin du braconnier). Donc, en l’absence de toute preuve scientifique sur la méthode ou de son effet suggéré sur la demande, on recommande...
support for the method or its suggested effect on demand, it is recommended that this method be treated with extreme caution.

**Penalties for rhino crimes**

**Kenya**

Stiffer penalties to punish wildlife offenders were drafted in 2013 in Kenya, as contained in a new wildlife conservation and management bill. The new penalties that came into force in January 2014 include life imprisonment or a minimum fine of 20 million Kenya shillings, equivalent to USD 250,000, for poaching rhinoceros or elephant or trafficking their parts or derivatives.

**Mozambique**

Mozambique continues to be a significant problem and the country still has not introduced new legislation to criminalize rhino poaching, illegal possession and dealing with adequate deterrent sentences as called for by the international community at CITES CoP16 Rhino Decisions. The failure of authorities to do this, despite a number of meetings, as well as to introduce sniffer dogs into Maputo harbour also raises questions as to the Mozambican authorities’ real commitment to deal with the problem. The Mozambique report to CITES, due at the end of January 2014, is awaited with interest and is likely to be a focus for discussion at the next CITES Standing Committee Meeting.

On a positive note, the Joaquim Chissano Foundation rhino conservation initiative was launched in Maputo during the reporting period. Encouragingly, ex-president Chissano recognized the culpability of Mozambique and some of its citizens in the rhino-poaching crisis and hopefully his foundation’s efforts will improve the situation, not only for rhino but also for the impoverished rural communities adjacent to Kruger.

**Vietnam**

Two independent studies have been undertaken in Vietnam. The Dalberg report (WWF.Dalberg 2012) highlighted the role of transnational organized crime in the illegal rhino-horn trade. With organized crime also involved in other que cette méthode soit traitée avec une extrême prudence.

**Peines pour les crimes de rhinocéros**

**Kenya**

Des peines plus sévères pour punir les délinquants de la faune ont été proposées en 2013 au Kenya et figurent dans un nouveau projet de loi sur la conservation et la gestion de la faune. Les nouvelles peines qui sont entrées en vigueur en janvier 2014 comprennent l’emprisonnement à perpétuité ou une amende minimale de 20 millions de shillings kenyans, soit l’équivalent de 250.000 dollars, pour le braconnage de rhinocéros ou d’éléphant ou le trafic de leurs parties ou dérivés.

**Mozambique**

Le Mozambique continue à être un important problème et le pays n’a pas encore introduit une nouvelle législation pour criminaliser le braconnage de rhinocéros, la possession illégale et prescrire des peines dissuasives adéquates telles qu’exigées par les décisions de la communauté internationale sur le rhinocéros à la Cdp16 de la CITES. Le fait que les autorités ne l’ont pas fait, malgré de nombreuses réunions et qu’ils n’ont pas introduit des chiens renifleurs dans le port de Maputo soulève donc des questions quant à l’engagement réel des autorités mozambicaines pour résoudre le problème. On attend avec intérêt le rapport du Mozambique à la CITES, dû à la fin de janvier 2014, qui pourrait être une base de discussion lors de la prochaine réunion du Comité permanent de la CITES.

Sur une note positive, l’initiative de conservation des rhinocéros de la Fondation Joaquim Chissano a été lancée à Maputo au cours de la période considérée. Fait encourageant, l’ex-président Chissano a reconnu la culpabilité du Mozambique et certains de ses citoyens dans la crise du braconnage de rhinocéros et nous espérons que les efforts de sa fondation permettront d’améliorer la situation, non seulement pour les rhinocéros mais aussi pour les communautés pauvres vivant à proximité de Kruger.

**Vietnam**

Deux études indépendantes ont été entreprises au Vietnam. Le rapport Dalberg (WWF.Dalberg 2012) a souligné le rôle du crime organisé transnational dans le commerce illégal des cornes de rhinocéros. Etant
commodities, it was a threat to development, national and regional security, and the environment. The report also indicated that the current approach was failing and that there was an urgent need to disrupt organized crime, as well as focus on changing consumer demand.

The consumer research on rhino-horn usage in Vietnam (TRAFFIC 2013) further identified the growing new trend. Its symbol as a sign of wealth, status, respect, and its supposed physical benefits of reducing fever and the effects of alcohol was well recognized. It was primarily used (5% of survey) by educated, influential businesspeople, professionals and government officials. A latent demand (16% of those surveyed) for the product was also noted. The report recommended a campaign directed at targeted behaviour change, especially focused on certain user groups that need culturally sensitive and positive messaging.

**Strategic rhino-focused meetings**

The period has been awash with numerous important international and national rhino meetings in which the AfRSG Secretariat made presentations. In October 2013, the CITES Rhinoceros Enforcement Task Force in cooperation with its partner, the International Consortium on Combating Wildlife Crime (ICCWC), held a meeting in Kenya to discuss ways to stop the illegal trade in rhinoceros horn, with a focus on disrupting the crime-trade chain. It was attended by 52 representatives from 21 countries that play a role as source, transit or destination countries in the illegal rhinoceros horn trade chain. Interpol, the UN Office on Drugs and Crime (UNODC), the World Bank and the World Customs Organization also attended the session. Outcomes from the meeting included discussion on various strategies, including increased international cooperation through memoranda of understanding between countries; the use of DNA sampling and forensic techniques to combat illegal wildlife trade; and requests for Mutual Legal Assistance to ensure that the entire crime chain is adequately investigated.

In addition, the inaugural meeting of the Wildlife Enforcement Network of Southern African (WENSA) was held in Gaborone, Botswana, in October 2013. It was attended by more than 70...
delegates from 10 southern African countries. It was agreed to establish the international WENSA, similar to other such groupings, following Southern Africa Development Community (SADC) protocols, and launch national committees to facilitate the communication of information nationally (i.e. between relevant government departments) and internationally. The focus was to establish a communication network of law-enforcement officers, sharing information in the fight against international wildlife trafficking. The need to operationalize the meeting resolutions as opposed to becoming an expensive talk shop was emphasized. It was stressed that every effort should build upon the already functional SADC Elephant and Rhino Security Group/Interpol Environmental Crime Working Group to get the best and quickest responses.

The SADC Rhino Management Group (RMG), which normally holds its biennial meeting close to AFRAF, gathered in November 2013. It was attended by a record 60+ delegates from South Africa, Namibia, Botswana and Zimbabwe. Delegates from Swaziland and Mozambique were, unfortunately, unable to attend. Besides the normal feedback on rhino populations, poaching statistics and rhino conservation programmes for southern African countries and provinces in South Africa, there was a major focus on how to break or disrupt transnational organized crime. This was discussed and debated at length with invited experts on the subject: Mr Peter Gastrow (senior research consultant with the Institute for Security Studies, and senior fellow at the International Peace Institute, New York); Ms Gretchen Peters (Terrorism, Transnational Crime and Corruption Centre [TraCCC] at George Mason University, USA); Dr Tim Haas (University of Wisconsin, USA); and Mr Julian Rademeyer (independent journalist). It was agreed that more of the same, such as a tunnel focus on anti-poaching activities alone will not address the escalating rhino crisis on the supply side but that there was a need for both national and international efforts to concentrate on disrupting transnational organized crime through sophisticated social networking analysis and following the money methodology (with the latter also being advocated at the CITES Rhinoceros Enforcement Taskforce meeting). It was agreed to develop a project proposal and seek funding to enact this project.

austrel. On s’est mis d’accord sur la mise en place du WENSA International, semblable à d’autres groupes, à la suite des protocoles de la Communauté de Développement d’Afrique Australe (SADC), et des comités nationaux pour faciliter la communication des informations à l’échelle nationale (c’est-à-dire entre les ministères concernés) et à l’étranger. L’accent était mis sur la création d’un réseau de communication des agents de lutte contre la fraude et le partage des informations dans la lutte contre le trafic international de la faune. Il fallait aussi concrétiser les résolutions de la réunion au lieu de palabres coûteuses. Il a été souligné que les efforts devraient se baser sur le Groupe de sécurité de la SADC sur l’éléphant et le rhinocéros déjà opérationnel et le Groupe de travail d’INTERPOL sur la criminalité de l’environnement pour obtenir les réponses les meilleures et les plus rapides.

Le Groupe de gestion des rhinocéros de la SADC (RMG), qui tient normalement sa réunion biennale en fonction de celle du GSRAF, s’est réuni en novembre 2013. Un nombre record de plus de 60 délégués d’Afrique du Sud, de la Namibie, du Botswana et du Zimbabwe y a participé. Les délégués du Swaziland et du Mozambique n’ont malheureusement pas pu y assister. Outre les évaluations normales sur les populations de rhinocéros, les statistiques du braconnage de rhinocéros et les programmes de conservation du rhinocéros pour les pays de l’Afrique australe et les provinces en Afrique du Sud, on a mis un accent majeur sur comment l’on pourrait briser ou perturber la criminalité transnationale organisée. Cela a été discuté et débattu longuement avec des experts invités sur le sujet: Mr. Peter Gastrow (consultant principal de recherche à l’Institut des études de sécurité, et chercheur principal à l’Institut international pour la paix à New York), Mme Gretchen Peters (Centre d’études sur le terrorisme, la criminalité transnationale et la corruption [TraCCC] à l’Université George Mason aux Etats-Unis), le Dr. Tim Haas (Université du Wisconsin aux Etats-Unis), et Mr. Julian Rademeyer (journaliste indépendant). Il a été convenu que continuer à faire la même chose, par exemple, se limiter aux activités anti-braconnage ne suffira pas pour faire face à l’intensification de la crise de rhinocéros du côté de l’offre, mais qu’il fallait que les efforts nationaux et internationaux se concentrent sur la perturbation de la criminalité transnationale organisée par une analyse sophistiquée du réseautage social et de la méthodologie de l’argent (cette dernière méthode étant préconisée à la réunion du Groupe de Travail de la CITES sur la lutte contre la Fraude du Rhinocéros). Il a été convenu d’élaborer une proposition de projet et de chercher des fonds pour adopter ce projet.
A further South African Portfolio committee meeting was held in Skukuza, Kruger National Park, to discuss progress and plans to address the rhino crisis. It was attended by a broader community of conservation officials, affected government departments, major NGOs, and the private sector than at the previous such meeting. The need to strategically aim at organized criminal networks was emphasized, as was the need for greater interdepartmental cooperation in sharing intelligence to address the crisis. It was stressed that rhino poaching was not only an environmental crime but, more importantly, economic sabotage of the national economy, and it needs to be treated as such. The need to empower and create genuine employment opportunities for poor rural communities adjacent to reserves and parks was recognized as an important strategic intervention.

The deputy Chair attended a meeting in Pretoria, South Africa, in 2013 between the Ministry of Forestry and Wildlife of Kenya and the Department of Environmental Affairs of South Africa. The objective of the meeting was to draft an MoU between Kenya and South Africa on wildlife conservation. Bilateral collaboration between the two countries, especially in combating illegal trade in rhinoceros and elephant parts, was discussed and included in the draft MoU.

Other meetings included the opening address and facilitation of the South African Private Rhino Owners Association meeting, and a keynote presentation at the Contemporary Conservation Practice Symposium.

Facilitating rhino conservation mechanisms through liaison

The Chair had the opportunity to meet and address Dr David Hayes, representative of US President Obama’s Advisory Council to combat wildlife trafficking, and Mr Greg Knad of the US National Fish and Wildlife Foundation, on the current status of rhinos, risks and key focal areas. This information was to be used in developing the US’s National Strategy for Combating Wildlife Trafficking, planned for release in February 2014 at the meeting on International Wildlife Trafficking (IWT).

Une nouvelle réunion du comité du Portefeuille sud-africain s’est tenue à Skukuza au parc national Kruger, pour discuter des progrès et des plans pour résoudre la crise du rhinocéros. Une gamme de personnes plus large a assisté que lors des réunions précédentes: des représentants des ministères concernés par la conservation, des principales ONG et du secteur privé. On a mis l’accent sur la nécessité de viser stratégiquement les réseaux criminels organisés, et de la coopération interministérielle dans l’échange de renseignements pour répondre à la crise. Il a été souligné que le braconnage des rhinocéros était non seulement un crime contre l’environnement mais plus important encore, un sabotage de l’économie nationale, et qu’il doit être traité comme tel. On a reconnu la nécessité de créer de véritables emplois pour les communautés rurales pauvres vivant à proximité des réserves et des parcs comme une intervention stratégique importante.

Le vice-président a assisté à une réunion à Pretoria en Afrique du Sud en 2013 entre le Ministère des Forêts et de la Faune du Kenya et le Département des affaires environnementales d’Afrique du Sud. L’objectif de la réunion était de rédiger un protocole d’accord entre le Kenya et l’Afrique du Sud sur la conservation de la faune. La collaboration bilatérale entre les deux pays, surtout dans la lutte contre le commerce illégal des produits issus de rhinocéros et d’éléphants, a été discutée et incluse dans le projet de protocole d’accord.


Faciliter les mécanismes de conservation du rhinocéros par la liaison

The Chair and the scientific officer made substantial inputs into the agenda of the UK’s United for Wildlife conference to be held at Zoological Society of London (ZSL) in London in February 2014. This is largely a preparatory meeting for the February 2014 intergovernmental International Wildlife Trafficking meeting, which will take place soon afterwards. Along with the Sustainable Use and Livelihoods Speciality Group (SULi), considerable inputs were made (via the offices of Dr S Stuart, Chair of IUCN’s SSC, and Dr Richard Jenkins, UK manager, IUCN Global Species Programme) into the various versions of the draft declaration scheduled for this latter meeting. Comments were also provided on drafts of a proposed wildlife trade resolution to be put to the European Union parliament.

The AfRSG Secretariat has also provided numerous media interviews, with BBC radio, VOA, Polish Radio, Radio ARTE (France), The Heroes of the Rhino War documentary, Norwegian newspaper Dagbladet, Associated Press, Mail & Guardian (South Africa), Saturday Star (South Africa), NTN24 (Colombia), Yale Enviro 360 (USA), Radio Kosmos (Namibia), Landbou Weekblad, Eye Witness News (South Africa), EarthTouch (South Africa), National Television (Kenya), Kenya Television Network and SABC (South African Broadcasting Commission).

Rhino conservation plans

Detailed inputs have been made (inclusive of other AfRSG members) to the South African White Rhino Biodiversity Management Plan. It is expected to be completed and submitted to the minister in the first quarter of 2014. This plan is important as South Africa is the custodian of the largest population of white rhinos in the world (~18,900 in 2012). In addition, the SADC Rhino Management Group has been appointed as the lead agent for the South African Black Rhino Biodiversity Management Plan. The RMG has advised the minister of Environment on how this can best be performed.

SANParks, which conserves more rhinos than any other conservation agency in the world, reviewed its 10-year strategic rhino plan that had expired in 2013. The new plan emphasizes the need to have a dynamic and adaptive proactive


Plans de conservation du Rhinocéros

Des apports détaillés ont été faits (y compris par les autres membres du GSRAf) au plan de gestion de la biodiversité du rhinocéros blanc d’Afrique du Sud. On prévoit de le terminer et le présenter au ministre dans le premier trimestre de 2014. Ce plan est important car l’Afrique du Sud est le gardien de la plus grande population de rhinocéros blancs au monde (~18,900 en 2012). En outre, le Groupe de gestion des rhinocéros de la SADC (RMG) a été nommé l’agent principal pour le plan de gestion de la biodiversité du rhinocéros blanc d’Afrique du Sud. Le RMG a informé le ministre de l’Environnement sur la meilleure façon de le réaliser.

SANParks, qui conserve plus de rhinocéros que tout autre organisme de conservation au monde, a passé en revue son plan stratégique décennal sur le rhinocéros qui avait expiré en 2013. Le nouveau plan met l’accent sur la nécessité d’avoir un programme anti-braconnage proactif,
anti-poaching programme; to make greater use of actionable, shared intelligence to break organized criminal syndicates; and to focus on establishing and bolstering new rhino populations in and out of the country.

The Botswana rhino strategy still awaits approval by the minister’s office.

It is disconcerting that a number of such plans have taken considerable time to obtain official approval.

The Zambian plan is scheduled for revision in 2014 and hopefully a plan and policy can also be developed for Uganda.

Comments were provided to the US Federal Register of the US Fish and Wildlife Service on the proposed change in the status of southern white rhinos in the USA. The change does not affect legal importation of legitimate hunting trophies but makes it much easier for law-enforcement officials in the USA to do their job.

Trophy hunting of rhinos

The AfRSG Secretariat and the SULi chair have been called upon to comment on the auction of a Namibian black rhino bull at the Dallas Safari Club meeting.

With all the media attention over the last few years on the increasing threat to the world’s rhino population from rampant poaching for their horn, it is often hard for people to understand the rationale for sport hunting of an endangered species. However, while it appears counter-intuitive, the removal of the odd surplus male black rhino can actually enhance overall metapopulation growth rates and further genetic conservation. The problems caused by such ‘surplus’ male black rhinos have long been recognized by rhino conservationists in Africa. The SADC RMG status reporting undertaken since 1989 has been invaluable in identifying and quantifying many of these problems:

• The risk of death, especially for breeding females and their calves, from fighting increases with rhino density, especially in strongly male-biased populations. SADC RMG data show that from 2007 to 2011, fighting deaths were the single greatest cause of known black rhino deaths in Namibia (31%) with females making up 26.7%, and subadults and calves 35% of all dynamique et adaptatif, de partager le renseignement pour briser les syndicats du crime organisé, et de se concentrer sur la création et le renforcement de nouvelles populations de rhinocéros dans le pays et en dehors du pays.

La stratégie de rhinocéros du Botswana attend toujours l’approbation par le bureau du ministre.

C’est déconcertant qu’un certain nombre de tels plans mettent beaucoup de temps à obtenir l’approbation officielle.

Le plan de la Zambie doit être revu en 2014 et nous espérons qu’un plan et une politique peuvent aussi être développés pour l’Ouganda.

Des commentaires ont été fournis au Registre du Service Fédéral de la Pêche et de la Faune Sauvage des Etats-Unis sur le changement proposé de statut du rhinocéros blanc du sud aux Etats-Unis. Le changement n’affecte pas l’importation légale de trophées de chasse légitimes, mais il rend le travail des fonctionnaires de l’application de la loi aux Etats-Unis beaucoup plus facile.

La chasse aux trophées de rhinocéros

Le Secrétariat du GSRAf et le président de SULi ont été appelés à se prononcer sur la vente aux enchères d’un taureau de rhinocéros noir de Namibie lors de la réunion à Dallas Safari Club.

Etant donné toute l’attention des médias ces dernières années sur la menace croissante à la population de rhinocéros du monde à cause du braconnage pour leur cornes, il est souvent difficile pour les gens de comprendre les raisons pour la chasse sportive d’une espèce menacée. Toutefois, même si elle apparaît contre-intuitive, la suppression de quelques rhinocéros noirs mâles excédentaires peut en fait accroître les taux de croissance de la métapopulation et promouvoir la conservation génétique. Les problèmes causés par le « surplus » de rhinocéros noirs mâles ont longtemps été reconnus par les écologistes des rhinocéros en Afrique. Le rapport de situation du RMG de la SADC entrepris depuis 1989 a été inestimable dans l’identification et la quantification de la plupart de ces problèmes:

• Le risque de décès du combat, surtout pour les femelles reproductrices et leurs veaux augmenté avec la densité de rhinocéros, en particulier dans les populations fortement favorisant les mâles. Les données du RMG de la SADC montrent que de 2007 à 2011, les décès dus aux combats étaient la principale cause de décès connus de rhinocéros noirs en Namibie (31 %), des femelles constituant 26,7 % et les sous-adultes et veaux 35 % de tous les décès dus au combat (K. Adcock, comm. pers.)
fighting deaths (K. Adcock, pers. comm.))

• Older bulls that have had the opportunity to breed are often marginalized to suboptimal habitat and face the prospect of losing condition, and when pushed close to human settlements they face a greater prospect of opportunistic poaching

• Skewing populations’ sex ratios in favour of breeding females leads to better population growth, not only because there are more females but because long-term RMG data indicate that individual female reproductive performance is better in populations with a lower proportion of males. Keeping populations productive is important as this provides an extra buffer in the face of rampant poaching

• Reintroducing surplus adult males back into established rhino populations increases the risk of fighting mortalities to both males and females

• Setting important habitat aside along with all its escalating protection costs is better reserved for breeding populations than for male-only ones

• Genetic conservation is enhanced by removing a bull that may have dominated breeding for a considerable time. Doing so provides greater genetic heterozygosity and ecological resilience to the population.

It was largely for these conservation-focused reasons that both South Africa and Namibia obtained the necessary two-thirds majority approval at the 13th CITES CoP for an annual maximum hunting quota of five black rhino males per year each. The potential revenue generated from the sale of these animals for trophy hunts is an added benefit to the conservation agencies or private rhino owners, as the funds are largely ploughed directly back into rhino conservation. In Namibia, the funds go directly into the Game Products Trust Fund, from which all rhino trophy-generated funds go back into rhino-conservation activities. The strict criteria by which only a relatively few bulls are selected emphasize the conservation benefits of the action. Namibia has made only six bulls available for hunts since 2004 when CITES supported the hunting quota, which indicates a non-financial focus of the programme.

Some in the press, social media, hunting organizations and indeed even some NGOs have questioned the rationale whereby ‘only old geriatric non-reproductive males are to be hunted’
and indeed whether geriatric males are incapable of breeding. The problem with these comments is that they are uninformed and do not deal with the actual reasons South Africa and Namibia advance for hunting surplus bulls. Neither South Africa nor Namibia has set out to hunt only ‘geriatric’ males as has been erroneously claimed. Rather, the point has been made that older males are likely to have bred and contributed their genes, but are less likely to breed successfully in future.

The bull auctioned at the Dallas meeting is an older animal (25+ years old and hence not necessarily a very old animal) that had been pushed out of Etosha National Park owing to increasing densities and social pressures within the park. The Namibian experience has been that reintroducing such older males back into the park has not been successful with up to 90% of such reintroductions leading to fight-related mortalities of these bulls or other animals they encounter (Pierre du Preez, pers. comm.). In addition, there is great concern that these pushed-out bulls may wander close to human settlements and be exposed to opportunistic poaching—something the Namibian authorities obviously want to avoid. Removing older problem bulls that have been pushed out of Etosha for trophy hunting is a viable solution to the problem, as well as generating significant funds that help boost and sustainably fund rhino conservation efforts.

Certain groups and individuals have made calls to move these surplus bulls to other areas to avoid the need to hunt them. These recommendations take little consideration into account as to who will pay for the animal, the additional costs of its capture and relocation, to where it would be moved, who would pay for this land, and who would fund the ongoing management and monitoring of surplus rhinos moved there. As all black rhinos in Namibia remain state assets no matter where they are kept, such surplus bulls would burden the national conservation authorities, who would rather plough their limited resources into protecting breeding populations.

The real tragedy of this whole debacle was the fact that the bull raised only USD 350,000. It is believed that one bidder had indicated they would offer USD 1 million at the auction; but due to threats from anti-sustainable-use groups and the hacking into a website, this bidder stood down. The result is that the Namibian rhino conservation
effort, which has an impeccable record, lost USD 650,000 in much-needed funds, but the rhino will still be hunted. The importance of this whole debate was that it focused attention on trophy hunting as a legitimate part of the broader sustainable-use philosophy. The actual black rhino hunt is based on sound conservation rationale, is sustainable, and is in line with IUCN’s overarching policy on trade and use (see IUCN Policy Statement on Sustainable Use of Wild Living Resources, adopted at the Amman IUCN World Conservation Congress in 2000 (https://portals.iucn.org/library/efiles/documents/Rep-2000-054.pdf). The policy supports legal wildlife trade in principle, provided it is biologically sustainable. It strongly opposes all illegal trade as well as any legal use or trade that is unsustainable. IUCN also recognizes that a well-managed, sustainable trade and use can contribute to both conservation and sustainable livelihoods. In addition, the issue of limited trade in hunting trophies falls under the IUCN SSC Guiding Principles on Trophy Hunting as a Tool for Creating Conservation Incentives (https://portals.iucn.org/library/efiles/documents/Rep-2012-007.pdf).

Conservation projects

Angola and Kenya

In response to a number of black rhino sightings in southeastern Angola close to the Namibian border, a limited but focused reconnaissance survey of the area was undertaken in 2013. If these animals are the remains of the original Angola black rhino populations, they are considered to be genetically important. Some rhino experts suggest they would be closely affiliated with the *Diceros bicornis bicornis* in Namibia (du Toit 1987) or with the *D.b. occidentalis* of Angola and northern Namibia (Groves and Grubb 2011). Dr Bruce Bennett, with the assistance of expert Namibian trackers, surveyed an area of approximately 4,500 km². Despite the fact that healthy game numbers of a broad range of species were noted in the survey area and relatively few indications of poaching were recorded, no signs of black rhino were detected. It was recommended that the survey be repeated in an adjacent area.

L’Angola et le Kenya

En réponse à un certain nombre d’observations des rhinocéros noirs dans le sud-est de l’Angola près de la frontière avec la Namibie, une étude de reconnaissance limitée mais axée sur la région a été entreprise en 2013. Si ces animaux sont les restes des populations originales de rhinocéros noirs d’Angola, ils devraient être considérés comme génétiquement importants. Certains experts des rhinocéros suggèrent qu’ils seraient étroitement liés au *Diceros bicornis bicornis* en Namibie (du Toit, 1987) ou au *D.b. occidentalis* d’Angola et du nord de la Namibie (Groves et Grubb 2011). Le Dr. Bruce Bennett, avec l’aide des experts traqueurs namibiens, a étudié une zone d’une superficie d’environ 4.500 km². Même si un nombre d’animaux sains d’une large gamme d’espèces ont été observés dans la zone d’étude et qu’on a enregistré relativement peu d’indications de braconnage, on n’a détecté aucun signe de rhinocéros noirs. Il a été recommandé que l’étude soit répétée dans la zone adjacente.
Detailed discussions have been held on how to secure the long-term future of the eastern black rhinoceros in Kenya with specific focus on the Tsavo ecosystem.

**Rhino bonds**

Given the successful use in the social field, the potential use of bond funding for rhino conservation projects has been identified by the Royal Foundation of the Duke and Duchess of Cambridge and Prince Harry. The ZSL and AfRSG have started to prepare a rhino impact bond document and seven priority-rated concept proposals to be ready in time for discussions to be held coinciding with a wildlife trafficking conference and international governmental meetings scheduled for February 2014. An update on this potentially important fund-raising approach will be covered in the next Chair’s report.

**Global Environment Fund project**

The AfRSG Secretariat and other AfRSG members have on request assisted the South African Department of Environmental Affairs develop a USD 2.6 million Global Environment Fund (GEF) funding proposal to boost the country’s investigative and wildlife forensic capacity. The work has been successful as GEF has since approved funding for the project, which will start in 2014.

**RhoDIS™**

The RhoDIS rhino DNA project continues to make headway. The routine use of DNA analysis in investigations and court cases continues to be valuable. I am pleased to learn that the SAB (South African Breweries) Boucher fund has also raised sufficient funds to donate another new sequencer machine, worth at least USD 150,000, to the Veterinary Genetics Lab, University of Pretoria. This machine will not only increase the number of samples that can be analysed in a day, but importantly it will mean that forensic analyses will not be significantly disrupted should the older existing sequencer go down and have to be sent away for repair. The South African Department of Environmental Affairs has also committed to funding analysis of South African forensic samples, which is a welcome development.


**Les obligations pour les Rhinocéros**

Compte tenu de l’utilisation réussie dans le domaine social, l’utilisation potentielle du financement par obligation pour les projets de conservation de rhinocéros a été identifiée par la Fondation royale du Duc et de la Duchesse de Cambridge et du Prince Harry. Le ZSL et le GSRAf ont commencé à préparer un document sur l’impact des obligations sur les rhinocéros et sept propositions prioritaires doivent être prêtes à temps pour les discussions qui coïncideront avec une conférence sur le trafic de la faune et les réunions gouvernementales internationales prévues pour février 2014. Une mise à jour sur cette approche potentiellement importante de collecte de fonds sera fournie dans le prochain rapport du président.

**Projet du Fonds pour l’Environnement mondial**

Le Secrétariat du GSRAf et d’autres membres ont aidé sur demande le Ministère sud-africain des affaires environnementales à développer une proposition de financement de USD 2,6 millions par le Fonds pour l’Environnement Mondial (FEM) pour accroître la capacité d’enquête et médico-légale du pays sur la faune. Le travail a été couronné de succès car le FEM a déjà approuvé le financement du projet, qui commencera en 2014.

**RhoDIS™**

Le projet d’ADN de rhinocéros RhoDIS continue à faire des progrès. L’utilisation systématique de l’analyse d’ADN dans les enquêtes et les procès continue à être utile. Je suis heureux d’apprendre que le fonds SAB Boucher a mobilisé des fonds suffisants pour faire un don d’une autre nouvelle machine séquenceur, d’une valeur d’au moins USD 150.000, au laboratoire de génétique vétérinaire de l’Université de Prétoria. Non seulement cette machine augmentera le nombre d’échantillons qu’on peut analyser par jour, mais surtout cela signifie que les analyses médico-légales ne seront pas perturbées significativement au cas où le séquenceur existant tomberait en panne et devrait être envoyé pour réparation. Le ministère sud-africain des affaires environnementales s’est aussi engagé à financer l’analyse des échantillons
Substance detector trial

Following on from an enquiry held in South Africa after a Mutual Legal Assistance Request from the UK to South Africa, the AfRSG scientific officer and wildlife investigator, Rod Potter, gave evidence at the trial of Mr Gary Bolton at the Old Bailey Central Criminal Court in London, UK. The jury at the trial found Mr Bolton guilty of both fraud charges of 1) knowingly making a detection device that did not work and then 2) knowingly selling it. Mr Bolton made many millions of pounds from sales of his GT200 detector, primarily from those looking for explosives and drugs. Unfortunately, in the past some African countries had been persuaded to buy his detectors with a view to using them to find ivory (including the Lusaka Agreement Task Force). Mr Bolton visited KwaZulu-Natal (KZN) in 2007, trying to sell the device and also trying to get some rhino horn so a rhino detection card could be made for it. At this demonstration the device was found to not work in a scientific trial that the AfRSG scientific officer had designed and which formed part of the evidence in the case. Following the KZN trial in 2007, warnings were issued about the GT200, highlighting the clever way it was marketed and the highly improbable pseudo-scientific explanations as to how it was supposed to work. The fact that it did not work when subjected to a proper scientific trial was shared with members of IUCN’s African and Asian Rhino Specialist Groups, the SADC Rhino Management Group, the SADC Elephant and Rhino Security Group/Interpol Environmental Crime Working Group and the CITES Secretariat. Hopefully these warnings have helped prevent any more money being wasted on such bogus devices. Despite the successful conviction of some sellers of bogus substance detectors in 2013, readers need to be aware that others may still be trying to sell similar detection devices. Mr Bolton was sentenced to seven years in prison and will also have to report on all his assets in 2014. It is likely that assets will be seized and proceeds used to help reimburse victims of his crimes.

Procès sur le détecteur des substances

Suite à l’enquête tenue en Afrique du Sud après une requête d’entraide judiciaire du Royaume-Uni à l’Afrique du Sud, le chargé scientifique du GSRAf et un enquêteur de la faune, Rod Potter, ont témoigné au procès de Mr. Gary Bolton à la Cour pénale centrale Old Bailey à Londres au Royaume-Uni. Le jury au procès a reconnu Mr. Bolton coupable de toutes les accusations de fraude de 1) faire sciemment un dispositif de détection qui ne fonctionnait pas puis 2) le vendre sciemment.

Mr. Bolton a fait plusieurs millions de livres par la vente de son détecteur GT200, principalement de ceux qui recherchaient les explosifs et la drogue. Malheureusement, au cours des dernières années quelques pays africains ont été persuadés d’acheter ses détecteurs en vue de les utiliser pour trouver l’ivoire (y compris le Groupe de Travail de l’accord de Lusaka). Mr. Bolton a visité le KwaZulu-Natal (KZN) en 2007, en essayant de vendre l’appareil et aussi en essayant d’obtenir de la corne de rhinocéros pour qu’une carte de détection de la corne puisse être faite. A cette démonstration, on a trouvé que le dispositif ne marchait pas dans un essai scientifique que le chargé scientifique du GSRAF avait conçu et qui faisait partie des preuves au procès. Après le procès du KZN en 2007, des avertissements ont été émis sur le GT200, en soulignant la façon intelligente dont il avait été commercialisé et les explications pseudo-scientifiques hautement improbables sur comment il était censé fonctionner. Le fait qu’il n’avait pas fonctionné quand il a été soumis à un essai scientifique a été partagé avec les membres des Groupes de Spécialistes des rhinocéros d’Afrique et d’Asie de l’UICN, le Groupe de gestion des rhinocéros de la SADC, le Groupe de gestion des rhinocéros d’Afrique australe, le Groupe de sécurité de l’éléphant et du rhinocéros de la SADC, le Groupe de travail d’Interpol sur les crimes contre l’environnement et le secrétariat de la CITES. Nous espérons que ces avertissements ont contribué à empêcher que davantage d’argent soit gaspillé sur de faux dispositifs. Malgré la condamnation réussie de certains vendeurs de faux détecteurs de substances en 2013, les lecteurs devraient être au courant que d’autres peuvent toujours essayer de vendre des dispositifs de détection similaires. Mr. Bolton a été condamné à sept ans de prison et il devra aussi rendre compte de tous ses biens en 2014. Il
Acknowledgements

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References

First Asian Rhino Range States meeting

The first Asian Rhino Range States meeting was held at Novotel Hotel, Bandar Lampung, Indonesia, 2–3 October 2013. The Indonesian minister of Forestry, Mr Zulkifli Hasan, inaugurated the meeting. About 100 delegates attended, not only from the Asian rhino range States but also worldwide experts in the field of rhino research, conservation and management.

The governments of Bhutan, India, Indonesia, Malaysia and Nepal recognize the critical situation facing Asian rhinos. The Sumatran rhinoceros faces extinction unless decisive and urgent measures are taken. The Javan rhinoceros could easily be wiped out in a single catastrophe. And the remarkable gains made in conserving the greater one-horned rhinoceros could easily be lost if current trends in the illicit trade in high-value wildlife products continue. These species are a remarkable cultural heritage of the people of Asia. The governments of these five countries have all agreed to the 2010–2020 Strategic Plan for Biodiversity, including Aichi Target 12 on preventing extinction.

These governments therefore have committed themselves to give high priority to implementing all the actions outlined in the Bandar Lampung Declaration, and to collaborate with each other and with the international community with the intention that by 2020 at the latest the populations of all three Asian rhinoceros species will be growing annually by at least 3%.

Currently, the greater one-horned rhinoceros is distributed primarily in India and Nepal; its population ranged between 3,300 and 3,350 as of end August 2013. The recovery of the greater one-horned rhino is one of the greatest conservation success stories in India and Nepal. Despite serious threats, including civil war both India and Nepal
faced in the past few decades, both countries have successfully managed to reduce the poaching pressure and grow rhino population numbers. The greater one-horned rhino is the only Asian large mammal species in recent history whose IUCN Red List status has actually been listed down from Endangered to Vulnerable.

With the above status, threats and conservation measures as context, the following actions are needed urgently:

- Continue to increase the level of protection in the protected areas with rhino populations and in potential translocation sites to ensure that poaching does not threaten the growth of the population. This will require increasing capacity in anti-poaching, especially as rhino population numbers increase.
- Ensure habitats in corridors are maintained or restored through integrated landscape planning to enhance connectivity among rhino populations.
- Set up a coordination body on rhino conservation in India so that a national rhino conservation plan, including combating rhino poaching and rhino horn trade, can be drafted and implemented as soon as possible. This coordination body will comprise chief wildlife wardens; protected area managers and relevant state police and other relevant enforcement agency officials of the states with rhino populations; representatives of the National Wildlife Crime Control Bureau; representatives of the Ministry of Environment and Forests; and relevant NGOs and individuals involved in rhino conservation.
- As a matter of highest priority, increase the population to over 4,000 rhinos spread over three countries (Bhutan, India and Nepal) by 2020, an increase from just over 3,300 in 2013, by building on current successful recovery efforts and promoting an active population management strategy, mainly through translocations into new sites.
- Urgently study the degradation of rhino habitats by invasive alien species, and design and implement management interventions to recover prime rhino habitats in Bhutan, India and Nepal.
- As a matter of urgency, set up a project through the relevant ministries in India and Nepal under the aegis of the Environmental Crime
Programme of Interpol, so that information on criminal suspects is shared without delay among rhino range States (in anticipation that known criminals who are still at large and who have been active in South Africa might abandon their attempts to acquire poached rhino horns in India and Nepal).

- Ensure increased cooperation for management of transboundary greater one-horned rhino populations in the Terai Arc (India and Nepal) and Manas (India and Bhutan) to ensure a minimum growth rate of 3% per annum of the rhino population.
- Build support of local communities living near the greater one-horned rhino populations, who suffer from stray animals that raid crops and that injure and even kill people. Work with these communities to conserve the species and to ensure that significant benefits flow to them, including from sustainable livelihood programmes and tourism.

**Javan and Sumatran rhinoceros joint needs**

Because the future of the Javan and the Sumatran rhinoceros depends on actions taken in Indonesia, action needs to be taken at a higher level to benefit both species:

- Establish a high-level national rhino conservation committee of senior Indonesian government decisionmakers supported by an advisory body of national and international experts on rhino population and habitat management. This committee will make timely decisions on conservation management proposals and report each year to the president of Indonesia on the progress achieved in rhino conservation.
- Appoint a full-time secretariat to support the Indonesian high-level national rhino conservation committee.
- Allocate sufficient resources, including adequate staff numbers, to the national parks (NPs) to enforce protection of remaining rhino populations in Ujung Kulon, Bukit Barisan Selatan, Way Kambas and Gunung Leuser NPs, and the wider Leuser ecosystem.
- Monitor all rhino protection efforts using a SMART [specific, measurable, achievable, relevant, time-bound] law-enforcement...
monitoring database to evaluate patrol effort, patrol coverage and patrol efficiency, and share results confidentially each month with all those directly involved in conserving the species.

- Ensure regular, frequent and intensive monitoring of all rhino populations in Indonesia, involving collaboration among all those directly involved in conserving the species to detect population trends and to inform future conservation and management decisions.

Approximately 50 Javan rhinoceros with no more than 4–5 breeding females remain in Ujung Kulon NP, Java’s largest remaining lowland forest tract. The population of the Javan rhinoceros, which has been monitored over the past decade, is thought to be stable, but it is the last population in the wild and there are no animals in captivity. Its main threat is that the reproducing population exists only in this one location, which makes it susceptible to catastrophic loss from disease or natural disaster.

Specific actions required for the Javan rhinoceros, in addition to those listed above:

- Permit and implement the removal of the arenga palm (using suitable methods) from the core of Ujung Kulon NP to increase the park’s carrying capacity for the Javan rhino population.
- Continue developing the Javan Rhino Study and Conservation Area (JARHISCA) in Ujung Kulon NP to maximize the breeding potential of the remaining animals.
- Establish a second population in an appropriate site within Indonesia.
- Permit the active management of wild rhino populations through the movement of animals within and between Ujung Kulon NP and the second wild population.

The 2013 estimate of Sumatran rhinoceros numbers based on surveys and density data is now down to around 100 rhinos from an estimated 413–563 in 1995. A small population of less than 10 rhinos was lost from Kerinci Seblat NP as recently as 2001. In Bukit Barisan Selatan, the range distribution has collapsed, with rhinos occupying no more than 30% of their former area. While the three remaining populations in Sumatra appear to be breeding, the rate of reproduction is low. Only the population in Way Kambas NP appears to be slowly growing. From the 14 sites in Indonesia and Malaysia that recorded presence of wild Sumatran rhinocéros à l’aide d’une base de données SMART (spécifiques, mesurables, réalisables, pertinentes et limitées dans le temps) pour évaluer l’effort des patrouilles, la couverture des patrouilles et leur efficacité, et partager les résultats de manière confidentielle chaque mois avec tous ceux qui sont directement impliqués dans la conservation de l’espèce.

- Assurer un suivi régulier, fréquent et intensif de toutes les populations de rhinocéros en Indonésie par la collaboration entre tous ceux qui participent directement à conserver l’espèce afin de détecter les tendances de la population et éclairer les décisions futures de conservation et de gestion.

Il y a environ 50 rhinocéros de Java dont un maximum de 4 à 5 femelles reproductrices dans le parc national d’Ujung Kulon, la plus grande étendue de forêt des plaines restante de Java. La population des rhinocéros de Java, qui a été suivie au cours de la dernière décennie semble être stable, mais c’est la dernière population à l’état sauvage et il n’y a pas d’animaux en captivité. Sa principale menace est que la population reproductrice n’existe que dans ce seul endroit, ce qui la rend vulnérable à une perte catastrophique à cause de la maladie ou d’une catastrophe naturelle.

Des actions spécifiques requises pour le rhinocéros de Java, en plus de celles énumérées ci-dessus:

- Faire approuver et enlever le palmier Arenga (en utilisant des méthodes appropriées) du principal parc national d’Ujung Kulon pour accroître la capacité de charge du parc pour la population de rhinocéros de Java.
- Continuer à développer la Zone d’étude et de conservation des rhinocéros de Java (JARHISCA) du parc national d’Ujung Kulon pour maximiser le potentiel de reproduction des animaux restants.
- Établir une deuxième population dans un site approprié en Indonésie.
- Permettre la gestion active des populations de rhinocéros sauvages grâce au mouvement des animaux au sein du parc national d’Ujung Kulon et entre ce parc et la deuxième population sauvage.

L’estimation du nombre de rhinocéros de Sumatra de 2013 sur la base des études et les données de densité est maintenant environ 100 rhinocéros par rapport à l’estimation de 413 à 563 en 1995. Une petite population de moins de 10 rhinocéros a été perdue du parc national de Kerinci Seblat aussi récemment que 2001. Au Bukit Barisan Selatan, l’habitat s’est effondré où les rhinocéros n’occupent pas plus de 30% de leur ancienne zone. Alors que les trois populations restantes à Sumatra semblent se reproduire, le taux de reproduction est faible. Seule
rhinoceroses in 1995, only 5 sites still had firm evidence of the species in 2012. In Indonesia, on the island of Sumatra, Sumatran rhinoceroses are now restricted to Bukit Barisan Selatan (perhaps 30 animals), Gunung Leuser (perhaps 30 animals), and Way Kambas NPs (perhaps as many as 35 animals). The initial decline was caused by poaching for horn for use in traditional Asian medicine. Now the populations are primarily threatened by small population size, habitat encroachment, the potential for catastrophic events and invasive plant species as well as poaching.

The Sumatran rhino now needs intensive care. Its numbers in the wild are extremely low and individuals are scattered among several small subpopulations across two range States. This situation and the species’ solitary nature and poor breeding record in captivity all combine to make the Sumatran rhinoceros a challenging patient. Extinction is a real prospect and so urgent and decisive actions need to be taken immediately. A Sumatran Rhino Emergency Plan will be implemented in 2013–2015 to halt the decline and to gather all necessary information so that a new Sumatran rhino recovery plan can be developed and approved by the end of 2015, and implemented from 2016 onwards.

The key points of the plan are summarized.

Assumptions of the emergency plan:
• There must be available the fullest possible information on the species’ biology, its habits, behaviour and interactions with its habitat.
• The greatest threat for very small populations is extinction through chance factors that operate on small numbers. Thus demographic aspects are more important than genetic or any other considerations; numbers must be increased in any way possible.
• It follows that every single individual is valuable; each is a resource that can be used for certain purposes or techniques in the pursuit of increasing numbers.

Success requirements for the emergency plan:
• High-quality, standardized information is needed on the sex, age and location of every individual wild rhino, through both immediate surveys and continued monitoring.
• The governments of Indonesia and Malaysia

la population du parc national de Way Kambas semble s’accroître lentement. Sur les 14 sites en Indonésie et en Malaisie qui avaient enregistré la présence des rhinocéros de Sumatra sauvages en 1995, seulement 5 sites avaient toujours une preuve solide de l’espèce en 2012. En Indonésie, sur l’île de Sumatra, les rhinocéros de Sumatra sont maintenant confinés à Bukit Barisan Selatan (peut-être 30 animaux), Gunung Leuser (peut-être 30 animaux), et le parc national de Way Kambas (peut-être jusqu’à 35 animaux). La baisse initiale était causée par le braconnage pour les cornes pour une utilisation dans la médecine traditionnelle asiatique. Les populations sont maintenant menacées par la petite taille de la population, l’empiètement sur l’habitat, le risque d’événements catastrophiques et les plantes envahissantes ainsi que le braconnage.


Les points clés du plan sont résumés ci-après.

Hypothèses du plan d’urgence :
• Il doit y avoir des informations disponibles les plus complètes sur la biologie de l’espèce, ses habitudes, son comportement et ses interactions avec son habitat.
• La plus grande menace pour les très petites populations est l’extinction due aux facteurs du hasard qui opèrent sur de petits nombres. Les aspects démographiques sont donc plus importants que les aspects génétiques ou toutes autres considérations; le nombre doit être augmenté n’importe comment.
• Il s’ensuit que chaque individu est précieux; chacun est une ressource qu’on peut utiliser à certaines fins ou à des techniques dans la poursuite de l’augmentation du nombre.

Pour que le plan d’urgence réussisse:
• 1. Il faut des informations de haute qualité et
must be committed to preventing the species’ extinction and agree that all existing rhinos, whether in the wild or under various confined conditions, should be managed to maximize the population’s rate of increase.

• Mechanisms are needed to ensure decisive, high-energy conservation actions in range States with further mechanisms for collaboration among ranges States and other governments and institutions.

• The emergency plan should run to the end of 2015, to be followed by a rolling Sumatran rhino recovery plan.

Key elements of the emergency plan:

• Collect critical information on wild rhinos in Sumatra to provide a sound basis for all future management decisions. Building on ongoing efforts in Bukit Barisan Selatan NP (BBS) and Way Kambas NP (WK), the following precise and standardized information is targeted for each population in BBS, WK and Gunung Leuser/Leuser Ecosystem (GL):
  – location and size of area occupied by rhinos
  – size of rhino populations
  – sex structure of each population
  – age structure of each population
  – relatedness among individuals of a population
  – proven female breeders and non-breeders in each population

• Strengthen protection of wild Sumatran rhinos by increasing the number of Rhino Protection Units and enhancing their training. Implement a Sumatran rhino protection needs assessment at all known sites with rhinos that will lead to specification of required ranger density, equipment needs and patrolling effort and protocols. This assessment will determine budgets and funding allocation.

• Identify Sumatran rhinos that are isolated and therefore cannot breed. All isolated animals found in Malaysia should be captured to contribute to the closely managed breeding programme, and a policy developed urgently for managing isolated animals in Indonesia so that they can contribute to the survival of the species.

• Develop an integrated strategy for managing Sumatran rhinos in contained or confined conditions to increase the breeding rate in all sites. As part of this strategy, participating normalisées sur le sexe, l’âge et l’emplacement de chaque rhinocéros sauvage individuel, à la fois par des recensements immédiats et la surveillance continue.

• Les gouvernements de l’Indonésie et de la Malaisie doivent être engagés à la prévention de l’extinction de l’espèce et se mettre d’accord que tous les rhinocéros existants, soit dans la nature soit dans diverses conditions confinés, devraient être gérés afin de maximiser le taux d’accroissement de la population.

• Il faut des mécanismes pour assurer les mesures de conservation vives et décisives dans les états de l’aire de répartition en plus des mécanismes de collaboration entre les états de l’aire de répartition et les autres gouvernements et les institutions.

• Le plan d’urgence devrait aller jusqu’à la fin de 2015 pour être suivi par un plan de rétablissement du rhinocéros de Sumatra.

Les éléments clés du plan d’urgence :

• Recueillir des informations essentielles sur les rhinocéros sauvages à Sumatra afin de fournir une base solide pour toutes les décisions futures de gestion. En s’appuyant sur les efforts en cours au parc national de Bukit Barisan Selatan (BBS) et au parc national de Way Kambas (WK), les informations précises et standardisées suivantes sont prévues pour chaque population dans BBS, WK et l’écosystème de Gunung Leuser/Leuser(GL):
  – L’emplacement et la taille de la zone occupée par les rhinocéros
  – La taille des populations de rhinocéros
  – La structure par sexe de chaque population
  – La structure de l’âge de chaque population
  – La parenté entre les individus d’une population
  – Les femelles reproductrices éprouvées et non-reproductrices dans chaque population


• Identifier les rhinocéros de Sumatra qui sont isolés et ne peuvent donc pas se reproduire. Tous les animaux isolés trouvés en Malaisie devraient être capturés pour contribuer au programme de reproduction étroitement
institutions need to agree regarding the transfer of individual rhinos or reproductive material and to establish assisted reproduction facilities and expertise.

- Develop infrastructure to manage Sumatran rhinos in contained or confined conditions. To plan for this, a cost-benefit analysis (looking at costs in relation to the likely breeding success of animals) should be carried out to compare a single large enclosure with a system of small, linked paddocks.
- Using the results from the first point, develop standard monitoring techniques and protocols to provide critical information on individual wild rhinos, with a standardized reporting format and schedule to be used across all rhino sites in all range States.
- Develop formal agreements as the means for intergovernmental collaboration in support of a unified Sumatran rhinoceros conservation effort.
- In collaboration with the relevant authorities, incorporate Sumatran rhino conservation interests in land-use development plans.
- Develop the concept of Sumatran rhino intensive management zones (IMZs) for formal recognition and appropriate legal status, with restrictions on other land uses and activities harmful to rhino conservation. IMZs should be established in BBS, WK and GL with significantly enhanced enforcement efforts, including considering fencing the IMZs to maintain rhino densities.
- Develop models for local community support for and engagement with Sumatran rhino conservation efforts. There should be a communication strategy that will engage local community support for controversial but necessary actions to save the Sumatran rhino from extinction, and so help prevent negative public opinion reactions from arising.
- Range States and national and international donors should develop a comprehensive budget for the emergency plan, and allocate funds as required.

- Elaborer une stratégie intégrée de gestion des rhinocéros de Sumatra en milieu confiné pour augmenter le taux de reproduction dans tous les sites. Dans le cadre de cette stratégie, les établissements participants doivent se mettre d’accord sur le transfert de rhinocéros individuels ou du matériel de reproduction et mettre en place les services et l’expertise de reproduction assistée.
- Développer des infrastructures pour gérer le rhinocéros de Sumatra en milieu confiné. Pour planifier cela, une analyse des coûts-avantages (en considérant les dépenses par rapport à la réussite probable de la reproduction des animaux) doit être effectuée pour comparer un grand enclos par rapport à un système de petits paddocks reliés.
- En utilisant les résultats du premier point, développer des techniques standards de suivi pour fournir des informations cruciales sur les rhinocéros sauvages individuels, utilisant un format de rapport normalisé et un calendrier dans tous les sites dans tous les états de l’aire de répartition du rhinocéros.
- Etablir des accords officiels comme des moyens de collaboration intergouvernementale en faveur d’un effort unifié de conservation du rhinocéros de Sumatra.
- En collaboration avec les autorités compétentes, incorporer les intérêts de conservation du rhinocéros de Sumatra dans le plan de développement de l’utilisation des terres.
- Développer le concept des Zones de Gestion Intensive du rhinocéros de Sumatra (ZGI) pour une reconnaissance officielle et un statut juridique approprié, avec des restrictions sur d’autres utilisations de la terre et des activités nuisibles à la conservation du rhinocéros. Les ZGI devraient être établies dans BBS, WK et GL avec des efforts de mise en application sensiblement améliorés, y compris les clôtures des ZGI pour maintenir les densités des rhinocéros.
- Elaborer des modèles de soutien de la communauté locale et de participation aux efforts de conservation des rhinocéros de Sumatra. Il devrait y avoir une stratégie de communication qui engagera le soutien de la communauté locale pour des actions nécessaires mais controversées dans le but de sauver le rhinocéros de Sumatra de l’extinction, et ainsi aider à prévenir des réactions négatives de l’opinion publique.
- Les états de l’aire de répartition et les bailleurs nationaux et internationaux devraient élaborer un
State of rhino poaching in South Asia

In 2013, Assam (in India) lost about 41 greater one-horned rhinos due to poaching, while Nepal lost only one.

Etat du braconnage des rhinocéros en Asie du Sud

En 2013, l’Assam (en Inde) a perdu environ 41 grands rhinocéros unicornes à cause du braconnage, alors que le Népal n’a perdu qu’un seul.
Recent findings on the ivory and rhino-horn trade in Lao People’s Democratic Republic

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Abstract

Although all trade in rhino and elephant products, both international and domestic, is forbidden in Lao People’s Democratic Republic (PDR), regulations are rarely enforced. This situation is resulting in a growing international ivory trade with ivory, both raw and worked, passing through and into Lao PDR, which acts as a transit country, particularly from Africa to China, for raw ivory. There is also an increasing retail market in ivory items, many smuggled in from southern China, especially newly carved African ivory from illegal sources. In March 2013, I counted 1,929 ivory pieces on display for retail sale in Vientiane and Luang Prabang, excluding the many ivory small Buddha amulets, which are easily confused with bone amulets. The numbers of Chinese in Lao PDR are increasing, and they are the main buyers of the ivory items I counted. Many were priced in US dollars, some in Chinese script and Chinese renminbi. Lao PDR is also home to major illegal wildlife traders, who have been responsible for much of the illegal rhino-horn trade from South Africa via Lao PDR to Vietnam since 2008. These illegal wildlife traders also recently bought all the real Asian rhino horns in the Vientiane markets to sell in Vietnam. Many counterfeit Asian rhino horns are for sale in the souvenir and jewellery shops and at the Hmong tribal medicine stalls, and some outlets are also now displaying fake African rhino horns resembling a hunting trophy with two horns attached to a base, aimed for the growing tourist market. They are apparently made in Vietnam and have been for sale to foreigners in Lao PDR since about 2010. Growing numbers of Vietnamese and Chinese now live in Lao PDR and some consume real African rhino horn. Lao prefer Asian rhino horns, revering them for worship on their family altars to bring them good luck in wealth. With more Chinese and Vietnamese coming to live, work and visit Lao PDR, however, the demand in ivory and rhino horn originating from Africa is increasing.

Résumé

Bien que tous les échanges des produits issus des rhinocéros et des éléphants soient interdits en République démocratique populaire du Laos aux niveaux international et national, les règlements sont rarement appliqués. Cette situation se traduit par une croissance du commerce international de l’ivoire où l’ivoire, brut et travaillé, passe par la RDP du Laos, qui sert de pays de transit pour l’ivoire brut, surtout en provenance de l’Afrique vers la Chine. Il y a aussi un marché de détail croissant des articles en ivoire dont la plupart entrent en contrebande du sud de la Chine, surtout l’ivoire africain nouvellement sculpté provenant des sources illégales. En mars 2013, j’ai compté 1 929 pièces d’ivoire exposées pour la vente au détail à Vientiane et Luang Prabang, à l’exclusion des nombreuses petites amulettes en ivoire du Bouddha, qu’on confond facilement avec des amulettes en os. Le nombre des Chinois au Laos augmente, et ce sont les principaux acheteurs des objets en ivoire que j’ai comptés. La plupart étaient libellés en dollars américains, certains en caractères chinois et en chinois...
Recent findings on the ivory and rhino-horn trade in Lao PDR

Introduction

Lao People’s Democratic Republic (PDR) covers 236,800 km², nearly the size of the UK. It is the only landlocked country in Southeast Asia, bordering China, Myanmar (Burma), Thailand, Cambodia and Vietnam. After the Communist take-over in 1975, many educated elite left the country. By 1985 a new class of wealthy elite emerged, embracing a much higher standard of living (Stuart-Fox 1986). The division between rich and poor in Lao PDR continues.

Much of the country is mountainous and forested, especially the northern region, and it remains one of the last bastions in Southeast Asia for wildlife. Forest is being steadily cut down through slash-and-burn to grow cash crops, and wild animals are killed, usually for food. Several hill tribes inhabit this northern region. Many from the Hmong tribe used to grow opium illegally in the high mountains undetected, until the government encouraged them to move down into the valleys. But these people maintain their hunting culture and sell meat illegally to vendors along the roadside and at markets or to other traders.

A growing population of Vietnamese and Chinese live in Lao PDR or travel through the country for work, and the growth in tourists is huge: from 14,400 in 1990 to over a million a year today. Illegal trade in endangered wildlife products, from elephants, tigers and pangolins, has increased, with more foreigners in the country buying these products. Lao PDR is also a major entrepot for international illegal wildlife trade (Vigne 2013). Insufficient enforcement of wildlife trade law has enabled a network of criminal Lao wildlife traders to evolve. Large amounts of ivory and rhino horn from Africa have been moving through the region.

Ivory

In the late 1980s there were between 2,000 and 3,000 wild elephants in Lao PDR and about 1,332 domesticated elephants; in 2011 estimates were 600 to 800 wild and 864 domesticated elephants (Khounboline 2011). Lao elephants are ‘totally protected’ and all trade in their products is forbidden (Nash 1997). Asian elephants have been on CITES Appendix I since 1975, and African elephants since 1990. Lao PDR became a Party to CITES in 2004 so all international ivory trade is banned. All domestic ivory trade from African as well as Asian ivory is forbidden in Lao PDR, the same as for neighbouring Vietnam and Cambodia, but Thailand and Myanmar allow a domestic trade from captive Asian elephants, and China allows regulated trade in ivory of African origin that has official documentation and identification (Martin and Vigne 2011). Until recently, nearly all ivory for sale...
in Lao PDR was from Asian elephants. From 1988 to 1990 the wholesale price of good-quality raw ivory doubled to about USD 200 a kilogram because of increased demand from foreigners, especially Thais (Martin 1992); much ivory for carving continued to be smuggled into Thailand through the 1990s, while a little supplied the small local ivory amulet-carving industry (Nash 1997).

In a survey in Lao PDR conducted in 2001, 1,424 ivory items were counted in 63 outlets in Vientiane and Luang Prabang, but the great majority of these were the very small 34-cm Buddha amulets. Numbers of active ivory carvers fell from at least 12 in 1990 to perhaps 5 in 2001, including 2 Vietnamese carvers in Vientiane, the capital, working for a Vietnamese-owned outlet (Martin and Stiles 2002). Surveys conducted in 2002 and 2011 showed a large jump in that decade in the variety of ivory items for sale, but vendors indicated most ivory still originated from Lao PDR in 2011. In 2011, 2,493 ivory items were counted in 24 outlets in Vientiane, Huay Xai and Boten (Nijman and Shepherd 2012). The main buyers of ivory items were Chinese and Japanese in the early 2000s (Martin and Stiles 2002) and predominantly Chinese by 2011 (Nijman and Shepherd 2012).

**Rhino horn**

Both Javan and Sumatran rhino species used to inhabit Lao PDR until perhaps a few decades ago. Until very recently, rhino horns from these animals were illegally for sale in the Morning Market of Vientiane in the jewellery shops. During a survey in 1992 most were said to be from the Sumatran species. The main buyers were Chinese from Thailand who used them for traditional medicine. The average retail price then was USD 16,594/kg, which was about 30% less than in Bangkok at the time (Martin 1992). Most of the rare Asian rhino horns seen for sale at that time were recognizably fakes made of wood, other horn or bone, and this continued to be the case into the 2000s.

**Methods**

From 15 to 25 March 2013, I visited Lao PDR following the Bangkok CITES Conference, at which the country was heavily criticized as a major transit country for wildlife products, especially rhino horn. I collected information from informers, traditional hunters, vendors and illegal traders who have first-hand experience in dealing with ivory and rhino horn, and I spoke to conservationists and expatriates in the country. I planned also to follow up with Xaysavang Trading Export-Import Co Ltd, but the director, Vixay Keosavang, had been exposed in the press just before my visit, with his photograph on a front cover article of the *International Herald Tribune* (Amatatham 2013), so the company was taking no calls nor having meetings at that time. I surveyed the retail markets and counted, priced and photographed ivory, fake rhino horns, and other wildlife products seen for sale in Vientiane and also in the famous World Heritage Site town of Luang Prabang. I also examined stalls with wildlife for sale along the roadside northwards to the Chinese border, a tarmac road used by lorry drivers, traders and wealthier travellers. I visited Luang Nam Tha, a city that was developed in the 1970s in the infamous golden triangle area and is a growing destination for eco-tourism. I surveyed the morning markets, night markets, hotel shops, traditional medicine stalls, souvenir outlets, and jewellery shops, and visited a large, recently developed, Chinese shopping centre in Vientiane.

**Results**

**Ivory**

**Sources and prices of raw ivory and other elephant products**

Lao elephant ivory is obtained from both domesticated and wild elephants in the country. In 2001 a Lao elephant tusk sold for USD 275/kg (Martin and Stiles 2002). Prices have increased considerably since then: in 2013 a cut piece of tusk from a domesticated Lao elephant was selling for 40,000 baht/kg wholesale (USD 1,282/kg), and a whole tusk from a dead Lao elephant was selling for 50,000 baht/kg wholesale (USD 1,600/kg). Lao traders prefer to get elephant products from dead domesticated elephants as they are cheaper than so-called jungle elephants. They smoke the meat and pretend it is from the jungle elephant to sell to Vietnamese for better prices. They sell smoked blocks of elephant meat (30 cm across) with the skin attached wholesale for 2,000 baht/kg (USD 66/kg) and elephant bones wholesale for USD 100/kg. Traders
Recent findings on the ivory and rhino-horn trade in Lao PDR

This former master ivory carver and his son craft nowadays mostly rosewood into Buddha figurines, but will carve by hand very small ivory amulets and rings, if little pieces of ivory are supplied to them, on commission.

They often sell the tusks to Vietnamese who sell them with the other elephant products to Vietnam. Elephant teeth (molars) are sometimes sold in Lao PDR in souvenir shops and retail for up to USD 390 each, toenails for about USD 32 each, and small finger-size pieces of Asian elephant skin for about USD 2.5 each at the Hmong traditional medicine pavement stalls in Vientiane.

African ivory tusks were not seen for sale during the survey, although seizures in other countries indicate that African raw ivory has been going to Lao PDR: 16 tusks via Kenya were intercepted in 2009, 239 tusks via Dubai and Bangkok in early 2010 and 435 kg of African ivory via Bangkok in late 2010, for example (Nijman and Shepherd 2012). Lao PDR, however, has never submitted a single ivory seizure record to ETIS over the 25-year period the database covers. Tom Milliken, who records the ETIS data, has not been informed of any ivory seizures in the country (Milliken, TRAFFIC Southern Africa, pers. comm., January 2014).

IVORY WORKSHOPS, PRODUCTION AND USES

In Luang Prabang I visited one of the last remaining ivory-carving families at their workshop. In the 1980s, the master carver knew about 20 families carving ivory, but from 1991 to 1993 the demand fell and most carvers moved to furniture and door carving; only two or three families carve ivory in the region today, if they receive it, he said. The carvers are provided with small pieces of ivory from jewellery and souvenir shop owners who commission them to carve Buddha amulets and rings to sell in their shops. The 50-year-old master carver learned to carve ivory from his father and improved his techniques during eight years as a monk at a temple. He and his son usually carve rosewood into Buddha figures that are used for worship at shrines, while his wife assists in the finishing sandpapering and in quality control. Their 25-year-old son started carving when he was 18. Both father and son use only traditional hand tools for all their work. The carvers prefer to carve ivory as it is softer than bone, but most of their work is now in wood.

Lao people do not generally choose ivory for jewellery, utilitarian objects or ornaments. They traditionally prefer whole Asian elephant tusks, keeping them on their altars, and will only carve ivory if it is broken. They like the beautiful curved shape of Asian tusks rather than African tusks. Some families keep a tusk in case they need to sell it for urgent money. The poorer Lao (and by far the majority) may buy an ivory amulet, but more commonly a bone amulet, often worn around their necks, especially by small children, to ward off evil spirits.

It is the Chinese in the country who are encouraging the upsurge in demand for new Chinese-carved ivory items. Most ivory items for sale in Lao PDR are today being crafted by Chinese carvers, according to some vendors. One vendor, who has started a new shop selling worked ivory and is married to a Chinese man, said she has Chinese ivory carvers working for her in the country, but time did not enable me to verify this. Many items are smuggled out of southern China across the border into Lao PDR. The Lao master carver I interviewed said he knew of no Chinese ivory carvers in Lao PDR and that Chinese-style ivory items seen for sale, such as Kwan Yin pendants (commonly for sale in China’s ivory retail shops) come in from China.
RETAIL OUTLETS AND PRICES FOR WORKED IVORY

In March 2013 I counted 1,929 ivory items on display for sale, excluding ivory Buddha amulets, in Vientiane and Luang Prabang, but I saw no ivory for sale in Luang Nam Tha. There were perhaps hundreds of ivory amulets, sometimes within gold or silver types of casing, in jewellery outlets that were not included in the count as they are often mixed with bone amulets and are almost impossible to tell apart. Of the larger ivory items counted, 1,868 were in Vientiane in 11 outlets: 7 souvenir and jewellery shops in the Morning Market, 3 luxury hotel shops and 1 new ivory specialty shop selling by far the most items to Chinese customers. Prices were highest in the luxury hotel outlets where overheads are high. In Luang Prabang I counted 61 ivory pieces for sale in 3 large souvenir shops, including a shop selling 6 Lao tusks. Two large jewellery shops also had 9 Lao tusks not for sale, 6 behind glass in their altars. The most expensive item seen in the country was a 30-cm recently carved Buddha figure selling for USD 9,000 and the cheapest items were rings for USD 20 each (see Table 1). Only a handful of old ivory items were seen for sale, such as Hmong ear-plugs, combs and hair clips selling for USD 500–700 each in a hotel shop for tourists. A number of outlets were closed in Vientiane’s Morning Market and elsewhere as it was the season for weddings and several vendors had gone home, so the numbers of outlets and ivory counted were minimum figures. The main ivory buyers were said to be Chinese, Japanese, South Koreans, Thai and Vietnamese.

Table 1. Retail prices for recently crafted popular ivory items for sale in Lao PDR in March 2013

<table>
<thead>
<tr>
<th>Item</th>
<th>Size (cm)</th>
<th>Price range (USD)</th>
<th>Average USD price</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Jewellery</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bangle</td>
<td>1–2</td>
<td>200–1,800</td>
<td>588</td>
</tr>
<tr>
<td>Bangle carved</td>
<td>2–3</td>
<td>1,800–2,600</td>
<td>2,350</td>
</tr>
<tr>
<td>Bracelet, beaded</td>
<td>0.5–1.5/bead</td>
<td>120–500</td>
<td>238</td>
</tr>
<tr>
<td>Necklace, beaded</td>
<td>0.5–1.5/bead</td>
<td>80–800</td>
<td>332</td>
</tr>
<tr>
<td>Necklace, pendant</td>
<td></td>
<td>300–900</td>
<td>520</td>
</tr>
<tr>
<td>Pendant</td>
<td>5–6</td>
<td>50–490</td>
<td>171</td>
</tr>
<tr>
<td>Ring</td>
<td>0.25–1 wide</td>
<td>20–300</td>
<td>90</td>
</tr>
<tr>
<td><strong>Figurines</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Animal</td>
<td>1–5</td>
<td>80–380</td>
<td>230</td>
</tr>
<tr>
<td></td>
<td>5–10</td>
<td>550–844</td>
<td>697</td>
</tr>
<tr>
<td>Human/religious</td>
<td>1–5</td>
<td>70–519</td>
<td>369</td>
</tr>
<tr>
<td></td>
<td>5–10</td>
<td>380–2,200</td>
<td>1,290</td>
</tr>
<tr>
<td></td>
<td>20–30</td>
<td>5,000–9,000</td>
<td>6,500</td>
</tr>
<tr>
<td><strong>Miscellaneous</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cigarette holder</td>
<td>10</td>
<td>420</td>
<td>420</td>
</tr>
<tr>
<td>Chopsticks, pair</td>
<td>25</td>
<td>250–490</td>
<td>382</td>
</tr>
</tbody>
</table>

A 20% discount was possible with bargaining, or 30% if 10 items were bought.
USD 1 = 7,700 Lao kip
USD 1 = 31 Thai baht
Recent findings on the ivory and rhino-horn trade in Lao PDR

IVORY SUBSTITUTES

The ivory-carving family interviewed in Luang Prabang said they often carve elephant bone (that they obtain directly from mahouts for USD 64/kg) into amulets. They also make fake tusk for display for Lao people who cannot afford ivory, crafting cow bone tibias (which they obtain free). After ivory, the master carver I interviewed prefers to carve elephant bone, and secondly cow bone. He does not carve water buffalo bone as it is too hard. He explained that to prepare bones for carving he removes the marrow, cleans and slices the bone, adds a leaf to whiten it and cooks it like a soup. When the amulets are carved, they are usually sold by shop vendors as ivory amulets, he admitted. As well as bone, resin (which resembles ivory) is also used for amulets. Bone carvings and synthetic ivory jewellery from China were also for sale in Vientiane and Luang Prabang. These items are inexpensive and not normally displayed behind glass, as are real ivory items. At a large number of souvenir stalls and Hmong traditional medicine stalls, especially in Vientiane, were bones shaped to resemble a pair of small tusks selling for about USD 65 a pair to tourists.

VENDORS’ VIEWS AND THE FUTURE OF THE IVORY TRADE

Vendors did not want their ivory items photographed as they are aware the ivory trade is illegal. They are unconcerned about inspections as they simply say to officials their ivory is fake. Vendors do not warn customers that it is illegal to buy and take ivory out of the country and there are no signs to this effect. Most vendors were typically friendly and cooperative, but occasionally they lied about their products, pretending they were bone or fake ivory from China, despite the high prices, even though typical ivory cross-hatching was clearly visible. Some vendors with new ivory items said to my translator they were Chinese carved and had been smuggled in from China. They had no hesitation admitting there is a growing demand for ivory in Lao PDR to meet increasing Chinese demand, and that this is the reason they have recently opened their retail businesses in the country. The fact that the ivory trade is forbidden was of no concern as the law is not enforced. At the Vientiane international airport was a display cabinet of confiscated wildlife products warning traffickers that the products displayed were illegal, but ivory was not among them as only inexpensive products or fakes (but no fake ivory) were on display.

Rhino horn

USE AND SALE OF RHINO HORN

Lao people traditionally worship Asian rhino horns on their family altars in their houses as they believe they bring kham khoun, meaning good luck in wealth. Asian rhino horn is highly regarded for this purpose. Some families inherit Asian rhino horns from their fathers. It is considered extremely bad luck to sell such a rhino horn, and families will do so only in desperate circumstances. When real Asian rhino horn is available, wealthy Lao people from the USA will sometimes buy it in the jewellery shops of the Morning Market in Vientiane, vendors said. The richer Lao from abroad, and also Thais and Chinese, who used to buy real Asian rhino horn, would visit only the expensive jewellery shops, realizing that the many pieces seen at the Hmong traditional medicine stalls and cheaper souvenir stalls in the markets were fakes. I was told by informers, however, that all the real Asian rhino horn that was previously available in the jewellery shops had been recently bought by Lao traders, notably Xaysavang Trading Export-Import Co. Ltd, apparently to sell in Vietnam. Some vendors tried to pretend their small counterfeit Asian rhino horns were

This ivory bangle with distinctive cross-hatching was for sale in Luang Prabang for USD 780 in a souvenir shop, although the vendor pretended it was made of fake ivory imported from China.
I saw only one possibly real Asian rhino horn in a souvenir shop in Luang Prabang where the vendor believed he had received an authentic horn, but even he was not convinced without proper testing.

In Luang Prabang, the master ivory carver I met said neither he nor his father before him had ever been asked to carve rhino horn as Lao people prefer it whole for their altars, as for Asian ivory tusks. Neither do Lao people, even the most traditional northern tribal headmen interviewed, consume rhino horn. They had no memory of rhino horn being consumed for any health cures. Real or fake, Lao are not interested in buying African rhino horn for themselves, as these animals are not from Lao PDR so they would not work on their altars for their spirits.

Real African rhino horn has been used in Lao PDR by some Vietnamese and Chinese living in the country since at least 2009. I was told the older men liked to consume it at ceremonies at their homes and at weddings. I learned that a group of businessmen regularly meet at a coffee shop in Luang Prabang and take it in turns, bringing a piece of rhino horn in their wallets that they grind into a powder on a special plate to put in their coffee to improve their health. These porcelain dishes (from Vietnam) are apparently not for sale in Lao PDR. Lao people appear not interested in joining in to consume rhino horn. The Vietnamese and Chinese say to their Lao friends that consuming it improves eyesight and virility, especially for elderly men. It is ironic that in traditional Chinese medicine, rhino horn in the past was consumed primarily to reduce fever and never as an aphrodisiac, but around 2008 a few newly wealthy Vietnamese elite decided to market it as an aphrodisiac as well as for cancer, and now some are aware of this in Lao PDR. Rhino horns, fake or real, were not seen in any pharmacist shops in Lao PDR because Lao people prefer western medicine.

**Rhino horn fake substitutes**

Increasing numbers of new fake African rhino horns are for retail sale in the country. Vendors can sell them openly at souvenir and pavement stalls as they are not real. They attract many tourists’ attention and are marketed to foreigners as souvenirs, sometimes to decorate new houses, and for good luck in business for only about 500,000 kip (USD 65) for one of the larger life-sized mounts with two horns. Vendors sometimes sell them for considerably more to gullible buyers.

Most of these fake African rhino horns are made of water buffalo horn or cow horn, with a larger anterior and smaller posterior horn mounted on a fake rhino skin base resembling a trophy. I was told they have been coming to Lao PDR since 2010 from Vietnam via the Plain of Jars. I counted 74 mounts (each with two fake rhino horns) on display for sale; of these 65 were in Vientiane, 9 in Luang Prabang and none in Luang Nam Tha. Most were at souvenir outlets and at Hmong tribal medicine stalls. I also counted 48 Javan look-alike rhino horns and 119 very small Sumatran-style rhino horns, mostly in Vientiane’s Morning Market. Seen selling fake rhino horns were 30 outlets in Vientiane and 8 outlets in Luang Prabang. A number of souvenir and jewellery outlets were closed as this was the wedding season, so these were minimum numbers, but it shows a continued interest in fake Asian rhino horns (which are sometimes offered to rich foreign visitors as the real item for very high prices) and a growing demand for inexpensive fake African rhino horn ‘trophy’ mounts for the tourist trade.

**Vendors’ views and the future of the rhino horn trade**

Lao people still like to worship Asian rhino horns on their altars to bring them luck in wealth, but most vendors admit that these are rare nowadays. Vendors are not interested in selling real African rhino horns for worship to Lao people as these rhinos are not part of their animist spirit tradition. One Lao vendor had photos in his shop of African rhino horn he had obtained in the past. He said that in 1993 he bought a 750-g African rhino horn for USD 6,000 and quickly sold it for USD 10,000 to a Chinese customer. Vendors said they would sell African rhino horn if they had it to Chinese and Vietnamese in Lao PDR. Meanwhile, the open trade in legal fake African rhino-horn ‘trophies’ is a growing business for the tourist market, although these items were in the display cabinet at the Vientiane airport as examples of illegal wildlife trade items.

**Discussion**

**Ivory**

In the 1990s and early 2000s very few ivory items were for sale except old items and tiny amulets made in Lao PDR. Since then the variety of ivory objects for sale in Lao PDR has been increasing. In 2013 most ivory
Recent findings on the ivory and rhino-horn trade in Lao PDR

items were said to be newly crafted by Chinese carvers. This ivory is of African origin, including jewellery (especially bangles and small-beaded necklaces with pendants), figurines (especially Buddhas), chopsticks, cigarette holders and sometimes ivory name seals and netsukes. In 2011, vendors said there was far less Chinese-made worked ivory for sale in the country (Nijman and Shepherd 2012). Some vendors said the retail ivory trade was new and growing, especially to meet Chinese demand, and the new Chinese items I saw verify this. In 2002, in Vientiane’s Morning Market, 93 ivory items were counted, in 2011 there were 142 ivory items (Nijman and Shepherd 2012) and in 2013 I counted 447 items, including new Chinese-made ones. In 2011 a luxury hotel in Vientiane was selling 1,843 ivory items (Nijman and Shepherd 2012) but in March 2013 this shop was closed; coloured necklaces were still in the shop, but the glass cabinet holding the ivory was empty. However, there was a new ivory specialty shop with a large number and variety of Chinese-made ivory objects for sale specifically for the Chinese with its signboard outside only in written Chinese.

Cross-border trade for elephants and elephant products remains a grave concern. Illegal trade in live elephants from Lao PDR into Thailand continues (Stiles 2009; Bottollier-Depois 2013). And cross-border trade to Vietnam in raw ivory and other elephant products from Lao elephants is growing. Lao ivory was reported to be going to Vietnam in 2008 (Stiles 2008), but this is now a major trade route, along with other elephant products. The cross-border trade in wildlife products is almost impossible to monitor properly as there are numerous routes through the forests for local people to neighbouring countries. The Mekong River also acts as a mode of transport for illegal products. Yet despite some dealers saying they are now wary that police are infiltrating the system posing as drug and wildlife product traders, especially since 2010, there is still scarce evidence of success in curbing the ivory trade.

In comparison, the retail ivory trade in neighbouring Cambodia has declined, due largely to improved law enforcement. In March 2013 a survey counted only 945 ivory items in 48 retail outlets, 90% of them being tiny Cambodian-made amulets (Martin and Martin 2013). The Cambodian government and non-government organizations (NGOs) there have cracked down on elephant poaching and reduced the numbers of tusks on the Cambodian market (Martin and Martin 2013). This shows that stronger law enforcement can work and is greatly needed in Lao PDR.

Rhino horn

Lao PDR has become well known for the notorious wildlife dealer, Mr Vixay Keosavang, director of Xaysavang Trading Export-Import Co. Ltd, who has never been prosecuted in the country. There are many allegations of the company’s involvement in the illegal African rhino-horn trade, especially via Lao PDR to

These are typical Buddha amulets—the four below carved from elephant ivory, the three on the top carved from elephant bone—that are sometimes supplied to the carvers by owners of domesticated elephants in Lao PDR.

Normally sold inexpensively as fakes, these African rhino horn trophy copies are displayed for sale to foreigners, mostly in Vientiane.
Vietnam. In November 2013 the US State Department offered a USD 1 million reward for information to dismantle this wildlife-trading syndicate (Fuller 2013). Most Lao people are desperate to improve their standard of living, and many will risk the illegal trade in wildlife, especially in lucrative African rhino horn, to make money.

Conclusion

Lao PDR has been known for several years as a significant entrepot for African ivory and rhino horn. Not only is the country rapidly losing its own valuable wildlife resource (including its elephants) to international markets, officials have not curtailed the illegal international ivory and rhino-horn trade from Africa since joining CITES in 2004. No government officers have reported any ivory seizures to ETIS/CITES from 1989 to the present yet there is a growing retail ivory trade with new Chinese-crafted ivory items flowing through the country. Lao’s rhinos went extinct because of the rhino-horn trade decades ago. It now appears that demand for African rhino horn in Lao PDR could increase with the growing numbers of Vietnamese and Chinese in the country. Lao PDR must enforce its laws forbidding both international and domestic trade in ivory and rhino horn that threatens Africa’s elephants and rhinos.

Acknowledgements

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Challenges and opportunities of transboundary rhino conservation in India and Nepal

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Abstract

Currently, the wild population of the greater one-horned rhinoceros (Rhinoceros unicornis) is found in India and Nepal. To manage this transboundary population along the Indo-Nepal border, their habitats and numbers need scientific monitoring. Regular data should be collected on their movement patterns and management, and the data shared across borders with concerned conservation and management agencies to monitor the rhino population and the corridors they use, especially in Suklaphanta–Lagga Bagga, Pilibhit Forest Division, Dudhwa, Katarniaghat and Bardia landscape. Rhinos moving around the Indo-Nepal border in Katarniaghat–Bardia and Lagga Bagga–Suklaphanta should be fixed with radio collars to generate vital information that will assist conservation and management of the greater one-horned rhino along the border, strengthen transboundary planning and conservation for the rhino, besides orienting the police and border security forces in both countries to contribute towards protection of this rhino population moving between the countries.

Résumé

Actuellement, la population sauvage des grands rhinocéros unicornes (Rhinoceros unicornis) se trouve en Inde et au Népal. Pour gérer cette population transfrontalière de rhinocéros le long de la frontière indo-népalaise, leurs habitats et leur nombre doivent être suivis scientifiquement. Des données sur leurs habitudes de déplacement et de gestion doivent être recueillies régulièrement, et ces données partagées à travers les frontières avec les organismes de conservation et de gestion concernés afin de suivre la population de rhinocéros et les couloirs qu’ils utilisent, en particulier dans les paysages de Suklampaha–Lagga Bagga, la forêt de Pilibhit, Dudhwa, Katarniaghat et Bardia. On doit mettre des colliers émetteurs sur les rhinocéros qui se déplacent près de la frontière indo-népalaise dans Katarniaghat–Bardia et Lagga Bagga–Suklaphanta pour générer des informations clés afin de faciliter la conservation et la gestion le long de la frontière, renforcer la planification et la conservation transfrontalière pour le grand rhinocéros unicorne, et aussi orienter les forces de police et de sécurité à la frontière des deux pays pour qu’elles contribuent à la protection de cette population de rhinocéros qui se déplace entre les pays.

Introduction

Most protected areas are not big enough to sustain a viable rhino population, and a small population can be highly vulnerable to the environment and demographic factors. International conservation organizations are increasingly advocating large-scale wildlife conservation initiatives that override national political borders. Alternatively known as transfrontier biosphere reserves (Fall 1999) or transboundary conservation areas (Westing 1998; Magome and Murombedzi 2003; Spenceley 2006; Ramutsindela 2007), these protected areas represent a compelling approach to wildlife conservation across borders. A landscape approach allows better ecosystem integrity and stability within a transboundary conservation initiative and could further pave the way for much-needed means to engage countries sharing borders
to conserve and save the remaining populations of threatened species that use transborder habitats (Sandwith et al. 2001; Busch 2007).

In 2008, the greater one-horned rhinoceros was downlisted in the IUCN Red List from Endangered to Vulnerable due to an overall increase in numbers in its distribution range within India and Nepal (Talukdar et al. 2008). India and Nepal, the last remaining strongholds of the species, share rhino habitats across the border, lending credence to the need for transboundary conservation planning to further enrich the gene pool in rhino conservation. The terai is one of the world’s most spectacular landscapes, encompassing the tall grasslands and sal (Shorea robusta) forests of the southern slopes and foothill valleys of the eastern Himalayas. This biologically diverse landscape spans an area of approximately five million hectares from Nepal’s Bagmati River in the east to India’s Yamuna River in the west. The terai is home to endangered wildlife such as the tiger, greater one-horned rhino, Asian elephant, sloth bear, gaur and Gangetic River dolphin; it also contains vital migratory and breeding habitat for over 500 bird species.

The terai is one of the few places in the world where rhinos, elephants and tigers coexist. It needs urgent conservation initiatives to protect the animals in their natural habitat. This landscape contains the Asian Rhino and Elephant Action Strategy (AREAS) priority populations of the greater one-horned rhino and Asian elephant. The terai supports the second largest population in the world, after Brahmaputra flood plain alluvial grassland habitats, of the greater one-horned rhinoceros along with three reintroduced populations in Dudhwa National Park (NP) in India, and Bardia NP and Sukhaphanta Wildlife Reserve in Nepal.

Most of the large mammals in the western terai are isolated, few in number and restricted to these protected areas due to degradation and fragmentation of the habitat outside them. A renewed approach to conserving and sharing key scientific data on rhinos and habitats in the Indo-Nepal transborder could open new opportunities to improve the long-term future of the greater one-horned rhinoceros along with rhino habitats in the Indo-Nepal transborder.

**Methods**

We identified the main corridors the greater one-horned rhino uses in the Indo-Nepal border through field visits, direct sightings, indirect evidence such as rhino dung and footprints, and also through interactions with local villagers, elephant mahouts and forest officials. We used geospatial technology and satellite imagery to draw these corridors to assess their current state and the challenges the rhinos and the habitat face.

**Results and discussion**

Our field visits and interactions have helped us identify the key corridors the rhinos use in the Indo-Nepal transborder, which we highlight below.

**Key corridors for rhino movement**

We identified two corridors along the Indo-Nepal border: the Sukhaphanta–Lagga Bagga–Pilibhit Forest and Dudhwa Tiger Reserve (TR) corridor, and the Bardia–Katerniaghat–Dudhwa and Basanta Forest corridor. All corridors fall in Uttar Pradesh state. We also found movement of rhinos from Chitwan NP in Nepal to Valmiki TR in Bihar State of India (Figure 1). The corridor depicted in Figure 1 is based on the movement of rhinos tracked, and information available about habitat use in the Indo-Nepal transborder. In the past three years, four rhinos from Chitwan NP moved to Valmiki TR, and one female rhino aged about 10 years passing through Valmiki TR was killed by a speed train in March 2013. Another female rhino was killed by poachers in May 2011 and two bullets were found in its carcass. At present, two rhinos are still inhabiting Valmiki TR.

From 1987 to 1991 and from 1999 to 2003, the second author, Dr Sinha, worked extensively on monitoring reintroduced rhinos in Dudhwa NP and assessing the corridor between Dudhwa NP and Katerniaghat Wildlife Sanctuary, which is now a satellite core of Dudhwa TR. During this period, the second author visited these areas and tracked stray rhinos and their signs, sometimes using a domestic elephant along with a mahout or going on foot or using a vehicle. Forest officials regularly track the rhinos in their respective areas to take stock of security needs. During regular meetings with forest officials of Nepal and India, information on movement of rhinos between the two countries is discussed. Regular tracking of rhinos is being carried out by the Forest Department of Uttar Pradesh, the Nepal Forest Department and NGOs such as the international WWF-India and the local Wildlife Trust India.
Challenges and opportunities of transboundary rhino conservation

Suklaphanta–Lagga Bagga–Pilibhit Forest–Dudhwa corridor

According to the Jhala et al. (2011) report on the status of tigers and copredators, Pilibhit Forest in Uttar Pradesh state is connected to Corbett TR in the northwest by the Surai Range falls in Haldwani Forest Division, and to Suklaphanta in Nepal to the northeast through the forests of Lagga Bagga (Figure 2).

Lagga Bagga is located on the Indo-Nepal border adjoining the famous Suklaphanta Wildlife Sanctuary (WLS) to the northeast. To the south and southeast, the Sharda River flows in a loop around it. The forest and grasslands of Lagga Bagga form a continuous stretch with Suklaphanta WLS, except for a small trench demarcating the international border. The Suklaphanta WLS has a good population of Bengal florican *Houbaropsis bengalensis* (Inskipp and Inskipp 1985). It also holds large populations of the swamp deer *Cervus duvauceli*, the hog deer *Axis porcinus*, the spotted deer *Axis axis* and the tiger *Panthera tigris*. Large mammals regularly move between Lagga Bagga and Suklaphanta WLS (Rahmani et al. 1987; Rahmani 1989).

The Lagga Bagga area forms a continuous narrow corridor along the Sharda Canal that stretches southeast into Kishanpur WLS. This corridor is also used by tigers, which form a contiguous population from Surai Range in Uttarakhand to Pilibhit Forest and Kishanpur WLS. While carrying out the all-India tiger census, the Wildlife Institute of India and WWF-India installed a number of camera traps in the area and observed the regular movement of tigers. However, the narrow Pilibhit Forest corridor is a bottleneck as dense agriculture and human settlements line its borders. The Sharda River forms a minor corridor since it is lined by intensive agricultural activities; it is used by tigers and elephants and the recently reintroduced rhinos between Dudhwa–Kishanpur–Pilibhit Forest–Lagga Bagga and Suklaphanta WLS. Six rhinos from Suklaphanta WLS in Nepal recently moved to the Lagga Bagga area in Uttar Pradesh’s Pilibhit Forest (Jhamak Bahadur Karki, pers. comm.). All rhinos had coloured tags with codes to identify them. Indian authorities always inform the Forest Department of Nepal whenever rhinos cross the boundary. During regular meetings, forest officials from both sides exchange information on rhino movements. Since
mid-2011, one male rhino from Suklaphanta WLS moved into Pilibhit TR. This relocation has been confirmed using the rhino track. Later, this male was sighted in Kishanpur WLS. He was also spotted in the Sathiana area of Dudhwa NP and has also been sighted in the Billaryan range and in neighbouring crop fields. He is regularly on the move, using the artificial corridor of sugarcane fields, which provides shelter in which to hide and also provides food.

**Bardia–Katerniaghat–Dudhwa and Basant Forest corridor**

Katerniaghat WLS is situated on the Indo-Nepal border in Bahraich District, Uttar Pradesh state. It represents the Terai-Bhabhar bio-geographic subdivision of the upper Gangetic plains (Rodgers and Panwar 1988). Owing to the great diversity of vegetation, the area is a mosaic of diverse habitats. The most interesting feature of the sanctuary is the presence of the greater one-horned rhinoceros. The second author found evidence of rhino presence in Katerniaghat between 1987 and 1992, and the first author saw the footprint of rhinos in Katerniaghat in 2012. Before this, forest staff had seen rhinos in the area because they regularly raided farmers’ fields. The main corridor is the Khata corridor between Bardia and Katerniaghat along the Girwa River. Rhinos use only this route to enter Katerniaghat WLS, either near the Dhanora Tal area, slightly southeast of the Girwa, or near Ambia Bardia village. Rhinos also enter near the Maila Nala area on the north of the Girwa. Rhinos travelling through this route is evinced by the dung piles and feeding signs they leave behind. Elephant dung and tiger pug marks were also found on this route, indicating that even elephants and tigers use the same route while coming from the Royal Bardia NP of Nepal to the Katerniaghat WLS. Recently, three rhinos—a male, a female and a subadult—were sighted in Katerniaghat WLS after they moved from Bardia NP through the Khata corridor.

The corridor between Dudhwa NP and Katerniaghat WLS (Figure 3) has been disrupted due to continuous biotic pressure caused by human settlements, cultivation, encroachment, the regular movement of people, and the use of natural resources. The situation of the corridor between Katerniaghat WLS and Royal Bardia NP is similar. In the past, corridors were safe passages for animals, allowing their movement from one place to another (Sinha and Singh 1999). While working on the corridor project (1999–2003) between Dudhwa NP and Katerniaghat WLS, the second author saw limited regular movements of tiger, elephant and rhino from Katerniaghat WLS to Dudhwa NP. Forest patches of the northern corridor of the North Nighasan forest range are close to Dudhwa NP and elephant, tiger, wild boar, chital (spotted dear), antelope or nilgai (*Boselaphus tragocamelus*), and hog deer were widely distributed in these areas. Animals move from Dudhwa NP to these areas and vice versa (Sinha et al. 2010). As the northern corridor lying along the Nepal side of the border also has forests, large animals move to either side. Elephants and rhinos move between Royal Bardia NP and Katerniaghat WLS, but they are restricted to certain areas. It is thus important to revive corridors to ensure the survival of these three isolated populations: rhinos, tigers and elephants.
Another narrow corridor on the other side of the river, which forms the international boundary between India and Nepal, developed due to afforestation. This corridor touches Dudhwa NP through the forest patches of Basanta Forest in Nepal and the Bela Persua area. In 1996, one adult female rhino from Bardia NP reached Dudhwa NP through Basanta Forest and was attacked and killed by a resident rhino inside the rhino holding area.

One subadult rhino from Nepal came to the Lakhimpur Kheri area and moved to the Sitapur area through a sugarcane field. It was captured and caged on 2 November 2004 by a combination of one veterinary official from West Bengal and forest officials and staff of Dudhwa NP near NH-24. But the cage was faulty and the animal’s condition was worsening as indicated by its pulse rate and heartbeat. It was therefore immediately given an antidote and released because further delay would have been fatal. The same animal reached Moradabad on 2 January 2005 and was successfully darted by a team of experts and assisting forest staff. It again was caged and sent to Kanpur Zoo. This rhino had also travelled through the sugarcane field corridor. On both occasions the second author took part in the entire capturing operation.

Small population issue

Currently Dudhwa NP in India and Bardia NP and Suklaphanta WR in Nepal have reintroduced rhino populations. In Dudhwa NP, 30 rhinos are confined inside a fence in a restricted area measuring 27 km², while the 24 rhinos in Bardia NP and the 7 rhinos in Suklaphanta WLS range freely. These reintroduced rhinos often cross the international border and explore the neighbouring cultivated areas for food and water.

The main issue is the size of the population and the safety of stray rhinos in the forest areas along the Indo-Nepal border. The population in Dudhwa NP has reached 30 rhinos including the founder population of one male and four females (three from Chitwan NP, Nepal and one from Pobitora WLS, Assam). On 27 November 2011, a second-generation adult male rhino was found dead. The horn had been removed; it was later recovered in Dhangeri, Nepal. The case is still under investigation to determine the cause of death.

Current status of rhinos in Dudhwa NP

- When the total fenced area for rhinos is considered, the forage area is limited and other areas are degraded by floods from River Suheli. Palatable grasses that rhinos prefer are now becoming unpalatable because the area is submerged under floodwater. The habitat requires management and improvement.
- Dudhwa NP covers over 490 km² but the rhinos are confined within an electric fence in an area measuring 27 km², restricting them to use only this space.
- One question we have for the Dudhwa authorities is for how long these rhino will be kept in the fenced area? We feel that some of the rhinos in the existing fenced areas of Dudhwa NP should be translocated to the proposed new rhino area in Bhadhi Taal, which is a good habitat with required food plants and wallowing sites available to give rhinos space and also allow for scientifically managed breeding in the wild, considering the family genetic tree of
the rhino population in Dudhwa NP. In 2005, the second author of this paper submitted a detailed project proposal to the Uttar Pradesh Forest Department and the Ministry of Forest and Environment, New Delhi, to create another fenced area for rhinos within Dudhwa NP.

- It is evident from field observations that a single male dominated breeding with almost all mature female rhinos and contributed to population growth. Therefore, we feel that a non-invasive DNA-based study using dung should be carried out soon to ascertain the genetic diversity of the Dudhwa rhino population.

**Current status of rhinos in Suklaphanta WLS**

- Currently, Suklaphanta WLS in Nepal has a population of seven rhinos that usually move to Lagga Bagga in Pilibhit Forest Division, Uttar Pradesh state, India. One of the adult males was sighted near Haldwani Forest Division in India and had stayed in a sugarcane field for more than six months before going back.
- The habitat may not be suitable for rhinos when we consider the terrain and availability or lack of it of water and forage during all seasons. The area falls in the Terai-Bhabar zone and the soil’s water-retaining capacity is low; therefore, the rhinos tend to stray out of Suklaphanta WR whenever water is scarce. Also, the soil consists of boulders and pebbles, and water seeps into the soil forming underground water channels commonly known as *choya*.
- Rhinos from Suklaphanta move into Lagga Bagga and further into the Pilibhit Forest Division and often feed on crop fields, to the annoyance of local villagers. This invasion of fields is bound to increase human–rhino conflict and is likely to result in animosity and killing of these stray rhinos.
- Long before rhinos were translocated from Bardia to Suklaphanta, one adult male rhino had been sighted in Suklaphanta but no-one knew where he came from. He must have reached Suklaphanta WR by coming from Bardia NP, but this is yet to be confirmed.
- It is imperative to have a joint research and monitoring team for the rhinos in the Indo-Nepal trans-border forest areas, where rhino movement has been recorded, to generate and maintain first-hand information on their movement pattern and cause of seasonal movement in this landscape. This situation in turn would help management authorities in both India and Nepal make informed decisions based on sufficient scientific information and analyses to ensure the future of the rhinos.
- Rhinos coming to Lagga Bagga and Pilibhit Forest are susceptible to being injured or killed because of the large numbers of villagers surrounding the forest area. Local people chase and harass the rhinos to save their crop fields, rhinos attack in retaliation, and on many occasions people have been killed, especially if there is a female rhino with a calf.

**Current status of rhinos in the Bardia–Katerniaghat complex**

The current rhino population in Bardia NP is 24. There were about 80 rhinos in Bardia before the political unrest in the country in the mid-2000s; over 75% of this population was wiped out by poachers taking advantage of the socio-political unrest. In 1991, three rhinos—a female with calf and a male—were sighted in Katerniaghat WLS. Currently, 4–5 rhinos have been reported in the area, which reflects that more rhinos from Bardia NP may have strayed out and come to Katarniaghat. After some time these rhinos moved back to Bardia and few stayed long outside the park. The need is urgent to monitor their movement patterns, habitat use and locations with the use of satellite radio collaring under a joint monitoring programme.

**Conservation priorities**

- Considering its location and importance, Lagga Bagga should be declared a protected forest or wildlife sanctuary.
- More efforts are needed for better coordination and cooperation in transboundary issues. Regular meetings involving senior officers of paramilitary forces and customs departments of both sides would achieve better coordination, help share field-based information on rhinos and help in anti-poaching operations.
- A joint research project should be carried out to track the radio-collared rhinos on both sides of the border to identify the movement pattern and habitat conditions of particular areas to which rhinos move.
- If possible, all rhinos should be radio collared or tagged with ID marks.
The forest habitats of the Indo-Nepal transborder are capable of providing shelter to a number of threatened species, including rhinos. A well-coordinated conservation and protection plan is essential to ensure that these habitats continue to extend suitable refuge to rhinos and other threatened wild animals in this important landscape of the Himalayas.

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The decline in carving African and Asian elephant tusks in Nepal and the decrease in ivory items for retail sale in Kathmandu

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Abstract

The Nepal ivory industry has collapsed since early 2001, when the last survey was conducted. The few remaining craftsmen have stopped carving ivory. The number of shops selling ivory items has fallen from 57 in February 2001 to 19 in December 2012. During this period ivory items on display for sale in Kathmandu dropped from 1,546 to 208. Smuggled raw ivory from Africa and Asia used to come into Nepal via India, but both the India and the Nepal governments have improved their border controls. Wildlife law enforcement in Nepal has strengthened considerably since 2010 with the establishment of government committees and bureaus dealing with wildlife crime all over the country. All ivory is illegal to sell or to display in shops, and vendors are now reluctant to sell new ivory items and are trying to offload their last remaining ivory objects. Turnover is slow as customer demand has fallen, partly as Nepalese now prefer to buy gold items and also because foreign tourists (the main buyers) show little interest in buying ivory as the selection is poor and there is a greater risk entailed in smuggling worked ivory out of the country. Thus Nepal is not a threat to Africa’s or Asia’s elephants.

Résumé


Introduction

Nepal has never been a major consumer of ivory compared with India, China and Japan for a variety of reasons, including the country’s small population, the past government’s policy of isolation, and general poverty of its people. Ivory has, nevertheless, been crafted in Nepal for hundreds of years, for the tiny elite made up of the royal family, the Rana dynasty (who ruled Nepal from 1846 to 1951), and a few wealthy businessmen. As there were no detailed studies of Nepal’s ivory craftsmen until 1982 and no retail ivory markets surveyed until 1998 (Martin 1998), statistics for early years are lacking. However, with the opening up of the country to international tourism in the 1960s and the subsequent increase in the number of souvenir and antique shops, especially in Kathmandu, ivory items became available to foreigners. In the early 1960s four main families were carving ivory in the Kathmandu Valley, the centre for ivory craftsmen in Nepal. In 1982 eight members of the main family of ivory craftsmen in the country...
were carving ivory items. With the 1990 CITES ban prohibiting international trade in elephant ivory, the number of ivory craftsmen in Nepal declined sharply (Martin 1998). By 2001 the number of ivory artisans in the remaining carving family was only three. The number of retail outlets offering ivory in Kathmandu declined from 71 in 1998 to 57 in 2001 (Martin and Stiles 2002).

**Methodology**

Fieldwork for this study in Nepal took place in December 2012. We (Esmond and Chryssee Martin) surveyed most of the souvenir, jewellery and antique shops in Kathmandu to determine which ones had ivory items for sale, the types of items, where they had been made and the prices. Vendors were interviewed for information on their ivory business. One visit was made to Patan (an adjoining city a few kilometres east of Kathmandu, noted for its skilled craftsmen) to interview the last ivory-carving family. Government personnel, especially from the Department of National Parks and Wildlife Conservation (DNPWC) and the Forestry Department, were interviewed on the status of Nepal’s elephants and trade in their products. We also talked with authorities on the tourist industry and with non-government organizations (NGOs) about elephant conservation.

**Legislation and enforcement in Nepal**

The National Parks and Wildlife Conservation Act of 1973 prohibits the sale and display for commercial purposes of all elephant ivory without a special permit, none of which have been issued. Thus, all ivory items seen for sale in Kathmandu’s retail outlets were illegal. In 1975 Nepal acceded to CITES, which from 1990 prohibited commercial imports and exports of all elephant ivory, including souvenirs. In 1975 Nepal acceded to CITES, which from 1990 prohibited commercial imports and exports of all elephant ivory, including souvenirs. In 2003 or 2004, the last member of the main ivory-carving family in Nepal stopped carving new ivory items at his home in Patan, although he continued to carry out repairs to ivory objects. He told us he gave up using ivory, but not other animal products, because raw ivory was difficult to obtain and expensive, and the sale of ivory objects was illegal. Moreover, his health was failing. It is unlikely that there are other craftsmen in Nepal carving ivory. Souvenir vendors told us that no new items were being made out of ivory in Nepal.
Before retiring, the Patan carver had been carving raw ivory into small boxes, prayer wheels, dice, religious figures and phurpas (traditional magic darts). He was getting raw ivory from African and Asian tusks imported from India, and African elephant tusk trophies from the Rana family in Nepal that they had obtained from sport hunting in Africa, tusks from wild elephants in Nepal dying of natural causes, and tusk tips cut off domesticated elephants in Nepal. He claimed he could still obtain raw ivory if he wanted, but it was difficult to get as few people are willing to sell it. He said the wholesale price in late 2012 was at least 40,000 Nepal rupees (NPR) per kilogram or USD 460 per kilogram sold in small pieces.

This 79-year-old man has two sons, one 57 and the other 55 years old, who said they stopped ivory carving at the same time as their father, carving instead wood and occasionally bones from domestic water buffaloes and deer antlers. They will sometimes repair old ivory items. A piece of deer antler about 10 cm long costs about NPR 1,000 (USD 11); water buffalo bones are usually free or NPR 2–4 (USD 0.2–0.5) for a similar-sized piece. They make from these antlers and bones prayer wheels, ear picks, Hindu gods, dice, small boxes and phurpas. However, they spend most of their time making wooden window frames. Their workshops are at their homes. They produce many of their items for shopkeepers in Kathmandu, taking advanced orders. The two sons are not training their children to be carvers as they do not see a future in the profession any more.

**Retail outlets and prices for worked ivory in Kathmandu**

We counted a total of 208 ivory items in 18 souvenir and antique shops and one jewellery shop (Table 1), 11 of which were in luxury hotels or attached shopping arcades, 4 in the area of Durbar Marg (near the Royal Palace) and 4 scattered elsewhere. We counted only items on open view, in keeping with other ivory surveys in various countries conducted in recent years by Esmond and Chryssee Martin, Dan Stiles and Lucy Vigne. We asked vendors if they had other ivory items stored away and only one said he had a few old pieces. Numbers of items per shop ranged from 1 to 38. Of 180 identifiable objects, there were 69 figurines, 62 items of jewellery, 21 netsukes, 12 paintings and a variety of other items (see Table 2).

Of 159 items where the country in which they had been made could be identified, 85 had been crafted in Nepal, mainly charms and figurines, and 42 in China, mainly figurines and netsukes. There were 13 Japanese figurines and netsukes that one vendor had brought back from Japan many years ago, 12 Indian items (mainly paintings on ivory slices), and 7 old Tibetan bangles (Table 2). Almost all the items were fairly old, crafted more than 15 years ago, according to the vendors. Only one shop vendor admitted to selling new ivory items—two netsukes that had been carved in China. Most of the items would have originated in Indonesia and the Philippines. Only one vendor admitted to selling new ivory items, two netsukes.

**Table 1. Number of shops and ivory items seen for retail sale in Kathmandu in 1998, 2001 and 2012**

<table>
<thead>
<tr>
<th>Year</th>
<th>Shops (no.)</th>
<th>Items (no.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1998</td>
<td>71</td>
<td>1,454</td>
</tr>
<tr>
<td>2001</td>
<td>57</td>
<td>1,546</td>
</tr>
<tr>
<td>2012</td>
<td>19</td>
<td>208</td>
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</tbody>
</table>

These ivory figurines and two ivory chess pieces were made in Nepal about 35 years ago. The 4-cm chess pieces were selling for USD 500 each in December 2012.
from African ivory, especially those from China, India and Japan, and a large number from Nepal.

The souvenir and antique shops are patronized mostly by foreign tourists. The main buyers of ivory items were Chinese, then Europeans and a few Japanese. Retail prices for similar types of ivory objects vary considerably based on shop location (luxury hotel shops being the most expensive), country of origin (Japanese items being generally more expensive), quality of workmanship, size, age (antiques being more expensive), and bargaining ability of the customers. The most expensive item was a 20-cm female goddess intricately carved in Nepal in the 1970s for sale in a luxury hotel shop, and the cheapest were thin rings (Table 3). The most numerous items for sale (28%) were religious and human figurines (see Table 4).

Ivory look-alike materials

No mammoth ivory items were on display for sale in Kathmandu. This material is common in China and

<table>
<thead>
<tr>
<th>Item</th>
<th>China</th>
<th>India</th>
<th>Japan</th>
<th>Nepal</th>
<th>Tibet</th>
<th>Country unknown</th>
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<td>8</td>
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<td>—</td>
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<td>11</td>
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<td>24</td>
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<td>4</td>
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<td>13</td>
<td>85</td>
<td>7</td>
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<td>28</td>
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</tbody>
</table>

Table 2. Number of ivory items crafted in various countries for sale in Kathmandu in December 2012
Hong Kong as a substitute for elephant ivory but is not frequently seen elsewhere in Asia. One man tried to sell us an elephant ivory horse with rider, pretending it was mammoth ivory, as unlike elephant ivory, mammoth ivory is legal. We saw many items made of bone, resin and plastic, which sometimes looked quite like ivory, but the vendors rarely tried to sell these as ivory.

Vendors’ views on the future of sales of ivory items in Nepal

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Decline in carving African and Asian elephant tusks in Nepal

460/kg for tiny pieces in 2012, giving less incentive to carvers to buy them.

The domestic demand for ivory items has dropped partly because the Nepalese now prefer to buy gold jewellery. Foreign visitors are the main ivory buyers, but despite a significant rise in their numbers, from 361,237 in 2001 to 736,215 in 2011 (Nepal 2012), they are buying less ivory because there is now a more limited choice of items and many of the foreign visitors cannot afford luxury ivory items. Vendors said sales of souvenirs in general have declined, and according to government statistics the average tourist spent only USD 38 a day in 2011, down from a peak of USD 73 in 2008 (Nepal 2012). Numbers of richer tourists have declined proportionately, compared with growing numbers of poorer Indian and Sri Lankan tourists visiting the birthplace of Buddha (Lisa Choegyal, tourist expert, pers. comm., December 2012). During this 11-year period the number of Chinese visitors increased from 8,738 to 61,917. The Chinese in Nepal, however, are nearly all tourists, unlike those in Africa, who are mostly contract workers and who are the main buyers of new ivory. Thus, unlike in Africa, there are no chopsticks and name seals offered for sale in Kathmandu, and most Chinese are not interested in the other available items.

A significant factor that has been reducing ivory demand even further is that the Nepal government has recently established several new committees to combat wildlife crime. These include the National Wildlife Crime Control Coordination Committee, the Wildlife Crime Control Bureau Central Level and the Wildlife Crime Control Bureau District Level; the last has 19 such bureaus in various parts of Nepal. These committees have successfully increased law-enforcement efforts to reduce wildlife crimes. The government has arrested a growing number of people dealing in wildlife products during the last three years and has imposed severe sentences on them (Acharya and Kandel 2012; Martin et al. 2013). These actions have consequently discouraged shop owners from illegally importing, selling and exporting ivory objects (Acharya and Kandel 2012; Martin et al. 2013). A further reason for the decline in ivory sales is that the Nepal media have become more active in exposing wildlife criminals; thus many vendors no longer want to take the risk of selling ivory in fear of being scathingly publicized.

Conclusion

The approximate 125 wild and the 215 trained elephants in Nepal are not at risk of being killed for their ivory. Raw elephant tusks from both Africa and Asia have become more difficult to smuggle into the country, as has worked ivory from other Asian countries; increasing prices have been another deterrent against bringing ivory items from other countries. Sales of raw and worked ivory, both old and new, are illegal and have declined sharply in Nepal since 2001. Nepal’s last family of ivory artisans based in the Kathmandu Valley, after many generations of carving ivory, are no longer producing new ivory items; no new artisans are taking up the profession, due to lack of demand for worked ivory in Nepal.

Since 2001 the retail sale of ivory items in Nepal has seen perhaps the most drastic recent decline in Asia. Vendors said turnover of worked ivory in their shops is very slow. Only 208 ivory objects

This old master carver no longer uses ivory but still carves water buffalo bone figurines part time. Inset: This is his unfinished figurine of a goddess.

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were counted on display in December 2012, down by over 85% compared with 12 years ago. Vendors are not replenishing their stocks because Nepalese and foreign customers hardly ever buy the few ivory items still available. The government’s increased and successful efforts to reduce wildlife crime, notably the illegal trade in ivory, are working. Thus, with the collapse of the Nepal ivory trade, elephants in Africa and Asia are not likely to be poached to meet any demand in Nepal.

Acknowledgements

We are most grateful to The Aspinall Foundation and Save the Elephants for funding our fieldwork in Nepal.

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Crop damage done by elephants in Malebo Region, Democratic Republic of Congo

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3 NGO Mbou-Mon-Tour, Kinshasa, Democratic Republic of Congo
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Abstract

Data on crop damage and crop raiding were collected from Malebo Region to document patterns of human–elephant conflict. Using interviews, field visits and market surveys, we found that raided fields had a mean size of 320 m² (75–600 m²), 16.6% of which were intersected by permanent elephant trails leading to permanent water points. The most damaged plant species was manioc (damage index $I = 60.1\%$). The mean number of monthly crop raiding incidents ranged between 0 (March and October) and 3 (July and August). Tree species eaten by elephants represented 23% of all trees surrounding fields. Mean annual financial loss caused by crop raiding in individual fields was USD 400 (USD 97–1,005). We argue that a broad community conservation scheme is essential. It must redraw the agricultural map of the region to account for habitat needs of elephants and other wildlife species to solve the human–elephant conflict. A condition for the success of such a programme is that communities are shown that elephants are part of their natural resources.

Additional key words: human–elephant conflict, key plant species, economic loss, community conservation

Résumé

Les données sur les dégâts et la maraude des cultures ont été recueillies dans la région de Malebo pour documenter des modèles du conflit homme–éléphant. Grâce à des interviews, des visites de terrain et des études de marché, il est apparu que les champs maraudés avaient une taille moyenne de 320 m² (75–600 m²): 16,6 % des champs ont été recoupés par des pistes permanentes d’éléphants menant à des points d’eau permanents. L’espèce la plus endommagée était le manioc ($I = 60,1 \%$). Les incidents mensuels de maraude des cultures variaient entre 0 (mars et octobre) et 3 (juillet et août). Les espèces d’arbres consommées par les éléphants représentaient 23% de tous les arbres des champs environnants. La perte financière annuelle causée par la maraude des cultures dans les différents champs était évaluée à 400 USD (97 à 1,005 USD). Nous affirmons qu’un programme plus large de conservation communautaire est essentiel et qu’il doit redessiner la carte agricole de la région pour tenir compte des besoins de l’habitat des éléphants et d’autres espèces sauvages pour résoudre le conflit homme-éléphant. Une condition pour le succès d’un tel programme est qu’on montre aux communautés que les éléphants font partie de leurs ressources naturelles.

Mots clés supplémentaires: conflit homme–éléphant, espèces de plante clés, perte économique, conservation communautaire
Introduction

Few data have been collected on human–elephant conflict (HEC) in the western Democratic Republic of Congo (DRC), although it is one of the most vexing problems in working to conserve elephants across their range (Dublin 1996; Kangwana 1995; Ekobo 1995; Parker and Osborn 2001). Existing records across elephant ranges hypothesize several HEC determinants. First, elephants are hypothesized to raid crops seasonally and tend to do so more frequently on farms with stands of trees with fruits that both elephants and people eat (Parker and Osborn 2001; Kinzonzi 2004). Second, it is hypothesized that human expansion pushes people to use marginal habitats inside intact forest blocks, thereby encroaching on elephant habitat. Indeed, cultivation inside protected areas harbouring elephants increases the risk of crop-raiding events (Hoare 1999). Third, elephants are thought to be attracted by both the quantities and the taste of cultivated staples (Wasilwa 2003). Finally, other studies indicate that habitat fragmentation may lead to HEC as humans often place their fields along elephant migratory routes (Hoare 1998, 2000).

None of these hypotheses has been tested in the western part of the DRC, particularly in the Lake Tumba Region. However, local communities indicate that HEC is a common problem; it is the reason why local farmers have resented conservation efforts over the last two decades. Reasons for this lack of information are numerous, the most prominent being that elephants had been thought to be extinct locally; no field surveys documented their abundant presence in this region (Inogwabini et al. 2011). HEC became a topic of concern for elephant conservation in many places across Africa in the 1980s and 1990s because HEC has immediate negative effects on both people and elephants; it frequently preceded a decline in African elephant numbers (Kangwana 1995). Lack of information meant that elephant populations in the Lake Tumba Region were in conflict with villagers, but this conflict is undocumented. It raised poaching levels, there was little effort in conservation, and the international conservation community was uninformed. This paper addresses this gap in knowledge. It has been designed with the objective of preliminarily documenting HEC patterns in the Malebo Region, Lake Tumba landscape. The study also provides the first indications of the economic cost of HEC to local communities.

Materials and methods

Study site

The Malebo Region (S: 02°00′00″–2°45′00″; E: 16°10′00″–17°12′00″; Figure 1) is in the Lake Tumba landscape, which straddles the provinces of Bandundu and Equateur, western DRC (Inogwabini et al. 2007a,b). At its southern edge, the region is located on the Bateke plateau and descends toward the Congo central basin, known as the Cuvette Centrale (Inogwabini et al. 2011).
Malebo is a forest–savanna mosaic ecosystem dividing the northern swampy forests and the southern savannas. Swampy forests in most of the territory of Lukolela are essentially composed of mixed mature forest with open understorey whose main emergent trees are Uapaca guineensis, U. heudelotii and Gubortia demeusii (Inogwabini et al. 2006). The region is also characterized by flood episodes during which water covers ca. 65% of the forest. Some portions of this region are within the Tumba–Lediiima Natural Reserve. Forest galleries in the forest–savanna mosaic comprise a terra firma mixed mature forest with species such as Gilbertiodendron deweveri and Entandrophragma sp., and 45–50% understorey of Marantaceae species such as Haumania liebrechtsiana and Megaphrynium macrostachii. Some of these galleries have been logged in the past 25–30 years to extract wenge (Millettia laurentii), a highly priced hard blackwood. The savannas are woody, dominated by Hymenocardia acida and Annona senegalensis. The southern limit of the region for this study is ca. 45 km from the southern limit of the Tumba–Lediiima Natural Reserve. Due to increased poverty and poor law enforcement that began in the early 1990s, the two million people residing in the Lake Tumba landscape depend on hunting, including elephants, as a permanent commercial activity (Colom et al. 2006). Modern weapons and ammunition are now prevalent all over the region and they fuel hunting activities.

Data collection and analysis

Data collection consisted of 1) interviews with local populations on the occurrence of field raiding by elephants in the vicinities of their villages, and 2) visits to fields to collect evidence of elephants raiding crops. Interviews consisted of a questionnaire on the species of crops grown in the villages, how often elephants visited fields, and which crop species elephants raided most frequently. Interviews were conducted in a stepwise approach. First, a list of villages was drawn up randomly and the questionnaire administered. A second list of 12 fields was established based on the analysis of the first list. It consisted of randomly selected villages that had reported HEC, regardless of its intensity. Twelve fields in these selected villages were randomly chosen for visits. Field sizes were measured using a 50-m tape measure. Elephant signs encountered within and near the field and damages were recorded. Crop-damage data consisted of species eaten or trampled on, counts of plants eaten or trampled and parts eaten.

We documented the environment immediately adjacent to the field by cutting four short 20-m line transects from the field’s edge. This was done for six randomly pre-selected fields. We counted key fruit plant species along the transects. Key fruit plant species were defined as those that elephants of Malebo Region ate most frequently (Inogwabini et al. 2011). Along these transects, all trees having a diameter at breast height (dbh) of ≥ 10 cm were counted within a strip of 20 m. To evaluate the economic cost of elephant crop raiding, we conducted a local market study and recorded individual prices of each item consumed.

We calculated the mean monthly crop-raiding incidents. A consumption or damage index was calculated as the ratio $I = \Sigma S / 12 \Sigma f$, where $S$ represents the count of each item eaten or trampled on in all fields, $f$ represents the 12 months of the calendar year, and $n$ the number of randomly selected and monitored fields ($n = 12$). A distribution index of key plant species was calculated as the percentage of how many of these species were recorded out of the total number of trees counted from 24 random transects laid around six random fields. The economic cost of crop raiding or crop damage by elephants presumed that all the production had a market value even though some portions would not end up at the market. This cost equalled the sum of all staple plants in the field multiplied by the market price. For staples sold in subsets, as are manioc roots, which are sold in 50-kg bags, we calculated the price based on how many 50-kg bags are ideally produced from one 100-m² field.

Results

The mean size of fields raided by elephants was 710 m² (range = 75–5,000 m²). However, if we take out the outlier of 5,000 m², a typical field in the region had a mean size of 320 m² (range 75–600 m²). Of the total randomly selected fields, 16.6% were intersected by permanent elephant trails: all trails led to permanent water points. Elephants raided nine food crops (Figures 2 and 3): the most damaged was manioc ($I = 60.1\%$; Figure 2); next was bananas ($I = 11.4\%$; Figure 2). Mean monthly crop raiding or crop damaging ranged between 0 and 3 events. The highest means were in July and August (Figure 3). Of the 27 tree species (dbh ≥ 10 cm) recorded along transects, 6 were key...
plant species (Figure 4). These trees represented a distribution index of 0.23, indicating that 23 out of 100 trees in the forest immediately adjacent to fields were key plant species. Mean cumulated annual financial loss that local communities incurred was estimated at USD 744.65 per field (range = USD 97–5,200). When the outlier of USD 5,200 is eliminated from the range, the mean decreases to USD 339.61 (range = USD 97–1,005).

**Discussion**

The nine food crops elephants raided (Figures 2 and 3) were the most important agricultural produce of the region. Manioc ($I = 60.1\%$), the most important food item, constitutes > 65% of the commercialized products of the region. The elephants did not eat manioc but trampled it. Bananas ($I = 11.4\%$), an equally important commercial product, have more economic value than manioc and other products. The elephants ate bananas and damaged the manioc in their search for bananas.

The highest mean monthly crop-raiding incidents were observed in July and August (Figure 3); this high coincides with the long dry season. Parker and Osborn (2001) also reported higher frequencies of crop damage in dry seasons in Zimbabwe. Dry seasons coincide with a period when vegetables and maize mature in Zimbabwe; this was not the case in Malebo. The first potential explanation for this pattern in Malebo is that during the dry season, water retreats in most rivers and permanent water points in the region. That the most damaged fields were located along permanent elephant trails leading to permanent water points implies that elephants searching for water come across fields with staples and damage them. Permanent water points determined elephant movements in different ecological conditions across Africa (Vanleeuwe and Gautier-Hion 1998; Tchamba 1998; Wasilwa 2003). Parker and Osborn (2001) also found that most crop-raiding incidents occurred along major rivers, meaning that elephants move to zones with sufficient water sources in the dry season. The second possible explanation is that fruits are relatively scarce in July and August in the Malebo forests (Inogwabini and Matungila 2009; Inogwabini 2010). Elephants might be forced to search for alternative sources of food.

The distribution index of key plant species was not high. The low index reflects the rarity of these trees in the region, which leads elephants to search for them during fruiting seasons. Among key plant species, *Annodium manii* and *Irvingia* sp. were of particular
Crop damage done by elephants in the Malebo Region, DRC

Both species grow naturally and, as in other forest sites across Central Africa (Dowsett-Lemaire 1995a,b; Maisels 1996; Blake 2002), both humans and elephants eat their fruits. The presence of elephant signs around fields with these species indicates that elephants were searching for them. Elephants raided more frequently farms with stands of the same tree species in other sites in Odzala-Kokoua National Park (Kinzonzi 2004). Key plant species such as *Ziziphus mauritiana* and *Sacoglottis gabonensis* also drove seasonal crop raiding in Zimbabwe (Parker and Osborn 2001) and Gabon (White 1994; Lahm 1996).

The estimated mean financial cost that farmers incur is significant. Crop raiding in communal semi-industrial and commercial fields increased the mean financial loss. Even when the increase introduced by the outlier was taken out, losing ca. USD 100 still had a significant impact in a country where the mean GDP is USD 130 per person per year (Eba’A Ayi et al. 2008). Extrapolated over the entire area of Malebo where 1,500 fields were recorded and ~15% of these fields had been raided by elephants, mean income loss equaled ca. USD 76,500 annually. This is an enormous loss for local communities. Similar findings were reported from other sites across Africa (Tchamba 1995, 1996; Kotchikpa 1997; N’osso 1997; Bhima 1998; Sam and Barnes 1998).

Elephant conservation schemes in the region should factor the local economics in their planning and incorporate community conservation aspects in their programmes. Through such a programme, people would be brought to understand the ecological, cultural and material benefits elephants provide to local communities. Such a programme should include knowledge of how to avoid crop-raiding incidents, improve agricultural practices and relocate fields to areas where there are fewer signs of elephants.

Barnes (1999) warned that in their range HEC was second only to ivory trade as a problem in working to conserve elephants. Therefore, conservation schemes have to put in place mechanisms to convince local communities to save their remaining elephant populations. The community conservation we argue for here should focus on root causes of crop raiding across communities. It would be prudent to include redesigning the agricultural map of the region, and improving local livelihoods and the overall sustainable development. This whole process will work only if local communities become better organized, democratic and an integral part of the decision-making process (Inogwabini 2007). The proposition echoes the idea that conservation of elephants in this

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**Figure 4.** Tree species present around fields and key plant species that elephants consume.
region, as in other parts of Africa, will work only when people are convinced that elephants are part of their natural resources, not the sole property of conservation organizations.

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Crop damage done by elephants in the Malebo Region, DRC


Successful reduction in rhino poaching in Nepal

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Abstract

Well deserving accolades, Nepal has succeeded in granting better protection for its Asian rhino population than has any other country. According to the 2011 census, Chitwan National Park, Bardia National Park and Suklaphanta Wildlife Reserve had a total of 534 greater one-horned rhinos. In that year, only one rhino was poached. In 2012, just one other rhino was illegally killed. In November 2010 the Nepalese government set up three wildlife crime-control committees to work together nationally and in the districts to combat poaching and illegal wildlife trade in coordination with the Department of National Parks and Wildlife Conservation, the Forest Department, Customs, the army, the police, the National Investigation Department and the Crime Investigation Bureau. Emphasis was placed on apprehending traders, identifying smuggling routes and enlisting other governments in the region to coordinate action against wildlife culprits. The cooperation of Nepal’s own government departments, help from non-government conservation organizations and commitment from local people living near the boundaries of the three protected wildlife areas led to more measures taken to ensure rhino protection. These measures included training of law-enforcement officers, enforced severe penalties for wildlife crimes, better anti-poaching units composed of members of the communities living around the parks, improved intelligence gathering, and more money allocated to the communities as a result of increased park income from higher entry fees, and a higher number of tourists. Local communities receive 50% of the gross income of the three protected areas. In addition, local communities are financially benefiting from providing more amenities to tourists. Despite escalating prices for rhino horn in China and Vietnam, Nepal has curtailed poachers and traders. Other rhino range States in Asia and Africa have much to learn from Nepal’s successes in rhino protection.

Additional key words: greater one-horned rhino, Chitwan, Bardia, Suklaphanta, anti-poaching measures, rhino horn traders, law enforcement

Résumé

Des éloges bien mérités, le Népal a réussi à accorder une meilleure protection de sa population de rhinocéros d’Asie que n’importe quel autre pays. Selon le recensement de 2011, le parc national de Chitwan, le parc National de Bardia et la réserve de la faune de Suklaphanta avaient un total de 534 grands rhinocéros unicorns. Cette année-là, un seul rhinocéros a été braconné. En 2012, juste un autre rhinocéros a été tué illégalement. En novembre 2010, le gouvernement népalais a mis en place trois comités de lutte contre la criminalité de la faune sauvage pour travailler ensemble à l’échelle nationale et dans les districts pour lutter contre le braconnage et le commerce illégal des espèces sauvages en coordination avec le Département des parcs nationaux et de la conservation de la faune, le Département des forêts, les douanes, l’armée, la police, le Département national des enquêtes et le Bureau des enquêtes criminelles. L’accent a été mis sur l’arrestation des commerçants, l’identification des itinéraires de contrebande et à la collaboration avec d’autres gouvernements de la région pour coordonner l’action contre les coupables de la faune. La coopération des départements gouvernementaux du Népal, l’aide des organisations non gouvernementales de conservation et l’engagement des populations locales vivant à proximité des limites des trois zones naturelles protégées ont facilité la prise de plusieurs mesures pour assurer la protection des rhinocéros. Ces mesures comprenaient la formation des agents de mise en application de la loi, des peines sévères pour les crimes de la faune, de meilleures unités anti-braconnage composées des membres des communautés vivant autour des parcs, amélioration de la collecte de renseignements et plus d’argent.
Successful reduction in rhino poaching in Nepal

Introduction

Nepal, home to a population of over 500 greater one-horned rhinos, has witnessed a remarkable decline in rhino poaching, with only one rhino a year illegally killed in 2011 and 2012. This is despite the price of rhino horn increasing several-fold since 2005 in the consumer markets of East Asia. In comparison, during this period the number of rhinos killed in Africa and Asia has been the worst for many years. South Africa, which has 72% of the world’s approximately 29,000 wild rhinos, lost from poaching at least 448 in 2011 and 668 in 2012 (Mike Knight, Chairman, IUCN SSC African Rhino Specialist Group, pers. comm., February 2013). Rhino poaching has also been significant during this period in Kenya and Zimbabwe.

This paper examines how Nepal, one of the poorest countries in the world and with a generally weak governance, has been able to implement such a successful rhino conservation programme. We consider which anti-poaching strategies that Nepal has followed could be implemented in other range States.

Methods

Fieldwork was carried out in Nepal, mostly in Kathmandu, Chitwan National Park (NP), Bardia NP and Suklaphanta Wildlife Reserve (WR) in March and December 2012. We interviewed extensively members of the Department of National Parks and Wildlife Conservation (DNPWC), who manage Nepal’s three wildlife protected areas with rhinos, along with army officers based inside these areas to protect the rhinos. We talked to Forest Department officials and updated information on illegal wildlife product trade networks. We met the staff of several wildlife non-government organizations (NGOs) involved in rhino conservation, including WWF and the National Trust for Nature Conservation (NTNC), as well as personnel in the tourist sector. We collected unpublished statistics from the DNPWC and other government departments.

Results

A fall in rhino poaching in and around Chitwan NP from 2008 to 2012, and recent arrests

In 2008 the DNPWC, with assistance from other government departments and NGOs, carried out a detailed rhino count that showed there were 408 rhinos alloué aux communautés en raison de l’augmentation des revenus du parc provenant des droits d’entrée plus élevés, et un plus grand nombre de touristes. Les collectivités locales reçoivent 50% du revenu brut des trois aires protégées. En outre, les collectivités locales profitent financièrement de la provision de plus de services aux touristes. Malgré la hausse des prix de la corne de rhinocéros en Chine et au Vietnam, le Népal a réduit le braconnage et le commerce. D’autres Etats de l’aire de distribution de rhinocéros en Asie et en Afrique ont beaucoup à apprendre des succès du Népal en matière de protection des rhinocéros.

Mots clés supplémentaires : grand rhinocéros unicorne, Chitwan, Bardia, Suklaphanta, mesures anti-braconnages, commerçants de la corne de rhinocéros, application de la loi

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in Chitwan NP, 22 in Bardia NP and an estimated 5 in Suklaphanta WR (DNPWC 2008; Martin et al. 2008/2009). A similar census was carried out in April 2011. The count recorded 503 rhinos in Chitwan NP, 24 in Bardia NP and 7 in Suklaphanta WR. There were thus a total of 534 wild rhinos in Nepal in 2011 (DNPWC 2011). This increase of 99 rhinos during this period can be attributed to both a healthy population growth rate and a decrease in rhino poaching. All Nepal’s rhinos are the greater one-horned species that are found also in northern India in the extensive grassland region just south of the Himalayas.

In 2008, 7 rhinos were poached in and around Chitwan NP, 6 within the park and 1 just outside; all had been shot. In 2009, 10 rhinos were shot dead, 7 inside the park and 3 in the Buffer Zone (Martin and Martin 2010). In 2010, 9 were poached, 8 in the park; all were adults that had been killed with guns (Babu Ram Lamichhane, conservation officer, NTNC, pers. comm., December 2012). In February 2011 the police were able to arrest five of the poachers who had killed 7 of the rhinos in 2010. They were all from the same family, according to press reports.

On 3 January 2011, one rhino was poached, the only one that year. It was an adult male shot in the southern part of the park at Dhobe. The poachers took the horn. The Nepalese used to cut off some of the skin and nails for traditional purposes, but demand is now down for these. Soon after this poaching incident, officials caught one poacher and the middleman, who had already sold the horn to a Tibetan trader in Kathmandu for export (Krishna Prasad Acharya, former director general of DNPWC, pers. comm., December 2012).

On 3 April 2012, one rhino was poached, again the only one for the year. It was an adult female killed inside the park on the western side at Sailimaili Khola. It too had been shot. At least three poachers were involved; they took only the horn. Bringing in a sniffer dog, the Kathmandu police team assisted the game scouts in finding the carcass. This was the first time that a sniffer dog had been used to track poachers in the field in Nepal. The police followed the poachers’ trail to the Indian border; most likely the poachers were all Indian nationals who got assistance from local Nepalese familiar with the region’s topography. The dog could not enter India so nobody at first was caught, but later, one gang member who had carried the supplies was arrested in India (Kamal Jung Kunwar, under-secretary, DNPWC; Jhamak B. Karki, chief conservation officer, Chitwan NP; Ganga Jang Thapa, executive officer, NTNC; Lamichhane; and Rupak Maharjan, assistant conservation officer, Kasara, Chitwan NP; all pers. comm., December 2012).

A fall in rhino poaching in and around Bardia NP and Suklaphanta WR from 2008 to 2012

In 2008, two rhinos were poached in Bardia NP (Martin et al. 2008/9), but from 2009 to the end of 2012 no rhino is known to have been poached there (DNPWC 2011, unpublished data; DNPWC 2012). This is in contrast to the seven years before 2008 when at least 60 rhinos were poached in Bardia NP, although few carcasses were ever found at that time due to lack of patrolling (Martin et al. 2008/9). As for Suklaphanta WR, no rhinos were poached from 2008 to the end of 2012, a reserve more famous for its large population of swamp deer that numbered 1,743 during the April 2011 census (Binay Kumar, DNPWC, Suklaphanta WR, pers. comm., March 2012).

Factors contributing to the sharp decline in rhino poaching in Nepal in 2011 and 2012

From an average of nearly 10 rhinos poached a year in Nepal from 2008 to 2010, the number dropped to only 1 a year in 2011 and 2012. This has been due to some effective rhino-protection strategies, greatly improving important new approaches to curtailing the rhino horn trade and initiating others.

In 2010 the national and district governments established new committees to combat wildlife crime. The prime minister was himself active in this important development. At a Cabinet meeting on 21 November 2010 chaired by the prime minister, the government set up wildlife crime control committees within the Ministry of Forest and Soil Conservation, under which the DNPWC falls. The committees consist of the National Wildlife Crime Control Coordination Committee (NWCCCC), the Wildlife Crime Control Bureau (WCCB) Central Level, and the Wildlife Crime Control Bureau District Level, of which there are 19 scattered throughout the country.

The government’s new NWCCCC consists of members from various ministries with expertise in fighting wildlife crime. NWCCCC establishes policies and gives advice to other bodies to control crimes
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The WCCB Central Level includes high-level representatives from the DNPWC, the Forest Department, Customs, army, police, the National Investigation Department and the Crime Investigation Bureau (CIB). The WCCB District Level involves officers from the same departments but excludes the CIB. The duties of the WCCB are to control poaching and all aspects of wildlife crime, with emphasis on catching traders and exposing smuggling routes locally and internationally. Recently the CIB established the Wildlife Crime Pillar III to reduce the poaching of large mammals. Police are now arresting suspected poachers and traders all over Nepal, which they rarely did before. The CIB has been providing money for intelligence. The CIB, the DNPWC and the Forest Department have been collaborating well with one another, sharing information and improving their anti-poaching efforts, such as by using the police sniffer dog in 2012. The CIB now alerts the DNPWC and the Forest Department of the whereabouts of poachers to enable them to carry out arrests beyond the protected areas. Before late 2010, park staff were limited to arresting rhino poachers only within and adjacent to the rhino-protected areas, but since late 2010 there have been considerable successes in apprehending poachers and traders farther afield (Acharya and Kandel 2012; Narendra Pradhan, former chief warden of Chitwan NP, pers. comm., December 2012).

Nepal has had high penalties for wildlife crime for some years. The district forest officers (DFOs) and the chief wardens all have the power to issue penalties and imprison wildlife criminals. Prosecutions are thus simple and frequent. Jail sentences are up to 15 years with a fine of up to NPR 100,000 (Nepal rupee) (USD 1,149) or both. They can be appealed at the Appellate Court, but usually the court supports the penalties. These heavy jail sentences and fines are indeed an effective deterrent against poachers and traders, and more people now know how great is the risk they take in attempting poaching.

On the international front, in January 2011 a regional network called South Asia Wildlife Enforcement Network (SAWEN) was set up to fight wildlife crime; it involves Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka. The secretariat is based in Kathmandu. SAWEN aims to facilitate coordination among member countries to control poaching and illegal wildlife trade in South Asia. Cross-border communication is improving between Nepal and India, as witnessed by the arrest of a poacher in India after the 2012 rhino-poaching incident. All three of these wildlife protected areas in Nepal border India. In March 2012 forest officers in India informed the DNPWC staff at Suklaphanta WR that two of their seven rhinos had temporarily crossed into India, demonstrating good cooperation and communication in guarding the rhinos between the Nepal and India border (Binay Kumar, pers. comm., March 2012).

The Nepal Army has also improved their anti-poaching activities. Earlier, during the Maoist insurgency from 1995 to 2006 the army that is based inside Chitwan NP, Bardia NP and Suklaphanta WR withdrew many of the scattered posts to concentrate their men for greater security. For instance, in Chitwan NP in late 2009 the army and the park staff had only 32 posts but by 2012 they were manning 51 posts and had greatly expanded their patrol work. The morale of the army in Chitwan NP, Bardia NP and Suklaphanta WR has improved due to the increased numbers of occupied posts in all three areas. In 2011 and 2012 the army put greater emphasis on security for wildlife since it no longer had to protect people from the Maoists. While the army until recently could only in extreme circumstances arrest poachers outside the protected areas, soldiers can now follow poachers into the surrounding areas and apprehend them wherever they are. In 2012 the army could also gather information on wildlife poachers and traders outside.

Women are often seen carrying firewood from the sal forests in the remote region of Suklaphanta Wildlife Reserve.
the park—another important new development. The army in Chitwan NP also has started mobile camps: there are now two mobile camps with 10–15 personnel for each one. The army’s cooperation with park staff, forest officers and other government departments has been steadily improving, enabling more effective rhino protection.

NGOs have also played an increasing role in rhino anti-poaching. Between 2009 and 2011, NTNC and the Zoological Society of London (ZSL) trained over 85 park staff in rhino-protected areas (Naresh Subedi, NTNC, pers. comm., July 2013). In 2012 WWF trained 55 enforcement officials on investigation and prosecution of wildlife crimes. The training was conducted in Bardia and Chitwan NPs and involved officials from many organizations (WWF 2012). NGOs have continued to help the communities around the parks and have initiated new projects. In addition, the government established a new buffer zone north of Bardia NP’s Babai Valley where most of the rhino poaching took place in the past. Here NTNC and the DNPWC have set up anti-poaching units from the local communities. In one month alone—October 2012—these units helped to confiscate 41 guns from poachers in this area (Thapa, pers. comm., December 2012). Families who give up guns are supported with alternative livelihoods through NTNC, DNPWC and WWF Nepal. An ongoing project aims to bring these communities into mainstream conservation through education and livelihood support. This project is largely funded by the United States Fish and Wildlife Service (Subedi, pers. comm., July 2013).

In mid-2012 the DNPWC substantially increased the entry fees to those visiting Chitwan NP, Bardia NP and Suklaphanta WR, increasing revenue partly to enable a larger amount to be paid to the local communities. Income earned by parks goes to the Central Treasury, which then allocates a budget to the DNPWC. In fact, the DNPWC based in Chitwan NP spent less than it earned in 2010/11: USD 755,319 expenditure versus USD 1,154,805 earnings (DNPWC 2011)! Chitwan NP’s total budget remains high compared with other government protected areas for rhinos in Asia and Africa. Combining the budgets for the DNPWC and the army, over USD 1,400 a year per km² is spent (unpublished data from the DNPWC and the army). A foreigner (excluding from neighbouring countries, which pay rather less) now pays NPR 1,500 (USD 17), up from NPR 500 (USD 7) in 2011 per day entry fee, and pays for a one-hour ride on a government elephant NPR 2,500 (USD 29), up from NPR 1,000 (USD 14) per person in 2011. A Nepalese visitor now pays NPR 100 (USD 1) entry fee, up from NPR 20 (USD 0.28). Tourist numbers have steadily increased thanks to the end of the Maoist insurgency and Nepal’s better security. In Chitwan NP in the financial year 2009/10 there were 115,181 visitors (72,973 foreigners, 31,309 Nepalese, and 10,899 from neighbouring countries). In the financial year 2010/11 the number rose to 146,620 (90,717 foreigners, 39,898 Nepalese and 16,005 from neighbouring countries). Bardia’s visitors also increased during this time from 6,248 to 8,055 (of whom 3,959 were foreigners). In comparison, Sukkaphanta’s visitors remained very low at 358 in 2010/11, due to the reserve being tucked away in the undeveloped far southwest of the country, which few people visit (DNPWC 2010, 2011).

Cooperation and communication have improved between the DNPWC and the local communities living around the wildlife protected areas. Many of the thousands of people in the buffer zones now have learned that they are given a 50% share of the DNPWC’s protected area gross revenue, and thus they understand it is in their interest to protect rhinos, which attract the tourists. One way that the communities around Bardia NP help protect rhinos is to contribute voluntarily over 100 youths to patrol the borders of Bardia NP and this has become more efficient due to the better coordination between the park and the community. In Chitwan NP, 22 user committees—groups within the buffer zone—provide voluntary anti-poaching units of between 9 and 13 people for each unit. In 2011 and 2012 local farmers and villagers became more experienced and committed, spotting outsiders coming into the area possibly attempting to find out about rhinos to poach (Lamichhane, pers. comm., 2012; Amir Maharjan, assistant conservation officer, Sauraha, Chitwan NP, pers. comm., December 2012). For several years some of the local communities in the buffer zones, such as those around Chitwan’s tourist hub of Sauraha, have been increasing their own tourist enterprises, thus receiving more direct tourist revenue. Often they present evening entertainment of traditional music and dancing, and they also give walking tours of their villages. With tourism growing since 2010, they have been putting a far greater effort into protecting rhinos that come into their areas. For instance, the Baghmara Community Forest near Sauraha employed 23 security guards in
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2012 (Maharjan, pers. comm., 2012). The Bellata Community Forest situated near Chitwan NP’s headquarters at Kasara also obtains revenue from tourists staying at nearby lodges. More lodges are being built there on private land and a new large one opened in 2012. Many more tourists visited the Bellata Community Forest in 2012 than earlier. The lodges arrange for each tourist to pay the community NPR 250 (USD 3) to walk in the forest and NPR 350 (USD 4) for an elephant to take passengers for a ride in the forest (Krishna Prasad Paudel, naturalist, Machan Paradise View, pers. comm., December 2012). Next to Bardia NP in the southwest buffer zone, some of the people living quite close to the headquarters have set up homestays where visitors, mainly from nearby India, can come and stay in their homes inexpensively, enjoying a rural setting and a peaceful atmosphere. The homestay owners have developed their skills in cooking, housekeeping and hospitality, with training from NGOs such as WWF and NTNC. They are thus receiving increased income from tourism, enabling them to improve their standard of living, buying more bicycles and building houses with more modern materials (Premi Khadka, owner of Bardia Jungle Cottage, pers. comm., March 2012). Near some of these homestays just outside the park is a waterhole that attracts rhinos, enabling tourists to see a rhino close up. As many tourists’ prime wish is to see elephants, rhinos and tigers, the villagers are now keener to protect Bardia and any of the animals that may stray afield.

Rhino protection has also been significantly improved, thanks to the DNPWC’s rhino identification and monitoring system. ZSL and NTNC started a project with the DNPWC in 2008 to photograph rhinos and record their body markings on computer to recognize individuals. Nearly all Bardia’s rhinos were recorded in 2009, and by the end of 2012, 120 rhinos had been identified in Chitwan NP (Lamichhane, pers. comm., December 2012). In 2010, the DNPWC with ZSL and NTNC established the Management Information System Technology (MIST) to improve monitoring and managing key species. First introduced into Suklaphanta WR, then Bardia NP and finally Chitwan NP, park and army staff complete forms documenting what the ground personnel have seen on patrol, and this information is fed into a database at their headquarters. It has improved the management of the rhinos, enabling more protection for them (Thapa, pers. comm., December 2012).

Intelligence has been greatly strengthened in Chitwan NP, home to 94% of Nepal’s rhinos. Senior staff have recruited new and more reliable informers, putting them in more strategic locations and providing...
them with greater incentives. In 2009 there were 16 informers around Chitwan NP; in 2012 the number rose to 20, with most in the buffer zones. Payments to informers increased from NPR 2,000–3,000 (USD 27–41) a month in 2009 to NPR 3,000–8,000 (USD 35–96) a month in 2012, funded mostly by WWF, NTNC and ZSL. The government has maintained a high concentration of staff in the rhino-protected areas. Suklaphanta WR, as well as having 14 army posts, has 15 wildlife guard posts including 3 new ones (Binay Kumar, DNPWC, Suklaphanta WR). In Chitwan NP, the government maintains an army battalion of 850 men—the same number for many years—along with 268 park staff in 2012, thus totalling 1,118 men in the park. This works out to about 1.2 people per km² for Chitwan NP—one of the highest concentrations for any government-managed rhino park or reserve in the world. In addition, near the western boundary of Chitwan NP in Nawalparasi District, a newly introduced army company of 350 men has been posted to carry out rhino anti-poaching activities, mainly by foot patrols.

A final factor that has helped to reduce rhino poaching in 2011 and 2012 has been the more aggressive role of the media, publicizing the urgent need for rhino protection. The DNPWC gives reports to the media that are used for awareness campaigns on the radio and television and in the press. The media have also actively criticized the government authorities when they have been seen not to be effective in reducing wildlife crime or human–wildlife conflict. The press has thus helped to increase transparency in some government departments by exposing mismanagement and corruption. Overall, the DNPWC is now largely free of corruption and senior staff are committed to wildlife conservation, a major factor in helping to reduce rhino poaching.

Results on the crackdown of rhino poachers and traders

Through cooperative effort, 55 rhino poachers and traders were arrested in 2010/11 in and around Chitwan NP (unpublished statistics, Chitwan NP). In October 2012, officials arrested an entire chain of rhino criminals in quick succession: the gang of poachers and two traders. The poaching gang consisted of 17 people, all arrested in the Chitwan area, including two women in the gang, being less likely suspects. The gang possessed NPR 900,000 (USD 10,345) in cash. The two traders, who lived in the Kathmandu area, were also arrested. This operation was a collaborative effort involving the DNPWC, CIB, the army and various NGOs (Lamichhane, pers. comm., December 2012). Since the government set up the NWCCCC, WCCB and Wildlife Crime Pillar III, officials have arrested and jailed several of the big wildlife traders, who were mainly based in Kathmandu. Arrest warrants had been out for some for 10 years or more (Acharya and Kandel 2012). By the end of 2012, according to Mr Acharya, only two major groups of wildlife traders were still operating in Nepal, down from seven in 2010 (pers. comm., December 2012).

During the financial year of 2010/11 the Forest Department office in Kathmandu arrested 50 wildlife traders and poachers with 13 leopard skins, 9 red panda skins, 6 fake rhino horns, 1 real rhino horn, various bird species, many musk pods from the male musk deer and other items (unpublished statistics, DFO, Kathmandu). Even the antique and curio shop owners in Kathmandu know about the government’s enhanced efforts to eliminate sales of prohibited wildlife products. In a survey of wild animal products for sale in these shops, we found only one item: an antique container made from a rhino nail to hold powder, priced at USD 862.

A growing number of government rhino horns are in stock in Nepal and officials are aware of the need for tighter security. The former king’s palace in Kathmandu has 90 rhino horns and some officials want to transfer them to somewhere safer. Mr Acharya, in his new position as chief of the Planning and Human Resource Division in the Ministry of Forests and Soils, is involved in the important job of improving
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Discussion

Ample evidence proves that the new government institutions in Nepal, as well as the expanded and improved anti-poaching activities implemented by officials, communities and NGOs, have resulted in less wildlife crime, with arrests and prosecutions of the main rhino poachers and traders and a fall in the sale of rhino horn in 2011 and 2012.

Other major factors responsible for the drop in rhino poaching in Nepal have been open and supportive cross-border communication between Nepalese and Indian officials; more power allocated to the army in anti-poaching work; increased NGO support to the communities regarding rhino awareness and protection; and higher park entry fees providing, among other things, more money for rhino protection and more money for the local communities. The people living in the buffer zones are now showing greater support for rhinos, and there is better communication between them and the DNPWC. Having become more involved in rhino protection in the buffer zones, they have helped to increase tourist numbers, and more communities are involved in rhino-based tourism. Also, rhino monitoring has improved considerably through using the rhino identification database, intelligence has expanded notably, and the number of government staff in the rhino ecosystems helping in anti-poaching has increased. More support from the media has added to these successes.

It would be advisable for those involved in rhino protection elsewhere in Asia and Africa to implement some of the strategies described in this article that have been responsible for Nepal’s reduction of rhino poaching since late 2010. The most important of these is a greater commitment from governments towards rhino conservation. It is vital for heads of State to support rhino conservation. Other important factors that require only a small administrative and financial cost to implement include strengthened intelligence networks, more stringent penalties for rhino crimes, and improved relations between officials and the people surrounding rhino-protected areas.

Conclusion

Nepal, a poor country with generally weak governance, almost eliminated rhino poaching in 2011 and 2012 as only two rhinos were poached during this time. This is primarily due to an increased commitment by the government to halting wildlife crime by introducing new crime-control committees that succeeded in arresting and prosecuting poachers and traders, enabling an overwhelming decline in rhino poaching. The communities living near the protected areas have also shown remarkable improvements in their anti-poaching efforts. Many of the main rhino poaching and trading gangs in Nepal have now been caught.

This accomplishment is extraordinary, especially since the price of rhino horn in the main markets in Vietnam and China has sharply escalated in recent years. Other rhino range States in Asia and Africa have much to learn from Nepal’s success.

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References


Ziwa Rhino Sanctuary—the first 10 years

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Introduction

Once there were hundreds of eastern black and northern white rhinos in Uganda, but through legal over-hunting and illegal poaching they became officially extinct in 1983. In 1997, a group of conservationists created the NGO Rhino Fund Uganda to raise funds to reintroduce rhinos to the country. So it was that the first fence posthole for the new Ziwa Rhino Sanctuary (ZRS) was dug in October 2013.

The sanctuary covered 64.2 km² in Nagasongola District in central Uganda. While this was outside of the historic range of the northern white rhino, it was only 120 kilometres further south of the area in Murchison Falls National Park to where white rhinos had been moved and bred successfully in the early 1960s.

The sanctuary area is divided between raised areas, ridges or interfluves with alluvial sandy soils and shallow drainage lines with clay loams or ‘black cotton’. The soils of the area are classified as Ferralsols and Fluvisols. The dominant vegetation types are *Combretum* woodland mosaic, wooded grassland, open and swamp grassland, and riverine swamp along the Lugogo River. There are only small areas of dense bushland or thicket. Approximately 30% of the area becomes seasonally inundated or waterlogged, including much of the grassland on the drainage lines and adjoining the swamp. Average annual rainfall between 2004 and 2012 was 1,046 mm (range 708–1,345 mm).

Before Ziwa was accepted as a rhino sanctuary, an expert evaluation of its carrying capacity suggested the habitat could maintain 1 rhino per 1.5 km² (Brett 1998), meaning a maximum today of 47 white rhinos. The fully fenced area received its first four white rhinos, two subadult males and two subadult females, in July 2005. By this time, the northern white rhino was almost extinct in the last confirmed wild population in the Democratic Republic of Congo (DRC), and those individuals remaining were of the highest conservation value. The DRC government authorities ultimately were unwilling to translocate any of the remaining rhinos to a more secure reserve in another country and would have been especially unwilling to do so to a new and untried reserve like Ziwa. Although the southern white rhino was not indigenous to Uganda, given the unavailability of indigenous northern white rhino IUCN supported the introduction of the more numerous southern white rhino into Ziwa, recognizing that this re-established the species in Uganda (Emslie et al. 2009). In September 2006, an adult female and immature male were added to form the founder population.

At the end of 2013, the white rhino population of ZRS consisted of 13 individuals: 3 adult males—Taleo, Moja and Hassani—and 3 adult females with calves—Nandi and female calf Uhuru, Bella and female calf Donna, Kori and female calf Laloyo, and 4 subadults, the males Obama, Augustu and Justus, and the female Malaika (Table 1).

The rhinos at Ziwa are held under heavy 24-hour security by armed guards and monitoring rangers, who follow the animals on foot from a distance but keep them in sight as much as possible. During the hours of darkness, the rangers have torches, which they use to observe the rhinos whenever they hear any sound of activity, and at least at 15-minute intervals to check on the rhinos. During full moon periods the rhinos are easily observed without the need for torches.
Rangers monitoring the rhinos initially reported any incident that was thought significant such as mating and calf birth. Since June 2010, to better understand the behaviour and movements of the rhinos, the monitors have kept an hourly record of the location, key activities of each rhino and their associations with conspecifics (for more details see Patton et al. 2011). The rangers complete a 24-hour sighting form for each hour of each day, recording the location, type of habitat, main activities—feeding, resting, moving—and secondary activities—drinking, wallowing, mating or fighting (conspecific aggression)—that have occurred. To standardize location information, the reserve is split into sectors and blocks, as shown in Figure 1.

The daily data are not always complete as there are occasions when a particular rhino is out of sight, especially in thick bush habitat, or has run off and has to be found again, especially after a disturbance at night. Microsoft Excel macros were used to consolidate and analyse the data.

Summary of the 3-year data collected between June 2010 and May 2013

Main activity

The daily pattern of main activity was consistent among each of the three 12-month periods:

- Midnight to 1 a.m. feeding or resting
- 1 a.m. to 5 a.m. resting
- 5 a.m. to 6 a.m. feeding or resting
- 6 a.m. to 11 a.m. feeding
- 11 a.m. to 4 p.m. resting
- 4 p.m. to midnight feeding

Feeding was carried out on average for 13 hours per day (54%), resting for 9 hours per day (38%), feeding or resting for 2 hours per day (8%). Rhinos were most likely to go to water to drink between 3 p.m. and 6 p.m.

During the night-time period of 7 p.m. to 7 a.m., where few detailed observations have been reported by other rhino areas, the rhinos spent 6 hours feeding (50%), 4 hours resting (33%) and 2 hours feeding or resting (17%).

Main location

The rhinos most-preferred location in each of the 3 years has been sector L block 2 (39% of the time); next was sector R blocks 2 and 3 combined (28% of the time). L2, R2 and R3 are areas where the grass was kept short by annual burning and that constitute pockets of relatively open ground where movement for rhinos is easy when grazing.

W block 2 (15% of the time) was important in wet months; it was higher, therefore drier, ground. In this block, cattle grazing maintained short grass.

Breeding performance

The aim of the reintroduction project is to produce as many new individuals as quickly as possible in order to boost rhino numbers in the country, and to in future provide animals to create and build a metapopulation of white rhinos. Rapid breeding of
rhinos also minimizes loss of genetic heterozygosity, and this is especially important given the current small founder number of this population. The data collected indicate the level of breeding performance of the population. Analyses undertaken include the interval between the new birth date and the apparent conception date (known here as the mating interval), the interval between the apparent conception date and the new birth date (the gestation period) and the interval between births of calves from the same female (the calving interval).

Table 2 summarizes the available reproduction data for the three females at ZRS.

### Mating

Taleo accompanied both Bella and Kori throughout August, September and October 2010. Mating was observed in early September with Bella and mid-September with Kori; Moja was also present at times in the same period. Taleo accompanied Nandi from the end of December 2011 to the end of February 2012 with mating observed in mid-February. Taleo accompanied Kori on two short 7-day periods in August and September 2012 with mating observed during the August period; Moja was absent throughout. Bella was accompanied by Taleo from mid-October through to 14 November 2012 with mating observed on 10 November. Taleo returned to Bella from 20 November to 9 December while Moja was absent throughout the period.

Mating observations by rangers showed Nandi mated four times in daylight hours on 11 January 2012 with mating lengths of 40, 21, 45 and 50 minutes and mated twice two days later for 28 and 10 minutes. Bella mated with Taleo on 7 September 2010 between 6 a.m. and 10 a.m. and between 12 p.m. and 2 p.m. Bella also mated with Moja between 6 a.m. and 7 a.m. on the same day. Kori mated with Taleo between 11 a.m. and 12 p.m. and between 3 p.m. and 4 p.m. on 19 September 2010. For the second calf, Kori and Taleo mated at 4.15 p.m. on 8 August 2012.

The ZRS data showed that the two mature adult males, Taleo and Moja, were continually interacting with the three breeding females and at times were in the same area at the same time. The sighting and mating data indicate that Taleo was the dominant male who was observed mating with all females. Mating with both males in a short time period was recorded only once when Taleo and Moja both mated Bella between 6 a.m. and 7 a.m. However, there were daylight-hour periods when the females were out of view when mating could have occurred; there are no records of night-time mating.

Both Bella and Kori were observed mating on only one day while Nandi mated on two days with a 48-hour gap. This observation suggests that conception was easily achieved.

Copulations recorded at ZRS were only available for the mating of the female Nandi with the male Taleo where it was recorded six times, four of which occurred in a 7-hour period and two in a 4-hour period. The length of each mating varied between 10 and 50 minutes, averaging 32 minutes. Although all females were accompanied by a male after mating, on only one occasion could a consort period be isolated—Taleo remained with Kori for three days after mating.

### Birth

The four gestation periods recorded in ZRS averaged 468 days (range 423–488). Five of six births occurred in January and June, two of the driest months of the year. The average intercalving interval for the three females was 2.1 years (range 1.9–2.3 years).

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**Table 2. Reproduction data for the three female white rhinos at Ziwa Rhino Sanctuary**

<table>
<thead>
<tr>
<th>Reproduction</th>
<th>Nandi</th>
<th>Bella</th>
<th>Kori</th>
</tr>
</thead>
<tbody>
<tr>
<td>First calf</td>
<td>Obama</td>
<td>Augustu</td>
<td>Justus</td>
</tr>
<tr>
<td>Birth date</td>
<td>25 Jun 09</td>
<td>07 Sept 09</td>
<td>02 Jan 10</td>
</tr>
<tr>
<td>Conception date¹</td>
<td>05 Feb 10</td>
<td>07 Sept 10</td>
<td>19 Sept 10</td>
</tr>
<tr>
<td>Mating interval² (days)</td>
<td>224</td>
<td>365</td>
<td>259</td>
</tr>
<tr>
<td>Gestation period³ (days)</td>
<td>423</td>
<td>488</td>
<td>483</td>
</tr>
<tr>
<td>Second calf</td>
<td>Malaika</td>
<td>Donna</td>
<td>Laloyo</td>
</tr>
<tr>
<td>Birth date</td>
<td>04 Jun 11</td>
<td>10 Jan 12</td>
<td>15 Jan 12</td>
</tr>
<tr>
<td>Intercalving interval</td>
<td>1.9 years</td>
<td>2.3 years</td>
<td>2.0 years</td>
</tr>
<tr>
<td>Conception date</td>
<td>13 Feb 12</td>
<td>10 Nov 12</td>
<td>08 Aug 12</td>
</tr>
<tr>
<td>Mating interval (days)</td>
<td>253</td>
<td>283</td>
<td>210</td>
</tr>
<tr>
<td>Gestation period</td>
<td>477 days</td>
<td>n.a.</td>
<td>n.a.</td>
</tr>
<tr>
<td>Third calf</td>
<td>Uhuru</td>
<td>n.a.</td>
<td>n.a.</td>
</tr>
<tr>
<td>Birth date</td>
<td>01 Jun 13</td>
<td>n.a.</td>
<td>n.a.</td>
</tr>
<tr>
<td>Intercalving interval</td>
<td>2.0 years</td>
<td>n.a.</td>
<td>n.a.</td>
</tr>
</tbody>
</table>

¹ Conception date shown was the last date when a mating was observed
² Mating interval represents the period between the birth of a calf and the conception date
³ Gestation period is the time between the conception date and the birth date of the subsequent calf
Fighting

Monitoring rangers record any aggressive behaviour from serious (as opposed to play-like) behaviour, from pushing and shoving through to fierce assaults resulting in injuries (Table 3).

Taleo was observed to be the dominant male, most often fighting with Moja, his same-age rival. The intensity of the fights developed over time and resulted in Moja trying to escape from the sanctuary by smashing through the fence. Since October 2012, Moja has made its main range (perhaps territory) in the rarely used sector K, away from the danger Taleo poses.

Hassani, when a 9-year-old male, was initially tolerated by Taleo but fought with Moja, but within a year, at 10 years of age, he was more of a breeding threat. From this time, Taleo started fighting him while Moja avoided any association.

Analysis of the fighting data between the males and females shows that most fights were in the months between the birth of a calf and first subsequent mating. For Nandi, data are available only for the second birth, when fighting with Taleo occurred in seven out of eight months leading up to mating. On some occasions, fighting between Nandi and Taleo was recorded as ‘Nandi defended the new calf’ from Taleo. Both Taleo and Moja fought with Bella in the four months before her first calf was conceived, after which fighting all but ceased, even in the months preceding the conception of the second calf. For Kori, fighting was spread across all months but at a much reduced level compared with the other two females, and she is considered the most placid of the three.

In summary, no fighting mortality occurred during the period and only once was veterinary intervention necessary, when Taleo injured Moja near his eye. Also the 24-hour protection has allowed staff to protect the vulnerable young animals from being injured or killed by bulls after they have left their mother but before they have joined the other animals.

Population performance

It is of conservation importance to increase the white rhinoceros population in East Africa in order to establish an additional out-of-range metapopulation in case of a catastrophe in the southern African range States. Optimum breeding performance is essential in establishing self-sustaining populations (Hermes et al. 2007) so it is vital to understand the reproductive status and factors that influence the fecundity of these animals.

Emslie and du Toit (2006) published indicators that can be used to determine population performance. In small populations such as ZRS, estimates are usually analysed over periods of three or five years as calving rates are variable year to year.

**Indicator 1. Overall annual population growth rates**

Over the period from the first birth in 2008 to 2013, seven births
- > 7.5%, indicates good to excellent performance
- 5–7.5%, indicates moderate to good performance
- 2.5–4.9%, indicates poor to moderate performance
- < 2.5%, indicates poor to very poor performance (population may even be declining).

<table>
<thead>
<tr>
<th>Rhino</th>
<th>Taleo</th>
<th>Moja</th>
<th>Hassani</th>
<th>Total</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Taleo ♂</td>
<td>—</td>
<td>79</td>
<td>26</td>
<td>105</td>
<td>39</td>
</tr>
<tr>
<td>Moja ♂</td>
<td>79</td>
<td>—</td>
<td>30</td>
<td>109</td>
<td>40</td>
</tr>
<tr>
<td>Hassani ♂</td>
<td>26</td>
<td>30</td>
<td>—</td>
<td>56</td>
<td>21</td>
</tr>
<tr>
<td>Total ♂</td>
<td>105</td>
<td>109</td>
<td>56</td>
<td>270</td>
<td>100</td>
</tr>
<tr>
<td>Nandi ♂</td>
<td>13</td>
<td>15</td>
<td>17</td>
<td>45</td>
<td>30</td>
</tr>
<tr>
<td>Bella ♀</td>
<td>34</td>
<td>33</td>
<td>4</td>
<td>71</td>
<td>48</td>
</tr>
<tr>
<td>Kori ♀</td>
<td>9</td>
<td>15</td>
<td>8</td>
<td>32</td>
<td>22</td>
</tr>
<tr>
<td>Total ♀</td>
<td>56</td>
<td>63</td>
<td>29</td>
<td>148</td>
<td>100</td>
</tr>
<tr>
<td>All, ♂ &amp; ♀</td>
<td>161</td>
<td>172</td>
<td>85</td>
<td>418</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 3. Number of fights recorded involving the six adult rhinos at Ziwa Rhino Sanctuary

New calf Uhuru meets subadult male Justus for the first time.
Even though the founder population had a 1:1 sex structure and two of the three founder females were introduced as subadults, the population has achieved a net average growth rate of 14.9% per annum, which is an excellent performance.

**Indicator 2.** Observed intercalving interval

- **> 3.5 years**, poor to very poor fecundity
- **3.1–3.5 years**, moderately poor to poor fecundity
- **2.5–3.0 years**, good to moderate fecundity
- **< 2.5 years**, good to excellent fecundity.

At ZRS, the four recorded birth intervals averaged 2.1 years, which is excellent fecundity.

**The future**

The data presented are clear evidence that ZRS has so far proven to have an excellent habitat and a secure environment for breeding southern white rhinos. Habitat preferences and breeding performance to date support management burning and use of cattle grazing to help create and maintain favoured open, short grass areas. However, challenges still need to be addressed. The small number of 6 founders is well below the 15–20 individuals recommended as a founder group in a new reserve, which might ultimately lead to a slower than desired increase in the population and reduced genetic heterozygosity. More females of breeding age are needed to redress this situation, especially as Ziwa was established to be the engine that produces surplus founder rhinos to set up additional populations in the country. In addition, the three female founders are under stress from both the competing three males of breeding age and from the rapidly increasing number of tourists. The females with their calves are often accompanied by one or more of the four subadults and are more consistent in their range than are the males. This makes them easier to monitor and take visitors to see. On any one day, only one of the females may be accessible, so at the height of the season, the presence of a constant stream of groups can create stress pressure on the individual rhino.

By 2008 ZRS was receiving a mere 2,223 visitors, but a concerted campaign to persuade safari operators to call into the reserve on their way to or from Murchison Falls has resulted in 11,051 visitors in 2012, increasing to 12,629 in 2013. As visitor numbers continue to rise, which is necessary to obtain the income required to maintain the reserve, the problem may affect breeding performance unless the population of females is increased to make more individuals accessible. It is hoped that a suitable rhino range State will donate as many as six females to ZRS, and sooner rather than later.

**References**


CITES-MIKES update
Mise à jour de la CITES-MIKES

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Minimizing the Illegal Killing of Elephants and other Endangered Species (MIKES)

In early December 2013, on the sidelines of the African Elephant Summit in Gaborone, the European Union announced the award of a €12.3 million grant to the CITES Secretariat to implement a project entitled *Minimizing the Illegal Killing of Elephants and other Endangered Species* (MIKES). The new project is expected to be launched in the course of 2014, with an initial phase of consultation with range States and other partners, and to conclude at the end of 2018.

MIKES builds on the strong foundation established and lessons learned through MIKE implementation over the past decade, but with an expanded focus to include: a) monitoring and protecting other CITES-listed flagship species threatened by illegal international trade, such as rhinos and great apes; b) initiatives aimed at minimizing the impact of poaching and the illegal trade in the target species, in particular through efforts to strengthen the capacity and capabilities of law enforcement agencies to combat poaching at the site and national levels; c) piloting the adaptive management and monitoring approaches promoted by MIKE in selected sites in the Caribbean and Pacific regions.

MIKES has been operating in Africa for 12 years, and there is now a rich volume of practical
experience that provides a strong foundation to design appropriate, realistic and cost-effective activities to be implemented by the new project. The lessons learned that have influenced the design of MIKES have been generated by the mid-term and final evaluations of MIKE Phases I and II, the most salient of which are summarized in the next three paragraphs.

A strong emphasis of MIKE Phase II was building capacity for ranger-based monitoring in all participating elephant range States. However, experience has shown that this capacity building has limited impact when investment in law enforcement and species protection remains low, because of insufficient resources with which to conduct ranger patrols. While it will continue to be important to provide essential investments in capacity building at the sites, there is a need to refocus investment on raising awareness and supporting cooperation and action to support species protection and law enforcement at national, subregional and international levels. In this way, the MIKES project has the potential of being more catalytic in enabling greater investment in species protection and site law enforcement in the long term, rather than fire-fighting to address capacity needs at the site level in the short term.

The complexity of law enforcement and management challenges now facing wildlife management authorities at the site and national levels highlight the need to invest in strengthening law enforcement systems. In Phase II, MIKE provided support to roll out the MIST (Management Information SysTem) ranger-based monitoring system, a contribution that partially met this need. However, advanced skills in MIST are required to generate user-friendly outputs, and managers need specific training to use such outputs to improve law enforcement operations. Other aspects of law enforcement systems also need to be strengthened, such as intelligence and prosecution systems, as well as the planning of law enforcement operations. Investing in the development of these systems and building the capacity of site managers to use them effectively in their law enforcement activities is likely to be highly catalytic in strengthening the protection of elephants and other flagship species, as well as the morale and efficiency of law enforcement teams at participating sites.

appropriées, réalistes et rentables à être mises en œuvre par le nouveau projet. Les leçons apprises qui ont influencé la conception de MIKES ont été générées par des évaluations semi-trimestrielles et finales des phases I et II de MIKE, dont les plus saillantes sont résumées dans les trois paragraphes suivants.

Un accent fort de la phase II de MIKE était le renforcement des capacités de surveillance des écogardes dans tous les États de l’aire répartition de l’éléphant qui participaient. L’expérience a toutefois montré que ce renforcement des capacités avait un impact limité lorsque l’investissement dans l’application de la loi et la protection des espèces est limité, à cause de l’insuffisance des ressources nécessaires pour la conduite des patrouilles des écogardes. Alors qu’il continuera à être important de faire des investissements essentiels dans le renforcement des capacités sur les sites, il est nécessaire de recentrer les investissements sur la sensibilisation et de soutenir la coopération et l’action pour la protection des espèces et l’application de la loi aux niveaux national, sous-régional et international. De cette façon, le projet de MIKES a le potentiel d’être plus catalytique en investissant davantage dans la protection des espèces et l’application de la loi sur le site sur le long terme, plutôt que de «combattre l’incendie» en répondant aux besoins en capacités au niveau du site à court terme.

La complexité des défis de l’application de la loi et de la gestion auxquels les autorités de la faune sont confrontées sur le site et au niveau national met en exergue la nécessité d’investir dans le renforcement du système d’application de la loi. Dans la phase II, MIKE a apporté son soutien au déploiement du MIST (Système de Gestion de l’Information), un système de surveillance basé sur les écogardes, une contribution qui a partiellement répondu à ce besoin. Toutefois, des compétences avancées dans MIST sont nécessaires pour générer des résultats adaptés, et les gestionnaires ont besoin de formation spécifique pour utiliser de tels résultats pour améliorer les opérations de lutte contre la fraude. D’autres aspects des systèmes d’application de la loi doivent également être renforcés, comme les systèmes de renseignements et de poursuites, ainsi que la planification des opérations de lutte contre la fraude. L’investissement dans le développement de ces systèmes et le renforcement des capacités des gestionnaires des sites à les utiliser efficacement dans leurs activités d’application de la loi pourrait être très catalytique et renforcer la protection des éléphants et d’autres espèces phares, ainsi que le moral et l’efficacité des équipes d’application de la loi sur les sites participants.
Regular and reliable data on elephant killing, elephant population status and trends, and ivory trade and impartial analysis are vital for achieving greater international and national political will and effective decisionmaking. MIKE Phase II has begun producing regular and reliable data and analyses that are becoming highly influential in informing international decisionmaking and action. The fact that the majority of stakeholders regard both MIKE and ETIS data as sound and statistically robust are key aspects of this success.

The purpose of the MIKES project is to strengthen management systems, capacity, information and decisionmaking processes supporting the protection of elephants and other CITES-listed flagship species, and combating the illegal trade in their products at site, national, subregional and international levels.

Five project results have been designed to achieve the project purpose:

**Result 1**: MIKE sites generate regular and reliable information on the status and threats to elephants and other flagship species and on key benchmarks of law enforcement and management effort to support decisionmaking on appropriate management, protection and enforcement needs.

**Result 2**: Law enforcement, adaptive management and monitoring systems, protocols and capacity are strengthened in high-priority protected areas selected for their critical importance for protection of elephant or other flagship species, and the severity of threats.

**Result 3**: National and subregional information, decisionmaking and interagency collaboration systems aimed at protecting elephants and other flagship species and combating the illegal trade in their products are developed and strengthened.

**Result 4**: International awareness, cooperation and action in the conservation and protection of elephants and other flagship species are strengthened, including the establishment of an emergency response mechanism to assist sites experiencing sudden law enforcement crises.

**Result 5**: Law enforcement, adaptive management and monitoring systems, protocols and capacity-building approaches supported by MIKES are piloted in selected sites in the Caribbean and Pacific regions to determine their usefulness and replicability in these regions.

Des données régulières et fiables sur l’abattage des éléphants, la situation et les tendances des populations d’éléphants, le commerce de l’ivoire et l’analyse impartiale sont vitales pour assurer une plus grande volonté politique nationale et internationale et une prise de décision efficace. La phase II de MIKE a commencé à produire des données et des analyses régulières et fiables qui ont une grande influence dans la prise de décision et l’action internationales. Le fait que la majorité des intervenants considèrent les données de MIKE et d’ETIS fiables et statistiquement robustes est un aspect clé de ce succès.

Le but du projet de MIKES est de renforcer les systèmes de gestion, et les processus de capacité, d’information et de prise de décision pour appuyer la protection des éléphants et d’autres espèces phares classées par la CITES et combattre le commerce illégal de leurs produits sur le site et aux niveaux national, sous-régional et international.

Cinq résultats du projet ont été conçus pour atteindre la réalisation de l’objectif du projet:

**Résultat 1**: Les sites MIKE génèrent des informations régulières et fiables sur l’état et les menaces aux éléphants et aux autres espèces phares et sur les critères clés d’application de la loi et les effets de gestion afin de soutenir la prise de décision sur la gestion, la protection et les besoins de mise en vigueur.

**Résultat 2**: L’application de la loi, les systèmes de gestion adaptive et de suivi, les protocoles et la capacité sont renforcés dans des zones protégées hautement prioritaires qui sont sélectionnées à cause de leur importance vitale pour la protection de l’éléphant ou d’autres espèces phares et la gravité des menaces.

**Résultat 3**: Les systèmes d’information au niveau national et sous-régional, de prise de décision et de collaboration inter-agences visant à protéger les éléphants et d’autres espèces phares et à combattre le commerce illégal de leurs produits sont développés et renforcés.

**Résultat 4**: La sensibilisation internationale, la coopération et l’action dans la conservation et la protection des éléphants et d’autres espèces phares sont renforcées, y compris la mise en place d’un mécanisme d’intervention d’urgence pour aider les sites connaissant des crises soudaines d’application de la loi.

**Résultat 5**: L’application de la loi, les systèmes de gestion adaptative et de suivi, les protocoles et les approches de renforcement des capacités soutenus par MIKES sont pilotés dans des sites sélectionnés dans les Caraïbes et du Pacifique pour déterminer leur utilité et leur reproductibilité dans ces régions.
Result 1 builds on the successful foundation for strengthening ranger-based monitoring of target species and threats in participating elephant range States established during MIKE Phases I, II and 3.0. MIKES will continue to support the development and implementation of the SMART (Spatial Monitoring and Reporting Tool) at sites and countries currently participating in MIKE. In partnership with other organizations, MIKES also envisages expanding the monitoring effort to additional sites that are of high priority for elephants and other flagship species. Another important dimension of Result 1 will be the establishment of simple measures of law enforcement that can be used by participating sites to measure the effectiveness and efficiency of their law enforcement actions.

Result 2 is designed to respond to major current and emerging hotspots for illegal killing of elephants and other target species. In selected priority sites, MIKES will provide technical and operational support to strengthen law enforcement capacity and systems of concerned protected area agencies by providing law enforcement training, technical support to design appropriate patrol strategies, and key operational support where required. Result 2 will also support efforts to strengthen the involvement of local communities in the law enforcement effort, alongside other local law enforcement agencies and the judiciary. Priority sites will be selected in accordance with their importance for the protection of key populations of elephants and other target species, the scale and nature of threats to these species, and the likelihood of mitigating these threats through targeted support for the protected area’s law enforcement and management systems.

Result 3 addresses the lesson learned from MIKE Phase II concerning the need to further strengthen national-level information, decisionmaking and enforcement systems designed to reduce illegal killing of elephants and other flagship species. Result 3 builds on the positive engagement of national wildlife authorities spearheaded by the MIKE subregional support units, and represents a crucial aspect of MIKES’s efforts to achieve sustainability by enabling national wildlife management agencies to mainstream monitoring in their protected area systems and management policies. Another important component of the
result will be the development of national-level activities designed to strengthen the capacity of selected participating countries to combat wildlife crime, including potential policy and legislation initiatives, enhanced availability of critical information, and improved collaboration between national law enforcement agencies and the judiciary. Result 3 will also facilitate and support subregional cooperation, information sharing and action to protect elephants and other flagship species, using the platform provided by the existing MIKE subregional meetings.

Result 4 will continue the process launched in MIKE Phases I and II to catalyse and inform international conservation awareness, collaboration and action through the regular dissemination of reliable, relevant and user-friendly information on the status and trends in elephants and other target species, as well as the international trade in their products. This will include support to other key international initiatives, such as support for the work of TRAFFIC on trade in the target species, including the Elephant Trade Information System (ETIS), the work of the IUCN Species Survival Commission (SSC) in monitoring the population status of elephants and other relevant target species, including the African Elephant Database (AED) maintained by the SSC African Elephant Specialist Group (AfESG). The result will also work with these key partner agencies to continue the development of an analytical framework designed to strengthen the integration of analysis and reporting of information across the entire illegal ivory supply chain, from the site through to the ultimate markets for these products.

Another key component of Result 4 will be the establishment of an Emergency Response Mechanism, aligned with the CITES/ICCWC (International Consortium on Combating Wildlife Crime) Wildlife Incident Support Team (WIST) process, designed to enable MIKES to respond to sudden increases in the illegal killing or international trade in elephants and other targeted flagship species at specific sites. Mitigation activities implemented through this mechanism could include strengthening law enforcement by providing equipment, technical expertise or by catalysing law enforcement support on the ground in partnership with other participating governments, and emergency support to national participants sélectionnés pour lutter contre la criminalité de la faune, y compris des initiatives de politique et de législation potentielles, une meilleure disponibilité des informations cruciales, et une collaboration améliorée entre les organismes nationaux chargés de l’application de la loi et la justice. Le résultat 3 veut donc faciliter et soutenir la coopération sous-régionale, l’échange des informations et les actions pour protéger les éléphants et d’autres espèces phares, en utilisant la plate-forme fournie par les réunions sous-régionales de MIKE existantes.

Le résultat 4 poursuivra le processus lancé dans les phases MIKE I et II pour catalyser et informer l’opinion internationale sur la conservation, la collaboration et l’action par la diffusion régulière des informations fiables, pertinentes et pratiques sur la situation et les tendances des éléphants et d’autres espèces cibles, ainsi que le commerce international dans leurs produits. Cela comprendra le soutien à d’autres initiatives internationales, telles que le soutien pour le travail de TRAFFIC sur le commerce des espèces cibles, y compris le Système d’informations sur le commerce d’éléphants (ETIS), le travail de la Commission de la sauvègarde des espèces (CSE) dans le suivi de la situation de la population des éléphants et d’autres espèces cibles pertinentes, y compris la base de données sur les éléphants d’Afrique (BDEA) maintenue par le Groupe de spécialistes sur l’éléphant d’Afrique (GSEAf) de la CSE. Le résultat travaillera aussi avec ces principaux organismes partenaires dans le but de poursuivre l’élaboration d’un cadre d’analyse conçu afin de renforcer l’intégration de l’analyse et de la communication des informations à travers toute la chaîne d’approvisionnement de l’ivoire illégal, à partir du site jusqu’aux marchés finaux de ces produits.

Un autre élément clé du résultat 4 sera la mise en place d’un mécanisme d’intervention d’urgence, aligné au processus de l’équipe de soutien aux incidents de la faune de la CITES/ICCWC (Consortium Mondial de Lutte contre la Criminalité liée aux espèces sauvages), conçu pour permettre à MIKES de répondre à l’augmentation soudaine de l’abattage illégal ou du commerce international des éléphants et d’autres espèces phares ciblées sur des sites spécifiques. Les activités d’atténuation mises en œuvre par ce mécanisme pourraient inclure le renforcement de l’application de la loi en fournissant des équipements, une expertise technique ou en catalysant l’appui de l’application de la loi sur le terrain en partenariat avec des gouvernements participants, et un soutien d’urgence aux agences nationales de la faune dans la lutte contre l’intensification soudaine de la criminalité de la faune.
wildlife agencies in combating sudden escalations in wildlife crime.

A final component of Result 4 is the provision of support for strengthening the capacity of wildlife agencies to collect forensic materials and carry out forensic investigations designed to inform wildlife trade investigations and to pinpoint the origins of illegal products of target species. The major focus of these forensic activities will be at the site level, where the project will build capacity of relevant protected-area personnel to conduct forensic activities, linked to the ranger-based monitoring and law enforcement initiatives being supported under Results 1 and 2. Support will also be provided to other levels of the forensic chain, linked to Result 3 (national level) and this result (international level).

Finally, Result 5 aims to pilot the key protected area and flagship species monitoring and protection methods that have been developed through a decade of MIKE implementation in selected protected area sites in the Caribbean and Pacific regions. The main aim will be to test the applicability and relevance of these management approaches outside the African continent, with different target species and in potentially very different law enforcement and management situations and challenges.


Un dernier élément du résultat 4 est la provision de l’appui au renforcement de capacité des organismes de la faune de rassembler du matériel médico-légal et de mener des enquêtes médico-légales visant à faciliter les enquêtes sur le commerce de la faune et à repérer l’origine des produits illégaux des espèces cibles. L’objectif principal de ces activités de médecine légale sera au niveau du site, où le projet renforcera les capacités du personnel des aires protégées pour mener des activités médico-légales, liées à la surveillance des écogardes et les initiatives d’application de la loi soutenues au titre des résultats 1 et 2. Un soutien sera aussi accordé à d’autres niveaux de la chaîne de la médecine légale, liés au résultat 3 (niveau national) et à ce résultat-ci (niveau international).

Enfin, le résultat 5 vise à piloter les méthodes de suivi et de protection clés des zones protégées et des espèces phares qui ont été développées par une décennie de mise en œuvre de MIKE dans certains sites d’aires protégées dans les régions des Caraïbes et du Pacifique. L’objectif principal sera de tester l’applicabilité et la pertinence de ces approches de gestion en dehors du continent africain, avec différentes espèces cibles et dans des situations d’application de la loi, de gestion et de défis potentiellement très différentes.

Since the ETIS analysis presented at the 16th meeting of the CITES Conference of Parties (CoP16) held March 2013 in Bangkok, Thailand, TRAFFIC has collected, verified and added 2,437 new seizure cases to the database, which now totals 20,708 records. For the IUCN-convened African Elephant Summit held 2–4 December 2013 in Gaborone, Botswana, an analysis was undertaken to extend the trend in illicit ivory trade through 2012. For that purpose, 14,070 separate raw or worked ivory seizures in 72 countries or territories were used, covering the period 1996–2012, and the same methodological framework was employed, based on bias-adjusted data outlined in the *PLOS One* paper (Underwood et al. 2013). The result showed that 2011 saw the highest level of illegal ivory trade in at least 16 years, but little had changed in 2012 with trade levels remaining unacceptably high. There is little doubt that the illegal trade in ivory continues to be a matter of grave concern for elephant conservation.

In fact, the situation may be worsening as preliminary assessment of the raw data for 2013 on large-scale ivory seizures (i.e. 500 kg or more) already represents the greatest quantity of ivory confiscated over the last 25 years for this type of illicit ivory trade transaction. This is alarming as large movements of ivory have been driving the upward trend in ivory trafficking in recent years. Large-scale movements of ivory represent the work of organized transnational crime syndicates in the trade and, generally speaking, are reported in the media whenever seizures occur so they mostly become known in real time. Thus, although the 2013 data as a whole still remain incomplete, tracking large-scale ivory seizures


En fait, il se peut que la situation s’aggrave car l’évaluation préliminaire des données brutes pour 2013 relatives aux saisies d’ivoire à grande échelle (soit 500 kg ou plus) représente déjà la plus grande quantité d’ivoire confisquée dans les 25 dernières années pour ce type de transaction du commerce illicite de l’ivoire. Cette situation est alarmante car ces grands mouvements d’ivoire sont une cause de la tendance vers la hausse du trafic d’ivoire au cours des dernières années. Des mouvements d’ivoire à grande échelle représentent le travail des syndicats du crime organisé transnational dans le commerce et, généralement parlant, ils sont rapportés dans les médias chaque fois qu’il y a des saisies, par conséquent, on les connaît en temps réel. Donc, même si les données de 2013 demeurent incomplètes dans leur ensemble, le
Milliken

essentially functions as an early warning indicator of the scale of ivory trafficking. Previously, 2011 represented the greatest number of shipments and the largest quantity of ivory seized, but 2013 (with fewer seizures by number) now represents the greatest quantity of ivory for this type of transaction ever recorded in ETIS (Table 1). This is a very worrying development.

Mapping large-scale ivory seizure flows provides insight into trade patterns and other dynamics of the illegal trade. For the first time ever, TRAFFIC mapped the period 2000 through 2013 and presented a series of spatial representations of the ETIS data in the report to the African Elephant Summit.

From 2000 through 2008 (Figure 1), there was considerable illegal trade activity from Atlantic Ocean seaports in Central and West Africa, particularly Douala (Cameroon), Lagos (Nigeria), and Accra (Ghana), and from Kinshasa (Democratic Republic of the Congo) to Belgium by air. Movement of ivory within Africa involved many different countries, and trafficking between Sudan and Egypt, a major unregulated ivory market, is captured in the data. On Africa’s east coast, Tanzania, Kenya and Mozambique begin to emerge as important exporters of ivory; however, the Malawi–South Africa–Singapore–Japan connection is most prominent owing to one exceptional 7.1-tonne shipment of ivory seized in Singapore. Trade to Japan was still active in this period and China, like Thailand, is only beginning to emerge in available data as the major end-use market. (The final destination for about 40% of suivie des saisies d’ivoire à grande échelle fonctionne essentiellement comme un indicateur d’alerte précoce de l’échelle du trafic de l’ivoire. Auparavant, l’année 2011 représentait le plus grand nombre de cargaisons et la quantité la plus importante d’ivoire saisie mais 2013 représente maintenant (avec moins de saisies en nombre) la plus grande quantité d’ivoire pour ce type de transaction jamais enregistrée dans ETIS (tableau 1). C’est une évolution très inquiétante.

La cartographie des flux d’ivoire à grande échelle donne un aperçu de la structure du commerce et d’autres dynamiques du commerce illégal. Pour la première fois, TRAFFIC a fait la cartographie de la période 2000 à 2013 et a présenté une série de représentations spatiales des données d’ETIS dans le rapport au Sommet sur l’éléphant d’Afrique.

Entre 2000 et 2008 (Figure 1), il y avait une activité considérable du commerce illicite en provenance des ports maritimes de l’océan Atlantique en Afrique centrale et occidentale, surtout Douala (Cameroun), Lagos (Nigeria) et Accra (Ghana), et de Kinshasa (République démocratique du Congo) vers la Belgique par voie aérienne. Le mouvement de l’ivoire à l’intérieur de l’Afrique implique de nombreux pays, et le trafic entre le Soudan et l’Egypte, un important marché d’ivoire non réglementé, est capté dans les données. Sur la côte est de l’Afrique, la Tanzanie, le Kenya et le Mozambique commencent à émerger comme des exportateurs importants d’ivoire. Cependant, la connexion Malawi–Afrique du Sud–Singapour–Japon est la plus évidente à cause d’une cargaison exceptionnelle de 7,1 tonnes d’ivoire saisie à Singapour. Le commerce vers le Japon est toujours actif dans cette période alors que la Chine et la Thaïlande commencent seulement à émerger dans

<table>
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<th>Year</th>
<th>Air No.</th>
<th>Sea No.</th>
<th>Land No.</th>
<th>Total No.</th>
<th>Air Weight</th>
<th>Sea Weight</th>
<th>Land Weight</th>
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<td>2</td>
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<tr>
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<td>1</td>
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<td>13</td>
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<tr>
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<td>16</td>
<td>77</td>
<td>13,960</td>
<td>100,642</td>
<td>26,114</td>
<td>140,716</td>
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The data presented in this table have been updated since the report to the African Elephant Summit. [Les données présentées dans ce tableau ont été mises à jour depuis le rapport du Sommet sur l’éléphant d’Afrique.]
the seizures made during this period, however, remains unknown.) Trade routes through Europe to Asia were also still active at the time.

Patterns change considerably in the period 2009–2011 (Figure 2), as the movement of large volumes of ivory profoundly shifts to the Indian Ocean ports of Dar es Salaam and Zanzibar in Tanzania. The Tanzanian trade is directed to Malaysia as the principal transit country, although some shipments also transit to the Philippines and Vietnam, or go directly to China. At this time, all other major ivory flows out of Africa (from South Africa, Kenya, Ethiopia and Nigeria) are dwarfed in comparison with the volume of ivory exported through Tanzania. China is the paramount destination, but trade to Thailand is also repeatedly captured in the data.

Indeed, Figure 2 coincides with the period when the greatest numbers of elephants were being illegally killed in Selous Game Reserve (GR), a crisis that the Tanzanian government largely denied in the build-up to CITES CoP15
in 2010 when the country unsuccessfully sought to transfer its elephant population to Appendix II and trade stockpiled ivory. With an area of over 80,000 km², the Selous ecosystem is roughly twice the size of Switzerland; it once harboured Tanzania’s largest elephant population and the second largest population in all of Africa. But the recent elephant population census coordinated by the Tanzania Wildlife and Research Institute and the Frankfurt Zoological Society found that in Selous GR and its surrounding ecosystem, some two-thirds of the elephant population have apparently been wiped out over the last four years. The survey documents only 13,084 elephants remaining in the Selous landscape, which stands in sharp contrast to the 2009 census estimate of 38,975 elephants, which in turn constituted a shocking retreat from the 109,419 elephants documented by Iain Douglas-Hamilton in 1976 when he conducted the first aerial census of the Selous. Figure 2 vividly captures the unprecedented flow of ivory out of Tanzania.
Tanzania during the exact period when the brunt of a national tragedy was unfolding for the Selous elephants.

In the period 2012–2013 (Figure 3), direct ivory exports from Tanzania waned markedly, but a proliferating trade from neighbouring Kenya emerged that apparently involved, at least to some extent, ivory from Tanzania. For example, forensic examination of an ivory consignment in a container that was reportedly put together in Uganda, exported from Kenya and seized in Sri Lanka in 2012 contained ivory that was sourced in Tanzania. Overall, Kenya’s port of Mombasa becomes the leading conduit through which major flows of ivory exit Africa.

There is reason to suspect that the criminal syndicates behind this trade could be adapting in the face of publicity highlighting the emergence of East Africa’s Indian Ocean seaports as the major pathways for illicit ivory. Figure 3 suggests a number of new patterns in the trade routes used to move ivory. Major ivory trade transactions

Figure 3. Trade routes for large-scale (> 500 kg) seizures of ivory, 2012–2013 (ETIS, 03 November 2013). [Figure 3. Les routes commerciales des saisies d’ivoire à grande échelle (> 500 kg), 2012-2013 (ETIS, 03 novembre, 2013)]
are apparently shifting back to West Africa and the hitherto unused port of Lomé (Togo); one consignment in 2012 took a circuitous trade route through Spain and the Mediterranean before being seized in Malaysia. During this period, two seizures involved ivory being airfreighted from Kenya to Nigeria, signalling recurring ivory trade flows from East to West Africa. Mozambique also became active as an exporting nation during this period with a large shipment of ivory to Vietnam. In fact, Vietnamese criminal syndicates operating in South Africa in the context of the rhino-horn trade have now largely shifted their operational bases to Mozambique and appear to be expanding into the illicit ivory trade out of that country. Because Tanzania launched Operation Tokomeza, a major law-enforcement action directed at wildlife crime, during this period, it is possible that illegal ivory trade flows shifted to Kenya and Mozambique. Operation Tokomeza was subsequently suspended because of alleged human rights abuses. Africa’s elephants remain under serious threat.

Reference

GUIDELINES FOR CONTRIBUTORS

Aim and scope

Pachyderm publishes papers and notes concerning all aspects of the African elephant, the African rhino and the Asian rhino with a focus on the conservation and management of these species in the wild. At the same time, the journal is a platform for disseminating information concerning the activities of the African Elephant, the African Rhino, and the Asian Rhino Specialist Groups of the IUCN Species Survival Commission.

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All manuscripts should be submitted online at: http://pachydermjournal.org

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These should be not more than 5,000 words and be structured as follows: 1) Title, 2) Abstract of not more than 250 words (informative type, outlining information from the Introduction, Materials and methods, Results, Discussion, but not detailed results), 3) additional key words (if any), not appearing in the title, 4) Introduction, 5) Materials and methods, 6) Results, 7) Discussion, 8) Conclusions, if appropriate, 9) Acknowledgements (optional, brief), 10) References (no more than 25), 11) Tables, 12) Figure and photo captions, 13) Figures and photos.

Papers may be reports of original biology research or they may focus more on the socio-economic aspects of conservation, including market surveys.

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Review papers, which are unbiased reviews of all the existing knowledge on a specific topic, are welcomed. Length should be < 6,000 words.

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Letters should be addressed to the relevant Specialist Group Chair, and should be < 1,000 words. Letters are welcome that comment on articles published in Pachyderm or on any other issue relating to elephant and rhino conservation in the wild.

Preparation of manuscripts

Images, figures and maps

Preferably provide figures and maps in their original form, for example, charts and data in Excel files, maps as EPS and images in the highest quality possible, such as TIF (600 dpi). Indicate clearly the author or source of figures, maps and photographs.

Title and authors

The title should contain as many of the key words as possible but should not be more than 25 words.
long. Follow with the name(s) of the author(s) with institutional affiliation and full postal and email address of the corresponding author, to whom proofs and editorial comments will be sent.

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**Nomenclature**

Use common names of animals and plants, giving scientific names in italics on first mention. Generally refer to animals in the plural form (i.e. rhinos, elephants).

**Spelling**


**Numbers**

Use the International System of Units for measurement (m, km, g, ha, h) with a space between the numeral and the unit of measurement. Give measurements in figures, for example 12 mm, 1 km, 3 ha, except at the beginning of a sentence.

Spell out numbers under 10 if not a unit of measurement unless the number is part of a series containing numbers 10 or over, for example: 14 adult males, 23 adult females and 3 juveniles.

In the text, use a comma as the separator for figures four digits or more: 1,750 and 11,750. The separator will be a full stop in French papers.

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We use the name-year method of citing and listing references. The punctuation and typographic style are as advocated by the internationally recognized Council of Science Editors in its *Scientific style and format*, 7th edition.

In the text, cite a single author: ‘(X 2005)’ or ‘X (2005); cite two authors: ‘(X and Y 2005)’ or ‘X and Y (2005)’; cite more than two authors ‘(X et al. 2007)’ or ‘X et al. (2007)’. Note that there is no comma between the author(s) and the year. If multiple works are being cited, separate them by a semicolon, listing them in chronological order: (X et al. 1998; B 2002; Z 2010).

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